THE BURGESS HILL ACADEMY

HOME LEARNING PACK

YEAR 11

Believe in your best

CONTENTS

HOW TO USE THIS BOOKLET

In this booklet you will find a menu of tasks related to the subjects and topics that you study. There are opportunities for you to revise material you have previously studied, practice skills that you have learned in class and sometimes learn something new.

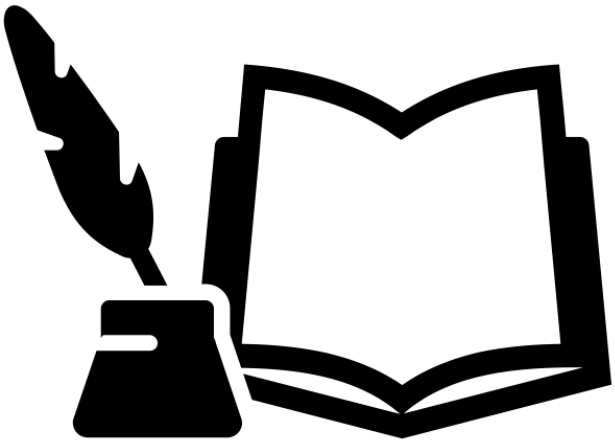
As a minimum you will a pen and some paper to complete these tasks. If you need these, please collect from the reception desk at the academy. For some of the mind-mapping tasks you might wish to use coloured pens or pencils but they are not essential. Some tasks may ask you to create packs of flashcards. You can use any kind of paper or card for this but don't worry if you don't have enough, just choose another task.

While you are not in school **you should follow your normal school timetable** and complete an hour of work for each hour you would normally be studying that subject. You may find that, without the support of your teacher you complete tasks more slowly than you would do in a lesson.

If you get really stuck on something, move on to the next task and/or seek help from the internet or by e-mailing your teacher if possible.

ENGLISH LITERATURE AND LANGUAGE

Work your way through the practice GCSE questions on the following pages. Some are from the English language paper and some from the English literature paper (poetry section). The English language questions should take at least 45 minutes each, the English literature questions. If you get really stuck on one, try a different question and/or contact your teacher for advice.



Practice Question One:

Section B: Writing

You are advised to spend about 45 minutes on this section.
Write in full sentences.
You are reminded of the need to plan your answer.
You should leave enough time to check your work at the end.

0	5

A magazine has asked for contributions for their creative writing section.

EITHER

Write a description suggested by this picture.

OR

Write a story with the title 'The Journey'.

(24 marks for content and organisation
16 marks for technical accuracy)
[40 marks]

Practice Question Three:

Section B: Writing

You are advised to spend about 45 minutes on this section.
Write in full sentences.
You are reminded of the need to plan your answer.
You should leave enough time to check your work at the end.

0	5

Your school is holding a creative writing competition.

EITHER

Write a description suggested by this picture.

OR

Write a story about a time in your childhood when you felt sad.

(24 marks for content and organisation
16 marks for technical accuracy)
[40 marks]

Practice Question Four:

Section B: Writing

You are advised to spend about 45 minutes on this section.
Write in full sentences.
You are reminded of the need to plan your answer.
You should leave enough time to check your work at the end.

0	5

A magazine has asked for contributions for their creative writing section.

EITHER

Write a description of the seaside suggested by this picture.

OR

Write a story with the title 'A Family Day Out'.

(24 marks for content and organisation
16 marks for technical accuracy)
[40 marks]

Practice Question Six:

Section B: Writing

You are advised to spend about 45 minutes on this section.
Write in full sentences.
You are reminded of the need to plan your answer.
You should leave enough time to check your work at the end.

0	5

Your school is holding a creative writing competition.

EITHER

Write a description suggested by this picture.

OR

Write a story about a patient in a hospital.

(24 marks for content and organisation
16 marks for technical accuracy)
[40 marks]

Practice Question Seven:

Section B: Writing

You are advised to spend about 45 minutes on this section.
Write in full sentences.
You are reminded of the need to plan your answer.
You should leave enough time to check your work at the end.

0	5

A magazine has asked for contributions for their creative writing section.

EITHER

Write a description of a storm suggested by this picture.

OR

Write a story about a natural disaster.

(24 marks for content and organisation
16 marks for technical accuracy)
[40 marks]

Practice Question Eight:

Section B: Writing

You are advised to spend about 45 minutes on this section.
Write in full sentences.
You are reminded of the need to plan your answer.
You should leave enough time to check your work at the end.

0	5

You have decided to enter an online creative writing competition.

EITHER

Write a description suggested by this picture.

OR

Write a story that begins 'I never used to believe in ghosts'.

(24 marks for content and organisation
16 marks for technical accuracy)
[40 marks]

Practice Question One:

Compare how poets present the theme of power in society in 'Ozymandias' and in one other poem from 'Power and Conflict'.

Ozymandias

I met a traveller from an antique land
Who said: Two vast and trunkless legs of stone
Stand in the desert. Near them on the sand,
Half sunk, a shatter'd visage lies, whose frown
And wrinkled lip and sneer of cold command
Tell that its sculptor well those passions read
Which yet survive, stamp'd on these lifeless things,
The hand that mock'd them and the heart that fed;
And on the pedestal these words appear:
'My name is Ozymandias, king of kings:
Look on my works, ye Mighty, and despair!'
Nothing beside remains. Round the decay
Of that colossal wreck, boundless and bare,
The lone and level sands stretch far away.

Percy Bysshe Shelley

[30 marks]

Practice Question Two:

Compare how poets present attitudes towards power in 'London' and in one other poem from 'Power and Conflict'.

London

I wander through each chartered street,
Near where the chartered Thames does flow,
And mark in every face I meet
Marks of weakness, marks of woe.

In every cry of every man,
In every infant's cry of fear,
In every voice, in every ban,
The mind-forged manacles I hear:

How the chimney-sweeper's cry
Every black'ning church appalls,
And the hapless soldier's sigh
Runs in blood down palace walls.

But most through midnight streets I hear
How the youthful harlot's curse
Blasts the new-born infant's tear,
And blights with plagues the marriage hearse.

William Blake

[30 marks]

Practice Question Three:

Compare how poets present the theme of nature in 'Extract from *The Prelude*' and in one other poem from 'Power and Conflict'.

Extract from, **The Prelude**

One summer evening (led by her) I found
A little boat tied to a willow tree
Within a rocky cove, its usual home.
Straight I unloosed her chain, and stepping in
Pushed from the shore. It was an act of stealth
And troubled pleasure, nor without the voice
Of mountain-echoes did my boat move on;
Leaving behind her still, on either side,
Small circles glittering idly in the moon,
Until they melted all into one track
Of sparkling light. But now, like one who rows,
Proud of his skill, to reach a chosen point
With an unswerving line, I fixed my view
Upon the summit of a craggy ridge,
The horizon's utmost boundary; far above
Was nothing but the stars and the grey sky.
She was an elfin pinnace; lustily
I dipped my oars into the silent lake,
And, as I rose upon the stroke, my boat
Went heaving through the water like a swan;
When, from behind that craggy steep till then
The horizon's bound, a huge peak, black and huge,
As if with voluntary power instinct,
Upreared its head. I struck and struck again,

And growing still in stature the grim shape
Towered up between me and the stars, and still,
For so it seemed, with purpose of its own
And measured motion like a living thing,
Strode after me. With trembling oars I turned,
And through the silent water stole my way
Back to the covert of the willow tree;
There in her mooring-place I left my bark, –
And through the meadows homeward went, in grave
And serious mood; but after I had seen
That spectacle, for many days, my brain
Worked with a dim and undetermined sense
Of unknown modes of being; o'er my thoughts
There hung a darkness, call it solitude
Or blank desertion. No familiar shapes
Remained, no pleasant images of trees,
Of sea or sky, no colours of green fields;
But huge and mighty forms, that do not live
Like living men, moved slowly through the mind
By day, and were a trouble to my dreams.

William Wordsworth

[30 marks]

Practice Question Four:

Compare how poets present the theme of manipulation in 'My Last Duchess' and in one other poem from 'Power and Conflict'.

My Last Duchess

Ferrara

That's my last Duchess painted on the wall,
Looking as if she were alive. I call
That piece a wonder, now: Frà Pandolf's hands
Worked busily a day, and there she stands.
Will't please you sit and look at her? I said
'Frà Pandolf' by design, for never read
Strangers like you that pictured countenance,
The depth and passion of its earnest glance,
But to myself they turned (since none puts by
The curtain I have drawn for you, but I)
And seemed as they would ask me, if they durst,
How such a glance came there; so, not the first
Are you to turn and ask thus. Sir, 'twas not
Her husband's presence only, called that spot
Of joy into the Duchess' cheek: perhaps
Frà Pandolf chanced to say 'Her mantle laps
Over my lady's wrist too much,' or 'Paint
Must never hope to reproduce the faint
Half-flush that dies along her throat': such stuff
Was courtesy, she thought, and cause enough
For calling up that spot of joy. She had
A heart – how shall I say? – too soon made glad,
Too easily impressed; she liked whate'er
She looked on, and her looks went everywhere.
Sir, 'twas all one! My favour at her breast,
The dropping of the daylight in the West,

The bough of cherries some officious fool
Broke in the orchard for her, the white mule
She rode with round the terrace – all and each
Would draw from her alike the approving speech,
Or blush, at least. She thanked men, – good! but thanked
Somehow – I know not how – as if she ranked
My gift of a nine-hundred-years-old name
With anybody's gift. Who'd stoop to blame
This sort of trifling? Even had you skill
In speech – (which I have not) – to make your will
Quite clear to such an one, and say, 'Just this
Or that in you disgusts me; here you miss,
Or there exceed the mark' – and if she let
Herself be lessoned so, nor plainly set
Her wits to yours, forsooth, and made excuse,
– E'en then would be some stooping; and I choose
Never to stoop. Oh sir, she smiled, no doubt,
Whene'er I passed her; but who passed without
Much the same smile? This grew; I gave commands;
Then all smiles stopped together. There she stands
As if alive. Will't please you rise? We'll meet
The company below, then. I repeat,
The Count your master's known munificence
Is ample warrant that no just pretence
Of mine for dowry will be disallowed;
Though his fair daughter's self, as I avowed
At starting, is my object. Nay, we'll go
Together down, sir. Notice Neptune, though,
Taming a sea-horse, thought a rarity,
Which Claus of Innsbruck cast in bronze for me!

Robert Browning

[30 marks]

Practice Question Five:

Compare how poets present attitudes towards war in 'The Charge of the Light Brigade' and in one other poem from 'Power and Conflict'.

The Charge of the Light Brigade

1.
Half a league, half a league,
Half a league onward,
All in the valley of Death
Rode the six hundred.
'Forward, the Light Brigade!
Charge for the guns!' he said:
Into the valley of Death
Rode the six hundred.

2.
'Forward, the Light Brigade!'
Was there a man dismay'd?
Not tho' the soldier knew
Some one had blunder'd:
Theirs not to make reply,
Theirs not to reason why,
Theirs but to do and die:
Into the valley of Death
Rode the six hundred.

3.
Cannon to right of them,
Cannon to left of them,
Cannon in front of them
Volley'd and thunder'd;
Storm'd at with shot and shell,
Boldly they rode and well,
Into the jaws of Death,
Into the mouth of Hell
Rode the six hundred.

4.
Flash'd all their sabres bare,
Flash'd as they turn'd in air
Sabring the gunners there,
Charging an army, while
All the world wonder'd:

Plunged in the battery-smoke
Right thro' the line they broke;
Cossack and Russian
Reel'd from the sabre-stroke
Shatter'd and sunder'd.
Then they rode back, but not
Not the six hundred.

5.
Cannon to right of them,
Cannon to left of them,
Cannon behind them
Volley'd and thunder'd;
Storm'd at with shot and shell,
While horse and hero fell,
They that had fought so well
Came thro' the jaws of Death
Back from the mouth of Hell,
All that was left of them,
Left of six hundred.

6.
When can their glory fade?
O the wild charge they made!
All the world wonder'd.
Honour the charge they made!
Honour the Light Brigade,
Noble six hundred!

Alfred Tennyson

[30 marks]

Practice Question Six:

Compare how poets present ideas about conflict in 'Exposure' and in one other poem from 'Power and Conflict'.

Exposure

Our brains ache, in the merciless iced east winds that knive us ...
Wearied we keep awake because the night is silent ...
Low, drooping flares confuse our memory of the salient ...
Worried by silence, sentries whisper, curious, nervous,
But nothing happens.

Watching, we hear the mad gusts tugging on the wire,
Like twitching agonies of men among its brambles.
Northward, incessantly, the flickering gunnery rumbles,
Far off, like a dull rumour of some other war.
What are we doing here?

The poignant misery of dawn begins to grow ...
We only know war lasts, rain soaks, and clouds sag stormy.
Dawn massing in the east her melancholy army
Attacks once more in ranks on shivering ranks of grey,
But nothing happens.

Sudden successive flights of bullets streak the silence.
Less deadly than the air that shudders black with snow,
With sidelong flowing flakes that flock, pause, and renew,
We watch them wandering up and down the wind's nonchalance,
But nothing happens.

Pale flakes with fingering stealth come feeling for our faces -
We cringe in holes, back on forgotten dreams, and stare,
snow-dazed,
Deep into grassier ditches. So we drowse, sun-dozed,
Littered with blossoms trickling where the blackbird fusses.
– Is it that we are dying?

Slowly our ghosts drag home: glimpsing the sunk fires, glozed
With crusted dark-red jewels; crickets jingle there;
For hours the innocent mice rejoice: the house is theirs;
Shutters and doors, all closed: on us the doors are closed, -
We turn back to our dying.

Since we believe not otherwise can kind fires burn;
Now ever suns smile true on child, or field, or fruit.
For God's invincible spring our love is made afraid;
Therefore, not loath, we lie out here; therefore were born,
For love of God seems dying.

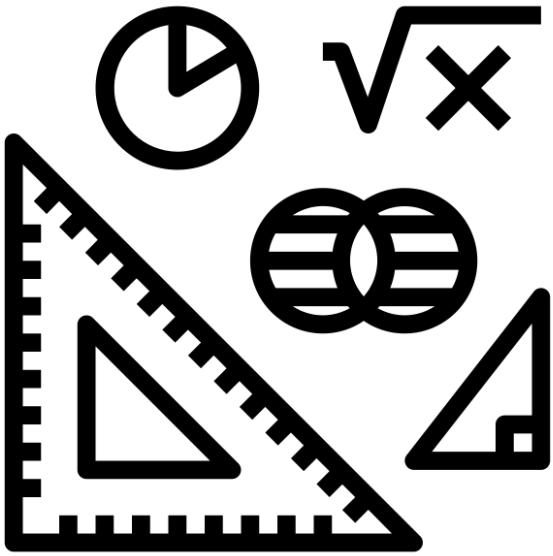
Tonight, His frost will fasten on this mud and us,
Shrivelling many hands. puckering foreheads crisp.
The burying-party, picks and shovels in their shaking grasp,
Pause over half-known faces. All their eyes are ice,
But nothing happens.

Wilfred Owen

[30 marks]

MATHS – FOUNDATION

On the following pages you will find a series of maths activities. Please start with the ones that are appropriate for your tier or set although of course you are welcome to try other activities if you wish. You can mark your own work by using the answers at the back of the section.



Place value

Grade 1

1. Write the number ninety thousand, one hundred and twenty-four using digits.

..... **[I got ___ / 1 mark]**

Grade 2

2. Write down the value represented by the digit 2 in each of these numbers.

a) 4269

..... **[___ / 1 mark]**

b) 723 000

..... **[___ / 1 mark]**

c) 5.201

..... **[___ / 1 mark]**

Grade 2

3. Put one of the symbols <, > or = in each box to make a correct statement.

a) 0.36 ☐ 0.306 **[___ / 1 mark]**

b) 0.450 ☐ 0.45 **[___ / 1 mark]**

c) 1.9003 ☐ 1.903 **[___ / 1 mark]**

Grade 2

4. Put these numbers in order of size, starting with the smallest.

7.504 7.45 7.405 7.054

..... **[___ / 2 marks]**

Grade 2

5. Work out

a) 67.9 × 1000

Hint
Think about how many places the digits move and in what direction.

..... **[___ / 1 mark]**

b) 0.9 ÷ 100

..... **[___ / 1 mark]**

Grade 2

6. 10 packets of sweets cost £8.50. How much does one packet cost?

.....p **[___ / 2 marks]**

Grade 3

7. Given that 4.5 × 192 = 864, write down the answer to each of these calculations.

a) 4.5 × 19.2

..... **[___ / 1 mark]**

b) 450 × 0.0192

..... **[___ / 1 mark]**

c) 8.64 ÷ 0.45

..... **[___ / 1 mark]**

Order of operations

Grade 2

1. Work out

a) $2 + 3 \times 9$

..... **[I got ___ / 1 mark]**

b) $24 \div (6 - 2) \times 5$

..... **[___ / 1 mark]**

c) $10 - 3^2$

..... **[___ / 1 mark]**

Grade 3

2. Work out

a) $(12 - 4 \times 2)^3$

..... **[___ / 1 mark]**

b) $\dfrac{4 \times 5^2}{4 \times 5 \div 2}$

..... **[___ / 1 mark]**

c) $5 \times \sqrt{50 - 1} + 6 \times 3$

..... **[___ / 1 mark]**

Grade 3

3. Use your calculator to evaluate these expressions.

a) $\dfrac{2 \times 36 + 18}{20 - 12}$

..... **[___ / 1 mark]**

b) $\left(\dfrac{3}{5}\right)^3 + 9 \div 3$

..... **[___ / 1 mark]**

c) $\sqrt{7.29} \times 1000$

..... **[___ / 1 mark]**

Grade 3

4. Bavan says that $2 \times 3^2 = 36$ but Eva says $2 \times 3^2 = 18$

Who is correct? Explain your reasoning.

Hint

Explain your answer using accurate calculations.

.....

..... **[___ / 1 mark]**

Grade 3

5. Rewrite these statements using brackets to make them true.

a) $22 - 10 - 7 = 19$

..... **[___ / 1 mark]**

b) $20 - 5 - 2 + 6 = 11$

..... **[___ / 1 mark]**

Rounding and truncating

Grade 2

1. Round 258.3 to

a) the nearest integer

..... **[I got ___ / 1 mark]**

b) the nearest 10

..... **[___ / 1 mark]**

c) the nearest 100

..... **[___ / 1 mark]**

Grade 2

2. Round 19.902 to

a) the nearest integer

..... **[___ / 1 mark]**

b) 1 decimal place

..... **[___ / 1 mark]**

c) 2 decimal places.

..... **[___ / 1 mark]**

Grade 2

3. Truncate 8.2694 to

Hint
Remind yourself of the difference between truncation and rounding.

a) an integer

..... **[___ / 1 mark]**

b) a tenth

..... **[___ / 1 mark]**

c) a hundredth.

..... **[___ / 1 mark]**

Grade 2

4. One bag of grass seed covers an area of 3.66 m^2. What size of lawn will nine bags of seed cover?
Give your answer to the nearest integer.

..... m^2 **[___ / 2 marks]**

Grade 2

5. A jug contains 3000 ml of juice. A glass holds 310 ml. How many glasses can be filled from the jug?

..... **[___ / 2 marks]**

Grade 3

6. Mark is paid £18.93 an hour and works 7.5 hours a day.
Kwamé is paid £22.17 an hour and works 6.5 hours a day.
What is the difference between their daily pay?

Hint
Money is often rounded to 2 dp.

£..... **[___ / 3 marks]**

Significant figures

Grade 3

1. Round 20 193 to

a) 4 significant figures

..... **[I got ___ / 1 mark]**

b) 3 significant figures

..... **[___ / 1 mark]**

c) 2 significant figures

..... **[___ / 1 mark]**

d) 1 significant figure.

..... **[___ / 1 mark]**

Grade 3

2. Round 0.006 802 to

a) 1 significant figure

..... **[___ / 1 mark]**

b) 2 significant figures

..... **[___ / 1 mark]**

c) 3 significant figures.

..... **[___ / 1 mark]**

Grade 3

3. The area of a square is 40 cm^2. What is the length of the side of the square?
Give your answer to 3 significant figures.

Hint
You square the side length to get the area of a square.

40 cm^2

..... cm **[___ / 2 marks]**

Grade 3

4. a) Evaluate this expression using your calculator.

$$\frac{4.56 \times 2.89}{12.1 - 0.56}$$

Write your answer as a decimal, giving all the digits on your calculator display.

..... **[___ / 1 mark]**

b) Write your answer to part **a** to 2 significant figures.

..... **[___ / 1 mark]**

Grade 4

5. Shirley rounds 0.065 29 to 2 significant figures and gives the answer 0.07
Shirley is wrong. Explain why.

Hint
Think about the difference between significant figures and decimal places.

.....

..... **[___ / 1 mark]**

Estimation

Grade 4

1. Estimate the value of 2.84×19.3. Show your working.

Hint
You usually round numbers to 1 sf to estimate.

..... **[I got ___ / 1 mark]**

Grade 4

2. Estimate the value of $\frac{317 + 48.6}{9.683}$. Show your working.

..... **[___ / 2 marks]**

Grade 4

3. Estimate the value of $\frac{2.67 \times 1.36}{0.11 + 0.42}$. Show your working.

..... **[___ / 2 marks]**

Grade 4

4. A biologist visits a lake at the start of January and works out that the number of fish in the lake is approximately 1000. She thinks that the population is growing at a rate of 17 fish per day. Estimate how many fish there will be in the lake five months later.

..... **[___ / 3 marks]**

Grade 5

5. In one week, an Italian restaurant sells 96 portions of lasagne. The restaurant sells a portion of lasagne for £8.95 and each portion costs £3.20 to make. Estimate the profit the restaurant makes from lasagne in the week.

£..... **[___ / 3 marks]**

Grade 5

6. James is driving to visit his Gran who lives 405 km away. He leaves at 8.30 am and drives at an average speed of 77 km/h, stopping for a 25-minute lunch break on the way. Estimate the time he arrives at his Gran's.

..... **[___ / 3 marks]**

Error intervals

Grade 5

1. A number is given as 5.3 rounded to 1 decimal place.
What is the smallest number this could be?

..... **[I got ___ / 1 mark]**

Grade 5

2. The length, L cm, of a rectangle is 14 cm to the nearest centimetre.
Complete the statement to show the range of possible values of L.

$\leq L <$ ..... **[___ / 2 marks]**

Grade 5

3. The length, p m, of a football pitch is given as 110 m.
Write the error interval for p if this value is rounded to

a) the nearest 10 metres

$\leq p <$ ..... **[___ / 2 marks]**

b) the nearest 5 metres

$\leq p <$ ..... **[___ / 2 marks]**

c) the nearest metre.

$\leq p <$ ..... **[___ / 2 marks]**

Grade 5

4. A number, x, is given rounded to a particular degree of accuracy.
Write the error interval for x in each case.

a) $x = 4.67$ to 2 decimal places

$\leq x <$ ..... **[___ / 2 marks]**

b) $x = 5000$ to 1 significant figure

$\leq x <$ ..... **[___ / 2 marks]**

Grade 5

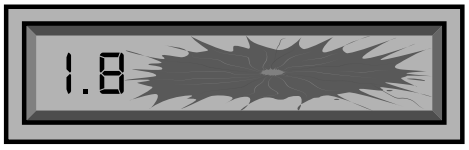
5. The average length, l seconds, of a chart song is 250 seconds to 2 significant figures.
Give the error interval for l.

Hint
Remember to use the correct inequality symbols: minimum ≤ x < maximum.

..... **[___ / 2 marks]**

Grade 5

6. Sienna uses her calculator to answer a question. The display breaks and she can only see 1.8 at the start of her answer. Let x be the unknown number on the display and write the range of possible values for x as an error interval.



..... **[___ / 2 marks]**

Calculating with negative numbers

Grade 1

1. The table shows the minimum temperature (in °C) across five months of the year.

Month	December	January	February	March	April
Minimum temperature (°C)	−1	−5	0	3	8

a) In which month is the lowest temperature recorded?

..... **[I got ___ / 1 mark]**

b) What is the difference in minimum temperature between December and January?

..... **[___ / 1 mark]**

c) What is the difference in minimum temperature between April and January?

..... **[___ / 1 mark]**

Grade 2

2. Evaluate

a) $2 + (-5)$

..... **[___ / 1 mark]**

b) $(-48) \div (-6)$

..... **[___ / 1 mark]**

c) $(-3)^2$

..... **[___ / 1 mark]**

Grade 3

3. Evaluate

Hint
Remember the order of operations.

a) $5 + (-3) \times 4$

..... **[___ / 2 marks]**

b) $(8 - 10) \times 4 - (-10)$

..... **[___ / 2 marks]**

c) $\dfrac{(-2) \times (-6)}{-10 + 7}$

..... **[___ / 2 marks]**

Grade 3

4. Thomas's bank balance is £241. He goes shopping and uses his bank card to spend £154 in the supermarket, £95 in the computer shop and £8.50 in a café. How much does Thomas need to pay into his bank account to bring the balance up to £100?

£..... **[___ / 3 marks]**

Calculating with decimals

Grade 2

1. Evaluate

a) 2.906 + 8.31

..... **[I got ___ / 2 marks]**

b) 25.043 – 17.82

..... **[___ / 2 marks]**

Grade 3

2. Evaluate

a) 7.4 × 0.26

Hint
*For part **b**, it's easier to divide by a whole number. How can you change the calculation to do this?*

..... **[___ / 2 marks]**

b) 17.12 ÷ 0.8

..... **[___ / 2 marks]**

c) $\frac{1.9 + 7.62}{9 - 8.3}$

..... **[___ / 3 marks]**

Grade 3

3. Seven identical toys cost a total of £55.65. How much does one toy cost?

£..... **[___ / 2 marks]**

Grade 3

4. Alex works out the answer to 14.5 × 2.6. Alex says the answer is 3.77

Explain, without working out the answer, how you can be sure Alex has made a mistake.

.....

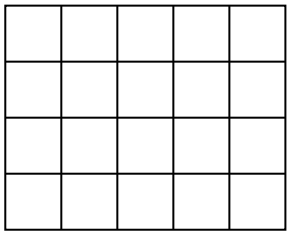
..... **[___ / 1 mark]**

Introduction to fractions

Grade 2

1. Which is the larger fraction, $\frac{1}{5}$ or $\frac{1}{4}$? Explain your answer.

You may use the diagram to help.



..... **[I got ___ / 1 mark]**

Grade 2

2. Write these fractions in order of size, starting with the smallest.

$\frac{3}{4}$ $\frac{2}{3}$ $\frac{5}{8}$ $\frac{7}{12}$

Hint
Find equivalent fractions with a common denominator.

..... **[___ / 2 marks]**

Grade 2

3. a) Write each mixed number as an improper fraction, giving your answer in its simplest form.

i) $1\frac{2}{5}$

..... **[___ / 1 mark]**

ii) $3\frac{3}{4}$

..... **[___ / 2 marks]**

b) Write each improper fraction as a mixed number, giving your answer in its simplest form.

i) $\frac{17}{9}$

..... **[___ / 1 mark]**

ii) $\frac{92}{40}$

..... **[___ / 2 marks]**

Grade 3

4. After a party, Dave has $2\frac{1}{3}$ bottles of cola left and Lizzie has $\frac{19}{8}$ bottles left. Who has the most cola? Show your working.

Hint
Here, you need to compare fractions that are presented differently. Convert both fractions to the same form.

..... **[___ / 3 marks]**

Proportions of amounts

Grade 2

1. Work out

a) $\frac{1}{5}$ of 45

..... **[I got ___ / 2 marks]**

b) 30% of 180

..... **[___ / 2 marks]**

c) $\frac{5}{7}$ of 14

..... **[___ / 2 marks]**

d) 62% of 50

..... **[___ / 2 marks]**

Grade 2

2. Every month, Faizal receives a bonus of 15% of his earnings in that month. In April, Faizal earnt £2460. How much was his bonus in April?

£..... **[___ / 2 marks]**

Grade 3

3. Which is bigger, 110% of 90 or $\frac{8}{7}$ of 84? Show all your working.

Hint
A diagram such as a bar model can help with these kinds of questions.

..... **[___ / 3 marks]**

Grade 3

4. Every year, a school raises money to donate to charity. One year, it chooses to donate $\frac{3}{8}$ of the money raised to a hospital. If the school raises £7200 that year, how much does it give to the hospital?

£..... **[___ / 2 marks]**

Grade 4

5. 48 children go on an outdoor activities day and must choose a morning activity.

25% of the children choose rock climbing.

$\frac{5}{12}$ of the children choose raft building.

The rest choose kayaking.

Work out how many children choose kayaking.

Hint
Calculate how many children choose rock climbing and how many choose raft building.

..... **[___ / 3 marks]**

Calculating with fractions 1

Grade 2

1. What is the reciprocal of 0.25?

..... **[I got ___ / 1 mark]**

Grade 3

2. Work out and simplify where possible

a) $\frac{1}{3} \times \frac{2}{5}$ ..... **[___ / 1 mark]**

b) $\frac{3}{7} \times \frac{14}{9}$ ..... **[___ / 2 marks]**

Grade 3

3. Evaluate and simplify where possible

a) $\frac{3}{4} \div \frac{1}{11}$ ..... **[___ / 2 marks]**

b) $\frac{6}{5} \div \frac{7}{10}$ ..... **[___ / 2 marks]**

Grade 3

4. A café uses up $\frac{2}{3}$ of a box of coffee beans every day. How many days will it take for the café to use up 16 boxes of coffee beans?

..... days **[___ / 2 marks]**

Grade 3

5. In a model village, everything is built at a size $\frac{1}{9}$ of the original size. If a street is 30 m long in real life, work out how long it is in the model village. Give your answer in its simplest form.

..... m **[___ / 2 marks]**

Grade 4

6. Rafael reserves $\frac{3}{10}$ of his monthly wage to pay his bills. $\frac{1}{4}$ of this amount is spent on his electricity bill. What fraction of his monthly wage does Rafael spend on his electricity bill?

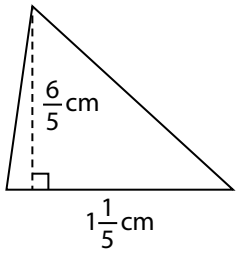
Hint
What calculation does the word 'of' represent?

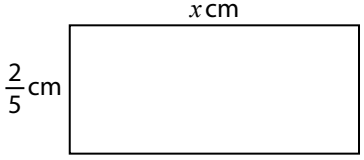
..... **[___ / 2 marks]**

Grade 5

7. A triangle has base $1\frac{1}{5}$ cm and perpendicular height $\frac{6}{5}$ cm.
A rectangle has the same area as the triangle. If the width of the rectangle is $\frac{2}{5}$ cm, what is its length, x cm? Give your answer in its simplest form.

Hint
This question combines fractions and geometry. Find the area of the triangle. What is the same about both shapes?





..... cm **[___ / 3 marks]**

Calculating with fractions 2

Grade 3

1. Work out and simplify where possible

a) $\frac{1}{3}+\frac{1}{5}$

..... **[I got ___ / 2 marks]**

b) $\frac{2}{9}+\frac{5}{6}$

..... **[___ / 2 marks]**

c) $1\frac{7}{8}+2\frac{3}{4}$

..... **[___ / 3 marks]**

Grade 3

2. Evaluate and simplify where possible

a) $\frac{7}{9}-\frac{1}{2}$

..... **[___ / 2 marks]**

b) $3\frac{1}{6}-2\frac{3}{4}$

..... **[___ / 3 marks]**

Grade 3

3. Janet says that $\frac{2}{5}+\frac{4}{5}=\frac{6}{10}$. Is Janet correct? Explain your reasoning carefully.

.....

..... **[___ / 1 mark]**

Grade 4

4. $\frac{1}{8}$ of the students in a class drive to school. $\frac{2}{3}$ of the students walk to school. The rest take the bus. What fraction of the students take the bus?

Hint
The whole class is represented by the number 1

..... **[___ / 3 marks]**

Grade 4

5. Daisy is building a model train track. Her track is $2\frac{4}{5}$ m long. She then takes out a piece of track which is $\frac{7}{8}$ m long and replaces it with a piece which is $1\frac{1}{20}$ m long. Work out the length of her track now.

..... m **[___ / 3 marks]**

Grade 4

6. Maxwell is reading a book on his e-reader. When he picks it up one day, it tells him he is $\frac{1}{3}$ of the way through the book. He reads some and when he puts it down he is $\frac{3}{4}$ of the way through the book. What fraction of the book did he read?

..... **[___ / 2 marks]**

Fractions, decimals, percentages

Grade 2

1. a) Write 0.4 as a fraction in its simplest form.

..... **[I got ___ / 1 mark]**

b) Write 6% as a decimal.

..... **[___ / 1 mark]**

c) Write $\frac{1}{8}$ as a percentage.

..... **[___ / 1 mark]**

Grade 2

2. a) Convert $\frac{6}{5}$ to a percentage.

..... **[___ / 1 mark]**

b) Convert 0.035 to a fraction in its simplest form.

..... **[___ / 1 mark]**

c) Convert 3.6% to a decimal.

..... **[___ / 1 mark]**

Grade 3

3. Write these numbers in order of size, starting with the smallest.

34% 0.3 $\frac{1}{3}$ $\frac{16}{50}$

..... **[___ / 3 marks]**

Grade 3

4. An online music streaming service, Dittify, does some research and finds that $\frac{7}{20}$ of its users listen to its daily mix playlist in the morning, $\frac{1}{5}$ of users listen to their own mix playlist and the rest choose an album.

What percentage of users choose an album?

Hint
Convert the fractions to percentages first.

..... **[___ / 3 marks]**

Grade 4

5. In Lin's class, 6 out of 25 students read fantasy books. In Jay's class, 8 out of 32 students read fantasy books. Lin says the proportion of students who read fantasy books is greater in her class than in Jay's. Is Lin correct? Explain your answer.

.....

..... **[___ / 2 marks]**

Powers and roots

Grade 2

1. Write down the value of

a) 4^2

..... **[I got ___ / 1 mark]**

b) 2^3

..... **[___ / 1 mark]**

c) $\sqrt{49}$

..... **[___ / 1 mark]**

d) $\sqrt[3]{27}$

..... **[___ / 1 mark]**

Grade 3

2. Evaluate

a) $2 \times \sqrt{9 + 16} + 6^2$

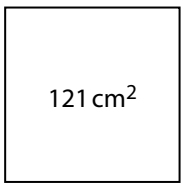
..... **[___ / 3 marks]**

b) $3^4 - 6 \times \sqrt[3]{8} + 50 \div 5^2$

..... **[___ / 3 marks]**

Grade 3

3. The area of a square is 121 cm^2. What is its perimeter?



Hint
Think how the side length of a square relates to its area and to its perimeter.

..... cm **[___ / 2 marks]**

Grade 4

4. a) Using your calculator, work out the value of $\frac{\sqrt[3]{3.6^2 + 91 \times 3.7}}{\sqrt{6.25} + 1.8^3}$

Write down all the figures on your calculator display.

Hint
Remind yourself how to round to 3 sf.

..... **[___ / 1 mark]**

b) Write your answer to part **a** to 3 significant figures.

..... **[___ / 1 mark]**

Grade 4

5. A cube-shaped box of side length 8 cm is made of solid metal. Work out how many smaller cubes of side length 2 cm will fill the box completely.

Hint
Consider the volume of the box and the volume of the smaller cubes.

..... **[___ / 3 marks]**

Calculating with indices

Grade 4

1. Simplify

Hint
Remind yourself of the rules of indices.

a) $7^2 \times 7^5$

..... **[I got ___ / 1 mark]**

b) $9^{10} \div 9^4$

..... **[___ / 1 mark]**

c) $2^5 \times 2^{-3}$

..... **[___ / 1 mark]**

d) $7^{-2} \div 7^{-6}$

..... **[___ / 1 mark]**

e) $(3^4)^4$

..... **[___ / 1 mark]**

Grade 4

2. Simplify

a) $(8^2)^{-5}$

..... **[___ / 1 mark]**

b) $\dfrac{9^3}{9^2 \times 9^4}$

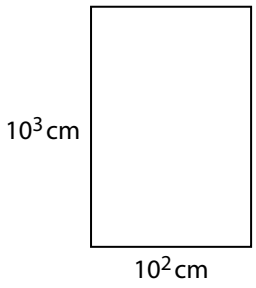
..... **[___ / 2 marks]**

c) $(2^7 \times 2^4)^{-1}$

..... **[___ / 2 marks]**

Grade 4

3. Work out the area of the rectangle, leaving your answer in simplified index form.



..... cm^2 **[___ / 2 marks]**

Grade 4

4. Peter says that $2^3 \times 5^2$ simplifies to 10^5. Peter is wrong. Explain why.

..... **[___ / 1 mark]**

Grade 5

5. Work out

a) 13^0

..... **[___ / 1 mark]**

b) 8^{-1}

..... **[___ / 1 mark]**

c) $\left(\dfrac{2}{5}\right)^3$

..... **[___ / 1 mark]**

d) $\left(\dfrac{1}{4}\right)^{-2}$

..... **[___ / 2 marks]**

Factors and multiples

Grade 2

1. Here is a list of numbers.

3 6 8 10 18 24 30 36

From the list, select

a) a factor of 12

..... **[I got ___ / 1 mark]**

b) a multiple of 9

..... **[___ / 1 mark]**

c) a number which is both a multiple of 12 and a multiple of 4

..... **[___ / 1 mark]**

d) a number which is both a factor of 24 and a factor of 16

..... **[___ / 1 mark]**

e) two numbers with a common factor of 5

..... **[___ / 1 mark]**

f) two numbers with a common multiple of 60

..... **[___ / 1 mark]**

Grade 3

2. What is the lowest common multiple of 9 and 12?

..... **[___ / 2 marks]**

Grade 3

3. What is the highest common factor of 18 and 12?

..... **[___ / 2 marks]**

Grade 4

4. Three alarms beep at the same time. The first alarm then beeps every 6 minutes, the second then beeps every 5 minutes and the third beeps every 15 minutes. Work out how long it is before all three alarms beep at the same time.

Hint
Is this an HCF or an LCM question?

..... minutes **[___ / 2 marks]**

Grade 4

5. Two 2-digit numbers have a highest common factor of 4 and a lowest common multiple of 60. What are the two numbers?

Hint
Remind yourself how to use prime factors to find the HCF and LCM.

..... **[___ / 2 marks]**

Prime factor decomposition

Grade 4

1. Write 110 as a product of its prime factors.

..... **[I got ___ / 2 marks]**

Grade 4

2. a) Write 540 as a product of powers of its prime factors.

..... **[___ / 2 marks]**

b) By looking at its prime factors, explain why 540 is divisible by 15

Hint
What are the prime factors of 15?

..... **[___ / 1 mark]**

Grade 4

3. a) Write 750 as a product of its prime factors. Give your answer in index notation.

..... **[___ / 2 marks]**

b) By looking at its prime factors, explain why 750 is not divisible by 4

..... **[___ / 1 mark]**

Grade 5

4. The prime factor decomposition of a number, x, is $2 \times 3^2 \times 7 \times 13$

a) Is x even or odd? Explain your reasoning.

..... **[___ / 1 mark]**

b) What is the prime factor decomposition of a number twice as big as x?

..... **[___ / 1 mark]**

Grade 5

5. A number is a multiple of 4, 5 and 6. Write the prime factor decomposition of the smallest number it could be.

..... **[___ / 2 marks]**

Finding HCF and LCM

Grade 4

1. a) Write 160 as a product of prime factors.

..... **[I got ___ / 2 marks]**

b) Find the highest common factor of 160 and 280

..... **[___ / 2 marks]**

c) Find the lowest common multiple of 160 and 280

..... **[___ / 2 marks]**

Grade 5

2. Two numbers have prime factor decompositions $2^3 \times 5 \times 11$ and $2 \times 3^2 \times 5$

Find

a) the highest common factor of the two numbers

Hint
You may wish to use a Venn diagram to help with this question.

..... **[___ / 2 marks]**

b) the lowest common multiple of the two numbers.

..... **[___ / 1 mark]**

Grade 5

3. Fran is sorting her books into piles. She has 225 yellow books and 324 orange books. She does not want to mix the colours and wants every pile to contain the same number of books. Work out the biggest number of books she can put in each pile.

..... **[___ / 3 marks]**

Standard form

Grade 3

1. Write these as ordinary numbers.

a) 1.56×10^{8}

..... **[I got ___ / 1 mark]**

b) 8.02×10^{-3}

..... **[___ / 1 mark]**

Grade 3

2. Write these numbers in standard form.

a) 48 000 000 000

..... **[___ / 1 mark]**

b) 0.000 0703

..... **[___ / 1 mark]**

c) 95×10^{6}

..... **[___ / 1 mark]**

d) 0.68×10^{-4}

..... **[___ / 1 mark]**

Grade 3

3. The distance from the Sun to Earth is approximately 150 000 000 km.
Write this number in standard form.

..... km **[___ / 1 mark]**

Grade 4

4. Put these numbers in order of size, starting with the biggest.

2.1×10^{4} 2.3×10^{5} 0.21×10^{4} 2200

Hint
Write all the numbers in the same form.

..... **[___ / 3 marks]**

Grade 4

5. The size of a bacteria cell is 4×10^{-7} m and the size of a virus is 0.000 000 05 m.
Which is smaller, the bacteria cell or the virus?

..... **[___ / 2 marks]**

Calculating with standard form

Grade 5

1. Work out the value of each expression, giving your answers in standard form.

a) $2 \times (3 \times 10^2)$

..... **[I got ___ / 1 mark]**

b) $(4 \times 10^{-4}) \div 2$

..... **[___ / 1 mark]**

c) $(3 \times 10^{-2}) + (5 \times 10^{-2})$

..... **[___ / 1 mark]**

d) $(9 \times 10^7) - (3 \times 10^7)$

..... **[___ / 1 mark]**

Grade 5

2. Everly says that $6 \times (3 \times 10^6)$ is written as 18×10^6 in standard form.

Is Everly correct? Explain your reasoning.

..... **[___ / 1 mark]**

Grade 5

3. Work out the value of $7 \times 10^{-2} \times 30\,000$. Give your answer in standard form.

..... **[___ / 2 marks]**

Grade 5

4. Work out the value of each expression, giving your answers in standard form.

a) $(5 \times 10^4) + (6 \times 10^5)$

..... **[___ / 2 marks]**

b) $(9 \times 10^{-3}) - (3 \times 10^{-4})$

..... **[___ / 2 marks]**

c) $(2.1 \times 10^8) \times (3 \times 10^{-5})$

..... **[___ / 2 marks]**

d) $(8.2 \times 10^3) \div (4.1 \times 10^7)$

..... **[___ / 2 marks]**

Guided answers

A correct final answer automatically scores all the marks, unless specified otherwise.

Page 1, Place value

1. 90 124
1 mark *for correct answer.*

2. a 200 **b** 20 000 **c** $\frac{2}{10}$ or 0.2
1 mark *for each correct answer.*

3. a > **b** = **c** <
1 mark *for each correct answer.*

4. 7.054, 7.405, 7.45, 7.504
2 marks *for correct order;* ***1 mark*** *for any three in correct order.*

5. a $67.9 \times 1000 = 67\,900$ **b** $0.9 \div 100 = 0.009$
1 mark *for each correct answer.*

6. £8.50 ÷ 10 = £0.85, so 1 packet costs 85p.
1 mark *for division;* ***1 mark*** *for 85p.*

7. a $4.5 \times 19.2 = 4.5 \times 192 \div \mathbf{10} = 864 \div \mathbf{10} = 86.4$
You could also estimate: $4.5 \times 19.2 \approx 5 \times 20 \approx 100$, which is close to 86.4

b $450 \times 0.0192 = 4.5 \times \mathbf{100} \times 192 \div \mathbf{10\,000}$
$= 864 \times \mathbf{100} \div \mathbf{10\,000} = 8.64$
You could also estimate: $450 \times 0.0192 \approx 500 \times 0.02 \approx 10$, which is close to 8.64

c You know that $864 \div 4.5 = 192$,
so $8.64 \div 0.45 = \frac{864 \div \mathbf{100}}{4.5 \div \mathbf{10}} = 192 \div \mathbf{10} = 19.2$
You could also estimate: $8.64 \div 0.45 \approx 10 \div 0.5 \approx 20$, which is close to 19.2

1 mark *for each correct answer.*

Page 2, Order of operations

1. a $2 + 3 \times 9 = 2 + 27 = 29$

b $24 \div (6 - 2) \times 5 = 24 \div 4 \times 5 = 30$

c $10 - 3^2 = 10 - 9 = 1$

1 mark *for each correct answer.*

2. a $(12 - 4 \times 2)^3 = (12 - 8)^3 = 4^3 = 64$

b $\frac{4 \times 5^2}{4 \times 5 \div 2} = \frac{4 \times 25}{10} = \frac{100}{10} = 10$

c $5 \times \sqrt{50 - 1} + 6 \times 3 = 5 \times \sqrt{49} + 6 \times 3$
$= 5 \times 7 + 6 \times 3$
$= 35 + 18 = 53$

1 mark *for each correct answer.*

3. a $\frac{2 \times 36 + 18}{20 - 12} = \frac{90}{8} = \frac{45}{4}$ or 11.25

b $\left(\frac{3}{5}\right)^3 + 9 \div 3 = \frac{27}{125} + 3 = \frac{402}{125}$ or 3.216

c $\sqrt{7.29} \times 1000 = 2.7 \times 1000 = 2700$

1 mark *for each correct answer.*

4. There are a number of ways to explain this. Two examples of correct explanations would be:
Eva is correct because you calculate 3^2, which is 9, then multiply by 2, so $2 \times 9 = 18$
Eva is correct. Bavan made the mistake of multiplying before squaring, whereas Eva squared before multiplying.
1 mark *for a correct, detailed explanation.*

5. a $22 - (10 - 7) = 19$ **b** $20 - (5 - 2 + 6) = 11$
1 mark *for each correct answer.*

Page 3, Rounding and truncating

1. a 258 **b** 260 **c** 300
1 mark *for each correct answer.*

2. a 20 **b** 19.9 **c** 19.90
1 mark *for each correct answer.*

3. a 8 **b** 8.2 **c** 8.26
1 mark *for each correct answer.*

4. $3.66 \times 9 = 32.94 \approx 33\ m^2$
1 mark *for correct multiplication;* ***1 mark*** *for rounding.*

5. $3000 \div 310 = 9.677$, so the jug will fill 9 whole glasses.
1 mark *for correct division;* ***1 mark*** *for truncating to an integer.*

6. $18.93 \times 7.5 = 141.975$, so Mark earns £141.98 a day.
$22.17 \times 6.5 = 144.105$, so Kwamé earns £144.11 a day.
The difference in their pay is £144.11 – £141.98 = £2.13 a day.
1 mark *for Mark's pay;* ***1 mark*** *for Kwamé's pay;* ***1 mark*** *for the difference. Total 3 marks.*

Page 4, Significant figures

1. a 20 190 **b** 20 200
c 20 000 **d** 20 000
1 mark *for each correct answer.*

2. a 0.007 **b** 0.0068 **c** 0.006 80
1 mark *for each correct answer.*

3. Side length = $\sqrt{40} = 6.32455532 = 6.32$ cm to 3 sf
1 mark *for square rooting;* ***1 mark*** *for 6.32*

4. a $\frac{4.56 \times 2.89}{12.1 - 0.56} = 1.141\,975\,737$

b 1.141 975 737 = 1.1 to 2 sf

1 mark *for each correct answer.*

5. Shirley has rounded 0.065 29 to 2 dp instead of 2 sf.
The correct answer is 0.065
1 mark *for a correct explanation.*

Page 5, Estimation

1. $2.84 \times 19.3 \approx 3 \times 20 \approx 60$
1 mark *for correct answer.*

2. $\frac{317 + 48.6}{9.683} \approx \frac{300 + 50}{10} \approx \frac{350}{10} \approx 35$
1 mark *for rounding to 1 sf;* ***1 mark*** *for correct answer.*

3. $\frac{2.67 \times 1.36}{0.11 + 0.42} \approx \frac{3 \times 1}{0.1 + 0.4} \approx \frac{3}{0.5} \approx 6$
1 mark *for rounding to 1 sf;* ***1 mark*** *for correct answer.*

4. Number of fish at start of January ≈ 1000
Increase ≈ 20 fish per day
Five months ≈ 5 × 30 ≈ 150 days
Number of fish after five months ≈ 150 × 20 + 1000 ≈ 4000
1 mark *for rounding rate of increase to 1 sf;* ***1 mark*** *for correct calculation for the number of fish after five months;* ***1 mark*** *for correct answer. Total 3 marks.*

5. Number of portions sold ≈ 100
Sale price per portion ≈ £9.00
Cost per portion ≈ £3.00
Profit per portion ≈ £9.00 – £3.00 ≈ £6.00
Total profit ≈ £6.00 × 100 ≈ £600

1 mark *for rounding portions, sale price and cost to 1 sf;* ***1 mark*** *for a profit calculation;* ***1 mark*** *for correct answer. Total 3 marks.*

Note that you could also find the total estimated sale price (£900) and subtract the total estimated cost (£300) to get the total estimated profit.

6. Distance driven ≈ 400 km
Average speed ≈ 80 km/h
Time driving ≈ $\frac{400}{80}$ ≈ 5 hours
Time for whole journey ≈ 5 hours 30 minutes (including the break)
Time of arrival is roughly 2 pm (8.30 am + $5\frac{1}{2}$ hours).
1 mark *for rounding distance and speed to 1 sf;*
1 mark *for finding the time taken;* ***1 mark*** *for correct answer. Total 3 marks.*

Page 6, Error intervals

1. The smallest number this could be is 5.25, since 5.25 is the smallest number that rounds to 5.3 to 1 dp.
1 mark *for correct answer of 5.25*

2. $13.5 \leq L < 14.5$
1 mark *for 13.5;* ***1 mark*** *for 14.5*

3. a $105 \leq p < 115$ **b** $107.5 \leq p < 112.5$
c $109.5 \leq p < 110.5$
1 mark *for each correct minimum;* ***1 mark*** *for each correct maximum.*

4. a $4.665 \leq x < 4.675$ **b** $4500 \leq x < 5500$
1 mark *for each correct minimum;* ***1 mark*** *for each correct maximum.*

5. $245 \leq l < 255$
1 mark *for correct minimum and maximum;* ***1 mark*** *for correct interval notation.*

6. Sienna can see a truncation to 1 dp, so the error interval is $1.8 \leq x < 1.9$
1 mark *for correct minimum and maximum;* ***1 mark*** *for correct interval notation.*

Page 7, Calculating with negative numbers

1. a January **b** $-1 - (-5) = 4$ °C
c $8 - (-5) = 13$ °C
1 mark *for each correct answer.*

2. a $2 + (-5) = -3$ **b** $(-48) \div (-6) = 8$
c $(-3)^2 = (-3) \times (-3) = 9$
1 mark *for each correct answer.*

3. a $5 + (-3) \times 4 = 5 + (-12) = -7$
1 mark *for –12;* ***1 mark*** *for correct answer.*
b $(8 - 10) \times 4 - (-10) = (-2) \times 4 - (-10) = -8 - (-10) = 2$
1 mark *for –8;* ***1 mark*** *for correct answer.*
c $\frac{(-2) \times (-6)}{-10 + 7} = \frac{12}{-3} = -4$
1 mark *for either 12 in the numerator or –3 in the denominator;* ***1 mark*** *for correct answer.*

4. Total spend = £257.50
Bank balance = £241 − £257.50 = −£16.50
Thomas must pay in £100 + £16.50 = £116.50 to get the balance up to £100
1 mark *for subtracting the spend from £241;* ***1 mark*** *for –£16.50 or £16.50 overdrawn;* ***1 mark*** *for final answer of £116.50. Total 3 marks.*

Page 8, Calculating with decimals

1. a
$$\begin{array}{r} 2.906 \\ +\ 8.310 \\ \hline 11.216 \\ {\scriptstyle 1} \end{array}$$
1 mark *for lining up the digits correctly in a column;*
1 mark *for correct answer.*

b
$$\begin{array}{r} {\scriptstyle 1}{\scriptstyle 14}{\scriptstyle 5}{\scriptstyle 1}25.043 \\ -17.820 \\ \hline 7.223 \end{array}$$
1 mark *for lining up the digits correctly in a column;*
1 mark *for correct answer.*

2. a
$$\begin{array}{r} 74 \\ \times\ 26 \\ \hline 444 \\ +1480 \\ \hline 1924 \\ {\scriptstyle 1}\ {\scriptstyle 2} \end{array}$$
Since 74 × 26 = 1924,
7.4 × 0.26 = 1924 ÷ 10 ÷ 100 = 1.924
1 mark *for multiplying 74 × 26 to get 1924;* ***1 mark*** *for correct answer.*

b 17.12 ÷ 0.8 = 171.2 ÷ 8
$$8\overline{)17^{1}1.^{3}2}\quad 2\ 1.4$$
171.2 ÷ 8 = 21.4
1 mark *for dividing 171.2 ÷ 8;* ***1 mark*** *for correct answer.*

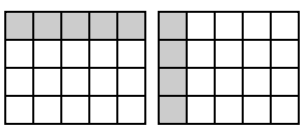
c $\frac{1.9 + 7.62}{9 - 8.3} = \frac{9.52}{0.7} = \frac{95.2}{7}$
$$7\overline{)9^{2}5.^{4}2}\quad 1\ 3.\ 6$$
$\frac{95.2}{7} = 13.6$
1 mark *for getting correct numerator and denominator;*
1 mark *for dividing 95.2 ÷ 7;* ***1 mark*** *for correct answer. Total 3 marks.*

3. £55.65 ÷ 7 = £7.95
$$7\overline{)55.^{6}6^{3}5}\quad 7.\ 9\ 5$$
1 mark *for attempting to divide;* ***1 mark*** *for correct answer.*

4. By estimating, 14.5 × 2.6 ≈ 15 × 3 ≈ 45. Alex's answer is not even close.
1 mark *for a correct explanation.*

Page 9, Introduction to fractions

1. $\frac{1}{4} > \frac{1}{5}$
Giving them a common denominator, $\frac{1}{4} = \frac{5}{20}$ and $\frac{1}{5} = \frac{4}{20}$
You can see $\frac{1}{4}$ is bigger.
Alternatively, you can say that $\frac{1}{4}$ must be bigger as one whole is split into four parts. Each part will be bigger than if the whole was split into five parts.
You can also show this by shading $\frac{1}{4}$ (horizontally) and $\frac{1}{5}$ (vertically) on the diagram:



1 mark *for a correct explanation.*

2. Giving each fraction a common denominator of 24,
$\frac{3}{4} = \frac{18}{24}$, $\frac{2}{3} = \frac{16}{24}$, $\frac{5}{8} = \frac{15}{24}$ and $\frac{7}{12} = \frac{14}{24}$
You can now put them in order by comparing the numerators and you have $\frac{7}{12}, \frac{5}{8}, \frac{2}{3}, \frac{3}{4}$
2 marks *for all correct,* ***1 mark*** *for three out of four correct.*

3. a i $1\frac{2}{5} = \frac{7}{5}$
1 mark *for correct answer.*

ii $3\frac{2}{4} = 3\frac{1}{2} = \frac{7}{2}$. Alternatively, $3\frac{2}{4} = \frac{14}{4} = \frac{7}{2}$
1 mark *for simplifying* $\frac{2}{4}$ *or* $\frac{14}{4}$*;* ***1 mark*** *for correct answer.*

b. i $\frac{17}{9} = 1\frac{8}{9}$
1 mark *for correct answer.*

ii $\frac{92}{40} = \frac{23}{10} = 2\frac{3}{10}$. Alternatively, $\frac{92}{40} = 2\frac{12}{40} = 2\frac{3}{10}$
1 mark *for simplifying* $\frac{92}{40}$ *or* $\frac{12}{40}$*;* ***1 mark*** *for correct answer.*

4. Dave has $2\frac{1}{3} = \frac{7}{3} = \frac{56}{24}$ bottles left.
Lizzie has $\frac{19}{8} = \frac{57}{24}$ bottles left.
$\frac{57}{24} > \frac{56}{24}$, so Lizzie has more.
Alternatively, Lizzie has $\frac{19}{8} = 2\frac{3}{8} = 2\frac{9}{24}$ bottles left.
Dave has $2\frac{1}{3} = 2\frac{8}{24}$ bottles left.
$2\frac{9}{24} > 2\frac{8}{24}$, so Lizzie has more.
1 mark *for converting* $2\frac{1}{3}$ *to an improper fraction (or for converting* $\frac{19}{8}$ *to a mixed number);* ***1 mark*** *for writing both fractions with a common denominator (such as 24);* ***1 mark*** *for a correct comparison and conclusion. Total 3 marks.*

Page 10, Proportions of amounts

1. a $\frac{1}{5}$ of $45 = 45 \div 5 = 9$

b 30% of $180 = 180 \div 10 \times 3 = 54$

c $\frac{5}{7}$ of $14 = 14 \div 7 \times 5 = 10$

d 10% of 50 = 5
So, 60% of $50 = 5 \times 6 = 30$
1% of 50 = 0.5
So, 2% of $50 = 2 \times 0.5 = 1$
62% of $50 = 30 + 1 = 31$
1 mark *for each correct calculation;* ***1 mark*** *for each correct answer.*

2. 10% of £2460 = £246
So, 5% of £2460 = £123
15% of £2460 = £246 + £123 = £369
1 mark *for correct calculation;* ***1 mark*** *for correct answer.*

3. 10% of 90 = 9
So, 110% of 90 = 90 + 9 = 99
$\frac{8}{7}$ of $84 = 84 \div 7 \times 8 = 96$
Since 99 > 96, 110% of 90 is bigger than $\frac{8}{7}$ of 84
1 mark *for finding 110% of 90;* ***1 mark*** *for finding* $\frac{8}{7}$ *of 84;*
1 mark *for a correct conclusion. Total 3 marks.*

4. $\frac{3}{8}$ of £7200 = £7200 ÷ 8 × 3 = £2700
1 mark *for correct calculation;* ***1 mark*** *for correct answer.*

5. Rock climbing: 25% of 48 = 48 ÷ 4 = 12
Raft building: $\frac{5}{12}$ of $48 = 48 \div 12 \times 5 = 20$
Kayaking: 48 − 12 − 20 = 16 children
1 mark *for the number who choose rock climbing;*
1 mark *for the number who choose raft building;* ***1 mark*** *for the number who choose kayaking. Total 3 marks.*

Page 11, Calculating with fractions 1

1. 4
1 mark *for correct answer.*

2. a $\frac{1}{3} \times \frac{2}{5} = \frac{2}{15}$
1 mark *for correct answer.*

b $\frac{3}{7} \times \frac{14}{9} = \frac{\cancel{3}^{1} \times \cancel{14}^{2}}{\cancel{7}_{1} \times \cancel{9}_{3}} = \frac{1 \times 2}{1 \times 3} = \frac{2}{3}$
1 mark *for multiplying;* ***1 mark*** *for the simplified answer.*

3. a $\frac{3}{4} \div \frac{1}{11} = \frac{3}{4} \times \frac{11}{1} = \frac{33}{4} = 8\frac{1}{4}$
1 mark *for turning into multiplication;* ***1 mark*** *for correct answer in improper fraction or mixed number form.*

b $\frac{6}{5} \div \frac{7}{10} = \frac{6}{5} \times \frac{10}{7} = \frac{6 \times \cancel{10}^{2}}{\cancel{5}_{1} \times 7} = \frac{6 \times 2}{1 \times 7} = \frac{12}{7} = 1\frac{5}{7}$
1 mark *for writing a correct multiplication;* ***1 mark*** *for correct, simplified answer in improper fraction or mixed number form.*

4. $16 \div \frac{2}{3} = \frac{16}{1} \times \frac{3}{2} = \frac{\cancel{16}^{8} \times 3}{1 \times \cancel{2}_{1}} = \frac{8 \times 3}{1 \times 1} = \frac{24}{1} = 24$ days
1 mark *for writing a division and turning into a correct multiplication;* ***1 mark*** *for correct answer.*

5. $\frac{1}{9}$ of $30 = \frac{1}{9} \times 30 = \frac{30}{9} = \frac{10}{3}$ m or $3\frac{1}{3}$ m
1 mark *for multiplying;* ***1 mark*** *for correct simplified answer (improper fraction or mixed number).*

6. $\frac{1}{4}$ of $\frac{3}{10} = \frac{1}{4} \times \frac{3}{10} = \frac{3}{40}$
1 mark *for multiplying;* ***1 mark*** *for correct answer.*

7. Area of triangle $= \frac{1}{2} \times 1\frac{1}{5} \times \frac{6}{5} = \frac{1}{2} \times \frac{6}{5} \times \frac{6}{5} = \frac{18}{25}$ cm^2
This is the area of the rectangle.
Length of rectangle $= \frac{18}{25} \div \frac{2}{5} = \frac{18}{25} \times \frac{5}{2} = \frac{\cancel{18}^{9} \times \cancel{5}^{1}}{\cancel{25}_{5} \times \cancel{2}_{1}} = \frac{9 \times 1}{5 \times 1}$
$= \frac{9}{5}$ cm or $1\frac{4}{5}$ cm
1 mark *for writing a correct multiplication;* ***1 mark*** *for writing a division and turning into a correct multiplication;* ***1 mark*** *for correct, simplified answer (improper fraction or mixed number). Total 3 marks.*

Page 12, Calculating with fractions 2

1. a $\frac{1}{3} + \frac{1}{5} = \frac{5+3}{15} = \frac{8}{15}$
1 mark *for finding a common denominator;* ***1 mark*** *for correct answer.*

b $\frac{2}{9} + \frac{5}{6} = \frac{4}{18} + \frac{15}{18} = \frac{19}{18}$ or $1\frac{1}{18}$
1 mark *for finding a common denominator;* ***1 mark*** *for correct answer.*

c $1\frac{7}{8} + 2\frac{3}{4} = \frac{15}{8} + \frac{11}{4} = \frac{15}{8} + \frac{22}{8} = \frac{37}{8}$ or $4\frac{5}{8}$
1 mark *for converting mixed numbers to improper fractions;* ***1 mark*** *for finding a common denominator;*
1 mark *for correct answer. Total 3 marks.*

2. a $\frac{7}{9} - \frac{1}{2} = \frac{14-9}{18} = \frac{5}{18}$
1 mark *for finding a common denominator;* ***1 mark*** *for correct answer.*

b $3\frac{1}{6} - 2\frac{3}{4} = \frac{19}{6} - \frac{11}{4} = \frac{38}{12} - \frac{33}{12} = \frac{5}{12}$
1 mark *for converting mixed numbers to improper fractions;* ***1 mark*** *for finding a common denominator;*
1 mark *for correct answer. Total 3 marks.*

3. Janet is not correct. She has added the numerators and the denominators. She should have found a common denominator and then added the numerators only.
1 mark *for a correct explanation.*

4. $\frac{1}{8}+\frac{2}{3}=\frac{3+16}{24}=\frac{19}{24}$
$1-\frac{19}{24}=\frac{24}{24}-\frac{19}{24}=\frac{5}{24}$
1 mark *for finding a common denominator of 24;* ***1 mark*** *for adding to get* $\frac{19}{24}$*;* ***1 mark*** *for correct answer. Total 3 marks.*

5. $2\frac{4}{5}-\frac{7}{8}+1\frac{1}{20}=\frac{14}{5}-\frac{7}{8}+\frac{21}{20}=\frac{112}{40}-\frac{35}{40}+\frac{42}{40}=\frac{119}{40}$ m or $2\frac{39}{40}$ m
1 mark *for converting mixed numbers to improper fractions;* ***1 mark*** *for finding a common denominator;* ***1 mark*** *for correct answer. Total 3 marks.*

6. $\frac{3}{4}-\frac{1}{3}=\frac{9-4}{12}=\frac{5}{12}$
1 mark *for finding a common denominator;* ***1 mark*** *for correct answer.*

Page 13, Fractions, decimals, percentages

1. a $0.4=\frac{4}{10}=\frac{2}{5}$ **b** $6\%=0.06$ **c** $\frac{1}{8}=12.5\%$
1 mark *for each correct answer.*

2. a $\frac{6}{5}=1\frac{1}{5}=120\%$ **b** $0.035=\frac{35}{1000}=\frac{7}{200}$ **c** $3.6\%=0.036$
1 mark *for each correct answer.*

3. Convert everything to a percentage.
$0.3=30\%$, $\frac{1}{3}=33.\dot{3}\%$, $\frac{16}{50}=\frac{32}{100}=32\%$
The order is 0.3, $\frac{16}{50}$, $\frac{1}{3}$, 34%.
1 mark *for converting everything to a percentage (or everything to a decimal, or everything to a fraction with a common denominator), condone one mistake;* ***2 marks*** *for correct order (****1 mark*** *for three out of four correct). Total 3 marks.*

4. $\frac{7}{20}=\frac{35}{100}=35\%$, $\frac{1}{5}=20\%$
$35\%+20\%=55\%$
$100\%-55\%=45\%$ play an album.
1 mark *for converting both fractions to a percentage;* ***1 mark*** *for subtracting from 100%;* ***1 mark*** *for correct answer. Total 3 marks.*

5. Lin's class: $\frac{6}{25}=\frac{24}{100}=24\%$
Jay's class: $\frac{8}{32}=\frac{1}{4}=\frac{25}{100}=25\%$
Lin is not correct. Jay's class has a (slightly) higher proportion of students who read fantasy books.
1 mark *for finding either 24% or 25% or for giving both fractions with a common denominator;* ***1 mark*** *for a complete, correct explanation.*

Page 14, Powers and roots

1. a $4^2=16$ **b** $2^3=8$
c $\sqrt{49}=7$ **d** $\sqrt[3]{27}=3$
1 mark *for each correct answer.*

2. a $2\times\sqrt{9+16}+6^2=2\times\sqrt{25}+36=2\times5+36$
$=10+36=46$
1 mark *for* $\sqrt{25}=5$ *and* $6^2=36$ *first;* ***1 mark*** *for multiplying before adding;* ***1 mark*** *for correct answer. Total 3 marks.*

b $3^4-6\times\sqrt[3]{8}+50\div5^2=81-6\times2+50\div25$
$=81-12+2=71$
1 mark *for* $3^4=81$, $\sqrt[3]{8}=2$ *and* $5^2=25$ *first;* ***1 mark*** *for multiplying and dividing before adding and subtracting;* ***1 mark*** *for correct answer. Total 3 marks.*

3. Side length: $\sqrt{121}=11$ cm
Perimeter: $4\times11=44$ cm
1 mark *for side length of 11 cm;* ***1 mark*** *for correct perimeter.*

4. a $\frac{\sqrt[3]{3.6^2+91\times3.7}}{\sqrt{6.25}+1.8^3}=0.845\,537\,207$
b 0.845 537 207 = 0.846 to 3 sf
1 mark *for each correct answer.*

5. Volume of box = $8^3=512\,\text{cm}^3$
Volume of small cubes = $2^3=8\,\text{cm}^3$
$512\div8=64$ cubes will fit in the box.
Alternatively, $8\div2=4$, so 4 cubes fit along each side of the box and the total number of cubes that fit is $4^3=64$ cubes.
1 mark *for volume of box (or for finding that 4 cubes fit along each side);* ***1 mark*** *for volume of small cubes (or for* 4^3*);* ***1 mark*** *for correct answer. Total 3 marks.*

Page 15, Calculating with indices

1. a $7^2\times7^5=7^{2+5}=7^7$ **b** $9^{10}\div9^4=9^{10-4}=9^6$
c $2^5\times2^{-3}=2^{5+(-3)}=2^2$ **d** $7^{-2}\div7^{-6}=7^{-2-(-6)}=7^4$
e $(3^4)^4=3^{4\times4}=3^{16}$
1 mark *for each correct answer.*

2. a $(8^2)^{-5}=8^{2\times(-5)}=8^{-10}$
1 mark *for correct answer.*
b $\frac{9^3}{9^2\times9^4}=\frac{9^3}{9^6}=9^{3-6}=9^{-3}$
1 mark *for* 9^6 *in the denominator;* ***1 mark*** *for correct answer.*
c $(2^7\times2^4)^{-1}=(2^{7+4})^{-1}=(2^{11})^{-1}=2^{11\times(-1)}=2^{-11}$
1 mark *for* 2^{11} *in the bracket;* ***1 mark*** *for correct answer.*

3. Area = $10^3\times10^2=10^5\,\text{cm}^2$
1 mark *for multiplying the two lengths;* ***1 mark*** *for correct answer.*

4. Peter has multiplied the bases. Since the bases are different this cannot be simplified as a simple power of 10
1 mark *for a correct explanation.*

5. a $13^0=1$
1 mark *for correct answer.*
b $8^{-1}=\frac{1}{8}$
1 mark *for correct answer.*
c $\left(\frac{2}{5}\right)^3=\frac{2^3}{5^3}=\frac{8}{125}$
1 mark *for correct answer.*
d $\left(\frac{1}{4}\right)^{-2}=4^2=16$
1 mark *for 4;* ***1 mark*** *for correct answer.*

Page 16, Factors and multiples

1. a 3 or 6 **b** 18 or 36 **c** 24 or 36
d 8 **e** 10 and 30 **f** Any two of 3, 6, 10 and 30
1 mark *for each correct answer. Just one correct answer needed to get each mark.*

2. Multiples of 9: 9, 18, 27, (36), 45, …
Multiples of 12: 12, 24, (36), 48, …
LCM(9, 12) = 36
1 mark *for any correct common multiple;* ***1 mark*** *for correct answer.*

3. Factors of 18: 1, 2, 3, (6), 9, 18
Factors of 12: 1, 2, 3, 4, (6), 12
HCF(18, 12) = 6
1 mark *for any correct common factor;* ***1 mark*** *for correct answer.*

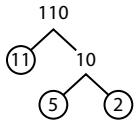
4. Multiples of 6: 6, 12, 18, 24, (30), 36, …
Multiples of 5: 5, 10, 15, 20, 25, (30), 35, …
Multiples of 15: 15, (30), 45, …
LCM(6, 5 and 15) = 30
The alarms next beep together after 30 minutes.
1 mark *for any correct common multiple;* ***1 mark*** *for correct answer.*

5. Multiples of 4: 4, 8, (12), 16, (20), …
Factors of 60: 1, 2, 3, 4, 5, 6, 10, (12), 15, (20), 30, 60
HCF(12, 20) = 4 and LCM(12, 20) = 60
The two numbers are 12 and 20
1 mark *for writing two numbers with a HCF of 4 or two numbers with a LCM of 60;* ***1 mark*** *for correct answer.*

Page 17, Prime factor decomposition

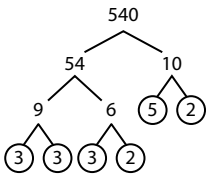
You might use a factor tree in your working with the same start and end as shown here but with different middle branches.

1.



$110 = 2 \times 5 \times 11$
1 mark *for finding or listing the prime factors;* ***1 mark*** *for correct answer.*

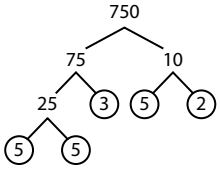
2. a



$540 = 2^2 \times 3^3 \times 5$
1 mark *for finding or listing the prime factors;*
1 mark *for correct answer.*

b Since $15 = 3 \times 5$ and both 3 and 5 are prime factors of 540, 540 must be divisible by 15
1 mark *for a correct explanation.*

3. a



$750 = 2 \times 3 \times 5^3$
1 mark *for finding or listing the prime factors;*
1 mark *for correct answer.*

b Since $4 = 2 \times 2$, but 750 only contains the factor of 2 once, 750 is not divisible by 4
1 mark *for a correct explanation.*

4. a $2 \times 3^2 \times 7 \times 13$ is even since 2 is a prime factor.
1 mark *for correct answer.*

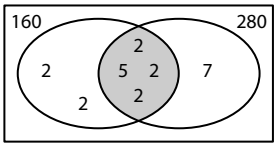
b To double a number, you multiply by 2, so the prime factor decomposition of a number twice as big will have another factor of 2. This is $2^2 \times 3^2 \times 7 \times 13$
1 mark *for correct answer.*

5. The prime factors of each number are:
$4 = 2 \times 2$; $5 = 5$; $6 = 2 \times 3$
Any number divisible by 4, 5 and 6 must have at least two 2s, one 5 and a 3, so the smallest such number is $2^2 \times 3 \times 5$
1 mark *for listing the prime factors of 4 and 6;* ***1 mark*** *for correct answer.*

Page 18, Finding HCF and LCM

1. a $160 = 2^5 \times 5$
1 mark *for finding or listing the prime factors;*
1 mark *for correct answer.*

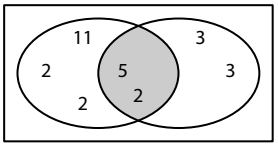
b $280 = 2^3 \times 5 \times 7$
A Venn diagram showing the prime factors looks like this:



$HCF(160, 280) = 2^3 \times 5 = 40$
1 mark *for multiplying the common factors;* ***1 mark*** *for correct answer.*

c From the Venn diagram,
$LCM(160, 280) = 2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 7 = 1120$
1 mark *for multiplying all the appropriate factors;*
1 mark *for correct answer.*

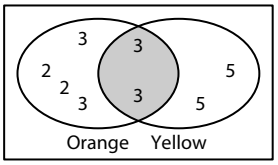
2.



a $HCF = 2 \times 5 = 10$

b $LCM = 2 \times 2 \times 11 \times 2 \times 5 \times 3 \times 3 = 3960$
1 mark *for correct Venn diagram or alternative method;*
1 mark *for HCF;* ***1 mark*** *for LCM. Total 3 marks.*

3. $225 = 3^2 \times 5^2$
$324 = 2^2 \times 3^4$
A Venn diagram would look like this:



The HCF of the two numbers is 9, so Fran can sort her books into piles of a maximum of 9 if they are to be the same size.
1 mark *for the prime factors of 225;* ***1 mark*** *for the prime factors of 324;* ***1 mark*** *for correct answer. Total 3 marks.*

Page 19, Standard form

1. a $1.56 \times 10^8 = 156\,000\,000$ **b** $8.02 \times 10^{-3} = 0.008\,02$
1 mark *for each correct answer.*

2. a $48\,000\,000\,000 = 4.8 \times 10^{10}$ **b** $0.000\,0703 = 7.03 \times 10^{-5}$
c $95 \times 10^6 = 9.5 \times 10^7$ **d** $0.68 \times 10^{-4} = 6.8 \times 10^{-5}$
1 mark *for each correct answer.*

3. 150 000 000 km = 1.5×10^8 km
1 mark *for correct answer.*

4. Putting all the numbers in either standard or ordinary form:
$2.1 \times 10^4 = 21\,000$, $2.3 \times 10^5 = 230\,000$,
$0.21 \times 10^4 = 2.1 \times 10^3 = 2100$, $2200 = 2.2 \times 10^3$
The order, starting with the biggest, is 2.3×10^5, 2.1×10^4, 2200, 0.21×10^4
1 mark *for converting at least two of the numbers correctly to an alternative form;* ***1 mark*** *for any three in the correct order;* ***1 mark*** *for all in the correct order. Total 3 marks.*

5. Virus: $0.000\,000\,05 = 5 \times 10^{-8}$ m
Bacteria cell: $4 \times 10^{-7} = 0.000\,0004$ m
The virus is smaller.
1 mark *for getting both numbers in the same form;*
1 mark *for correct conclusion.*

Page 20, Calculating with standard form

1. a 6×10^2 **b** 2×10^{-4}
c 8×10^{-2} **d** 6×10^7
1 mark *for each correct answer.*

2. Everly is not correct. 18 is not between 1 and 10 so it is not in standard form. The correct answer is 1.8×10^7
1 mark *for 'No' and correct explanation.*

3. $30\,000 = 3 \times 10^4$
$(7 \times 10^{-2}) \times (3 \times 10^4) = 21 \times 10^{(-2)+4} = 21 \times 10^2 = 2.1 \times 10^3$
1 mark *for 21×10^2;* ***1 mark*** *for correct answer.*

4. a $(5 \times 10^4) + (6 \times 10^5) = 50\,000 + 600\,000 = 650\,000$
$= 6.5 \times 10^5$
1 mark *for converting to ordinary numbers or the same power of 10;* ***1 mark*** *for correct answer.*

b $(9 \times 10^{-3}) - (3 \times 10^{-4}) = 0.009 - 0.0003 = 0.0087$
$= 8.7 \times 10^{-3}$
1 mark *for converting to ordinary numbers or the same power of 10;* ***1 mark*** *for correct answer.*

c $(2.1 \times 10^8) \times (3 \times 10^{-5}) = 6.3 \times 10^{8+(-5)} = 6.3 \times 10^3$
1 mark *for 10^3;* ***1 mark*** *for correct answer.*

d $(8.2 \times 10^3) \div (4.1 \times 10^7) = 2 \times 10^{3-7} = 2 \times 10^{-4}$
1 mark *for 10^{-4};* ***1 mark*** *for correct answer.*

Page 21, Terms and expressions

1. a $n - 2$ **b** $n - 2 + 11 = n + 9$
1 mark *for each correct answer.*

2. $3g$
1 mark *for correct answer.*

3. $2x + 3y$
1 mark *for $2x$ or $3y$;* ***1 mark*** *for correct answer.*

4. $7 + 4p + 3q$
1 mark *for correct answer (the three terms can be written in any order).*

5. a $2a + 3b = 2 \times 5 + 3 \times 2 = 10 + 6 = 16$
b $10 - c = 10 - (-4) = 14$
c $\frac{8a}{c} = \frac{8 \times 5}{-4} = \frac{40}{-4} = -10$
d $ac + b = 5 \times (-4) + 2 = -20 + 2 = -18$
For each part, ***1 mark*** *for substituting the numbers in the correct place;* ***1 mark*** *for correct answer.*

Page 22, Simplifying expressions

1. a $2x + 3x - x = 4x$
1 mark *for correct answer.*

b $3p - 5q + 7q - 2q + 4p = 7p$
1 mark *for $7p$ or $0q$;* ***1 mark*** *for correct answer.*

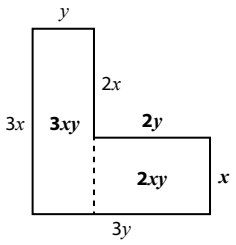
c $7 + 5t - 2 - 9t = 5 - 4t$
1 mark *for 5 or $-4t$;* ***1 mark*** *for correct answer.*

2. a $x^2 + 4x + 3x^2 - 6x + 1 = 4x^2 - 2x + 1$
1 mark *for $4x^2$ or $-2x$;* ***1 mark*** *for correct answer.*

b $9mn - 2m^2 + 7nm + 11m^2 = 16mn + 9m^2$
1 mark *for $16mn$ or $9m^2$;* ***1 mark*** *for correct answer (terms can be written in any order).*

3. $2x + 3x + x + 2 + x - 1 = 7x + 1$
1 mark *for adding all the sides together;* ***1 mark*** *for correct answer.*

4.



$3xy + 2xy = 5xy$
1 mark *for $3xy$;* ***1 mark*** *for $2xy$;* ***1 mark*** *for correct answer. Total 3 marks.*
Note that there are alternative methods.

5. Nikita: x, Gabriella: $2x$, Paulo: $x + 2x + 3 = 3x + 3$
Total number of figures: $x + 2x + 3x + 3 = 6x + 3$
1 mark *for $2x$;* ***1 mark*** *for $3x + 3$;* ***1 mark*** *for correct answer. Total 3 marks.*

Page 23, Formulae

1. a Cost = $80 + 5 \times 15 = 80 + 75 = £155$
1 mark *for substituting in;* ***1 mark*** *for correct answer.*

b $\frac{275 - 80}{15} = 13$ hours
1 mark *for 195 or subtracting 80 first;* ***1 mark*** *for correct answer.*

2. a $d = \frac{4+5}{2} = \frac{9}{2} = 4.5$
1 mark *for substituting in;* ***1 mark*** *for correct answer.*

b $d = 4^2 - 3 \times 4 = 16 - 12 = 4$
1 mark *for substituting in;* ***1 mark*** *for correct answer.*

c $4 = 2d - 12$
$2d = 4 + 12 = 16$
$d = \frac{16}{2} = 8$
1 mark *for substituting in;* ***1 mark*** *for rearranging;*
1 mark *for correct answer. Total 3 marks.*

3. $a = \frac{24 - 0}{8} = \frac{24}{8} = 3$ m/s^2
1 mark *for substituting in;* ***1 mark*** *for correct answer.*

4. $C = 100 + 40t$ or $C = 40t + 100$
1 mark *for $40t + 100$;* ***1 mark*** *for correct answer.*

5. Number of tablets = $\frac{17.5}{3.5} = 5$
1 mark *for substituting in;* ***1 mark*** *for correct answer.*

Page 24, Equations and identities

1.

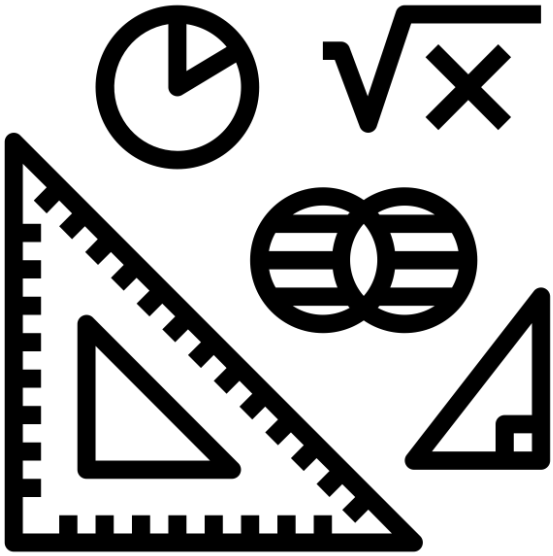
Expression	Formula	Equation	Identity
e, g	b, f	(a), c	d, h

1 mark *for each correct answer. Total 7 marks.*

2. A, **D**, **E**
1 mark *for each correct answer. Total 3 marks.*

MATHS – HIGHER

On the following pages you will find a series of maths activities. Please start with the ones that are appropriate for your tier or set although of course you are welcome to try other activities if you wish. You can mark your own work by using the answers at the back of the section.



Calculations

Grade 3

1. Work out

a) 25.043 – 17.82

..... **[I got ___ / 2 marks]**

b) 7.4 × 0.26

..... **[___ / 2 marks]**

c) 17.12 ÷ 0.8

..... **[___ / 2 marks]**

Grade 4

2. Work out

a) $(12 - 4 \times 2)^3$

..... **[___ / 1 mark]**

b) $\dfrac{4 \times 5^2}{4 \times 5 \div 2}$

..... **[___ / 1 mark]**

c) $5\sqrt{50 - 1} + 6 \times 3$

..... **[___ / 1 mark]**

d) $5 + (-3.2) \times 4$

..... **[___ / 1 mark]**

e) $(1 - 0.1) \times 4 - (-10)$

..... **[___ / 2 marks]**

f) $\dfrac{(-0.2) \times (-6)}{-1 + 0.7}$

..... **[___ / 2 marks]**

Grade 4

3. Supermarket A sells a pack of six vegan burgers for £4.65

Supermarket B sells a pack of eight for £6.59

Which supermarket is better value? Show your working.

..... **[___ / 3 marks]**

Grade 4

4. Marina's fence measures 1.4 m by 10.5 m. It costs £0.60 to paint the fence per square metre. How much does it cost to paint the fence in total?

£..... **[___ / 3 marks]**

Rounding & truncation

Grade 3

1. Round 20 193 to

a) 4 significant figures

..... **[I got ___ / 1 mark]**

b) 3 significant figures

..... **[___ / 1 mark]**

c) 2 significant figures

..... **[___ / 1 mark]**

d) 1 significant figure.

..... **[___ / 1 mark]**

Grade 3

2. Round 0.006 802 to

Hint
Where do significant figures start?

a) 1 significant figure

..... **[___ / 1 mark]**

b) 2 significant figures

..... **[___ / 1 mark]**

c) 3 significant figures.

..... **[___ / 1 mark]**

Grade 3

3. a) Calculate $\frac{1}{3}(0.02 \times 11.9)^2$. Write all the figures on your calculator display.

..... **[___ / 1 mark]**

b) Write your answer to part **a**

i) truncated to 2 decimal places

..... **[___ / 1 mark]**

ii) rounded to 2 significant figures.

..... **[___ / 1 mark]**

Grade 3

4. One bag of grass seed covers an area of 3.66 m^2 and costs £4.99. Fabio needs grass seed for a lawn of 32 m^2. How much will the grass seed cost Fabio? Give your answer to the nearest pound.

£..... **[___ / 3 marks]**

Grade 4

5. Shirley rounds 0.065 29 to 2 significant figures and gives the answer 0.07. Shirley is wrong. Explain why.

Hint
Think about the difference between significant figures and decimal places.

..... **[___ / 1 mark]**

2

Estimation

Grade 4

1. Estimate the value of $\frac{317 + 48.6}{9.683}$. Show your working.

Hint
Always round numbers before calculating.

..... **[I got ___ / 2 marks]**

Grade 4

2. Estimate the value of $\frac{2.67 \times 1.36}{0.11 + 0.42}$. Show your working.

..... **[___ / 2 marks]**

Grade 4

3. A biologist visits a lake at the start of January and works out that the number of fish in the lake is approximately 1000. She thinks that the population is growing at a rate of 17 fish per day. Estimate how many fish there will be in the lake five months later.

..... **[___ / 3 marks]**

Grade 5

4. In one week, an Italian restaurant sells 96 portions of lasagne. The restaurant sells a portion of lasagne for £8.95 and each portion costs £3.20 to make. Estimate the profit the restaurant makes from lasagne in the week.

£..... **[___ / 3 marks]**

Grade 5

5. James is driving to visit his Gran who lives 405 km away. He leaves at 8.30 am and drives at an average speed of 77 km/h, stopping for a 25-minute lunch break on the way. Estimate the time he arrives at his Gran's.

..... **[___ / 3 marks]**

Grade 6

6. Giving your answers to 1 decimal place, estimate the value of

a) $\sqrt{47}$

..... **[___ / 1 mark]**

b) $\sqrt{200}$

..... **[___ / 1 mark]**

Error intervals & bounds

Grade 5

1. The length, p m, of a football pitch is given as 110 m.
Write the error interval for p if this value is rounded to

a) the nearest 10 metres

$\leq p <$ ..... **[I got ___ / 2 marks]**

b) the nearest 5 metres.

$\leq p <$ ..... **[___ / 2 marks]**

Grade 5

2. A number, x, is given rounded to a particular degree of accuracy.
Write the error interval for x in each case.

a) $x = 4.67$ to 2 decimal places

$\leq x <$ ..... **[___ / 2 marks]**

b) $x = 5000$ to 1 significant figure.

$\leq x <$ ..... **[___ / 2 marks]**

Grade 5

3. A number, y, is given truncated. Write the error interval for y.

a) $y = 9$ truncated to an integer

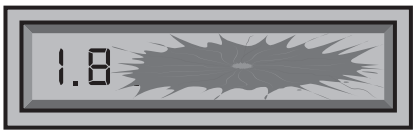
$\leq y <$ ..... **[___ / 2 marks]**

b) $y = 2.5$ truncated to 1 decimal place

$\leq y <$ ..... **[___ / 2 marks]**

Grade 5

4. Sienna uses her calculator to answer a question. The display breaks and she can only see 1.8 at the start of her answer. Let x be the unknown number on the display and write the range of possible values for x as an error interval.



Hint
Remember your inequalities.

..... **[___ / 2 marks]**

Grade 7

5. The side length of a square is given as 15 cm to the nearest centimetre. Work out the error interval for the area, x cm^2, of the square.

..... **[___ / 3 marks]**

Grade 7

6. A car travels on the motorway at a speed of 110 km/h to 3 significant figures, for a distance of 45 km, correct to the nearest kilometre. By considering bounds, work out the time taken in hours to travel this distance to an appropriate degree of accuracy. Give a reason for your answer.

..... **[___ / 5 marks]**

Adding & subtracting fractions

Grade 3

1. Work out and simplify where possible

a) $\frac{2}{9}+\frac{5}{6}$

..... **[I got ___ / 2 marks]**

b) $3\frac{1}{6}-2\frac{3}{4}$

..... **[___ / 3 marks]**

Grade 4

2. $\frac{1}{8}$ of the students in a class drive to school. $\frac{2}{3}$ of the students walk to school. The rest take the bus. What fraction of the students take the bus?

Hint
The whole class is represented by the number 1

..... **[___ / 3 marks]**

Grade 4

3. Daisy is building a model train track. Her track is $2\frac{4}{5}$ m long. She then takes out a piece of track which is $\frac{7}{8}$ m long and replaces it with a piece which is $1\frac{1}{20}$ m long. Work out the length of her track now.

.....m **[___ / 3 marks]**

Grade 4

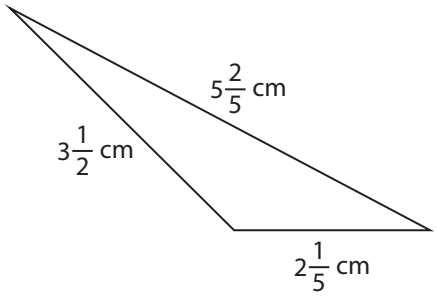
4. Maxwell is reading a book on his e-reader. When he picks it up one day, it tells him he is $\frac{1}{3}$ of the way through the book. He reads some and when he puts it down he is $\frac{3}{4}$ of the way through. What fraction of the book did he read?

..... **[___ / 2 marks]**

Grade 5

5. Work out the perimeter of the shape shown.

Hint
Add together the whole number parts and then add together the fraction parts.



.....cm **[___ / 3 marks]**

Multiplying & dividing fractions

Grade 3

1. A café uses up $\frac{2}{3}$ of a box of coffee beans every day. How many days will it take for it to use up 16 boxes of coffee beans?

..... **[I got ___ / 2 marks]**

Grade 4

2. Work out and simplify where possible.

a) $1\frac{1}{2} \times 3\frac{5}{6}$

..... **[I got ___ / 3 marks]**

b) $4\frac{4}{9} \div 2\frac{2}{3}$

..... **[___ / 3 marks]**

Grade 4

3. Rafael reserves $\frac{3}{10}$ of his monthly wage to pay his bills. $\frac{1}{4}$ of this amount is spent on his electricity bill.

What fraction of his monthly wage does Rafael spend on his electricity bill?

Hint
What calculation does the word 'of' represent?

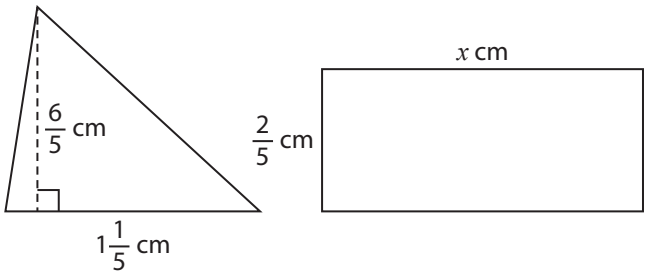
..... **[___ / 2 marks]**

Grade 5

4. A triangle has base $1\frac{1}{5}$ cm and height $\frac{6}{5}$ cm. A rectangle has the same area as the triangle. If the width of the rectangle is $\frac{2}{5}$ cm, what is its length, x cm?

Give your answer in its simplest form.

Hint
This question combines fractions and geometry. Find the area of the triangle. What is the same about both shapes?



..... cm **[___ / 3 marks]**

Grade 5

5. Vasiliki has a piece of material $3\frac{3}{4}$ m long.

She is cutting it into smaller pieces of length $\frac{5}{6}$ m.

How many smaller pieces can she get, and what fraction of a metre will be left over?

Hint
You need to divide fractions here.

Number of small pieces = ... Fraction left = ... m

[___ / 3 marks]

6

Fractions, decimals & percentages

Grade 4

1. In Lin's class, 6 out of 25 children read fantasy books. In Jay's class, 8 out of 32 children read fantasy books. Lin says the proportion of children who read fantasy books is greater in her class than in Jay's. Is Lin correct? Explain your answer.

.....

.....

[___ / 2 marks]

Grade 5

2. Sally says that multiplying by 0.01 is the same as dividing by 100. Is Sally correct? Explain your reasoning.

.....

[___ / 1 mark]

Grade 6

3. Explain, using prime factors, why $\frac{11}{28}$ is a recurring decimal.

.....

.....

[___ / 2 marks]

Grade 6

4. Jonathan ran some park races last year. 15% of his races were 5 km runs, $\frac{7}{10}$ of his races were 10 km runs and the rest were half marathons. If he ran 20 races in total, how many were half marathons?

.....

[___ / 3 marks]

Grade 6

5. In a city, 5.5 out of every 22 square metres are used for housing and services. If housing takes up $\frac{5}{8}$ of this space, what percentage of the total area is used for services?

.....

[___ / 3 marks]

Recurring decimals

Grade 6

1. Express these fractions as decimals.

a) $\frac{1}{18}$

..... **[I got ___ / 2 marks]**

b) $\frac{20}{33}$

..... **[___ / 2 marks]**

c) $\frac{3}{7}$

..... **[___ / 2 marks]**

Grade 7

2. Prove algebraically that $0.\dot{5} = \frac{5}{9}$

Hint
Let $x = 0.\dot{5}$ and find $10x$

[___ / 2 marks]

Grade 7

3. Write $0.\dot{8}\dot{4}$ as a fraction in its simplest form.

..... **[___ / 3 marks]**

Grade 8

4. Prove algebraically that $0.0\dot{5}\dot{6} = \frac{28}{495}$

[___ / 3 marks]

8

Surds

Grade 7

1. Write these expressions in the form $a\sqrt{2}$, where a is an integer.

a) $\sqrt{18} - \sqrt{8}$

..... **[I got ___ / 2 marks]**

b) $\sqrt{200} + \sqrt{72} - \sqrt{98}$

..... **[___ / 2 marks]**

c) $3\sqrt{2} + 7\sqrt{32}$

..... **[___ / 2 marks]**

d) $\frac{14}{\sqrt{2}}$

..... **[___ / 2 marks]**

Grade 8

2. Write these expressions in the form $a + b\sqrt{3}$, where a and b are integers.

a) $(1 + \sqrt{3})^2$

..... **[___ / 2 marks]**

b) $\frac{8}{2 - \sqrt{3}}$

Hint
Multiply numerator and denominator by the denominator with a changed sign.

..... **[___ / 3 marks]**

c) $\frac{\sqrt{3} - 1}{\sqrt{3} + 1}$

..... **[___ / 3 marks]**

Grade 8

3. Show that $(\sqrt{11} - \sqrt{8})(\sqrt{11} + \sqrt{8}) = 3$

..... **[___ / 3 marks]**

Index notation

Grade 4

1. Peter says that $2^3 \times 5^2$ simplifies to 10^5. Peter is wrong. Explain why.

..... **[I got ___ / 1 mark]**

Grade 5

2. Simplify $\frac{(2^7 \times 2^4)^{-1}}{2}$ fully and leave your answer in index form.

Hint
A power of -1 gives the reciprocal and a power of $\frac{1}{n}$ gives the nth root.

..... **[___ / 2 marks]**

Grade 6

3. Write in simplified index form

a) $\left(3^{\frac{1}{4}}\right)^{\frac{1}{4}}$ ..... **[___ / 1 mark]**

b) $\sqrt[3]{5^2}$ ..... **[___ / 2 marks]**

Grade 7

4. Work out

a) $\left(\frac{2}{5}\right)^3$ ..... **[___ / 1 mark]**

b) $25^{\frac{1}{2}}$ ..... **[___ / 1 mark]**

c) $8^{\frac{2}{3}}$ ..... **[___ / 2 marks]**

d) $\left(\frac{16}{9}\right)^{-\frac{3}{2}}$ ..... **[___ / 3 marks]**

Grade 8

5. $3 \times \sqrt{27} = 3^n$

Find the value of n

..... **[___ / 3 marks]**

Grade 9

6. $2^x \times 2^y = 64$ and $2^x \div 2^y = 4$

Find the values of x and y

Hint
Start by finding two simultaneous equations.

$x =$ ..... $y =$ ..... **[___ / 4 marks]**

10

Prime factor decomposition

Grade 4

1. Write 110 as a product of its prime factors.

..... **[I got ___ / 2 marks]**

Grade 4

2. a) Write 540 as a product of powers of its prime factors.

..... **[___ / 2 marks]**

b) By looking at its prime factors, explain why 540 is divisible by 15

Hint
What are the prime factors of 15?

..... **[___ / 1 mark]**

Grade 4

3. a) Write 750 as a product of its prime factors. Give your answer in index notation.

..... **[___ / 2 marks]**

b) By looking at its prime factors, explain why 750 is not divisible by 4

..... **[___ / 1 mark]**

Grade 5

4. The prime factor decomposition of a number, x, is $2 \times 3^2 \times 7 \times 13$

a) Is x even or odd? Explain your reasoning.

..... **[___ / 1 mark]**

b) What is the prime factor decomposition of a number twice as big as x?

..... **[___ / 1 mark]**

Grade 5

5. A number is a multiple of 4, 5 and 6. Write the prime factor decomposition of the smallest number it could be.

..... **[___ / 2 marks]**

Finding HCF and LCM

Grade 4

1. a) Write 160 as a product of prime factors.

..... **[I got ___ / 2 marks]**

b) Find the highest common factor of 160 and 280

..... **[___ / 2 marks]**

c) Find the lowest common multiple of 160 and 280

..... **[___ / 2 marks]**

Grade 5

2. Two numbers have prime factor decompositions $2^3 \times 5 \times 11$ and $2 \times 3^2 \times 5$

Find

a) the highest common factor of the two numbers

..... **[___ / 2 marks]**

b) the lowest common multiple of the two numbers.

..... **[___ / 1 mark]**

Grade 5

3. Fran is sorting her books into piles. She has 225 yellow books and 324 orange books. She does not want to mix the colours and wants every pile to contain the same number of books. Work out the biggest number of books she can put in each pile.

..... **[___ / 3 marks]**

Grade 6

4. Two numbers, A and B, have prime factor decompositions $A = 2 \times 3 \times 7 \times x$ and $B = 2^2 \times 5^2$

The highest common factor of the two numbers is 4

a) Work out the value of x.

Hint
How does the HCF relate to the prime factor decomposition?

..... **[___ / 1 mark]**

b) Work out the value of the number A.

..... **[___ / 1 mark]**

Standard form

Grade 3

1. Write these as ordinary numbers.

a) 1.56×10^8

..... **[I got ___ / 1 mark]**

b) 8.02×10^{-3}

..... **[___ / 1 mark]**

Grade 3

2. Write these numbers in standard form.

a) 48 000 000 000

..... **[___ / 1 mark]**

b) 0.000 0703

..... **[___ / 1 mark]**

c) 95×10^6

..... **[___ / 1 mark]**

d) 0.68×10^{-4}

..... **[___ / 1 mark]**

Grade 3

3. The distance from the Sun to Earth is approximately 150 000 000 km. Write this number in standard form.

.....km **[___ / 1 mark]**

Grade 4

4. Put these numbers in order of size, starting with the biggest.

2.1×10^4 2.3×10^5 0.21×10^4 2200

Hint
Write all the numbers in the same form.

..... **[___ / 3 marks]**

Grade 4

5. The size of a bacteria cell is 4×10^{-7} m and the size of a virus is 0.000 000 05 m. Which is smaller, the bacteria cell or the virus? Show your working.

..... **[___ / 2 marks]**

Grade 4

6. Here are the populations of four countries.

Angola: 31.8×10^6 Uzbekistan: 3.29×10^7 Malaysia: 31.9 million Mongolia: 3.2×10^6

Which country has the largest population? Show your working.

..... **[___ / 2 marks]**

Calculating with standard form

Grade 5

1. Work out the value of each expression, giving your answers in standard form.

a) $(5 \times 10^4) + (6 \times 10^5)$

..... **[I got ___ / 2 marks]**

b) $(9 \times 10^{-3}) - (3 \times 10^{-4})$

..... **[___ / 2 marks]**

c) $(2.1 \times 10^8) \times (3 \times 10^{-5})$

..... **[___ / 2 marks]**

d) $(8.2 \times 10^3) \div (4.1 \times 10^7)$

..... **[___ / 2 marks]**

Grade 6

2. The MiG 25 fighter jet can fly at 4×10^3 km/h. How long would it take to travel a distance of 3000 km? Give your answer in minutes.

Hint
Remember that $\text{speed} = \frac{\text{distance}}{\text{time}}$

..... minutes **[___ / 3 marks]**

Grade 6

3. A region on a map forms the shape of a rectangle with width 1.2×10^2 km and length 7×10^3 km. Work out the area of this region in standard form.

..... km^2 **[___ / 3 marks]**

Grade 7

4. The circumference of Earth is 4.0075×10^9 cm. The circumference of another planet is 0.2 times the circumference of Earth.

Hint
Start by rounding the circumference of Earth.

a) Work out an estimate for the circumference of this planet. Give your answer in standard form.

..... cm **[___ / 3 marks]**

b) Is your answer in part **a** an underestimate or an overestimate? Explain your answer.

..... **[___ / 1 mark]**

Guided answers

Page 1, Calculations

1. a
$$\begin{array}{r} {}^{1}2{}^{14}\cancel{5}{}^{1}.043 \\ -\,17.820 \\ \hline 7.223 \end{array}$$

1 mark *for lining up the digits correctly in columns;*
1 mark *for the correct answer.*

b
$$\begin{array}{r} 74 \\ \times\ 26 \\ \hline 444 \\ +\,1480 \\ \hline 1924 \end{array}$$

Since $74 \times 26 = 1924$,
$7.4 \times 0.26 = 1924 \div 10 \div 100 = 1.924$

1 mark *for multiplying 74 × 26 to get 1924;* ***1 mark*** *for the correct answer.*

c $17.12 \div 0.8 = 171.2 \div 8$

$$8\overline{)17^{1}1.^{3}2}\quad 21.4$$

$171.2 \div 8 = 21.4$

1 mark *for dividing 171.2 by 8;* ***1 mark*** *for the correct answer.*

2. a $(12 - 4 \times 2)^3 = (12 - 8)^3 = 4^3 = 64$

1 mark *for correct answer.*

b $\frac{4 \times 5^2}{4 \times 5 \div 2} = \frac{4 \times 25}{10} = \frac{100}{10} = 10$

1 mark *for correct answer.*

c $5\sqrt{50 - 1} + 6 \times 3 = 5 \times \sqrt{49} + 6 \times 3 = 5 \times 7 + 6 \times 3$
$= 35 + 18 = 53$

1 mark *for correct answer.*

d $5 + (-3.2) \times 4 = 5 + (-12.8) = -7.8$

1 mark *for correct answer.*

e $(1 - 0.1) \times 4 - (-10) = 0.9 \times 4 - (-10) = 3.6 - (-10)$
$= 13.6$

1 mark *for 3.6;* ***1 mark*** *for the correct answer.*

f $\frac{(-0.2) \times (-6)}{-1 + 0.7} = \frac{1.2}{-0.3} = -4$

1 mark *for either 1.2 in the numerator or –0.3 in the denominator;* ***1 mark*** *for the correct answer.*

3. Supermarket A: £4.65 ÷ 6 = £0.775 per burger
Supermarket B: £6.59 ÷ 8 = £0.82375 per burger
$0.775 < 0.82375$
Therefore, Supermarket A is better value.

1 mark *for 0.775;* ***1 mark*** *for 0.82375;* ***1 mark*** *for correct conclusion with full justification. Total 3 marks.*

4. Area of fence = $1.4 \times 10.5 = 14.7\,m^2$
Cost = $14.7 \times 0.6 = £8.82$

1 mark *for multiplying lengths;* ***1 mark*** *for multiplying by cost per square metre;* ***1 mark*** *for correct answer. Total 3 marks.*

Page 2, Rounding & truncation

1. a 20 190 **b** 20 200
c 20 000 **d** 20 000

1 mark *for each correct answer.*

2. a 0.007 **b** 0.0068 **c** 0.006 80

1 mark *for each correct answer.*

3. a 21.56 8361…
b i 22 **ii** 21.5

1 mark *for each correct answer.*

3. a 0.018 8813…
b i 0.01 **ii** 0.019

1 mark *for each correct answer.*

4. $32 \div 3.66 = 8.743\ldots$
He can only buy whole bags, so round up to the next integer: 9 bags.
Total cost = $9 \times 4.99 = £44.91$
= £45 to the nearest pound

1 mark *for correct division;* ***1 mark*** *for rounding up and multiplying by £4.99;* ***1 mark*** *for correct answer. Total 3 marks.*

5. Shirley has rounded 0.065 29 to 2 dp instead of 2 sf. The correct answer is 0.065

1 mark *for a correct explanation.*

Page 3, Estimation

1. $\frac{317 + 48.6}{9.683} \approx \frac{300 + 50}{10} \approx \frac{350}{10} \approx 35$

1 mark *for rounding to 1 sf;* ***1 mark*** *for correct answer.*

2. $\frac{2.67 \times 1.36}{0.11 + 0.42} \approx \frac{3 \times 1}{0.1 + 0.4} \approx \frac{3}{0.5} \approx 6$

1 mark *for rounding to 1 sf;* ***1 mark*** *for correct answer.*

3. Number of fish at start of January ≈ 1000
Increase ≈ 20 fish per day
Five months ≈ $5 \times 30 \approx 150$ days
Number of fish after five months ≈ $150 \times 20 + 1000 \approx 4000$

1 mark *for rounding rate of increase to 1 sf;* ***1 mark*** *for correct calculation for the number of fish after five months;* ***1 mark*** *for correct answer. Total 3 marks.*

4. Number of portions sold ≈ 100
Sale price per portion ≈ £9.00
Cost per portion ≈ £3.00
Profit per portion ≈ £9.00 – £3.00 ≈ £6.00
Total profit ≈ £6.00 × 100 ≈ £600

1 mark *for rounding portions, sale price and cost to 1 sf;* ***1 mark*** *for a profit calculation;* ***1 mark*** *for correct answer. Total 3 marks.*
Note that there are alternative methods.

5. Distance driven ≈ 400 km
Average speed ≈ 80 km/h
Time driving ≈ $\frac{400}{80} \approx 5$ hours
Time for whole journey ≈ 5 hours 30 minutes (including the break)
Time of arrival is roughly 2 pm (8.30 am + $5\frac{1}{2}$ hours).

1 mark *for rounding distance and speed to 1 sf;* ***1 mark*** *for finding the time taken;* ***1 mark*** *for correct answer. Total 3 marks.*

6. a $\sqrt{36} < \sqrt{47} < \sqrt{49}$, so $6 < \sqrt{47} < 7$
$\sqrt{47} = 6.9$ to 1 dp

1 mark *for an answer of 6.8 or 6.9*

b $\sqrt{196} < \sqrt{200} < \sqrt{225}$, so $14 < \sqrt{200} < 15$
$\sqrt{200} = 14.1$ to 1 dp

1 mark *for an answer of 14.1 or 14.2*

Page 4, Error intervals & bounds

1. a $105 \le p < 115$ **b** $107.5 \le p < 112.5$
1 mark *for each correct minimum;* ***1 mark*** *for each correct maximum.*

2. a $4.665 \le x < 4.675$ **b** $4500 \le x < 5500$
1 mark *for each correct minimum;* ***1 mark*** *for each correct maximum.*

3. a $9 \le y < 10$ **b** $2.5 \le y < 2.6$
1 mark *for each correct minimum;* ***1 mark*** *for each correct maximum.*

4. Sienna can see a truncation to 1 dp so the error interval is $1.8 \le x < 1.9$
1 mark *for correct minimum and maximum;* ***1 mark*** *for correct interval notation.*

5. Lower bound for the length is 14.5 cm, so lower bound for the area is $14.5^2 = 210.25\text{ cm}^2$.
Upper bound for the length is 15.5 cm, so upper bound for the area is $15.5^2 = 240.25\text{ cm}^2$.
Error interval for the area, $x\text{ cm}^2$, is $210.25 \le x < 240.25$
1 mark *for* 14.5^2*;* ***1 mark*** *for* 15.5^2*;* ***1 mark*** *for correct error interval. Total 3 marks.*

6. The error interval for the speed, s km/h, is $109.5 \le s < 110.5$
The error interval for the distance, d km, is $44.5 \le d < 45.5$
The lower bound for the time taken is $\frac{44.5}{110.5} = 0.4027\ldots$ hours
The upper bound for the time taken is $\frac{45.5}{109.5} = 0.4155\ldots$ hours
Both of these answers round to 0.4 hours to 1 dp, so this is an appropriate degree of accuracy.
1 mark *for upper and lower bounds for speed;*
1 mark *for upper and lower bounds for distance;*
1 mark *for lower bound for time;* ***1 mark*** *for upper bound for time;* ***1 mark*** *for correct answer. Total 5 marks.*

Page 5, Adding & subtracting fractions

1. a $\frac{2}{9} + \frac{5}{6} = \frac{4}{18} + \frac{15}{18} = \frac{19}{18}$ or $1\frac{1}{18}$
1 mark *for finding a common denominator;* ***1 mark*** *for correct answer.*
b $3\frac{1}{6} - 2\frac{3}{4} = \frac{19}{6} - \frac{11}{4} = \frac{38}{12} - \frac{33}{12} = \frac{5}{12}$
1 mark *for converting mixed numbers to improper fractions;* ***1 mark*** *for finding a common denominator;* ***1 mark*** *for correct answer. Total 3 marks.*

2. $\frac{1}{8} + \frac{2}{3} = \frac{3+16}{24} = \frac{19}{24}$
$1 - \frac{19}{24} = \frac{24}{24} - \frac{19}{24} = \frac{5}{24}$
1 mark *for finding a common denominator of 24;* ***1 mark*** *for adding to get* $\frac{19}{24}$*;* ***1 mark*** *for correct answer. Total 3 marks.*

3. $2\frac{4}{5} - \frac{7}{8} + 1\frac{1}{20} = \frac{14}{5} - \frac{7}{8} + \frac{21}{20} = \frac{112}{40} - \frac{35}{40} + \frac{42}{40} = \frac{119}{40}$ m or $2\frac{39}{40}$ m
1 mark *for converting mixed numbers to improper fractions;* ***1 mark*** *for finding a common denominator;* ***1 mark*** *for correct answer. Total 3 marks.*

4. $\frac{3}{4} - \frac{1}{3} = \frac{9-4}{12} = \frac{5}{12}$
1 mark *for finding a common denominator;* ***1 mark*** *for correct answer.*

5. Perimeter $= 3\frac{1}{2} + 5\frac{2}{5} + 2\frac{1}{5}$
$= 3 + 5 + 2 + \frac{1}{2} + \frac{2}{5} + \frac{1}{5}$
$= 10 + \frac{5}{10} + \frac{4}{10} + \frac{2}{10}$
$= 10 + \frac{11}{10}$
$= 10 + 1\frac{1}{10} = 11\frac{1}{10}$ cm
1 mark *for summing the lengths;* ***1 mark*** *for finding common denominator;* ***1 mark*** *for correct answer or equivalent. Total 3 marks.*

Page 6, Multiplying & dividing fractions

1. $16 \div \frac{2}{3} = \frac{16}{1} \times \frac{3}{2} = \frac{\overset{8}{\cancel{16}} \times 3}{1 \times \underset{1}{\cancel{2}}} = \frac{8 \times 3}{1 \times 1} = \frac{24}{1} = 24$ days
1 mark *for writing a division and turning it into a correct multiplication;* ***1 mark*** *for correct answer.*

2. a $1\frac{1}{2} \times 3\frac{5}{6} = \frac{3}{2} \times \frac{23}{6} = \frac{\overset{1}{\cancel{3}} \times 23}{2 \times \underset{2}{\cancel{6}}} = \frac{1 \times 23}{2 \times 2} = \frac{23}{4} = 5\frac{3}{4}$
1 mark *for converting to improper fractions;* ***1 mark*** *for multiplying;* ***1 mark*** *for correct answer. Accept correct improper fraction or mixed number. Total 3 marks.*
b $4\frac{4}{9} \div 2\frac{2}{3} = \frac{40}{9} \div \frac{8}{3} = \frac{40}{9} \times \frac{3}{8} = \frac{\overset{5}{\cancel{40}} \times \overset{1}{\cancel{3}}}{\underset{3}{\cancel{9}} \times \underset{1}{\cancel{8}}} = \frac{5 \times 1}{3 \times 1} = \frac{5}{3} = 1\frac{2}{3}$
1 mark *for converting to improper fractions;* ***1 mark*** *for writing a correct multiplication;* ***1 mark*** *for correct, simplified answer (improper fraction or mixed number). Total 3 marks.*

3. $\frac{1}{4}$ of $\frac{3}{10} = \frac{1}{4} \times \frac{3}{10} = \frac{3}{40}$
1 mark *for multiplying;* ***1 mark*** *for correct answer.*

4. Area of triangle $= \frac{1}{2} \times 1\frac{1}{5} \times \frac{6}{5} = \frac{1}{2} \times \frac{6}{5} \times \frac{6}{5} = \frac{18}{25}\text{ cm}^2$
This is the area of the rectangle.
Length of rectangle $= \frac{18}{25} \div \frac{2}{5} = \frac{18}{25} \times \frac{5}{2} = \frac{\overset{9}{\cancel{18}} \times \overset{1}{\cancel{5}}}{\underset{5}{\cancel{25}} \times \underset{1}{\cancel{2}}}$
$= \frac{9 \times 1}{5 \times 1} = \frac{9}{5}$ cm or $1\frac{4}{5}$ cm
1 mark *for writing a correct multiplication;* ***1 mark*** *for writing a division and turning into a correct multiplication;* ***1 mark*** *for correct, simplified answer (improper fraction or mixed number). Total 3 marks.*

5. $3\frac{3}{4} \div \frac{5}{6} = \frac{15}{4} \div \frac{5}{6} = \frac{15}{4} \times \frac{6}{5} = \frac{90}{20} = \frac{9}{2}$ or $4\frac{1}{2}$ or 4.5
Vasiliki can get 4 smaller pieces.
$\frac{1}{2} \times \frac{5}{6} = \frac{5}{12}$ m will be left over.
1 mark *for converting to improper fraction and writing a correct multiplication;* ***1 mark*** *for correct answer to the multiplication and identifying correct number of smaller pieces;* ***1 mark*** *for correct fraction left over. Total 3 marks.*

Page 7, Fractions, decimals & percentages

1. Lin's class: $\frac{6}{25} = \frac{24}{100} = 24\%$
Jay's class: $\frac{8}{32} = \frac{1}{4} = \frac{25}{100} = 25\%$
Lin is not correct. Jay's class has a (slightly) higher proportion of students who read fantasy books.
1 mark *for finding either 24% or 25% or for giving both fractions a common denominator;* ***1 mark*** *for a complete, correct explanation.*

2. Since $0.01 = \frac{1}{100}$, multiplying by 0.01 is the same as multiplying by $\frac{1}{100}$, which makes the answer 100 times smaller, so it is equivalent to dividing by 100. Sally is correct.
1 mark *for a correct explanation.*

3. $\frac{11}{28} = \frac{11}{2 \times 2 \times 7}$
If a fraction produces a terminating decimal, the prime factors in the denominator can only be 2s or 5s. This

fraction has a prime factor of 7 in the denominator, so it will produce a recurring decimal.

1 mark *for the prime factor decomposition of 28;* ***1 mark*** *for a correct explanation.*

4. $\frac{7}{10} = 70\%$; $70\% + 15\% = 85\%$; $100\% - 85\% = 15\%$

15% of the runs were half marathons.

Since 15% of 20 is 3, Jonathan ran 3 half marathons.

1 mark *for adding $\frac{7}{10}$ and 15% (either as percentages or fractions) and subtracting from 100% (or 1);* ***1 mark*** *for attempting to find 15% of 20;* ***1 mark*** *for the correct answer. Total 3 marks.*

Note that there are alternative methods.

5. Area used for housing and services $= \frac{5.5}{22} = \frac{1}{4}$

Fraction of this area used for services $= 1 - \frac{5}{8} = \frac{3}{8}$

Total area used for services $= \frac{3}{8} \times \frac{1}{4} = \frac{3}{32} = 9.375\%$

1 mark *for $\frac{3}{8}$;* ***1 mark*** *for multiplying by $\frac{1}{4}$;* ***1 mark*** *for correct answer as a percentage. Total 3 marks.*

Page 8, Recurring decimals

1. a $18\overline{)1.^{1}0^{10}0^{10}0^{10}0^{10}0}$ $\quad 0.0\dot{5}5\dot{5}5\dot{5}5$ $\quad \frac{1}{18} = 0.0\dot{5}$

b $33\overline{)20.^{20}0^{20}0^{20}0^{20}0}$ $\quad 0.\dot{6}0\dot{6}0$ $\quad \frac{20}{33} = 0.\dot{6}\dot{0}$

c $7\overline{)3.^{3}0^{2}0^{6}0^{4}0^{5}0^{1}0^{3}0}$ $\quad 0.4285714\dot{2}8\dot{5}7\dot{1}4\dot{2}8\dot{5}7\dot{1}4$ $\quad \frac{3}{7} = 0.\dot{4}28571\dot{4}$

For each part, ***1 mark*** *for division;* ***1 mark*** *for the correct answer.*

2. Let $x = 0.\dot{5}$

Then $10x = 5.\dot{5}$

Subtracting x from $10x$, you have $9x = 5$, so $x = \frac{5}{9}$

1 mark *for finding x and $10x$ and subtracting;* ***1 mark*** *for the correct answer.*

3. Let $x = 0.\dot{8}\dot{4}$

Then $100x = 84.\dot{8}\dot{4}$

Subtracting x from $100x$, you have $99x = 84$, so $x = \frac{84}{99} = \frac{28}{33}$

1 mark *for finding x and $100x$ and subtracting;* ***1 mark*** *for $\frac{84}{99}$;* ***1 mark*** *for the correct answer. Total 3 marks.*

4. Let $x = 0.0\dot{5}\dot{6}$

Then $10x = 0.\dot{5}\dot{6}$

Also $1000x = 56.\dot{5}\dot{6}$

Subtracting $10x$ from $1000x$, you have $990x = 56$, so $x = \frac{56}{990} = \frac{28}{495}$

1 mark *for finding $10x$ and $1000x$ and subtracting;* ***1 mark*** *for $\frac{56}{990}$;* ***1 mark*** *for the correct answer. Total 3 marks.*

Page 9, Surds

1. a $\sqrt{18} - \sqrt{8} = 3\sqrt{2} - 2\sqrt{2} = \sqrt{2}$ $(a = 1)$

1 mark *for simplifying both surds;* ***1 mark*** *for correct answer.*

b $\sqrt{200} + \sqrt{72} - \sqrt{98} = 10\sqrt{2} + 6\sqrt{2} - 7\sqrt{2} = 9\sqrt{2}$ $(a = 9)$

1 mark *for simplifying the three surds;* ***1 mark*** *for correct answer.*

c $3\sqrt{2} + 7\sqrt{32} = 3\sqrt{2} + 7 \times 4\sqrt{2} = 3\sqrt{2} + 28\sqrt{2} = 31\sqrt{2}$ $(a = 31)$

1 mark *for simplifying $7\sqrt{32}$;* ***1 mark*** *for correct answer.*

d $\frac{14}{\sqrt{2}} = \frac{14\sqrt{2}}{2} = 7\sqrt{2}$ $(a = 7)$

1 mark *for rationalising the denominator (multiplying numerator and denominator by $\sqrt{2}$);* ***1 mark*** *for correct answer.*

2. a $(1 + \sqrt{3})^2 = (1 + \sqrt{3})(1 + \sqrt{3}) = 1 + \sqrt{3} + \sqrt{3} + 3 = 4 + 2\sqrt{3}$ $(a = 4, b = 2)$

1 mark *for expanding the brackets;* ***1 mark*** *for simplifying expression to correct answer.*

b $\frac{8}{2 - \sqrt{3}} = \frac{8(2 + \sqrt{3})}{(2 - \sqrt{3})(2 + \sqrt{3})} = \frac{16 + 8\sqrt{3}}{4 - 3} = \frac{16 + 8\sqrt{3}}{1} = 16 + 8\sqrt{3}$ $(a = 16, b = 8)$

1 mark *for rationalising the denominator (multiplying numerator and denominator by $2 + \sqrt{3}$);* ***1 mark*** *for 1 in the denominator;* ***1 mark*** *for the correct answer. Total 3 marks.*

c $\frac{\sqrt{3} - 1}{\sqrt{3} + 1} = \frac{(\sqrt{3} - 1)(\sqrt{3} - 1)}{(\sqrt{3} + 1)(\sqrt{3} - 1)} = \frac{3 - 2\sqrt{3} + 1}{3 - 1} = \frac{4 - 2\sqrt{3}}{2} = 2 - \sqrt{3}$ $(a = 2, b = -1)$

1 mark *for rationalising the denominator (multiplying numerator and denominator by $\sqrt{3} - 1$);* ***1 mark*** *for 2 in the denominator;* ***1 mark*** *for the correct answer. Total 3 marks.*

3. $(\sqrt{11} - \sqrt{8})(\sqrt{11} + \sqrt{8}) = 11 + \sqrt{11}\sqrt{8} - \sqrt{11}\sqrt{8} - 8$

$= 11 - 8 = 3$ as required

1 mark *for attempt to expand brackets;* ***1 mark*** *for cancelling middle terms;* ***1 mark*** *for fully correct working. Total 3 marks.*

Page 10, Index notation

1. Peter has multiplied the bases. Since the bases are different, this cannot be simplified as a simple power of 10

1 mark *for a correct explanation.*

2. $\frac{(2^7 \times 2^4)^{-1}}{2} = \frac{(2^{7+4})^{-1}}{2} = \frac{(2^{11})^{-1}}{2} = \frac{2^{11 \times (-1)}}{2} = 2^{-11-1} = 2^{-12}$

1 mark *for 2^{11} in the brackets;* ***1 mark*** *for correct answer.*

3. a $(3^{\frac{1}{4}})^{\frac{1}{4}} = 3^{\frac{1}{4} \times \frac{1}{4}} = 3^{\frac{1}{16}}$

1 mark *for correct answer.*

b $\sqrt[3]{5^2} = 5^{\frac{2}{3}}$

1 mark *for a fractional index with 3 in the denominator;* ***1 mark*** *for the correct answer.*

4. a $\left(\frac{2}{5}\right)^3 = \frac{2^3}{5^3} = \frac{8}{125}$

1 mark *for correct answer.*

b $25^{\frac{1}{2}} = \sqrt{25} = 5$

1 mark *for correct answer.*

c $8^{\frac{2}{3}} = (\sqrt[3]{8})^2 = 2^2 = 4$

1 mark *for 2;* ***1 mark*** *for correct answer.*

d $\left(\frac{16}{9}\right)^{-\frac{3}{2}} = \left(\frac{9}{16}\right)^{\frac{3}{2}} = \left(\frac{\sqrt{9}}{\sqrt{16}}\right)^3 = \left(\frac{3}{4}\right)^3 = \frac{27}{64}$

1 mark *for $\frac{9}{16}$;* ***1 mark*** *for $\frac{3}{4}$;* ***1 mark*** *for correct answer. Total 3 marks.*

5. $3 \times \sqrt{27} = 3 \times (27)^{\frac{1}{2}} = 3 \times (3^3)^{\frac{1}{2}} = 3^1 \times 3^{\frac{3}{2}} = 3^{1 + \frac{3}{2}} = 3^{\frac{5}{2}}$

$n = \frac{5}{2}$ or $2\frac{1}{2}$ or 2.5

1 mark *for attempting to rewrite 27 with base 3,* ***1 mark*** *for $3^{\frac{3}{2}}$;* ***1 mark*** *for correct answer. Total 3 marks.*

6. $64 = 2^6$

$2^x \times 2^y = 2^6 \Rightarrow x + y = 6$ (1)

$4 = 2^2$

$2^x \div 2^y = 2^2 \Rightarrow x - y = 2$ (2)

(1) + (2): $2x = 8 \Rightarrow x = 4$

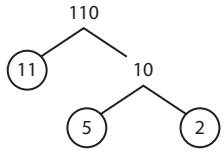
Substitute into (1): $4 + y = 6 \Rightarrow y = 2$

1 mark *for attempting to rewrite 64 and 2 with base 2;* ***1 mark*** *for either equation correct;* ***1 mark*** *for attempting to solve simultaneously;* ***1 mark*** *for correct values for x and y. Total 4 marks.*

Page 11, Prime factor decomposition

You might use a factor tree in your working with the same start and end as shown here but with different middle branches.

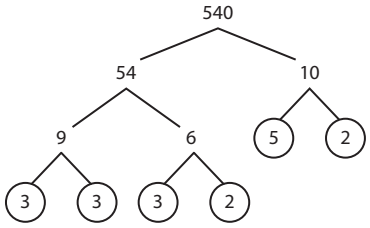
1.



$110 = 2 \times 5 \times 11$

1 mark *for finding or listing the prime factors;* ***1*** *for correct answer.*

2. a



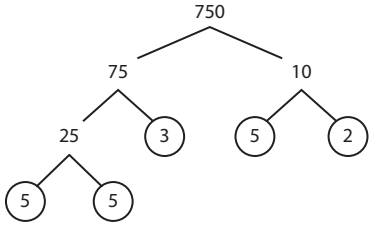
$540 = 2^2 \times 3^3 \times 5$

1 mark *for finding or listing the prime factors;* ***1 mark*** *for correct answer.*

b Since $15 = 3 \times 5$ and both 3 and 5 are prime factors of 540, then 540 must be divisible by 15

1 mark *for a correct explanation.*

3. a



$750 = 2 \times 3 \times 5^3$

1 mark *for finding or listing the prime factors;* ***1 mark*** *for correct answer.*

b Since $4 = 2 \times 2$, but 750 only contains the factor of 2 once, 750 is not divisible by 4

1 mark *for a correct explanation.*

4. a $2 \times 3^2 \times 7 \times 13$ is even since 2 is a prime factor.

1 mark *for correct answer.*

b To double a number, you multiply by 2, so the prime factor decomposition of a number twice as big will have another factor of 2. This is $2^2 \times 3^2 \times 7 \times 13$

1 mark *for correct answer.*

5. The prime factors of each number are:

$4 = 2 \times 2$; $5 = 5$; $6 = 2 \times 3$

Any number divisible by 4, 5 and 6 must have at least two 2s, one 5 and a 3, so the smallest such number is $2^2 \times 3 \times 5$

1 mark *for listing the prime factors of 4 and 6;* ***1 mark*** *for correct answer.*

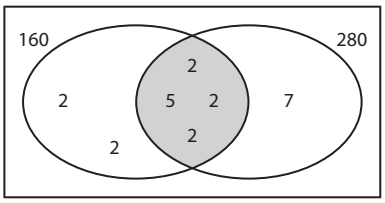
Page 12, Finding HCF and LCM

1. a $160 = 2^5 \times 5$

1 mark *for finding or listing the prime factors;* ***1 mark*** *for correct answer.*

b $280 = 2^3 \times 5 \times 7$

A Venn diagram to show the prime factors looks like this:



$HCF(160, 280) = 2^3 \times 5 = 40$

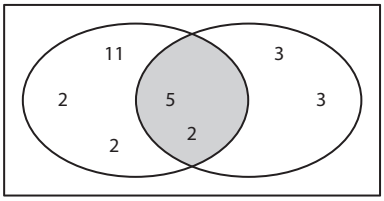
1 mark *for multiplying the common factors;* ***1 mark*** *for correct answer.*

c From the Venn diagram,

$LCM(160, 280) = 2 \times 2 \times 2 \times 2 \times 2 \times 5 \times 7 = 1120$

1 mark *for multiplying all appropriate factors;* ***1 mark*** *for correct answer.*

2.



a $HCF = 2 \times 5 = 10$

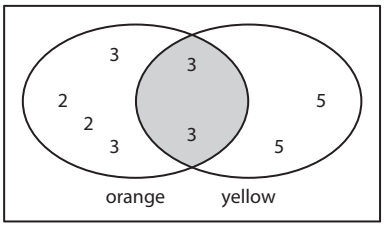
b $LCM = 2 \times 2 \times 11 \times 2 \times 5 \times 3 \times 3 = 3960$

1 mark *for correct Venn diagram or alternative method;* ***1 mark*** *for HCF;* ***1 mark*** *for LCM. Total 3 marks.*

3. $225 = 3^2 \times 5^2$

$324 = 2^2 \times 3^4$

A Venn diagram would look like this:



The HCF of the two numbers is 9, so Fran can sort her books into piles of a maximum of 9 if they are to be the same size.

1 mark *for the prime factors of 225;* ***1 mark*** *for the prime factors of 324;* ***1 mark*** *for correct answer. Total 3 marks.*

4. a You know that $4 = 2^2$ must divide into A, but $2 \times 3 \times 7$ only has one 2

Therefore, $x = 2$

b $A = 2 \times 2 \times 3 \times 7 = 84$

1 mark *for each correct answer.*

Page 13, Standard form

1. a $1.56 \times 10^8 = 156\,000\,000$ **b** $8.02 \times 10^{-3} = 0.008\,02$

1 mark *for each correct answer.*

2. a $48\,000\,000\,000 = 4.8 \times 10^{10}$ **b** $0.000\,0703 = 7.03 \times 10^{-5}$

c $95 \times 10^6 = 9.5 \times 10^7$ **d** $0.68 \times 10^{-4} = 6.8 \times 10^{-5}$

1 mark *for each correct answer.*

3. $150\,000\,000$ km $= 1.5 \times 10^8$ km

1 mark *for each correct answer.*

4. Putting all the numbers in either standard or ordinary form:

$2.1 \times 10^4 = 21\,000$; $2.3 \times 10^5 = 230\,000$;

$0.21 \times 10^4 = 2.1 \times 10^3 = 2100$; $2200 = 2.2 \times 10^3$

The order, starting with the biggest, is 2.3×10^5, 2.1×10^4, 2200, 0.21×10^4

1 mark *for converting at least two of the numbers correctly to an alternative form;* ***1 mark*** *for any three in the correct order;* ***1 mark*** *for all in the correct order. Total 3 marks.*

5. Virus: $0.000\,000\,05 = 5 \times 10^{-8}$ m
Bacteria cell: $4 \times 10^{-7} = 0.000\,0004$ m
The virus is smaller.
1 mark *for getting both numbers in the same form;* ***1 mark*** *for correct conclusion.*

6. Put all the populations in the same form.
If you put them all in standard form, you have:
Angola: 3.18×10^7; Uzbekistan: 3.29×10^7;
Malaysia: 3.19×10^7; Mongolia: 3.2×10^6
Uzbekistan has the biggest population.
1 mark *for putting all numbers in the same form;*
1 mark *for correct answer.*

Page 14, Calculating with standard form

1. a $(5 \times 10^4) + (6 \times 10^5) = 50\,000 + 600\,000$
$= 650\,000 = 6.5 \times 10^5$
1 mark *for converting to ordinary numbers or the same power of 10;* ***1 mark*** *for correct answer.*

b $(9 \times 10^{-3}) - (3 \times 10^{-4}) = 0.009 - 0.0003$
$= 0.0087 = 8.7 \times 10^{-3}$
1 mark *for converting to ordinary numbers or the same power of 10;* ***1 mark*** *for correct answer.*

c $(2.1 \times 10^8) \times (3 \times 10^{-5}) = 6.3 \times 10^{8+(-5)} = 6.3 \times 10^3$
1 mark *for 10^3;* ***1 mark*** *for correct answer.*

d $(8.2 \times 10^3) \div (4.1 \times 10^7) = 2 \times 10^{3-7} = 2 \times 10^{-4}$
1 mark *for 10^{-4};* ***1 mark*** *for correct answer.*

2. Using time $= \frac{\text{distance}}{\text{speed}}$,
$\text{time} = \frac{3000}{4 \times 10^3} = \frac{3 \times 10^3}{4 \times 10^3} = \frac{3}{4}$ hour = 45 minutes
1 mark *for dividing distance by speed;* ***1 mark*** *for $\frac{3}{4}$ hour;*
1 mark *for correct answer in minutes. Total 3 marks.*

3. Area $= (1.2 \times 10^2) \times (7 \times 10^3) = 8.4 \times 10^{2+3} = 8.4 \times 10^5$ km^2
1 mark *for multiplying;* ***1 mark*** *for 10^5;* ***1 mark*** *for correct answer. Total 3 marks.*

4. a Circumference $\approx 4 \times 10^9 \times 0.2 = 0.8 \times 10^9 = 8 \times 10^8$ cm
1 mark *for rounding 4.0075;* ***1 mark*** *for multiplication;*
1 mark *for correct answer in standard form. Total 3 marks.*

b It is an underestimate because 4.0075 is rounded down.
1 mark *for correct answer with explanation.*

Page 15, Simplifying expressions

1. a $3p - 5q + 3p^2 + 2q + 2q^2 - 9p^2 = 3p - 3q - 6p^2 + 2q^2$
1 mark *for $-3q$ and $-6p^2$;* ***1 mark*** *for the correct answer.*

b $5x^3 - 2xy - 6 + 6x^3 - 2 - 7xy + 8 = 11x^3 - 9xy$
1 mark *for $11x^3$ or $9xy$;* ***1 mark*** *for the correct answer.*

2. a Perimeter $= 3x + 3x + 7y + 7y = 6x + 14y$
1 mark *for an unsimplified expression;* ***1 mark*** *for the correct answer.*

b Area $= 3x \times 1.5x = 4.5x^2$
1 mark *for an unsimplified expression;* ***1 mark*** *for the correct answer.*

3. a $(2a)^3 = 8a^3$
1 mark *for 8;* ***1 mark*** *for a^3.*

b $(5a^2b^3)^2 = 25a^4b^6$
1 mark *for 25;* ***1 mark*** *for a^4 b^6.*

c $\frac{6x^2y^{-3}}{18yx^{-1}} = \frac{1}{3}x^3y^{-4}$ or $\frac{x^3}{3y^4}$
1 mark *for $\frac{1}{3}$;* ***1 mark*** *for $x^3\,y^{-4}$ or $\frac{x^3}{y^4}$.*

d $\sqrt{x^4y^6} = (x^4y^6)^{\frac{1}{2}} = x^2y^3$
1 mark *for x^2;* ***1 mark*** *for y^3.*

4. a $\frac{3^{-2} \times 3^8}{3^7} = \frac{3^6}{3^7} = 3^{-1}$
$3^{-1} = 3^x$, so $x = -1$
1 mark *for 3^6 in the numerator;* ***1 mark*** *for 3^{-1};* ***1 mark*** *for identifying that $x = -1$. Total 3 marks.*

b $2^5 \times 4^2 = 8^x$
$2^5 \times (2^2)^2 = (2^3)^x$
$2^5 \times 2^4 = 2^{3x}$
$2^9 = 2^{3x}$
$3x = 9$, so $x = 3$
1 mark *for writing 4 as 2^2 or 8 as 2^3;* ***1 mark*** *for 2^9 on the left-hand side;* ***1 mark*** *for the correct answer. Total 3 marks.*

Page 16, Solving linear equations

1 a $\frac{5-x}{2} = 12$; $5 - x = 24$; $5 = 24 + x$; $x = -19$
1 mark *for $5 - x = 24$;* ***1 mark*** *for the correct answer.*

b $\frac{2}{y} = 5$; $2 = 5y$; $y = \frac{2}{5}$
1 mark *for $2 = 5y$;* ***1 mark*** *for the correct answer.*

c $3 + p = 4p - 6$; $3 + 6 = 4p - p$; $9 = 3p$; $p = 3$
1 mark *for $9 = 3p$;* ***1 mark*** *for correct answer.*

d $3(3 - 2p) = 4 - 11p$
$9 - 6p = 4 - 11p$
$-6p + 11p = 4 - 9$
$5p = -5$
$p = \frac{-5}{5} = -1$
1 mark *for $5p = -5$;* ***1 mark*** *for correct answer.*

2. Sarah: n, Ewan: $n - 5$, Cameron: $2n$
Total: $n + (n - 5) + 2n = 35$
$4n - 5 = 35$
$4n = 40$
$n = 10$, so Sarah plays 10 holes.
1 mark *for $n - 5$ and $2n$;* ***1 mark*** *for adding and writing equal to 35;* ***1 mark*** *for correct answer. Total 3 marks.*

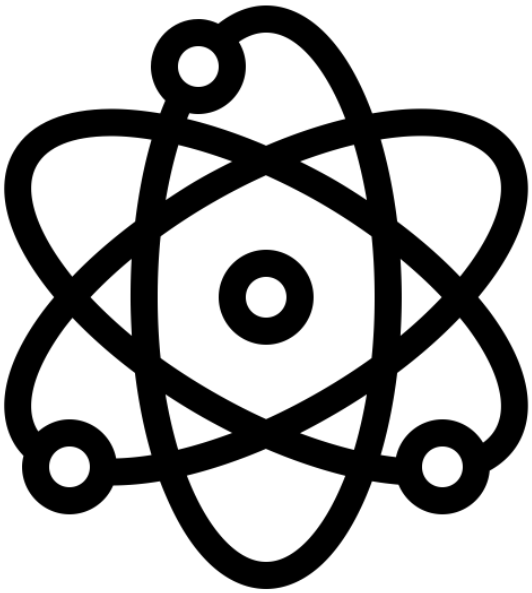
3. $2x + 3 = 3x - 4$; $3 + 4 = 3x - 2x$; $7 = x$
Rosalind's number is 7
1 mark *for a correct equation;* ***1 mark*** *for a correct rearrangement;* ***1 mark*** *for correct answer. Total 3 marks.*

4. a $2x - 1 = x + 3$; $2x - x = 3 + 1$; $x = 4$
1 mark *for a correct equation;* ***1 mark*** *for a correct rearrangement;* ***1 mark*** *for correct answer. Total 3 marks.*

b If $x = 4$, the shorter side is $x + 3 = 4 + 3 = 7$ cm
(or $2x - 1 = 2 \times 4 - 1 = 7$ cm).
The perimeter is $7 + 7 + y + y = 14 + 2y$.
Since $14 + 2y = 34$, $2y = 20$, $y = 10$
This means the area of the rectangle is $10 \times 7 = 70$ cm^2.
1 mark *for finding the length of the shorter side (7 cm);*
1 mark *for setting up an equation to find y;* ***1 mark*** *for $y = 10$;* ***1 mark*** *for correct answer. Total 4 marks.*

SCIENCE

Use the knowledge organisers to create mind maps or flashcards for each topic. Then, when you have finished, answer the practice questions on the back of each knowledge organiser.



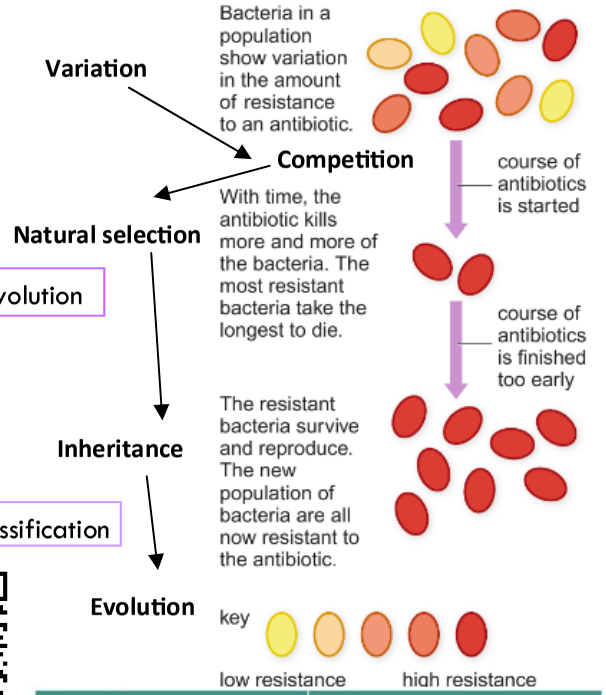
CB4- Natural selection and genetic modification

Ancestor	An organism from which more recent organisms are descended.
Antibiotic	Medicine that helps people recover from a bacterial infection by killing the pathogen.
Resistant	Unaffected or less affected by something.
Competition	There is competition between organisms that need the same things as each other (such as food). We say that they 'compete' for those things.
Genetic variation	Differences between organisms caused by differences in genes and passed on to offspring by their parents through reproduction. Also called inherited variation.
Natural selection	A process in which certain organisms are more likely to survive and reproduce than other members of the same species, because they possess certain genetic variations.
Ardi	Nickname for a 4.4-million-year-old fossilised specimen of *Ardipithecus ramidus*.
Lucy	Nickname for a 3.2-million-year-old fossilised specimen of *Australopithecus afarensis*.
Leakey	discovered fossils from 1.6 million years ago
Binomial system	System of naming organisms using two Latin words.
Evolution	A change in one or more characteristics of a population over a long period of time.
Hominid	A primate of a family (*Hominidae*) which includes humans and their fossil ancestors.
Species	A group of organisms that can reproduce with each other to produce offspring that will also be able to reproduce. Organism names have two Latin words – the first is its genus and the second is its species.
Classification	Sorting things into groups.
Domain	The three main groups that organisms are now sorted into: Archaea, Bacteria and Eukarya.
Genus	A group of similar organisms. The genus name is the first word in the scientific name for a species (the second word is the 'species name'). Different closely related species belong to the same genus.
Kingdom	There are five kingdoms into which organisms are divided: plants, animals, fungi, protists and prokaryotes.
Species	A group of organisms that can reproduce with each other to produce offspring that will also be able to reproduce. Organism names have two Latin words – the first is its genus and the second is its species.

Quizlet

BBC Bitesize Evolution

BBC Bitesize Classification



Kingdom	Main charateristics
animals	multicellular (with cells arranged as tissues and organs), cells have nuclei, no cell walls
plants	multicellular (with cells arranged as tissues and organs), have chloroplasts for photosynthesis, cells have nuclei, cellulose cell walls
fungi	multicellular (apart from yeasts), live in or on the dead matter on which they feed, cells have nuclei, cell walls contain chitin (not cellulose)
protists	mostly unicellular (a few are multicellular), cells have nuclei, some have cell walls (made of different substances but not chitin)
prokaryotes	unicellular, cells do not have nuclei, flexible cell walls

Bacteria	Archaea	Eukarya
Cells with a nucleus.	Has a nucleus, genes.	Has a nucleus.
No unused sections in genes.	Unused sections of genes.	Unused sections of genes.
Can cause harm to humans.	Live in extreme environments, cannot cause harm to humans.	

PRIDE THROUGH SUCCESS

CB4b - Darwin's theory

1. What is natural selection?
2. How does natural selection lead to evolution?
3. How is Darwin's theory supported by evidence?

Strengthen and/or extend your knowledge depending on how well you could answer these questions.

Strengthen

List the stages of how evolution occurs and use each stage to show how bacteria develop antibiotic resistance.

Extend

Ground finches have large, powerful beaks to crush seeds. A closely related species has a narrow beak for probing in small holes for insets. Suggest how this species could have evolved from seed-eating species.

CB4a– Evolution for human evolution

1. What is evolution?
2. How do fossils provide evidence for human evolution?
3. How do stone tools provide evidence for human evolution?

Strengthen and/or extend your knowledge depending on how well you could answer these questions.

Strengthen

Describe how scientists try to show human evolution by placing fossils in order.

Extend

One explanation for appearance of more sophisticated tools is that large or more complex brains evolving. Suggest another hypothesis to explain this.

CB4c– Classification

1. How are organisms classified as five kingdoms?
2. How has genetic analysis changed our understanding of evolution?
3. How are organisms classified as three domains

Strengthen and/or extend your knowledge depending on how well you could answer these questions.

Strengthen

State two things that scientists examine in order to put organisms into groups.

Extend

Explain why Archaea were placed in their own domain only after genetic analysis became available. .

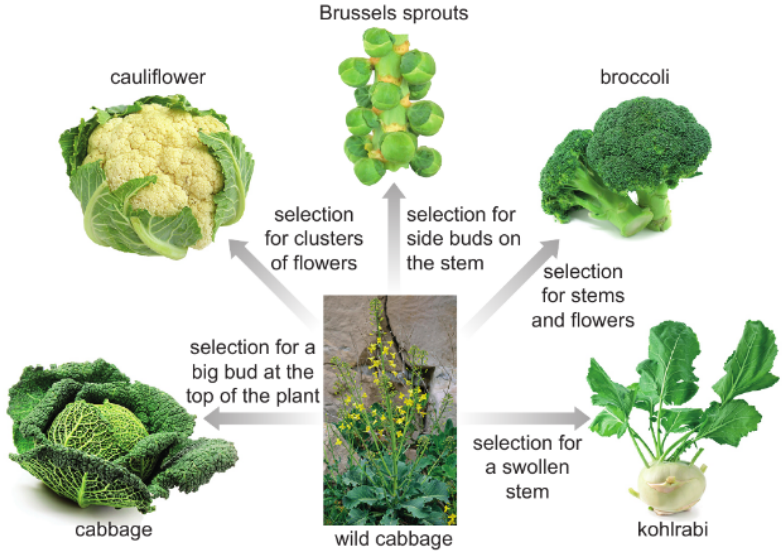
CB4– Part 2 Natural selection and genetic modification

Artificial selection	When people choose organisms with certain characteristics and use only those ones for breeding.
Breed	Group of animals of the same species that have characteristics that make them different to other members of the species.
Disease resistance	Unaffected or less affected by a certain disease.
Gene	Section of the long strand of DNA found in a chromosome, which often contains instructions for a protein.
Genetic engineering	Altering the genome of an organism, often by adding genes from another species. Also called genetic modification.
Genetically modified organism (GMO)	Organism that has been produced using genetic engineering.
Genome	All the DNA in an organism. Each body cell contains a copy of the genome.
GMO	Short for 'genetically modified organism'.
Selective breeding	When humans choose an organism that has a certain characteristic and then breed more of these organisms, making that chosen characteristic more and more obvious.
Variety	Group of plants of the same species that have characteristics that make them different to other members of the species.
Yield	The amount of useful product that you can get from something.
Allele	Most genes come in different versions, called alleles. So a gene for eye colour may have a version (allele) that can cause dark eyes and an allele that can cause pale eyes.
Base	There are four substances called bases that help make up DNA, often shown by the letters A, C, G and T. Pairs of bases form 'links' between two 'spines' formed of phosphate groups and a type of sugar.
Diabetes	Disease in which the body cannot control the blood glucose concentration at the correct level.
Insulin	The hormone that decreases blood glucose concentration. Used in the treatment of type 1 diabetes.
Ligase	An enzyme that joins two DNA molecules together.
Plasmid	A small loop of DNA found in the cytoplasm of bacteria.
Recombinant DNA	DNA made by joining two sections of DNA together.
Restriction enzyme	An enzyme that cuts DNA molecules into pieces.
Sticky end	A short section of single-stranded DNA found at the end of a section of DNA that has been cut by a restriction enzyme.

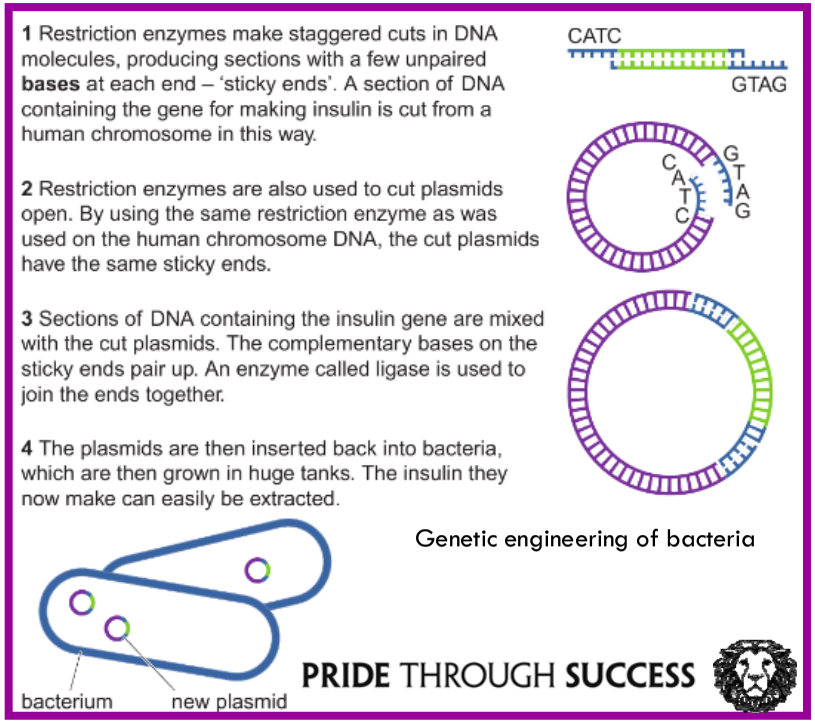
Quizlet

BBC Bitesize selective breeding

BBC Bitesize Genetic engineering



Selective breeding of wild cabbage has produced many vegetables– all varieties of the same species..



Genetic engineering of bacteria

CB4d - Breeds and varieties

1. What are the ways in which we create new breeds and varieties?
2. How is selective breeding carried out?
3. Why do we genetically engineer organisms?

Strengthen and/or extend your knowledge depending on how well you could answer these questions.

Strengthen

People with haemophilia lack a blood protein called Factor VIII, so their blood does not clot properly. They can be treated with Factor VIII from donated blood, but this is expensive. Describe how another organism could be used to make Factor VIII more cheaply. .

Extend

Compare and contrast the use of selective breeding and genetic engineering in agriculture .

CB4e– Genes in agriculture and medicine

1. What are the benefits and risks of selective breeding?
2. What are the benefits and risks of genetic engineering?
3. **H** How is genetic engineering carried out?

Strengthen and/or extend your knowledge depending on how well you could answer these questions.

Strengthen

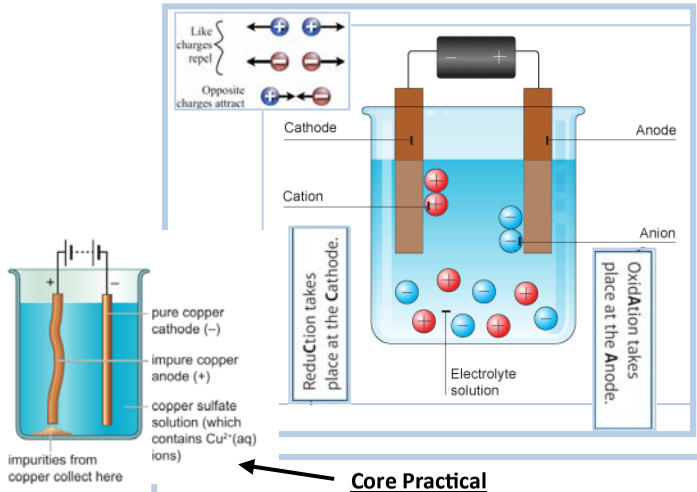
Discuss how a farmer might decide whether or not to plant a large area with one variety of wheat that is suited to that area.

Extend

H Explain the importance of using just one type of restriction enzyme in genetic engineering.

Chemistry Topic — CC10-12 Electrolysis

Electrolysis	Splitting compounds using electricity. The process in which energy is transferred by a direct electrical current decomposes electrolytes.
Electrolyte	An ionic compound that is molten or dissolved in water so the ions are free to move.
Electrode	A rod made of metal or graphite that carries the current into or out of the electrolytes. There are 2 kinds: cathode and anodes.
Cathode	The negative electrode (that attracts the positive cations).
Anode	The positive electrode (that attracts negative anions)
Cations	Positive ions. E.g. Ca^{2+}
Anions	Negative ions. E.g. O^{2-}
Oxidation	A reaction where: ⇒ oxygen is added to a chemical ⇒ Electrons are lost from an atom or ion (OIL) ⇒ e.g. Fe —> Fe^{+2+} + 2 e
Reduction	A reaction where: ⇒ oxygen is removed from a chemical ⇒ Electrons are gained from an atom or ion (RIG) ⇒ e.g. Fe^{+2+} + 2 e —> Fe
Half Equations	A chemical equation written to describe an oxidation or a reduction. It will include ions and electrons (see above).
Discharged	In electrolysis an ion is discharged when gains or loses ions to form an element.
Inert	Does not react.
Reactivity series	A list of metals in order of reactivity with the most reactive at the top.
Displacement reaction	When a more reactive element displaces a less reactive element from one of it's compound. E.g. Carbon displaces zinc during it's extraction. Carbon + zinc oxide —> zinc + carbon dioxide
Spectator ion	A spectator ion is an ion that exists in the same form on both the reactant and product sides of a chemical reaction. The ion is unchanged on both sides of a chemical equation and does not affect the equilibrium.
Redox reaction	A reaction in which both oxidation and reduction occur.



Core Practical

The copper needed for electrical wires must be very pure and this is achieved using the electrolysis.

Impure copper is used as the anode. Cu —> Cu^{2+} + 2e

Pure copper is made at the cathode. Cu^{2+} + 2e —> Cu

The impurities gather at the bottom.

The table below shows how some common electrolytes are split.

⇒ the positive cations are attracted to the negative cathodes

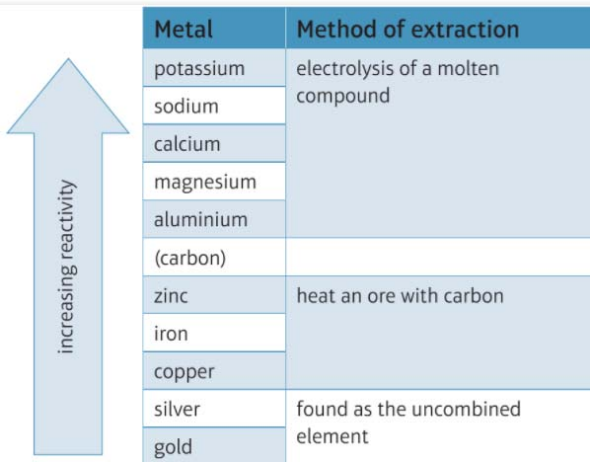
⇒ The negative anions are attracted to the positive cations

Electrolyte	Cathode	Anode
Sodium chloride	sodium	chlorine
Copper chloride	Copper	Chlorine
Sodium sulphate	sodium	Sulphate
Water (acidified with sulphuric acid)	Hydrogen	Oxygen
Lead bromide	Lead	Bromine

Chemistry Topic — CC 10-12 Electrolysis		
Learning Outcome	**Strengthen**	**Extend**
CC10a 3.22-3.24 and 3.27-3.28	1. Define electrolysis. 2. Define electrolytes and give some examples. 3. Explain why cations move to the cathode and anions move to the anodes.	4. Describe oxidation and reduction in terms of electrons. 5. Write half equations for the formation of iron ions, copper ions, sodium ions, boron ions, oxygen ions, fluorine ions. 6. Write half equations for the formation of elements from their ions: magnesium, chlorine, lithium, sulphur.
CC10a *3.31* *(Core Practical)*	1. Draw the equipment and diagram for the electrolysis of copper. Label it with: cathode, anode, pure copper, impure copper, copper sulphate. 2. Write a method for the electrolysis of copper sulphate to purify copper.	3. Label the diagram from Q1 with oxidation, reduction. 4. Add half equations for the reaction. 5. Explain why the electrolysis of copper is important. 6. Explain why the products formed at the anode are different when copper sulphate is electrolysed using graphite electrodes instead of copper electrode. 7. State and explain one safety precaution.
CC10b 3.25, 3.26, 3.30	1. State the products of the electrolysis of: copper chloride, sodium chloride, sodium sulphate, water acidified with sulphuric acid, molten lead bromide and copper sulphate with copper electrodes. 2. Predict the products of electrolysis of sodium sulphate, iron fluoride, potassium oxide. 3. How is copper purified using electrolysis?	4. Write half equations for the reactions at the anode and cathode for each of the electrolysis experiment in Q1 and 2. 5. Predict the products of the electrolysis of magnesium fluoride. Fully justify your prediction. 6. Explain why the electrolysis of sodium chloride solution produces hydrogen and chlorine at the electrodes.
C11a 4.1, 4.2 and 4.3	1. State the order of reactivity of metals. 2. Complete the following word equations: A. sulphuric acid + zinc —> _____ + _____ B. Water + sodium —> ____ + _____ C. Nitric acid + copper —> _____ + _____	3. Which metal of the following forms a cation most easily: aluminium, copper or gold. Explain your answer, in terms of the reactivity series of metals. . 4. Write balanced equations for the reactions in Q2 in the strengthen side.

Chemistry Topic – CC10-12 Electrolysis

Ore	A rock that contains enough of a compound to extract a metal for profit.
Extraction	The process of obtaining a metal from an ore.
Native state	A metal existing uncombined i.e. as a pure metal e.g. gold.
Bioleaching	Bacteria produce a solution containing copper ions, called **leachate**. Copper is extracted from this solution using displacement with iron.
Phytoextraction	Growing plants that absorb metal compounds. The plants are burnt to form ash, from which the metal is then extracted.
Corrosion	Happens when a metal reacts with oxygen over time. A specific example is iron corrosion.
Rusting	Happens when a metal reacts with oxygen in the presence of water.
Recycling	The process of converting waste materials into new materials and objects.
Life cycle assessment (LCA)	Life cycle assessments are carried out to decide whether it is worthwhile manufacturing or recycling a product. There are 4 stages to consider: obtaining and processing raw materials; manufacturing and packaging the product; using the product and: disposal of the product.
Reversible reactions	A chemical reaction that can work in both directions.
Dynamic Equilibrium	When the forward and backwards reactions in a reversible chemical reaction are occurring at the same rate.
Closed system	When substances cannot enter or leave an observed environment e.g. a stoppered test tube.
Open system	A system into or from which substances can enter or leave .e.g. an open test tube.
Endothermic	A type of reaction in which energy from the surroundings is transferred to the products e.g. photosynthesis.
Exothermic	A type of reaction in which energy is transferred to the surroundings from the reactants e.g. combustion.



To determine the order of reactivity of metals 3 types of reactions were considered. Some of them have rules you must remember.

⇒ **metals + water —> metal hydroxide + hydrogen**

E.g. Potassium + water —> potassium hydroxide + hydrogen

E.g. $2\ K + 2\ H_2O \rightarrow 2\ KOH + H_2$

⇒ **Metals + acid —> salt + hydrogen**

E.g. Sodium + hydrochloric acid —> sodium chloride + hydrogen

$2Na + 2HCl \rightarrow 2NaCL + H_2$

⇒ **Metals and salts (displacement reactions).**

How do you work out the salt made when metals react with acids?

1. The first part is the name of the metal.

2. The 2nd part is determined by the acid.

⇒ Hydrochloric acid (HCl) makes chloride salts (Cl^-).

⇒ Sulphuric acid (H_2SO_4) makes sulphate salts (SO_4^{2-}).

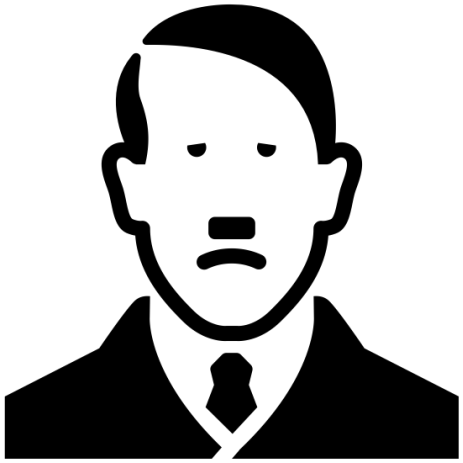
⇒ Nitric acid (HNO_3) makes nitrate salts ($NO3^-$).

PRIDE THROUGH SUCCESS

Chemistry Topic — CC10-12 Electrolysis		
Learning Outcome	**Strengthen**	**Extend**
CC11b **4.4, 4.7, 4.8**	1. Define ore and native state. 2. Describe the 2 main processes of extracting metals. 3. Which method of extraction is used for copper oxide, aluminium oxide, zinc oxide and sodium oxide? 4. What is a leachate? 5. Describe phytoextraction and bioloeaching.	6. How are biological methods used to extract some metals 7. Explain why iron is extracted from iron oxide using a different method to the one used to extract aluminium from aluminium oxide. 8. Compare and contrast biological and non-biological methods of metal extraction.
CC11c 4.2, 4.5, 4.6, 4. 4.9	1. Describe oxidation and reduction in terms of oxygen and in terms of electrons. 2. Zinc oxide reacts with carbon to form zinc and carbon dioxide in a redox reaction. Explain which has been oxidised and which ahs been reduced. 3. What types of reaction happen to ores when metals are extracted?	4. Explain whether the underlined substance has been oxidised or reduced. a. $2CuO + \underline{C} \rightarrow CO_2 + 2Cu$ b. $\underline{Al^{3+}} + 3e \rightarrow Al$ 5. Three metals were left outside for 1 month Metal A did not corrode at all; Metal B corroded a lot; Metal C corroded a little. Put the metals in order of increasing reactivity and explain your reasoning.
C11d 4.10, 4.11, 4.12	1. Describe what is meant by recycling metals. 2. State 3 advantages of recycling metals. 3. State the 4 features of a life cycle assessment. 4. State 3 disadvantages of recycling metals.	5. Why is a life cycle assessment carried out? 6. Outline how a broken aluminium saucepan is recycled to make an aluminium drinks can. 7. Discuss the advantages and disadvantages of recycling aluminium.
C12a 4.13, 4.14, 4.15, 4.16, 4.17	1. What is meant by dynamic equilibrium? 2. How is ammonia manufactured? 3. How do changes in temperature, pressure and concentration affect the equilibrium position?	4. Use equations to explain the formation of ammonia in a reversible reaction that reaches a dynamic equilibrium. 5. Explain how a dynamic equilibrium is reached in the formation of ammonia. 6. The formation of ammonia is exothermic. Describe three ways to increase the amount of ammonia at equilibrium.

HISTORY

Use the knowledge organisers on the following pages to make mind maps and flashcards of key facts. Then test yourself with the 50 question quiz.



HISTORY Knowledge Organiser - Topic : Weimar Germany, 1919-29

Timeline

1	9th Nov 1918	Kaiser abdicates (leaves throne) and flees Germany.
2	9th Nov 1918	Weimar Republic is set up.
3	11th Nov 1918	WWI ends. Armistice agreed after German surrender.
4	Jan 1919	Spartacist Uprising (left wing) in Berlin and other cities. Crushed by army and the Freikorps.
5	26th Jun 1919	Treaty of Versailles is signed.
6	3rd Mar 1920	Kapp Putsch – attempted takeover by Freikorps led by Wolfgang Kapp. Failed due to lack of support.
7	Jan 1923	Ruhr Crisis – France invades the Ruhr over reparations leading to huge problems in Germany.
8	Jun 1923	Hyperinflation causes huge social and economic problems.
9	Aug 1923	Gustav Stresemann becomes Chancellor (but only for 3 months!)
10	Nov 1923	The Munich Putsch – The Nazis try to overthrow the Bavarian government and cause a revolution. They fail. 16 Nazis are killed and Hitler is arrested.
10	Sep 1924	Stresemann signs the Dawes plan which ends hyperinflation.
11	Dec 1925	Germany signs Locarno Pact with France, Britain, Belgium and Italy
12	June 1929	Young plan agreed.
13	Oct 1929	Wall Street crash leads to the Great Depression.

Key Individuals

14	Friedrich Ebert	First Chancellor of Germany and later President.
15	Gustav Stresemann	Chancellor (Aug-Nov 23) and Foreign minister (1923 - 1929). Solved hyperinflation and Ruhr crisis. Brought period of stability to Germany.
16	Kaiser Wilhelm II	King of Germany, who fled Nov 1918.

Key Words/Terms

	Armistice	Agreement to stop fighting. Germany asked for it in 1918.
	November Criminals	Name given to the Weimar politicians who accepted the armistice which ended WWI.
	Constitution	The system of laws and rules in a country.
	Reichstag	The German Parliament.
	Article 48	Gave President emergency powers in times of crisis.
	Proportional Representation.	The number of votes won in an election, determined the number of seats in the Reichstag.
	Chancellor	Head of Government, chosen by the President.
	President	Head of state and military, voted by people, could use Article 48 and had power to dismiss government.
	Coalition	A government of two or more political parties.
	Extremist	Groups that believe in violent or radical ideas.
	Communism	Left wing groups who believe everybody should be equal in the country and it should be run for the workers.
	Fascism	Right wing groups who believe in a strong ruling leader.
	Freikorps	WWI veterans who formed private armies.
	Spartacists	Revolutionary communists who wanted Germany to be run by the working classes. Led by Rosa Luxemburg.
	Putsch	A violent attempt to overthrow the government.
	Reparations	£6.6 bn fine placed on Germany following Versailles Treaty.
	Demilitarised	No military forces are allowed in the area.
	Article 231	The Versailles 'War guilt clause' blaming Germany for WWI.
	Hyperinflation	Extremely high inflation, where prices rise and the value of money plummets and it becomes worthless.
	Rentenmark	Temporary currency introduced by Stresemann to end hyperinflation.

HISTORY Knowledge Organiser - Topic : Nazi control and dictatorship, 1933-39

Timeline

1	27TH Feb 1933	Reichstag fire. Parliament burns down. Hindenburg passes Reichstag Fire Decree.
2	31st Mar 1933	Reichstag passes Enabling Act – Hitler can pass any law.
3	2nd May 1933	Hitler bans trade unions. These are to be replaced by German Labour Front.
4	20th Jun 1933	Concordat signed with Pope. Rome would not oppose Nazis if Catholic church was left alone.
5	14th Jul 1933	Hitler bans all political parties apart from the Nazis.
6	29th Jun 1934	Night of the Long Knives – Hitler eliminates threat from SA.
7	2nd Aug 1934	Hindenburg dies. Hitler combines roles of President and Chancellor and takes the title Fuhrer (leader) of Germany.
8	Aug 1934	German army swears allegiance to Hitler.
9	1st Aug 1936	Berlin Olympics begins.
10	1938	Over course of the year, Hitler removes 16 army generals from their positions.

Key Individuals

11	Joseph Goebbels	Head of Nazi propaganda. Minister for Propaganda and Popular Enlightenment from 1933.
12	Ernst Rohm	Leader of the SA. Arrested and executed
13	Heinrich Himmler	Leader of the SS. Organised night of the Long Knives. Head of all police agencies in Germany from 1936.
14	Paul von Hindenburg	President of Germany, 1926-34

Key Words/Terms

15	Anti-Semitism	Hatred and persecution of the Jews
16	Fuhrerprinzip	The idea that the Nazi party and Germany should have one leader obeyed by all.
17	Reichstag	German Parliament
18	SA	Sturmabteilung – the paramilitary 'storm troopers' of the Nazi party.
19	SS	Schutzstaffel – Nazi paramilitary organization who acted as Hitler's personal bodyguard.
20	SD	Nazi intelligence agency, 'security service.'
21	Gestapo	Official secret police of the Nazi regime.
22	General Election	Democratic process whereby the people cast their vote for who they want to represent them in the Reichstag.
23	Propaganda	Information, often misleading, spread with the intention of promoting a political cause or point of view.
24	Enabling Act	Law giving Hitler power to rule without consulting Reichstag for four years.
25	Fuhrer	Title taken by Hitler making him supreme leader of Germany.
26	Censorship	Controlling what is produced and suppressing anything considered to be against the state.
27	Concordat	Agreement with Pope that Nazi rule would not be opposed if Catholic church was left alone.
28	Gleichschaltung	Bringing people into identical way of thinking and behaving.
29	Indoctrination	Converting people to your ideas using education and propaganda

HISTORY Knowledge Organiser - Topic : Life in Nazi Germany, 1933-39

Timeline

1	1933	Boycott of Jewish shops and businesses
2	1933	Law for the Encouragement of Marriage passed.
3	1933	Sterilisation Law passed.
4	1933	First concentration camp for women opened at Moringen.
5	1933	First Napola schools set up.
6	1935	Nuremburg Laws passed [formalized racial laws such as removing citizenship from German Jews]
7	1935	Conscription introduced.
8	1936	Membership of the Hitler Youth made compulsory.
9	1938	Jewish children banned from German schools.
10	1938	Lebensborn programme introduced.
11	1938	Kristallnacht [night of broken glass] – waves of attacks on Jews.
12	1939	Euthanasia campaign began.
13	1939	Designated Jewish ghettos established.

Key words / terms

	Volksgemeinschaft	The people's community. This was the Nazi idea of a community based upon the German race.
	Herrenvolk	Master race. The idea that 'pure' Germans were superior to other races such as Jews.
	Reich Labour Service	Scheme to provide young men with manual labour jobs. Compulsory for all men 18-25 to serve 6 months.
	League of German Maidens	Organisation set up to prepare teenage girls for Nazi ideas of a woman's role.

Key Words/Terms

	Anti-Semitism	Hatred and persecution of the Jews
	Propaganda	Information, often misleading, spread with the intention of promoting a political cause or point of view.
	Gleichschaltung	Bringing people into identical way of thinking and behaving.
	Indoctrination	Converting people to your ideas using education and propaganda
	Aryan	Nazi term for a non-Jewish German, someone of supposedly 'pure' German stock.
	Concentration camp	Prison for political prisoners and enemies of the state who are placed there without trial.
	Euthanasia	Bringing death to relieve suffering. The Nazis interpreted this as killing anyone who was of no further use to the state e.g. disabled.
	Kinder, kuche, kirche	Children, kitchen, church. The three 'Ks' women were supposed to follow.
	Ghetto	A densely populated area of a city inhabited by a particular ethnic group, such as Jews.
	Gypsy	A race of people found across Europe who travel rather than living in one place.
	German Labour Front (DAF)	Nazi replacement for Trade Unions with aim of controlling German workers.
	Hitler Youth	Organisation set up to convert the young to Nazi ideas.
	Nazi Teachers League	Organisation set up to control teachers and what they taught.
	Strength through Joy movement (KdF)	Organisation set up to improve leisure time of German workers.
	Napola Schools	Special schools to train future leaders of the state.

Germany 1890-1945 Knowledge Quiz

1) What was the name of Germany's last Emperor (Kaiser)?

2) Why was socialism growing in influence by 1900? _

3) Why did the Naval Laws, 1898-1912, cause problems within Germany?

4) Why were there shortages of food, medicine and clothing during World War One, and what did this lead to?

5) What was the electoral system used in Weimar Germany called, and why was this a problem?

6) What was Article 48?
7) How many different governments did Germany have between 1919 and 1932?

8) Copy and Complete this table to outline the terms of the Treaty of Versailles.

L (Land)	Name <u>three</u> changes of territory, including who the land went to.	
A (Army)	Name <u>three</u> military restrictions.	
M (Money)	What was the reparations amount?	
B (Blame)	Which article of the Treaty was the War Guilt Clause? What did Germany call the Treaty?	
& (What else?)	What was set up by the Treaty?	

9) **Copy and complete:** In 1922, when Germany announced that it could not _____, troops from _____ and _____ marched into and took over the German industrial area of the _____. The German government then ordered workers in this area to _____, and _____ in order to pay them. This meant that _____ and prices were raised, leading the government to _____
_____ - causing hyperinflation.

10) Who were the Spartacists and why were they unsuccessful in taking over Berlin in 1919?

11) Why did some people actually benefit from hyperinflation, despite most suffering from poverty and unemployment?

12) Why did the 1920 Kapp Putsch fail after 100 hours?

13) Why was the Munich Putsch a success for Hitler in the long-term?

14) How did Gustav Stresemann help Germany recover from each of these problems?
- a) Hyperinflation
- b) Invasion of the Ruhr
- c) Reparations were too high
- d) Germany had lost its status as a great power

15) Why did some Germans hate the 1920s 'Golden Age' of Weimar culture in art, design, literature, nightlife and cinema?

16) How many Germans were unemployed by 1932 as a result of the Great Depression?
17) Name four reasons why the Nazis grew in popularity after 1929.
18) Outline which Nazi policies appealed to each of these social groups.
- a) Farmers
- b) Wealthy business owners
- c) Ex-soldiers

19) **Copy and complete:** The Nazis became the largest party in the Reichstag in _____. President Hindenburg refused to appoint Hitler as Chancellor because _____. Ex-Chancellor _____ convinced President Hindenburg to appoint Hitler as Chancellor because _____, but Hindenburg limited Hitler's power by _____ and _____.

20) Briefly answer these ten questions to explain how Hitler went from Chancellor to dictator.
- a) What happened on 27th Feb 1933, shortly before March's election?
- b) What did the president then pass using Article 48?
- c) What did this allow Hitler to do?
- d) Why was Hitler disappointed with the March 1933 election results?
- e) What was the Enabling Act?
- f) Which other political party supported the Nazis by voting for the Enabling Act?
- g) What did Hitler ban using the Enabling Act?
- h) Why did Hitler see Rohm as a threat to his leadership?
- i) What was the Night of the Long Knives?
- j) What gave Hitler ultimate power on 2nd Aug 1934?

21) What was the name of the first Nazi concentration camp, opened in 1933 for political prisoners?
22) Answer these six questions on Nazi economic policy.
- a) What did all men aged 18-25 do in the National Labour Service (RAD)?
- b) What were autobahns?
- c) How did Hitler create jobs and also reward his wealthier supporters?
- d) How else did Hitler reduce unemployment amongst men aged 18-25?
- e) What percentage of Germans were unemployed by 1939?
- f) Why is this figure unreliable?

23) What did Economic Minister Shacht do to help support Hitler's plans, and why didn't this please Hitler?

24) When Goering took over as Economic Minister in 1936, what did his Four Year Plan aim to do?

25) Which two schemes did the German Labour Front (DAF) run, and what did each of them do?

26) How did workers lose their rights in the Nazi-run economy?

27) List five ways in which the German public suffered during 'Total War'.

28) **Copy and complete:** In schools and in youth movements, boys were prepared for a career in the _____ and were taught Nazi versions of _____. For example, they would learn about how unfair the _____ was. Problems in Maths and Science included calculations about how much money Germany would save if it got rid of _____. Time spent doing _____ trebled. Girls were taught how to be good _____ and _____. A new subject called _____ was introduced to indoctrinate students in incorrect Nazi racial beliefs. Teachers had to be _____, and _____ were not allowed to attend school.

29) What were the names of the youth organisations for boys and girls?
30) What were the 'Three C's' that women were supposed to focus on?
31) How were women 'persuaded' to give up work, but why wasn't this ultimately successful?
32) Explain two ways in which women were persuaded to have more children.
33) What was the name of the 1933 agreement between the Nazis and the Catholic Church, and how did Hitler break this?
34) What did Hitler do to the Protestant churches?
35) What did some Protestants do in response to this, and why weren't they successful?
36) What is the term for discrimination against Jewish people?
37) What percentage of the German population in 1933 was Jewish?
38) What did the Nuremberg Laws of 1935 do?
39) What happened on Kristallnacht in November 1938, and what was the outcome of this?
40) Who were the *Einsatzgruppen*?
41) <u>Why</u> did the treatment of Jewish people change in 1941?
42) How many European Jews were murdered in the Holocaust?
43) Name two death camps and one concentration camp.
44) Name one instance of armed Jewish resistance to the Holocaust.
45) Who were the Gestapo?
46) Why could there not be legal justice in Nazi Germany?
47) Name three forms of Nazi propaganda.
48) How did Goebbels try to keep up morale during World War Two?
49) Who were these opposition youth groups and what did they do to oppose the Nazi regime?
    a) Edelweiss Pirates
    b) White Rose Movement

50) What were the reasons for the July Bomb Plot, and why was it ultimately unsuccessful?

GEOGRAPHY

Use the information that follows to fill in the keyword bank. Then, answer the practice exam questions at the end of this section.

Section B – The changing economic world

Topic	Key ideas	RAG Coding		
The development gap	I can explain reasons why there are global variations in economic development			
	I can explain various strategies that exist for reducing the development gap.			

Lesson Number	Lesson Topic
1	Why are there global variations in development and quality of life around the world?
2	How do we measure development?
3	What is the demographic transition model?
4	How do population structures change?
5	What are the causes of uneven development?
6	How does uneven development affect wealth and health?
7	How does uneven development lead to migration?
8	How can we reduce the development gap?
9	How can aid and technology reduce the development gap?
10	How can fair trade reduce the development gap?
11	How can debt relief reduce the development gap?
12	How can tourism reduce the development gap in Jamaica?

Revision Guide: The Development Gap

Keyword List

Keyword	Definition
Development	
Trade	
Development Gap	
Gross National Income (GNI)	
Newly-Emerging Economies (NEEs)	
Life Expectancy	
Birth Rate	
Death Rate	
Infant Mortality	
Literacy Rate	
Quality of Life	
Human Development Index (HDI)	
Demographic Transition Model (DTM)	
HIC	
LIC	
Colonialism	
Imbalance	
Malaria	
Migration	
Investment	
Industrial Development	
Infrastructure	
Tourism	
Aid	
Short-Term Aid	
Bilateral Aid	
Multilateral Aid	
Long-Term Aid	
Tied Aid	
Voluntary Aid	
Intermediate technology	
Free Trade	
Fairtrade	
Debt Relief	
Microfinance	

Content

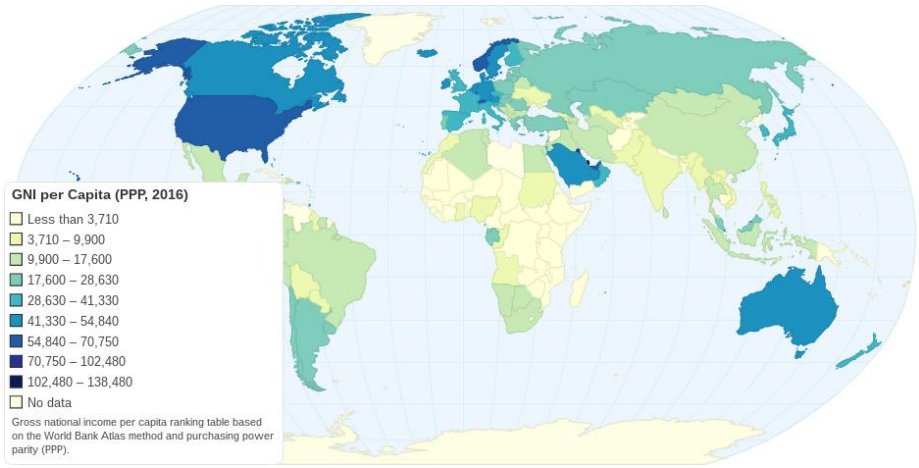
Lesson 1 - Why are there global variations in development and quality of life around the world?

Development is the progress of a country in terms of economic growth, the use of technology and human welfare.

Gross National Income (GNI):

Measurement of economic activity calculated by dividing the gross (total) national income by the size of the population.

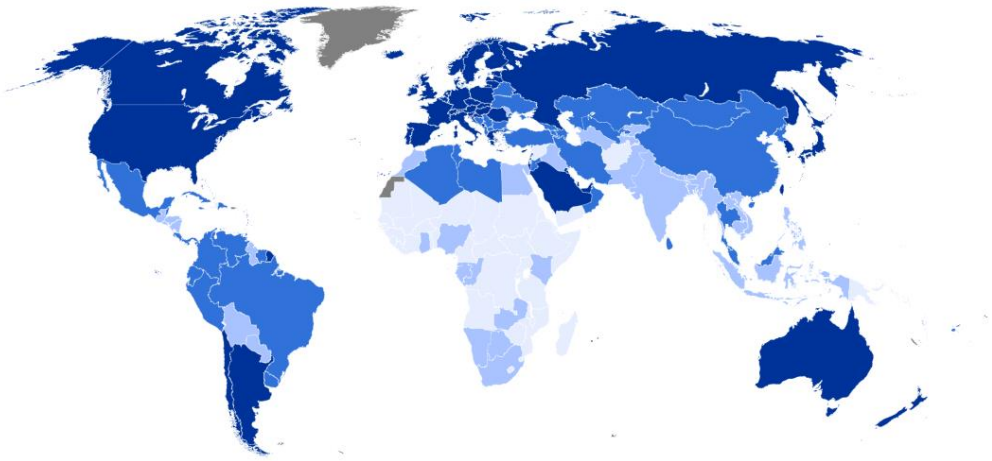
Map showing differences in GNI across the world.



Human Development Index (HDI):

A method of measuring development where GDP per capita, life expectancy and adult literacy are combined to give an overview. HDI is expressed in values 0-1, where 1 is the highest.

Map showing differences in HDI across the world.



Quality of Life:

The standard of health, comfort, and happiness experienced by an individual or group.

• Low income country (LIC) – countries that have a GNI per capita of $1,045 according to the World Bank. These are poorer countries that have mainly primary jobs such as farming and mining. Countries include Bangladesh and Mali.
• High income country (HIC) - a country that has a GNI per capita of $12,746 or above according to the World Bank. These are richer countries that have lots of industry and service jobs such as the UK and Japan.
• Newly Emerging Economies (NEE) - Countries that have begun to experience high rates of economic development, usually with rapid industrialisation. They differ from LICs in that they no longer rely primarily on agriculture, have made gains in infrastructure and industrial growth, and are experiencing increasing incomes and high levels of investment. E.g. Brazil, Russia, China and South Africa (the so-called BRICS countries).

Lesson 2 - How do we measure development?

There are a huge number of measures that can be used to measure the level of Development of a place. These measures can be classified as;

• Social – relating to the development of the people of the place and;

• Economic, relating to the finances and wealth of the place.

Some countries may have imbalances in these measures, so a country may have very high levels of wealth and economic development, but poor levels of political freedom so poor political and social development. It is therefore better to look at a NUMBER of different measures of development of places before coming to a judgment about its level of development.

Measure of Development	Definition
GNI per head	Gross national income is a measure of the country's wealth. GDP is part of GNI. It includes the total value of goods and services produced within a country (i.e. its Gross Domestic Product), together with its income received from other countries (such as interest and dividends), minus similar payments made to other countries. So if a British-based company such as BP sends profits back to the UK our GNI is enhanced, whilst profits flowing out of the country from a company such as Nissan to Japan will count to Japan's GNI and not the UKs.
Human Development Index (HDI)	This is a composite (combined) measure that considers life expectancy, GNI and an education index to give a value between 0 and 1, 1 being the most developed. This is powerful as it includes both economic and social factors.
Birth Rates	How many babies are born per 1000 people in a population per year. We tend to find that the poorest countries have high birth rates, and wealthier countries have lower births rates. This is because poorer countries have high replacement rates to compensate for high infant mortality, poorer access to family planning and contraception, and a tradition for large family size to supplement a largely agricultural workforce.
Death rates	How many people die per 1000 people in a population per year. This is becoming less useful as a measure of development, as death rates fall due to imported medicine and technology in many poorer countries. It would be better to look at CAUSE of death, as in

	HICs it will be wealth and age related illnesses.
Infant mortality	How many babies die per 1,000 live births per year. This is a useful measure as it indicates the medical systems in the country and how well the most vulnerable in society, the very young, are protected and looked after in their early years.
People per doctor	How many people there are for every doctor in a country or place. Again, this indicates how much money is available in a country for the training and recruitment of doctors, which has an instant knock on effect on the well-being and quality of life of a person.
Literacy rate	What percentage of the country is able to read and write as adults. This is another social measure, and helps to indicate the standard of education within a country or place.
Access to safe water	What percentage of people have access to sanitary and safe water that is free from bacteria and parasites. This is something we take for granted in the UK, but according to Water.org 780 million people lack access to safe water and 3.4million die every year from a water related disease.
Life expectancy	The average age a person can expect to live to at birth. This is a very useful indicator as it reveals how good food security, water quality, shelter and medical care are in a country.

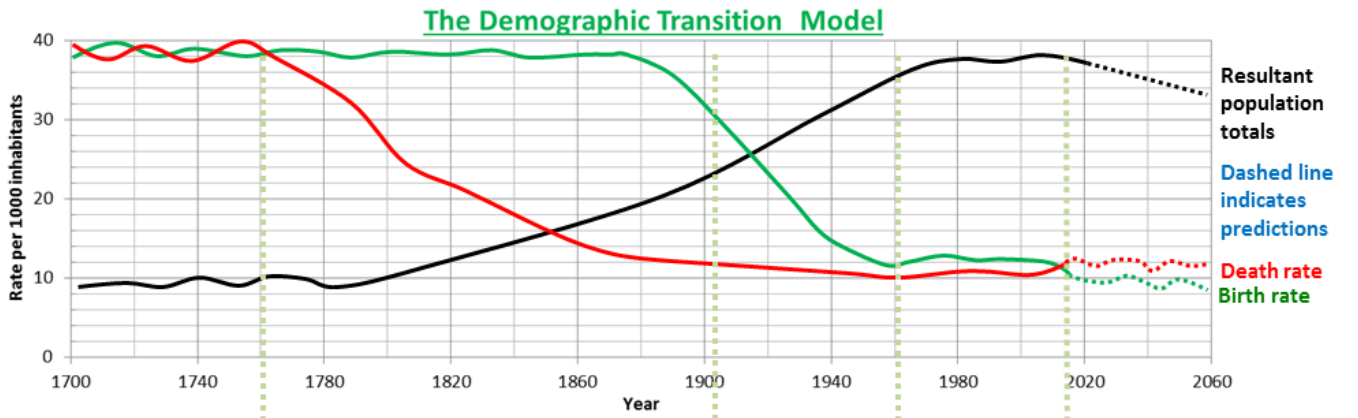
Lesson 3 - What is the demographic transition model?

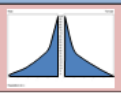
The demographic transition model shows population change over time. It studies how birth rate and death rate affect the total population of a country.

The five stages of the demographic transition model

1. Total population is low but it is balanced due to high birth rates and high death rates.
2. Total population rises as death rates fall due to improvements in health care and sanitation. Birth rates remain high.
3. Total population is still rising rapidly. The gap between birth and death rates narrows due to the availability of contraception and fewer children being needed to work - due to the mechanisation of farming. The natural increase is high.
4. Total population is high, but it is balanced by a low birth rate and a low death rate. Birth control is widely available and there is a desire for smaller families.
5. Total population is high but going into decline due to an ageing population. There is a continued desire for smaller families, with people opting to have children later in life.

As a country passes through the demographic transition model, the total population rises. Most LEDCs are at stage 2 or 3 (with a growing population and a high natural increase). Most MEDCs are now at stage 4 of the model and some such as Germany have entered stage 5.



	Stage 1 – High fluctuating	Stage 2 – Early expanding (Youthful)	Stage 3 – Late expanding	Stage 4 – Low fluctuating	Stage 5 – Decline (Ageing)
When for the UK?	UK pre 1760	UK 1760 to 1870	UK 1870 to 1950	Post 1950	Soon?
Current examples	Amazon Basin tribes-**LICs**	Ethiopia **LICs**	India, Brazil **NEEs**	UK, USA **HICs**	Russia, Germany, Japan **HICs**
Birth rate	HIGH	HIGH	FALLING	LOW	VERY LOW
Death Rate	HIGH	FALLS RAPIDLY	FALLS SLOWLY	LOW	LOW
Natural Increase	Stable or slow increases & decreases	Very rapid increase	Increases at a slower rate	Stable or slow increase	Slow decrease
Reasons for changes to BR	Religious values strong and promote large families, children required for work in farming & manufacturing. High Infant and child mortality rates so high REPLACEMENT rates. Lack of contraceptives & family planning.		Falling Infant mortality. Laws against child work so fewer needed. Improved medical care and diet.	Emancipation & education of women. Materialism (wealth chosen over large families). Later child birth. Later & fewer marriages. Huge range of family planning options.	
Reasons for changes to DR	Diseases (e.g. Plague). Famines. Poor medical knowledge	Improvements in medical care (e.g. sterilisation, small pox vaccine), better sewers, water supply and sanitation. Improved food supply & education		Medical advances (e.g. transplants, heart operations etc.) Better food supply. Preventative medicine.	
Population Pyramid Shape					

As populations move through the stages of the model, the gap between birth rate and death rate first widens, then narrows. In stage 1 the two rates are balanced. In stage 2 they diverge, as the death rate falls relative to the birth rate. In stage 3 they converge again, as the birth rate falls relative to the death rate. Finally in stage 4 the death and birth rates are balanced again but at a much lower level.

Limitations of the model

1. The model was developed after studying the experiences of countries in Western Europe and North America. Conditions might be different for LEDCs in different parts of the world.
2. The original model doesn't take into account the fact that some countries now have a declining population and a 5th stage. Most texts will now show this stage as it is relevant to an increasing number of MEDCs in the 21st century.

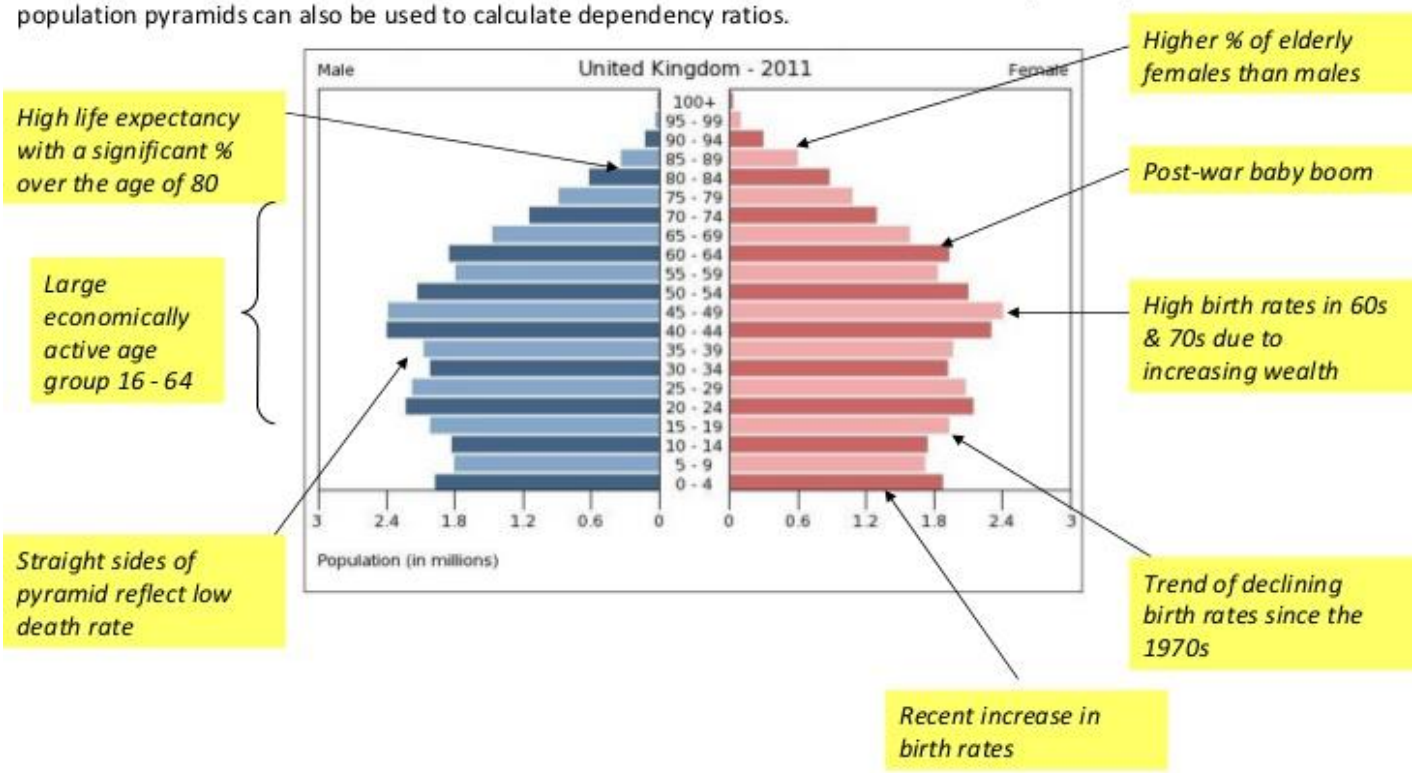
Lesson 4 - How do population structures change?

Population structure means the 'make up' or composition of a population. Looking at the population structure of a place shows how the population is divided up between males and females of different age groups.

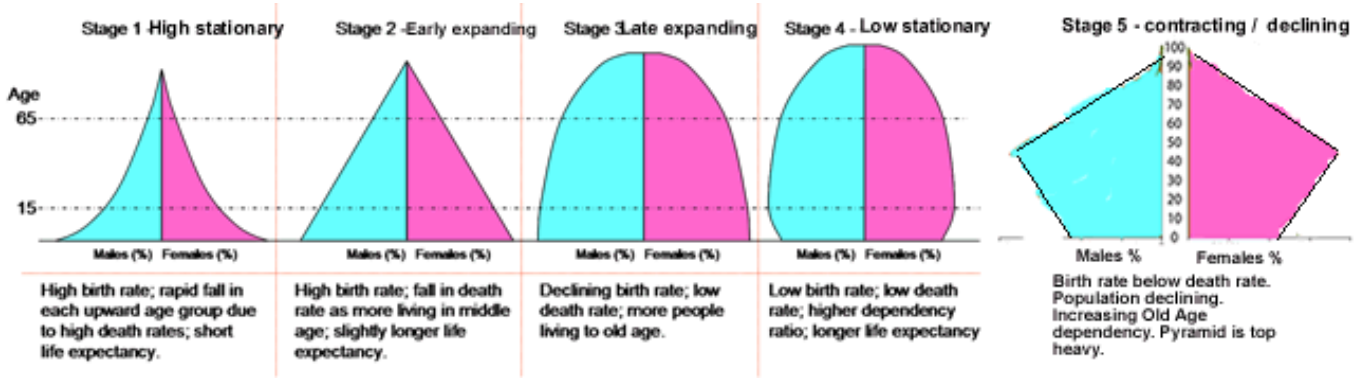
Population structure is usually shown using a population pyramid. A population pyramid can be drawn up for any area, from a whole continent or country to an individual town, city or village.

Population Pyramids

The population structure of a country is usually displayed using a population pyramid graph (shown below). Population pyramids show the differences between the numbers of males and females as well as the number or percentage of people in each age category (know as the age-sex structure). Population pyramids can show: trends in birth and death rates, impacts of migration, impacts of wars or diseases and can give an indication of life expectancy. Data from population pyramids can also be used to calculate dependency ratios.



Population pyramids link to each stage of the DTM:



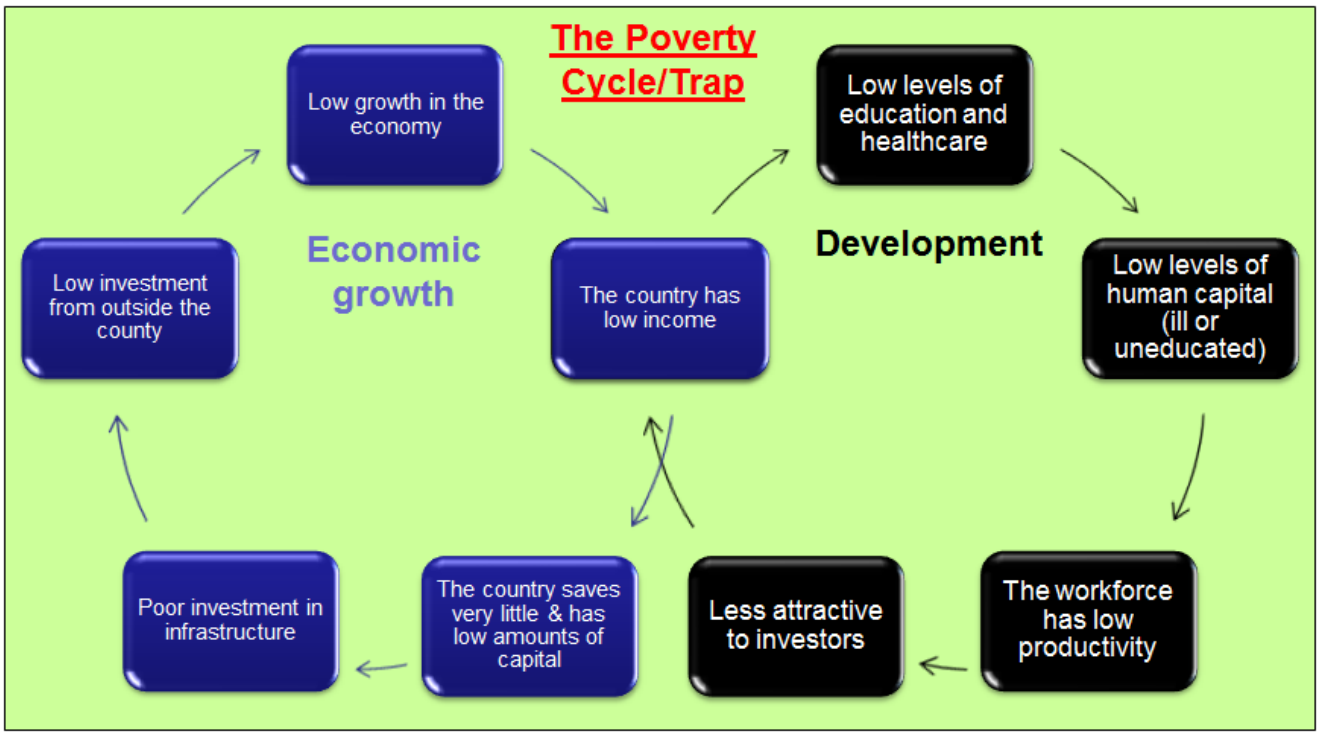
Lesson 5 - What are the causes of uneven development?

Economic factors affecting development

Unfortunately poverty can lead to poverty. The diagram shows the poverty trap, which is often thought of as a cycle. Low investment in key areas such as infrastructure (roads, rail, telecommunications etc.), education and healthcare can be bad for a population.

Populations in countries at low levels of development can become more vulnerable to ill health (as we have seen with HIV and AIDs in sub-Saharan Africa) which reduces the productivity of the workforce.

In addition, a lack of education leads to a lower quality workforce, and poor road networks are not attractive to outside investors. Simple things like these can exacerbate (make worse) poverty, and keep countries mired in a low level of development.



It is very difficult to expand from a very low base, particularly in today's very competitive global economy. In addition, countries at low levels of economic development are also more likely to be victims of civil wars and their after effects. Countries such as the Sudan, Democratic Republic of the Congo and Rwanda are good examples of this. Wars consume vital resources and divert attention away from the crucial issues for normal people, healthcare, reliable food supplies, stability, economic well-being and access to clean drinking water.

WORLD TRADE

The world's poorest countries have also been at the mercy of a global trade system designed and controlled by the world's richest countries. Several measures put in place by the world's richest countries mean that the world's poorest countries are at a disadvantage;

1. Import tariffs of goods from poorer countries put the prices of those goods UP
2. Subsidies (payments from governments to the producer) of goods produced in richer countries push the prices of rich world goods cheaper. This makes it harder for poorer countries to compete.
3. The world trade system encourages a "race to the bottom", where buyers from richer countries go from place to place around the world driving down prices because supply of goods often outstrips demand.

In addition, the lack of reliable energy supply, political stability, infrastructure and educated workforce put countries at a disadvantage. The net result in many poorer countries is that they are forced to export only lower value raw materials such as agricultural goods, whilst they buy back more expensive manufactured goods or services. Poorer countries do not have the capital to set these types of industries up.

PHYSICAL factors

The physical environment can have a direct impact upon the development of a place. The UK benefitted in many ways from its physical or natural environment for its rise to a global superpower during the Industrial Revolution. Its Island natural gave it a coastline to fully exploit for resources and many potential trade routes. It had the right mix of natural resources to exploit for many Industrial processes, including coal, iron Ore and Limestone. It also had a temperate climate without the extremes of weather that can damage development. Many countries are not as fortunate and the following factors can limit development;

1. Climate related disease – many tropical countries unfortunately suffer from diseases that thrive in hot humid conditions, such as Dengue Fever, Chagas Disease and Malaria. People who get these diseases are incapacitated and cannot work or may even die, limiting development.
2. A lack of natural resources – countries with few natural resources start off at a very low economic base and find it hard to create products that can sell on world markets.
3. Natural resource curse theory – this is a theory that states if a country has one very valuable resource all efforts of the country are put into the exploitation of that resource. That limits the POTENTIAL development of other industries and if the resource is in the hands of a minority unscrupulous ruling elite, the profits are not shared well amongst people in the country.
4. Being landlocked with bad neighbours – although this has a political element to it, countries that have no access to the sea are at the mercy of their neighbours. If they are "bad neighbours" who expect huge payments or have regular conflict, this can severely limit development.
5. Climatic hazards such as hurricanes and drought are more likely to strike some countries than others. For fragile countries a drought could have a devastating impact on development. The 2011 to 2012 Horn of Africa famine that affected Ethiopia, Eritrea, Kenya and Somalia had a long term impact. As well as killing and weakening people from hunger and thirst, many of these countries had to deal with a refugee crisis, diverting valuable resources away from other development objectives.

Famine in the Horn of Africa - ©Oxfam East Africa

Revision Guide: The Development Gap

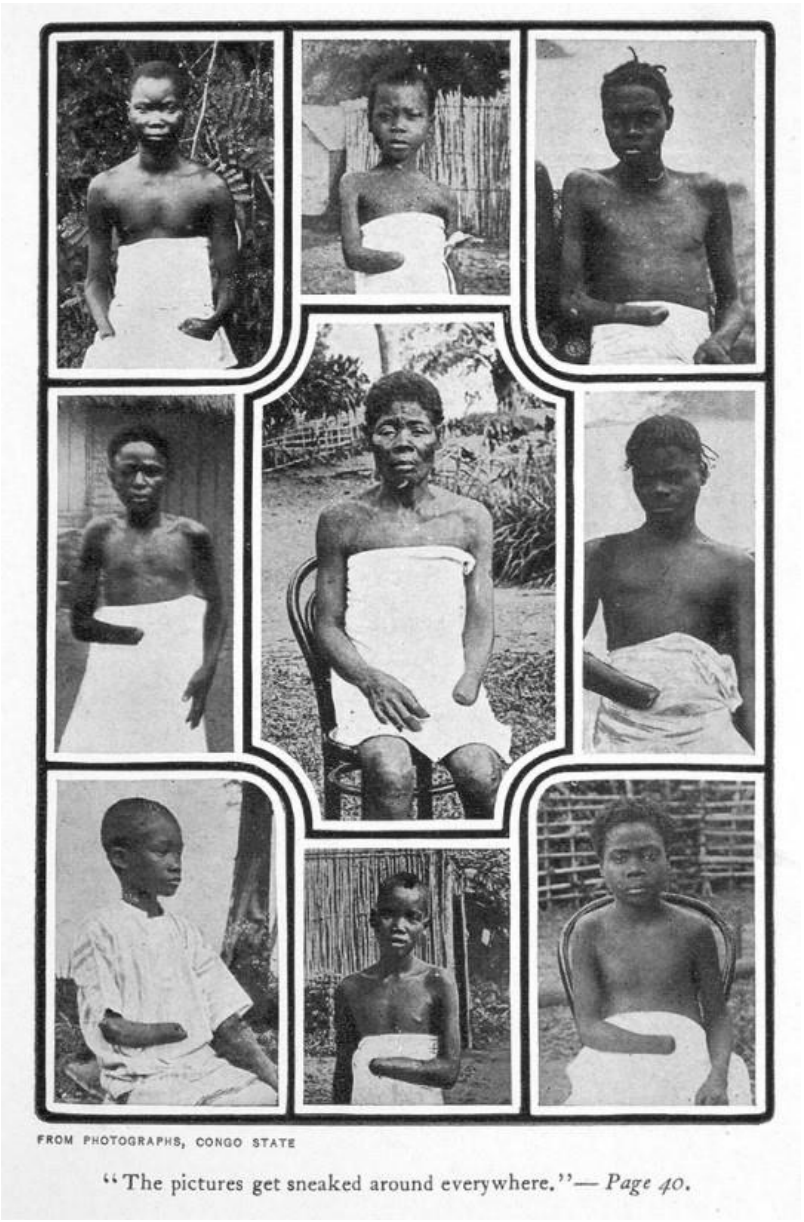
HASTINGS ACADEMIES TRUST

HISTORICAL FACTORS

There are many historical factors that can affect the level of development of a place. In the short term a lack of investment in education is particularly important, as many countries cannot afford to send all children to school even at a basic level. UNICEF claim that in 2006 93 million children of primary school age were not in school!

Colonialism - Looking at the longer term, the colonial legacy of many countries across the globe has held many countries back. Countries such as the UK, France, Spain and Germany had colonies across the globe from which they took people and resources. These processes have limited the development of these countries. Opposite is an image of mutilated Congolese slaves who were forced to work on Belgian rubber plantations under King Leopold. Such acts of vicious oppression held countries such as the Congo back.

Colonial countries also drew up borders and created countries that ignored tribal, ethnic and religious differences within those regions. This has subsequently led to conflict which also holds a countries economic development back.
Another good example here is Nigeria, a country created by the UK but struggling to cater for all of its different ethnic and religious groups.

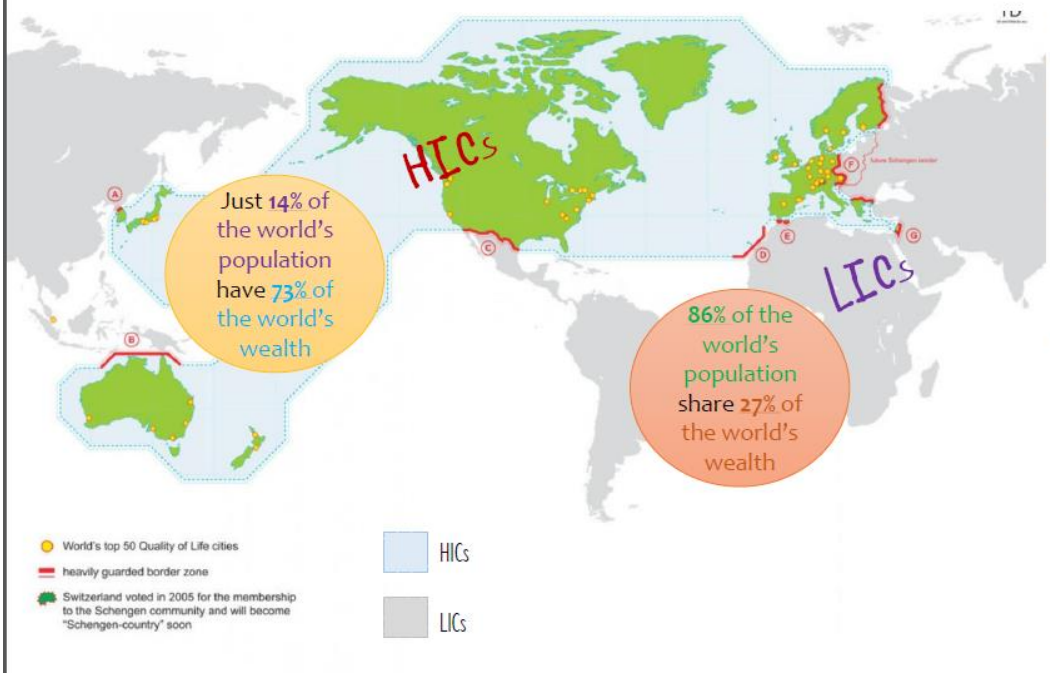


FROM PHOTOGRAPHS, CONGO STATE

"The pictures get sneaked around everywhere."— *Page 40.*

Lesson 6 - How does uneven development affect wealth and health?

UNEVEN DEVELOPMENT = DISPARITIES IN 1) WEALTH AND 2) HEALTH



LICs

- Malaria
- Typhoid
- Maternal mortality
- Infant mortality
- HIV/AIDS
- Tuberculosis
- Diarrhoea and dysentery

HICs

- Main causes of death are heart and lung diseases, cancer, dementia or diabetes.

Many illnesses are caused by dangerous 'luxuries' that we can afford such as cigarettes, unhealthy food and alcohol

The link between wealth and health

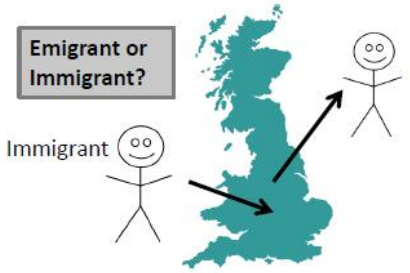
How does wealth (£) affect health? What can countries afford if they have the money to spend on healthcare?

- Better healthcare – hospitals, clinics, surgeries, emergency services etc
- More doctors and nurses being trained = lower patient per doctor ratio
- More research into diseases and more vaccinations (measles etc)
- Better treatment, better equipment and better quality training
- Lower infant mortality rates, lower maternal mortality rates and lower death rates
- Longer life expectancy
- More knowledge on how to stay healthy
- Better quality food and diet
- More knowledge on how to protect HIV/AIDS and malaria

Lesson 7 - How does uneven development lead to migration?

Migration

is the movement of people from one place to another. It can be internal (within a country) or international (between 2 countries). It can also be classified as rural to urban migration (countryside to city), or urban to rural migration.



Refugees – flee their homes in their country because their life is at risk. This may be due to war, famine etc. eg. Syria
Asylum seekers - apply for safety in another country. Once they are given permission to stay they are termed refugees

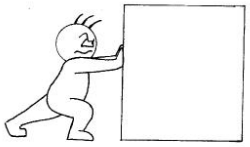
Why do people migrate?

- Political
- Social
- Environmental
- Economic

A range of different factors influence a person's decision to migrate.

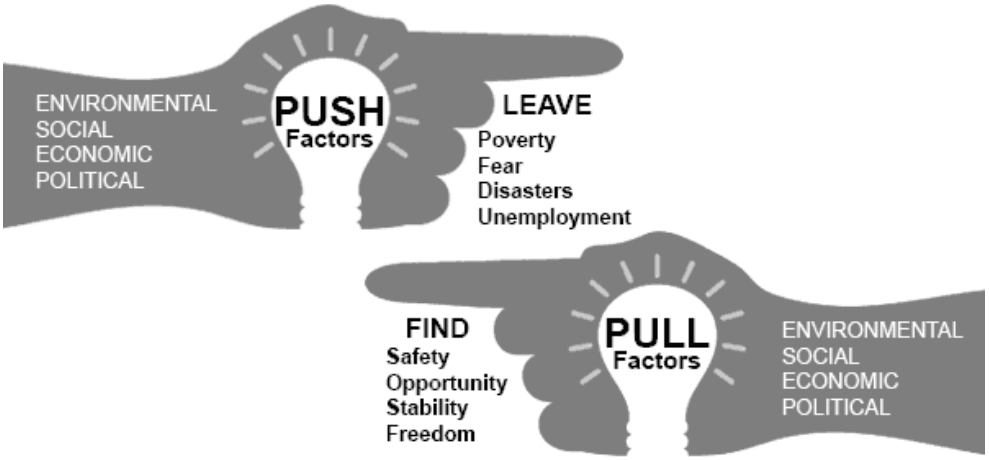
Some negative factors will encourage you to leave (push factor)

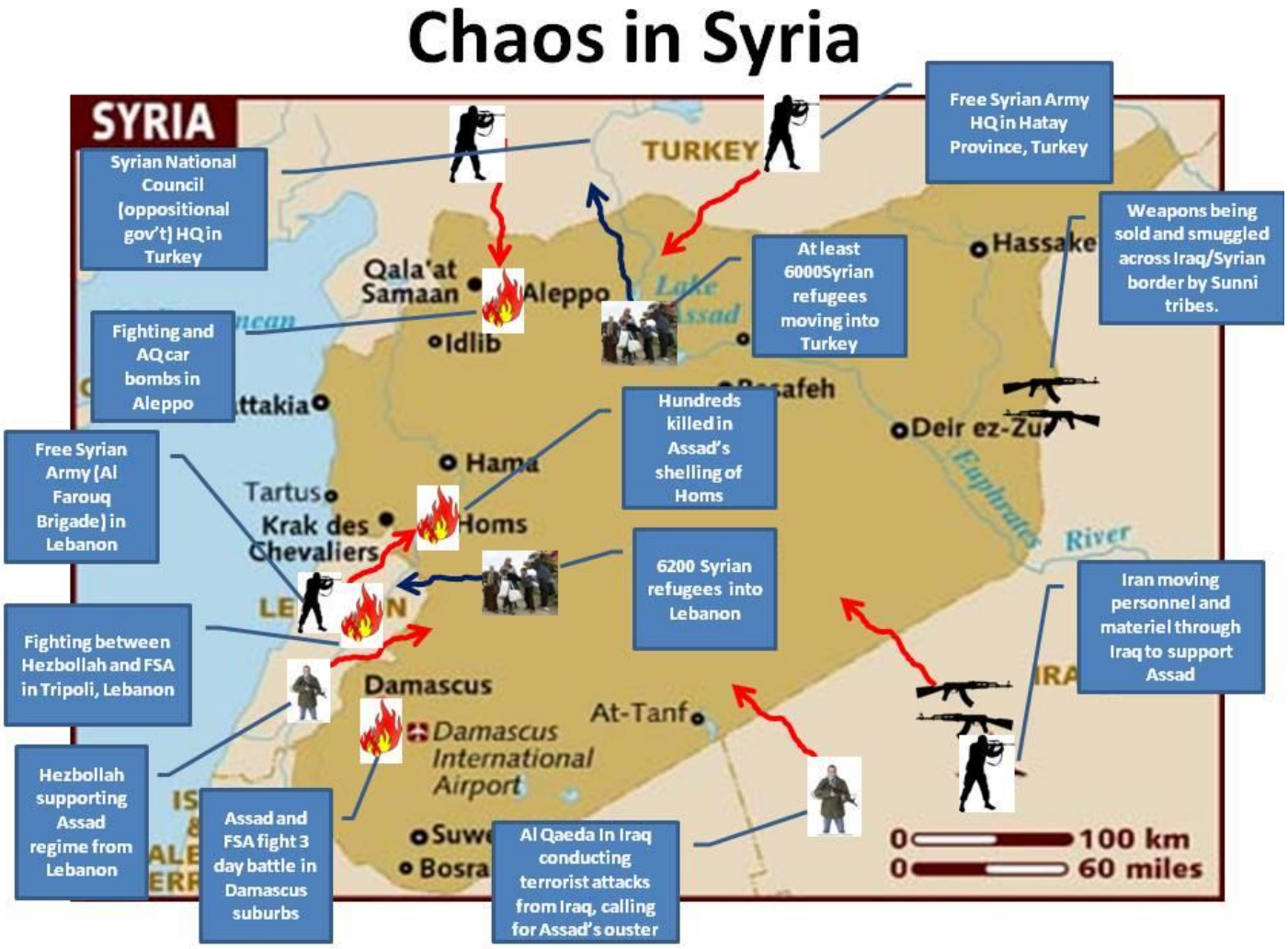
Other positive factors will persuade you to move to your new location (pull factor).



PUSH FACTORS

PULL FACTORS





Middle East Refugee Crisis, 2015

Conflicts in the Middle East and North Africa have contributed heavily to the refugee crisis. The United Nations reported that war in Syria and Iraq, as well as continuing violence and instability in Afghanistan and Eritrea, have driven the crisis. While some politicians have said that economic migrants make up the majority of those arriving, in reality the majority are refugees fleeing Syria, Eritrea and Afghanistan. The Syrian civil war that has raged since 2011 has displaced more than 4 million people.

Economic Migration to the UK

Economic migration is defined as a choice to move to improve the standard of living by gaining a better paid job.

When Poland and seven other Eastern European countries joined the EU in 2004, the UK received many economic migrants. There were 500,000 workers from Eastern Europe in 2009. The pull factors included wages five times greater than they could get at home. Some come for seasonal jobs, such as vegetable and fruit picking. More qualified migrants may look for medical or education jobs.

Lesson 8 - How can we reduce the development gap?

Investment

Investment can be used in 2 ways in poorer countries in order to try and improve quality of life and reduce gaps in development. Internal investment can come from large companies or the government, who might develop their own companies and projects. Many LICs are not capable of doing this, so turn instead to Foreign Direct Investment (FDI).

FDI is were foreign companies (such as BMW) locate their factories or research and development facilities in another country. This has good features such as improving the expertise and skills of local people who work in the factories, increasing trade for the country, offering new job opportunities to people, transferring technology and ideas from rich to poorer nations and increasing taxes to the host country. However, there are some negatives such as the misuse of the environment, local workers in poorer countries getting poor wages or working in poor conditions, profits leaving the poor country and going back to the host country of the company, and also large foreign firms squashing the development of local companies.

Industrial development

Infrastructure development brings employment, higher incomes and opportunities to invest in housing education and infrastructure. This is called the multiplier effect.

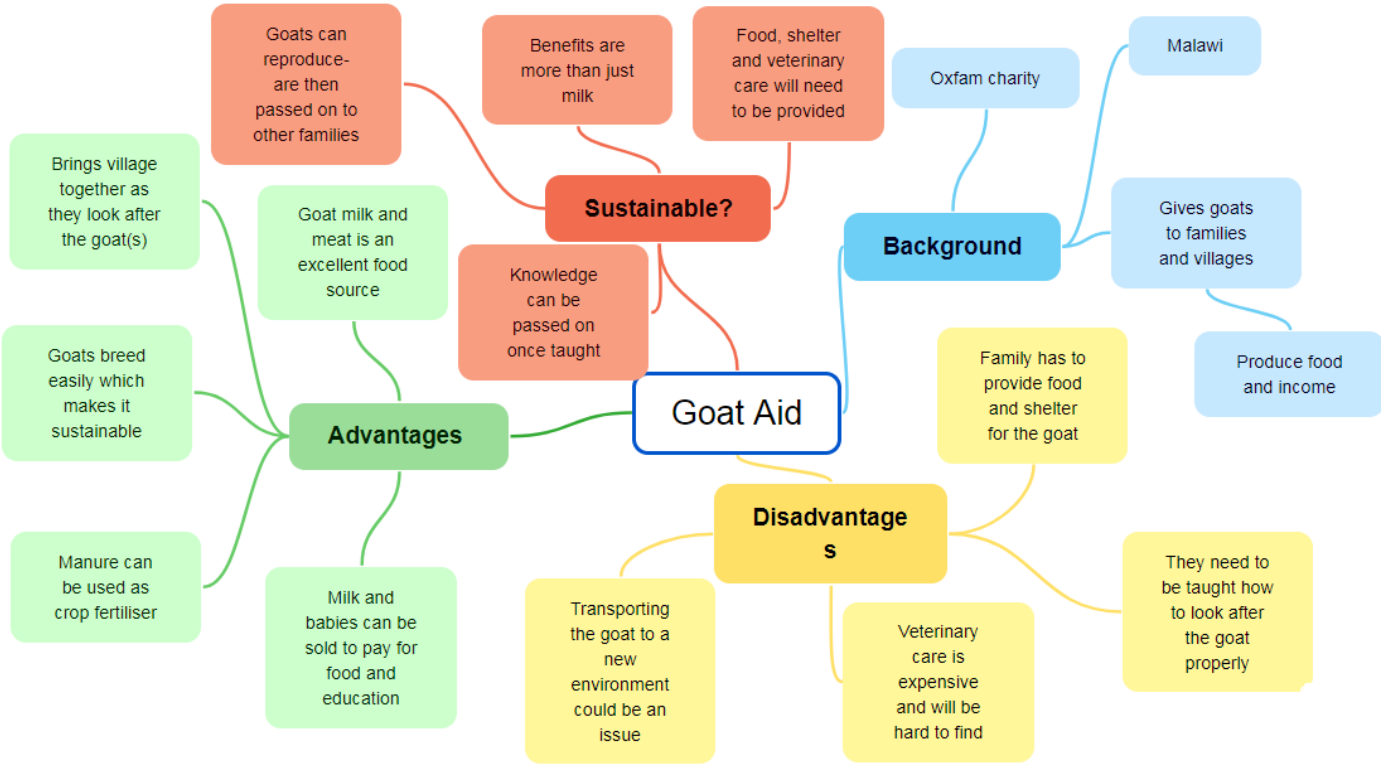
Tourism

Countries which have tropical beaches, spectacular landscapes or abundant wildlife (like the Bahamas/Seychelles) become dependent on Tourism for their development. This can be positive and negative.

Lesson 9 - How can aid and technology reduce the development gap?

Types of aid

- **Emergency or short-term aid** - needed after sudden disasters such as the 2000 Mozambique floods or the 2004 Asian tsunami.
- **Conditional or tied aid** - when one country donates money or resources to another (bilateral aid) but with conditions attached. These conditions will often be in the MEDC's favour, eg the controversial Pergau Dam project in Malaysia, where Britain used aid to secure trade deals with Malaysia.
- **Charitable aid** - funded by donations from the public through organisations such as OXFAM.
- **Long-term or development aid** - involves providing local communities with education and skills for sustainable development, usually through organisations such as Practical Action.
- **Multilateral aid** - given through international organisations such as the World Bank rather than by one specific country.



Intermediate technology

Intermediate or appropriate technology is a way of transferring technology from rich countries to poorer nations.

Its goal is to improve the quality of life in a country through mid-level technology that is small-scale, labour-intensive, energy-efficient, environmentally sound, and locally controlled

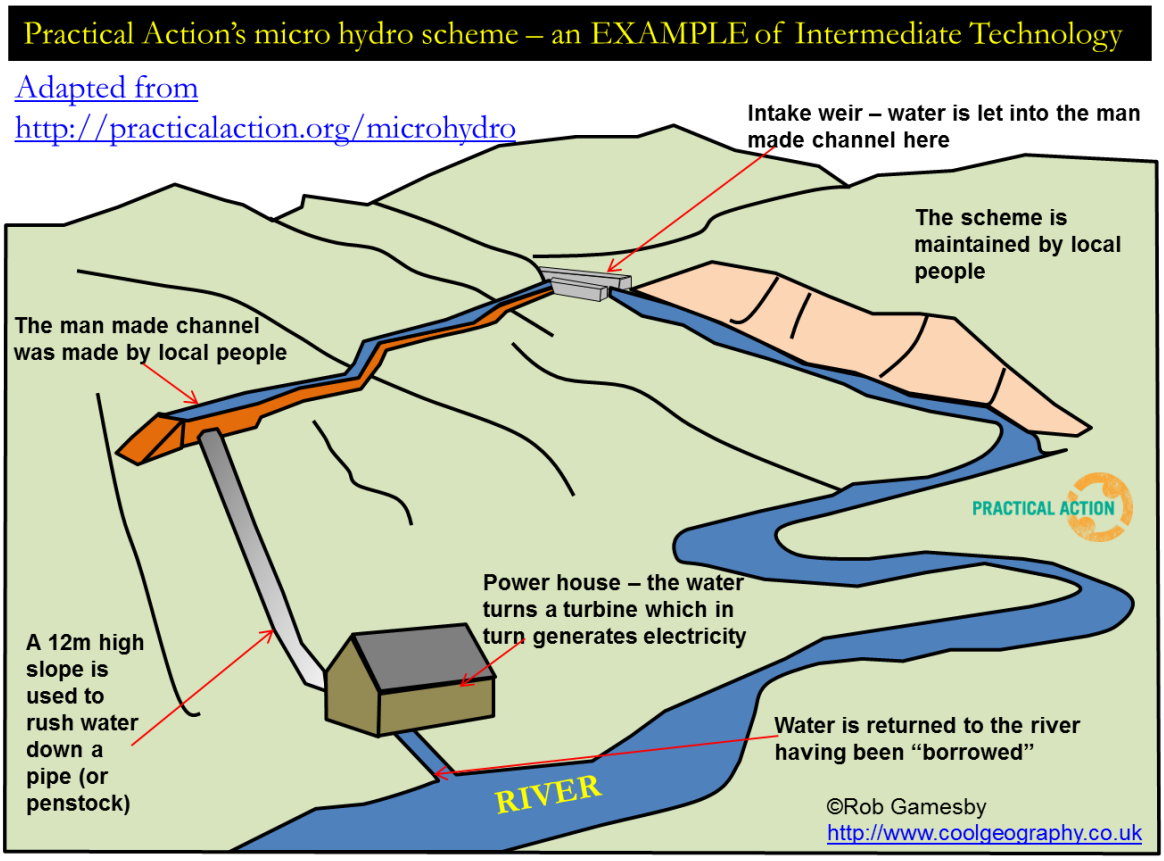
This type of technology is designed to improve on current technology within LICs and to be manageable for local people to use. There is no point in sending machinery and technology into an area if the people can get no use of it because it is too complicated.

Intermediate or appropriate technology is a move away from big aid projects. It aims to use simpler technologies that are right for the people, right for the environment and right for the donor. In most poor countries, high tech industries are too expensive to develop and inappropriate to the needs of local people. Appropriate/intermediate technology is usually;

A) Labour intensive - utilising and creating employment for local labour.
B) Using sustainable technology and tools/knowledge of local people
C) Uses newly developed technology that are low cost and local which local people can manage and control rather than IMPORTED techniques and technologies
D) In harmony with the local environment.

Practical Action is a charity that has over 100 projects worldwide helping over 900,000 people. One type of project is using micro hydro-electric power stations to generate electricity so people can work their way out of poverty. Micro-hydro power is the small-scale gathering of energy from falling water, such as steep mountain rivers. Using this renewable, indigenous, non-polluting resource, micro-hydro plants can generate power for homes, hospitals, schools and workshops.

Practical Action promotes small-scale hydro schemes that generate up to 500 kilowatts of power. This provides poor communities in rural areas with an affordable, easy to maintain and long-term solution to their energy needs. This means that this is a great example of Appropriate Technology. They have developed micro-hydro systems with communities in Peru, Zimbabwe, Sri Lanka, and Kenya.



Lesson 10 - How can fair trade reduce the development gap?

Free Trade

Trade is the exchange of goods, money and services between countries and regions. The goods made in a region and sold to other places and known as Exports (they Exit the country or region). The goods bought into a place from other regions are known as Imports (they come Into the country or region). Trade can be used to help even out the gaps in development.
If value of exports for a country or region is greater than its Imports it will have a trade surplus and will make money. If a region imports more than it sells then it will have a trade deficit.

Most HICs import primary products which have low value and export high value manufactured goods an even higher value services.

Most LICs export lower value primary products (such as cocoa, cotton etc.), this means that they struggle to raise standards of living in their countries because they do not have much foreign money coming in from trade. The price of primary goods also varies widely and producers can lose out massively, so the trade in a sense is unfair.

Fair Trade

This is a scheme designed to get a better deal for the producers of the primary products that HIC countries need. The producers get access to the market for their goods, a contract (for extra financial security), better prices for their products and access to the Fair Trade Premium, which is a sum of money available from the Fair Trade foundation to be spent upon improving yields, farming practices, health care or education. Fair Trade is an international movement and its influence is growing, more than 4,500 products now bear the fair trade mark, and 72% of the UK population recognise the Fair Trade logo. In addition, more than 7 million people in Africa, Asia and Latin America benefit from Fair Trade - farmers, farm workers, and their families.

Lesson 11 - How can debt relief reduce the development gap?

Debt Relief

Many LICs took out huge loans (for millions of pounds) during the 1970s, offered to them by banks and governments in rich HICs.
The LICs wanted to use the money for various development projects such as building dams, roads, schools etc. The idea was to help countries to develop by improving their industries and infrastructure. The loans had to

be paid back, and the longer the loan went unpaid the larger it got, because the HICs added a sum of money called interest every month.

Over time these loans got so large because of interest that some LICs would never be able to pay them off. It also meant that some HICs spent more on loan payments than on health care and education for the people living in their countries. This has had a really damaging effect on the quality of life of people who live in these areas.
If a project succeeds debts are easily repaid and there is no issue. However, if a project fails debts can build up because of the interest and countries can get into huge financial trouble. This issue can massively affect the development of a country, which directly affects the standard of living of the people who live there.

In the run up the new millennium a campaign was started to drop the debt, which has had some success in cancelling some debt, freezing the interest on some debt and in some cases giving the poorer LICs more time to pay back their debts. This campaign was called Jubilee 2000. As a result of this campaign the UK government cancelled much but not all of the debts owed to it by poorer nations. Banks have not cancelled debts however, and many countries the world over suffer the effects of debt.

Microfinance loans

Microfinance loans are Very small loans which are given to people in the LICs to help them start a small business. They are typically given to people with very low incomes who would not have access to normal bank loans Banks consider them too much of a risk. The idea is that low-income individuals are capable of lifting themselves out of poverty if given access to money to start their own businesses. The interest rates are either very low, or in the case of charitable donations non-existent, only the loan sum needs repaying.

Lesson 12 - How can tourism reduce the development gap in Jamaica?

What is the state of Jamaica's economy?

Jamaica is one of the largest islands in the West Indies. Its population is 2.7 million. Its economy is based on a range of minerals (such as Bauxite and oil), agricultural products (sugar and rum) and some manufacturing. It has suffered from slow growth, debt and high unemployment.

How has tourism affected Jamaica?

- In 2014 tourism contributed to 24% of Jamaica's GDP
- Tourism in Jamaica provides income for people so that the local economy can improve further
- Income from tourism is US$2 billion each year. Taxes paid to government contribute further to the development of the country.
- New port and cruise lines facilities have been built on the island.
- Tourism in Jamaica provides 200,000 people with jobs in the tourist industry.
- In the northern tourist areas , wealthy Jamaicans live in high quality housing with a high standard of living. These areas have benefited from tourism.
- Community and eco-tourism is expanding in more isolated regions with people running small-scale guest houses or acting as guides.
- The annual 1.1. million cruise passengers only spend an average US $70 per day compared with $120 per day spent by other visitors.
- Roads and airports have been slower to develop meaning that some parts of the island are isolated.

Exam Questions

Q1. Outline **one** disadvantage of using a single measure of development such as income.

_____

_____

_____

_____

(Total 2 marks)

Q2.(a) Give **three** features of the pattern of world trade.

1. _____

_____

2. _____

_____

3. _____

_____

(3)

(b) For **one or more** of the features of world trade listed in **(a),** or others that you have studied, explain how they worsen global inequalities.

_____

_____

_____

_____

_____

_____

_____

_____

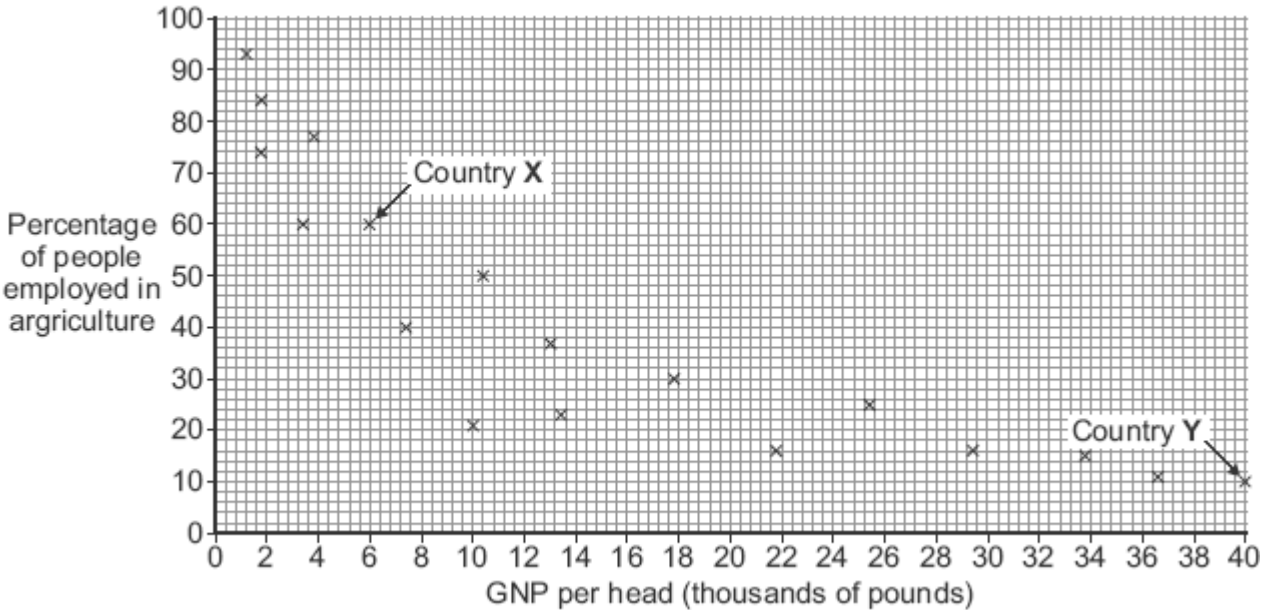
Extra space _____

_____

_____

(4)
(Total 7 marks)

Q3. Study the scattergraph below showing the link between GNP per head and the percentage of people employed in agriculture in selected countries.



(i) What is the relationship between GNP per head and the percentage of people employed in agriculture shown in the scattergraph?

_____

_____

(1)

(ii) Why is GNP per head not a good indicator of a country's level of development?

_____

_____

_____

_____

(2)
(Total 3 marks)

Q4. Study the table below which gives some measures of development for five countries.

Country	GNP per head (US Dollars)	World ranking	HDI	World ranking
Malaysia	4 595	38	0.834	60
Germany	25 620	9	0.925	19
Russia	2 740	58	0.717	72
Brazil	4 330	37	0.809	62
UK	24 295	18	0.932	14

'Human Development report 1999' by United Nations Development Programme (1999); extract from Table concerning GNP per head. By permission of Oxford University Press, Inc. www.oup.com

(i) What do the letters HDI mean?

_____

_____

(1)

(ii) Explain why HDI may be a better indication of a country's level of development than GNP. Use the table above and your own knowledge.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Extra space _____

_____

_____

(4)

(iii) Use a **named** example to show the impact of a natural hazard on a country's development.

Extra space

(4)
(Total 9 marks)

Q5. Infant mortality is the rate of child deaths.
Kolkata has a very high infant mortality rate.
Why is infant mortality a useful indicator of economic development?

_____

(Total 4 marks)

Q6. Describe **one or more** advantages of charitable aid.

_____

_____

_____

_____

_____

_____

(Total 3 marks)

Q7.(a) What is a Trading Group?

_____

_____

(1)

(b) Outline **one** way in which Trading Groups can help poor countries get a better deal from world trade.

_____

_____

_____

_____

(2)
(Total 3 marks)

Q8. Outline **one** way that Fairtrade helps to deal with the problems of unequal development.

_____

_____

_____

_____

(Total 2 marks)

FRENCH

Use the information that follows to either test yourself on key words/phrases for each topic (using the look/cover/check technique) or create flashcards with the Spanish on one side and the English translation on the other. Either test yourself or get someone else to test you. When you feel confident, write a short paragraph about each topic using the vocabulary you have revised.

GCSE FRENCH KNOWLEDGE ORGANISER

DESCRIBING A PHOTO

Sur la photo il y a… (In the photo there is…)

PEOPLE

un homme	a man
une femme	a woman
un garçon	a boy
une fille	a girl
des jeunes	some young people
il est vieux	he is old
elle est vieille	she is old
grande	tall
petite	short
jolie	pretty/handsome

ACTIONS

il est en train de/ ils sont en train de	he is/they are in the middle of
...parler	...talking
...rire	...laughing
se disputer	arguing
marcher	walking
fêter	celebrating
travailler	working
jouer	playing
manger	eating

LOCATIONS

il/elle est	he/she is
ils sont	they are
dehors	outside
dedans	inside
à la maison	at home
en plein air	in the open air
des arbres	some trees
des édifices	some buildings
au collège	at school
au travail	at work

MOOD

il/elle semble	he/she seems
ils semblent	they seem
(mal)contente/s	(un)happy
triste/s	sad
fatiguée/s	tired
énervée/s	angry
surprise	surprised
pressée	in a hurry
ennuyée	bored
ravie	delighted

WEATHER

il fait beau	it's nice
il fait du soleil	it's sunny
il pleut	it's raining
il neige	it's snowing
il y a du vent	it's windy
il fait beau	it's nice
il fait du soleil	it's sunny
il pleut	it's raining
il neige	it's snowing
il y a du vent	it's windy

GENERAL

au premier plan	in the foreground
au deuxième plan	in the background
à gauche	on the left
à droite	on the right
près de	next to
devant	in front of
au milieu	in the middle
derrière	behind
je peux voir	I can see
la photo montre	the photo shows

GIVING YOUR OPINION

You can also give your opinion of the photo and add a little information, e.g.

J'aime cette photo parce que c'est coloré (colourful) *et j'adore jouer au foot*

TOPIC 1: Me, my family and friends

Je m'appelle Emilie et *j'ai* quatorze *ans*	**I'm called** Emilie and *I'm* 14 *years old*
J'aurai 15 **ans** dans trois mois	**I will be** 15 **years old** in three months
Je pense que je suis *assez* typique	**I think that** I am *quite* normal
Quand j'étais petit, j'étais *un peu* pénible	**When I was** little I was *a bit* annoying
mais plus maintenant car *j'ai grandi*	**but not anymore** because *I've grown up*
Tout le monde dit que je suis sociable	**Everyone says that** I am sociable
et que j'aime **m'amuser**	and that I like **to have fun**
Il y a cinq personnes *dans ma famille*	**There are** five people *in my family*
Mes parents **sont mariés depuis** 2001	My parents **have been married since** 2001
Ma mère qui s'appelle Ellie est généreuse	**My mum who is called Ellie is** generous
mais **mon père, Albert, est** *très* sévère	but **my dad, Albert, is** *very* strict
Je m'entends bien avec ma soeur Aline	I get on well with my sister Aline
J'ai de la chance de *l'*avoir	**I'm lucky** to have *her*
Ma grand-mère **est morte** *il y a* cinq ans	My grandmother **died** five years *ago*
Elle était sympa et **elle** *me* manque	She was nice and *I* **miss** her
Je pouvais *parler de tout* avec elle	**I could** *talk about everything* with her
Hier **je suis allée** en ville avec mon ami	Yesterday **I went** into town with my friend
car **il y avait** le marché de Noël	because **there was** the Christmas market
Nous **avons acheté** des cadeaux pour...	We **bought** presents for...
Ensuite **nous sommes allés** *voir* un film	Next **we went** *to see* a film
À l'avenir je voudrais *me marier*	**In the future** I would like *to marry*
Mon mari/femme idéale **serait**...	My ideal husband/wife **would be**...
J'aurai un *grand* mariage romantique	**I will have** a *large* and romantic wedding
Bien que *j'aie* une grande famille	**Although** *I have* (subjunctive) a large family
je **ne voudrais pas** avoir des enfants	I **wouldn't like** to have children

TOPIC 2: Technology in everyday life

Je me sers de mon portable *pour tchatter*	**I use** my phone *(for) to chat*
Je **l'**utilise aussi pour surfer sur internet	I also use **it** to surf the internet
Je ne m'**en** sers pas pour faire mes devoirs	I don't use **it** to do my homework
car l'écran est **trop** petit	because the screen is **too** small
J'aime **écouter** de la musique	I like **to listen** to music
et **faire des recherches** sur internet	and **do research** on the internet
Hier soir **j'ai téléchargé** des films	Last night **I downloaded** some movies
Puis je suis allée sur **les réseaux sociaux**	Next, I went on **social media**
et **j'ai actualisé** ma page personnelle	and **I updated** my homepage
Avant de *me déconnecter*	**Before** *switching off*
j'ai partagé un photo **sur** Instagram	**I shared** a photo on Instagram
Selon moi l'internet **peut être** dangereux	According to me the internet **can be** dangerous
Il est important de sécuriser son mot de passe	**It's important to** secure (y)our password
Il faut faire attention quand on est *en ligne*	**You must** pay attention when you're *online*
Et **il ne faut pas** *ajouter en ami*	And **you must not** *add as a friend*
les gens qu'**on ne connaît pas**	people that **you don't know**
D'autre part, *ce n'est pas* dangereux	**On the other hand**, *it's not* dangerous
Dans le passé les portables étaient *lents*	**In the past** phones were *slow*
Il était difficile de communiquer	**It was difficult to** communicate
Les ordinateurs étaient **grands** et *chers*	Computers were **large** and *expensive*
et la connexion **n'était pas** fiable	and the connection **was not** reliable
À l'avenir **il y aura** des robots	In the future **there will be** robots
et des voitures **sans conducteur**	and cars **without drivers**
La technologie **sera plus avancée**	Technology **will be more advanced**
et **plus rapide** dans vingt ans	and **faster** in twenty years

TOPIC 3: Free-time activities

Je fais beaucoup de sports **comme** le foot	I do a lot of sport **such as** football
pour développer mes capacités	**in order to** develop my skills
Je joue **au tennis** mais je ne fais pas *du vélo*	I play **tennis** but I don't go *cycling*
parce que **je le trouve** *trop* fatiguant	because **I find it** *too* tiring
Normalement **je regarde** *les infos*	Normally **I watch** *the news*
car **ça m'intéresse** beaucoup	because **it interests me** a lot
et **je ne rate jamais** les feuilletons	and **I never miss** the soaps
Au ciné **je préfère voir** les films d'action	At the cinema **I prefer to see** action films
en mangeant … et *en buvant* …	**while eating** … and *while drinking* …
Je trouve les films bon pour ma culture	**I find** films good for my culture
et j'aime regarder **les films étrangers**	and I like to watch **foreign films**
pour améliorer mes compétences linguistiques	**in order to improve** my language skills
Je suis **un rat de bibliothèque**	I'm **a bookworm**
Récemment **j'ai lu** un bon roman	Recently **I read** a good novel
Mais normalement **je préfère** écouter	But normally **I prefer** to listen
de la musique ou **à la** radio	**to** music or **to the** radio
plus que lire des livres	**more than** reading books
Le weekend prochain **je vais aller** au parc	Next weekend **I'm going to go** to the park
Il faut acheter *des choses* pour le collège	**I have to** buy *some things* for school
Ensuite je vais **traîner** avec *mes potes*	Next I'm going **to hang out** with *my homies*
Les loisirs sont importants pour déstresser	Hobbies are important for destressing
Je peux **oublier** mes soucis	I can **forget** my worries
Bien que je sois/je lise/je fasse...	**Although** I am/I read/I do...
C'est une **perte de temps**	It's a **waste of time**
On aurait préféré	We would have preferred

TOPIC 4: Customs and festivals in the French-speaking world

À mon avis **les fêtes** et *les jours fériés*	In my opinion **festivals** and *bank holidays*
sont importants pour **passer du bon temps**	are important for **having a good time**
Mais **en ce qui concerne** la Saint Valentin	But **as far as** Valentine's day **is concerned**
C'est **une perte d'argent**	It's **a waste of money**
Ma fête religieuse préférée est **Pâques**	My favourite religious holiday is **Easter**
Le chocolat, c'est **mon péché mignon**!	Chocolate is **my guilty pleasure**!
Nous **la** célébrons avec *toute la famille*	We celebrate **it** with *all the family*
Nous cherchons les œufs dans le jardin	**We look for** eggs in the garden
La fête de la musique *a lieu* en France	**World Music Day** *takes place* in France
pour célébrer **le début de l'été** le 21 juin	to celebrate **the start of summer** on 21st June
L'année dernière j'**y** ai participé	Last year I took part **in it**
et **tout le monde** jouait dans les rues	and **everyone** was playing in the streets
Quand **j'avais** quinze **ans**	When **I was** fifteen **years old**
J'ai fêté mon anniversaire avec mes amis	**I celebrated** my birthday with my friends
Nous sommes allés regarder un film	**We went** to watch a film
et quand **je suis rentrée** à la maison	and when **I got back** home
j'ai reçu **de nombreux** cadeaux	I received **a lot of** presents
Ce sera différent l'année prochaine	**It will be** different next year
J'aurai **une** grande **boum**	I will have **a** big **party**
Et toute ma famille **sera** là	And all my family **will be** there
Je serai traitée comme une princesse	**I will be treated** like a princess
Mon cadeau idéal serait un portable	**My ideal present** would be a phone
et **je pourrais** télécharger des applis	and **I would be able to** download apps
Je voudrais **aussi** des nouveaux vêtements	I'd **also** like some new clothes
pour porter à **ma fête d'anniversaire**	to wear to **my birthday party**

TOPIC 5: Home, town, neighbourhood and region

J'habite **à** Highbridge, une petite ville	I live **in** Highbridge, a small town
dans **le sud-ouest** de l'Angleterre	in **the south-west** of England
J'y habite avec ma famille *depuis* un an	**I have lived there** *for* a year
C'est situé au bord de la mer	**It's situated** by the seaside
Il n'y a grand-chose à faire **pour les jeunes**	There's not a lot **for young people** to do
Mais il y a **des magasins** et *un jardin public*	But there are **some shops** and *a park*
J'aime **habiter** à la campagne	I like **living** in the countryside
parce que c'est **plus tranquille qu'**en ville	because it's **quieter than** in town
Selon moi, ma région est très jolie	**According to me**, my region is very pretty
et en été il y a beaucoup de touristes	**and in summer** there are a lot of tourists
Ma région **est connue pour** le cidre	My region **is known for** its cider
et le fameux fromage de Cheddar	and the famous Cheddar cheese
C'est une région historique aussi	It's a historic region too
La semaine dernière **j'ai visité** le musée	Last week **I visited** the museum
et **j'y ai appris** beaucoup	and **I learned** a lot **there**
J'ai aussi **fait des courses** *en ville*	**I** also did some shopping *in town*
J'ai rencontré mes amies au ciné	I met my friends at the cinema
et **on a regardé** un film d'horreur	and **we watched** a horror film
Ça m'a donné la chair de poule!	**It gave me goosebumps!**
À l'avenir je voudrais habiter *en ville*	**In the future** I would like to live *in town*
À Londres **ou même** Bristol *c'est plus animé*	In London **or even** Bristol *it's livelier*
J'achèterais un appartement spacieux	**I would buy** a spacious apartment
Je sortirais tous les soirs	**I would go out** every evening
J'irais à toutes les boîtes de nuit	**I would go** to all the nightclubs
Je m'amuserais bien	I would have a lot of fun

TOPIC 6: Social issues

Pour aider les SDF/les démunis	To help the homeless/those in need
je travaille comme **bénévole** pendant l'été	I work as a **volunteer** during the summer
Je pense que **les associations caritatives**	I think that **charities**
jouent un rôle important dans **la société**	play an important role in **society**
en aidant ceux qui *ont besoin* d'eux	**by helping** those who *need* them
Bien que ne j'aie pas *trop* le temps	**Although** I don't have *too much* time
je voudrais **créer** une association caritative	I would like **to create** a charity
pour aider les mères *célibataires*	**to help** *single* mums
et **leurs enfants** car **ça m'inquiète** le plus	and **their children** because **that worries me** the most
Je vais collecter des choses nécessaires	**I'm going to collect** essential things
comme des produits d'hygiène	**such as** hygiene products
Je vais essayer de faire *mon mieux*	**I'm going to try** to do *my best*
pour que ces femmes *ne manquent de rien*	**so that** these women *don't lack anything*
Si j'avais plus de temps et d'argent	**If I had** more time and money
j'aiderais **le monde** entier	I would help **the** entire **world**
J'ai le cœur sur la main	**I am all heart**
Les jeunes **font face à** la pression des paires	Young people **face** peer pressure
En étant connectés *en ligne* tout le temps	**By being** connected *online* all the time
les jeunes **peuvent** *être* intimidés	young people **can** *be* intimidated
ce qui peut avoir un impact	**which** can have an impact
sur leur **santé mentale** et *travail scolaire*	on their **mental health** and *schoolwork*
Ils peuvent avoir **d'autres** problèmes	They can have **other** problems
comme **l'anorexie**, *les drogues* ou l'alcool	such as **anorexia**, *drugs* or alcohol
Il est important de parler de *ses* problèmes	**It's important** to talk about *one's* problems
pour *les* résoudre	**in order to** resolve *them*

PERFECT TENSE (*"has done/did"*)

Start with the present tense of *avoir/être*, then add the past participle of the second verb:

-er	-ir	-re
Remove **–er** Add **-é**	Remove **-r**	Remove **–re** Add **-u**
jou**er** → (j'ai) jou**é**	fin**ir** → (j'ai) fini	vend**re** → (j'ai) vend**u**

VERBS USING ÊTRE e.g. je suis allé(e)

monter entrer sortir venir aller naître
partir descendre arriver tomber rester
mourir retourner ***(and all reflexive verbs)***

The past participle for these verbs must agree with the subject in gender and number:

je suis allé (m) *je suis tombée* (f)
on est entrés (mpl) *on est entrées* (fpl)

PRESENT TENSE (*"does/is doing"*)

Remove the -er/-ir/-re and add these endings:

	jouer	finir	vendre
je	jou**e**	fin**is**	vend**s**
tu	jou**es**	fin**is**	vend**s**
il/elle/on	jou**e**	fin**it**	vend
nous	jou**ons**	fin**issons**	vend**ons**
vous	jou**ez**	fin**issez**	vend**ez**
ils/elles	jou**ent**	fin**issent**	vend**ent**

ÊTRE

je suis / tu es / il est / nous sommes / vous êtes / ils sont

AVOIR

j'ai / tu as / il a / nous avons / vous avez / ils ont

SIMPLE FUTURE TENSE (*"will/shall do"*)

Add these endings to the infinitive:

	jouer	finir	vendre
je	jouer**ai**	finir**ai**	vendr**ai**
tu	jouer**as**	finir**as**	vendr**as**
il/elle/on	jouer**a**	finir**a**	vendr**a**
nous	jouer**ons**	finir**ons**	vendr**ons**
vous	jouer**ez**	finir**ez**	vendr**ez**
ils/elles	jouer**ont**	finir**ont**	vendr**ont**

IRREGULAR STEMS

être (ser-) *avoir* (aur-) *faire* (fer-)
venir (viendr-) *savoir* (saur-) *aller* (ir-)
devoir (devr-) *pouvoir* (pourr-) *voir* (verr-)

IMPERFECT TENSE (*"was doing/used to do"*)

Remove *–ons* from the *nous* form of the present tense, add these endings (*ais/ais/ait/ions/iez/aient*)

	jouer	finir	vendre
je	jou**ais**	finiss**ais**	vend**ais**
tu	jou**ais**	finiss**ais**	vend**ais**
il/elle/on	jou**ait**	finiss**ait**	vend**ait**
nous	joui**ons**	finiss**ions**	vend**ions**
vous	joui**ez**	finiss**iez**	vend**iez**
ils/elles	jou**aient**	finiss**aient**	vend**aient**

NEAR FUTURE TENSE (*"is going to do"*)

Use the present tense of *aller* followed by the infinitive:

je	**vais**
tu	**vas**
il/elle/on	**va**
nous	**allons**
vous	**allez**
ils/elles	**vont**

jouer
finir
vendre
être
aller
vouloir
etc.

CONDITIONAL TENSE (*"would do"*)

Begin with the future stem, add imperfect endings:

	jouer	finir	vendre
je	jouer**ais**	finir**ais**	vendr**ais**
tu	jouer**ais**	finir**ais**	vendr**ais**
il/elle/on	jouer**ait**	finir**ait**	vendr**ait**
nous	jouer**ions**	finir**ions**	vendr**ions**
vous	jouer**iez**	finir**iez**	vendr**iez**
ils/elles	jouer**aient**	finir**aient**	vendr**aient**

IRREGULAR STEMS

Same as for the simple future

EXTRA MARKS: USE WITH THE IMPERFECT TENSE

Si j'avais le temps, j'irais... (If I had time, I'd go to...)

PLUPERFECT TENSE (*"had done"*)

Very similar to the perfect tense, except you start with the *imperfect* tense of auxiliary verbs *avoir/être:*
e.g. j'*avais* joué, il *avait* fini, nous *étions* allés, elles s'*étaient* brossées les dents

SUBJUNCTIVE MOOD (expressing hope/fear/desire/wish etc.)

Remove *–ent* from the *ils* form of the present tense, add endings (*e/es/e/ions/iez/ent*)

e.g. ils jouent		jouer	finir	vendre
que	je	joue	finisse	vende
	tu	joues	finisses	vendes
	il/elle/on	joue	finisse	vende
	nous	jouions	finissions	vendions
	vous	jouiez	finissiez	vendiez
	ils/elles	jouent	finissent	vendent

IRREGULAR VERBS

être	(je sois)
avoir	(j'aie)
faire	(je fasse)
venir	(je vienne)
savoir	(je sache)
aller	(j'aille)
devoir	(je doive)
pouvoir	(je puisse)
vouloir	(je veuille)
falloir	(il faille)

ONLY USE THE SUBJUNCTIVE AFTER THESE PHRASES SUCH AS:

bien que	(although)	*vouloir que*	(to want that)
falloir que	(to be necessary that)	*préférer que*	(to prefer that)
désirer que	(to desire that)	*être important que, être essentiel que*	
penser que, croire que (negative only)		*être urgent que*	

e.g.	*je **veux que** tu le **fasses***	(I want you to do it – lit: I **want that** you **do** it)
	*je **préfère qu'**il **soit** sympa*	(I **prefer that** he **be** nice)
	*il **ne pense pas qu'**elle **soit** belle*	(He **doesn't think that** she **is** beautiful)
	***bien que** je n'**aie** pas l'argent*	(**although** I don't **have** the money)

PRONOUNS (SAYING "*it*")

Put *le*, *la* or *les* in front of the main verb

*je **le** mange*	I eat **it**
*je **l'**ai mangé*	I ate **it**
*je **le** mangeais*	I was eating **it**
*je vais **le** manger*	I'm going to eat **it**
*je **le** mangerai*	I will eat **it**
*je **le** mangerais*	I would eat **it**
*que je **le** mange*	that I eat **it** (subj.)

<u>If the pronoun is feminine or plural, you need to make the past participle agree:</u>

je ***les** ai mangé<u>s</u>*	I ate **them**
*je **l'**avais vu<u>e</u>*	I had seen **her**

Use *y* for 'there', and *en* for 'some/any':

j'**y** suis allé	I went **there**
je n'**en** ai pas	I don't have **any** [of them]

THE NEGATIVE

Put the negative around the main verb

ne...pas	not
ne...jamais	never
ne...rien	nothing
ne...personne	nobody
ne...que	only
ne...plus	no more/any more
ne...aucun	not a single one
ne...guère	hardly, barely
ne...ni...ni	neither...nor

EXAMPLES

*il **n'**a **jamais***	He **never** has
*il **n'**a **rien** bu*	He drank **nothing**
*il **ne** l'aura **pas***	He **won't** have it
*je **n'**ai vu **ni** l'un **ni** l'autre*	I didn**'t** see **neither** one **nor** the other

OPINION PHRASES

Don't just say *j'aime* or *je déteste*!

je pense que	I think that
je crois que	I believe that
à mon avis	in my opinion
selon moi	according to me
je trouve que	I find that
je préfère	I prefer
je dirais que	I would say that
je sais que	I know that
j'estime que	I reckon that
il me semble que	it seems to me that
il me paraît que	it appears to me that
en ce qui concerne X	as far as X is concerned

Don't forget – you should always justify your opinion using *parce que* or *car*!

COMPARATIVE & SUPERLATIVE

Replace "…" with any adjective

plus ... que	more ... than
moins ... que	less ... than
aussi ... que	as ... as
mieux	better
pire	worse
le/la plus ...	the most ...
le/la moins ...	the least ...
le/la mieux	the best (thing)
le/la pire	the worst (thing)

EXAMPLES

plus grand que	more tall/tall**er** than
moins grand que	less tall/short**er** than
aussi** grand **que	**as** tall **as**
*le **plus** grand*	the **most** tall/tall**est**
*la **moins** grande*	the **least** tall/short**est**

USING PROF3C

to ace the writing and speaking exams!

***P** ast tense*	Hier j'ai joué au foot
***R** easons (&)*	(J'adore le foot
***O** pinions*	parce que c'est top)
***F** uture tense*	Demain j'étudierai avec mes copains
***3** rd person*	Mes amis adorent le français
***C** onditional*	Je voudrais habiter en France à l'avenir

Use PROF3C to help you answer:

- 40/90 word essay (F)
- 90/150 word essay (H)*
- General conversation (F/H*)

* To have access to the highest marks for these questions, you should also try to add a subjunctive phrase, pronouns etc. too (everything from these two pages)

BEFORE, DURING, AFTER

Saying when something happens

***avant de** (+infinitive)*
before ___ing
avant de faire mes devoirs
(before doing my homework)

***après avoir** (+past participle)*
after having ____
après avoir fait mes devoirs
(after having done my homework)

***être en train de** (+infinitive)*
to be in the midst of ___ing
je suis en train de faire mes devoirs
I'm in the midst of doing my homework

EXAMPLE

Avant de sortir, ma mère m'avait demandé de ranger ma chambre *après avoir fait* mes devoirs, mais j'étais *en train de parler* sur mon portable

TOPIC 7: Global issues

L'environnement est **menacé**	The environment is **threatened**
par les émissions de dioxyde de carbone	by the emission of carbon dioxide
Les températures seront augmentées	Temperatures will rise
et **il y aura** un manque d'*eau potable*	and **there will be** a lack of *drinking water*
si **on ne protège pas** l'environnement	if **we don't protect** the environment
Il faut **réduire**, *réutiliser* et recycler	It is necessary to **reduce**, *reuse* and recycle
Je recycle le papier/carton/plastique/verre	I recycle paper/cardboard/plastic/glass
Je prends une douche *au lieu d'*un bain	**I take** a shower *instead of* a bath
J'éteins la lumière *quand je sors*	**I turn off** the light *when I go out*
Il faut aussi **baisser** le chauffage	It is also necessary **to turn down** the heating
avant de *quitter* la maison	**before** *leaving* the house
Ma mère **achète** *toujours* les produits bio	My mum *always* **buys** organic products
et mon père fait **du covoiturage**	and my dad does **carsharing**
Il va acheter **une voiture électrique**	He is going to buy **an electric car**
Je supporte **le commerce équitable**	I support **fair trade**
Je ne veux pas que les ouvriers soient *exploités*	**I don't want** the workers to be *exploited*
Récemment **j'ai participé** à *une manifestation*	Recently **I took part** in *a protest*
Je me suis inscrite à l'association WWF	**I subscribed** to the charity WWF
J'ai ramassé *les déchets* dans le parc	**I cleared up** *the rubbish* in the park
J'ai nettoyé le lac *près de chez moi*	I **cleaned** the lake *near to my house*
Au collège on va **trier** les déchets	At school we're going **to sort** the rubbish
On va organiser **une journée verte**	We're going to organise **a 'green' day**
On va planter **plus** de fleurs et d'arbres	We're going to plant **more** flowers and trees
J'ai la main verte	**I have green fingers**
Je vais **consommer** moins de *viande*	I'm going to **consume** less *meat*

TOPIC 8: Travel and tourism

D'habitude **je reste** en Angleterre *en été*	Normally **I stay** in England *during summer*
Il y a beaucoup **à faire** et *à visiter*	There is a lot **to do** and *to visit*
C'est ma destination **favorite/préférée**	It's my **favourite** destination
Je préfère **voyager** *en voiture*	I prefer **to travel** *by car*
parce que j'ai **toujours** *le mal de mer*	because I **always** get *seasick*
et **j'ai** *vraiment* **peur de** voler	and **I'm** *really* **scared of** flying
Quand j'étais petite *j'allais* en France	**When I was little** *I used to go* to France
Nous visitions Disneyland Paris	We used to visit Disneyland Paris
On **faisait la queue** depuis des heures	We **used to queue** for hours
pour voir **les manèges** et les princesses	to see **the rides** and the princesses
Je **ne** m'ennuyais **jamais**	I was **never** bored
Mes **dernières** vacances étaient terribles!	My **last** holiday was terrible!
On est allés en Californie **pendant un mois**	We went to California **for a month**
car mon père **a** toujours **voulu** *y* aller	because my dad **has** always **wanted** to go *there*
Mes frères **se sont chamaillés** tout le trajet	My brothers **bickered** the whole journey
La réceptionniste à l'hôtel était **impolie**	The hotel receptionist was **impolite**
et la chambre était très **sale**	and the room was very **dirty**
Le pire était de *perdre* mon passeport	**The worst thing** was *losing* my passport
Quel désastre!	What a disaster!
Si **je gagnais** la loterie	If **I won** the lottery
je voyagerais autour du monde	**I would travel around** the world
Je nagerais dans l'Océan Pacifique	**I would swim** in the Pacific Ocean
Je ferais de **la plongée**	I would go **scuba diving**
pour voir les poissons tropicaux	**in order to see** the tropical fish
Ce serait le pied!	**It would be awesome!**

TOPIC 9-10: My studies/Life at school or college

Mon collège **s'appelle** ...	My school **is called** ...
C'est un collège **mixte**	It's a **mixed/co-educational** school
Pour les jeunes **de** onze **à** dix-huit ans	For young people **from** 11 **to** 18 years old
Je trouve les profs sympa mais *un peu* strictes	**I find** the teachers nice but *a little* strict
Le collège est **grand** et *assez* moderne	The school is **large** and *quite* modern
Il y a **environ** treize cent *étudiants*	There are **approximately** 1300 *students*
Je porte une chemise blanche,	**I wear** a white shirt
une veste noire et un pantalon noir	a black blazer and black trousers
Je **n'aime pas du tout** mon uniforme scolaire	I **don't like** my school uniform **at all**
c'est **inconfortable** et *moche*	it's **uncomfortable** and *ugly*
Les cours **commencent** à neuf heures	Lessons **commence** at 9am
et **finissent** à trois heures **de l'après-midi**	and **finish** at three **in the afternoon**
Au collège **de mes rêves**	In the school **of my dreams**
il n'y aurait pas d'uniforme scolaire	**there wouldn't be a** school uniform
et le collège **finirait** à midi	and school **would finish** at noon
pour que je puisse bavarder l'après-midi	**so that I could** chat in the afternoon
J'étudie **l'anglais**, *les maths* et l'EPS	I study **English**, *Maths* and PE
mais **ma matière préférée**, c'est le français	but **my favourite subject** is French
parce que c'est **très** amusant	because it's **very** amusing
et le prof est **vraiment** sympa	and the teacher is **really** nice
Par contre je déteste les sciences	**On the other hand** I hate science
car c'est **trop** difficile et ennuyeux	because it's **too** difficult and boring
Bien que j'aie choisi la géographie	**Although** I've chosen Geography
je ne suis pas douée en ça	**I'm not gifted** at it
mais je **le** trouve *très* intéressant	but I find **it** *very* interesting

TOPIC 11-12: Education post-16/Job choices and career ambitions

Je **ne** vais **pas** aller au lycée	I am **not** going to go to college
Je vais étudier le français et l'allemand	**I'm going to study** French and German
Je pense que les langues sont importantes	I think that languages are important
pour trouver **un bon emploi**	to find **a good job**
Pour mon stage j'ai travaillé dans un bureau	**For work experience** I worked in an office
Ce n'était pas mal mais *c'était* ennuyeux	**It wasn't** bad but *it was* boring
Je crois que je voudrais *travailler* dehors	**I believe that** I'd like *to work* outside
parce que **j'aime** être *en plein air*	because **I like** to be *in the open air*
Je voudrais **devenir** vétérinaire	I would like **to become** a vet
D'abord **je dois** aller à l'université	First **I have to** go to university
parce qu'**il faut avoir** un diplôme	because **you have to have** a degree
Je sais que je dois travailler *dur*	**I know that** I must work *hard*
mais **je vais réussir** dans la vie	but **I'm going to succeed** in life
et je serai **fier/fière** de moi	and I will be **proud** of myself
Ma mère est **institutrice**	My mum is **a primary school teacher**
et mon père travaille **dans un magasin**	and my dad works **in a shop**
Ma mère trouve ça **enrichissant**	My mum finds it **rewarding**
et mon père adore **aider** les clients	and my dad loves **to help** the customers
En ce moment j'ai **un petit boulot**	At the moment I have **a part-time job**
Je fais du baby-sitting le soir	**I do babysitting** in the evenings
Ce n'est pas bien payé	It's not well paid
mais je veux **gagner** mon *propre* argent	but I want **to earn** my *own* money
Un jour je voudrais travailler *avec les enfants*	**One day** I'd like to work *with children*
après avoir travaillé *comme vétérinaire*	**after having** worked *as a vet*
mais **je ne sais pas** quand. *On verra*.	but **I don't know** when. *We will see*.

SPANISH

Use the information that follows to either test yourself on key words/phrases for each topic (using the look/cover/check technique) or create flashcards with the Spanish on one side and the English translation on the other. Either test yourself or get someone else to test you. When you feel confident, write a short paragraph about each topic using the vocabulary you have revised.

Módulo 1 – ¡Desconéctate!

Learn the phrases below using LOOK, COVER, WRITE, CHECK!

Durante el verano ***hago*** artes marciales.	During the summer *I* ***do*** martial arts.
(No) *me* **gusta** tomar el sol.	*I* (don't) ***like*** sunbathing.
(A ella) le **mola** ver películas.	*She* ***likes*** watching films.
Tengo seis semanas de vacaciones en verano	*I* ***have*** six weeks holiday in summer
Prefiero ir a España.	*I* ***prefer*** to go to Spain.
Mi padre ***prefiere*** *alojarse* en un hotel.	*My dad* ***prefers*** to stay in a hotel.
Fui de vacaciones a Francia	*I* ***went*** on holiday to France.
El invierno pasado ***fuimos*** de vacaciones a Alemania.	Last winter *we* ***went*** on holiday to Germany.
Fui con *mi* familia	*I* ***went*** with *my* family
Viajé en avión.	*I* ***travelled*** by plane.
Me alojé en un camping.	*I* ***stayed*** on a campsite.
El primer día ***saqué*** muchas fotos.	On the first day *I* ***took*** a lot of photos.
Lo mejor **fue** cuando ***visité*** la Sagrada Familia	The best thing **was** when *I* ***visited*** the Sagrada Familia.
Lo peor **fue** cuando ***perdí*** *mi* móvil.	The worst thing **was** when *I* ***lost*** *my* phone.
Lo **pasé** fenomenal	It **was** amazing!
Fue horroroso porque ***vomité*** en una montaña rusa.	It was horrific because *I* ***vomited*** on a rollercoaster.
Quiero hablar con el director porque el aire acondicionado no **funciona**.	*I* ***want*** to talk to the manager because the air conditioning does not **work**.
La habitación **está** sucia	The room **is** dirty

Adapting the phrases for your own work:

Underlined	This is additional information that can be changed for what you want to say.
Bold	These are verbs which can be changed for different people or tenses.
Italic	These words must be changed if you are talking about a different person.

Challenge:
When learning the vocabulary, practise using other tenses, changing details, and talking about other people.

Módulo 1 – ¡Desconéctate!

Learn the verbs below using LOOK, COVER, WRITE, CHECK!

Yo Form	PRESENT	PRETERITE	IMPERFECT	NEAR FUTURE
HACER (to do)	hago	hice	hacía	voy a hacer
IR (to go)	voy	fui	iba	voy a ir
ALOJARSE (to stay)	me alojo	me alojé	me alojaba	voy a alojarme
VIAJAR (to travel)	viajo	viajé	viajaba	voy a viajar
VISITAR (to visit)	visito	visité	visitaba	voy a visitar
TENER (to have)	tengo	tuve	tenía	voy a tener
SACAR (to take)	saco	saqué	sacaba	voy a sacar

My Progress with this topic:

Date	F Score	H Score	Date	F Score	H Score

Expand and adapt your vocabulary:

My independent vocabulary:

Módulo 2 – Mi vida en el insti

Learn the phrases below using LOOK, COVER, WRITE, CHECK!

Estudio inglés y español.	***I study*** English and Spanish.
(No) ***me*** **interesa** la tecnología.	***I am*** (not) *interested* in technology.
(No) ***le*** **interesan** las matemáticas.	***He/she is*** (not) *interested* in maths.
Prefiero la música porque ***es*** menos aburrida que el dibujo.	*I* ***prefer*** music because *it* ***is*** less boring than art.
Odio las ciencias porque ***son*** más difíciles que la geografía.	*I* ***hate*** science because *it* ***is*** harder than geography.
Mi profe ***crea*** un buen ambiente.	My teacher **creates** a nice atmosphere.
Aprendo mucho porque *mi* profe **explica** bien.	*I* ***learn*** a lot because *my* teacher **explains** well.
Tenemos que llevar un uniforme.	*We* ***have*** to wear a uniform.
Llevo una chaqueta negra y una corbata azul.	*I* ***wear*** a black blazer and a blue tie.
El uniforme **mejora** la disciplina.	The uniform **improves** discipline.
Me **gusta** porque las diferencias económicas no **son** tan obvias.	I **like** it because financial differences **are** not as obvious.
En *mi* insti hay una piscina grande y nueva.	In *my* school there is a big, new pool.
En *mi* escuela primaria no había una biblioteca.	In *my* primary school there was no library.
Lo bueno **es** que **hay** un gimnasio bien equipado.	The good thing **is** that there **is** a well-equipped gym.
Lo peor **es** que no **se debe** llevar piercings.	The bad thing **is** you **must** not wear piercings.
Tampoco **se permiten** los móviles en clase.	Mobile phones **are** not allowed in class either.
Vamos **a participar** en un intercambio a Zaragoza.	*We* ***are*** **going to participate** in an exchange to Zaragoza.
Soy miembro del club de judo desde hace tres años.	*I* have been a member of judo club for 3 years.

Adapting the phrases for your own work:

Underlined	This is additional information that can be changed for what you want to say.
Bold	These are verbs which can be changed for different people or tenses.
Italic	These words must be changed if you are talking about a different person.

Challenge:
When learning the vocabulary, practise using other tenses, changing details, and talking about other people.

Módulo 2 – Mi vida en el insti

Learn the verbs below using LOOK, COVER, WRITE, CHECK!

Yo Form	PRESENT	PRETERITE	IMPERFECT	NEAR FUTURE
ESTUDIAR (to study)	estudio	estudié	estudiaba	voy a estudiar
LLEVAR (to wear)	llevo	llevé	llevaba	voy a llevar
INTERESAR (to be interested in)	me interesa(n)	me interesó/ interesaron	me interesaba(n)	me va(n) a interesar
Useful verbs for describing school				
THERE IS/ARE	hay	hubo	había	habrá
IT IS/ARE	es/son	fue/fueron	era/eran	será/serán
IT HAS	tiene	tuvo	tenía	tendrá

My Progress with this topic:

Date	F Score	H Score	Date	F Score	H Score

Expand and adapt your vocabulary:

My independent vocabulary:

Módulo 4 – Intereses e influencias

Learn the phrases below using LOOK, COVER, WRITE, CHECK!

Después del insti ***juego*** al futbolín con *mis* amigos.	After school *I* ***play*** table football with *my* friends.
Los fines de semana *vamos* a la pista de hielo.	At the weekend *we go* to the ice rink.
Normalmente ***gasto*** *mi* paga en libros.	Normally *I* ***spend*** *my* pocket money on books.
La semana pasada ***jugué*** al baloncesto.	Last weekend *I* ***played*** basketball.
Mi hermana ***hizo*** equitación.	*My sister* ***went*** horse riding.
Me **molan** programas de deportes.	*I* ***like*** sports programmes.
Sin embargo *mi madre le* **encantan** documentales.	However *my mum* ***loves*** documentaries.
No ***soy*** teleadicto porque no ***veo*** más de dos horas al día.	*I* ***am*** not addicted to TV because *I* ***don't*** **watch** more than two hours a day.
En mi tiempo libre *suelo* hacer deporte.	In my free time *I usually* do sports.
Solemos ir al cine y dar un paseo.	*We usually* go to the cinema and go for a walk.
Cuando *era* más joven *jugaba* al tenis de vez en cuando	When *I* was younger *I* played tennis from time to time.
Mi hermana solía jugar al voleibol pero ahora *hace* natación.	*My sister* used to play volleyball but now *she swims*
Esta semana *he* visto dos películas.	This week *I have* watched two films. .
Prefiero ir al cine porque el ambiente **es** mejor.	*I* ***prefer*** to go to the cinema because the atmosphere **is** better.
Rafa Nadal **es** *mi* modelo a seguir porque **tiene** mucho éxito.	Rafa Nadal **is** *my* role model because he **is** very successful.
Taylor Swift **es** *mi* modelo a seguir porque **usa** su fama para ayudar a otros.	Taylor Swift **is** *my* role model because she **uses** her fame to help others.

Adapting the phrases for your own work:

Underlined	This is additional information that can be changed for what you want to say.
Bold	These are verbs which can be changed for different people or tenses.
Italic	These words must be changed if you are talking about a different person.

Challenge:
When learning the vocabulary, practise using other tenses, changing details, and talking about other people.

Módulo 4 – Intereses e influencias

Learn the verbs below using LOOK, COVER, WRITE, CHECK!

Yo Form	PRESENT	IMPERFECT	PERFECT	FUTURE
JUGAR (to play)	juego	jugaba	he jugado	voy a jugar
HACER (to do)	hago	hacía	he hecho	voy a hacer
VER (to watch)	veo	veía	he visto	voy a ver
SOLER (to tend to)	suelo	solía		
PREFERIR (to prefer)	prefiero	prefería		
GASTAR (to spend money)	gasto	gastaba	he gastado	voy a gastar
SER (to be)	soy	era	he sido	voy a ser

My Progress with this topic:

Date	F Score	H Score	Date	F Score	H Score

Expand and adapt your vocabulary:

My independent vocabulary:

Módulo 5 – Ciudades

Learn the phrases below using LOOK, COVER, WRITE, CHECK!

Vivo en Londres. Está en el sur de Inglaterra.	*I* ***live*** in London. It is in the south of England.
Es una ciudad muy grande y moderna.	It **is** a very big and modern city.
En *mi* ciudad **hay** unos museos y muchas tiendas.	In *my* town there **are** some museums and lots of shops.
Hace dos años no había ni mercado ni bolera.	Two years ago there was no market or bowling alley.
Me **encanta** dónde ***vivo*** porque siempre **hay** mucho que hacer.	*I* ***love*** where *I* ***live*** because there **is** always lots to do.
En la panadería se puede comprar pan.	In the bakery you can buy bread.
El banco **abre** a las nueve por la mañana y **cierra** a las cinco por la tarde.	The bank **opens** at 9 in the morning and **closes** at 5 in the afternoon.
Para ir a la plaza mayor sigue todo recto, pasa el puente y toma la tercera calle a la izquierda.	To get to the main square, go straight ahead, pass the bridge, and take the third street on the left.
¿Me puede ayudar? ¿Cuánto *cuesta* el llavero?	Can you help me? How much does the keyring *cost*?
Mi pueblo está situado al lado del río.	*My* town is situated next to the river.
El clima **es** frío y **llueve** mucho.	The climate **is** cold and it **rains** a lot.
Mañana ***visitaré*** la catedral en el centro de la ciudad.	Tomorrow ***I*** **will visit** the cathedral in the centre of the city.
Mi hermano ***nadará*** en el mar.	*My brother* **will swim** in the sea.
Si hace buen tiempo, ***iremos*** a la playa.	If the weather is nice, *we* **will go** to the beach.
Si hace mal tiempo, no ***harán*** una excursión.	If the weather is bad, *they* **will not do** a trip.
Lo mejor de *mi* ciudad **es** que el transporte público **es** muy bueno.	The best thing about *my* city **is** that the public transport **is** very good.
Lo peor **es** que **hay** pocos espacios verdes.	The worst thing **is** that there **are** few green spaces.

Adapting the phrases for your own work:

Underlined	This is additional information that can be changed for what you want to say.
Bold	These are verbs which can be changed for different people or tenses.
Italic	These words must be changed if you are talking about a different person.

Challenge:
When learning the vocabulary, practise using other tenses, changing details, and talking about other people.

Módulo 5 - Ciudades

Learn the verbs below using LOOK, COVER, WRITE, CHECK!

Yo Form	PRESENT	PRETERITE	IMPERFECT	FUTURE
VIVIR (to live)	vivo	viví	vivía	viviré
VISITAR (to visit)	visito	visité	visitaba	visitaré
IR (to go)	voy	fui	iba	iré
HACER (to do)	hago	hice	hacía	haré
THERE IS/ARE	hay	hubo	había	habrá
IT IS THEY ARE	es son	fue fueron	era eran	será serán
IT HAS THEY HAVE	tiene tienen	tuvo tuvieron	tenía tenían	tendrá tendrán

My Progress with this topic:

Date	F Score	H Score	Date	F Score	H Score

Expand and adapt your vocabulary:

My independent vocabulary:

Módulo 6 – De Costumbre.

Learn the phrases below using LOOK, COVER, WRITE, CHECK!

Desayuno a las ocho.	*I* ***have*** **breakfast** at 8 o'clock.
Cuando *era* más pequeño *desayunaba* cereales todos los días.	When *I* was younger *I used* to eat cereal for breakfast every day.
Cenamos muy tarde por la noche.	*We* ***eat*** dinner very late at night.
A las seis *me* ***levanto*** y *me* ***ducho***.	At 6 o'clock *I* ***get up*** and *I* ***shower***.
A las siete ***salgo*** de casa.	At 7 o'clock *I* ***leave*** the house.
No *me* ***encuentro*** bien. *Me* ***duele*** la garganta.	*I* ***don't feel*** well. *My* throat **hurts**.
Estoy enfermo hoy. ***Tengo*** un resfriado.	*I* ***am*** unwell today. *I* ***have*** a cold.
Normalmente *los españoles* ***comen*** mucha fruta.	Normally *the Spanish* ***eat*** lots of fruit.
Mi plato favorito **es** la paella porque *me* ***encanta*** arroz.	*My* favourite dish **is** paella because *I* ***love*** rice.
Me ***gustaría*** probar tortilla española.	*I* ***would*** **love** to try Spanish omelette.
Ayer ***celebramos*** el cumpleaños de *mi* padre.	Yesterday *we* ***celebrated*** *my* dad's birthday.
Comimos en un restaurante caro y ***abrió*** *sus* regalos.	*We* ***ate*** in an expensive restaurant and *he* ***opened*** his presents.
Soy vegetariano/a. No ***como*** carne ni pescado.	*I* ***am*** a vegetarian. *I* ***don't*** **eat** meat or fish.
Soy alérgico al gluten.	*I* ***am*** allergic to gluten.
Vamos a celebrar un día especial con toda la familia.	*We* ***are*** **going to celebrate** a special day with the whole family.
Mi cantante favorito **es** Ed Sheeran.	*My* favourite singer **is** Ed Sheeran.
El año que viene ***voy*** **a** **ir** a un concierto de Ed Sheeran.	Next year ***I am*** **going to** **go** to an Ed Sheeran concert.
¡***Cantaremos*** y ***bailaremos***!	*We* ***will*** **sing** and **dance**.

Adapting the phrases for your own work:

Underlined	This is additional information that can be changed for what you want to say.
Bold	These are verbs which can be changed for different people or tenses.
Italic	These words must be changed if you are talking about a different person.

Challenge:
When learning the vocabulary, practise using other tenses, changing details, and talking about other people.

Módulo 6 – De Costumbre.

Learn the verbs below using LOOK, COVER, WRITE, CHECK!

Yo Form	PRESENT	PRETERITE	IMPERFECT	NEAR FUTURE
Desayunar (To eat breakfast)	desayuno	desayuné	desayunaba	voy a desayunar
Comer (To eat (lunch))	como	comí	comía	voy a comer
Cenar (To eat dinner)	ceno	cené	cenaba	voy a cenar
Doler (to hurt)	me duele	me dolió	me dolía	me va a doler
Beber (to drink)	bebo	bebí	bebía	voy a beber
Celebrar (to celebrate)	celebro	celebré	celebraba	voy a celebrar
Bailar (to dance)	bailo	bailé	bailaba	voy a bailar

My Progress with this topic:

Date	F Score	H Score	Date	F Score	H Score

Expand and adapt your vocabulary:

My independent vocabulary:

Módulo 7 – ¡A Currar!

Learn the phrases below using LOOK, COVER, WRITE, CHECK!

Soy cocinero y ***trabajo*** en un restaurante.	***I am*** a chef and I work in a restaurant
Trabajo como enfermero en un hospital.	***I work*** as a nurse in a hospital
Soy una persona muy creativa	***I am*** a very creative person
Es un trabajo exigente.	**It is** a demanding job
Me **encanta** *mi* trabajo porque **es** muy variado.	***I love*** *my* job because it is very varied
Para ganar dinero ***reparto*** periódicos.	To earn money, *I* ***deliver*** **newspapers**
No *tengo* un trabjao a tiempo parcial pero en casa ***paso*** la aspiradora	***I don't have*** a part-time job but at home ***I vacuum***.
Gano cinco euros a la hora	***I earn*** five euros an hour
Suelo cortar el césped	***I usually*** *cut* the grass
Hice *mis* practices laborales en la empresa de *mi* madre.	***I did*** my work experience *in my mum's* company
Aprendí muchas habilidades nuevas.	***I learnt*** a lot of new skills
Domino el inglés *y* ***hablo*** un poco de español.	***I am fluent*** in English and ***I speak*** a bit of Spanish
Aprender un idioma te abre la mente.	Learning a language opens your mind
He trabajado en una oficina y *he* estudiado español.	*I have* worked in an office and I *have* studied Spanish
En el futuro ***quiero*** vivir en Colombia.	In the future ***I want*** to live in Colombia
Tengo la intención de casar*me* y tener hijos.	***I plan*** to get married and have children
Me gustaría viajar por el mundo	*I would* like to travel the world
Espero ser feliz.	***I hope*** to be happy

Adapting the phrases for your own work:

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Italic	These words must be changed if you are talking about a different person.

Challenge:
When learning the vocabulary, practise using other tenses, changing details, and talking about other people.

Módulo 1 – ¡A Currar!

Learn the verbs below using LOOK, COVER, WRITE, CHECK!

Yo Form	PRESENT	PRETERITE	IMPERFECT	NEAR FUTURE
SER to be	soy	fui	era	voy a ser
TRABAJAR to work	trabajo	trabajé	trabajaba	voy a trabajar
HACER to do	hago	hice	hacía	voy a hacer
HABLAR to speak	hablo	hablé	hablaba	voy a hablar
DOMINAR to speak fluently	domino	dominé	dominaba	voy a dominar
GANAR to earn	gano	gané	ganaba	voy a ganar
SOLER to use to	suelo		solía	

My Progress with this topic:

Date	F Score	H Score	Date	F Score	H Score

Expand and adapt your vocabulary:

My independent vocabulary:

Módulo 8 – Hacia un mundo mejor.

Learn the phrases below using LOOK, COVER, WRITE, CHECK!

Vivo en una casa moderna.	*I* **live** in a modern house.
***Le* gustaría vivir** en un piso cómodo.	*He/She* **would like to live** in a comfortable flat
Nuestro piso **está** en la tercera planta.	*Our* flat **is** on the third floor.
Para cuidar el medio ambiente ***vamos*** en bibi.	To protect the environment *we* ***travel*** by bike.
También ***separamos*** la basura.	*We* also ***separate*** the rubbish.
En el futuro *reciclaremos* todo lo posible.	In the future *we will recycle* everything possible.
Creo que ***llevo*** una dieta sana.	I think *I* ***lead*** a healthy diet.
No ***como*** muchos dulces.	*I don't* ***eat*** a lot of sweets.
Debería comer más verduras porque contienen mucha fibra.	*I* ***should*** *eat* more vegetables because they contain a lot of fibre.
Para *mí* el problema más serio **es** la drogadicción.	For *me* the most serious problem **is** drug addition.
Me preocupa el desemplo porque **hay** muchas personas sin hogar.	Unemployment **worries *me*** because **there are** lots of people without a home.
La destrucción de los bosques **es** muy preocupante.	The destruction of forests **is** very worrying.
Se debería plantar más árboles.	One should plant more trees.
Hay que ahorrar agua.	You must save water.
No ***tomo*** drogas porque es peligroso.	*I don't* ***take*** drugs because it is dangerous.
Mis amigos ***beben*** alcohol porque *les* **relaja**	My friends ***drink*** alcohol because it **relaxes** them.
Los Juegos Olimpicos **elevan** el orgullo nacional.	The Olympic Games **raise** national pride.
Me encanta la Copa Mundial de Fútbol porque **une** comunidades.	*I* ***love*** the Football World Cup because it **unites** communities.

Adapting the phrases for your own work:

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Italic	These words must be changed if you are talking about a different person.

Challenge:
When learning the vocabulary, practise using other tenses, changing details, and talking about other people.

Módulo 8 – Hacia un mundo mejor.

Learn the verbs below using LOOK, COVER, WRITE, CHECK!

Yo Form	PRESENT	PRETERITE	IMPERFECT	NEAR FUTURE
Vivir (To live)	vivo	viví	vivía	voy a vivir
Reciclar (To recycle)	reciclo	reciclé	reciclaba	voy a reciclar
Llevar (To lead)	llevo	llevé	llevaba	voy a llevar
Comer (to eat)	como	comí	comía	voy a comer
Tomar (to take)	tomo	tomé	tomaba	voy a tomar
Beber (to drink)	bebo	bebí	bebía	voy a beber
preocupar (to worry)	me preocupa	me preocupó	me preocupaba	va(n) a preocuparme

My Progress with this topic:

Date	F Score	H Score	Date	F Score	H Score

Expand and adapt your vocabulary:

My independent vocabulary:

DRAMA

Use the information that follows to either test yourself on key words/phrases for each topic (using the look/cover/check technique) or create a mind map for each topic that contains key facts and images. Once you have created a mind-map you should put it away and try to recreate it from memory, then look at your original mind-map and add what you have missed.

Knowledge Organiser

DRAMA

GCSE

A: Know your Drama course

Component 1 Understand Drama	Component 2 Devising Drama	Component 3 Texts In Practice
What is assessed?	**What is assessed?**	**What is assessed?**
Knowledge and understanding of drama and theatre. Study of a set text Blood Brother. Analysis and evaluation of the work of live theatre makers.	Process of creating devised drama. Performance of devised drama (as performer or designer.) Analysis and evaluation of own work (devising log)	Performance of two extracts from one play. Free choice of play but it must contrast with Blood Brothers. Can be a monologue.
How it's assessed	**How it's assessed**	**How it's assessed**
Written exam 1hr 45mins Open book (clean text) 80 marks 40% of GCSE Marked by AQA **Section A:** Theatre Roles and terminology (4) **Section B:** Study of Blood Brothers. 4 questions on given extract from the play (44) **Section C** Live theatre production: one question on the work of theatre makers in a single live theatre production.	Devising log (60 marks) Devised performance (20 marks) 80 marks in total 40% of the GCSE Marked by teachers and moderated by AQA	Performance of extract 2 (20 marks) Performance of extract 2 (20 marks) 40 marks in total 20% of the GCSE Marked by a visiting examiner.

B: Features of a play

Performance Style:	the way in which something is performed. A realistic performance has a believable or life-like performance style, or a comedy might feature multi-role or physical comedy as its performance style.
Character:	a person or other being (such as a talking animal) in a play, novel or film.
Character list:	a list of the characters that appear in the play. Some lists include a short description of the characters, such as their age or occupation.
Genre:	a category of drama such as historical drama or musical.
Stage directions:	descriptions of aspects of the play not conveyed by the actors' speeches. These may include a description of what the set or characters look like, their actions and how certain lines are spoken. It may also note pauses, silences or beats to indicate when characters are not speaking.
Monologue:	a long speech spoken by one character.
Plot:	the main events of the play presented in a particular sequence by the playwright.
Dramatic climax:	the moment of greatest dramatic tension in a play.
Resolution:	the end of the plot when the problems of the play are resolved
Dialogue:	what the characters say.

Knowledge Organiser

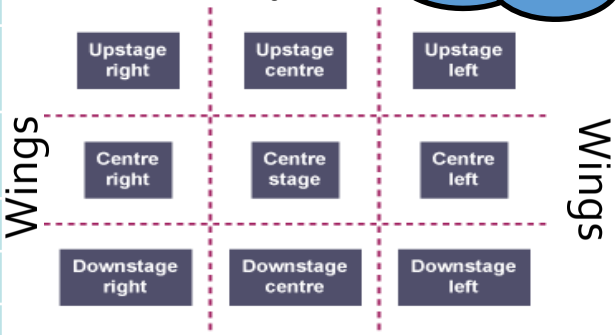
DRAMA GCSE

C: Terminology and areas of the stage

Realistic	A performance style that is life like or naturalistic.
Multi role	When an actor plays more than one character in a performance.
Physical comedy	The use of (over-exaggerated) body movement, gesture and facial expression to create comedy.
Pause, silence, beat	A stop in the script. Often used for the dramatic effect of creating tension or to mark an important moment in the performance.
Plot	The main events of the play.
Tension	A sense of anticipation or anxiety.
Playwright	The person responsible for writing a play.
Act	A play is divided into Acts
Scene	An Act is divided into scenes

Backstage

Remember: The areas of the stage are always from the performer's point of view as they are standing on the stage.



D: Vocal and Physical Skills

VOCAL SKILLS

Accent	A way of pronouncing a language (country, area or social class)
Volume	How loud or quietly someone speaks
Pitch	How high or low someone speaks
Tone	How something is said – sarcastic tone, happy tone, sad tone
Timing	Use of pause or silence. The rhythm of the way you speak
Pace	How fast or slow someone speaks
Intonation	The rise and fall of the voice
Phrasing	How something is said for dramatic effect (pause, emphasise words)
Emotional range	Happy, sad, scared, shy, nervous (linked with tone)
Delivery of lines	Working with other actors (linked with timing) action - reaction

PHYSICAL SKILLS

Posture	How someone stands and/or sits (slouched, upright)
Gesture	How someone uses their hands and arms when they are speaking
Facial expression	How the face is used to communicate feeling. (EG – open mouthed, scrunched eyes, pouted lips.)
Movement	How someone moves around the stage space. This also includes physical theatre movement (dance, unison movement.)
Gait	How someone walks (stride, leap, shuffle.)

DRAMA GCSE

E: Theatre Roles and responsibilities

THEATRE MAKER:
PLAYWRIGHT
WHAT THEY DO:
Writing the script of the play including the dialogue and stage directions.

Theatre Maker:
Understudy

What they do:
Learn a part including lines and movements, so they are able to take over from someone when needed.

THEATRE MAKER:
Costume Designer

WHAT THEY DO:
Design what the actors wear on stage. Making sure that costumes are appropriate for the style and period of the piece.

Theatre Maker:
Lighting designer

What they do:
Design the lighting states and effects that will be used in a performance. Understanding the technical capabilities of the theatre and creating a lighting plot.

THEATRE MAKER:
SOUND DESIGNER
WHAT THEY DO:
Designing the sound required for the performance, which may include music and sound effects. Considering if microphones are needed and creating a sound plot.

Theatre Maker:
Technician

What they do:
Operating the technical equipment (lighting and sound boards) during a performance.

THEATRE MAKER:
Stage Manager

WHAT THEY DO:
Running the backstage elements of the play and supervising backstage crew. Organises the rehearsal schedule and keeps a list of props and other technical needs. Creating a prompt book and calling the cues for the performance.

THEATRE MAKER:
PERFORMER

WHAT THEY DO:
Appearing in a production, for example by acting, singing, dancing or singing. Creating a performance or assuming a role on stage in front of an audience.

THEATRE MAKER:
Theatre Manager

WHAT THEY DO:
Running the theatre building, including overseeing the Front of House staff and the box office staff who sell tickets.

Theatre Maker:
Director

What they do:
Overseeing the creative aspects of the production. Developing an idea for the production. Liaising with designers, rehearses the actors and ensures all technical elements are ready. Giving notes to the actors to help them improve their performance and agreeing the blocking of the actors.

Theatre Maker:
Set Designer

What they do:
Designing the set of the play. Providing sketches and other design materials before overseeing the creation of the set.

THEATRE MAKER:
Puppet Designer

WHAT THEY DO:
Designing the puppets for a production, taking into account the style of puppets and how they will be operated.

Section F: Staging Configurations

Sightline: the view of the audience.

Backdrop: a large painted cloth hung as part of the scenery.

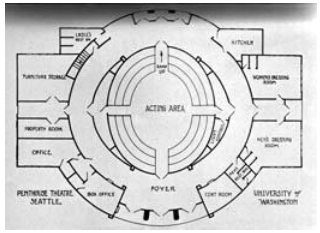
Theatre In The Round

ADVANTAGES:

- Directors and actors often find this a very **dynamic,** interesting space because the audience is close to the stage.
- The actors enter and exit through the audience, which can make the audience feel more engaged.
- Unlike spaces such as proscenium arch theatre, there is no easily achieved **'fourth wall'** separating the audience from the acting area.

DISADVANTAGES:

- Designers cannot use **backdrops** or flats, as this would block the audience's view.
- Stage furniture has to be chosen very carefully so that **sightlines** are not blocked.
- Actors have to be carefully blocked so that no section of the audience misses important pieces of action or facial expressions for too long.



A staging configuration where the audience are seated around all sides of the stage.

ADVANTAGES:

- Stage pictures are easy to create as the audience look at the stage from roughly the same angle.
- Backdrops and large scenery can be used without blocking sightlines.
- There may be **fly space and wing space** for storing scenery.
- The frame around the stage adds to the effect of a fourth wall, giving the effect of a self contained world on the stage.

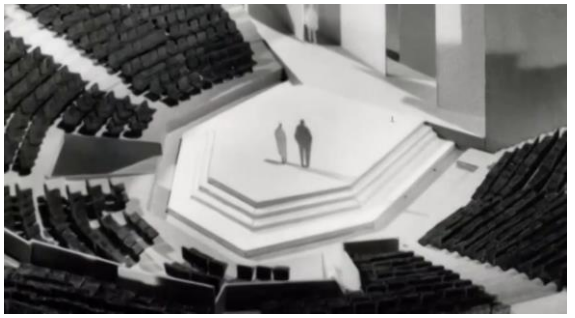
DISADVANTAGES:

- Some audience members may feel distant from the stage.
- The **auditorium** could feel very formal and rigid.
- Audience interaction may be more difficult.

Thrust Stage

DISADVANTAGES:

- Sightlines for audience on the extreme sides can be obstructed.
- The audience on the left and right sides of the auditorium have each other in their view.
- **Box sets** cannot be used.



A thrust stage protrudes into the auditorium with the audience on three sides. This is one of the oldest theatre types of stage.

ADVANTAGES:

- ✓ Combine some of the advantages of proscenium arch and theatre in the round stages.
- ✓ As there is no audience on one side of the stage, backdrops, flats and large scenery can be used.
- ✓ The audience may feel closer to the stage.

Fourth Wall: an imaginary wall between the audience and the actors giving the impression that the actors are unaware they are being watched.

Proscenium Arch

This is a common form of theatre for larger theatres or opera houses. The proscenium refers to the arch around the stage which emphasises that the audience is seeing the same stage picture. The area in front of the arch is called an apron.

Auditorium: the part of the theatre where the audience sits.

Section F: Staging Configurations

Traverse Stage

On a traverse stage, the acting area is a long, central space with the audience seated on either side facing each other.

Audience

STAGE

Audience

ADVANTAGES:

- The audience feel very close to the stage as there are two long front rows.
- They can see the reactions of the other side of the audience facing them, which can work well for audience interaction.
- Sometimes, extreme ends of the stage can be used to create extra acting areas.

DISADVANTAGES:

- Big pieces of set, scenery or backdrops can block sightlines.
- The acting area is long and thin, which can make some blocking challenging.
- Actors must be aware of making themselves visible to both sides of the audience.
- Lighting for traverse stages needs to be arranged carefully to avoid shining light in to the audience's eyes or light spilling on to them unnecessarily.

Fly Space: area above the stage where scenery may be stored and lowered to the stage.

Promenade

To promenade means 'to walk' and promenade theatre is when the audience stand or follow the actors through the performance. This may occur in a conventional theatre space or it may be designed for a **site specific** show when an unconventional space is used for the production.

ADVANTAGES:

- ✓ This is an interactive and exciting type of theatre where the audience feel very involved.

DISADVANTAGES:

- The audience may find moving about the space difficult or get tired standing.
- Actors and crew need to be skilled at moving the audience along and controlling their focus.
- There can be health and safety risks.

End on Staging

End on staging is similar to a proscenium arch stage, as the audience is seated along one end of the stage directly facing it. However, it does not have the large proscenium frame.

ADVANTAGES:

- ✓ The audience all have a similar view.
- ✓ Stage pictures are easy to create.
- ✓ Large backdrops or projections may be used.

DISADVANTAGES:

- Audience members on the back rows may feel very distant from the stage.
- It doesn't have the frame of the proscenium arch theatre, which can enhance some types of theatre.
- It may not have the wing and fly areas typical of proscenium arch theatre.

Wing Space: areas to the side of the stage. This is where actors wait, unseen by the audience, to enter the stage. Where props are stored.

Knowledge Organiser

DRAMA GCSE

Catharsis – when the events of a play make the audience feel strong emotions like fear or sadness and they get it out, creating an emotional release.

Section G: Form and Genre

FORM *– is the* ***type*** *of drama (decided by the playwright).*
GENRE *– refers to what sort of* ***story a performance tells.***

EXAMPLES OF FORM:

FORM	CONVENTIONS
PLAY	Dialogue (either scripted or improvised) between several characters.
MUSICAL	Some dialogue between characters but also some singing and dancing.
MIME	The performer(s) should remain silent and convey meaning through movement and facial expression.
MONOLOGUE	One performer who talks directly to the audience.

Sub-genres of comedy:

FARCE – improbable situations and physical humour entertain the audience.

PARODY – makes fun of an existing piece of work (eg – another play) by imitating it.

SATIRE – mocks something serious (eg- politics) by highlighting how ridiculous it is.

GENRE	CHARACTERISTICS OF THAT GENRE
TRAGEDY ***Sophocles*** ***Shakespeare***	- Developed by Ancient Greeks - Serious plot - Sad ending – death of one or more main characters - Aim to produce **'catharsis'** for the audience - Most modern tragedies have characters from more normal backgrounds, making it easier for the audience to relate to them. - TRAGICOMEDY contains both comedy and humour.
DOCUMENTARY THEATRE (DOCUDRAMA) ***Recorded Delivery theatre company***	- Takes stories from real life and brings them to the stage - Modern genre of theatre - Plot, character and script taken from factual sources like newspapers, letters and interviews. - Real life events portrayed in an authentic way. - Performers can repeat source material word for word. This is known as VERBATIM THEATRE. A popular way to deliver strong message about topical issues.
MELODRAMA ***Pantomime***	- Unbelievable plots - Extreme emotions and exaggerated acting - Stories about love with a happy ending - Music features heavily in Melodrama but doesn't contribute to the plot. Incidental music is played in the background to add to the overall mood.
COMEDY ***Shakespeare***	- Also date back to Ancient Greece - Light hearted plot, witty dialogue - Happy ending for the main characters - Shakespeare used techniques such as wordplay and mistaken identity to create comedy - Visual comedy – characters' appearance, actions and use of props create humour as well as their words.

FOOD PREPARATION AND NUTRITION

Use the information that follows to either test yourself on key words/phrases for each topic (using the look/cover/check technique) or create a mind map for each topic that contains key facts and images. Once you have created a mind-map you should put it away and try to recreate it from memory, then look at your original mind-map and add what you have missed.

KS4 KNOWLEDGE ORGANISER - FOOD, NUTRITION AND HEALTH

Eight tips for healthy eating

The Department of Health has produced the following practical tips to help you make healthier choices. They are:

1) Base your meals on starchy foods
2) Eat lots of fruit and veg
3) Eat more fish
4) Cut down on saturated fat and sugar
5) Eat less salt
6) Get active and be a healthy weight
7) Don't get thirsty
8) Don't skip breakfast

change 4 life
Eat well Move more Live longer

5 A DAY YOUR WAY

2. PROTEIN

- is a **macronutrient**
- **is formed** from **chains of amino acids.**
- **8 amino acids** need to be provided by the diet and are called **essential** amino acids. **Children require 2 more.**
- Protein is used for specific functions in the body: **growth, repair, maintenance** and is a **secondary energy source.**

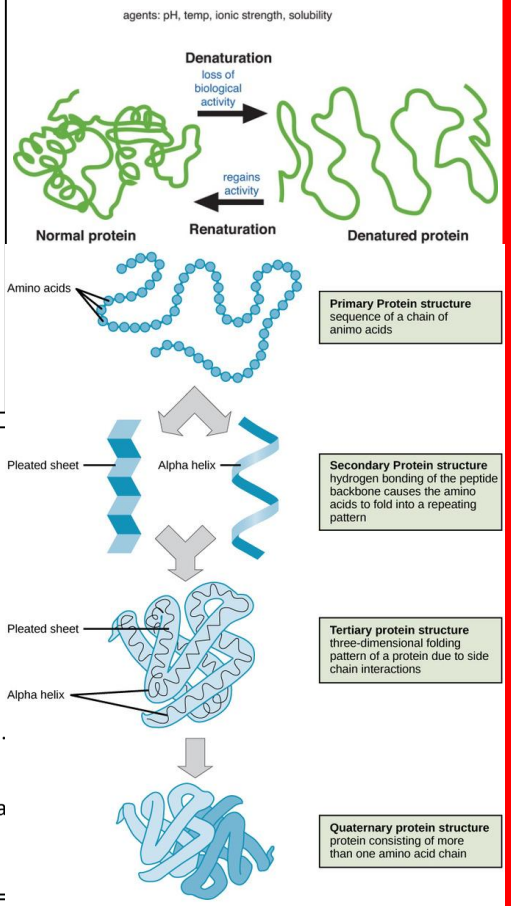
BIOLOGICAL VALUE

The biological value of protein means the amount of essential amino acids present.

Animal protein sources contain **all the essential amino acids** required by the body **HBV high biological value.**

Mycoprotein (Quorn) and texturised vegetable protein (TVP) are of HBV too.

Proteins from plant sources are **of low biological value** and lack some essentia amino acids. The exception is soya, which is a plant protein of HBV.

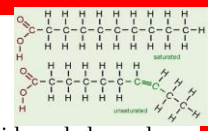


PROTEIN EXCESS AND DEFICIENCIES

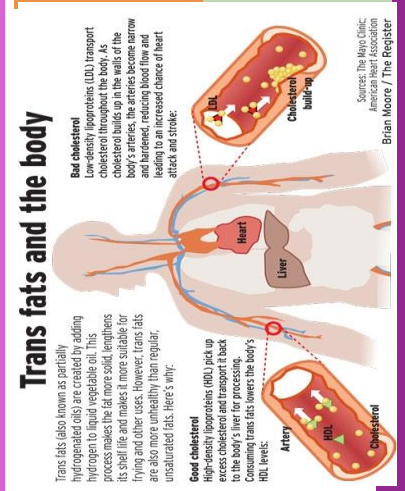
third source of energy. In developing countries KWASHIORKOR occurs.

more protein required in - babies and children for growth - adolescents for growth spurts - pregnant women (baby) - nursing mothers (lactation).

3. FAT



- is a **macronutrient**
- Made up of fatty acids and glycerol.
- structure of fatty acids influences their effect on health and cooking choice.
- fat soluble vitamins A,D,E and K.
- Provides protection for the bodies major organs
- Fat is a component of hormones.



4. CARBOHYDRATE

- is a **macronutrient**
- Body needs a constant supply of glucose, for energy.
- **Dietary fibre** is a form of carbohydrate.
- are produced during photosynthesis.
- mono, di, poly saccharides

Types of Fiber

Soluble fiber

- Gelatinous texture (jams)
- It has demulcent properties that protect the stomach. **(gastritis, heartburn)**
- It helps to treat **constipation** and to reduce **cholesterol.**
- It is contained in fruits, vegetables, legumes, seaweed.

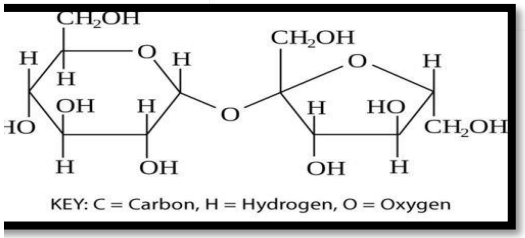
Insoluble Fiber

- Dry Texture (wheat bran).
- It satisfies the appetite and has **laxative effect** (obesity).
- It reduces cholesterol.
- It is contained in whole grains, nuts and seeds.

5 micronutrients

Fast release of Energy

Slow release of Energy



Simple carbohydrates

Simple carbohydrates are found in foods such as fruits, milk, and vegetables

Cake, candy, and other refined sugar products are simple sugars which also provide energy but lack vitamins, minerals, and fiber

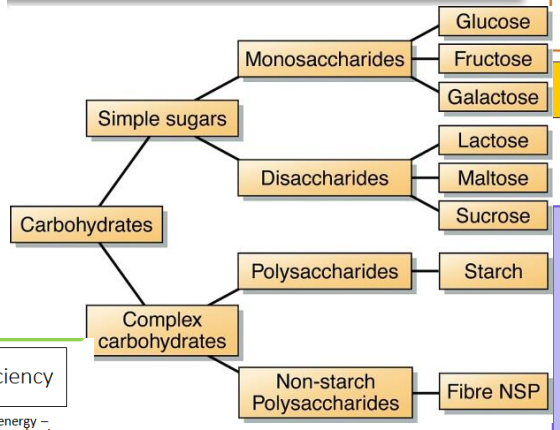
Simple/Sugary. They provide us with glucose Fructose, galactose, lactose, maltose, sucrose.

Complex carbohydrates

Complex carbohydrates provide vitamins, minerals, and fiber

Foods such as breads, legumes, rice, pasta, and starchy vegetables contain complex carbohydrates

Complex/Starchy. They provide us with **Starch** & **Fibre/NSP**



intrinsic

- Intrinsic – fruit and veg – easier for body to absorb

extrinsic

Free sugars – sugars added to food. Processed sugars.

Too much sucrose	Excess	Deficiency
• Obesity and tooth decay. • Tooth decay = plaque + sucrose = acid = holes in teeth • Hyperactivity • Highs and lows	• Obesity • Hyperactivity • Poor health • Dental caries • Diabetes caused by the effect excess sugar has on the pancreas (see next slide)	• Lack of energy – tiredness – due to levels of glucose dropping • Weight loss – body will start to use stored fats in the adipose tissue • Severe weakness – once body has used up all reserve fat for energy will start to pull it from protein to keep brain and vital organs working

PROTEIN COMPLEMENTATION

Protein of LBV can be eaten together to provide all the essential amino acids. Called protein complementation.

This is important for vegetarians and vegans.

Vitamin	Major Function	Dietary Sources
Fat Soluble		
A	Maintenance of skin, bone, teeth, growth, and vision	Carrots, broccoli, spinach, eggs, cheese, and milk
D	Maintenance and growth of bones	Milk, egg yolk, tuna, and salmon
E	Antioxidant	Vegetable oils, whole grains, green leafy vegetables
K	Blood clotting	Green leafy vegetables, cabbage, and milk
Water Soluble		
B_1 (thiamin)	Energy production	Breads, pasta, pork, oysters
B_2 (riboflavin)	Energy production	Milk, meat, cereals, pasta, dark green vegetables
B_3 (niacin)	Energy production	Poultry, meat, tuna, cereal, pasta, bread, nuts, legumes
B_6 (pyridoxine)	Protein and fat metabolism	Avocados, green beans, spinach, cereals, bread
B_{12}(cobalamine)	Red blood cell formation	Meat, fish, milk, eggs
Folic acid	DNA synthesis, red blood cell formation	Dark green leafy vegetables, fortified cereals, wheat germ, oranges, bananas
Pantothenic acid	Macronutrient metabolism, hormone synthesis	Cereals, bread, nuts, eggs, dark green vegetables
Biotin	Fatty acid synthesis, energy production	Egg yolk, green leafy vegetables
C (ascorbic acid)	Antioxidant, maintenance of bones, teeth, collagen	Citrus fruits, melons, strawberries, tomatoes, green peppers, potatoes

Mineral	Major Function	Dietary Sources
Major Minerals		
Calcium	Growth, bone and teeth formation, nerve impulses	Dairy, dark green vegetables, sardines, clams
Sodium	Body water and acid–base balance, nerve function	Abundant in most foods
Potassium	Body water and acid–base balance, nerve function	Meat, milk, fruits, vegetables, cereals, legumes
Chloride	Acid–base balance	Table salt, seafood, meets, eggs, milk
Phosphorous	Bone and teeth formation, acid–base balance	Dairy, meat, fish, poultry, nuts, grains
Trace Minerals		
Iron	Component of hemoglobin and enzymes	Meats, eggs, legumes, grains, dark green vegetables
Chromium	Glucose and energy metabolism	Fats, meats, cereals
Zinc	Component of enzymes	Milk, shellfish, wheat bran

Year 10/ 11 Knowledge Organiser
WJEC Food Preparation & Nutrition: Unit 2 – Food Choice

150

Key Words:

1. **Kosher:** refers to food that is allowed to be eaten because it is considered clean in Judaism.
2. **Halal:** meat which has been slaughtered in a specific way.
3. **Lacto vegetarian:** are vegetarians who eat no fish, meat, meat products, or eggs, but eat dairy foods.
4. **Lacto-ovo vegetarian:** are vegetarians who eat no fish, meat, meat products, but eat eggs and dairy products.
5. **Vegan:** are vegetarians who eat no fish, no meat, meat products, eggs or dairy foods. Only plant foods are eaten.
6. **Ethical:** relating to moral principles or the branch of knowledge dealing with these.
7. **Diabetes:**is a condition caused because the pancreas doesn't produce any, or enough, insulin to control the amount of sugar in the blood.
8. **Coeliac:** is a person suffering from coeliac disease.
9. **Gluten:** is a general name for the proteins found in flour.
10. **Lactose intolerance:** means you cannot digest lactose.
11. **Allergy:** also known as allergic diseases, are a number of conditions caused by hypersensitivity of the immune system to something in the environment that usually causes little or no problem in most people. These diseases include hay fever, food allergies, atopic dermatitis, allergic asthma, and anaphylaxis.
13. **Regional:** relating to the regions of a country.
14. **Multicultural:** relating to or containing several cultural or ethnic groups within a society.
15. **Cuisine:** is a style of food characteristics to a particular country or region.
16. **Food intolerance:** is a sensitivity to some foods.
17. **Lactose:** is the sugar naturally found in milk.
18. **Coeliac disease:** is a bowel disease; a sensitivity to gluten.
19. **Seasonal:** refers to foods that are only available at certain times of the year.
20. **Physical Activity Level (PAL):** is the amount of physical activity you do each day, for example sitting, standing, running and exercise.
21. **Disposable income:** is what money is left over for saving or spending after taxes are subtracted from income.
22. **Food miles:** are the distance that food is transported as it travels from producer to consumer.
23. **Carbon footprint:** is the amount of greenhouse gases produced in the production and transportation of foods.
24. **Anaphylaxis:** Anaphylaxis is a severe and potentially life-threatening reaction to a trigger such as an allergy. It's also known as **anaphylactic shock**.

How nutritional needs vary depending on age

1. As we age our nutritional needs change due to a number of reasons.
2. **YOUNG CHILDREN** – growth spurt – require more protein, calcium and vitamin D. Teething – calcium, fluoride and VitD, developing immune system, fewer sugary sweets and drinks to prevent overweight and tooth decay.
3. **TEENAGERS –** Calcium and vitamin D for growth spurts and bones, iron to prevent anaemia, eat regularly for energy, fewer sweets and sugary drinks to prevent obesity.
4. **ADULTS AND THE ELDERLY** – more dietary fibre to prevent obesity, diabetes and cancers, more vitamin D and calcium for bones, fewer sugars snacks and drinks, elderly need less energy and energy dense foods, more iron to prevent anaemia and maintain healthy red blood cells, less salt ad more water to reduce hypertension.

Portion size and costing when planning a meal.

1. Eating the correct portion size ensures that individuals nutritional ad energy needs are met. Must stay within the family budget.

Diet, Nutrition and Health:

1. **Hypertension** – condition in which blood pressure is too high. Due to obesity, smoking ..
2. **Iron deficiency anaemia –** condition caused by a lack of iron in the diet.
3. **Obesity –** Condition in which fat is stored by the body in large amounts.
4. **Coronary heart disease** – condition in which blood vessels in the heart are narrowed by cholesterol plaque build –up.
5. **Type 2 diabetes** – chronic condition in which blood sugar levels are abnormally high.
6. **Skeletal disorders** – group of diseases of the skeletal system caused by a deficiency of micronutrients.
7. **Energy –is the number of calories you need to consumer every day to maintain function and body mass.**
8. **Energy needs – depend on sex, age, height, weight, occupation, lifestyle, body composition.**
9. **BMR –** basal metabolic rate.
10. **PAL –** physical activity level
11. **BMR x PAL = total energy expenditure (TEE)**
12. **BMI – body mass index.**

Religion

1. **Rastafarians –** eat i-tal (clean, natural and pure), coconut oil, herbal tea, fruit and veg. Don't eat pork, salt, milk coffee, alcohol.
2. **Buddhists** – eat a vegetarian diet, don't eat meat and alcohol.
3. **Muslims –**eat halal food only, don't eat pork, alcohol, fish and shellfish, without scales.
4. **Jews –** eat kosher food, don't eat shellfish, pork, meat with diary.
5. **Hindus –**eat milk, main vegetarian, don't eat beef and alcohol.
6. **Sikhs –** eat a vegetarian diet,, don't eat alcohol, kosher, halal, beef.
7. **Christians –**eat generally everything, don't eat meat on a Friday.

Ethical beliefs

1. May be based on – animals suffering, how food is made or how food production affects the environment.
2. **Fair-trade** – global movement focused on ensuring fair working conditions, prices and wages to farmers and workers in developing countries.
3. **Animal welfare** – Movement focused on ensuring the well-being of animals and humane conditions for rearing animals.
4. **Organic foods** - Plants and animals are grown and reared in the most natural way possible.
5. **GM foods** – Plants or animals in which DNA has been altered.
6. **Local produce** – local food fresher, tastier, cheaper, fewer food miles and lower carbon emissions.
7. **Food miles –** Distance from a farm to the plate.
8. **Carbon footprint** – amount of carbon dioxide and other greenhouse gases emitted during the production of the food.
9. **Greenhouse gases** - carbon dioxide, water vapour, nitrous oxide, ozone .

Medical Conditions

1. **Food intolerances –** reaction of the digestive tract to a food ingredient.
2. **Most common intolerances** – lactose, gluten (in wheat, barley, rye and oats)
3. **Symptoms and diet** – cause bloating, stomach cramps or diarrhoea.
4. **Food allergy** – reaction of the immune system to a food ingredient.
5. **Most common allergens –** nuts, eggs, milk, wheat, fish and shellfish.
6. **Symptoms and diet** – can cause a severe, life threatening reaction.
7. **Anaphylactic shock** – must avoid the food.

Factors influencing food choices:

1. **Physical activity level** – amount of energy needed to perform daily tasks.
2. **Healthy eating** – a balanced and varied diet.
3. **Lifestyle** – the way people live.
4. **Food availability** – the amount and variety of food available.
5. **Seasonality** – availability of foods.
6. **Cost of food** – the price of food products.
7. **Income** – disposable income is the amount of money a family can spend on rent and food.
8. **Preferences** – some prefer sweet or savoury.
9. **Enjoyment** – eat certain foods for enjoyment.
10. **Time available to prepare food** – busy
11. **Time of day** – breakfast, lunch and dinner.
12. **Celebration** – plays an important part for special occasions.

British Cuisine:

1. **England** – Cornish pasty, Yorkshire pudding, fish and chips, English breakfast, sandwiches, roast dinner, beer and cider.
2. **Wales** – Cawl meaty broth, welsh rarebit, Glamorgan sausage, welsh cakes, bara brith, laver bread.
3. **Northern Ireland** – colcannon, soda bread, black pudding, Irish stew, oatmeal, Irish cream, whiskey and beer.
4. **Scotland** – porridge, scotch broth, Dunlop cheese, kippers, haggis, scotch pie, oat cakes

International Cuisine:

1. **Mediterranean cuisine –** olives and olive oil, grapes, wine, fish, seafood, tomatoes, aubergines, courgettes.
2. **Chinese** – noodle, rice, pork, duck, chicken, Chinese cabbage, water chestnuts, bamboo shoots, mushrooms, bean sprouts, soy sauce
3. **Japanese** – rice, soya, fish, seafood, noodles, seaweed, eggs, seasonal foods, green tea, wasabi.
4. **India** – rice, lentils, chickpeas, beans, coconut milk, ghee butter, paneer cheese.

Year 10/ 11 Knowledge Organiser
WJEC Food Preparation & Nutrition: Unit 3 – Food Science

Why do we cook food?

1. **Making it safe** – heat fills bacteria, inactivates harmful enzymes and toxins.
2. **To develop flavours** – water evaporation, adding sugar – caramelisation and other reactions add flavour.
3. **To improve texture –** makes food easier to eat.
4. **To improve shelf life** – cooking kills microorganisms which could spoil the food.
5. **To increase variety** – one product may be cooked in many different ways.

Heat transfer

1. CONDUCTION- direct heat from the saucepan to the food inside.

HOB → PAN → FOOD

E.G. boiling water

2. CONVECTION – indirect transfer of the heat through water or air.

OVEN → AIR → FOOD

E.G. steaming vegetables, baking muffins.

3. RADIATION – indirect transfer of heat through heat waves.

- **Microwaves send electromagnetic waves –** heating up the food.
- Used in grills and barbeques.

HEAT → WAVES → FOOD

E.G grilling meat, tasting bread, microwaving soup

Sensory evaluation

1. **Smell –** Olfactory system responds to aroma stimuli and sends information to the brain.
2. **Touch –** helpful in judging the texture, consistency and mouthfeel of the food.
3. **Eyesight –** important when presenting food, more appetising, colourful, neat and decorated.
4. **Hearing –** crunchiness and crispiness indicates its freshness.
5. **Taste –** taste buds located on the tongue. 5 tastes – sweet, sour, salty, bitter and umami.

How does cooking affect food?

1. **Appearance** – meats shrink, cakes rise, eggs become solid, sauces thicken, rice and pasta increase in size.
2. **Colour** - Foods become golden or brown, red and green vegetable may lose colour.
3. **Flavour** – ay become sweeter, more pronounced, rich.
4. **Texture** – eggs set, vegetables and meats soften, chips become crunchy, bread becomes crispy, custard becomes creamy, sauces thicken.
5. **Smell** – is more pronounced because essential oils fill the air and are more easily detected by the olfactory system.
6. **Maillard reaction –** high temperatures, sugar and protein react with each other producing brown compounds what affect the colour, taste and smell of food. E.g.. Browning of onions.

Cooking methods – oil based methods

1. **Deep fat frying –** foods become golden and crunchy, but their nutritional value is poor. (loss of vitamins, high fat content)
2. **Shallow frying –** seals the surface of food and helps to obtain crunchy top and juicy interior.
3. **Stir frying –** low fat. Helps to preserve nutritional value of food.

Cooking methods – water based methods

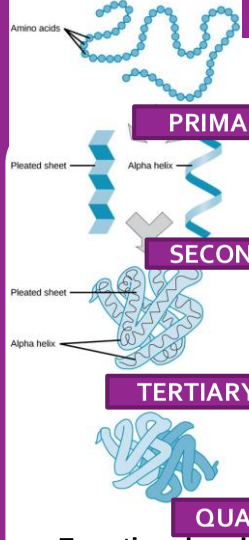
1. **Steaming** – Helps preserve nutritional value of food. Low in fat.
2. **Boiling** – May cause vitamin loss. Low in fat.
3. **Simmering**- long time required. Causes vitamin loss.
4. **Blanching –** prevents enzymic browning and oxidation, preserves nutritional value.
5. **Poaching –** ideal for preparing delicate ingredients.
6. **braising** – long time required. Causes vitamin loss.

Cooking methods – dry methods

1. **Baking -** long time required. Causes vitamin loss. Palatability is improved (cakes and other baked goods become sponge like and often have crispy top).
2. **Roasting -** Helps to reduce amount of fat in food. Long time required. Decreases vitamin content. Helps to obtain a crispy skin or surface.
3. **Grilling** – may create harmful substances. Usually low in fat.
4. **Dry-frying –** Reduces amount of fat n food. Nutritional value is preserved.

Functional and chemical properties of food

Protein



Macromolecules built of thousands of amino acids bonded together into long chains.

AMINO ACID- PEPTIDES- POLYPEPTIDES (PROTEINS)

Functional and chemical properties

1. **Denaturation –** damage of the protein's structure caused by:

a) **Heat –** during cooking, proteins vibrate resulting in hydrogen bonds being broken.

b) **Acid –** hydrogen atoms from the acid bind with nitrogen from the protein, preventing it from forming hydrogen bonds within protein molecules, and so it cannot form a 3D structure.

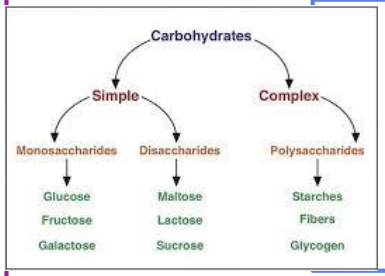
c) **Mechanical action** – during whisking, protein uncoils and exposes hydrophobic areas, which stick together and form a foam.

2. **Coagulation –** aggregation (heating) of protein particles into larger lumps, causing it to set. Eg setting of egg.
3. **Syneresis –** leakage of water from overcooked (over-coagulated) proteins. Usually associated with eggs.
4. **Gluten formation –** complex, net-like protein built of glutenin and gliadin. Proteins from wheat, rye, barley and oats. Net traps and hold air bubbles during proving and baking.

Glutenin+gliadin+water= gluten net, soft springy texture.

5. **Foam formation –** air bubbles trapped in a liquid (e.g. egg white). Whisking makes proteins unravel and denature.

Carbohydrate



Macromolecules which include mono-, di- and polysaccharides (built of thousands of monosaccharides bonded together.

Functional and chemical properties

1. **Gelatinisation –** happens when starch granules absorb water, swell and break during heating, causing mixture to thicken and form a gel when cooled.

Starch+water+heat= gelatinisation

2. **Dextrinisation –** happens when starch chains break down into shorter chains of dextrin's, during the process, molecules of water evaporate and carbon is left to give brown colour, occurs during baking and tasting bread and other baked goods.

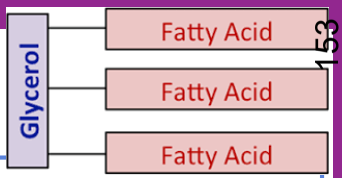
Starch+heat=dextrinisation

2. **Caramelisation –** happens when sugar is heated to a very high temp, causing it to liquidise and form a thick, brown syrup, during the process, water evaporates and carbon is left to create a brown or black colour, occurs during roasting of vegetables, making caramel and fudge etc.

Sugar+heat=caramelisation

1. **ENZYMIC BROWNING –** discolouration of fruits and vegetables as a result of oxygen reacting with enzymes and plant cell substances.
2. **Slow down – lower temp, adding heat and acid, removing the oxygen.**
3. **Oxidation –** substances react with oxygen changing the appearance, smell and nutritional value of food.

Fats and oils



1. Macromolecules built of a glycerol head and fatty acid tail.
2. Fat particles are **immiscible -** they are repelled by water molecules and separate from it, forming little droplets of oil in the mixture, and eventually creating a coat on top of it.

Functional and chemical properties

1. **Shortening –** when fat participles surround starch to produce a waterproof layer. Prevents gluten formation.
2. **Aeration –** trapping air bubbles in a fat mixture, e.g. cream or butter, to improve its texture.
3. **Plasticity –** ability of fat to be easily spreadable and melt at various temperatures. Depends on the length of the fatty acid chain.
4. **Melting point -** temp when fat turns to oil.
5. **Emulsion –** stable mixture of oil and water.

Water-in-oil emulsion – butter

Oil-in-water emulsion - milk

2. **Emulsifiers-** used bind together molecules into a stable emulsion. E.g. lecithin from egg yolk used to make mayonnaise.

Raising agents

1. **MECHANICAL –** methods of trapping air bubbles to mixtures or between layers. Whisking, beating, folding, rubbing-in, sieving, creaming.
2. **BIOLOGICAL –** yeast is a singe-celled fungus used in the production of baked goods, cheese, wine and beer.

YEAST+SUGAR+WARMTH+LIQUID- CARBON DIOXIDE+ALCOHOL/ACID.

3. **CHEMICAL –** bicarbonate of soda and baking powder. CO_2 bubbles form and cause the batter to rise, while proteins set and structure becomes stable.

Year 10/ 11 Knowledge Organiser
WJEC Food Preparation & Nutrition: Unit 4 – Food Safety

Food spoilage and contamination

1. Food spoilage may be caused by many various microorganisms – bacteria, yeast and moulds – as well as by enzymes naturally present in the food products.

Microorganisms

1. Tiny organisms visible only under a microscope e.g. bacteria, yeast and mould.
2. Warmth – ideally a temperature between 5°c and 63°c.
3. Water – microorganisms grown better in moist conditions.
4. Good – ideally protein, but sometimes also sugar.
5. Time – the longer the time, the more time microorganisms have to multiply.
6. DANGER ZONE – 5°C – 63°C. Bacteria growth above and below these temperatures is slower.
7. Growth controlled – by storing food in proper conditions, freezing and refrigerating food, cooking food before eating, not refreezing food once it has been defrosted.

Enzymes

1. Enzymes - Biologically active protein-based molecules.
2. Catalysts – speed up the rate of chemical reactions.
3. Enzymes are necessary for fruit to ripen.
4. Enzymic browning – darkening of fruit and vegetables caused by enzymes and should be avoided to preserve nutritional value of food. Browning can be stopped by:-
5. Blanching – food put into boiling water then immediately plunged into cold water or ice.
6. Use of acids – use of lemon juice or vinegar. Acid denatures and deactivates enzymes, because they are built of protein.

Key terms

1. **Shelf life –** period of time during which food can be safely stored and eaten.
2. **Food poisoning –** illness caused by eating contaminated food or drinking contaminated water.
3. **First in, first out –** Rule which says that the oldest foods should be eaten first.
4. **Vacuum packing –** Packaging food in airtight foil bags to remove oxygen and prevent spoilage.
5. **Food covering –** prevents from light, air, oxygen and dust, protects from pests and rodents, tainting.
6. **Perishable foods –** have a fairly short shelf life and need to be stored in the fridge. Raw and cooked meat, especially minced, raw and cooked poultry, raw and cooked fish and shellfish, milk and dairy, eggs, vegetables and fruit.
7. **Insulated cold bag** – used to transport high-risk foods and maintain their low temperature.
8. **Best before –** applied to food quality (look, flavour and colour) and it's relatively safe to eat the food after that date: it is used on dry, frozen or tinned foods and eggs.
9. **Use by** – applies to food safety so it might be harmful to eat a food after that date: used on fresh foods such as milk and dairy.
10. **Ambient storage** – storing at room temperature usually around 20°c.
11. British Lion Scheme – food safety mark which guarantees that eggs are produced in the Uk and that al the hens have been vaccinated against salmonella.

Cross-contamination

1. Cross-contamination – is when bacteria, toxins or food particles are transferred to a food product.

Caused by:-

- Waste food and rubbish
- Pests and rodents
- The cooks hand
- Work surfaces and equipment
- Other contaminated foods, including high-risk foods.

2. Anaphylactic shock – is a life-threatening reaction of the immune system to an allergen

Most common allergens – nuts, fish and seafood, milk and eggs.

Food poisoning

1. Food poisoning – is a disease caused by eating spoiled or contaminated food. Such food may contain certain microorganisms, toxins or enzymes.
2. Pathogenic bacteria – microorganisms which cause disease.
3. Carrier – a person who carries a pathogen but shows no symptoms of a disease.
4. Symptoms – stomach pains and cramps, nausea and vomiting, diarrhoea, fever, shivering
5. Campylobacter – raw poultry and unpasteurised milk.
6. E. Coli – undercooked beef, unwashed vegetables, dirty hands.
7. Salmonella – raw eggs, meat and poultry, unpasteurised milk.
8. Listeria – ready-to-eat foods, unpasteurised milk, dirty hands.
9. Staphylococcus aureus – salads, ham, eggs, tuna, poultry, cream, hands of an infected person.

Use in food production and signs of food spoilage

BACTERIA

1. **FOOD SPOILAGE –** Clostridium botulinum produces a toxin which causes meat bulge. Most bacteria do not cause visible signs of spoilage.
2. **USE IN FOOD MANUFACTURING** – cheese used a starter culture LACTOBAILLUS to give a balanced aroma taste and texture. Yoghurts – starter culture, probiotics – health benefits.
3. **WHY DOES THIS WORK?** Bacteria ferment lactose from milk into lactic acid, giving food a sour taste and coagulates the protein. Causes yoghurt to become thicker.

YEAST

1. **FOOD SPOILAGE** ferments sugar in juices and beverages, making them sour, fizzy and foamy.
2. **USE IN FOOD MANUFACTURING** Bread, doughnuts and other baked goods use yeast to help them rise.
3. **WHY DOES THIS WORK?** Yeast ferments sugar in foods and produces carbon dioxide to help it rise. It also crates fizz in some alcoholic drinks.

MOULD

1. **FOOD SPOILAGE** Creates a green, white or black coating on food products such as bread, grapes, tomatoes and jams.
2. **USE IN FOOD MANUFACTURING** Blue cheeses, such as Stilton, have a mould called Penicillium added to give them a distinctive texture, taste and aroma.
3. **WHY DOES THIS WORK?** Mould breaks down polysaccharides into shorter chains, which changes the taste of the food.

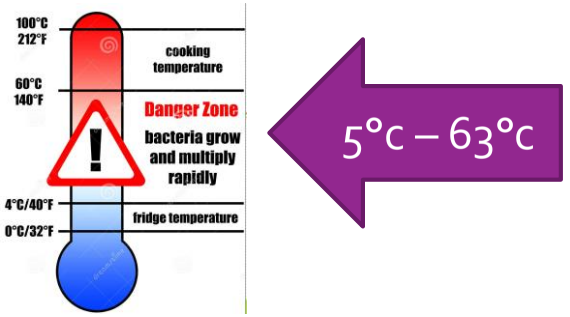
ENZYMES

1. **FOOD SPOILAGE** Turn bananas, apples, potatoes and other foods brown.
2. **USE IN FOOD MANUFACTURING** Rennet is an enzyme used in cheese production to coagulate milk.
3. **WHY DOES THIS WORK?** Enzymes react with oxygen and turn yellow pigments in food into brown melanin.

Temperature Control

1. Tainting – means that the m=smell of one food contaminates other food. Always cover.
2. Freezer burn – involves the dehydration and oxidation of food caused by improper freeing. E.g. inadequate packaging.

Freezing	-18°c
Chilling	0°c – 5°c
Cooking	Above 75°c
reheating	Above 75°c.



Correct use of a domestic fridge and freezer

Food safety principles when cooking and preparing food

1. PERSONAL HYGIENE

- Always wash hands before and after cooking and dry with disposable paper towels.
- Avoid touching your face or hair
- Tie your hair back and cover with a hairnet.
- Avoid cooking when your ill.
- Change clothes and use an apron.
- Cover any wounds with a waterproof plaster.
- Do not wear rings or other jewellery when cooking.

2. SEPARATE FOODS

- Separate raw and cooked foods both when preparing and storing food.
- Cover prepared food and store in closed containers.
- Use dedicated, colour-coded utensils.
- Wash dishes straightway in hot water to avoid pests and cross-contamination.

3. WORK SURFACES

- Clean thoroughly after dealing with high-risk foods.
- Use soapy hot water or antibacterial spray to clean any spills.
- Use a clean kitchen towel or disposable paper towels.

4. TEMPERATURE CONTROL

- Make sure the temperature inside food reaches 75°c both when cooking and reheating.
- Make sure the temperature of served food is above 63°c.
- Do not put hot food straight into the fridge – let it cool for 90 minutes.
- Ensure correct cooking time to avid cold spots.
- Defrost thoroughly to avoid cold spots.

Year 10/ 11 Knowledge Organiser
WJEC Food Preparation & Nutrition: Unit 5 – Food Provenance

Supporting health

1. Healthy eating – what we eat has a huge impact on our health. Too little may lead to a nutrient deficiency. High level of processing could lead to a lack of nutrients.
2. **Governments and producers –** strive to make food safe and healthy for consumers by adding substances which are beneficial for health.
3. **Cholesterol-lowering spreads –** fat spreads enriched with plant sterols and plant stanols. Substances proven to effective lower blood cholesterol level an prevent atherosclerosis.
4. **Cholesterol –** fatty substance necessary for correctly transporting fats around the body.

LDL – Bad as increases cholesterol amount in blood. Can block up the block vessels.

HDL – good as it transports cholesterol to the liver, which can remove its excess from the body.

5. Health outcomes of increased cholesterol and excessive fat consumption – excess. Cholesterol deposited in the blood vessels and create atherosclerotic plaque. Risk of hypertension, CHD, heart failure and stroke.

Food fortification

1. **Food fortification** – during processing many food products lose their nutritional value. The main function of food fortification is to:-

- **Restore the nutritional value of foods**
- **Improve the nutritional value of foods**
- **Make food more suitable for certain groups of consumers**
- **Prevent diseases caused by malnutrition.**

2. **Fortification required by law:-**

Wheat flour and bread – Thiamine – prevent beri beri, help release energy from food. **Niacin** to prevent pellagra, **calcium** to prevent rickets and osteoporosis, iron to prevent iron deficiency and anaemia.

Vegetable fat spreads. Vit A – prevent growth and eyesight issues eg. Night blindness, **Vit D** – prevent rickets and osteoporosis.

Simi-skimmed and skimmed milk. Vit A – prevent growth and eyesight issues e.g. night blindness.

Food additives

	advantages	disadvantages
Colouring	• Improve the look of food • Make appetising	• Hides poor quality food • hyperactivity in children.
Emulsifiers and stabilisers	• Prevents ingredients from separating • Maintain the texture	• Flatulence and bloating. • Hides poor quality ingredients.
Flavourings	• Improve taste and smell • More appetising.	• Hides poor quality ingredients • Increase appetite.
preservatives	• Increased shelf life • Prevent oxidation and spoilage.	• May cause allergic and anaphylactic shock. • Cause cancer

Genetic modifications

1. **Plant cell –** cells contain DNA. DNA built of tiny genes which encode all information about an organism.

Cell- nucleus- chromosome-DNA- gene

2. **Modern technologies –** allow people to manipulate the DNA code.

- cut out unwanted genes to avoid disease.
- Modify the sequence of genes.
- Paste new genes to add new features

3. **Genetically modified –** when the DNA has been changed.

advantages	disadvantages
Resistant to weather condition, pests	GM seeds contaminate fields.
Need fewer nutrients to grow	No proof that they are safe
Less need for fertilisers and herbicides	May increase risk to allergies and cancer. And obesity.
Animals produce more muscle tissue and milk	The use of bacteria and viruses in production cause new diseases.
Produce high-yield crops, high nutrition.	Resistance to antibiotics. Pests develop resistance.

Food production – primary sources of food.

1. **Primary source** – foods in their natural, raw state e.g. milk, what grains, apples.
2. **Primary processing of food –** doesn't significantly affect the natural values of food products. **Sorting, trimming, discarding, washing, wrapping, draining, trussing, cutting, heat treatment, milling, deboning, skinning, deseeding.**
3. **Making of flour –** harvesting and transport to mill, separating from dirt etc, washing and drying, milling, sieving.
4. **Bran – the outer layer of a grain.**
5. **Heat treatment of milk.**

- **Pasteurisation –** 72c for 15 sec to kill pathogenic bacteria.
- **Ultra-heat-treatment –** heated 135c for 1-2 seconds, kill bacteria.
- **Microfiltration –** milk pushed through very fine membranes.
- **Sterilisation –** heated to 110°c for 30 mins. Nutrients + flavour affected.
- **Drying –** condensed, then dried, fall in B vitamin levels.

Food production – secondary sources of food.

1. **Secondary source –** goods that have been changed e.g. yoghurt, flour, jam
2. **Secondary processing of food** – affects natural features to obtain new food products. Smoking, irradiation, adding additives, fermentation, cooking/heating, drying and freeze-drying.
3. **The making of pasta** – harvesting, milling, mixing, kneading, adding flavourings and colourings, rolling, pasteurisation, cut into shapes, drying, packaging
4. **Jam** – harvesting, washing, crushing, adding water and sugar, simmering, pouring into jars.
5. **Pectin** – natural gelling agent present in fruit.
6. **Acid** – can be naturally occurring. May be added to the mixture to help release the pectin.
7. **The making of yoghurt** – milk cows, transporting of milk, pasteurisation and homogenisation, warming to 42°c, adding starter culture, fermentation (ripening), cooling, adding flavourings, packaging.
8. **Starter cultures** – probiotic bacteria begins the fermentation process.
9. **Fermentation** – changing lactose into lactic acid by adding bacteria. Change in PH leads to coagulation and thickens mix.
10. **Making of cheese** – milking, transportation, pasteurisation, homogenisation, adding starter culture, fermentation, added rennet, cutting curd, pressing, add salt, pressing, ageing.
11. **Rennet** – enzyme which coagulates milk and increases curdling.
12. **Whey:** liquid by-product of cheese production.

Food and the environment, and sustainability of food.

1. **Danger of carbon dioxide –** production creates carbon dioxide. This creates a layer around the earth which reflects warmth back onto the earth. Average temp rises.
2. **Carbon footprint –** amount of CO2 and greenhouse gases emitted into the environment. By input, processing and output.
3. **Global warming** – rise in average temperature on earth due to extravagant release of greenhouse gases.

CO2 layer – heat cannot escape – rise in temp – glaciers melt- fierce hurricanes, rainfall- crop failure – food shortage.

1. **Greenhouse gases** – vapour, CO2, nitrous oxide, methane, ozone, CFC's, absorb infrared radiation and trap heat.
2. **Food miles –** distance from the field to the plate.
3. **Food production –** direct and indirect effect on the environment by creating various pollutants and by causing deforestation.
4. **Packaging –** using fossil fuels to produce, tonnes thrown away, unrecycled creates pollution, animals, birds and fish swallow debris and die, some **never** decompose.
5. **Fairtrade** – foundation and ethical movement focused on supporting farmers and sustainability of food. Fair wages and prices, improved working condition, empowers local communities, education for all.
6. **Food availability** – climate change affects food availability. Droughts, flood causes crop failure. Therefore no plants to eat and no food for animals.
7. **Food security** – when all people, at any time, have access to nutritious, healthy food in sufficient amount.
8. Seasonal foods – foods which are characteristic of a given season when they ripen and are harvested.

Spring – sprouts, kale, lettuce, spring onion, radish
Summer – peas, berries, courgettes, cucumbers, apricots, cherries
Autumn – apples, pears, plums, aubergine, pumpkin, celery
Winter – potatoes, carrots, parsnips, beetroots, Brussel sprouts, onion.
Advantages – reduce food miles and carbon footprint, cheaper, higher in nutrients and tastier.

9. Food waste – due to buying or cooking too much, not eating before it goes off. Effect – waste of money, pollution, carbon footprint increased. Prevention – planning, only cook what's needed, store leftovers, prevent spoilage, make compost from left overs.

Increased food availability	Decrease food availability
Use of GM seeds and organisms Use modern technologies store longer Transportation of food.	Climate change Insufficient land Growing world population Overexploitation of soil and fisheries, limited resource e.g. water and fossil fuels.

Food sources

1. **Food sources** – where and how food is made depends on climate, soil quality, availability of water, resources, availability of land, size of population. Religion, ethical beliefs.
2. **Grown** – orchards, fields, polytunnels.
3. **Reared** – sheds, barns, fish farms
4. **Gathered** – in forests, near the roads,
5. **Caught** – open spaces and forests oceans and seas.

Sustainable fishing

1. **Sustainable fishing –** fishing in natural fisheries limited to certain period of time. Giving the shoal time to reproduce and restore itself. Policy set by the Marine Stewardship Council.
2. **Advantages of fish farms –** protect the natural ecosystems, prevent overexploitation of fisheries, keep animal welfare standards, protect wild species diversity. Prevent by catch.
3. **By catch –** accidental catch of a sea organism which wasn't the primary goal of the fishing.
4. **Disadvantages of fish farms –** fish tanks often overcrowded, fed low-quality feed affecting their flavour and nutritional value, might be fed antibiotics, increasing risk of antibiotic resistance.
5. Methods of fishing

Purse seining – use large nets to trap fish.
Longlining – use longline, fish attach to a hook on the line
Bottom trawling – pulling a large net along the sea bottom.

Farming:

1. **Organic farming –**

- **No chemicals**
- **Little or no use of pesticides**
- **No artificial fertilisers**
- **No herbicides**
- **No GM feed or seeds**
- **Antibiotics are only used when necessary**
- **Crop rotation may be applied to preserve soil quality**
- **Animal welfare standards are kept.**

2) **Intensive farming –**

- **Chemicals such as pesticides, herbicides and artificial fertilisers are used to prevent crop failure.**
- **Antibiotics are used to prevent diseases in livestock, not to cure them.**
- **GM feed and seeds are used to obtain high –yield crops.**
- **Animal welfare standards are often violated.**

Local and seasonal foods

1. **Characteristic of countries or regions, as well as certain seasons of the year.**

- **Fresher**
- **More nutritious**
- **Tastier**
- **Empowers local farmers**
- **Support local communities**
- **May be cheaper than imported foods**
- **Supports biodiversity of specifies**
- **Limited offer/ small variety of foods offered**
- **Limited availability/ short time for purchase**
- **Depends on weather conditions and local climate**
- **May be more expensive than imported foods**

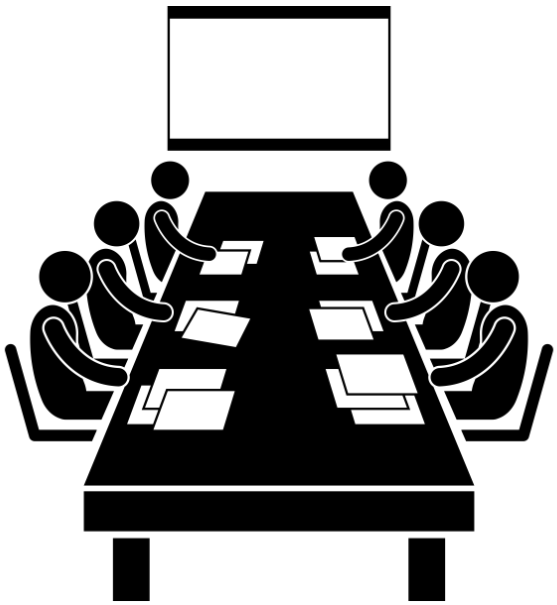
Genetically modified foods:

1. **Come from GM animals or plants, or GM microorganisms are used during production.**

- **Resistance to pests and unfavourable weather conditions.**
- **More nutrients, e.g. beta-carotene in golden rice.**
- **Fewer pesticides and herbicides are used.**

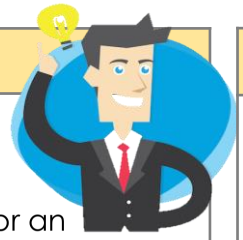
BUSINESS STUDIES

Use the information that follows to either test yourself on key words/phrases for each topic (using the look/cover/check technique) or create a mind map for each topic that contains key facts and images. Once you have created a mind-map you should put it away and try to recreate it from memory, then look at your original mind-map and add what you have missed.



1.1 Being an Entrepreneur

What do I need to know?



1. What is an entrepreneur?
2. What motivates an entrepreneur?
3. What skills and characteristics are important for an entrepreneur to have?
4. How can these skills and characteristics be applied to the business world?

Skills and Characteristics	Application to the Business World
Confident	Believing ideas will become successful
Motivated	Wanting the business to do well
Determined	Not allowing difficulties to affect the business
Results-focused	Taking action with the end result in mind
Initiative	Taking action without being told
Decision-making	Make decisions quickly and under pressure
Analytical ability	Using logical reasoning
Communication	Able to communicate with a variety of stakeholders

Financial Motivator	Personal Motivator	Social Motivator
An entrepreneur who is motivated to do well by the money they can earn. *e.g. Jahmilla is motivated to work hard so that she can earn £100,000 to buy a private jet.*	An entrepreneur who is motivated through personal reasons of their own. *e.g. Anson is motivated to work hard at his new business idea so he can finally take his mum on holiday to Thailand.*	An entrepreneur who is motivated by helping other people. *e.g. Emre is motivated to work hard at his entrepreneurial idea because he wants to help others.*

Key Words	
1) Entrepreneur	Someone who is willing to put their career and financial security at risk to pursue a business idea.
2) Motivation	The reason or driving force behind an individual's behaviour or actions e.g. Miss Paras gets up at 4:00 am every morning to go to the gym because she is motivated to lose weight for her holiday to Jamaica.
3) Skills	The ability to do something well e.g. time-management
4) Characteristics	A quality that someone may have e.g. honesty

1.2 Business Aims and Objectives - Financial

What do I need to know?
1. What are aims? 2. What are objectives? 3. What financial aims and objectives might a business have? 4. What is the difference between break even and profitability? 5. What is the difference between revenue and profit maximisation?

Aims	Objectives
Aims are the bigger goals that the business wants to achieve *Eg. Increase revenue*	Objectives are the smaller steps required to meet the aim *Eg. promote the product using social media to create more awareness*

Breakeven	Profitability
This is where the business' total revenue is equal to its total costs **TR = TC** Formula: $\frac{\text{Fixed costs}}{\text{Selling price – variable costs}}$	Profit is the owners reward for investing in the business **Profit or loss = Sales revenue – Total costs**
Increasing Revenue	**Profit Maximisation**
Over time a business needs to increase the money they are making from sales (sales revenue). To do this they could: • Increase prices • Up-sell their products • Cross sell • Offer bundle deals • Increase marketing/advertising	A business will try to ensure they make the most possible profit from each product/service they sell

1.2 Business Aims and Objectives – Non-Financial

What do I need to know?
1. What is customer satisfaction? 2. What is business expansion? 3. What are the different ways business can expand? 4. What is employee engagement and satisfaction? 5. What is diversification in business? 6. How can a business diversify? 7. What is corporate social responsibility?

Non-financial aims/objectives	Application to the Business World
Customer satisfaction	Making customers happy so they are more likely to return and be loyal to the business
Expansion	Purchasing new premises or employing new staff
Employee engagement/ satisfaction	Happy employees provide excellent customer service and work harder. Often satisfied employees stay in the business longer
Diversification	Expanding the range of products sold within the market
Ethical/corporate responsibility	Consider social and environmental factors when completing their business operations

Market segmentation / Diversification:
Reasons why businesses need to segment their market: • Benefits they require • Amount of money they are able/willing to pay • Quantity of goods they require • Quality of goods they require • Time and location at which they wish to purchase the goods

CSR = Corporate social responsibility

Stakeholder	Ethical / corporate responsibility
Investors/ shareholders	To provide a good return for the money they have invested in the business
Employees/ manager	Paid a fair wage and have safe working conditions
Customers	Good quality products at a fair price
Suppliers	To purchase goods on a regular basis and pay all invoices on time
Environmental groups	Have environmentally friendly operations

1.3 Legal structures

What do I need to know?
1. What is a sole trader?
2. What is a partnership?
3. What is a PLC and LTD?
4. What is a franchise?
5. What is a co-operative?
6. What are the features of a flat organisational structure?
7. What are the features of a tall organisational structure?
8. Why a business might restructure?

Public sector	Private sector
Businesses that are owned by the government – there are very few remaining Eg. Royal mail	Businesses that are owned by private individuals Eg. Sole traders, parnerships, PLCs, LTDs

Key Words	
1) Hierarchy	Refers to the number of layers of authority within the organisation
2) Chain of command	The line of communication and authority within a business
3) Span of control	The number of people for which an individual or organisation is responsible
3) Delayering	When businesses remove layers of authority to allow faster and more effective communication
4) Redundancy	When the business reduces the number of workers as there is no longer any work for certain employees

Organisational structure	Definition and examples
Sole trader	A business owned and controlled by one person Eg. plumber or electrician
Partnership	A business owned and controlled by 2-20 individuals Eg. solicitor or estate agents
Public limited company	A business owned by shareholders that can be anyone Eg. Marks and Spencer
Private limited company	A business owned by shareholders who are friends and family of the entrepreneur Eg. JCB ltd
Franchise	The franchisor grants a licence to another business so they can sell its brand or business idea Eg. McDonalds
Co-operative	A business owned by their staff, who are members of the firm Eg. Co-operative Press

Tall organisation Vs Flat organisation

1.4 Stakeholder engagement

What do I need to know?

1. What is an internal stakeholder?
2. What is an external stakeholder?
3. What are the interests of each stakeholder?

Internal stakeholder	External stakeholder?
These are stakeholders within an organisation • Owners • Managers • Employees • Workers	These are stakeholders outside of an organisation • Customers • Suppliers • Shareholders • Local community • Government • Financial providers

Businesses that engage with their stakeholders are likely to:
- Have increased staff motivation and retention
- A good reputation
- New ideas
- Increased share price

Stakeholder	Engagement
Owners	Interested in how the business is doing eg. profit and loss each year.
Shareholders	Interested in if the business is likely to continue in the future. They want to know that their share investment is safe and how much dividends they will earn.
Management	Managers require up-to-date information so they can plan for the long term future of the business.
Government	Checks compliance with legislation eg. health and safety and finance records
Employees / workers	Need to be assured of their job security. They are interested in the working conditions of the business and being paid on time.
Customers	Need to be certain the business will sell them a high quality product that gives 'value for money'
Suppliers	Need to ensure the business will pay on time and assured that the business will purchase from them in the future.
Local community	Mostly provide the employees for the organisation. Also concerned about pollution and noise.

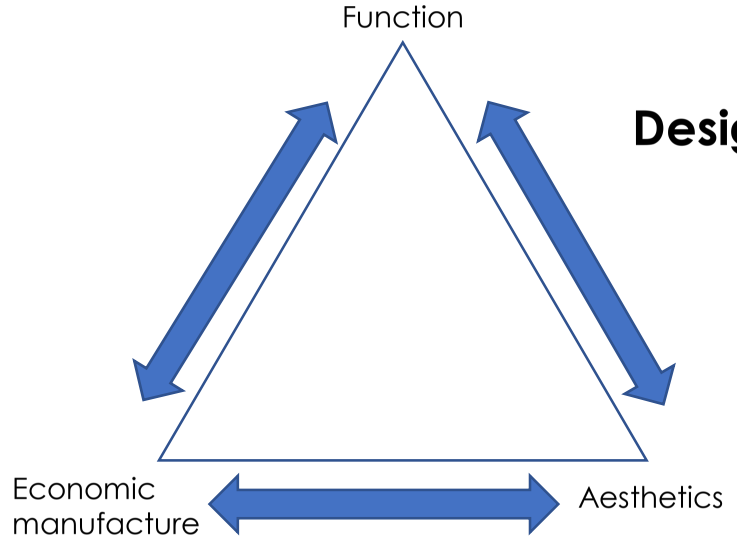
2.1 Marketing Mix - Product

What do I need to know?

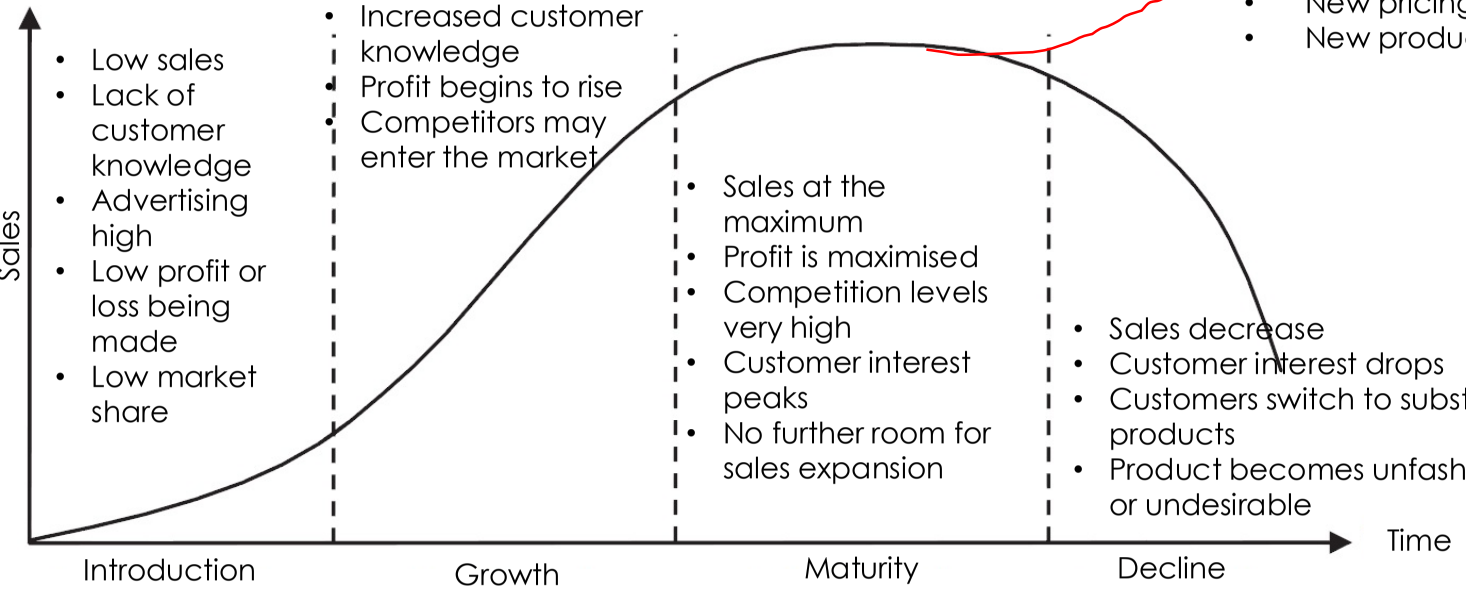
1. What is a tangible product?
2. What is an intangible product?
3. What is the design mix?
4. What are the features of each stage of the product life cycle?
5. What are some extension strategies?
6. What is the Boston Matrix?

Tangible	Intangible
Physical items that exist in the real world Eg. A car, a mobile phone, a teddy bear	Products that have no physical being Eg. Car insurance, mobile phone networks

Design mix



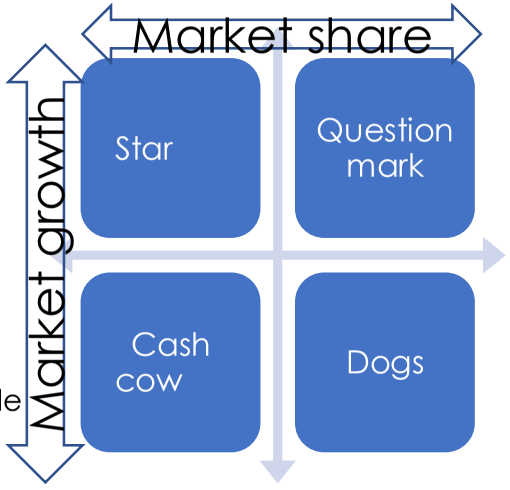
Product life cycle



Extension:

- New advertising campaigns
- New pricing strategy
- New product features

Boston Matrix



2.1 Marketing Mix - Place

What do I need to know?

1. What are the factors that affect where a product/service is sold?
2. What are the channels of distribution?
3. What are the advantages and disadvantages of using E-commerce?

E-commerce
(Selling goods through a website directly to customers)

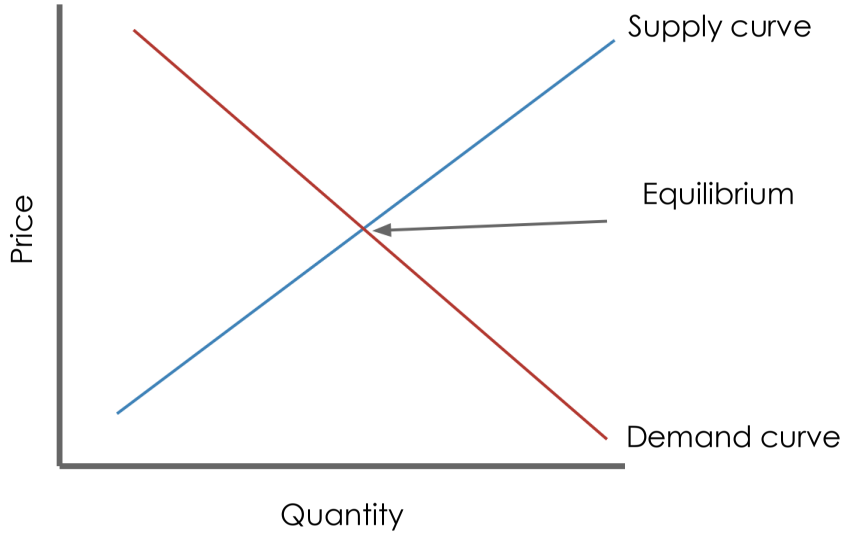
Advantages:
- Low cost
- Quick and easy for customers
- No need to pay for the 'middle man'

Disadvantages
- Risk the products may not be as they look online to customers
- Consumers may be concerned about giving bank details online

2.1 Marketing Mix - Price

What do I need to know?

1. What is equilibrium price?
2. What is price skimming?
3. What is price penetration?
4. What is psychological pricing?
5. What is loss leader pricing?
6. What is competitive pricing?
7. What is promotional pricing?
8. What are the advantages and disadvantages for these pricing strategies?



Pricing strategy	Price tactic
Price skimming	The business introduces the product at a high price and then gradually lowers it over time. Eg. Dyson bag less cleaner
Price penetration	The business introduces the product at a lower price than usual to attract customers. It gradually increases the price over time. Eg. selling a new flavour of crisps for cheaper
Psychological	The business sets a price that appears to be attractive to a customer. Eg. selling a holiday for £999 instead of £1000
Loss leader	The business is willing to make a loss on a product in order to get customers to purchase the product. It then increases the price once the customer likes the product.
Competitive	The business sets a price that is similar to that of a local competitor. Eg. supermarkets price matching goods.
Promotional	The business temporarily reduces the price of a product to increase interest in it.

2.1 Marketing Mix - Promotion

What do I need to know?

1. What is advertising?
2. What is sales promotion?
3. What is personal selling?
4. What is direct marketing?
5. What are promotional objectives?

Promotional Objectives

- Increasing consumer knowledge
- Increasing market share
- Communicating with customers
- Encouraging purchasing
- Developing customer loyalty

Key terms

1) Sales promotion – Short term boost of sales
2) Personal selling – A sales person sells a product to a client face to face
3) Direct marketing – Selling products directly to the public eg. online or telephone sales

Ways of advertising	Advantages	Disadvantages
Leaflets	• Cheap to produce • Targeted to customers in the local area • Easy to distribute • Easy to read and have good visual impact	• Often thrown away once read • Can be seen as junk mail and not read • They are not usually kept therefore have do not have long term impact
Social media	• Cheap and easy to distribute • Can be used to update customers about offers and new products • Access to international markets	• Less useful for targeting older people • Require daily monitoring to prevent inappropriate behaviour • Risks of negative reviews or hacking
Newspapers	• Low cost • Can target local customers • National newspapers are more widely read than local newspapers • National newspapers have wider reach • Effective in targeting the older generation	• National newspaper advertising is very expensive • Unless the advert is in prime position, there may be competition for the readers attention • Less effective at targeting the younger generation
Magazines	• Targeted advertisement • People tend to keep magazines, unlike leaflets • People often pass on magazines to others	• Deadlines for advertisements can be months in advance • Costs can be high • Magazines contain lots of adverts, it is possible the business' advert will be lost among them
Radio	• Targeted advertisement • Can be produced quickly • Cheaper than TV adverts	• Often used as background noise • Prime slots are more expensive eg. morning • No way to save an advert so all information needs to be taken in at once

2.2 Market research and Markets

What do I need to know?

1. What is the difference between qualitative and quantitative data?
2. What is primary research?
3. What are some examples of primary research?
4. What is secondary research?
5. What are some examples of secondary research?
6. What is a mass market?
7. What is a niche market?

Quantitative Vs Qualitative

Quantitative data is factual numerical data and qualitative is information about peoples opinions and views

Mass Vs Niche Market

Mass markets is one in which goods or services are produced in large quantities and are aimed at most of the market

A niche market is one in which goods or services are produced in small quantities and aimed at a particular segment of the market

Type of research	Examples	Advantages	Disadvantages
Primary (Field) Gathering data and information that has not been collected before	• Interviews • Observations • Questionnaires • Surveys • Focus groups • Consumer trials	• Relevant and up-to-date information • Specific to the business completing the research • Only available to the business doing the research, giving it a competitive advantage	• Costly and time-consuming • A sample size that is too small may provide biased results • Consumers are not always willing to take part
Secondary (Desk) Gathering data and information that has already been collected	• Books, trade magazines, newspapers • Published company reports • Internal data • Competitors' data • Government publications and statistics • Purchased research material	• Cheaper than primary (sometimes free) • Information usually based on a wide sample • Information is readily available therefore not time consuming	• Information is available to all businesses • Not specific information • Could be out of date therefore irrelevant in current conditions

Market-orientated business

Produces goods based on consumer wants and needs. It will undertake high levels of market research to find out customers' wants and needs

Product-orientated business

Produces only goods that it is good at making. It has low levels of engagement with its potential customers

3.1 Operations Management

What do I need to know?

1. What is outsourcing?
2. What is lean production?
3. How can you maintain and improve quality?
4. What is job production?
5. What is batch production?
6. What is flow production?

Outsourcing

When businesses grow, they are often not able to complete all business tasks themselves. They need to outsource some of their operations by paying another business to do the work
eg. website design

Just in time

Stock arrives on the production line just as it is needed. This minimizes the amount of stock that has to be stored, and so reduces storage costs

Maintaining and improving quality

1. Quality control
2. Benchmarking
3. Quality assurance
4. Total quality management (TQM)

Job Production

One product is made at a time. Every product will be slightly different and usually made by hand/machine. The products will be expensive and time consuming to make.
Eg. Paintings, Handmade jumpers, Bespoke jewellery

Kaizen

A Japanese concept that focuses on gradual and continuous improvement

Lean production

Aims to cut waste and improve quality

Cell production

Divides the production process into a series of small stages. Ensures teams complete a full unit of production

Batch Production

Small quantities of identical products are made. This method uses machinery and manpower. The products tend to be relatively expensive due to the labour costs. Each batch will be slightly different.
Eg. Coloured paint, Knitting wool

Mass production

This is usually completed on a production line an involves the assembly of different components or items. It is usually completed by machine and relatively cheap to operate.
Eg. Cars, T-shirts

Continuous Flow Production

This is similar to mass production except that the production line is operated 24 hours a day, 7 days a week. This reduces the costs of stopping and starting production. Few workers are required.
Eg. Canned baked beans, Mass-produced loaves of bread

4.1 Customer service

What do I need to know?

1. What are the benefits of providing good customer service?
2. How is customer service measured?
3. What do employees need to provide excellent customer service?

Employees will need

- Good communication skills
- Patience to understand customers' needs and wants
- Attention to detail – It is important that employees focus on customer requirements
- Good product knowledge
- Excellent personal presentation skills

Ways to measure customer service

- Customer satisfaction scores
- Repeat business data
- Levels of complaints/compliments
- Customer surveys
- Mystery shoppers
- Social media
- Online surveys
- Customer comment cards
- Comments made to staff members
- Telephone/email surveys
- Email contact forms

Benefits of good customer service

- Provide word of mouth promotion
- Improve business reputation
- Encourage repeat business
- Set the business apart from its competitors
- Provide brand awareness
- Ensure customer loyalty and encourage customers to purchase from their business in the future

4.2 Internal influences on business

What do I need to know?

1. What are the functional areas of a business?
2. What is Maslow's motivation theory?
3. What is Mayo's motivation theory?
4. What is Hertzberg's motivation theory?
5. What is the operations department responsible for??

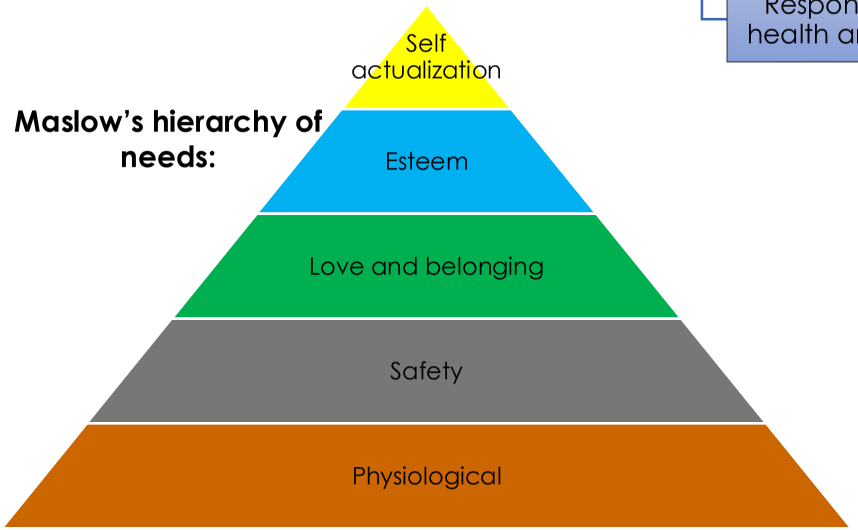
Functional areas of a business

- **Human resources**
  - Staff and employees
    - Recruitment and selection of employees
    - Training and development of employees
    - Performance management of employees
    - Responsible for health and safety
- **Marketing**
- **Operations**
  - The production process
    - Turning inputs (raw materials) to outputs that can be sold
- **Finance**
  - Organizes finances for each department, monitors cash flow and reports on financial performance

Maslow's motivation theory

- Most our actions are governed by our needs
- We are motivated to satisfy a hierarchy of 5 sets of needs
- Each set of needs has to be fulfilled totally before the next
- By the time all needs have been catered for, the individual will be motivated by self-actualisation (development)

Maslow's hierarchy of needs:



Hertzberg's motivation theory

- Frederick Herzberg asked 200 accountants and engineers about the incidents in their jobs that gave them strong feelings of satisfaction/dissatisfaction
- Workers will not be motivated by hygiene factors but if these hygiene factors are not met then it can lead to dissatisfaction which could result in poor productivity

Mayo's motivation theory

- Mayo showed that worker productivity is influenced by far more than purely scientific factors such as tools, methods and incentives.
- Mayo conducted his Hawthorne experiments in Chicago where he experimented with working conditions eg. lighting and hours of work. The findings showed that no matter what changes, productivity increased- even when conditions were worse!
- The results showed that workers are motivated by changes to their environment due to management interest which made employees feel valued and increased team spirit

4.2 Internal challenges of growth

What do I need to know?

1. What are the challenges of growth for a business?
2. How can maintaining customer service levels challenge growth?
3. How can diseconomies of scale challenge growth?

Maintaining customer service levels

To ensure business growth, a business needs to ensure that its customer service levels are consistent and maintained. If they vary from one week to the next then it is likely that customers will take their business elsewhere, with more reliable service. This will prevent business growth.

Economies of scale

As a business grows, it benefits from a reduction in average costs of production. This is called economies of scale and gives larger firms a competitive advantage over smaller firm

Purchasing	The bigger the size of orders, the lower the cost to purchase each individual competent becomes
Technical	The bigger the business, the more access they have to the latest technology and equipment
Managerial	As businesses grow, they are able to employ specialist managers. These managers know how to get the best value for each pound spent eg. in production, marketing etc which reduces the cost of output
Advertising	As firms grow, each pound spent on advertising has a greater benefit for the firm

Diseconomies of scale

- When diseconomies of scale appear, the average costs of production rise with output
- Diseconomies of scale include problems with communication
- As a firm grows and levels of hierarchy increases, efficiency and communication can break down
- This leads to increasing inefficiency and therefore increasing average costs
- In larger firms it may be harder to co-ordinate, satisfy and motivate workers meaning they do not give their best
- As businesses grow in size, they can be increasingly harder to control

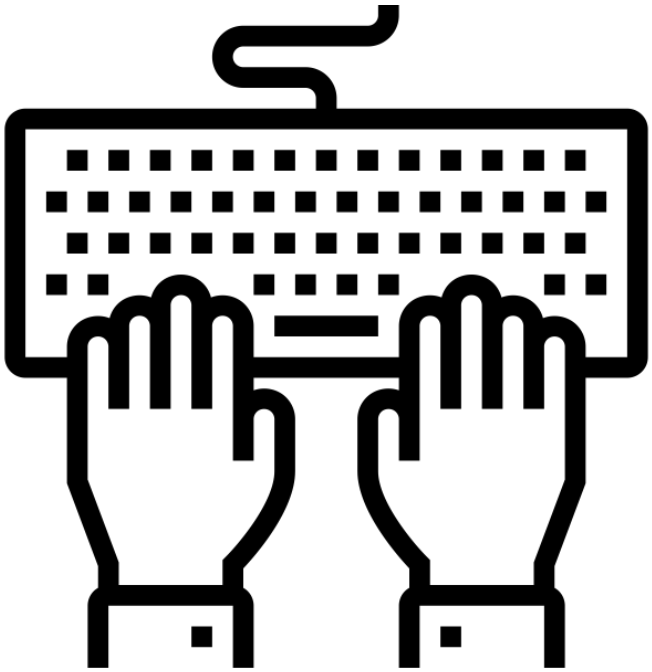
5.1 External influences

What do I need to know?
1. What is GDP? 2. What are interest rates? 3. What is the living wage? 4. How can changes in fashions and trends affect a business? 5. What is the competitive environment? 6. How can the level of employment affect a business? 7. How can the availability of local skills affect a business? 8. What changes to legislation have affected businesses? 9. How can changes in VAT, income tax and corporation tax affect businesses?

External influence	How they affect businesses
GDP	This is the measure of the market value of all the goods and services produced during a period of time in a specific country or region. The figure is used for international comparisons.
Interest rates	This is the cost of borrowing money or the benefit that is gained form saving money. Low interest rates encourage customers to buy as there is no benefit from saving. High interest rates result in customers buying fewer goods and there is more incentive to save.
Living wage	This is the minimum amount of money that businesses must pay their employees. An increase means businesses have to pay higher wages therefore costs increase. However, it means individuals will have more money which they are likely to spend on goods and services.
Changes in fashions and trends	A business must keep up with current trends to survive (eg. blockbuster). Businesses will also need to be able to sell off old outdated stock at a lower price.
Changes in the competitive environment	The economy is always changing, and businesses need to be able to survive during the different climates eg. during a recession or downturn.
Availability of skills locally	Organisations in remote areas often struggle to employ high quality staff so employees may need to be bought in from elsewhere. This can incur extra costs.
Changes to legislation and tax rates	A business must comply with all current legislation. There are costs involved in this eg, health and safety checks, copyright etc. VAT – Changes in VAT can either increase or decrease the price of a product (an increase might affect sales) Income tax – If income tax is higher then people have less disposable income to spend in businesses Corporation tax – This is paid on company profits. If there is an increase in rates then the business has less retained profit that can be used to expand or pay shareholders.

COMPUTER SCIENCE

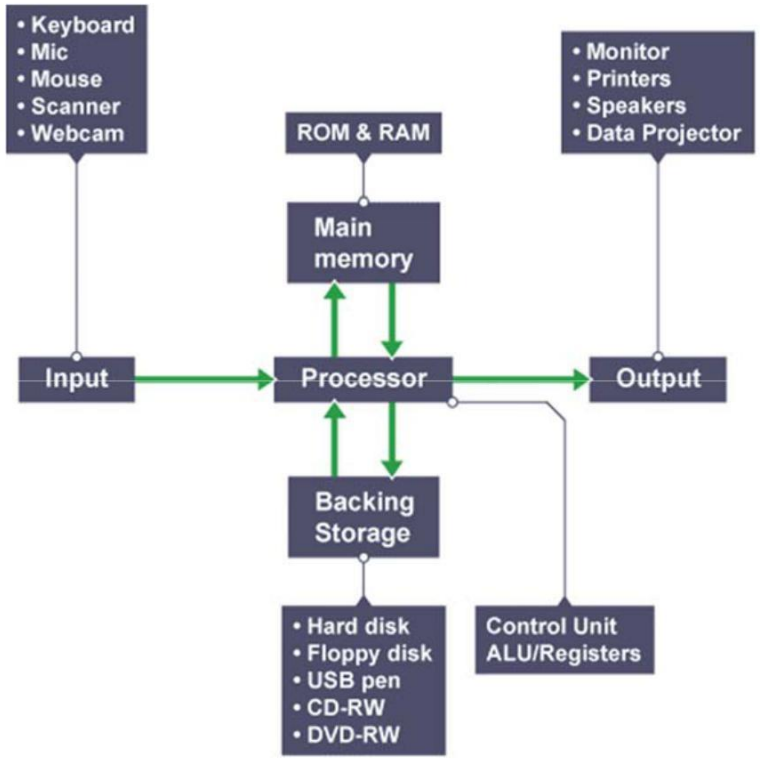
Use the information that follows to either test yourself on key words/phrases for each topic (using the look/cover/check technique) or create a mind map for each topic that contains key facts and images. Once you have created a mind-map you should put it away and try to recreate it from memory, then look at your original mind-map and add what you have missed.

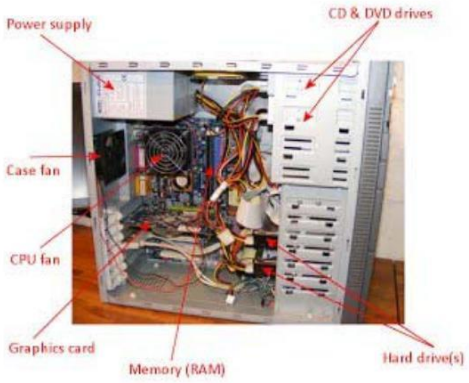


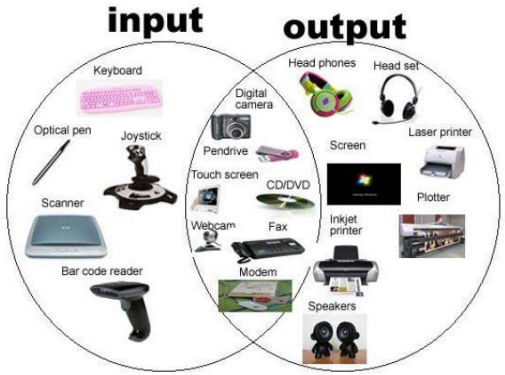
Computer Science
Unit 0 Hardware

Key vocab	
Hardware	Computer hardware is the physical parts or components of a computer
Peripheral	A peripheral device is any auxiliary device such as a computer mouse or keyboard that connects to and works with the computer in some way.
Input peripheral	A device that may be connected to a computer system. They are used to bring data from the physical world into the computer system.EG Mouse, touchscreen.
Output peripheral	A device that may be connected to a computer system. They are used to bring data from the computer into the physical world. EG A monitor or speakers.
Storage peripheral	A device which is used to store data & files on. EG CD, Memory stick.

Hardware	
BIOS	Basic Input Output System. A small program is stored on this ROM chip to load the operating system correctly.
CMOS Battery	Small battery used to keep track of the time when a computer is switched off.
CPU	Central Processing Unit. The device used to control and execute commands within the computer. The performance is measured in GHz, which is the number of processes which can be executed in 1 second.
GPU	Graphics Processing Unit. Used for processing of graphics, particularly used by gamers and graphic designers.
Hard drive	Area of storage used to retain documents and programs. A form of long term memory. Alternatives may include SSD or hybrid drives.
Motherboard	The motherboard connects all components to each other, which allows them to communicate.
PCI	An expansion port that allows a computers capabilities to be upgraded. Components that may be upgraded include GPU, sound cards and NICs.
PSU	Power Supply Unit. Converts mains AC to low-voltage DC power to power all components of a computer. Random
RAM	Access Memory, a place where data and instructions that are currently in use by the CPU or have recently been used are stored.





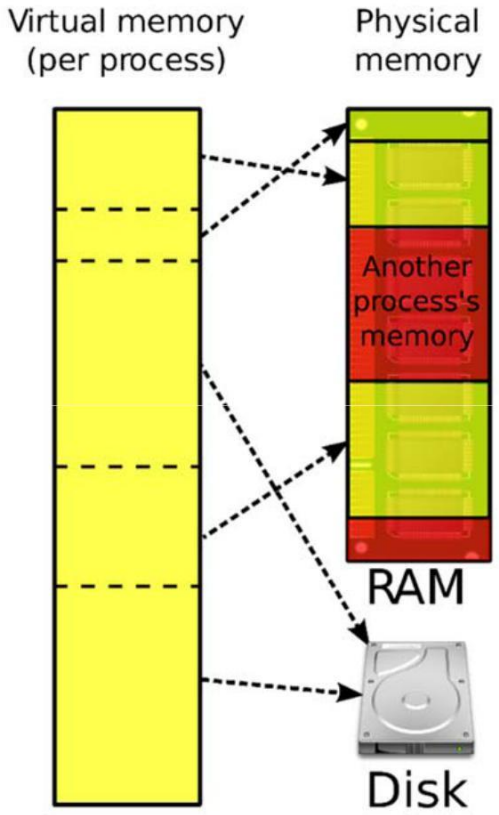


GCSE Computer Science
1.2 Memory

Key vocabulary	
Primary Memory	Memory used to store data and instructions that are required by the CPU.
RAM	Random Access Memory is volatile memory used to store data and instructions which are needed by the CPU. Also referred to as main memory.
Dynamic RAM	Contains 1 transistor and capacitor that hold charge briefly. This needs to be refreshed every few milliseconds.
Static RAM	Uses 5 transistors which are wired together to represent each bit. No need to be refreshed. More wiring per bit.
ROM	Read only memory. Used to store the boot sequence as this should never be changed. This memory is non-volatile.
Bootstrap loader	A small program that loads the operating system. Once the operating system is loaded it takes care of the rest.
Flash Memory	Electrons are forced into a layer between two barriers which hold the charge by using a high electric current.
Virtual Memory	When RAM is full, a section of the hard drive can be used to store programs and instructions.
Volatile	Storage which needs to have power to store data. If power is lost, data is lost.
Non-Volatile	Storage which does not lose its contents when the power is lost.

The CPU will first search for data in the Cache memory and then move further away until it finds what it is looking for. The further away from the CPU, the longer data will take to transfer.

RAM vs ROM	
RAM	**ROM**
Volatile memory	Non-volatile memory
Stores the user data / programs / part of the operating system that is currently in use.	Used to store the BIOS / bootstrap loader.
Memory can be written to or read from.	Memory can only be read from and not written to.



Computer Science
Secondary Storage

Key vocabulary	
Secondary Storage	A non-volatile storage medium which stores files and programs. Examples include the hard drive (HDD) and solid state drives (SSD).
Magnetic devices	Magnetic disks are read and written to with a moving head inside the disk drive. They often contain moving parts and are susceptible to damage. Magnetic devices can be either internal or portable.
Solid State devices	SSD has no moving parts. It retains an electronic charge using logic gates. Examples include SD cards and USB memory sticks. Also referred to as flash storage.
Optical devices	Optical media includes CD, DVD and Blu-Ray disks. Lasers are used to read and write data to a disk. Data is stored on tracks around the disk as a series of pits which represent binary code.
Cloud storage	Cloud storage refers to saving data in an off-site location maintained by another party. Examples include Dropbox, Google and Microsoft. This relies on having an internet connection to be able to upload and download files from a cloud server.

Comparing secondary storage	
Capacity	The amount of space that is available to store files. Generally measured in GB.
Speed	How quickly a computer can read and write data from a storage device.
Portability	How easy a device is to be transported. Some devices may be permanent hardware, others may be easier to transport.
Durability	Will the device withstand a certain amount of damage without corrupting files?
Reliability	The length of time that a device is expected to last for, how long will it retain functionality?
Cost	The cost of a device is compared in terms of cost per GB.

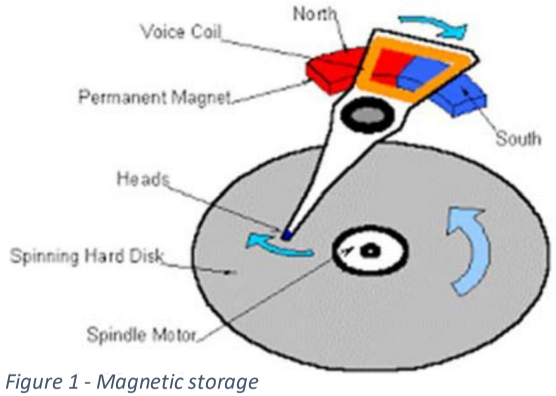


Figure 1 - Magnetic storage

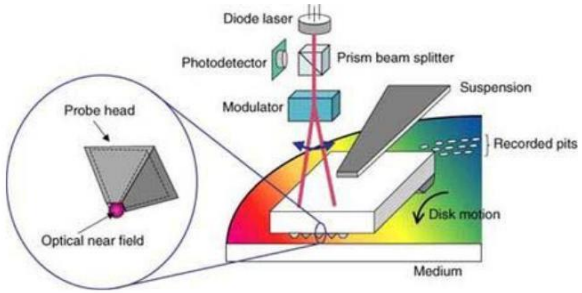


Figure 2 - Optical storage

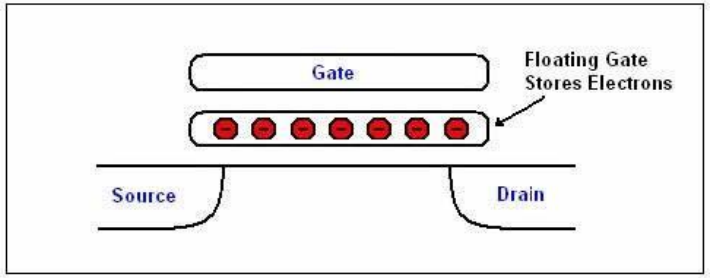


Figure 3 - Solid State storage

Computer Science
1.4 Wired and wireless Networks

NIC	Network Interface Controller. The component that allows a device to connect to a network, typical examples are WiFi and Ethernet.
WAP	Wireless Access Point. The point to which a wireless-enabled device connects to a network. It normally connects to or is built into a router.
Hub	The role of a hub is to allow communication between multiple devices in a network. They are used in LAN networks. Hubs will send a copy of the packets received to all devices on a network. When the devices receive packets they will either accept or reject them, they use the destination IP address to do this.
Switch	The role of a switch is to allow communication between multiple devices in a network. They are used in LAN networks. A switch will behave like a hub when it is switched on, however it will learn which devices are connected to which ports, and then send packets directly to the correct computer, saving bandwidth.
Router	A router is designed to route packets across wide area networks such as the internet. It will pass packets between other routers until the final destination is reached. Modern routers have built in WAP and switches.
UTP	Unshielded Twisted Pair. A cable used for providing fast data transmission and minimal interference. Relatively easy to install.
Coaxial Cable	Bulkier than UTP and less convenient to install.
Fibre Optic	A cable which transmits light at the speed of light to send binary code. Not subject to interference from neighbouring cables.
Wireless	A commonly used connection as it gives portability to devices and required minimal alteration to buildings. Easy to add new devices to the network.

Network	A collection of computer systems that are linked together and can share data.
Node	A device connected to a network via a link.
Links	The interface on which multiple devices can communicate. Such as a cable or wireless.
Client	A client is a piece of computer hardware or software that accesses a service made available by a server.
Server	A server is an instance of a computer program that accepts and responds to requests made by another program, known as a client.

LAN	A Local Area Network. All devices are connected on one site. The network may be in a single building or campus or group of buildings in a small area. Management and maintenance is usually completed by a group of network engineers.
WAN	A Wide Area Network. Typically covers a large geographical area, talking in many cities or worldwide. The connections are typically provided by a telecoms company such as BT. The largest example of a WAN is the internet. A WAN connects multiple LAN networks.
PAN	Personal Area Network. Personal devices are often connected to each other in a home or a car.
WLAN	Wireless LAN
MAN	Metropolitan Area Network. Devices are connected in a city. Not commonly used as many devices now use the internet.
SAN	Storage Area Network where multiple servers provide a large-scale storage facility.
VPN	Virtual Private Network. A part of the internet that is sealed off from public use and reserved for an organisation. It is not a physical network but behaves as one.

Computer Science
1.6 System Security Forms of Attack, Threats to Networks, Identifying Vulnerabilities

Cyber Security Risks	
Blagging	Knowingly or recklessly obtaining or disclosing personal data or information without the consent of the controller (Owner of data). EG Employees sharing passwords.
Hacking	Attempting to gain access to a system through cracking passwords.
Human Error	People are often the weakest part of security systems and criminals take advantage of human error and gullibility.
Malware	Software that can harm devices, which is installed on someone's device without their knowledge or consent. May be spread by email, messaging services or downloading infected files.
Phishing	Emails designed to appear as a reputable organisation to gain trust of users and harvest personal information.
Poor Network policy	Network policies are not always designed to provide maximum security. For example, a strong policy should recommend changing passwords regularly and ensure that the passwords used are strong.
Spyware	Secretly monitors user actions (eg. key presses) and sends info to a hacker.
SQL Injection	Exploiting a technique that exploits security weaknesses in websites. Achieved by inserting malicious code into a database field on a website such as a password field.
Trojan	Trojans are malware disguised as legitimate software. Unlike viruses and worms, Trojans do not replicate themselves – users install them not realising they have a hidden purpose.
Virus	Viruses attach (by copying themselves) to certain files. Users spread them by copying infected files and activate them by opening those files.
Worm	Worms are like viruses but they self-replicate without any user help, meaning they can spread very quickly.

Types of Hacking	
Brute Force Attack	An attack that runs through a list of different passwords or letters until access to an account is gained,
Denial-of-service	Where a hacker tries to stop users from accessing a part of a network or website, mostly by flooding the network with useless requests, making the network very slow or completely inaccessible.
Data Interception and Theft	Shouldering is attempting to look over someone's shoulder when using an ATM. Measures to reduce this risk include destroying paper documents when no longer needed, logging off or locking computers when not in use and locking rooms containing computers.
Forms of Network Attack	
Passive	Where someone monitors data travelling on a network and intercepts any sensitive information they find.
Active	When someone attacks a network, for example with malware.
Insider	When someone within an organisation exploits their network access to steal information.
Brute force	A type of active attack used to gain information by cracking passwords through 'trial and error'. Uses likely password combinations to gain access to user accounts.
Identifying and preventing vulnerabilities	
Network Forensics	Use of software for capturing, storing and analysing network events. The outcome is finding out communication between whom, when, how and how often.
Penetration (Pen) Testing	A strategy to identify security weaknesses including: -Gathering information about the target of possible attacks -Identifying possible entry points to the network -Attempting to break in -Report findings and respond.
Internal Pen Testing	Puts the tester in the position of an employee with standard access rights to the network to determine how much damage they could do.
External Pen Testing	May target servers within a business to see how easy they are to break and how it can be achieved.
Acceptable Use Policies (AUP)	Procedures and precautions which are in place to make network users aware of threats and the steps they must take when using the network.

Computer Science
1.6 System Security Preventing Vulnerabilities

Key Vocab	
Antimalware	Software designed to protect a computer in one of 3 ways: preventing installation of harmful software, preventing important files from being changed, scanning for virus activity on the system and removing as appropriate. Antimalware protects against worms, Trojan Horses, spyware, adware and keyloggers.
Antivirus	Software designed to protect against viruses.
Update	New malware is released regularly and so anti-malware definitions must be up-to-date to protect form the latest viruses.
Firewall	Hardware or software designed to prevent unauthorised access to or from a private network or intranet. All messages entering or leaving the network will pass through the firewall to be examined.
Password Protection	In a networked environment such as a school or a company, multiple users use many of the computers. Passwords should be strong (Not easy to guess, lower and uppercase letters, numbers, symbols).
Access Levels	Part of an access control procedure for computer systems, which allows a system administrator to set up a hierarchy of users. Thus, the low-level users can access only a limited set of information.
Encryption	Changing data before transmission so someone can only decipher it with the appropriate key to unlock information. Interceptors would find the message unintelligible.
Key	A cryptographic key is a string of bits used by a cryptographic algorithm to transform plain text into cipher text or vice versa. This key remains private and ensures secure communication.
Symmetric Key encryption	A secret key algorithm (sometimes called a symmetric algorithm) is a cryptographic algorithm that uses the same key to encrypt and decrypt data.
Asymmetric key encryption	Asymmetric cryptography, also known as public key cryptography, uses public and private keys to encrypt and decrypt data. The keys are simply large numbers that have been paired together but are not identical (asymmetric).

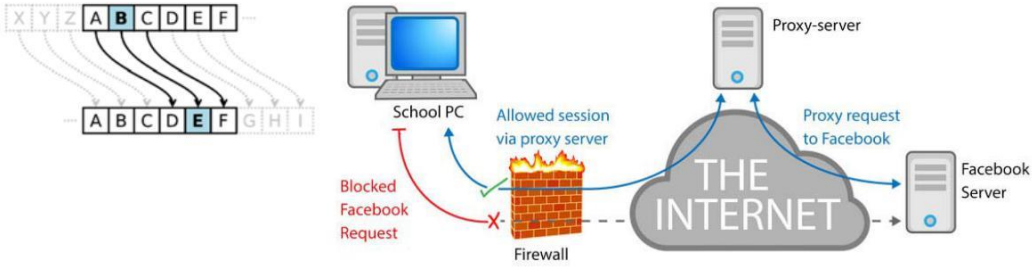


Figure 1 - A firewall sits on the edge of a network and chooses which traffic to allow through using a set of rules. As shown above the rules may not always be strong enough.

Symmetric encryption methods such as the Caesar cipher involve shifting letters along the alphabet.

Figure 3 –

Plaintext	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Ciphertext	F	O	X	A	B	C	D	E	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	W	Y	Z

Plaintext	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Ciphertext	B	C	D	E	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	W	Y	Z	F	O	X	A

Cipher to use in HW

Figure 2 - Keyword encryption involves using a keyword to begin filling up the alphabet, then the rest is filled with remaining letters.

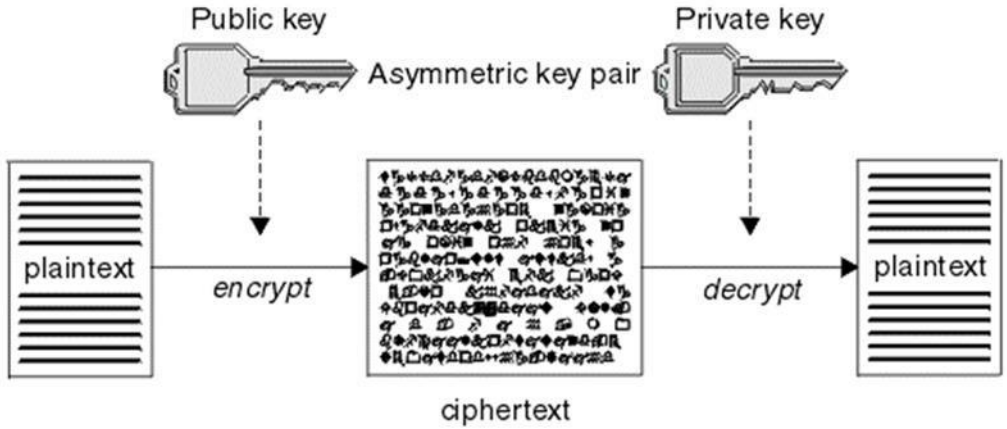


Figure 4 - Asymmetric key encryption uses public keys to encrypt data for somebody who then uses their private key to decrypt it.

Computer Science
2.1 Algorithms Pseudocode

Examples of pseudocode syntax and explanations	
`x = 5`	Declares a new variable called x and gives it a numerical value of 5
`name = "Bob"`	Creates a new variable called name and sets its value to "Bob"
`str(x)`	Casts the value in x to be a string value
`int(x)`	Casts the value in x to be an integer value
`float(x)`	Casts the value in x to be a float value
`print(name)`	Prints a variable to the screen
`print("Hello")`	Prints the given string in quotes to the screen.
`name = input("Please enter your name")`	An input from the user which asks them for their name and stores in a variable.

`for i = 0 to 7`
`  print("Hello")`
`next i`
	A count controlled loop which will print "Hello" 8 times (0-7 inclusive).

`while answer != "Computer"`
`  answer = input("What is the password?")`
`endwhile`
	A condition controlled loop which asks a user for a password until they correctly guess with "Computer".

`do`
`  answer = input("What is the password?")`
`until answer == "Computer"`
	A condition controlled loop which asks a user for a password until they correctly guess with "Computer".

`entry = input("Enter a selection")`
`if entry == "a" then`
`  print("You selected a")`
`elseif entry == "b" then`
`  print("You selected b")`
`else`
`  print ("Unrecognised selection")`
`endif`
	Selection can be carried out to identify certain situations within a program. The program here takes an input and prints different statements for the A and B selection.

`function triple(number)`
`return number * 3`
`endfunction`
	Creates a simple function to triple a number given as an input.

`array names[3]`
`names[0] = "Ahmad"`
`names[1] = "Ben"`
`names[2] = "Catherine"`
	Creates an array called names, the length is set to 3. Names are then added to the positions in the array.

GCSE Computer Science
2.2 Programming Techniques

`print('hello!')`	Prints a value on screen (in this case, hello!)
`input('')`	Inputs a value into the computer.
`x=input('')`	Inputs a value and stores it into the variable x.
`x=int(input(''))`	Inputs a value into x, whilst also making it into an integer.
`print(str(x))`	Prints the variable x, but converts it into a string first.
`if name == "Fred":`	Decides whether the variable 'name' ha a value which is equal to 'Fred'.
`else:`	The other option if the conditions for an if statement are not met (eg. name = 'Bob' when it should be Fred)
`elif name == "Tim"`	elif (short for else if) is for when the first if condition is not met, but you want to specify another option.
`#`	# is used to make comments in code – any line which starts with a # will be ignored when the program runs.
`for i in range(0,10):`	Loops any code indented after this line a certain number of times, in this case, 10.
`while x < 10:`	Loops any code indented after this line until the condition is met, in this case x becoming equal to or greater than 10.
`list = ['','']`	Creates a variable and makes it an array – a list which can store many values.

Python	A programming language which is quite close to English!
Programming	The process of writing computer programs.
Code	The instructions that a program uses.
Sequence	Parts of the code that run in order and the pathway of the program reads and runs very line in order.
Selection	Selects a pathways through the code based on whether a condition is true
Iteration	Code is repeated (looped), either ***while*** something is true or ***for*** a number of times
Algorithm	A set of rules/instructions to be followed by a computer system
Variable	A value that will change whilst the program is executed. (eg. temperature, speed)
Function	A collection of code that works outside the main program. These are created to speed up programming. They can be called from a single line of code at any time.
Comparative Operator	When comparing data, an operator is used to solve the equality such as <>, != or ==
Syntax	The punctuation/way that code has to be written so that the computer can understand it. Each programming language has its own syntax.
Data Type	This indicates how the data will be stored. The most common data types are integer, string, and float/real.
String	A collection of letters, numbers or characters. (eg, Hello, WR10 1XA)
Integer	A whole number. (eg. 1, 189)
Float/Real	A decimal number, not a whole number. (eg. 3.14, -26.9)
Boolean	1 of 2 values. (eg. True, False, Yes, No)
Variable.write	File.write("VariableName")
open	Open a text file
List	MyList = ["Apple","Fruit","Bannana","Parsnip"]

a	append	**w**	write	**r**	read

Computer Science
2.1 Algorithms Computational thinking skills

Key vocab	
Algorithm	A set of instructions which is followed to solve a given problem. Can be represented using a flowchart or Pseudocode.
Abstraction	Removing any unnecessary detail from a problem in order to solve it. Identifies the information that can be removed from the problem without changing it.
Decomposition	Breaking a large problem down with no known solution into smaller steps and stages.
Algorithmic thinking	Algorithmic thinking is a way of getting to a solution through the clear definition of the steps needed – nothing happens by magic.
Searching algorithm	An algorithm for finding values within a set of data.
Linear search	When a list is unsorted and an item needs to be found the algorithm will start at the beginning and move through until it finds the required value.
Binary search	If a list is sorted, an efficient search can be undertaken. It works by repeatedly dividing the set in half and checking where the value is in relation to the current one. It continues until the list has been fully checked or the search term found.
Sorting Algorithm	An algorithm used to sort a set of data into a given order. Examples include bubble sort, insertion sort and merge sort.
Sequencing	Writing steps down in an order in which they must happen.
Selection	Being able to select between different options or scenarios.
Iteration	Iteration is the act of repeating a process, either to generate an unbounded sequence of outcomes, or with the aim of approaching a desired goal, target or result.
Variable 	A value, which can change when a program is run. A variable is a memory location. It has a name that is associated with that location; the location stores some data.

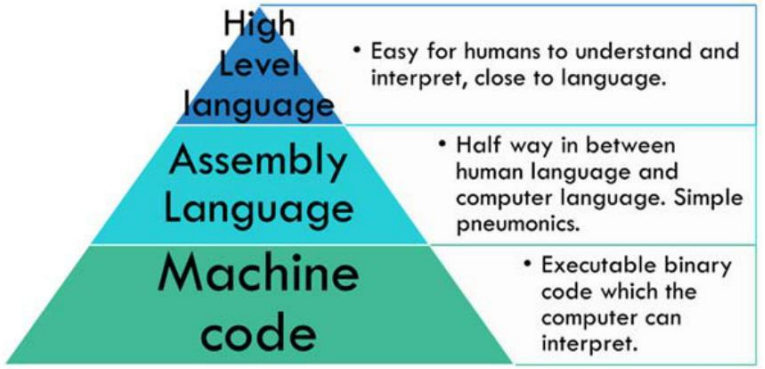
Data types		
Integer	A whole number, such a 3, -45, 108	2 or 4 bytes
Real / Float	A number with a fractional part such as 43.69, -9.32.	4 or 8 bytes
Char / Character	A single character where a character can be any letter, digit, punctuation mark or symbol that can be typed.	1 byte
String	Zero or more characters. A string can be null (empty), just one, or several character.	1 byte per character
Boolean	A Boolean variable has the value of True or False.	1 byte

Binary Logic Gate Diagrams		
Process	Input/Output	Start/Stop
	Manuel Input	Decision

Computer Science
Theory 2.5 – Translators and programming tools

Key Vocab	
Opcode	The part of an instruction that tells the CPU the operation to be Executed.
Operand	The part of the instruction that tells the CPU that data or which to Apply the opcode.
Translator	A program that converts source code (High level) to m code (Low Level).
High level code	Programming languages that are most like human language. They make programming easier because the programmer can concentrate on the logic of the program and not worry about the Hardware.
Low level code	Binary code that a CPU can execute.
Assembly Language	A low-level symbolic code made of pneumonic words converted by An assembler.
Assembler	A translator for converting assembly language code to object code.
Instruction set	The complete set of instructions that a processor can handle.
Source code	The program written in a high-level language before conversion to Machine code.
Object code	The machine code produced by a computer.
Compiler	Compiles work through the source code, spot certain errors and Translate all code into a machine code file called object code. Object Code is stored in a file to be executed.
Linker	A program used with a compiler or assembler to provide links to the Libraries needed for an executable program.
Interpreter	Interpreters work through the source code and translate it one Command at a time then immediately execute it. When errors are Found the process of execution will stop. (Like in Python).
Execution	The process of running a program.
Editor	A software used to write source code in a simple way. No frills.
Integrated Development Environment	A software tool that provides many of the utilities required to develop a program in one place. Common features may include an editor for a particular language, debugging tools, systematic progression through a program and a linker.
Run time environment	All the necessary facilities to run a program on a different platform, rather than creation of a program.

Programming Standards
Code should follow agreed conventions (EG Lowercase for variable names, schemes to be followed).
Language code is written in.
Functions used to tidy up repeated code.
Comments explain the code clearly.
Correct use of indentation.
Useful identifiers (File names & Variable names)
Code should follow agreed conventions



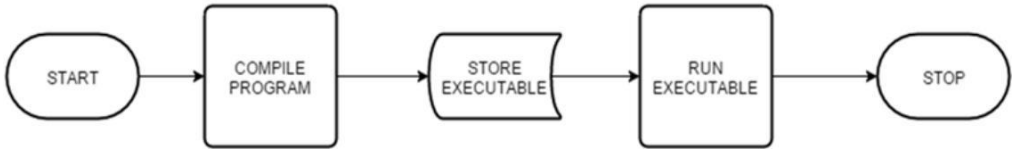


Figure 1 - How a compiler translates programs.

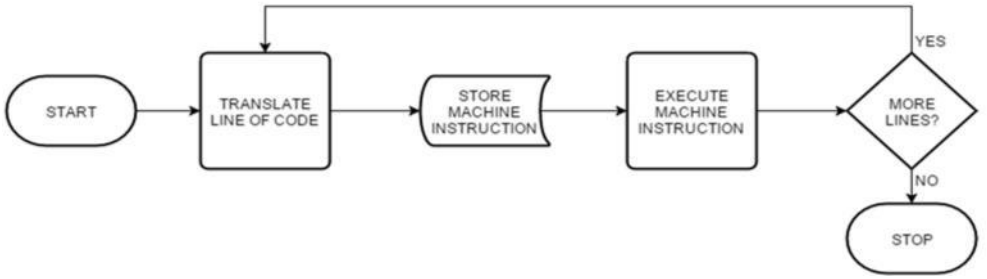
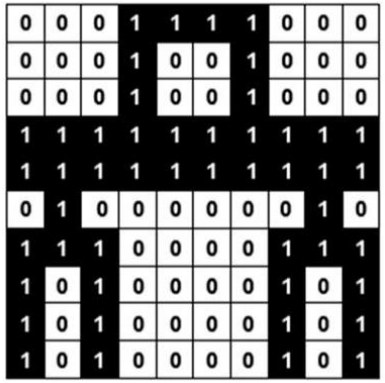


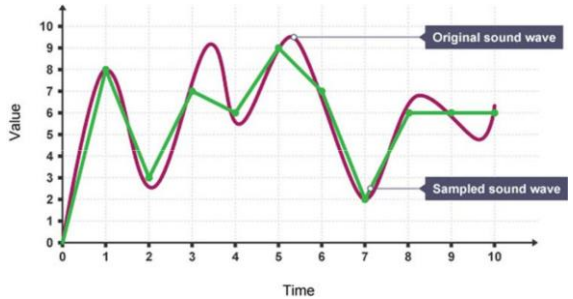
Figure 2 - How an interpreter translates programs.

Binary	Numbering system which uses base 2 (0s & 1s) – the only language that computers truly understand. 0 means off, 1 means on.
Denary	Numbering system which uses base 10 (0-9) – these are our normal numbers that we use every day. (Otherwise known as decimal)
Hexadecimal	Numbering system which uses base 16 (0-9 and A-F). These numbers are used to represent colours and code in assembly language, as they are easier for humans to understand than binary.
Binary addition	Adding binary numbers together (see rules of binary addition).
Overflow	If you cannot represent a number in the given amount of space (IE more bits are needed to represent a number), then this is an overflow error.
Binary Shift	Moving bits within a binary number in a certain direction. Any empty positions are filled with 0.
Check digit	An additional digit at the end of a string of numbers used to check for mistakes in transmission. ISBNs are formed of 12 bits for the item number, then the 13th is a check digit.

Bit	The smallest amount of data (stands for ***b****inary dig****it***) (0 or 1).
Byte (B)	8 bits
Kilobyte (KB)	1024 bytes
Megabyte (MB)	1024 kilobytes
Gigabyte (GB)	1024 megabytes
Terabyte (TB)	1024 gigabytes
Petabyte (PB)	1024 terabytes



Binary Addition	
0+ 0	= 0
0+ 1	= 1
1+ 0	= 1
1+ 1	= 0, carry a 1
1+ 1 + 1	= 1, carry a 1

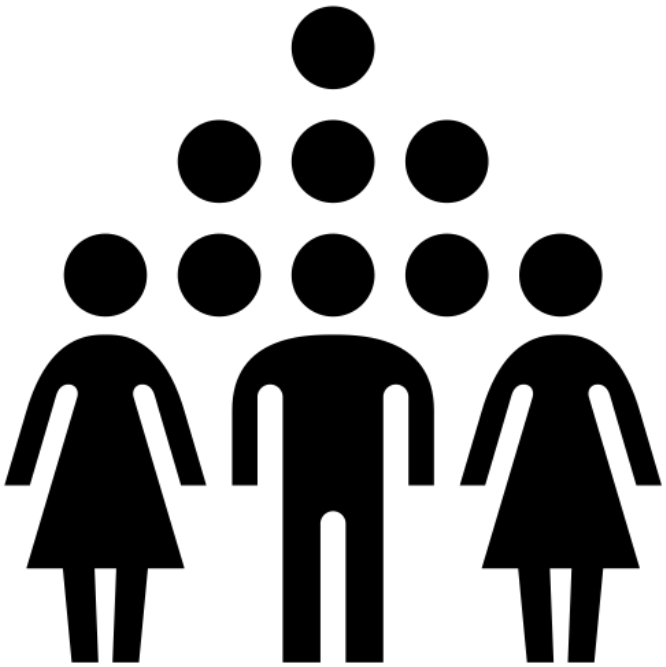


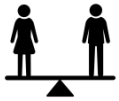
Character	A single letter, number or symbol. (e.g., A, 1, !)
Character set	A set of characters used in a language, which are each represented using a unique binary number.
ASCII	A character set which uses 7 bits to store a maximum of 128 characters. This uses the binary numbers 0 to 127.
Extended ASCII	The same as ASCII, though uses 8 bits (1 byte) to represent 256 characters using the numbers 0 to 255.
Unicode	The modern standard for representing characters in a computer system. Uses 16 bits to allow 65,536 characters to be represented.
Image	A picture that has been created or copied and stored in electronic form.
Bitmap	A map of bits, whereby the image is made of pixels.
Vector	An image represented using lines and shapes with specific properties such as line and fill colour. Data about each shape is stored in binary.
Pixels	The individual units (dots) that make up an image.
Colour depth	The number of bits, which are used to represent each pixel in an image. Increased numbers of colours means more bits are needed.
Resolution	The level of detail in an image, measured in dots per inch (dpi). If the size of an image is increased then the quality will reduce.
Metadata	Data, which is stored about a file. Examples include the type of file, date and time created, file size and geolocation.
Sampling	Method of converting an analogue sound signal into a digital file containing binary numbers.
Sample rate	The frequency at which you record the amplitude of a sound. Measured in Hertz.
Sample resolution	The number of bits used to store each sample.
Sample size	The number of seconds over which the sample was taken.
Compression	The re-encoding of data so that less bits are used to store it. Usually done to increase speed of transmission.
Lossy	Removes data completely to reduce the size of a file (eg. JPG).
Lossless	Organises data to reduce the size of a file without removing any information (eg. ZIP).

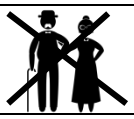
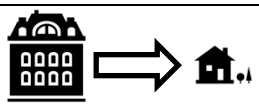
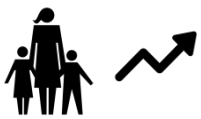
128	*64*	*32*	*16*	*8*	*4*	*2*	*1*

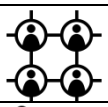
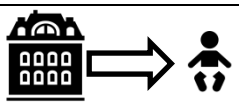
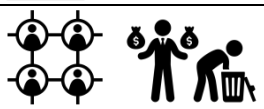
SOCIOLOGY

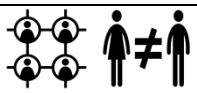
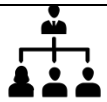
Use the information that follows to either test yourself on key words/phrases for each topic (using the look/cover/check technique) or create a mind map for each topic that contains key facts and images. Once you have created a mind-map you should put it away and try to recreate it from memory, then look at your original mind-map and add what you have missed.



FAMILIES – KNOWLEDGE ORGANISER – FAMILY FORMS AND CONJUGAL ROLES		
FAMILY FORMS		
NUCLEAR FAMILY		A **heterosexual** couple and their children living together.
EXTENDED FAMILY		**Relatives** outside of the nuclear family (e.g. grandparents, aunts etc).
RECONSTITUTED FAMILY		A **blended or step family** that includes children from previous relationships.
LONE PARENT FAMILY		A family with **one parent.**
SAME SEX FAMILY		A family where a **gay or lesbian couple** live with their children.
EMPTY NEST FAMILY		A nuclear family where the **children have left home**.
BEANPOLE FAMILY		A multi-generational, extended family
THE RAPOPORTS'S 5 TYPES OF DIVERSITY IN UK FAMILIES		
CULTURAL DIVERSITY		1. Families are different in their **culture, values and beliefs**.
LIFE COURSE DIVERSITY		2. Families are different in the **stage that they are at** (e.g. newly married compared to an **empty nest** family).
ORGANISATIONAL DIVERSITY		3. Families are different in the way they are **organised** (e.g. **nuclear** compared to **reconstituted** or **lone parent**).
GENERATION/ COHORT DIVERSITY		4. Families are different depending on **the year they were born** (e.g. couples married in the 1950s often expected marriage to last for life).
SOCIAL CLASS DIVERSITY		5. Families are different in their **social classes and wealth.**
CONJUGAL ROLE RELATIONSHIPS		
CONJUGAL ROLES		**Segregated conjugal roles** are when there is a clear division of domestic labour and tasks are divided by gender. This was normal in the early 20th century.
		**Joint conjugal roles** are when there is no rigid division of household tasks into male and female jobs. Some sociologists suggest that conjugal roles are becoming more **joint**.
		**Symmetrical families** are when spouses perform different tasks but men and women share household responsibilities equally. Some sociologists, such as Young and Willmott, argue that over time families in Britain are becoming more **symmetrical.**
THE FEMINIST PERSPECTIVE OF OAKLEY ON THE IDEA OF THE CONVENTIONAL FAMILY.		Oakley defines the conventional family as a **nuclear family where the male and female parents are married and live with their children (aka cereal packet family)**. She considered the conventional family to be a form of **social control** and that women often have a **dual burden** (meaning they go out to work but also do the majority of the housework and childcare). However, she noticed that **other forms of family are becoming increasingly popula**r, such as lone parent or same sex families.

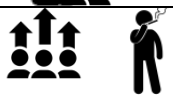
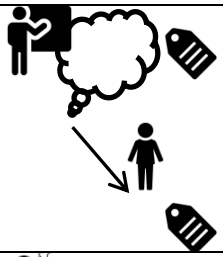
FAMILIES – KNOWLEDGE ORGANISER – CHANGING FAMILIES		
CHANGING RELATIONSHIPS WITHIN FAMILIES		
HOW RELATIONSHIPS WITHIN FAMILIES HAVE CHANGED OVER TIME.		1. Children's **needs and rights** are more widely recognised.
		2. People see their **extended family much less**.
	 	3. The extended family are still important but that their role is more likely to take the form of **phone calls and financial help**.
THE PRINCIPLE OF STRATIFIED DIFFUSION.		Young and Willmott developed the theory of **stratified diffusion.** This is the idea that **changes in norms and values start amongst the wealthier people in society** and then over time others start to behave in the same way.
CHANGING PATTERNS IN UK MARRIAGE AND DIVORCE SINCE 1945		
CHANGING PATTERNS IN MARRIAGE		1. There are **fewer marriages** and more people are **cohabiting.**
		2. An **increasing number of babies are born to couples who aren't married** and these births are no longer stigmatised.
		3. **Civil partnerships** for same sex couples have been legal since 2005, while **same sex marriage** was introduced in 2014.
		4. People are **putting off marriage until they are older.**
CHANGING PATTERNS IN DIVORCE		The number of **divorces per year has increased** since 1945 although there have been times when it decreased and the number peaked in 1993.
THE CONSEQUENCES OF DIVORCE		1. There has been an **increase in lone parent and reconstituted families**.
		2. Some **children lose contact with parents** or extended family following a divorce.
		3. Divorce can lead to **loss of income** for the former partners.

	 4. Divorced people, particularly men, may experience **a loss of emotional support** if their friends and social networks change.
FAMILIES 3 – KNOWLEDGE ORGANISER – PERSPECTIVES ON FAMILIES	
FUNCTIONALIST PERSPECTIVES ON FAMILIES	
THE FUNCTIONALIST PERSPECTIVE 	**Nuclear families** are positive both for individuals and society because
	 1. They control **sexual activity**
	 2. They encourage **reproduction**
	 3. They ensure that children are **socialised**
	 4. They help to maintain the **economy** because the work is split between the husband and wife in **their conjugal roles.**
PARSONS (FUNCTIONALIST) ON THE TWO MAIN FUNCTIONS OF THE FAMILY	 1. The nuclear family supports **primary socialisation,** ensuring the children learn the **culture** and **values** of their society.
	 2. The nuclear family also supports **personal stabilisation for the adults.** This means that the adults support each other emotionally if their lives are stressful (aka '**warm bath' theory**).
CRITICISMS OF FUNCTIONALIST PERSPECTIVES ON FAMILIES	
UNREALISTIC IDEALISATION	 Functionalists such as Parsons have an **unrealistic idea of 'perfect' families**. The reality is usually more complicated.
DYSFUNCTIONAL FAMILIES	 Functionalists ignore **dysfunctional families and marital breakdown** where there might be **conflict, child abuse, stress and domestic violence.**
LOSS OF TRADITIONAL FUNCTIONS	 Functionalist views are no longer relevant and are based on an **outdated, traditional view of families**. Families now are much more diverse.
LACK OF CONTACT WITH WIDER KINSHIP NETWORKS	 In the past families used to maintain close contact with the extended family. Nowadays people move around more and so **often don't have much contact with the extended family.**
MARXIST PERSPECTIVES ON FAMILIES	
THE MARXIST PERSPECTIVE 	Marxists are usually **critical** of the nuclear family because
	 (1) **They keep society unequal** (e.g. the bourgeoisie send their children to private schools and pass their wealth and property on to them)
	 2) **Through primary socialisation working class children learn to accept their position** in an unfair, capitalist society.

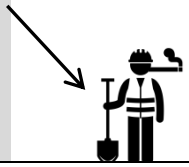
ZARETSKY'S MARXIST PERSPECTIVE ON THE DEVELOPMENT OF FAMILIES		The family was originally a unit of production (e.g. **all members of the family worked together)** but now **there is a split between the 'private sphere' and wor**k. This means that **women are expected to work for free** (e.g. cleaning and childcare) while **men go to work to support the economy**. Only socialism can end this artificial separation.
FEMINIST PERSPECTIVES ON FAMILIES		
THE FEMINIST PERSPECTIVE 	Feminists are usually **critical** of the nuclear family because	
		Through **primary socialisation** families help to **reproduce gender inequalities.** The word **canalisation** describes how parents channel children towards gendered toys and activities e.g. girls get dolls, boys get action figures.
DELPHY AND LEONARD'S FEMINIST CRITIQUE OF FAMILIES		The family is **patriarchal.** Men benefit from the **unpaid work of women** even when women have jobs they still do most of the housework.
		The family is **hierarchical**. The husband usually has more power and makes most of the decision.

EDUCATION – KNOWLEDGE ORGANISER – TYPES OF EDUCATION AND PERSPECTIVES		
TYPES OF SCHOOL AND SCHOOLING		
FORMAL EDUCATION		Takes places in educational establishments such as schools and universities.
INFORMAL EDUCATION		Takes place when people learn from their everyday life.
PRIMARY		Schools for children aged 5-11
SECONDARY		Schools for children aged 11-16. Includes comprehensive schools, free schools, special schools and academies.
INDEPENDENT SCHOOLS		Fee paying schools. These include private schools and public schools (older fee paying schools). Around 7% of English schoolchildren attend independent schools.
STATE SCHOOLS		State schools do not charge fees. Their intake is more socially mixed.
HOME SCHOOLING		Children are taught at home by parents or tutors.
DE-SCHOOLING		Illich argues that schools repress children and promote passive conformity. He argues that education should be abolished and that children should be able to decide what to learn based on their natural curiosity.
FORMAL CURRICULUM		The content of the planned lessons that learn at school.
HIDDEN CURRICULUM		The unintended lessons that children learn at school. These can be through the school rules, things that happen at break times etc.
PERSPECTIVES ON EDUCATION		
FUNCTIONALIST PERSPECTIVE		1. **Education serves the needs of the economy**. It gives people the knowledge and skills that people will need for work.
		2. **Education facilitates social mobility.** Gifted students from disadvantaged backgrounds can achieve qualifications and move up to a higher social class.
		3. **Education fosters social cohesion**. Schools help to reinforce the social bonds, norms and values that unite different people in society.
DURKHEIM'S FUNCTIONALIST PERSPECTIVE		The main function of education is **socialisation;** teaching children the norms and values of their society. Through history, for example, children learn that they are part of a community. By following school rules, children learn the difference between right and wrong
PARSONS FUNCTIONALIST PERSPECTIVE		The education system helps society to be **meritocratic.** Children are successful because of their abilities and effort not their family background. **Education acts like a sieve**, grading students and allocating them to jobs based on their abilities (this is known as their **achieved status**).
MARXIST PERSPECTIVE		1. **Education serves the interests of the ruling class**. For example, it promotes the idea that capitalist society is fair and meritocratic.

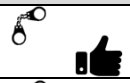
		2. **Education reproduces the class structure**. Children from privileged backgrounds are more likely to leave with better qualifications and get better jobs.
		3. **Education is a form of negative secondary socialisation.** Children learn to accept hierarchy and obey rules which prepare them to accept their role in a capitalist society.
BOWLES AND GINTIS'S MARXIST PERSPECTIVE		Bowles and Gintis use the term **correspondence principle** to describe the way that education (through the hidden curriculum) **trains children for life in the capitalist system** and prevents rebellion or revolution. School and work, for example, both involve uniforms, strict time-keeping, hierarchy, rewards, punishments, boring tasks etc.
EDUCATION – KNOWLEDGE ORGANISER – ACHIEVEMENT		
SOCIAL CLASS AND EDUCATIONAL ACHIEVEMENT		
SOCIAL CLASS		In general, **middle class students achieve better exam results than working class students.**
HALSEY'S STUDY ON EDUCATIONAL DESTINATIONS	 	Halsey, Heath and Ridge researched the educational destinations of school children. They conducted a large, fact to face study that divided people into three social classes based on their father's occupation; service class (e.g. professionals such as doctors), intermediate class (e.g. office workers) and working class (e.g. manual labourers). **Children born into the service class did much better at school and were more likely to go to university than the intermediate class and both did better than the working class.**
EXPLANATIONS FOR CLASS DIFFERENCE		1. **Economic circumstances:** Students from affluent backgrounds usually have the facilities to help them study (space, PC etc), parents often employ tutors and live in the catchment areas of good schools.
		2. **Parental values:** Parents from the upper and middle classes often value education and expect their children to do well. Parents from the working class might be less interested or have lower expectations.
		3. **Cultural Capital:** Middle class parents often have the knowledge and skills to be able to help their children with school work and revision.
BALL'S STUDY ON PARENTAL CHOICE	 	Ball, Bowe and Gewirtz argue that the publication of league tables has led **increased competition between schools**. However, **middle class parents have an advantage in this competition** because they can afford to move to good schools or to pay for their children to travel further to those schools.
GENDER AND EDUCATIONAL ACHIEVEMENT		
GENDER		In general, **girls do better than** boys in both GCSEs and A levels than boys.
		Girls are more likely to study subjects such as English and Art at A level, whereas boys are more likely to study physics and maths.
EXPLANATIONS FOR GENDER DIFFERENCES		1. **Women's rights:** Changes to the law have made gender discrimination in education illegal. Feminism has meant that girls now are expecting to get a job and be financially independent.
		2. **Anti-school sub-culture amongst boys:** Peer pressure may encourage boys to see school and educational success as 'uncool'.
		3. **Gendered curriculum:** The hidden curriculum encourages the perception that some subjects are masculine whilst others are feminine.
ETHNICITY AND EDUCATIONAL ACHIEVEMENT		

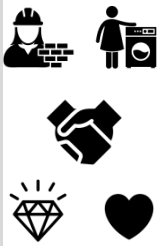
ETHNICITY		In general, **students from some minority ethnic groups** (e.g. Chinese) **achieve better exam results than others** (e.g. Black Caribbean).
EXPLANATIONS FOR ETHNICITY DIFFERENCES: HOME FACTORS		1. **Economic circumstances:** Students from some minority ethnic groups (e.g. Black Caribbean) are more likely to experience material deprivation than those from others.
		2. **Parental values:** Some ethnic minority parents (e.g. British Chinese) are more likely to value education and educational success.
		3. **Cultural capital:** White, middle class parents often have the knowledge and skills to be able to help their children with school work and revision.
EXPLANATIONS FOR ETHNICITY DIFFERENCES: SCHOOL FACTORS		1. **Ethnocentric curriculum:** The idea that the formal curriculum is biased towards white, European culture
		**2. The hidden curriculum:** The hidden curriculum emphasises white, mainstream norms and values (e.g. school uniform policy).
		3. **Institutional racism:** When the policies and procedures of an organisation result in discrimination. Some people argue that the high rate of fixed-term exclusions of Black Caribbean boys is evidence of institutional racism in schools.
EDUCATION – KNOWLEDGE ORGANISER – PROCESSES WITHIN SCHOOLS		
STREAMING		**Students are allocated to a band based on their overall ability** and are taught in this band for most of their subjects.
THE EFFECTS OF STREAMING		1. **Promotes class differences in achievement:** A disproportionately high number of lower stream students are drawn from the working class.
		2. **Creates an anti-school sub-culture:** In response to being labelled as failures, some lower stream students reject the school's values and rules.
SETTING		**Students are allocated to a class based on their achievement in that subject**. They will be taught in different classes for different subjects.
THE EFFECTS OF SETTING		Students are often set because of their behaviour rather than their achievement. Students are often not moved up or down a class for practical reasons (e.g. class size).
MIXED ABILITY TEACHING		Students are taught in **mixed ability classes.**
LABELLING AND THE SELF-FULFILLING PROPHECY		**Negative labelling of students can lead to a self-fulfilling prophecy**. For example, students who are told that they are low ability in maths come to believe that and give up more easily in maths lessons.
THE INTERACTIONIST PERSPECTIVE		Interactionism focuses on small-scale interactions between teachers and students. Research suggests that **teachers label students based on factors such as their appearance, gender, ethnicity and how well they conform to the school's rules, norms and values.**
BALL ON TEACHER EXPECTATIONS		Ball undertook a case study of streaming in a secondary school. **Some students changed their behaviour over time as a result of teacher expectations.** For example, teachers expected students in the 'top' band to be well-behaved and hard working and students in the 'bottom' band to be slow to complete work and poorly behaved. Over time, students' behaviour began to mirror these expectations.
THE KEY IDEAS OF WILLIS ON THE CREATION OF COUNTER SCHOOL CULTURES.		Willis carried out a study of 12 working class boys ('lads') in a single sex school. He used qualitative methods to explore their counter-school culture. They resisted the school and its rules and focussed on 'dossing' ad 'having a laff.' They saw the more conformist boys as 'cissies.' They saw manual work as masculine and white collar work as effeminate. Willis followed the 'lads' into their jobs and argues that the **anti-school culture**

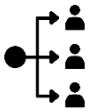
prepared them for working class jobs where they adopted similar attitudes.

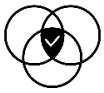


CRIME AND DEVIANCE – KNOWLEDGE ORGANISER – KEY TERMS AND PUBLIC DEBATES		
KEY TERMS		
CRIME		Actions that break the criminal law e.g. burglary, murder, identity theft etc.
DEVIANCE		Actions that do not conform to society's norms. Deviant behaviour is socially defined and varies between cultures and over time.
SOCIAL ORDER		The way in which various components of society work together to keep society as it is.
TWO PERSPECTIVES ON SOCIAL ORDER		**Consensus perspectives** such as **functionalism** argue that social order is maintained because most people agree with society's norms and rules.
		**Conflict approaches** such as **Marxism** argue that social order is maintained because one group (e.g. the bourgeoisie) have the power to influence the laws and maintain order through social control.
FORMAL SOCIAL CONTROL		The ways that the state controls people's behaviour based on **laws and written rules.**
INFORMAL SOCIAL CONTROL		The way that people's behaviour is controlled based on **unwritten rules and sanctions** such as pubic approval or disapproval. It is enforced via **peer and social pressure.**
AGENCIES OF SOCIAL CONTROL		**Groups that help the state to control people's behaviour**. These include families, schools, the police, courts, prison service, probation service etc.
ANOMIE		When a society's **norms and values disintegrate or disappear**.
LABELLING THEORY		The theory that **people often behave in ways that reflect how others have labelled them.**
INSTITUTIONAL RACISM		When an organisation discriminates against an ethnic group through its processes, attitudes and behaviour. The Macpherson report into the death of Stephen Lawrence concluded that the Police were institutionally racist.
SUBCULTURE		A group that has **norms and values that are different to mainstream society** and that often cause or influence illegal/deviant behaviour e.g. gangs.
WHITE COLLAR CRIME		**Non-violent, financial crimes** such as tax evasion, fraud, bribery etc. They are **usually committed by businesses/governments** and are underreported.
FOLK DEVIL		A media created **villain or enemy of society**.
MORAL PANIC		An **over exaggerated public response** to some social issue that relates to right and wrong.
PUBLIC DEBATES OVER CRIMINAL AND DEVIANT BEHAVIOUR		
MEDIA COVERAGE		The media decide what is 'newsworthy' and exaggerate certain types of crime (**deviancy amplification)** which in turn influences politicians**.**
VIOLENT CRIME		**Violent crime (e.g. knife crime) gets a high profile** in the media and therefore the public become concerned about it and politicians feel that they have to do something about it.
SENTENCING		Some people believe that **prison sentences are too sof**t and that many prisoners get released too early. There is also the question of whether some crimes deserve a prison sentence at all.
TREATMENT OF YOUNG OFFENDERS		There has been large a rise in **violence, sexual abuse, suicide and self harm in youth prisons** (e.g. Feltham) and some people want them to be closed down.
FOLK DEVILS AND MORAL PANICS		The interactionist Cohen argues that the media often portray an oversimplified version of events that creates a **folk devil** (e.g. drill music). These oversimplified versions of events can lead to a **moral panic.**

CRIME AND DEVIANCE – KNOWLEDGE ORGANISER – PERSPECTIVES ON CRIME AND DEVIANCE		
FUNCTIONALIST PERSPECTIVE		1. **A limited amount of crime is necessary** for society to improve. All social change begins with some sort of deviance
		2. **Crime has some positive functions**, such as emphasising the boundaries of acceptable behaviour and binding communities together (e.g. when they condemn a horrific crime)
		3. **Crime and deviance often occurs when children are inadequately socialised.** If children don't learn the norms and values of society they are more likely to deviate from them.
MERTON'S STRAIN THEORY		The functionalist Merton argues that **crime occurs when people can't achieve the goals that they have been socialised to strive for** (e.g. wealth) through socially acceptable means. This leads to **anomie** and high rates of crime.
INTERACTIONIST PERSPECTIVE		Interactionists argue that **crime and deviance are socially constructed** and that people in power label certain people as deviant and they then are more likely to commit crime.
BECKER'S LABELLING THEORY		The interactionist Becker argues that what makes something deviant is not the act itself but how people label it. For example, killing someone is usually deviant but not during a war. Through **informal social control** labels stick and become part of someone's **master status** (the way they see themselves), leading to a **deviant career** and perhaps to someone becoming part of a **deviant subculture.**
MARXIST PERSPECTIVE		Marxists argue that **capitalism is criminogenic (it causes crime)**. It encourages people to want and value material possessions but exploits the working class so that they can't afford them. It is inevitable that **the working class will commit crime to try and get material possessions or express their frustration with the system.**
		A**gencies of social control** act in the interests of the bourgeoisie and **target certain types of crime** that are more likely to be committed by the working class (e.g. knife crime rather than **white collar crime**). This is called **selective law enforcement.**
FEMINIST PERSPECTIVE		The feminist perspective examines the way that women are treated by society. Many **crimes against women such as rape or domestic violence are under reported** and have a low conviction rate.
		Some sociologists believe that women are sometime treated more leniently by male police officers, juries and judges. This is known as the **chivalry thesis.**
		When women commit certain crimes (e.g. crimes against children) the **double deviance thesis** suggests that they will receive a harsher punishment because they have broken gender norms as well as the law.
HEIDENSOHN ON FEMALE CONFORMITY		The feminist Heidensohn uses **control theory** to explain why women have lower rates of recorded crimes than men. She argues that **women are controlled by men**, leaving them with fewer opportunities to commit crime. For example, **girls are controlled by their fathers** and have to be home earlier than boys, **women are often controlled by male managers or supervisors and many women do not go out at night because they are afraid of male violence.**

FACTORS AFFECTING CRIMINAL AND DEVIANT BEHAVIOUR		
SOCIAL CLASS		Official crime statistics indicate that **working class people are more likely to commit crime than other classes** and they are over represented in prisons.
GENDER		Official crime statistics indicate **that females are less likely to offend than males.**
ETHNICITY		Crime statistics shows that **members of some ethnic groups (e.g. Black African/Caribbean) are more likely to offend than others.**
AGE		Crime statistics indicate that **young people (15-19) are more likely to commit crime than older people.**
ALBERT COHEN ON STATUS FRUSTRATION & DELINQUENT SUBCULTURES		Cohen argues that **working class boys often underachieve in school** due to the middle class norms and values and so suffer from **status frustration.** They therefore join a **subculture** (e.g. a gang) where they can achieve status in other ways. In these subcultures they learn to be **delinquent** and commit crime.
CARLEN ON WOMEN, CRIME AND POVERTY		Carlen interviewed 39 women to investigate why women commit crime. She suggests that working class women often don't commit crime because they have made a '**class deal'** and a '**gender deal'** with society. The **class deal** is that they will be able to buy goods if they work hard. The **gender deal is** that they should do domestic labour in return for love and financial support from a male partner. Carlen argues that both of these deals are actually exploitative but give women the illusion of fairness. However, **if working class women believe that these deals have been broken they are more likely to commit crime.**
CRIME DATA		
OFFICIAL CRIME STATISTICS		Crimes that are recorded by the **police and courts**. Available on the internet but do not always provide an accurate picture of actual crimes committed as not all crimes are **reported and recorded.**
VICTIM SURVEYS		**Victim surveys ask people about their experiences of crime** (e.g. CSEW: Crime Survey for England and Wales). These provide data about crimes that are not recorded by the police but do not cover all crimes (e.g. murder).
SELF-REPORT STUDIES		**Self report studies ask people about the crimes they have committed** (e.g. OCJS: Offending, Crime and Justice Survey). These provide information on some crimes that are not recorded by the police (e.g. vandalism) but are unlikely to reveal much about more serious crimes as people are unlikely to self-report them.
PATTERNS AND TRENDS		The CSEW shows that **UK crime has been falling steadily for the last 20 years**. However, **there has been an increase in online crimes** and there is a **growth in serious violence**, particularly in urban areas like London and Manchester.
THE 'DARK FIGURE' OF CRIME		**The dark figure of crime includes all of the crimes that are not recorded**. This could be for a number of reasons (e.g. fear of reprisal, crime committed by family member, the victim is not aware that the act was a crime).
LABELLING THEORY		**Behaviour becomes deviant when people such as police officers define it as deviant.**
FEMINIST PERSPECTIVE		Many crime statistics, particularly police recorded crimes, **under represent crimes against women such as domestic violence.**
MARXIST PERSPECTIVE		Many crime statistics, particularly police recorded crimes, **under represent white collar crimes such as tax evasion.**

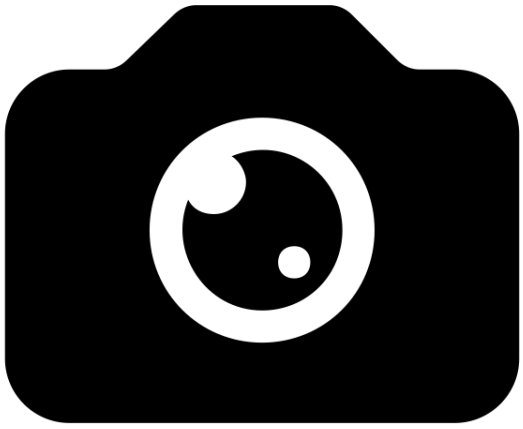
SOCIAL STRATIFICATION KNOWLEDGE ORGANISER		
KEY TERMS		
SOCIAL STRATIFICATION		The division of society into a **hierarchy** of unequal social groups
SLAVERY		A system of **social stratification** in which some people are owned by others
SOCIAL MOBILITY		Movement up or down the **social hierarchy**
CLOSED SOCIETY		A society in which no **social mobility** is possible
OPEN SOCIETY		A society in which **social mobility** is possible
MERITOCRACY		A society in which success and status depend on individual talents and effort
SOCIO-ECONOMIC CLASS		**Social class is the main form of stratification in the UK today**. It consists of broad groups of people (classes) who share a similar social and economic situation such as occupation and wealth.
COMMUNISM		A society without any **hierarchy** where the **means of production** (factories and shops) are owned by everyone
PERSPECTIVES ON SOCIAL STRATIFICATION AND SOCIO-ECONOMIC CLASS		
DAVIS AND MOORE: FUNCTIONALIST PERSECTIVE		The functionalists Davis and Moore argued that social stratification is **functionally necessary** in every human society because it helps **role allocation**. They argue that some roles in society are more **functionally important** than others (e.g. surgeons and lawyers). Social stratification means that the most talented and motivated people will be attracted to the more **functionally important** roles because they have greater rewards.
FEMINIST PERSPECTIVE		**Social stratification enables patriarchy**. Nurses, for example, are just as important as doctors but they get paid less because they are mostly women.
MARXIST PERSPECTIVE		**Marx argued that there are two main classes in capitalist society**; the bourgeoisie and the proletariat. The bourgeoisie own the **means of production** (factories and shops) and exploit the proletariat. The proletariat don't realise that they are being exploited because of **false class consciousness**, which leads them to believe that capitalist society is fair. Marx believed there will be a revolution where the proletariat seize the means of production and establish a classless society **(communism).**
WEBER'S PERSPECTIVE		Weber agreed with Marx that property ownership and wealth are important features of social class. However, he argued that **non-economic factors such as social status and power are also importan**t and help determine a person's life chances. For example, an aristocrat may be poor but still have high social status
LIFE CHANCES IN THE UK		
LEGISLATION		There are several laws in this country that make it illegal to discriminate against people at work. For example the **Equal Pay Act (1970**) and the **Equality Act (2010).**
SOCIAL CLASS		Working class people are far less likely to get into high paid jobs and professions than middle class and upper class people.
GENDER		Men are on average paid 20% more than women (known as the **gender pay gap**), some jobs are still dominated by men and women still do most of the domestic work and childcare. Some sociologists argue that women face a **glass ceiling** (invisible barrier to promotion) at work.
RACE AND ETHNICITY		Unemployment is higher amongst certain ethnic groups (i.e. Pakistani, Bangladeshi, Black Caribbean and Black African) than others and men from ethnic minority groups are more likely to be working in manual jobs. Sociologists sometimes call this the **ethnic penalty.**
SEXUALITY		There is little data on how sexuality affects life chances but some research show how gay people choose not to go into certain professions because they perceive them as **homophobic.**

AGE		Age discrimination is illegal in the UK but still occurs. Young people and old people often find it difficult to get a job, particularly in some professions.
DISABILITY		Disabled people in the UK earn on average half as much as non-disabled people and disabled people are far more likely to be unemployed.
RELIGION AND BELIEF		People from certain religions (e.g. Muslims) are far more likely to be unemployed than people from other faiths. This is particularly true for Muslim women who wear head scarfs and could be because of **Islamophobia** and stereotyping.
INTERSECTIONALITY		When factors that affect life chances combine. For example, black, working class women may experience more social disadvantages than a white, middle class man.
	THE IDEA OF THE AFFLUENT WORKER	
EMBOURGEOISEMENT		The idea put forward by some sociologists that as working class families become more affluent, they adopt middle class norms and values such as **consumerism** and the **privatised nuclear family** (a nuclear family cut off from the extended family)
DEVINE AND THE IDEA OF THE AFFLUENT WORKER		Devine interviewed 62 working class men and women in Luton during the 1980s. She found little evidence to support the embourgeoisement thesis. Instead she found that **working class families were still critical of capitalism** and, although not as communal as in the past, still retained links with their extended family.
	POVERTY AS A SOCIAL ISSUE	
ABSOLUTE POVERTY		When a household does not have sufficient income to buy the minimum needed for survival (food, shelter etc)
RELATIVE POVERTY	★★☆☆☆	When a household's income is significantly below the average for their society
MATERIAL DEPRIVATION		When a household is unable to afford the goods that most people in that society own
THE CULTURE OF POVERTY		This is the theory that poverty is the result of norms and values that are passed on from one generation to the next, resulting in a **cycle of deprivation**. This theory suggests that poor families often don't value things like education and saving money that could help them to escape from poverty.
THE WAY IN WHICH GOVERNMENTS HAVE ATTEMPTED TO ALLEVIATE POVERTY		Governments attempt to alleviate poverty through (1) Means tested **welfare benefits** (i.e. unemployment benefits, housing benefits etc) (2) Introduction of the national **minimum wage** (currently £8.21 per hour for workers aged over 25) (3) **Reducing unemployment** through programmes such as apprenticeships and (4) Providing free services such as **education and healthcare**
THE IMPACT OF GLOBALISATION ON POVERTY IN THE UK		Some sociologists suggest that **globalisation has increased the inequality in the UK**. For example, the global financial crisis of 2007-2008 led to a recession in the UK with increased unemployment.
FUNCTIONALIST PERSPECTIVE ON POVERTY		Poverty sometimes performs a **positive function** in society. For example, it means that there are people willing to do the difficult and dangerous jobs cheaply.
FEMINIST PERSPECTIVE ON POVERTY		Women (particularly lone parents) are at greater risk of living in poverty than men.
MARXIST PERSPECTIVE ON POVERTY		Poverty is an inevitable consequence of the unequal distribution of wealth in a capitalist society. **Poverty helps the bourgeoisie because it makes it easier for them to exploit the proletariat.**
TOWNSEND ON RELATIVE DEPRIVATION		Townsend developed a deprivation index to measure **relative deprivation** in the UK. This took the form of a questionnaire that asked questions such as how often a household ate fresh meat. Using this he found that 22% of the UK population was living in poverty, a much higher figure than official statistics.
MURRAY ON THE UNDERCLASS		**New Right** sociologist Murray argues that the introduction of welfare benefits encourages lone parent families, unemployment and crime and therefore leads to the creation of a **welfare dependent underclass**. Welfare benefits are meant to reduce poverty but, he argues, in fact they increase it.

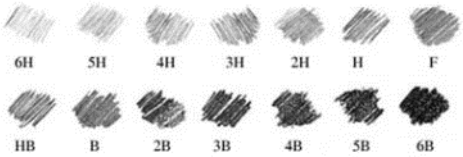
POWER AND AUTHORITY		
AUTHORITY		When someone has power over someone else, usually because of their position in society. For example, police officers have power over other UK citizens.
COERCION		When someone has power over someone else because of fear, threats or punishments. For example, a kidnapper has coercive power over their victim.
TRADITIONAL AUTHORITY		Traditional authority comes from **tradition or custom**, for example the authority of the queen in the UK.
CHARISMATIC AUTHORITY		Charismatic authority is when someone has authority because of the strength of their **personality**, for example the authority of certain celebrities or MLK in the USA.
RATIONAL-LEGAL AUTHORITY		Rational-legal authority is when someone holds authority because of the **legal position** they occupy, for example the authority of the Prime Minister.
FORMAL SOURCES OF POWER		Formal power comes from **a position that someone holds in society**, for example the manager of a company or the captain of a sports team.
INFORMAL SOURCES OF POWER		Informal power comes from other ways that someone can influence people, for example because of their **charisma** or because they have access to information or resources that other's in the groups don't.
FUNCTIONALIST PERSPECTIVE		It is important for some individuals and groups to have power over others so that society can function properly. For example, it is important for the government to have the power to pass laws, for the police and the courts to have the power to arrest and imprison people, for teachers to have the power to set detentions.
FEMINIST PERSPECTIVE		Men have power over women in the home, the workplace and within politics. They often seek to maintain these unequal power relationships.
MARXIST PERSPECTIVE		The **bourgeoisie** have power over the **proletariat** because they own the **means of production**. They use this power to **exploit** the proletariat and maintain social inequality.
WEBER ON POWER AND AUTHORITY	 	Weber disagreed with Marx that the main source of power is economics and argued that charismatic, rational-legal and traditional sources of authority are equally important. Weber also argued that, in a capitalist society, the middle classes will increase while the working class will shrink.
WALBY ON PATRIACHY		Walby identified six sources of **patriarchal power and control** (1) **Paid work.** There is a **gender pay gap** and a **glass ceiling** (2) **House work.** Women do most of the house work (3) **Culture.** There are different norms and values for men and women (4) **Sexuality.** There are different expectations for men and women when it comes to sexual behaviour (5) **Violence.** Men often use physical violence to control women (6) **The State.** Most politicians are men.
FACTORS AFFECTING POWER RELATIONSHIPS		
FACTORS AFFECTING POWER RELATIONSHIPS		Factors that can affect power relationships include social class, gender, sexuality, ethnicity, disability, age and religion

ART AND PHOTOGRAPHY

Use the information that follows to test yourself on key words/phrases for each topic (using the look/cover/check technique), to research the work of artists and photographers and to develop your own responses to practitioners as we have been doing in class.



Knowledge Organiser
Art GCSE Art and Design

	Assessment Objectives / Skills	Knowledge and Understanding	Key words	1.Techniques & processes that may be covered
	Students will be required to demonstrate the ability to:	Students will learn: **TRANSFERRABLE SKILLS**	REMEMBERING, UNDERSTANDING, ANALYSING, APPLYING, CREATING, EVALUATING	Drawing from observation, Drawing from secondary sources, drawing using a grid, Shading, crosshatching, hatching, stippling, blending tones using a range of pencils, using pencil crayons, biro, pen and wash.  Painting (acrylic, watercolour) Collage, modelling, mixed media, digital editing, textile techniques (batik, tie- dye) Printing (mono printing, block printing, foam printing.)
1	**AO3: RECORD IDEAS OBSERVATIONS & INSIGHTS** relevant to the theme of the PORTFOLIO as it progresses.	-The ways in which meanings, ideas and intentions can be communicated through drawing Annotation: students will be expected to record a purposeful written annotation using suitable specialist vocabulary, demonstrating an understanding of the formal elements.	Observation, primary & secondary sources, composition, proportion, balance, perspective, depth, colour, line, form, tone, texture, annotation	
2	**AO1: DEVELOP IDEAS** through investigations demonstrating critical understanding of artist's work.	-How sources inspire the development of ideas, through exploring the work and approaches of artists that link to the theme.	Respond, describe, explain, analyse, research, select, inspiration, explore, pastiche, realism, abstract	**2.Themes you may cover** A portfolio of work based on a starting point. Starting points include Indulgence, Inside/Outside, Distorted, Derelict, Cultures, In the News
3	**AO2: REFINE WORK** by exploring ideas, selecting and experimenting with appropriate media, materials, techniques and processes	-Experimenting using different media, materials, techniques and processes. Looking at the ways in which they can be used in relation to students' own creative intentions.	Making connections, variety, explore, select, develop, reflect, experiment	**3. Artists for inspiration that may be covered** Van Gogh- for his mark making technique. Ben Heines – for his use of tone. Mark Powell –for his use of biro on recycled paper. Artists chosen independently to develop your portfolio.
4	**AO4: PRESENT** a personal and meaningful response that realises intentions and demonstrates understanding of visual language.	-Ability to produce a final outcome that links all of the portfolio together. - Use of the visual language through application of the formal elements.	Meaningful, personal, final piece, formal elements, explain, evaluate.	4. **Presentation of the portfolio** All work should be neatly presented in display folders with clear annotations.

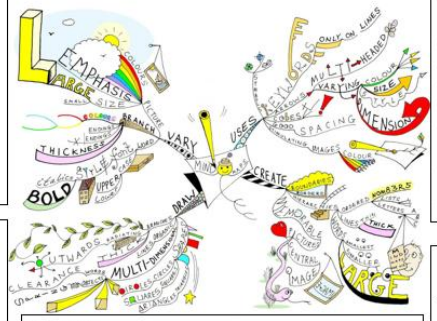
Art and Design Knowledge Organiser

Assessment Objective 1: Contextual Understanding – Develop ideas through investigations, demonstrating critical understanding of sources

1 Mind Mapping – Ideas presented around the theme of the work

Central idea.
This is the starting point of your Mind Map and represents the topic you are going to explore.
Your central idea should be in the centre of your page and should include an image that represents the Mind Map's topic.

Branches.
The main branches which flow from the central image are the key themes. You can explore each theme or main branch in greater depth by adding smaller branches.



Key words.
When you add a branch to your Mind Map, you will need to include a key idea. An important principle of Mind Mapping is using **one word per branch**. Keeping to one word sparks off a greater number of associations compared to using multiple words or phrases.

Colour coding.
This links the visual with the logical and helps your brain to create mental shortcuts. The code allows you to categorise, highlight and analyse information. Colours also make images more appealing and engaging.

Include images.
Images have the power to convey much more information than a word or sentence. They are processed instantly by the brain and act as visual stimuli to recall information.

2 Moodboard – A collage of ideas using collected images

Consider your theme.
Do you want it quite narrow or are you happy to collect a wider range of ideas.

Use a range of sources.
Internet images, photographs, wallpaper/fabric samples, lettering.

Don't limit yourself.
Even if it doesn't directly link to your starting point it may relate to the theme. Consider colours and words to help you.

Apply your ideas.
Your moodboard will directly link to the development of your project. If there is empty space fill it with sketches or annotations.

Pick a style.
Pulling it all together with a colour theme or visual style will make your page work together as a whole.

3 Artist Research – showing your understanding of an artists work or style

Biographical information.
Birth, death, style, education, important works

Social, historical and economic influences.
What was happening at the time? Were they responding to anything that was happening around them?

Technical information.
How was their produced? What methods and materials did they use?

Artistic influences.
Who influenced their work? Did their work influence anyone else?

Collected images.
Select images that are relevant and that appeal to you, make comments about why you like them

Copied images.
Show your understanding by reproducing examples of their work

Presentation.
Must be A3 or 2 A4 sheet, include a clear title and relevant background

When analysing work, use the Content/Form/Process/Mood model

4 Analysing Art Work

Content – Looking at the subject of the work.
What is it? What exactly can you see? What is happening? What does the work represent?
What does the artist call the work?
Does the title change the way we see the work?
What is the theme of the work?
Landscape, portrait, journey, moment, memory, event, surreal, fantasy, abstract, message.

Form – Looking at the formal elements.
What colours does the artist use? Why? How is the colour organised?
What kind of shapes can you see?
What kinds of lines and marks does the artist use?
What is the surface like? What textures can you see?
What patterns can you see?
How big is the work?
Light, delicate, layered, strong, rough, dark, peaceful, dripped, textured, scale, vivid, bright.

Process – How the work has been developed and made.
What materials and tools have been used?
What is the evidence for how it has been made?
Painted, drawn, woven, printed, cast, stitched, constructed, collaged.

Mood – Looking at the communication of moods and feelings.
How does the work make you feel?
Why do you feel like this?
Does the colour, texture, form or theme of the work affect your mood?
Quiet, contemplative, thoughtful, hopeful, peaceful, elated, joyful, reflective.

Art and Design Knowledge Organiser

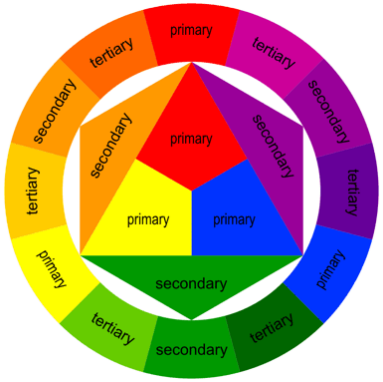
Assessment Objective 2: Creative Making – refine work by exploring ideas and experimenting with appropriate media, materials, techniques and processes

1

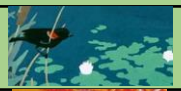
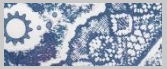
Media	The substance that an artist use to make art
Materials	The same as media but can also refer to the basis of the art work eg, canvas, paper, clay
Techniques	The method used to complete the art work, can be generic such as painting or more focus such as blending
Processes	The method used to create artwork that usually follows a range of steps rather than just one skill

3

Colour Theory	
Primary= RED, YELLOW, BLUE	Complimentary; Colours opposite on the colour wheel
Secondary= Primary+Primary	Harmonious; Colours next to each other on the wheel
Tertiary= Secondary+Primary	Monochromatic; shades, tones & tints of one colour
Shades – add black	Hue – the pigment
Tint – add white	Warm; RED, ORANGE YELLOW. Cold; BLUE, GREEN, PURPLE



2

Pencil		The basic tool for drawing, can be used for linear work or for shading
Biro		Drawings can be completed in biro and shaded using hatching or cross hatching
Pastel (chalk/oil)		Oil and chalk pastels can be used to blend colours smoothly, chalk pastels give a lighter effect
Coloured pencil		Coloured pencil can be layered to blend colours, some are water soluble
Acrylic paint		A thick heavy paint that can be used smoothly or to create texture
Watercolour		A solid or liquid paint that is to be used watered down and layered
Gouache		A pure pigment paint that can be used like watercolours or more thickly for an opaque effect
Pressprint		A polystyrene sheet that can be drawn into to print white lines – can be used as more than 1 layer
Monoprint		Where ink is transferred onto paper by drawing over a prepared surface
Collograph		A printing plate constructed of collaged materials
Card construction		Sculptures created by building up layers of card or fitting together
Wire		Thick or thin wire manipulated to create 2d or 3d forms
Clay		A soft substance used for sculpting, when fired can be glazed to create shiny colourful surfaces
Batik		A fabric technique using hot wax to resist coloured inks
Silk painting		Fabric inks painted onto silk, Gutta can be used as an outliner to prevent colours mixing

Art and Design Knowledge Organiser

Assessment Objective 3: Reflective Recording – Record ideas, observations and insights relevant to intentions as work progresses

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1

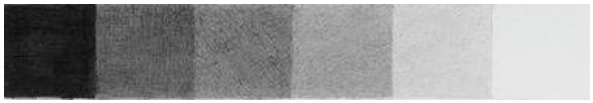
Methods of Recording

Observational drawing	Drawing from looking at images or objects
First hand observation	Drawing directly from looking at objects in front of you
Second hand observation	Drawing from looking at images of objects
Photographs	Using a camera or smartphone to record images will class as first hand observation
Sketches	Basic sketches and doodles can act as a starting point for development

Stages of Drawing

Basic shapes → Accurate shapes → Detail → Shade

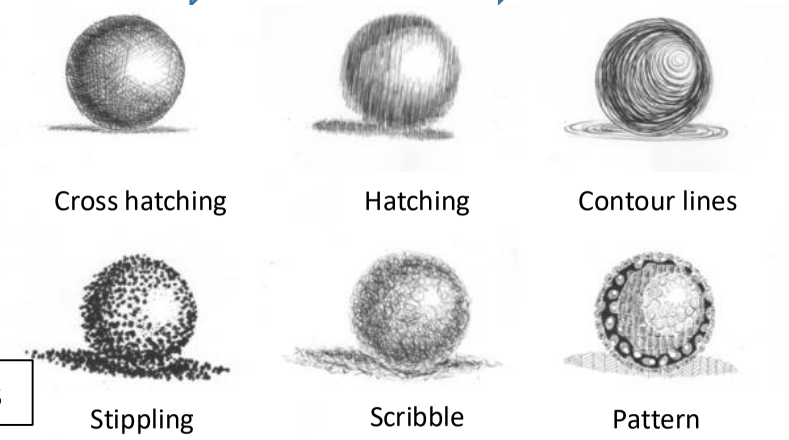
2



Tonal shade

Produce a range of tones by varying the pressure and layering – consider using softer pencils for darker shades

Alternative shade techniques



3

Annotation

Describes writing notes, using images and explaining your thoughts to show the development of your work.

Step 1- Describe
What is this an image of?
What have you done here?
What was this stage of the project for?

Step 2- Explain
How was this work made?
How did you produce particular effects? How did you decide on the composition?

Step 3- Reflect
Why did you use these specific methods? Why do particular parts work better than others?
Why might you do things differently next time?

Art and Design Knowledge Organiser

Assessment Objective 4: Personal Presentation: Present a personal and meaningful response that realises intentions and demonstrates understanding of visual language.

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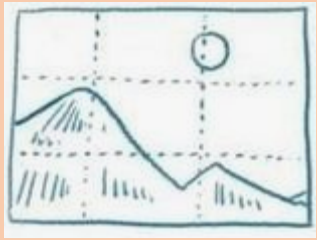
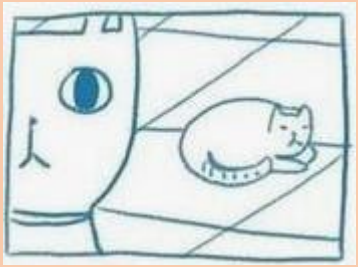
1 Formal Elements of Art

LINE	the path left by a moving point, e.g. a pencil or a brush dipped in paint. It can take many forms. e.g. horizontal, diagonal or curved.
TONE	means the lightness or darkness of something. This could be a shade or how dark or light a colour appears
TEXTURE	the surface quality of something, the way something feels or looks like it feels. There are two types : Actual and Visual
SHAPE	an area enclosed by a line. It could be just an outline or it could be shaded in.
PATTERN	a design that is created by repeating lines, shapes, tones or colours. can be manmade, like a design on fabric, or natural, such as the markings on animal fur.
COLOUR	There are 2 types including Primary and Secondary . By mixing any two Primary together we get a Secondary

2 Composition Layouts

Rule of thirds – Place focal objects at 1/3 or 2/3 of the image horizontally or vertically. Not in the middle





Balance elements. If there is an emphasis on one side balance it out with smaller objects on the other

Simplify and fill. Enlarge or crop the image to fill the space

Use lines. Lines will draw the viewer in, they don't have to be straight, consider S or C

3

A Rough	A Visual/ Maquette	Final Piece
A basic sketch of a final idea	A small image or model created in selected materials	An image or sculpture pulling all preparatory work together

Artists techniques to inspire your portfolio further.

Alfred Basha

WHERE: Born in Italy in.
WHEN: 1989- present day.

WHAT:A graphic designer/Artist who made drawings inspired by nature.

HOW: He would use fine black inked pen with attention to detail.

INSPIRED BY: Nature particularly the animal world. He was also influenced by surrealist art and would merge animals with the natural world.

SALVADOR DALI

WHERE: born SPAIN

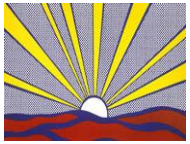
WHEN: 1904-1989

WHAT: Surrealist artist.

HOW: Painting (oil on canvas), drawing, photographer, sculptor

INSPIRED BY; His painting style was influenced by the Renaissance masters such as Raphael and Michelangelo

ROY LICHTENSTEIN



WHERE: America

WHEN: 1923-1997

WHAT: Pop artist

HOW: Made prints, paintings and sculptures

INSPIRED BY comic strips, Lichtenstein produced precise compositions that often had 2 meanings. His work was influenced by popular advertising and the comic book style.

JONE BENGOA

WHERE: Born in Spain

WHEN: 1996-present

WHAT: Realistic and expressive eye portraits depicting different emotions

HOW: Watercolour paintings

INSPIRED BY; It is said that "the eyes are the windows to the soul" and she manages to express it in her realistic eye paintings.

BEN HEINES

WHERE: Born in Belgian

WHEN: 1983-Present day

WHAT: He is an accomplished illustrator and photographer. His name became famous in 2010 with the invention of a new art form titled "Pencil Vs Camera".

INSPIRED BY: He is an enthusiastic traveler, he is inspired by nature, animals, architecture, friendship. He loves discovering new cities and cultures.

Andres Preis

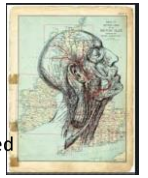
WHERE: Born in Germany

WHEN: 1988- present day

WHAT: A graphic designer/illustrator who prefers tradition drawing techniques.to detail and digital art.

INSPIRED BY: He was inspired by advertising especially posters for his compositions.

Mark Powell



WHEN; Contemporary artist

WHERE; American born but London based

WHAT; Reuses old envelopes, maps & books as canvases to produce incredible drawings. His sketches are made using only a Biro pen, and they often incorporate original stamps and postage marks. .

INSPIRED BY; Jean Michael Basquait and Chuck Close

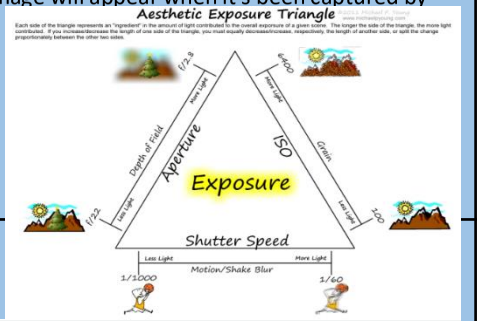
Photography Knowledge Organiser Autumn Term

Framing and Composition:

1. **framing** is the presentation of visual elements in an image, especially the placement of the **subject** in relation to other objects. **Framing** can make an image more aesthetically pleasing and keep the viewer's focus on the framed object(s).
2. **composition** is the placement or arrangement of visual elements or 'ingredients' in a work of art, as distinct from the subject. It can also be thought of as the organization of the elements of art according to the principles of art.

7. Exposure and 8. Exposure Triangle

A photograph's exposure determines how light or dark an image will appear when it's been captured by your camera.
Over exposure = too light.
Under exposure = too dark.
Exposure can be manipulated using 3 elements.
Aperture, ISO, shutter speed.
This is known as the **Exposure Triangle**.

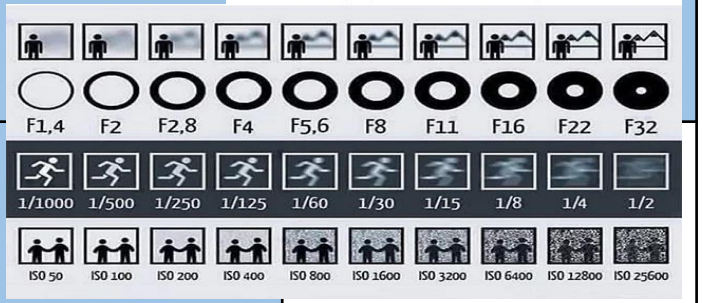


The **rule of thirds** is applied by aligning a subject with the guide lines and their intersection points, placing the horizon on the top or bottom line, or allowing linear features in the image to flow from section to section.

9. Aperture
The size of the hole in the lens.
This is measured as an f/stop.
Small aperture = less light = big f/stop.
Large aperture =more light= small f/stop.

Leading The Eye. The primary use for **diagonal lines** is to lead the eye to a certain point in the **photo** and they are extremely effective at doing this. When you intersect a **diagonal line**, or point it in the direction of a particular object, the tension created draws the eye towards this point.

10. Shutter Speed
The time taken for the shutter to close.
Fast = less light = freezes motion.
Slow = more light = motion blur



Symmetry **means centred**. Neatly **centred composition** is the best way to emphasise various kinds of symmetry, both horizontal or vertical.

11. ISO
ISO is the sensitivity of the image sensor to light. Low ISO= the less sensitive your **camera** is to light and the finer the grain (reduced noise). Higher **ISO** are used in darker situations to get faster shutter speeds.

12. Front Lighting
the least dramatic, front lighting illuminates the subject

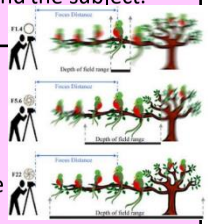
13. Back Lighting
the sun or other light source emanates from behind the subject. Creates silhouettes.

6. Golden Ratio

The rule of thirds is an simple version of a more advanced mathematical equation known as the **golden ratio** (also known as the Fibonacci Sequence). The **golden ratio** is found in nature. 1,1,2,3,5,8,13,21,34. The 2 proceeding numbers in the sequence are added together to get the next. They join in an anti clockwise helix.

14. Side lighting
perfect for emphasizing texture, defining depth, and bringing out patterns. 45 angle is good for portraits.

15. Depth of Field
Shallow = part of The frame is in Focus.
Deep = All the frame Is in focus.



Photography Knowledge Organiser SpringTerm

Genre

Documentary photography

usually refers to a popular form of**photography** used to chronicle events or environments both significant and relevant to history and historical events as well as everyday life.

Kitra Cahana — Mike Brodie
Tim Hetherington — Thomas Gudzowaty
Edward Burtynsky — Lynsey Addario
Corey Arnold — John Decker
Stephanie Sinclair — Steve Mc Curry

Photo-journalism

in which written copy is subordinate to pictorial usually photographic presentation of news stories or in which a high proportion of pictorial presentation is used; broadly : news **photography**.

Dorothea Lange — Mary Ellen Mark
Dayanita Singh — Alec Soth
Diane Arbus — Peter Hugo
Bruce Davidson — Boris Mikhailov
Don McCullen — Chris Steele Perkins

Studio photography

A **photographic studio** (also known as a**photography studio** or **photo studio**) is a workspace to take, develop, print and duplicate**photographs**. ... The **studio** may have a darkroom, storage space, a **studio** proper where **photographs**are taken, a display room and space for other related work.

Joe McNally — Scott Kelby
Annie Leibovitz — David Bailey
Fernando Decilitiis — Jaime Travezan
Eric Almes

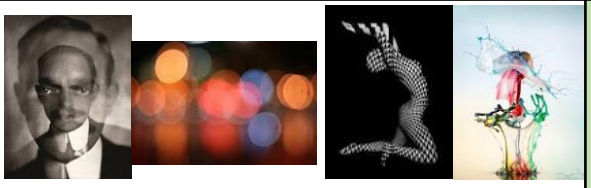
Location photography

shooting is the shooting of a film or television production in a real-world setting rather than a sound stage or backlot. ... Second unit **photograph** is not generally considered a **location** shoot. Before filming, the locations are generally surveyed in pre-production, a process known as **location** scouting and recce.

Ansel Adams — Henri Cartier Bresson
Annie Leibovitz — Brian Duffy
Dorothea Lange — Yousef Karsh
Brassai — Robert Cape
Jay Mansel — Jerry Ulesman

Experimental imagery

Abstract **photography**, sometimes called non-objective, **experimental**, conceptual or concrete **photography**, is a **means** of depicting a visual image that does not have an immediate association with the object world and that has been created through the use of photographic equipment, processes or materials.



Aaron Siskind — Marco Brever
Alvin Langdon — Anna Atkins
Gaston Bertin — Josh Brash
Brno del Zou

Installation

is an artistic genre of three-dimensional works that often are site-specific and designed to transform the perception of a space.

Joshua Citarella — Sara Cwyner
Martine Syms — Artie Vierkant
Kate Steciw — Leigh Ledare
Lucas Blacklock — Ryan Forester
Timur Si Quin — Marco Scozzaro

Photography Knowledge Organiser Summer Term

Camera Techniques

1. Bokeh

Bokeh is the orbs created when lights are out of focus in an image. It's a neat effect to have in the background of a photo, c…s.

2. Burst Mode

You can take photos one at a time. Or, you can turn the burst mode on and the camera will continue snapping photos as long as you hold the button down, or until the buffer is full (which is a fancy way of saying the camera can't process any more). Burst speeds differ based on what camera you own, some are faster than others. Just how fast is written in "fps" or frames (pictures) per second.

3. Flash Sync

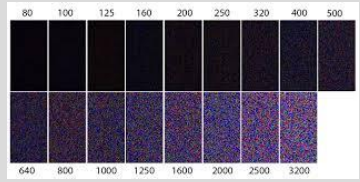
You probably know that the flash is a burst of light—flash sync determines when the flash fires. Normally, the flash fires at the beginning of the photo, but changing the flash sync mode adjusts when that happens. The rear curtain flash sync mode, for example, fires the flash at the end of the photo instead of the beginning.

4. Histogram

In photography, a histogram is a chart that depicts how many light and dark pixels are in an image. If the chart peaks towards the left, the image has a lot of dark hues. If the chart peaks to the right, the image has a lot of light hues. If those peaks are cut off at the edges, the image is underexposed (on the left edge) or overexposed (on the right edge).

5. Noise

Noise is simply little flecks in an image, also sometimes called grain. Images taken at high ISOs have a lot of noise, so it's best to use the lowest ISO you can for the amount of light in the scene.



6. RAW

RAW is a file type that gives the photographer more control over photo editing. RAW is considered a digital negative, where the default JPEG file type has already been processed a bit. RAW requires special software to open, however, while JPEG is more universal.

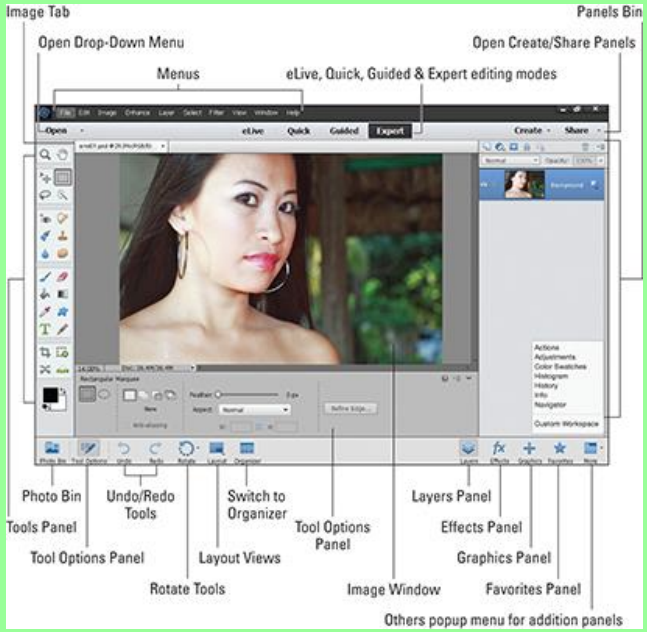
7. Time Lapse

A time lapse is a video created from stitching several photos together taken of the same thing at different times. Don't confuse a time lapse with a long exposure, which is a single image with a long shutter speed.

8. White Balance

Your eyes automatically adjust to different light sources, but a camera can't do that—that's why sometimes you take an image and it looks very blue or very yellow. Using the right white balance setting will make what's white in real life actually appear white in the photo. There's an auto white balance setting, but like any automatic setting it's not always accurate. You can use a preset based on what light you are shooting in like sun or tungsten light bulbs, or you can take a picture of a white object and manually set the white balance.

9. Photoshop Elements 14



10. Editing Sites

https://www.fotor.com/app.html#/editor

http://photogramio.com/

https://www.befunky.com/

https://www.picmonkey.com/photo-editor

https://photoeditor.polarr.co/

https://ipiccy.com/

https://www.dafont.com/

SPORT

Use the information that follows to either test yourself on key words/phrases for each topic (using the look/cover/check technique) or create a mind map for each topic that contains key facts and images. Once you have created a mind-map you should put it away and try to recreate it from memory, then look at your original mind-map and add what you have missed.

Unit 1
Learning Aim A- Components of Fitness

Components of physical fitness	Components of skill related fitness
Aerobic endurance	Agility
Muscular endurance	Balance
Flexibility	Coordination
Speed	Power
Muscular strength	Reaction time
Body composition	

Physical Fitness

Aerobic Endurance
The ability of the cardiorespiratory system to work efficiently, supplying nutrients to the working muscles. This is needed for long distance events.

What is the cardiorespiratory system?
- ✓ Uptakes oxygen from air breathed in
- ✓ Transports oxygen around body to working muscles
- ✓ Removes waste products such as carbon dioxide

AEROBIC- in the presence of **oxygen** (long distance events)
ANAEROBIC- **without oxygen** (short distance or power events)

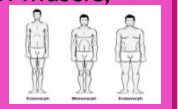
Muscular Endurance
The ability of muscles to work repeatedly against a light to moderate load without getting tired.

Speed
Accelerative speed: This is the speed generated in order for a performer to be at their top speed. *Eg- long jump run up*
Pure speed: This is needed for events that are won by achieving the quickest time. *Eg- 100m sprint*
Speed endurance: This is an athlete's ability to sustain speed over a long period of time with short recovery periods. *Eg- a footballer*

SPEED (m/s) = DISTANCE TRAVELLED / TIME TAKEN

Muscular Strength
The maximum force that can be generated by a muscle or group of muscles. Weights will be heavy and therefore repetitions are low.

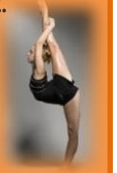
Body Composition
This is the combination of muscle, fat and bone.



EcTomorph- **T**all and **T**hin
EnDomorph- Short and **D**umpy
Mesomorph- **M**uscular

Flexibility
The ability to move a joint fluidly through a complete range of movement.

Some sports require all round flexibility whereas some sports require flexibility at specific joints.



Skill Related Fitness

Coordination
The ability to use body parts together accurately. This is needed in most sports.

HAND-EYE coordination
FOOT-EYE coordination
HAND-HAND coordination

Power
POWER = STRENGTH x SPEED

The ability to use strength at speed.

Therefore the faster or stronger a motion, the more powerful it will be.

Balance
The ability to maintain the centre of mass over a base of support.

STATIC BALANCE- maintaining a balance whilst stationary. *Eg- handstand*
DYNAMIC BALANCE- maintaining a balance whilst in motion. *Eg- cartwheel*

Reaction time
The time taken for a performer to respond to a stimulus. *Eg- sprinter*

Agility
The ability to change direction quickly. *Eg- rugby players*

Heart Rate (HR)
The number of times your heart beats per minute (bpm)
Resting Heart Rate (HR)
Your heart rate at rest
Maxmimum Heart Rate (HRmax)
The maximum number of times the heart should beat before it becomes unsafe.

HR max = 220 - age

Target Heart Rate

This is the recommended maximum heart rate for a training zone and is used to measure exercise intensity.

BORG scale

The BORG rating of perceived exertion (RPE) scale is used to measure how hard a perfomer thinks they are working.

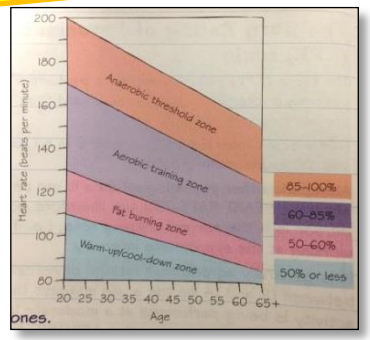
RPE Scale	
6	
7	Very, Very Light
8	
9	Very Light
10	
11	Fairly Light
12	
13	Somewhat Hard
14	
15	Hard
16	
17	Very Hard
18	
19	Very, Very Hard
20	

The BORG scale can be used to predict heart rate:
RPE x 10 = approximate HR (bpm)

Training zones

The target zone you train in depends on the type of benefits you are hoping to achieve.

You must work out your HR max before you can calculate your target heart rate zones!



Basic principles of training

Frequency **How often you train.**
This should be gradually increased.

Intensity **How hard you train.**
This should be gradually increased.

Time **How long you train for.**
This should be gradually increased.

Type **The training method used.**
This should be specific to the component of fitness the performer aims to develop.

Remember FITT!

Unit 1
Learning Aim A- Principles of Training

Specificity

This means that the training is relevant to the individual's sport, activity or fitness related goals.

Overload

Training must be demanding enough to cause the body to adapt.
For the body to make fitness gains, it must get more demanding over time- this is called **progressive overload**.
Overload can be achieved by gradually increasing FITT

Adaptation

This is when your body adapts to cope with increased training. This usually happens during rest times.

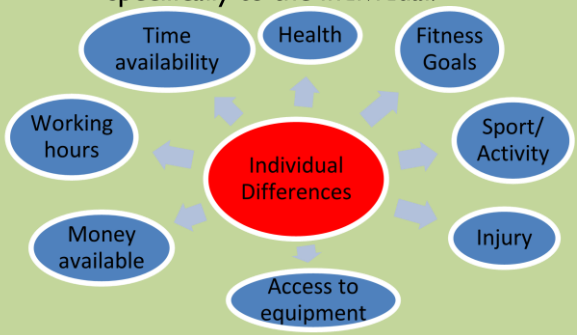
Reversibility

Fitness can be lost if training is stopped or if the intensity of training is not sufficient enough.

HYPERTROPHY- When a muscle grows in size.
MUSCLE ATROPHY- When a muscle loses size

Individual differences & lifestyle factors

Fitness programmes should be designed specifically to the individual.



Rest and Recovery

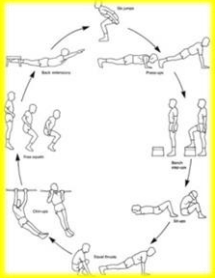
Rest is very important as it allows training adaptations to occur and the body to recover from any damage. Rest time also allows energy stores to be replenished.

Variation

A variety of training routines should be used to avoid boredom. It will also help to reduce the risk of injury caused by repetition of the same training methods.

Circuit training

This is a series of different activities that can be either sport-specific or tailored to improve certain aspects of fitness.



Intensity can be easily increased by increasing time on stations and decreasing rest time.
Circuit training is great for variation!

Continuous training

This is a steady pace, low-moderate intensity training method used for developing aerobic endurance.
Continuous training includes working for long periods of time/over long distances without stopping.

Fartlek training

Fartlek training involves running at different speeds or over different terrains.
Walk periods might be included for recovery but there are no rest periods.

Unit 1
Methods of Training

Flexibility training

This is used to stretch the muscles and increase flexibility. There are 3 types of flexibility training:

1- Static stretching

-Active: This is performed independently where the performer applies their own force to stretch the muscle.

-Passive: This is known as assisted stretching wherein the performer requires the help of another person or object to stretch the muscle.

2- Ballistic stretching

This is when fast, jerky movements are used through the complete range of motion. This is usually in the form of bobbing or bouncing.

3- Proprioceptive neuromuscular facilitation (PNF)

This is when a muscle is stretched to its limit and then held for 6-10 seconds. The muscle is then relaxed before being stretched again- this time further.

Plyometric training

This method of training is used to develop explosive power and strength. It works by making muscles exert maximal force when contracting and then relaxing rapidly. Plyometric training can include bounding, jumping and press ups with claps.

Speed training

Speed training is specific to the type of speed a performer wants to develop.
1- Acceleration sprints: used to work on acceleration such as for long jump run up.
2-Hollow sprints: used to develop speed endurance. Sprinting periods are followed by periods of walking to allow for recovery.
3-Interval training: this is used to develop speed over a set distance.

Weight training

This is used to improve strength or endurance.
Strength endurance: 50-60% of 1RM & 20 reps.
Elastic strength: 75% of 1RM & 12 reps.
Maximum strength: 90% of 1RM and 6 reps.

1RM- the maximum weight a person can lift in one contraction.
Rep- how many times a lift is done. These make up a set.

Interval training

Interval training is where periods of high intensity work are followed by periods of rest. A performer works for a maximum of 5 minutes before resting in preparation to work again. This form of training is specifically useful for power or speed athletes.

Body Mass Index (BMI)

Used to measure fat and determine if a person is overweight.

$$BMI = \frac{weight\ (kg)}{height^2\ (m^2)}$$

Bioelectrical Impedance Analysis (BIA)

Used to predict the percentage of body fat in a person.

Participants must not exercise for 12 hours prior to the test, or eat or drink within 4 hours of the test.

Participant data should be entered into machine before BIA electrodes are connected to each wrist and foot, sending electrical impulses through the body.

Skinfold Testing

Skinfold calipers are used to measure fat at various locations on the body.

Males: Chest, Abdominal, Thigh.

Females: Stomach, Tricep, Thigh.

Pre-Test procedures

Informed consent must be given by all participants. A PAR-Q form may be used to provide medical information.

Muscular Endurance Tests- Sit Up or Press Up Test

Complete as many sit ups or press ups (depending on selected muscle group) as possible in one minute.

Advantages: Quick and easy- no equipment needed. Disadvantages: Correct technique important.

Reliability- Using the same methods for each test- are results consistent?

Validity- Accuracy of results- do they measure what you need?

Practicality- How easy it is to carry out tests- are expenses and equipment required?

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Unit 1
Learning Aim C: Fitness Testing

Why are fitness tests important?

-Provide information on current fitness levels

-Can be used to plan training programme

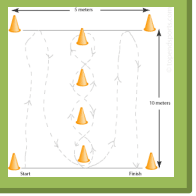
-Can be used to measure progress

Agility Test- Illinois Agility Test

Start lying on floor face down. On 'go' get up and print around course in direction indicated.

Advantages: Cheap to do. Minimal equipment needed.

Disadvantages: Good surface needed to minimise slipping risk.

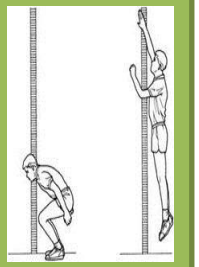


Anaerobic Power Test- Vertical Jump Test

Stand with dominant side against board and reach up to record standing reach height. One dip is allowed then the participant must jump and touch the board as high as they can.

Advantages: Quick to do. Minimal equipment needed.

Disadvantages: Only measures power in legs.

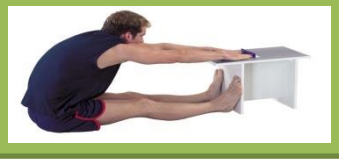


Flexibility Test- Sit & Reach Test

Reach slowly forwards on sit and reach box, keeping legs flat on the floor.

Advantages: Easy and quick.

Disadvantages: Does not measure entire body flexibility.



Strength Test- Grip Dynamometer Test

Hold dynamometer parallel to the side of body (arms by side) with display facing away from body. Squeeze as hard as possible for 5 seconds without moving arm.

Advantages: Minimal equipment needed.

Disadvantages: Only measures strength of arm muscles.

Speed Test- 35 Metre Sprint Test

Sprint as fast as possible over 35m whilst a peer times using a stopwatch.

Advantages: Easy and quick.

Disadvantages: Assistant and non-slip surface needed.

Aerobic Endurance Tests- 1. Step Up Test

Step up and down bench in time with metronome. Do this for 5 minutes before taking pulse reading.

Advantages: Easy and quick. Disadvantages: Requires correct reading of pulse in order to be reliable.

2. Multi-Stage Fitness Test

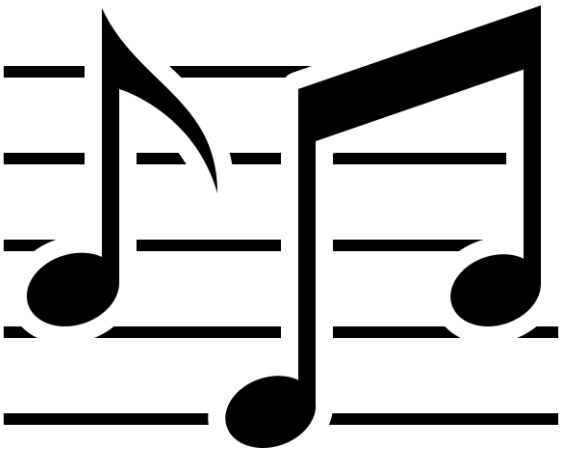
20m shuttle runs in time with bleeps that gradually increase pace.

Advantages: Large numbers can be tested at once. Cheap to do.

Disadvantages: Not suitable for all (eg- elderly and asthma sufferers). Requires high levels of motivation.

MUSIC

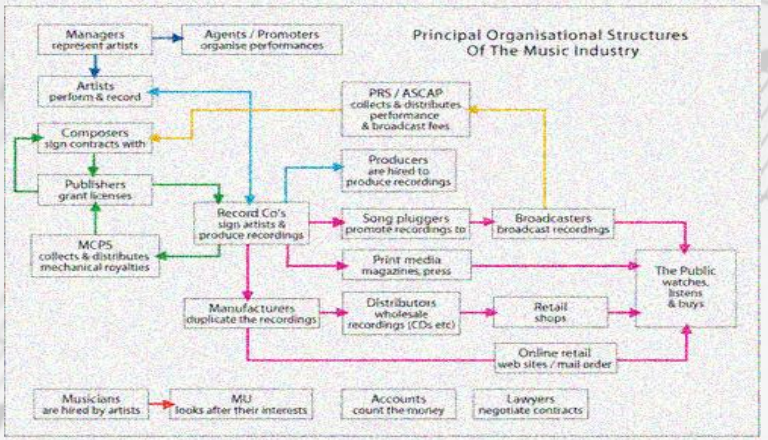
Use the information that follows to either test yourself on key words/phrases for each topic (using the look/cover/check technique) or create a mind map for each topic that contains key facts and images. Once you have created a mind-map you should put it away and try to recreate it from memory, then look at your original mind-map and add what you have missed.



BTEC MUSIC Knowledge Organiser – UNIT 1

1

agent	finds you work
manager	nurtures your career – gets you gigs
contract	a legal agreement concerning employment – written or verbal
permanent	a contract that lasts until you resign or are asked to leave
temporary	a short term contract – a day, a month etc
full-time	more than 37hrs a week
Part-time	less than 35hrs a week
casual	variable hours, flexible
freelance	work for yourself, not committed to an employer
invoice	a document which states how much you are owed and how you can be paid
NI	National Insurance
Income Tax	Tax paid by every working person



3

music journalist	writes for music magazines, blogs, radio tv
session musician	hired to record in studios and play in live sessions – not permanent members of the group
studio manager	controls studio bookings and hires staff and promotes studio
roadie	sets up and packs away equipment
door staff	security guard employed at venues
instrument technician	looks after, sets up, tunes and fixes instruments
live sound technician	sound checks and in charge of sound at a gig

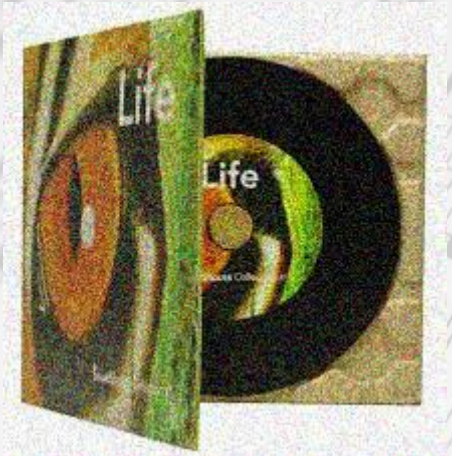
2

SERVICE COMPANIES	provide services to the artist, the venue and the production companies
PRS for Music	Performing Rights Society
MCPS	Mechanical Copyright Protection Society
PPL	Phonographic Performance Licence
A&R	Artist and Representation
MU	Musicians' Union
PLASA	Professional Lighting and Sound Association
BECTU	Broadcast Entertainment Cinematograph Theatre Union
EQUITY	Union for actors/dancers
MPG	Music Producers' Guild
APRS	The Association of Professional Recording Services

BTEC MUSIC Knowledge Organiser - UNIT 2

1

target audience	who your music is for
artistic intention	What you want to achieve
download	digital transfer of music via the internet
podcast	a series of files which are downloaded
copyright	the legal right of ownership of an original work
PRS	Performing Rights Society
royalties	payment made to the copyright holder
PPL	Phonographic Performance Licence
streaming	multimedia which is constantly delivered and received
social media	technology which helps share information



promotion	publicity in order to increase sales
distributor	someone who supplies goods to a retailer
retailer	someone who sells to the consumer
digipack	CD packaging
press release	a form of communication to give information – audio/video or written
website	a collection of pages on the internet under a common name
merchandise	branded products which help to market an artist and their music
poster	paper product used to advertise

AWESOME MERCHANDISE