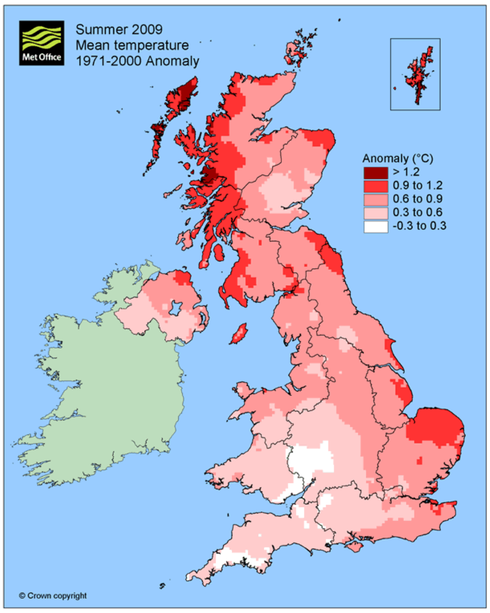
Geographical Skills:

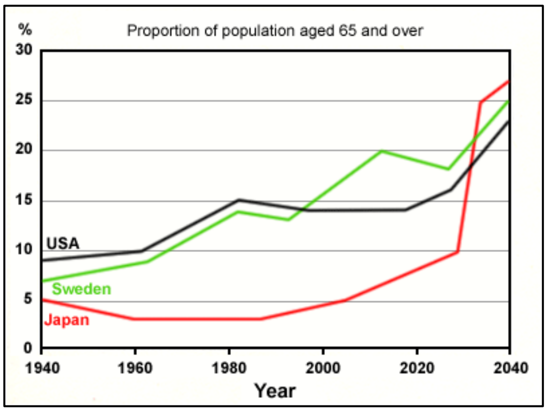
Paper 3

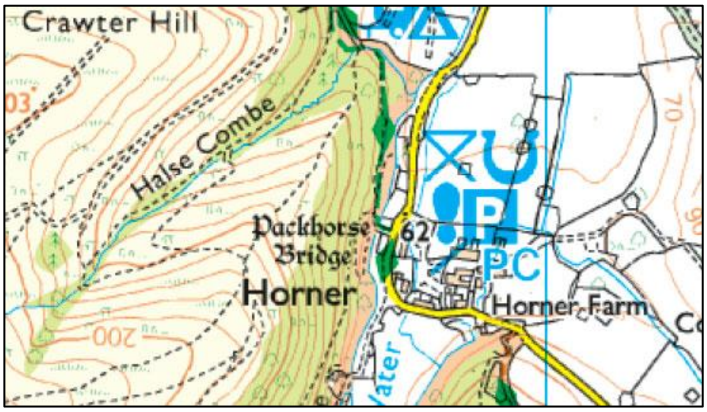


A: Cartographic Skills

B: Graphical Skills

C: Statistical Skills





Paper 3: Revision Geographical Skills

Exam	Topics	Length of Exam	Value	Exam Date
Paper 1: Living with the Physical Environment	Section A The Challenge of Natural Hazards ➢ **Question 1:** The Challenge of Natural Hazards Section B The Living World ➢ **Question 2:** The Living World Section C Physical Landscapes in the UK ➢ **Question 3:** Coastal Landscapes in the UK and ➢ **Question 4:** River Landscapes in the UK	90 minutes	35%	21st May 2019 PM
Paper 2: Challenges in the Human Environment	Section A Urban issues and challenges ➢ **Question 1:** Urban issues and challenges Section B The changing economic world ➢ **Question 2:** The changing economic world Section C: The challenge of resource management. ➢ **Question 3:** The challenge of resource management and ➢ **Question 6:** Energy	90 minutes	35%	5th June 2019 PM
Paper 3: Geographical applications	Section A: Issue evaluation Section B: Fieldwork	75 minutes	30%	13th June 2019 PM

Did you know?

10% of the marks across **all three papers** is allocated to the assessment of maths and statistical skills.

15% of the **total marks** is allocated to assessment of fieldwork (including interpretation of results).

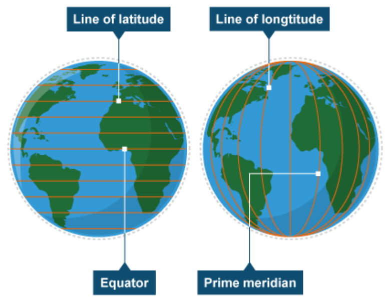
There is really useful section on BBC Bitesize about Geographical Skills:

https://www.bbc.co.uk/education/topics/z2y9wmn

A: Cartographic Skills

Atlas maps

Latitude and longitude



> *Latitude and longitude are measured in degrees (°). Each degree is subdivided into 60 minutes (‘). So the location of Tewkesbury is expressed as:*
>
> ***51° 59' N 2° 9' W***

Lines of *latitude* and *longitude* are used to locate places accurately on the Earth's surface.

Lines of latitude

These imaginary lines run parallel to the equator, from e___ to w____**.** They divide the world into the n___________ and s___________ hemisphere. They are parallel, but they are not the same length and get s_______ as they move away from the equator, reaching 90° at the poles.

How many important lines of latitude can you name?

Lines of longitude

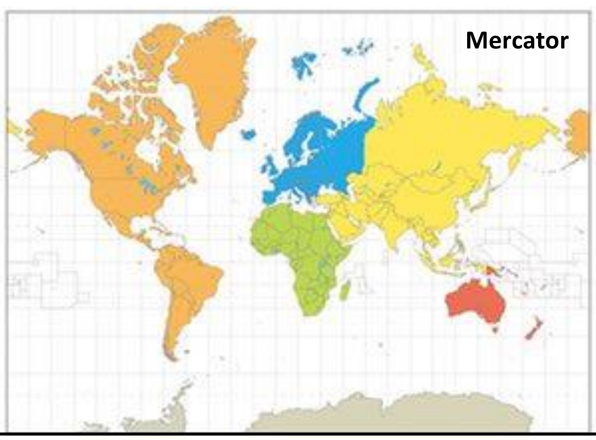
Lines of longitude run from the top of the Earth to the bottom – n_____ to s______. They are not parallel as lines of latitude are – they meet at a point at the north and south poles and are called meridians. The lines start at the Prime or G____________ Meridian (0°) and move east and west to the International D______ L_____ (180°).

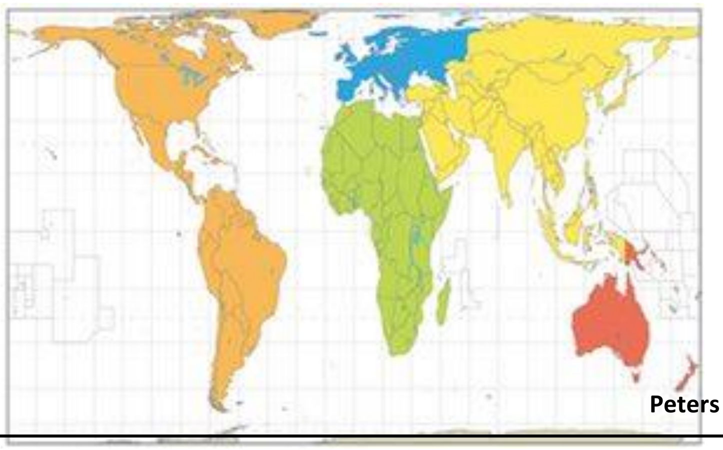
Using atlas maps

Atlas maps show a range of information, such as:

- Countries and regions, settlements and political borders.
- Physical features, such as relief.
- Thematic maps, such as climate and biomes.
- Global issues, such as global warming.

Map projections: There are different ways of projecting the world onto a map. The Mercator projection is probably the most familiar, but the Peter’s projection more realistically represents the true size and position of continents.

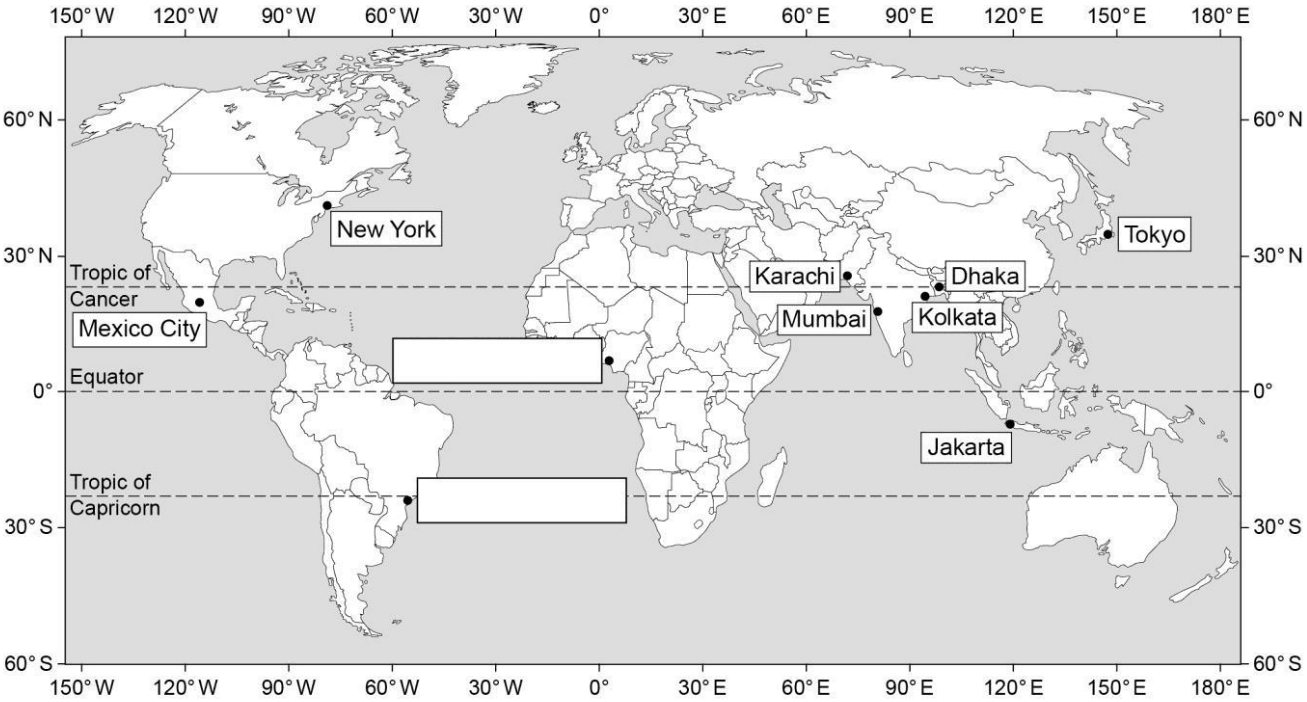




GCSE Exam question

Question 1 Issue evaluation

Study **Figure 1**, a map showing the location of ten of the world's top ten megacities (2014).



1. On **Figure 1**, add the names of the **two** megacities to the correct boxes.

   Use the information in the table below. **[1 mark]**

Megacity	**Latitude**	**Longitude**
Lagos	6 °N	3 °E
São Paulo	24 °S	46 °W

2. Which **one** of the following is the correct latitude and longitude for Jakarta?

   Shade **one** circle only.

A	21 °N	52 °E	○
B	30 °S	157 °E	○
C	6 °S	106 °E	○
D	33 °N	75 °E	○

[1 mark]

Identify patterns or distributions on maps

When asked to describe patterns or distributions on maps, think about **PEA!**

This is a very important skill. Use this acronym to help you write a quality description.

Pattern

Example

Anomaly

1. **Pattern** - Give an overview. Is the pattern even or uneven? Consider the spread.
2. **Examples** - State where things are that support your pattern are – be specific.
3. **Anomalies** - Are there any oddities or gaps? These are anomalies and you need to identify where they are.

GCSE Exam Question

Study **Figure 4**, which shows the distribution of major earthquakes.

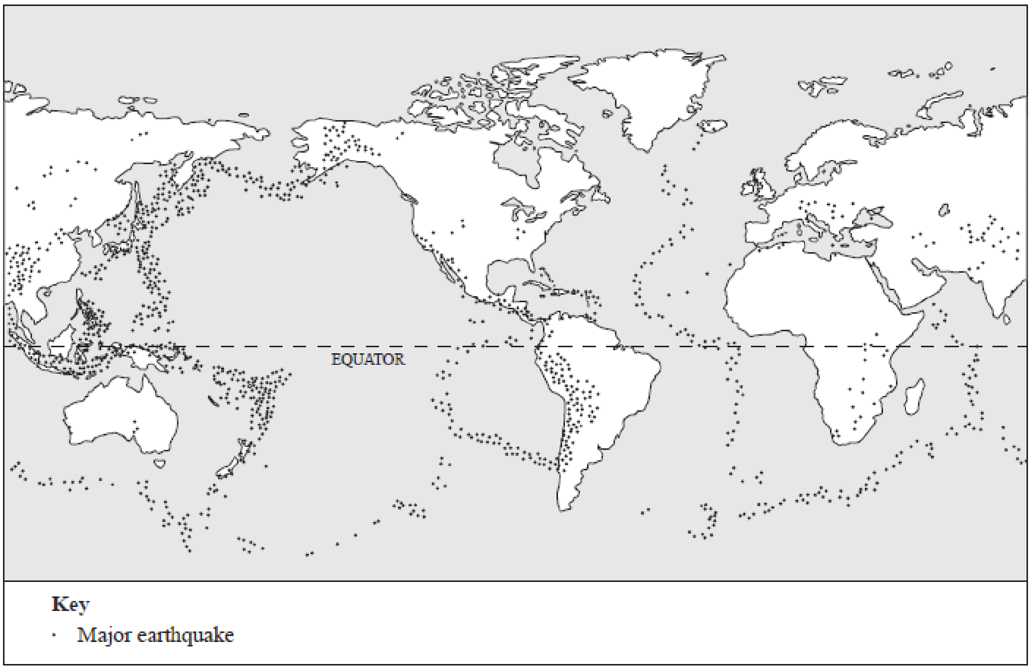


Figure 4

Describe the distribution of earthquakes shown in figure 4. (4marks)

___

___

___

___

___

___

___

___

___

___

Ordnance Survey Maps

Maps are produced at different scales. The scale of the map is how much smaller the map is than the area it represents.

Landranger Maps

1:50 000 scale means 2cm on the map means 1km on the ground.

It covers a larger area, but shows less detail.

Explorer Maps

1:25 000 scale means 4cm on the map means 1km on the ground.

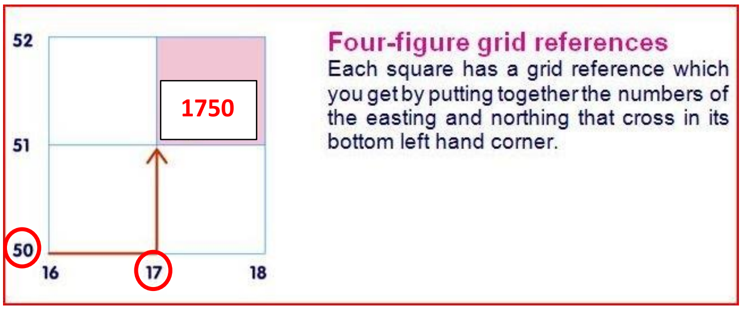
It covers a smaller area, but shows more detail e.g. footpaths.

Grid references

Ordnance Survey maps are covered in a series of blue gridlines. These gridlines can be used to pinpoint locations through a unique number known as a grid r____________________.

A **four-figure grid reference** is a handy way of identifying any s__________________ on a map. Four figure references are useful if you're trying to describe the position of a large feature such as a forest or settlement.

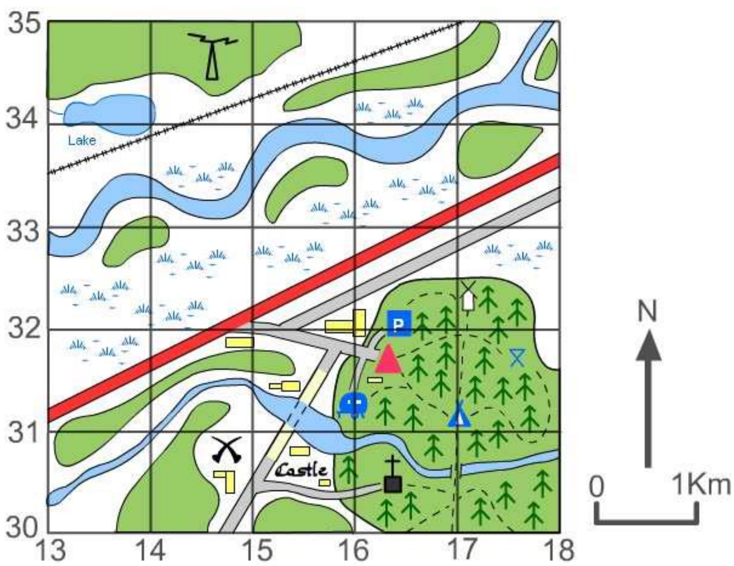
Grid references are easy, as long as you remember that you always **go along the corridor** before you **go up the stairs**.



No need to add brackets, commas or dashes.

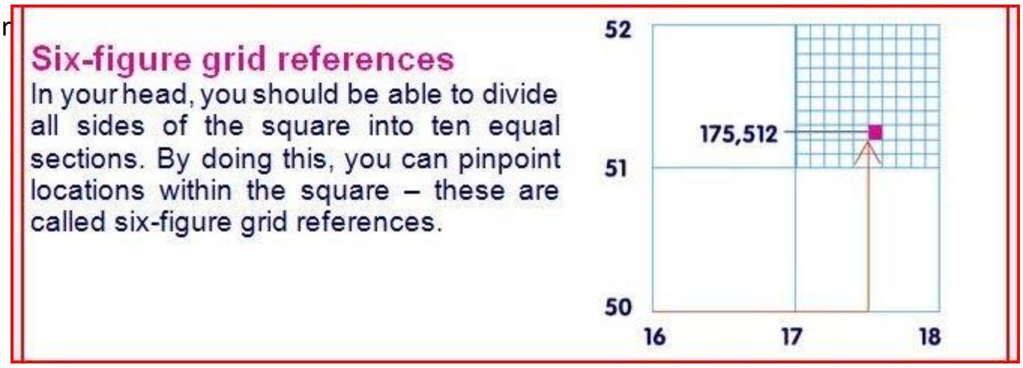
➢ Write down the **four figure** grid references for the following:

1. Picnic site __________________
2. Church with a tower __________
3. Youth hostel ________________
4. Campsite __________________
5. Castle ____________________
6. Car Park __________________



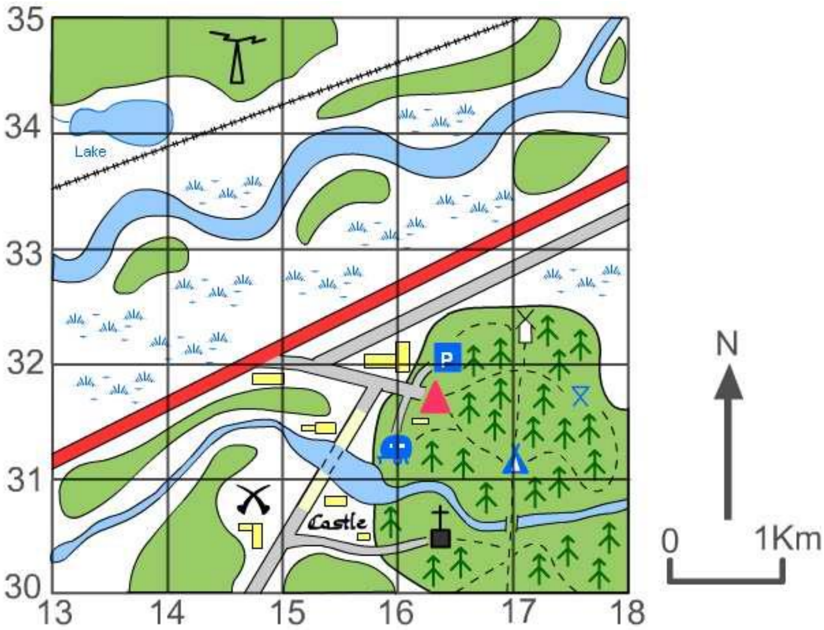
Grid references continued…

A **four-figure reference** on an Ordnance Survey map equals an area on the ground of one square k____________. One kilometre is quite a large area. To be more accurate we need to use a **six-figure grid reference**. This pinpoints a place exactly to within 100 metr



- Write down the **six figure** grid references for the following:

1. Picnic site ___________________
2. Church with a tower __________
3. Youth hostel _______________
4. Campsite ___________________
5. Castle _____________________
6. Car Park ___________________



Symbols

When drawing a map, it is important to include as much information as possible. However, adding a lot of detail can make a map confusing, so symbols (images, abbreviations and letters) are used to represent the main items.

The exam board is expecting you to know the main symbols used by the Ordnance Survey. However, **there is no need to learn the meaning of every symbol**, as a map extract will always be accompanied by a **key**.

However, it is important to at least **learn some of the basic symbols** so that map reading becomes easier.

- **Green bits** mean woodland (various types).
- **Blue areas** are either water, tourist information or motorways.
- **Roads** are colour coded. Blue= motorways, red= ‘A’ roads, orange/ brown = ‘B’ roads, yellow= local roads and white=tracks.
- **Contours** are thin brown lines that join areas of equal height at 10 metre intervals e.g. 10m, 20 m and 30 m above sea level.
- To help with height black dots with figures next to them are written on maps.

Draw the correct symbol in the box using the key at the back of the AQA textbook p.352.

Church with tower	Cemetery	Quarry
Main Road	Marsh	Rivers
Motorway	Coniferous Wood	Windmill
Footpath	Camp Site	Mixed Woodland
Parking	Radio/ TV Mast	Non-coniferous woodland
Information Centre	Post Office	Public convenience

Scale

The scale of a map allows a reader to calculate the size, height and dimensions of the features shown on the map, as well as d________________________ between different points.

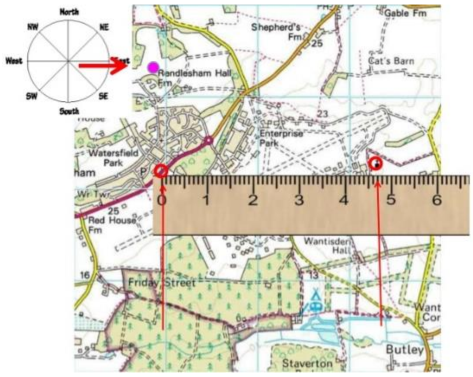
The scale on a map is the ratio between real life distances and how many times it has been shrunk to fit it on the map.

The maps in your exam will have a scale of 1:50 000 *(where 1cm = 50,000cm on the ground or 500m or 0.5 km)* **or a scale of 1:25 000** *(where 1cm = 25,000cm on the ground, or 250m or 0.25km)***.**

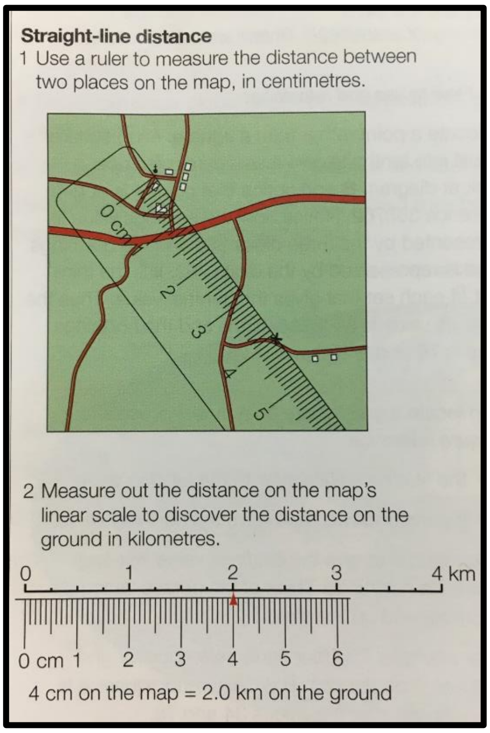
Remember!

1:25 000 map 1 km = 4 cm on the map.

1:50 000 map 1 km = 2 cm on the map.



Straight line distances



Straight line distances between locations can be calculated as follows:

- Simply place your ruler over both points and measure the distance in-between in cm.
- Convert into kilometres using the scale line.
- Or multiply your answer by 0.5 (1:50 000 map) or by 0.25 (1: 25 000 map).

Practice question:

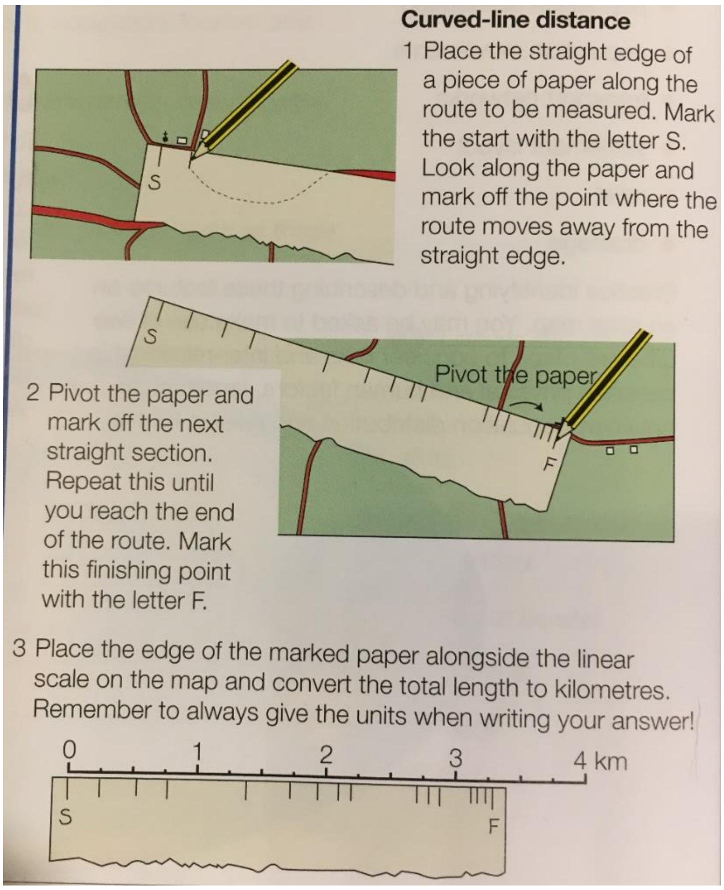
If the distance between a church and a campsite is 16cm, what would the real-life distance be on a:

a) 1:50 000 scale map __________

b) 1:25 000 scale map __________

Curved line distances

Measuring the distance along a curved or winding route such as a road or river is more complicated. This can be done by either using a piece of string or by splitting the road or river into straight sections. The easiest way to measure the distance along a winding route is by using a piece of paper or string.



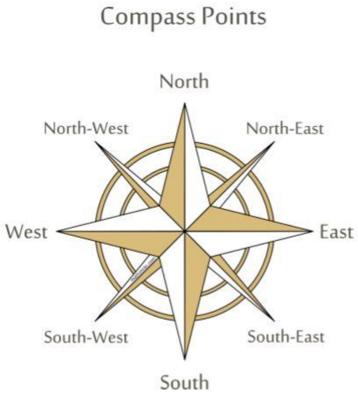
- Another method is to take a piece of string and place one end at the starting point.
- Carefully lay the string along the road or path, following the curves as closely as you can.
- When you reach the end mark it on your string with a pen.
- Now straighten the string along the scale line to work out the real-life distance.

Remember!

Take a ruler and a piece of paper / string into the exam to help you use the scale!

Compass direction

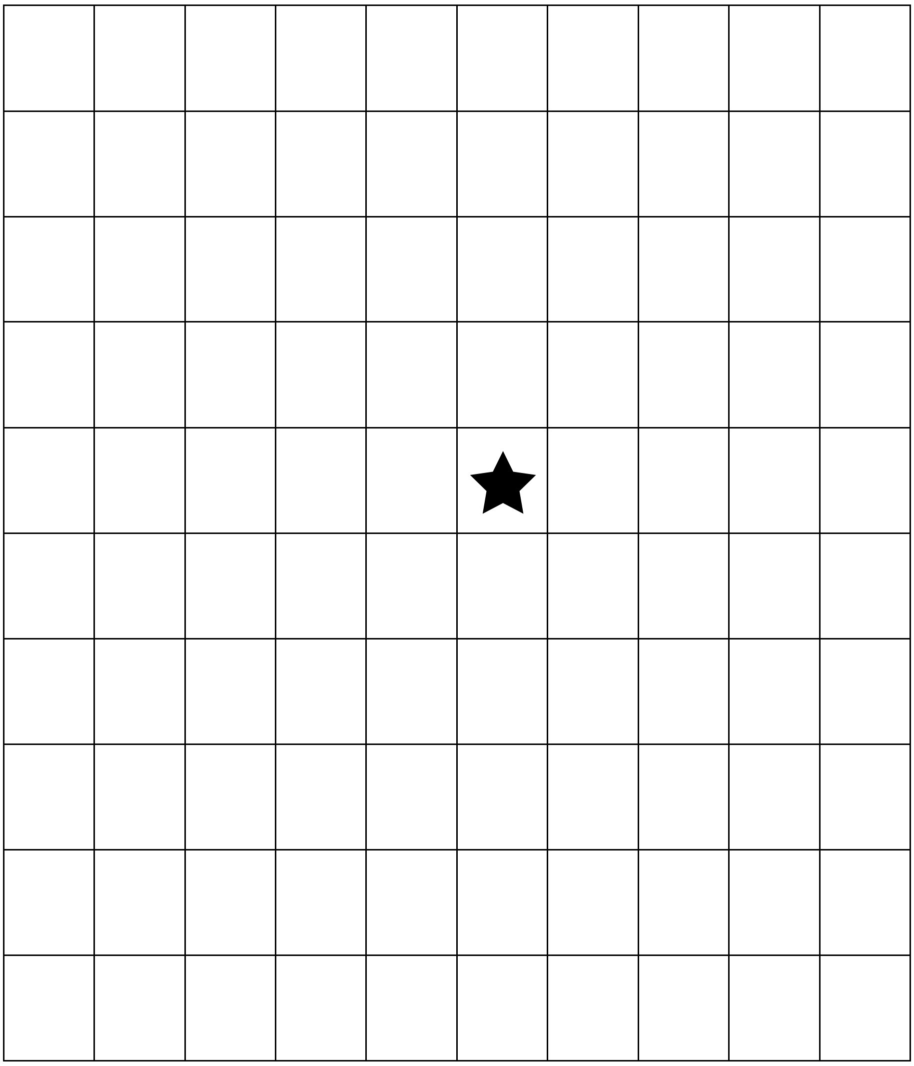
In the exam you will be expected to know the 8-point compass, shown below:



- The **top** of an OS map is always **north.**
- Remember to give the direction **from** one point **to another**.

Can you think of a rhyme to help you remember the points of the compass?

Practice questions



From the black star draw:

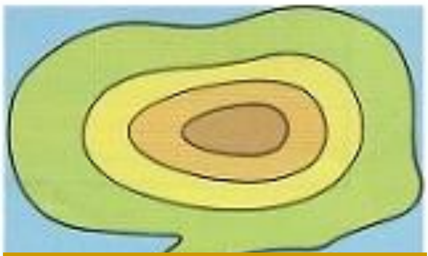
1. A green circle 3 squares north.
2. A blue square 1 squares south.
3. A yellow triangle 3 squares south east.
4. A pink heart 1 square north west.
5. A brown circle 3 squares east.
6. An orange square 5 squares west.
7. A purple heart 3 squares south west.
8. A blue triangle 2 squares north.

Contours, spot heights and gradients

Relief is a term, geographers use to describe the shape and height of the land. OS maps use two systems to illustrate relief, spot heights and contour lines.

C_______________ lines

S_____________ heights

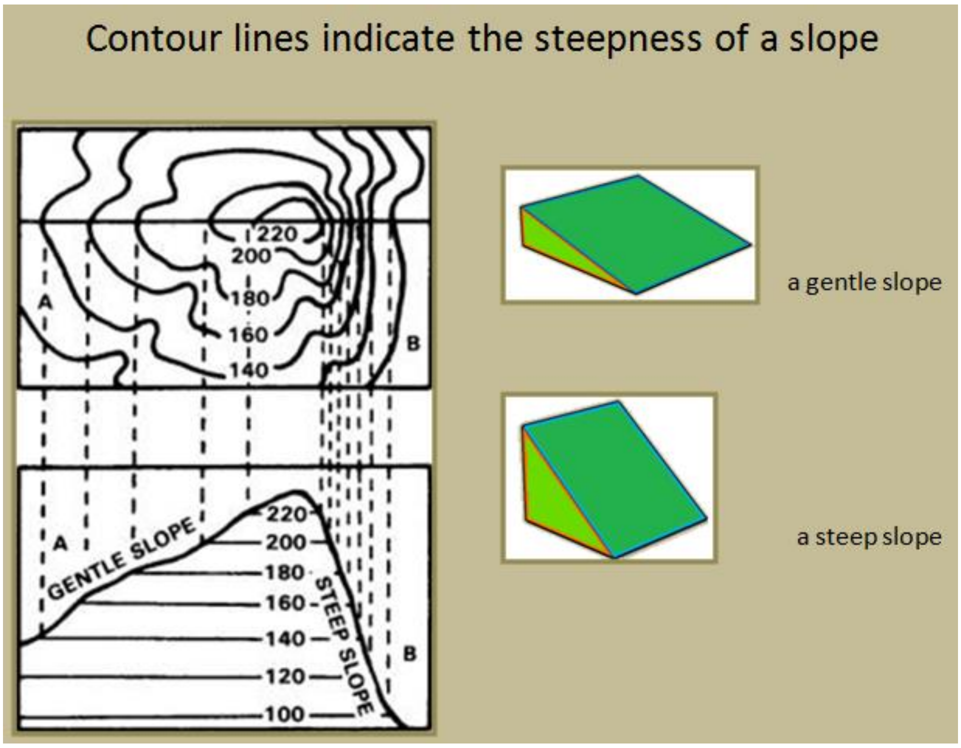


G_______________

Contour lines

A contour is a line drawn on a map that joins points of equal height above sea level in 10 metre intervals. Therefore, every point on a 50 metre contour line is 50 metres above sea level. Contours on OS maps are coloured light brown. The diagram below shows the link between the shape of a hill and the contours representing it on a map.

- ***Lines that are close together show a s________________ slope.***
- ***Lines that are far apart show slopes that are g_________________________.***



Spot heights

Spot heights are usually indicated by black dots with a height above sea level written alongside.

Ordnance Survey practice questions

Answer the following questions using the 1: 50 000 OS map extract on page 105 of the AQA textbook of the Swanage coast. Remember! *There is a key for the symbols used on page 352.*

1. Look at photograph B on p104 and the map extract. Which compass direction was the camera facing? ____

2. Give the four figure grid reference of the following features:
   a) Parking at Shell Bay ____________
   b) Studland Heath ____________
   c) Lighthouse off Studland Bay ____________
   d) Information Centre at Swanage ____________
   e) Whitecliff Farm ____________

3. Give the six figure grid reference of the following features:
   a) Triangulation pillar in 0177 ____________
   b) Town Hall (TH) in 0378 ____________
   c) Mast in 0181 ____________
   d) Public convenience in 0383 ____________
   e) Railway station in 0278 ____________

4. Using the scale at the bottom of the map (2cm = 1km) work out the **straight-line distance** between:
   a) Ballard Point and Peveril Point ____________
   b) Old Harry and South Haven Point ____________
   c) Anvil Point and Redend Point ____________
   d) Peveril Point and Anvil Point ____________
   e) The Pinnacles and Old Harry ____________

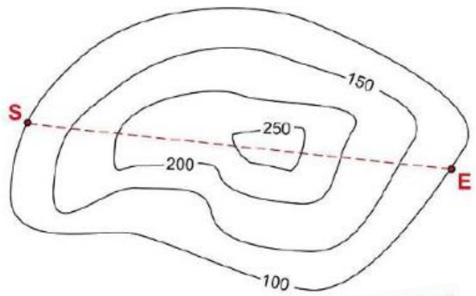
5. What is the height of the land at 013776? ______________________________________

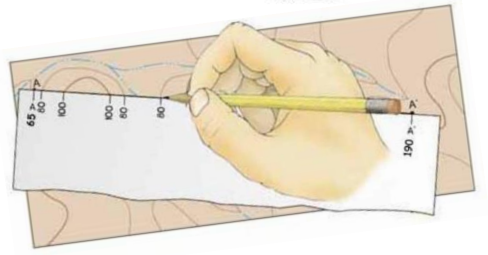
6. Describe the height and shape of the land at Ballard Down.
   ____
   ____
   ____
   ____
   ____
   ____
   ____

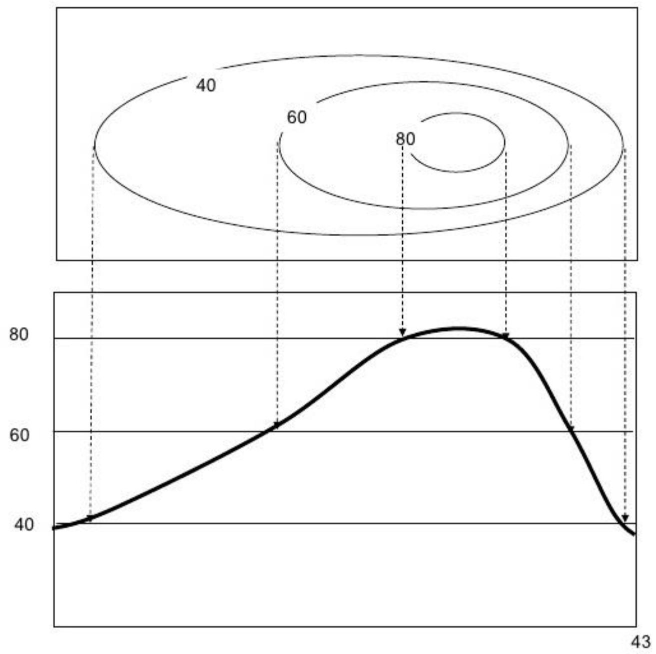
7. This area is popular with tourists. Write down or draw all the symbols on the map associated with tourism.
   ____
   ____
   ____
   ____
   ____
   ____

Drawing cross-sections

- A cross-section is an imaginary ‘slice’ through a landscape.
- It shows the changes in relief along a chosen line.
- It is a graph which shows distance along the x-axis and height on the y-axis.
- When drawing a cross-section, the scale used on both axes must be chosen carefully to show a true representation of the landscape.



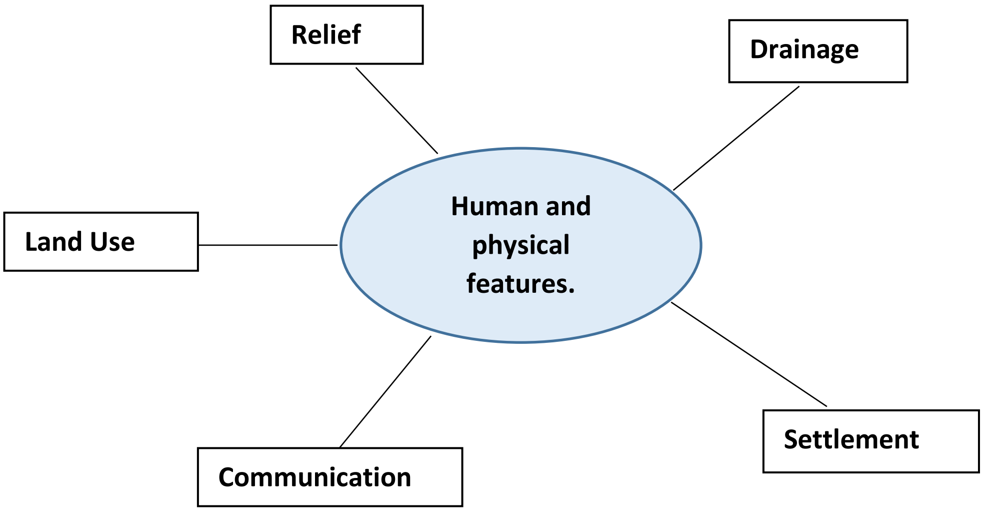




- Place the straight edge of a piece of paper along the chosen section.
- Mark the start and finish of the section.
- Mark contours along the paper.
- Draw the axes of a graph and chose an appropriate vertical scale.
- Lay the piece of paper along the horizontal axis.
- Mark each contour value on the graph paper.
- Join the points **freehand** with a curved line.

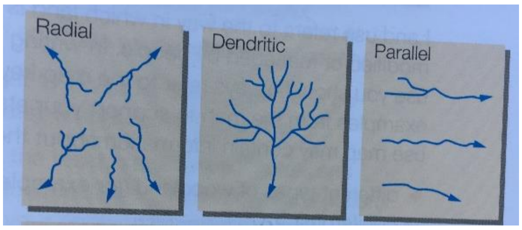
Exam Practice - Using the 1: 50 000 OS map extract of the River Tees near Darlington on page 123 of the AQA GCSE geography textbook, draw a cross-section from 360110 to 380130.

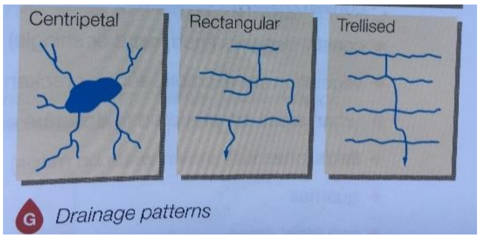
Interpreting the physical and human landscape – Colour code which features are human and which are physical on the spider diagram. Don´t forget to add a key.



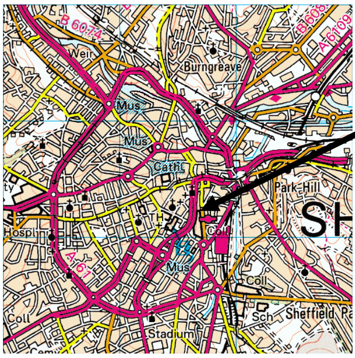
1. Relief – the height and shape of the land. To describe the land accurately you need to use **actual figures** taken from **spot heights** or **contour lines** and include the **units e.g. metres.**

2. Drainage – the presence of **water** and where it **flows**. To describe the drainage, you need to comment on the **direction they are flowing** (highland to lowland), the **drainage density** (the total length of the rivers), the **pattern** of the rivers (see below) and any evidence of **human activity** (straightening the channel/building embankments).



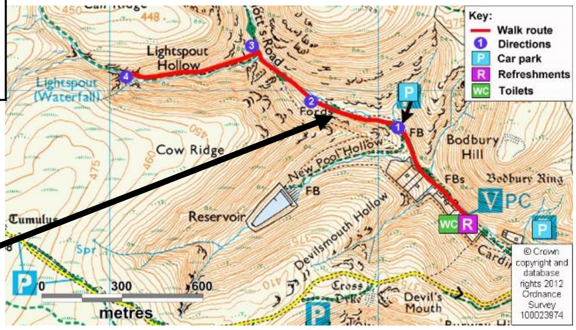


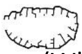
3. Communication – these can include many different types of transport, such as **roads, railways, footpaths, ferries, airports, cycleways.** To describe communication networks, you need to give such as length of feature, orientation (compass direction), patterns and density e.g. **ring road**. Roads, canals and railways often follow **flat land**, footpaths often follow **river valleys.**



Ring road around a city centre on OS map.

Footpath at the bottom of a valley.



4. Land Use – this is the way land is used or has been changed by people. To describe land use you need to use the **map key** and give **specific examples** to support your statements. Examples of land use which can be seen on OS map include: -
    - Woodland (coniferous or non-coniferous)
    - Coastal deposits (marsh)
    - Urban areas (housing, settlement)
    - Fields (white on OS maps)
    - Quarries 
    - Industrial areas (Wks)
    - Tourist sites (blue symbols)
    - Recreation

Practice questions

Using the OS 1:50 000 map extract of the River Tees near Darlington answer the following questions.

a) Describe the **relief** of the land in 3311.

____

____

b) Describe the **drainage** of Staindale Beck in 3707.

____

____

c) Describe of the pattern of **settlement** in 3810 (High Worsall).

____

____

d) Describe the route of the Teasdale Way **footpath.**

____

____

e) Describe all the types of **land use** in 3808.

____

____

Drawing sketch maps from OS maps

A sketch map is drawn to produce a simplified version of an OS map. It should focus on just a few key features, such as patterns of roads or rivers. Without lots of other information.

- Draw a **frame** using the same scale as the map.
- Divide the frame into **grid squares**. Write the **numbers** around the frame.
- Draw the features you need in **pencil**.
- **Label** and **annotate** your sketch as necessary.
- Add a **scale**, **north point** and **title.**

GCSE Exam Question

Look at the OS map extract on page 123 of the AQA textbook. Draw a sketch map of grid squares 3407, 3408, 3507 and 3508 on the grid below.

a) Draw the course of the river and the 20m contour line that runs alongside the river on either side. Draw any levees that have formed either side of the river. [***3 marks]***

b) Carefully label the following:
   - the meander
   - the floodplain
   - the direction of river flow
   - levees [***4 marks]***

3407

c) Explain how the course of the meander may change in the future?

[4 marks]

Drawing sketches from photographs

In a similar way to a drawing from a sketch map, a drawing from a photograph needs to identify the main features only.

- Draw a frame that is the same shape as the photograph.
- Draw one or two major lines for guidance e.g. a hilltop or river.
- Decide which features you need to show and concentrate on those features.
- Labels (single words or phrases) and annotations (more detailed descriptions) should always be added.

GCSE Exam Question

3.1 Look at photograph C on page 104 of the AQA textbook.

Draw a **labelled sketch** of main coastal features in the box below. Label the following landforms on your sketch:

- Cave
- Stack
- Wave-cut platform [***4 marks]***

3.2 Complete the following paragraph about how arches are formed.

Chose the correct words from the list below.

Cave **faults** **arch**

[2 marks]

Lines of weakness in a headland, such as ………………………………………………… are eroded by the energy from waves.

The rock wears away along a line of weakness to form a ……………………………………………

Over time, erosion may lead to the cave breaking through the headland to form an

…………………………………………………………

B: Graphical Skills

Do you know your graphs?

In the exam you will be expected to read and interpret information in a variety of ways, including graphs.

When describing what a graph a shows, remember:

*When asked to describe patterns or distributions on **graphs**, think about* ***PEA!***

Pattern

Example

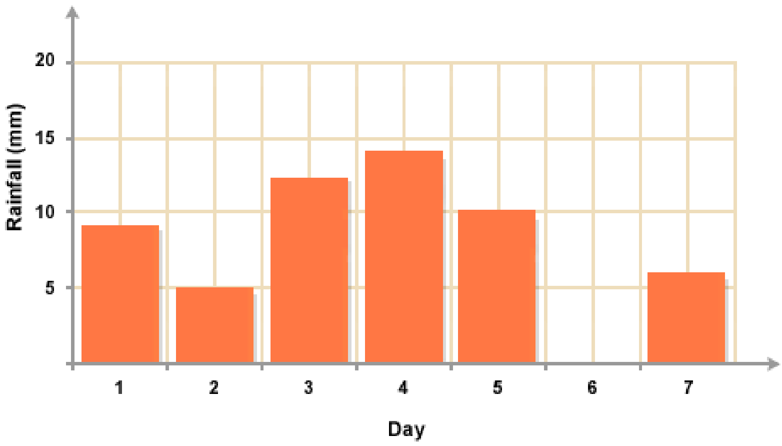
Anomaly

This is a very important skill. Use this acronym to help you write a quality description.

1. ***Pattern*** *- Give an overview. Describe the overall trends and patterns.*
2. ***Examples*** *– Give some evidence to support your description. Be specific – quote figures.*
3. ***Anomalies*** *- Are there any oddities in the data/trends? These are anomalies.*

1. Bar graphs

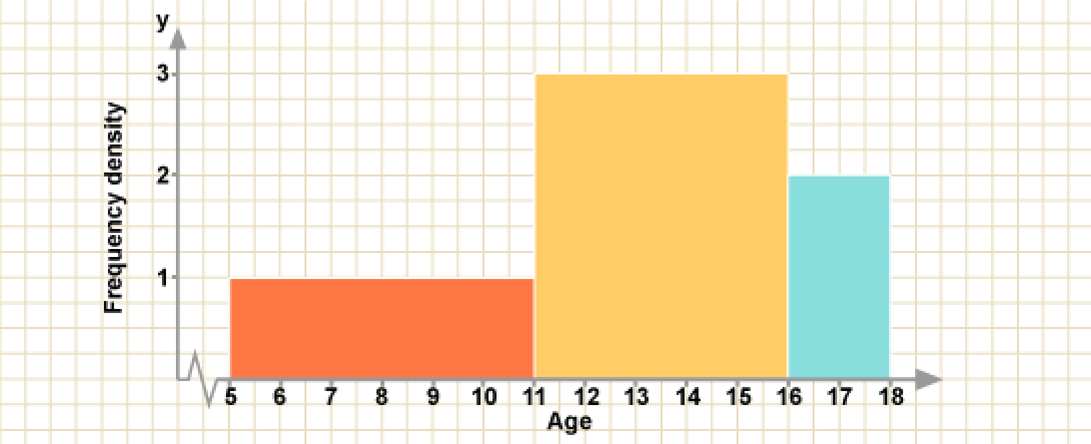
A bar chart is made up of columns of the same width. The height of the bar is proportional to the quantity represented. The **vertical scale** should be used for **% or absolute data**. The **horizontal** scale axis should be used for **discrete or categorical** data. All bar charts should begin at zero on the vertical axis.



Advantages of bar graphs	Disadvantages of bar graphs
• Commonly used so easily understood. • Show relative magnitudes very effectively. • As the scale passes through zero positive and negative values can be presented on one graph.	• Can be over complicated by including too many multiple bars.

2. Histograms

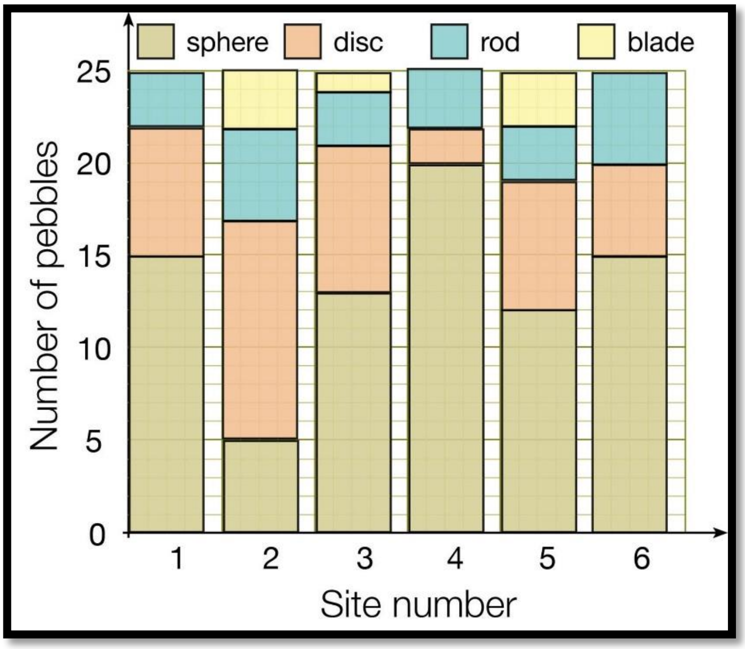
A histogram also uses bars with **no gaps** between them. It represents *continuous* data, for example over time. The values may all be part of a single sample and, **the bars are effectively connected**, a single colour or type of shading is used. There should be **equal class intervals between the bars**.

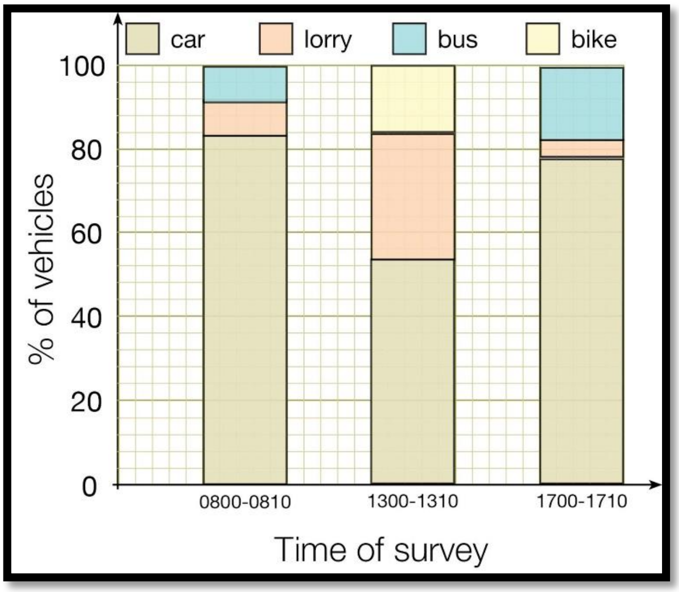


Advantages of histograms	Disadvantages of histograms
• It is easy to see trends over time as the bars are together.	• It can be difficult to read specific data as the bars are so close together.

3. Divided bar graph

It is possible to subdivide individual bars in order to show multiple data; this is called a **divided bar graph.** This type graph is often used to show percentages; it is a good alternative to a pie chart.





Advantages of divided bar	Disadvantages of divided bar
• It is easy to see the share of data sets as categories are colour-coded.	• It can be difficult to read specific data as some of the categories are small.

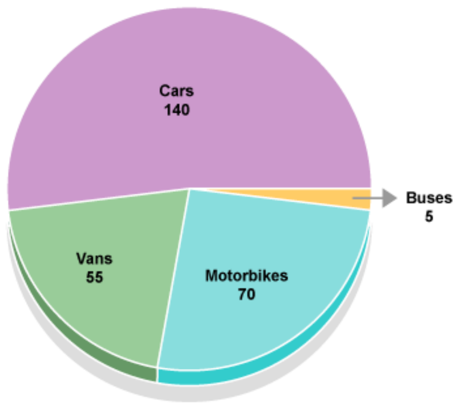
4. Pie chart

A chart is a circle divided into a segment; it shows the **proportions** of a total. Percentage figures are written inside or alongside the segments to interpret the diagram.

Remember!
The area of the circle is divided into segments according to the share of the total value represented by that segment.

- 100% = 360°
- To convert percentages to degrees, multiply the value by 3.6
- Use the formula X total x 360

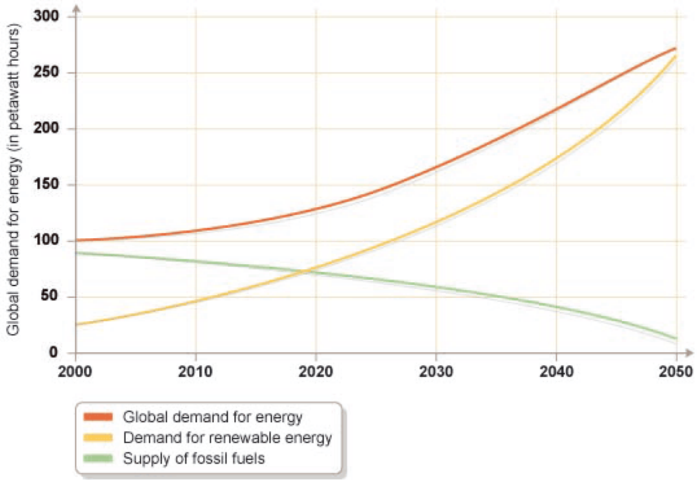
Tips
• Start from 12 O'clock position
• Draw smallest segment first



Advantages of pie charts	Disadvantages of pie charts
• A pie chart is a good way of showing how a total is divided up. • Visually effective - easy to see the relative contribution of individual segments to the whole. • Can be used on a map to give extra infomation	• Hard to assess % accurately from the pie chart, especially if the individual slices are small. • Comparing one pie chart with another at anything beyond a superficial level is difficult. • Small segments less than 5 degrees are difficult to draw.

5. Line graph

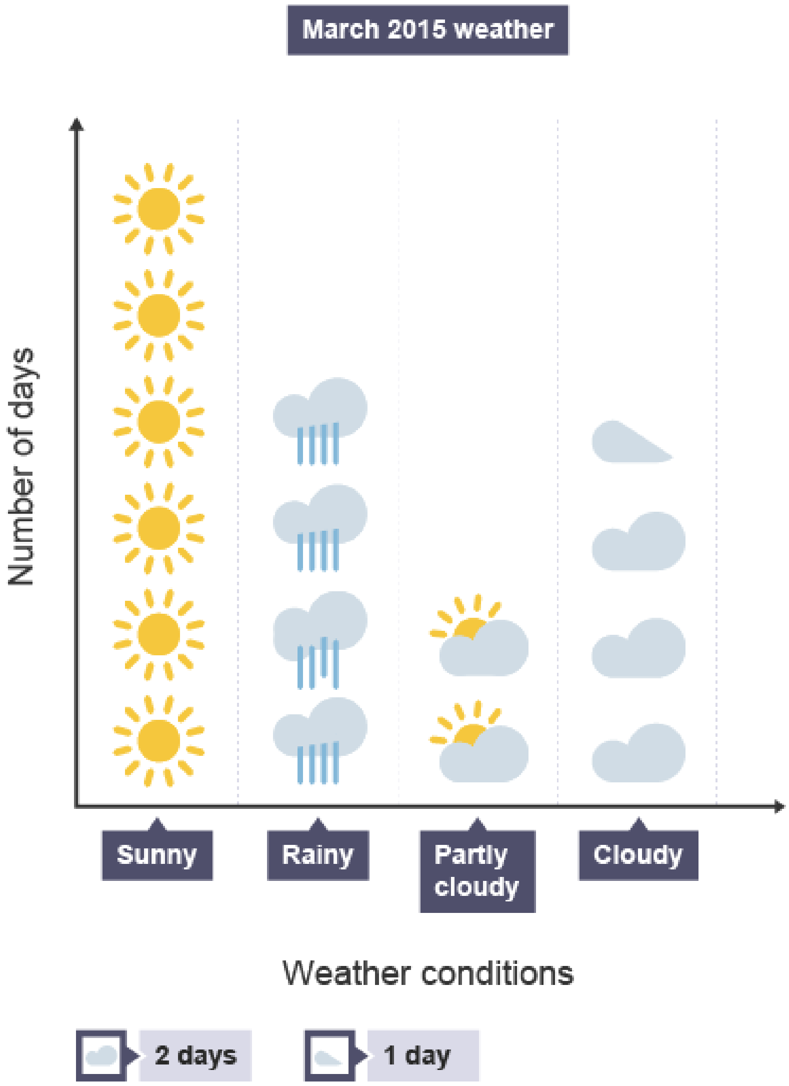
A simple line graph shows how one variable changes against another over time. The variables must have something to do with each other. **Time** is shown on the **horizontal axis** and must have **equal spacing**. These graphs are appropriate when you want to show absolute changes in data over time.



Advantages of line graph	Disadvantages of line graph
• Show changes over time clearly. • Show a large amount of a data on one graph. • Can be easily understood and require little explanation.	• The scale needs to be carefully considered to show trends accurately. • Works better with smaller sets of data.

6. Pictograms

A pictogram uses a pictorial symbols or icon instead of a bar. All **icons** must be the **same size** but **fractions of icons** can be used to represent values in between e.g. half.

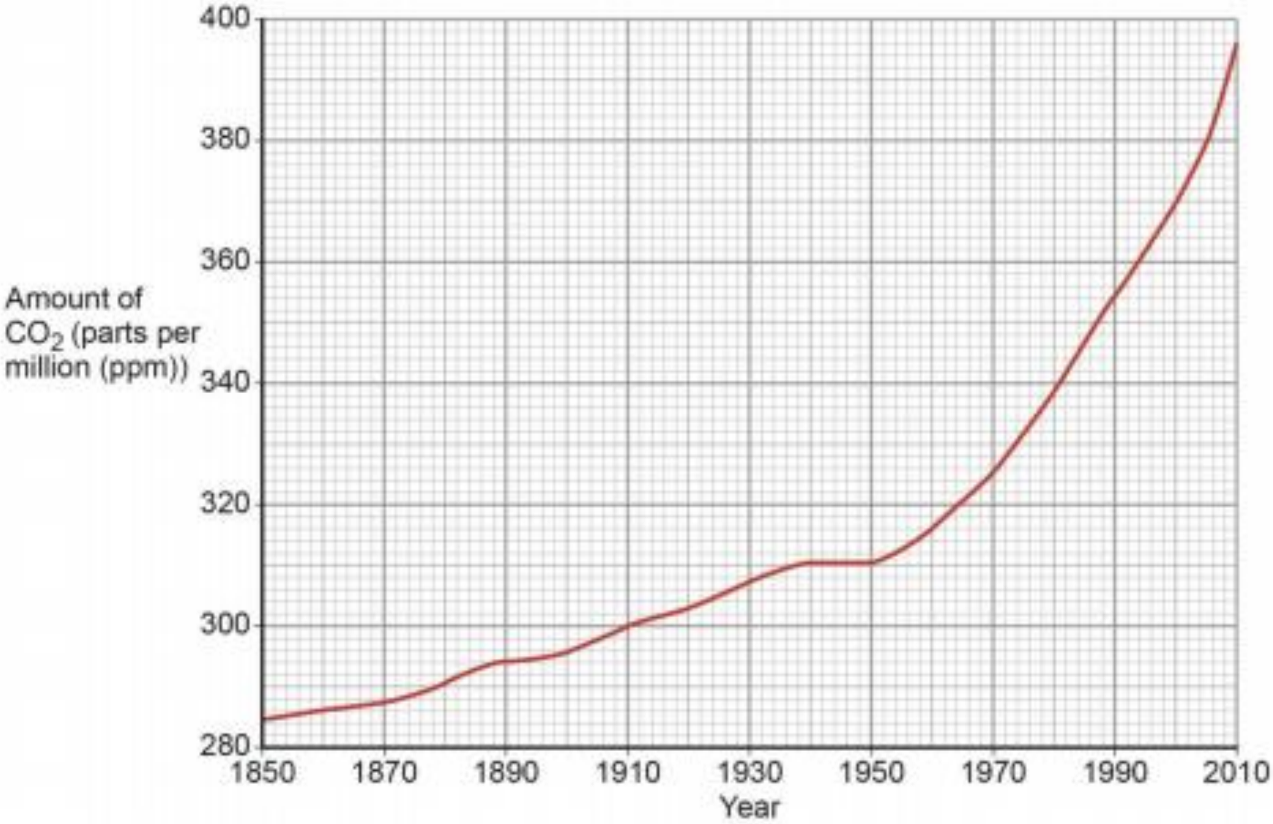


Advantages of pictogram	Disadvantages of pictogram
• Represents data effectively. • A visual technique, so easy to interpret.	• Can be difficult to draw as all icons must be the same size. • It can be difficult to extract precise data from the diagram.

GCSE Exam Question

Study **Figure 1**, a graph showing changes in the amount of carbon dioxide (CO_2) in the atmosphere.

Figure 1



0 1 . 1 Describe the change in the amount of carbon dioxide in the atmosphere shown in **Figure 1**.

[2 marks]

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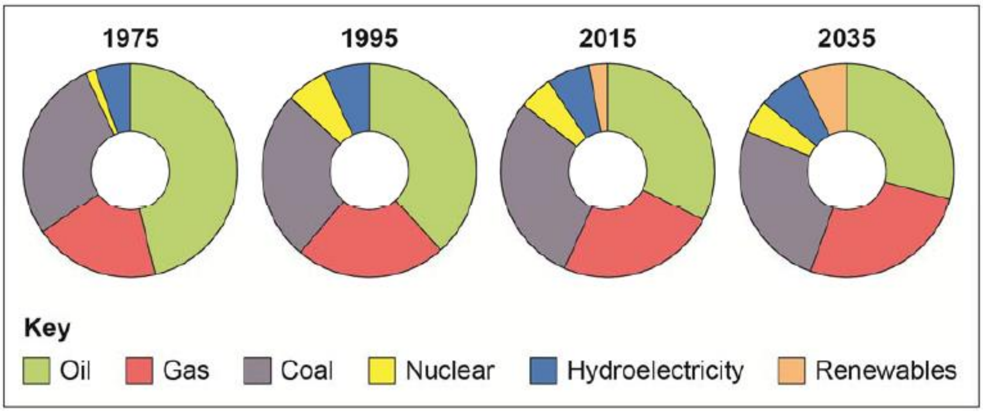
___

___

United Kingdom energy mix



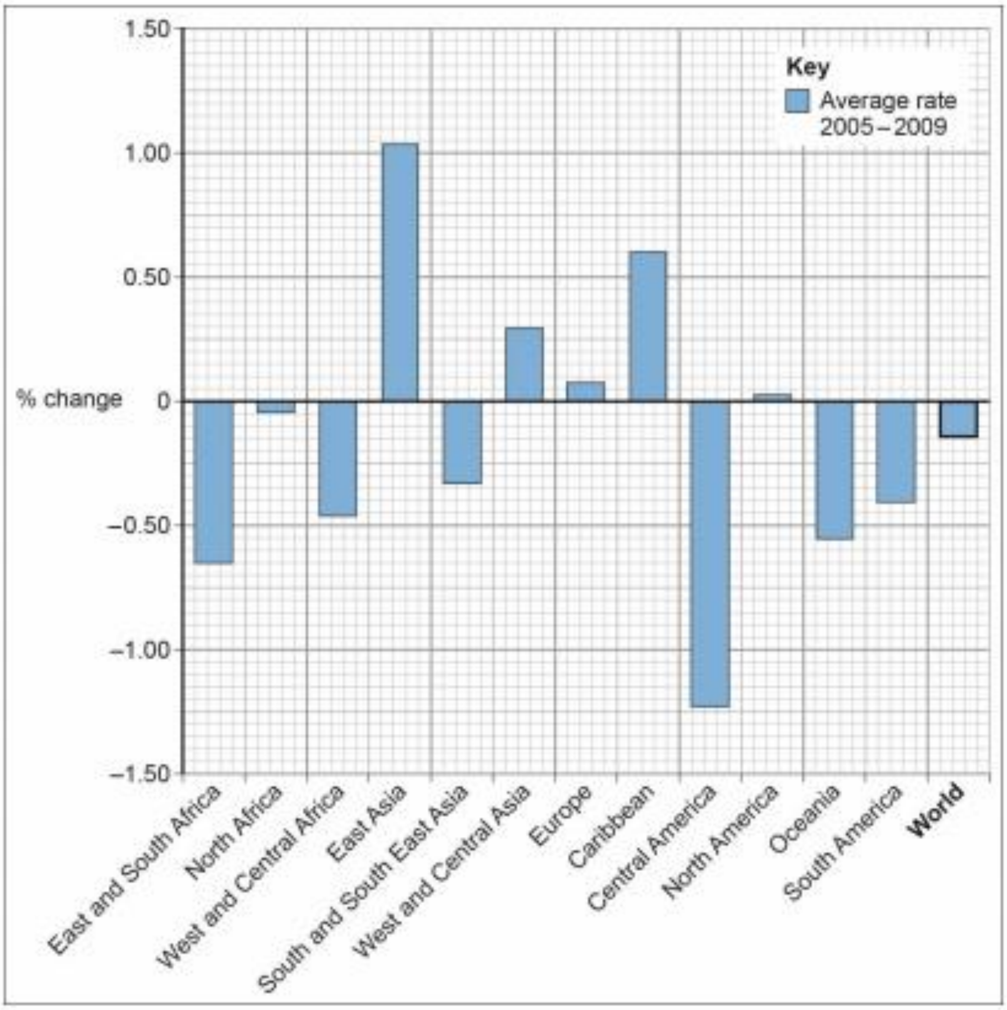
Study **Figure 1**, 'Energy in the United Kingdom', in the resource booklet.

0 1 . 1 Describe the changing pattern of total energy consumption in the UK between 1970–2015.

[2 marks]

Study **Figure 8**, which shows how the forested regions of the world changed between 2005 and 2009.

Figure 8



0 2 . 5 Which region of the world had the greatest rate of deforestation between 2005 and 2009?

[1 mark]

0 2 . 6 State the number of regions of the world where the rate of deforestation was greater than the world average rate of deforestation between 2005 and 2009.

[1 mark]

0 4 . 3 Study **Figure 5**, two sets of data collected by students who were carrying out a geographical enquiry about traffic problems in a town centre.

Figure 5

Car ownership in the town	
Date	**Number of Cars**
1950	3127
1960	4240
1970	4912
1980	5727
1990	6520
2000	7983
2010	8920

How people travelled to the town centre (sample of 100 people)	
Car	62
Walk	17
Bus	15
Motorcycle	3
Cycle	3

The following four methods were considered for presenting the data shown in **Figure 5**.

A Pie chart

B Line graph

C Proportional symbol map

D Flow line map

Which method (A, B, C or D) would be most suitable for presenting each set of data?

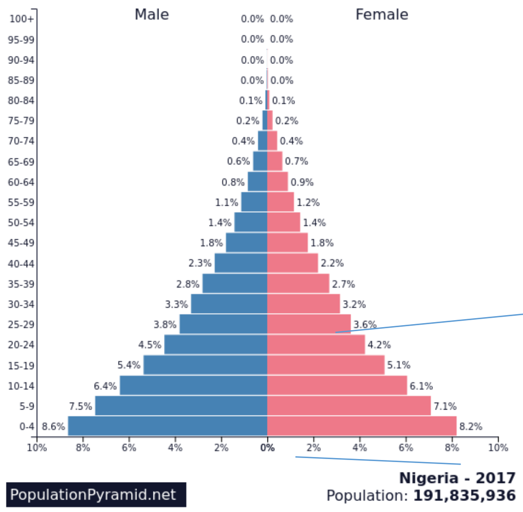
[2 marks]

Data shown in Figure 5	Presentation method
Car ownership in the town	
How people travelled to the town centre	

7. Population Pyramids

A population pyramid is a type of **histogram** showing the proportions of a population in different **age** and **gender** categories. It is usually shaded; males are the proportion of males are shaded **blue** and females are **red/pink**. Population pyramids show the **structure** of a population and the **shape** of the pyramid provides valuable information for the future provision of **health care, schooling and housing.**

Few people live into their old age so life expectancy is low.



Steep sides 'pyramid shape' indicates high death.

A wide base indicates a high birth rate.

Want to know more?

Look an annotated population pyramid for the UK on page 339 of the AQA textbook. How i

There is more information about population pyramids on pages 200-201 in 'The Developme

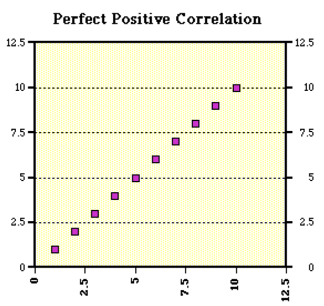
8. Scatter graphs

A scatter graph shows the relationship between two variables by the distribution of dots. It is usual that the **dependent variable** is placed on the y-axis (Vertical), and the **independent variable** on the x-axis. Dots are plotted on the graph using the two sets of data as coordinates. The arrangement of dots can then be examined to see if there is a positive relationship (as one variable increases so does the other), a negative relationship (as one variable increases the other decreases) or no relationship (there is no recognisable pattern to the distribution of dots).

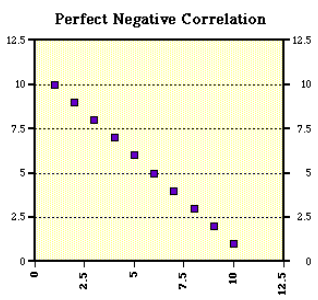
A best fit line is drawn that comes close to as many points on the graph as possible.

There are three possible relationships

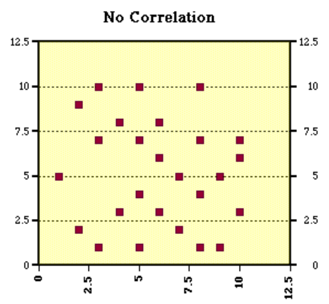
Positive



Negative



No relationship

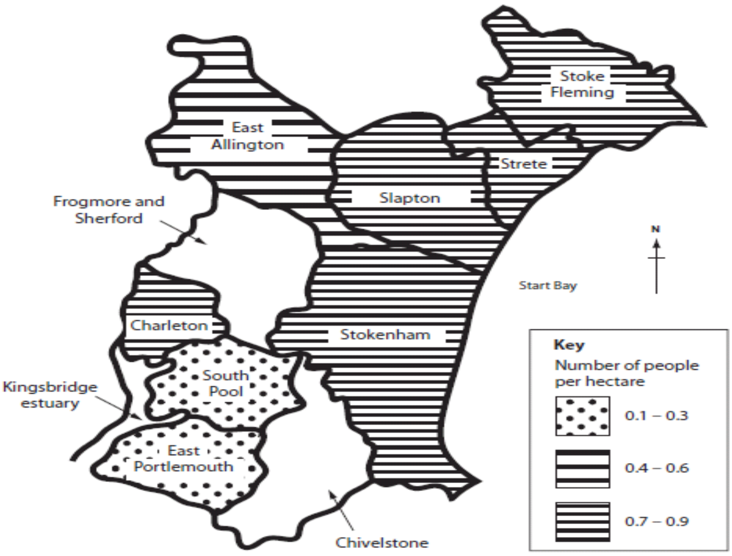


Advantages of scatter graphs	Disadvantages of scatter graphs.
• Shows a trend in the data relationship • Retains exact data values and sample size	• Hard to visualize results in large data sets • Flat trend line gives inconclusive results • Data on both axes should be continuous

• Shows minimum/maximum and outliers	• Positioning the line of best fit is subjective

9. Choropleth maps

A choropleth map uses **different colours** or **different densities of the same colour** to show the distribution of data categories.

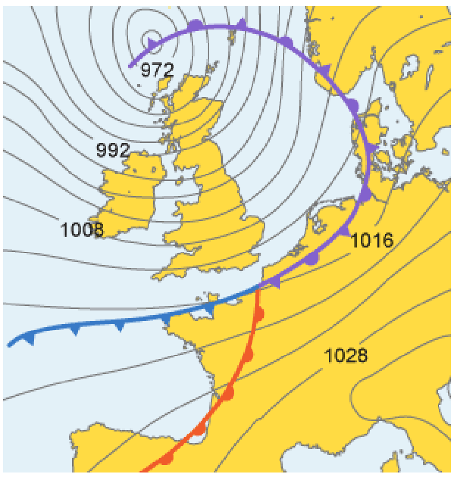


Advantages of choropleth maps	**Disadvantages of choropleth maps**
Different colours or shading make it easy to interpret.	There may be significant variations at a local level e.g. within a region.
Data is presented by country/region/county which makes it easy to see patterns and analyse.	A choropleth map suggests there are abrupt changes in boundaries, which is not usually the case.
The data can be grouped so that is easy to see the spread of values.	The intervals for the values need to be chosen carefully.
Give a good indication of how changes can happen over space.	

10. Isoline maps

An isoline uses lines of equal value to show patterns (‘iso’ means ‘equal’). Isoline maps can be tricky to draw but are a good way of showing patterns when put onto a base map.

One type of isolines you already know is contour lines on a map. They show areas of same height.

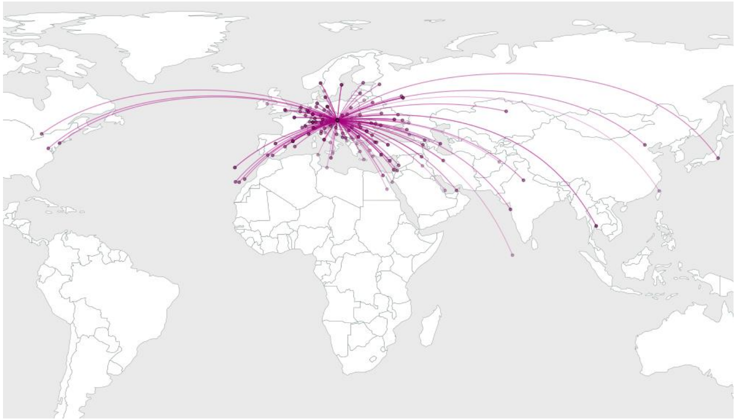


Some of the most common types of isoline maps show weather and climate. The map **opposite joins points of equal pressure** as an isoline.

11. Desire line map

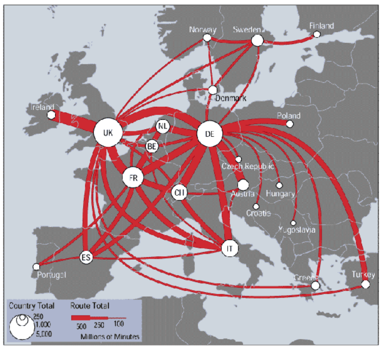
A desire line map shows the movement of people or goods between places. They may also be **proportional** and show **distances** between places and show the **spatial density** of the data represented. They do not show the **exact path of movement**, however.

When drawing a desire line map, each line should be positioned accurately to show where it starts (source) and ends (destination).



12. Flow line maps

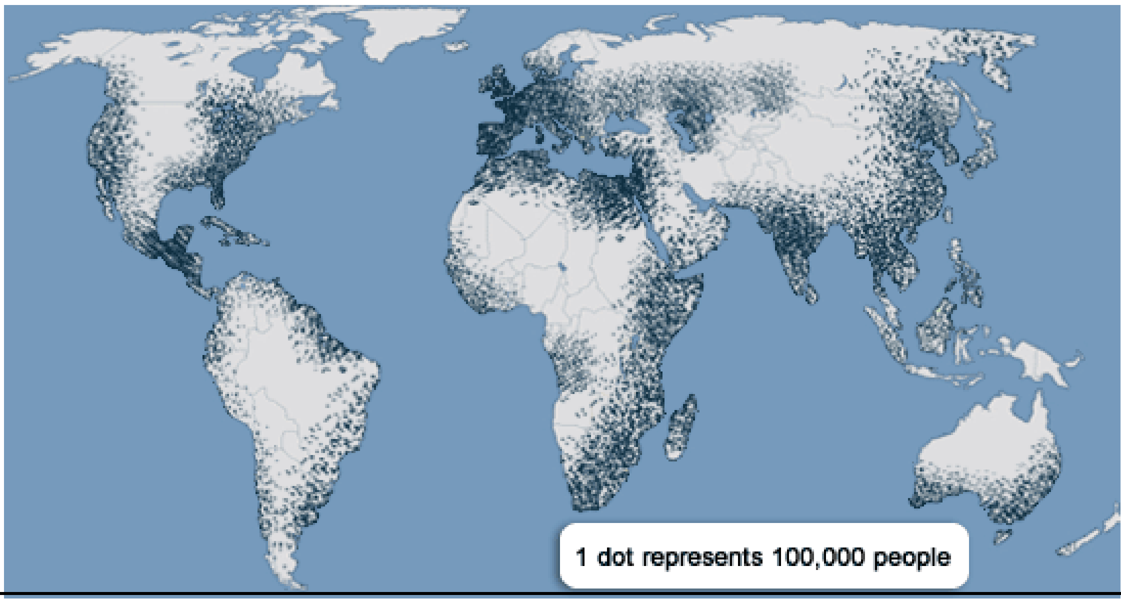
This technique indicates the **direction** and **volume** of movement, with the thickness of the line representing the volume. They show the movement between places by connecting the **source** with the **destination**



Flow lines can be drawn on a base map but, but an appropriate scale is needed to avoid flow lines **crossing over each other**.

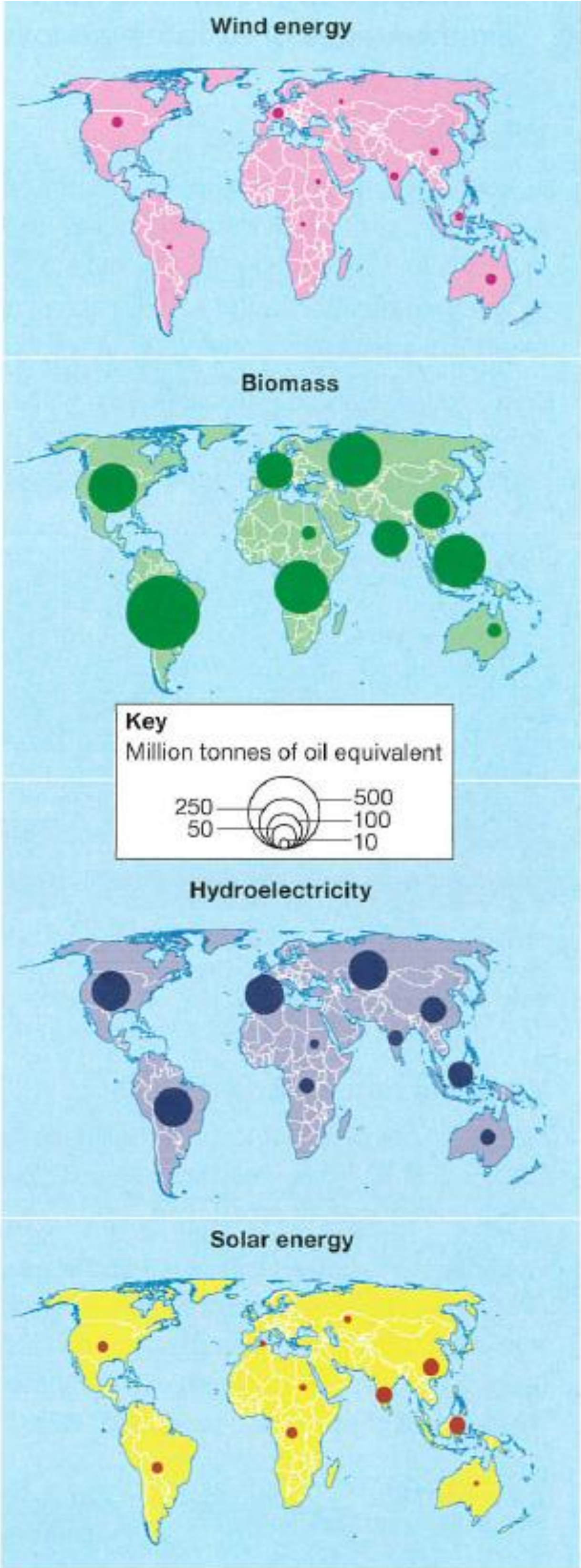
13. Dot maps

Dots are used to represent a particular value of number and are located accurately on a map. The number and density of dots represents the data but it can be difficult to interpret accurately.



14. Proportional symbols

Proportional symbols are a useful way to show data on a base map where **spatial variations** can be seen.



B Potential sites for global renewable energy production

The area of the circle needs to be proportional to the data.

How much hydroelectricity and wind energy could be made in Brazil?

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____
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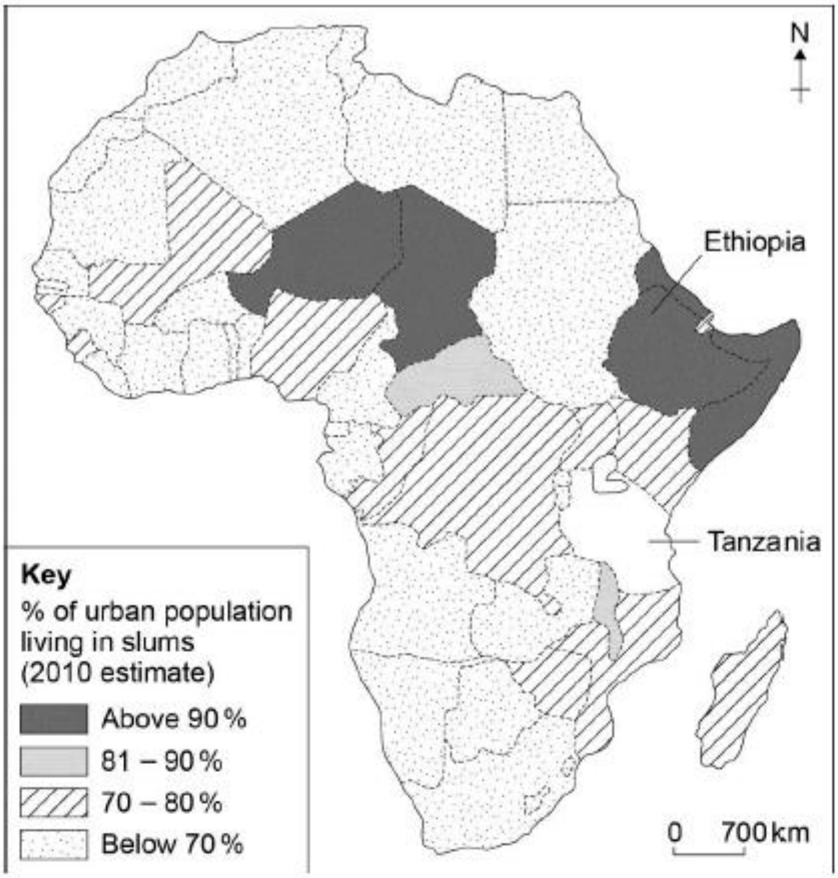
Study **Figure 3**, a choropleth map showing the percentage of the urban population living in slums in African countries (2010 estimate).

Figure 3



0 2 . 1 Complete **Figure 3** using the information below.

[1 mark]

Estimated percentage (%) of urban population living in slums:

Tanzania – 80%

0 2 . 2 What is the estimated percentage of urban population living in slums in Ethiopia?

Shade **one** circle only.

A Above 90% ○

B 81–90% ○

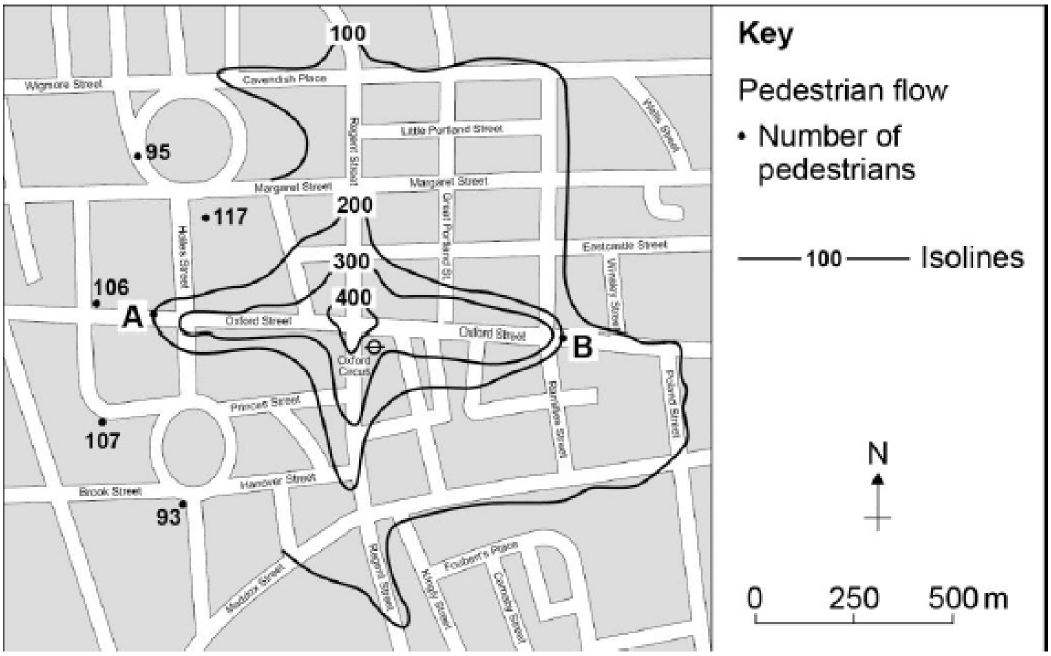
C 70–80% ○

D Below 70% ○

[1 mark]

Figure 8 is an isoline map of pedestrian flow in part of London using results from a 5 minute pedestrian count.

Figure 8



0 4 . 2 Complete the isoline for 100 pedestrians shown on **Figure 8**.

[1 mark]

0 4 . 3 Describe the pattern of pedestrian flow shown on the completed map.

[2 marks]

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0 4 . 5 Explain why the pattern of pedestrian flow shown in **Figure 8** may not be accurate.

[2 marks]

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C: Statistical Skills

Geographers frequently use numbers and data sets. Statistics are an important part of any geographical investigation as they help to identify patterns and trends.

Remember!

In the exam you may be asked to **spot weaknesses** in the presentation of selected data. This might involve identifying **incorrect labelling of axes** or **inaccurate interpretation of trends.**

1. Measures of central tendency

Central tendency is a description of the **'average'** within a data set. There are three ways of measuring the central tendency:

- **Mean**
- **Median**
- **Mode**

Mean

Calculated **by adding up all the values** in a data set and **dividing by the number of values**.

Mean

Add all the numbers then divide by the amount of numbers

9, 3, 1, 8, 3, 6

9 + 3 + 1 + 8 + 3 + 6 = 30

30 ÷ 6 = 5

The mean is 5

Median

This is the **central point** value in a **ranked set of data.** If there is an **even number** of values, the median lies **halfway between the two central values**.

Median

Order the set of numbers, the median is the middle number

9, 3, 1, 8, 3, 6

1, 3, 3, 6, 8, 9

The median is 4.5

Mode

This is the **most common value** in a data set. If there are **no repeated values,** there is **no mode**.

Mode

The most common number

9, 3, 1, 8, 3, 6

The mode is 3

3. Measures of spread

Central tendency is useful but they do not indicate how the values in a data set are **spread around the average.**

The **range** is the **difference between the highest and lowest values.**

Range

The difference between the highest number and lowest number

9, 3, 1, 8, 3, 6

9 - 1 = 8

The range is 8

4. Quartiles and inter-quartile range

Dispersion graphs are particularly useful because they show the **range** of data and are useful to make **comparisons** between data, such as sites. The inter-quartile range is a more accurate way of showing the spread of data because it does not include the **extremities**.

How to calculate the inter-quartile range

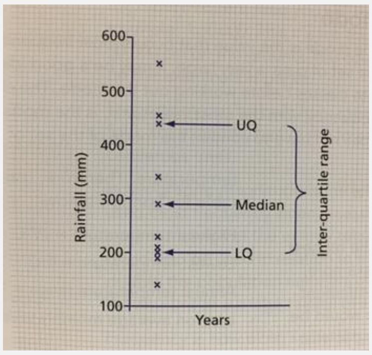
- The IQR is calculated by writing the all the data in **rank order** from **lowest** to **highest** or **plotting it on a dispersion graph.**
- The values are then divided into four equal groups or **quartiles.**
- The number of values is known as ***n***.
- The **upper quartile (UQ)** is calculated as follows:-

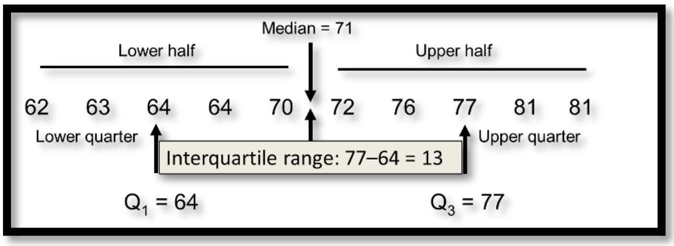
$$\frac{(n+1)}{4}$$

- The **lower quartile range (LQ)** is calculated as follows:-

$$\frac{3(n+1)}{4}$$

- The difference between these two values is known as the **IQR.**





United Kingdom

1900: 15% working in tertiary sector

2006: 74% working in tertiary sector

Step one: 74-15 = 59

Step two: 59/15 = 3,9333

Step three: 3,9333x100 = 393,333%

Percentage increase was 393,333%

5. Percentage change

Percentage change is a good way to **describe changes over time** or **compare sets of data.**

How to calculate the percentage change.

- Work out the difference between the two numbers (NEW number minus ORIGINAL number).
- Divide the result (the *INCREASE*) by the *ORIGINAL* number.
- Multiply the answer by 100 to give a percentage.
- If it is a **positive number there is an increase,** if the answer is **a negative number there is a decrease.**

6. Describing relationships in bivariate data

The term **bivariate data** simply means the data for **two variables** that are related. Bivariate data is usually plotted as a **scattergraph**. The **dependent variable** is plotted **along the side (*y axis*)** and the **independent variable** is plotted **along the bottom (*x axis*)**.

Example of bivariate data

- **GDP** and **energy consumption** is an example of bivariate data.
- We can expect the **amount of energy consumed** to **increase** as the **wealth of a country (GDP) increases**. So, energy consumption is **dependent** on GDP.
- Therefore, **energy consumption** can be said to be the **dependent variable (*y axis*)** and **GNP** the **independent variable.**

GCSE Exam Question

Question 2 **The changing economic world**

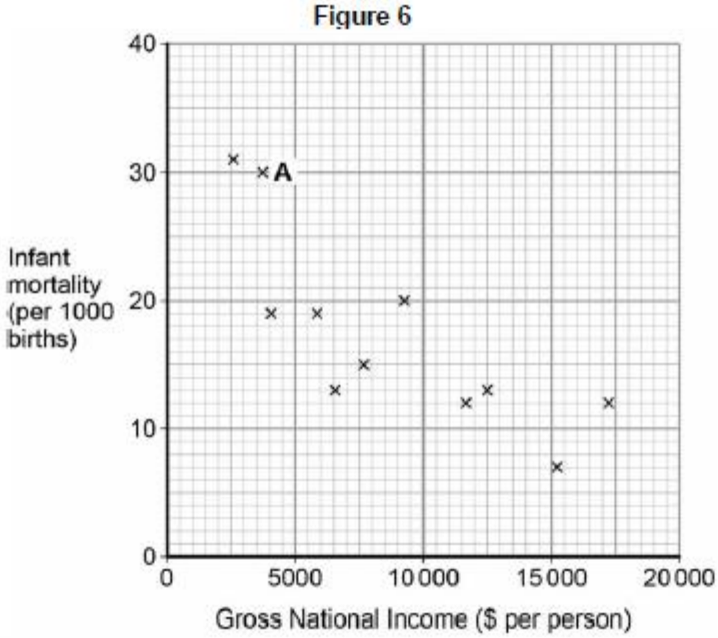
Study **Figure 5**, a table showing Gross National Income (GNI $) and Infant Mortality for a number of South American countries.

Figure 5

Country	**Gross National Income 2013 ($ per person)**	**Infant Mortality 2013 (per 1000 births)**
Argentina	17 250	12
Brazil	11 690	12
Bolivia	2 550	31
Colombia	7 590	15
Chile	15 230	7
Ecuador	5 760	19
Guyana	3 750	30
Paraguay	4 010	19
Peru	6 270	13
Suriname	9 370	20
Uruguay	15 180	10
Venezuela	12 550	13

Study **Figure 6**, a scattergraph showing the information in **Figure 5**.

Figure 6



0 2 . 2 Complete the scattergraph by plotting the data for Uruguay.

GNI: 15 180

Infant mortality: 10

[1 mark]

0 2 . 3 Draw a line of best fit (trend line) on the scattergraph to show the relationship between GNI and infant mortality.

[1 mark]

0 2 . 4 Suggest **one** reason for the relationship between GNI and infant mortality shown on the scattergraph.

[2 marks]

0 2 . 5 Using the data in **Figure 5**, calculate the average infant mortality rate for the twelve countries shown.

Show your working in the space below.

[2 marks]

As part of an enquiry collecting primary physical geography data, a student measured pebble sizes at one location on a beach.

The results are shown in **Figure 9**.

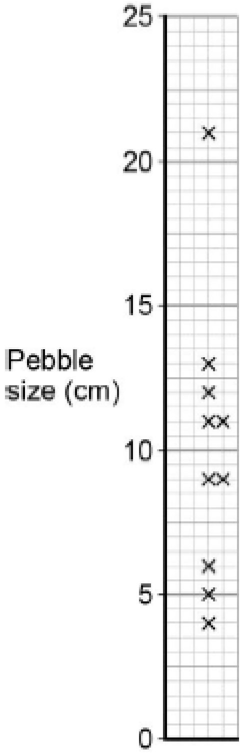
Figure 9

Pebble size is measured along the long axis.

Sample	Pebble size in centimetres
1	12
2	5
3	7
4	9
5	4
6	11
7	9
8	11
9	6
10	13
11	21

0 4 . 6 Complete the dispersion graph below using the data for Sample 3 in **Figure 9**.

[1 mark]



0 4 . 7 Suggest **one** way in which the data collection technique in **Figure 9** could be adapted to make the sample more reliable.

[1 mark]

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0 4 . 8 Using the data in **Figure 9**, calculate the interquartile range of the pebble size data.

Show your working in the space below.

[2 marks]

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Interquartile range = ____________ cm

0 4 . 9 Describe the pebble size data shown on the dispersion graph in **Question 04.6**.

[4 marks]

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Turn over for the next question