St Peter's Primary School
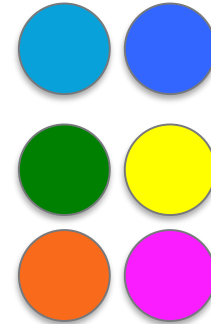
Mathematics Workshop

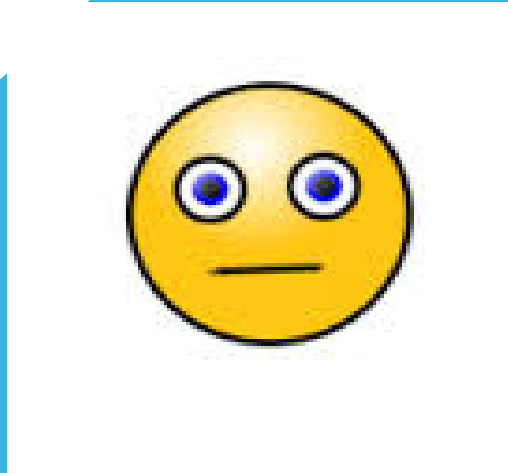# TOM KEEPS HIS TOY CARS IN THREE BOXES
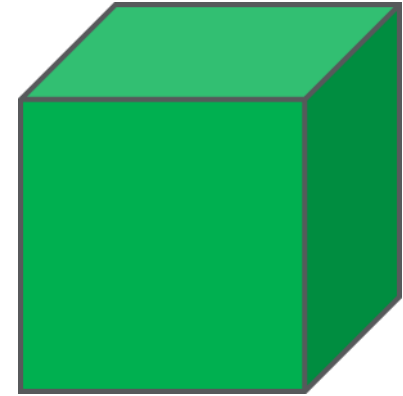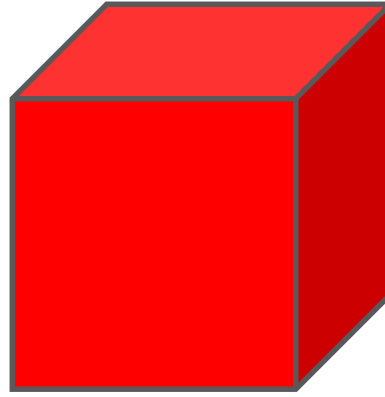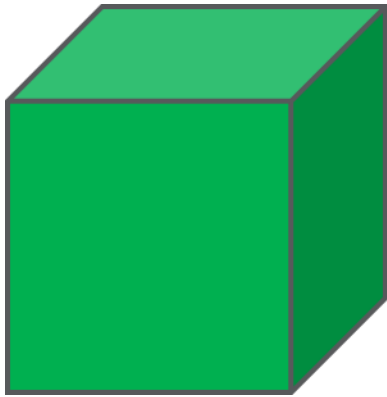
Tom has less than 30 cars. How many cars could be in each box?
What number of cars could Tom have if he had the same number of cars in each box? Give three different answers.

It is important that children are able to solve problems that have more than one answer.

On a scale of one to ten, how much do you honestly enjoy mathematics?

NATIONAL CURRICULUM AIMS FOR CHILDREN

To become _**fluent**_ in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop _**conceptual understanding**_ and the ability to recall and apply knowledge rapidly and accurately

**To reason** mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language

To solve problems by _**applying**_ their mathematics in a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

At St Peter's we aim for our children:

- to be an active participant in their own learning.
- To be confident and numerate.
- to be _fluent_ in their mathematics at the appropriate level.
- to be able to _reason_ about their learning using the correct mathematical vocabulary.
- to be able to _apply_ their skills and knowledge as they progress, through _sustainable_ learning.
- _to develop an appreciation that mathematics is a key skill that equips them for life._
- To _enjoy_ mathematics

AIMS FOR THE WORKSHOP TODAY

To have some fun with maths

To consider why learning basic skills is so important

To look at some of the strategies used in school

To think about ways you can support your children at home.

To ask any burning questions.

COUNTING IS A CRUCIAL SKILL!

Why?

- Helps pupils to make sense of the number system at all stages; whole numbers, decimals and fractions.

- Helps them to calculate.

COUNTING IS CRUCIAL

Counting on and back in different steps is one of the most important things you can do with your child. ***This is the basis for times tables***

Reason about the counting and you elevate it to a new level.

Small cakes cost 25p each plus 25p for a bag.
Jay paid £3.50 for a bag of cakes.
How many cakes did he buy?
(this is an example that children in KS2 would be able to solve easily if they were used to counting in steps of 25 and had made the link that 4 x 25 = 100.)

I HAVE TRIED AND TRIED

A few children find it almost impossible to retain times table knowledge so they need other strategies. However, most children can learn 2s, 5s and 10s.

Then try to encourage your child to learn all the square numbers e.g.

2x2, 3x3, 4x4, 5x5 etc. This will give them a good starting point.

Multiplication Grid

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

The red numbers indicate how many tables you know if you know 2s, 5s 10s and square numbers.

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

The red numbers indicate how many tables you know if you know 2s, 5s 10s, square numbers and prime numbers.

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

EXPECTATIONS OF TIMES TABLE KNOWLEDGE IN YEARS 5 AND 6

540 ÷ 90   620 ÷ 0.5

18 x 12   470 x 0.5

5/7 of 350   700 x 0.9

8 x 0.7

180 ÷ 6

The government are introducing a times tables test for children in Year Four. By the end of Year Four children are expected to know all tables to 12 x 12. This includes division facts.

It is crucial that children can explain their thinking using the appropriate vocabulary. This not only embeds their own learning but supports the learning of others through hearing quality explanation.

The use of visual images and practical resources is crucial to the ***conceptual understanding*** of mathematics and supports children's

talk.

Conceptual understanding means that children are confident with the mathematics involved and don't just follow a process.

BEING ABLE TO DRAW A RESPONSE DEVELOPS REASONING AND SHOWS CONCEPTUAL UNDERSTANDING

Draw something to prove to me that:

- 7 is an odd number

- An odd number divided by 2 will always have a remainder of 1

- 2/4 is equivalent to ½

- 30 + 5 = 20 + 15

No words or numbers allowed.
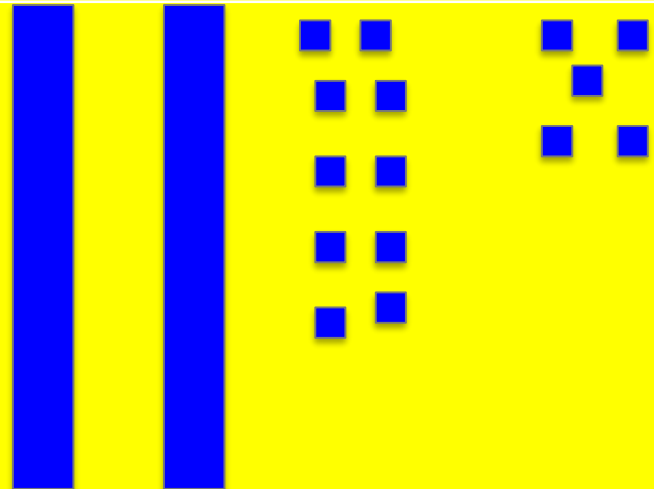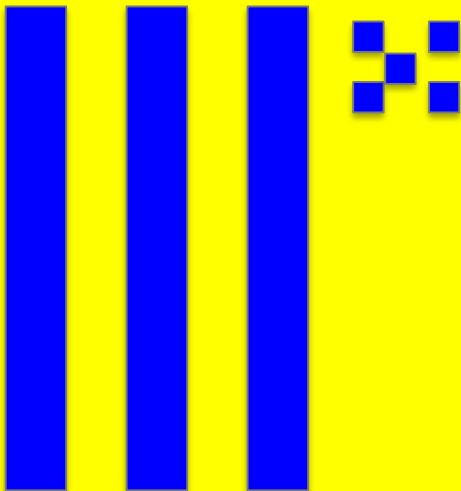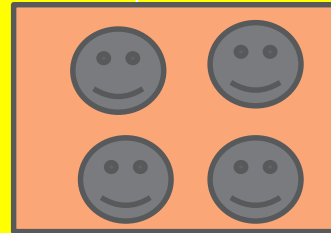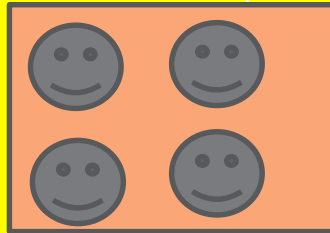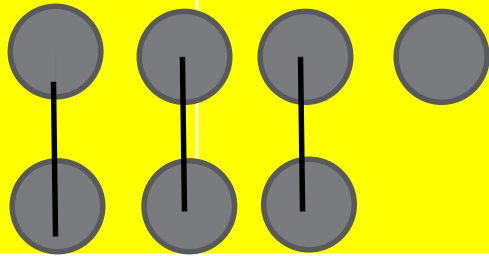
CHILDREN NEED TO LEARN MATHEMATICS IN A SENSORY WAY.

- *What I hear, I forget; What I see, I remember; What I do, I understand."*

– Old Chinese proverb, sometimes attributed to Confucius

THERE ARE LOTS OF WAYS TO LEARN.

There is no single, exclusively correct learning style in mathematics. We learn things in a variety of ways.

How would you do this calculation?

57 - 29

Counting back strategy

Number bonds

Subtracting a single-digit number from a tens number

Subtracting a multiple of ten from any number

Partitioning numbers efficiently

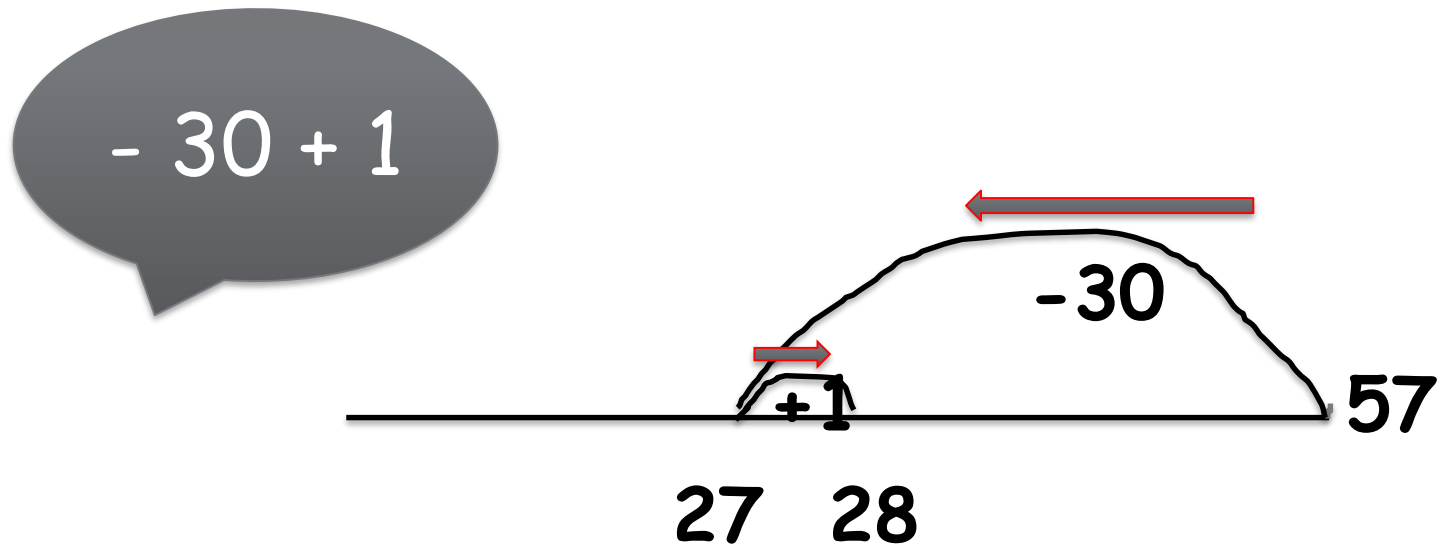Combining numbers to calculate a total

$$29 = 20 + 7 + 2$$

-20   -2   -7   57

28   48   50

Counting up strategy

Number bonds to ten

Adding a multiple of ten to any number

Combining numbers to find a total

Understanding the finding the difference model.

57 – 29 Rounding and adjustment strategy

- 30 + 1

-30

+1

57

27   28

This is a higher order strategy and not all children will be able to work in this way so they need a secure strategy that works for them.

```
          4  1
          57
          29
          28
```

```
40
  50        1 7
- 20          9
  20          8
```

Children need to know that numbers can be partitioned in different ways to aid calculation.

Partition this number in as many different ways as you can so that one number is always a multiple of ten : 97

A dragon lived in a cave.

The dragon doubled in size every day.

After 20 days the dragon filled the cave.

After how many days did the dragon half-fill the cave?

THE DREADED F WORD: FRACTIONS

Fractions have a very high profile within the Primary Curriculum.

Children begin to learn about fractions before they come into school. They have a great sense of fairness:

That is not half. He has got more than me.

I am 4.

Well, I am older. I am 4 ½.

THE F WORD (FRACTIONS)

| Reception	Finding halves of objects and small numbers. Sharing between two. Learning about pairs e.g. I have 10 socks, how many pairs do I have? Carry on a pattern and reason about it:
Year 1	Identify shapes split in half and not split in half. Identify and reason about quarters. Discuss time and turns in terms of halves and quarters. Identify half and quarters of a set of objects. Solve problems by sharing between two and four. Identify halves and quarters on a number line beyond one. Make towers half and quarter as tall as a given tower. Solve problems such as: Tom is half as old as May. How old could they both be?

THE F WORD (FRACTIONS)

Year 2	Find 1/3, ¼, 2/4, and ¾ of shapes, groups, lengths, mass and capacity. Complete the shading of a range of representations so that ½, ¼, or ¾ are shaded.
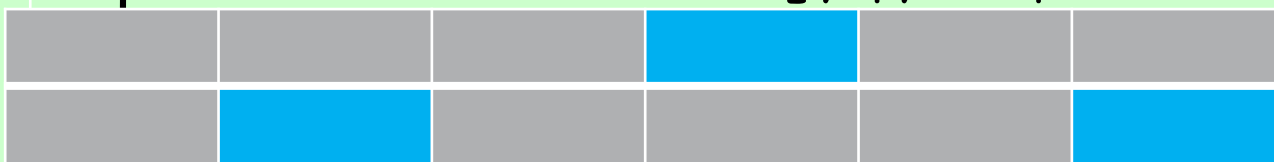
Understand equivalent fractions: 2/4 = ½ etc.
Identify time and turns in terms of ½, ¼ and ¾.
Understand right angles as a quarter-turn.
Know half of all whole numbers to 20.
Share between 2, 3, and 4.
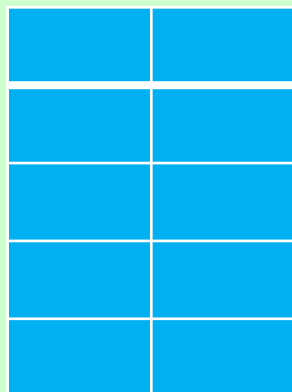Solve problems such as: Tom thought of a number and halved it and the answer was 9. What was his number?
Count to at least 10 in halves and quarters.
Position halves, quarters and thirds on a number line.
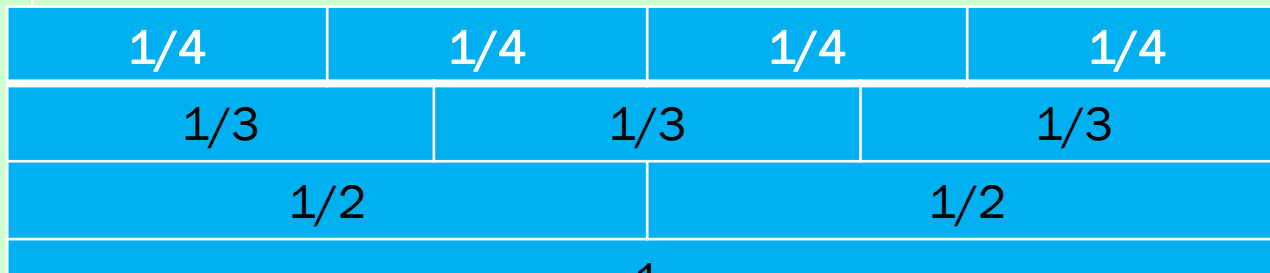
THE F WORD (FRACTIONS)

Year 2	Make towers 1/3 or ¾ of the size of this one.

Solve problems such as:

Tom made a shape using 20 cubes. ½ the cubes are red, a quarter of the cubes are blue and the rest are green. What fraction of the shape is green? How many of each colour did Tom use?

Create fraction walls and link to the number line.

1/4	1/4	1/4	1/4
1/3		1/3	1/3
1/2		1/2	

Year 3	Show a unit fraction of any denominator of a whole shape, set of objects and continuous quantity. Show any non-unit fraction with a small denominator as above and link to division. Compare eighths, quarters and halves. Compare fifths and tenths. Explore mixed numbers e.g. $2\frac{1}{2}$. Order fractions on a number line.
Year 4	All of the above. Explore improper fractions e.g. 4/3.

| 1/3 | 2/3 | 3/3 |

| 4/3 | 5/3 | 6/3 |

Link fractions to proportion e.g. $\frac{1}{4}$ = one in every 4.
Count in fractions including tenths.
Solve problems such as: Tom has 1/3 as many sweets as Ben. Tom has 8 sweets, How many does Ben have?

Year 5	Represent mixed numbers using a rectangular model.
	Represent, identify and produce equivalent fractions.
	Compare and order fractions.
	Express remainders resulting from division as a fraction.
	Convert between fractions and decimals.
	Explore fractions that can be simplified and those that can't. e.g. $\frac{7\ (\div 7)}{21\ (\div 7)} = \frac{1}{3}$
	Apply a secure knowledge of multiples and factors.
	Add and subtractions with the same denominator or denominators of the same number..
	Multiply fractions by whole numbers e.g. $\frac{3}{4}$ x 2.
	Solve problems such as: Would you rather have 1/100 of £1,000,000 or 2/10 of £ 100,000?
	Make connections between fractions and

Year 6	• Everything that has gone before plus:
	• Find any fraction of an amount, quantity etc.
	• Compare and order any fractions including fractions greater than 1.
	• Add and subtract fractions with different denominators and mixed numbers using the concept of equivalent fractions.
	• Multiply pairs of proper fractions.
	• Divide proper fractions by whole numbers.
	• Solve problems such as which number comes halfway between $5\frac{1}{3}$ and $5\frac{2}{3}$?

3/5 of the class are girls. There are ten boys. How many girls are there?

3/5 ÷ 2, 2/5 = 24 so what is the whole number?

Count in fractions forwards and backwards across zero

What basic skill will really support children's success with fractions?

Times tables

Children start counting in steps of an equal number from Reception.

By the end of Year Two, the aim is for children to be confident with the 2,5 and ten times tables and to be beginning to be confident with the 3 times table.

LET'S LOOK AT HOW TABLES KNOWLEDGE CAN SUPPORT WORK IN FRACTIONS

3/5 – 1/10

What table facts do children need to know to be successful here?

Knowing a times table securely means that you can:
- Say the table (7 times 2 = 14 etc.)
- You can answer multiplication facts at random
- You can answer related division facts (e.g. I know that 7 x 2 = 14 so I know that 14 ÷ 7 = 2)
- Moving through KS2, you can use your tables knowledge to solve related problems (e.g. 7 x 2 = 14 so I know that 7 x 20 = 140 or I know that 7 x 2 = 14 so I know that 0.7 x 2 = 1.4)

TIMES TABLE KNOWLEDGE ALSO SUPPORTS WORK WITH SHAPE

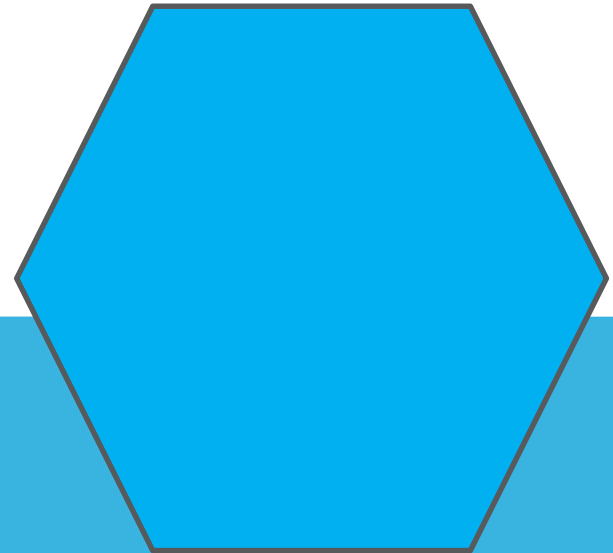**An equilateral triangle has a perimeter of 36cm.**

What is the length of each side? (3 times table)
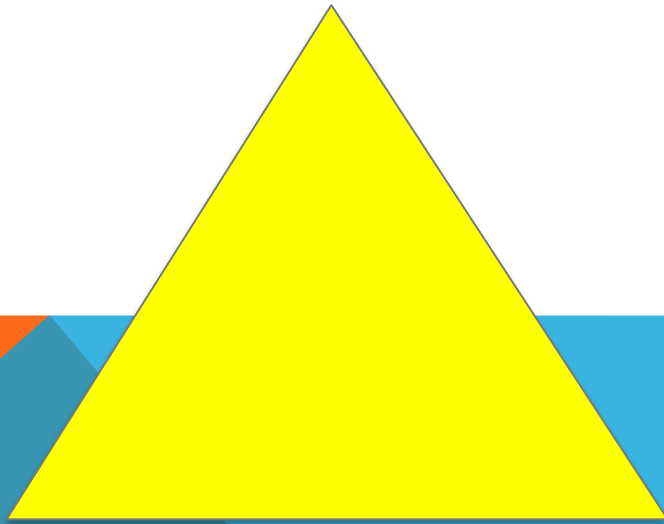
TIMES TABLE KNOWLEDGE ALSO SUPPORTS WORK WITH SHAPE

A regular hexagon has a perimeter of 42cm.

What is the length of each side? **(6 times table)**

HOMEWORK

- **There is far more emphasis in the new curriculum on basic skills and homework will reflect this.**

- **Expect your child to be asked to practise and consolidate basic skills on a regular basis.**

- **Mathletics**

HOW CAN I HELP MY CHILD AT HOME? - MATHEMATICS

- *Create a positive view of mathematics – be a mathematician together*
- *learning tables*
- *telling the time*
- Help your child to understand the importance of mathematics in everyday life
- Support your child when learning basic skills such as number bonds, counting in equal steps and tables
- Help them to see the value of learning these skills
- **Value homework activities even if you think your child knows it. They must be fluent and able to apply the skills if learning is to be sustainable**

HOW CAN I HELP MY CHILD AT HOME? MATHEMATICS

count anything and everything;

skips, jumps, claps, pasta shapes, trees, red cars etc.

count backwards from a number to zero

count in 2s, 5s 10s 20s ½s etc. whilst walking to school climbing the stairs, playing on the swing or trampoline etc

play games with dice:

- throw a dice and double the number

- add ten to the number

- throw two dice and add or subtract the numbers

- throw two dice and you can add the numbers together if they are both even or both odd

- play a game using one dice and double the number if odd and halve the number if even.

HOW CAN I HELP MY CHILD AT HOME? - MATHEMATICS

Play games with dominoes:

- add the dots on each side of the domino

- find dominoes with the same number of dots on each side e.g. double 4 is 8,

- find dominoes with an odd/even number of dots

- find as many dominoes as you can with the same number of dots, (6 and 1 has the same number of dots as 3 and 4) etc.

Put marbles in two containers. Say how many marbles are in the boxes in total and the child works out the possibilities for each box i.e. 8 marbles altogether so could be 7 + 1, 6 + 2, 5 + 3, 4 + 4 etc.

HOW CAN I HELP MY CHILD AT HOME? - MATHEMATICS

Get to know money;

* recognise coins,
* sort coins,
* find the coin with the highest/lowest value,
* add pairs of coins,
* create a home shop using toys or fruit etc.
* find different coins to give the same value e.g. how many ways can we pay for an item costing 10p? 5p and 5p or 2p + 2p + 2p + 2p + 2p etc.
* Involve children in shopping activities.

Identify shapes in the environment while in the park or walking to school etc.

finding the lightest, longest, widest, heaviest etc.

Most of all have fun with mathematics.

Useful websites:

https://www.topmarks.co.uk
http://uk.mathletics.com
https://www.theschoolrun.com
http://www.primaryhomeworkhelp.co.uk