Below are some fun activities you may like your child to try over the Summer holidays. In addition to these, look upon the school website for interactive ideas:

http://www.highworth.bucks.sch.uk/NEW/PAGES/FunLinksMaths.htm

There are lots of fun mathematical website links under the 'Children' – 'Maths' link.

Your child may want to show their new teacher some of their home learning and this might earn them a certificate, or even their very own Mufti Day!!

Number Investigations

Four Integers

1. Using four different integers (whole numbers) and the x symbol make the highest possible result. All the integers have to be used.

For example: 3, 7, 5, 1 gives 157 x 3 = 471 or 37 x 51 =1887.

2. Now chose four other integers and make the largest result using only multiplication.

3. What conclusions can you make?

4. What predictions can you make about using 5, 6, … digits?

1, 2, 3, 4

Using the digits 1, 2, 3 and 4 and +, - , x and ÷ symbols, make the numbers from 1 to 30.

Each of the numbers has to be used every time, for example 1 + 2 + 3 + 4 = 10.

Consecutive Numbers

Which numbers from 1 – 30 can be written as the sum of 2 consecutive numbers?
What do you notice about these numbers?

What two consecutive whole numbers add together to make 101 or 4323?
How do you know?

Extend to the sums of 3, 4, 5… consecutive numbers

Palindromes

Think of a three-digit number. Reverse the digits to generate a second number. Subtract the smaller from the larger. Reverse the digits again. Add the two new numbers.

e.g.

$$\begin{array}{r} 341 \\ -\ 143 \\ \hline 198 \end{array} \qquad \begin{array}{r} 198 \\ +\ 891 \\ \hline 1089 \end{array}$$

Do you always get 1089? If so, why?

Try with 2, 4, 5 digit palindromes.

Integers to 10

Pick 2 integers (whole numbers) which add to 10. (3 and 7)
What is their product? (21)

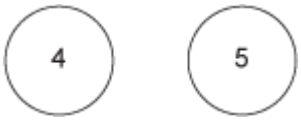
Is this the maximum product with a pair which adds to 10?
What is the maximum product? Why do you think that is?

Which 2 integers which add to 20 will give the maximum product? How will you prove it?
What about other numbers?

What about 3 integers which add to 10? What is the maximum product?

3 integers that total 20…?
4 integers…
…etc…

Discs



Each disc has another number (not necessarily the same) written on the reverse side.

Tossing the discs in the air and then adding the numbers on the uppermost faces, the totals 9, 10, 11 and 12 can be produced.

What numbers are written on the reverse sides of the discs?

With different numbers on the reverse, can you produce different sets of four **consecutive numbers** as totals?

How many different consecutive totals can you find?

Barcodes

The digits in barcodes have the following meanings:
The first two digits indicate the country.
The next five digits indicate the manufacturer.
The next five digits indicate the product.
The final digit is called the ‘check digit’ and it is included to confirm that the number has been scanned correctly.

The check digit of a barcode, which is the thirteenth digit, is calculated as follows:

Split the previous twelve digits into two sets: those in odd place order (i.e. the first, third, fifth, etc. digit) and those in even place order. These are referred to below as ‘odd’ and ‘even’ digits.

Calculate the following:
(the sum of the ‘odd’ digits) + (3 × the sum of the ‘even’ digits).

The final check digit is the smallest number you need to add to the result to get a multiple of ten.

Find some things with a barcode. Make sure the check digit is correct.

What other ‘secret codes’ can you find out about?

Time Challenge

Cut out and challenge to put in order. Generates some great discussion (arguments!)

A minute	The time needed to soft boil an egg	A million seconds
A year	Number of years since the Victorians were around	The number of years since the Romans came to Britain
Time for an oak tree to get to 30m high	Time for the earth to go round the sun	The time the shutter is open on a camera when you take a photo in daylight.
Time for light to come from the moon	A hundred months	Length of time since the last ice age.
Number of months since you were born	An hour	A thousand days
A month	A fortnight	Number of years since my granny was born
A day	Time from sowing tomato seed to eating the first tomato.	Length of time to have a good shower
The time for a game of football without any extra time	Time needed for you to read all the Harry Potter books	Time for the moon to go once round the earth
Time to tidy your bedroom	The time for the TV signal to come from the TV mast to your TV set	The total amount of time in a year spent in my maths lessons.

Probability

The Horse Race Game

1	2	3	4	5	6	7	8	9	10	11	12

This is a grid for a 'horse race'.

Select a horse each and put a counter on your number.

Roll two dice and add the scores.

Move the horse on that number forward one square.

Play the game until a horse reaches the finishing line.

Is the game fair?

If not, can you make it fair?

You could change ....

.... the course

.... the rules

Problem Solving

Creepy Crawlies

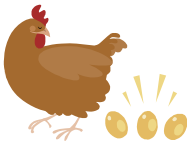
Ibrahim collects lizards, beetles and worms. He has more worms than lizards and beetles together. Altogether in the collection there are twelve heads and twenty-six legs. How many lizards does Ibrahim have?

Zios and Zepts

On the planet Vuv there are two sorts of creatures:
Zios who have 3 legs and Zepts who have 7 legs.
The great planetary explorer Nico, who first discovered the planet, saw a crowd of Zios and Zepts. He managed to see that there was more than one of each kind of creature before they saw him. Suddenly they all rolled over onto their backs and put their legs in the air.

He counted 52 legs. How many Zios and how many Zepts were there?

Chicken and Sheep



A farmer looks across a field of chicken and sheep. He counts 26 heads and 74 legs. How many chicken and sheep does he have?

Try to represent this problem in different ways: pictures, models, cubes, graph, algebra, etc…

Data Handling

Smarties

(This activity is a clever one to get a grown up to buy you chocolate..!)

Get yourself a tube of Smarties.
Estimate how many Smarties are inside the tube.
Estimate how many are orange.

Open the tube and compare estimates to actual.

Sort your Smarties into groups in different ways:

- ✓ Different colours
- ✓ Biggest number of colour to smallest number
- ✓ Carroll diagram – primary colours / not primary colours / odd number/ not odd number

Write down how many of each colour in your tube before eating!

Complete a bar chart showing quantity of each colour of Smartie.
What is the mode and mean?

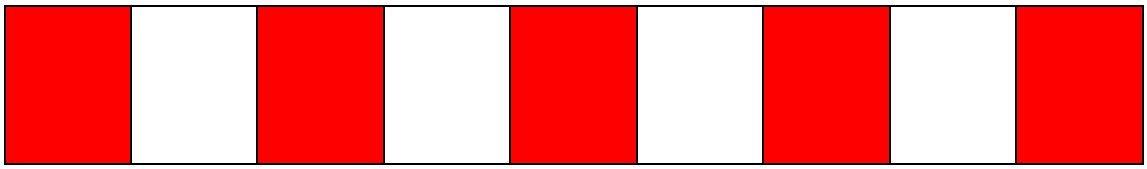
Ideas for using the tube:

What shape is it?
Can you drawn its net?
What is the surface area?
Can you work out its volume?
Tessellation – why hexagonal? (most efficient shape to pack – found in nature: honeycomb)

Can you make some tessellation patterns based upon the Smartie tube?

Predicting Rules & Patterns

Repeating Patterns



This pattern has been made from squares of two colours.

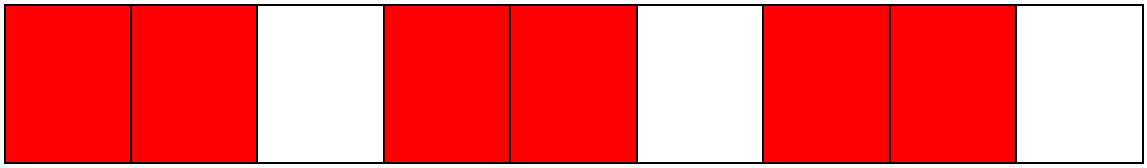
What colour will the 17th cube in the sequence be?

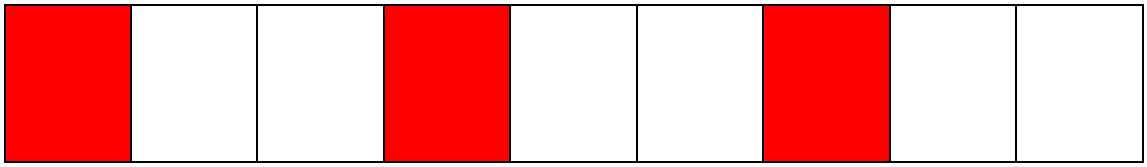
What about the 20th? 100th cube?

Can you convince someone else you are right?

Can you find a way of predicting the colour of any square?

What about these patterns?



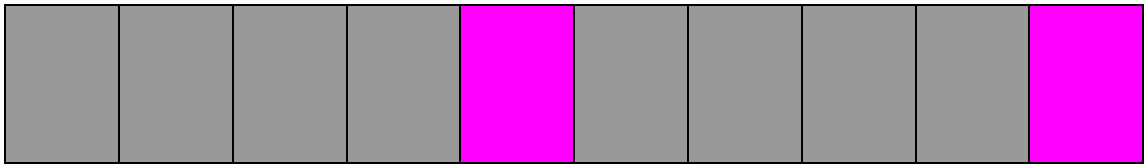


Make up some repeating patterns of your own using two colours.

See if you can find a way of predicting what colour any square will be.

Path Pattern

Heather is laying a new path. She is using a mixture of grey and pink slabs. Here is her pattern:

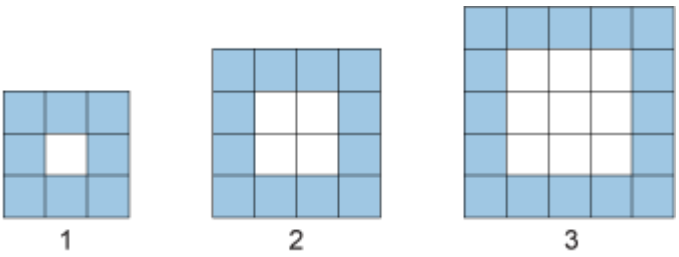


How many pink slabs would she need if her path had a total of:

- 24 slabs?
- 40 slabs?
- 100 slabs?

How do you know your answers are correct?

Border Pattern



What would the next picture look like? How would you draw it?
How many tiles in the centre and border? What pattern can you see?

How many tiles in the n^{th} pattern?

Area Challenge

$4cm^2$

Using a piece of cm^2 paper, how many different shapes with and area of $4cm^2$ can you draw.

Cut them out. Can you fit them in a pattern with the shapes touching on a side (not just a corner).

Time Investigation

Reactions

Test a family member (or friends) reaction time by recording how fast they can grasp a ruler when you drop it between their fingers. Repeat 5 times and record results.

Make a conjecture:
e.g. The older you are, the slower your reactions; You will get better over time; Girls will be quicker than boys; If you are left handed, your reactions will be quicker with your left hand; Your average time will be quicker than your first attempt; etc

Test your conjecture with others in your family and record results. Was your conjecture correct? What have you found out?

Using the data collected:
Can you work out the averages: mean, mode, median?
The range?
Can you create a graph to show your results?

Number Game

Nice and Nasty Numbers

Nice Numbers

2 players needed.

Each player draws 3 squares for a three-digit number:

A)

B)

Player A rolls a 6 sided dice and puts the number in one of their squares.
Player B does the same.
Continue until all 6 boxes are filled.

Winner is the player who has made the largest three-digit number.

Variations:

Lowest number wins
Nearest to 500 wins
Largest even number wins
If the difference between the final numbers is less than 200, player A wins; if greater than 200, player B wins

Add a decimal point to the squares – closest to 1 wins

Digits can only be used once – e.g. if 5 is rolled a second time, roll again

Add scoring system – e.g. Largest number wins. The difference between the two numbers is the number of points scored by winner for that round.

Nasty Numbers

When you roll the dice, you can choose to either put the digit in your grid or put it somewhere in your opponent's grid.

Variation:
Only have one 'nasty' number each game – choose when to use it; or have 2nd roll must be put in one of opponent's squares, etc…

… the possible variations are endless… you can make up your own…

Multiplication Tables

×	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

When you know your times table facts, all areas of maths become sooooo much easier! If you know that:

6 x 7 = 42 you also know that **42 ÷ 7 = 6** and **42 ÷ 6 = 7** and that

$^1/_6$ of 42 = 7 and **$^1/_7$ of 42 = 6** and that

60 x 7 = 420 and **70 x 6 = 420**

and so on and so.....!

Challenge yourself to learn as many times tables facts as you can this Summer – perfect for long car journeys – get an adult to test you!