

Time Cards

Cut out and challenge to put in order.

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.

The Horse Race Game

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

This is a grid for a 'horse race'.

Pupils select a horse and put their counter on the number.

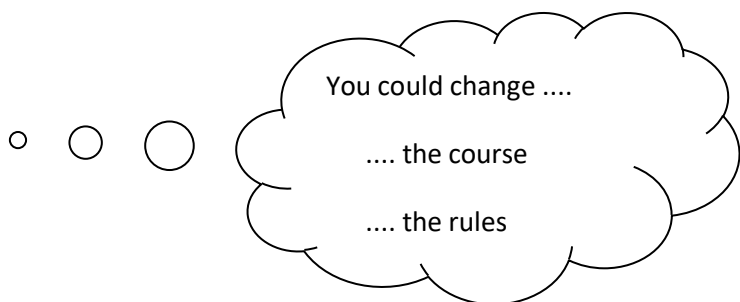
Roll two dice and add the scores.

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?



Four Integers

1. Using four different integers and the \times symbol make the highest possible result.

All the integers have to be used.

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

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 5, 6, ... digits?

Four Cubes

1. Make a shape with 4 multi-link and put it in the bag.

Ask someone to feel the shape and describe it in words – no hand movements!

Everyone makes the shape with 4 multi-link as described.

2. What other shapes are possible to make with only 4 multi-link cubes?

3. Having identified all the shapes put one in the bag and see if can be identified.

1, 2, 3, 4

Using the digits 1, 2, 3 and 4 and $+$, $-$, \times and \div symbols make the numbers from 1 to 30.

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

Creepy Crawlies

Ross 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 Ross have?

(Thinking Mathematically, John Mason with Leone Burton & Kaye Stacey p. 48)

Zios and Zepts

On the planet Vuv there are two sorts of creatures. The Zios have 3 legs and the Zepts 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?

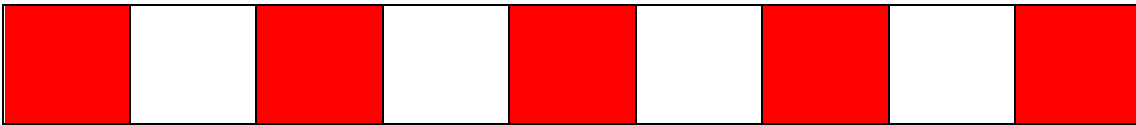
(Jenni Murray, NRICH <http://nrich.maths.org/1005>)

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, using 26 children, etc...

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?

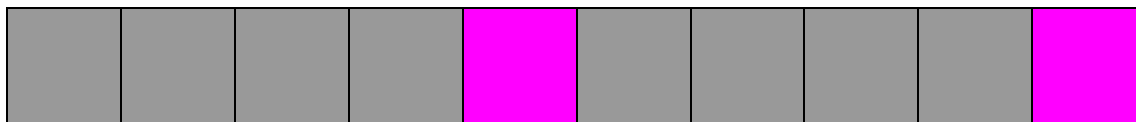


Make up some repeating patterns of your own using two colours.

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?

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, 4323 or 54 307? How do you know?

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

Jumping Frogs

A classic!

<http://nrich.maths.org/1246>

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. 341

 143

 198

 891

 1089

Do you always get 1089? If so, why? Try with 2, 4, 5 digit palindromes.

Always, Sometimes, Never

All prime numbers are odd.

If the digits of any number add up to a multiple of 3, then the number is divisible by 3.

Multiplying by any number always makes the result larger.

Adding something to a number always makes it larger.

Subtracting something from a number always makes it smaller.

Dividing a number by something always makes it smaller.

Some other good examples for number and shape are here:

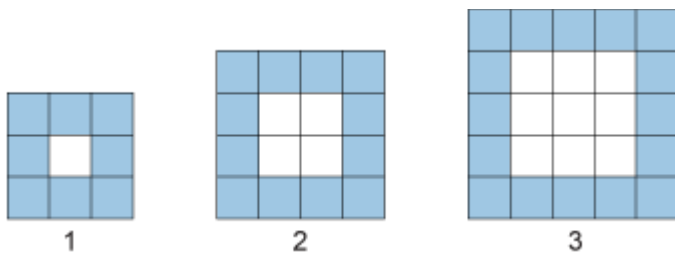
<http://www.cfbt.com/lincs/primary,nursery,special/primarymathematics07/developingthinkingskills/always,sometimes,never.aspx>

4cm²

Using a piece of cm² paper, how many different shapes with an area of 4cm² can you draw.

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

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 nth pattern?

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:

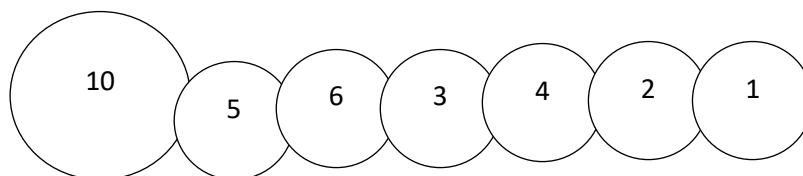
(the sum of the 'odd' digits) + (3 × the sum of the 'even' digits).

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?

Caterpillars



Caterpillars don't live beyond 100 years old.

A caterpillar age is written on the head. The body parts are made in the following way:

If the number is even, half it

If the number is odd, add one

The pattern continues until you reach 1.

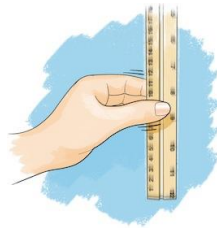
An age 10 caterpillar has 6 body parts.

What patterns do you notice with caterpillars with other ages?

How old is the longest caterpillar?

Reactions

Test a partner's 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 the class and record results. Was your conjecture correct? What have you found out?

Use the data collected:

Averages: mean, mode, median

Range

Graphs

Smarties

Give each child a tube of Smarties.

Ask them to estimate how many are inside the tube. Ask them to 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

Venn diagram - multiples of 3 / multiples of 2

Carroll diagram – primary colours / not primary colours / odd number/ not odd number

...etc...

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

Ideas for using the tube:

What shape is it?

Nets

Surface area

Volume

Tessellation – why hexagonal? (most efficient shape to pack – found in nature: honeycomb)

Symmetry

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 add 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...

Nice and Nasty Numbers

Nice Numbers

2 players.

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

A)

--	--	--

B)

--	--	--

Player A rolls a 10 sided die 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 500, player A wins; if greater than 500, player B wins

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

Digits can only be used once – e.g. if 7 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.