Primary
& Early Years
Magazine 51

National Centre
for Excellence in the
Teaching of Mathematics

Welcome to Issue 51 of the Primary Magazine. In this issue The Art of Mathematics features the artist Damien Hirst. A little bit of history continues its series on inventions: in this issue we look at the Post-it Note. Focus on... looks at Spring, and Maths to share continues to explore the changes to mathematics in the new National Curriculum.

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Editor's extras

The NCETM Professional Development Lead Support Programme

We 've confirmed a number of new dates in the summer term for the NCETM PD Lead Support Programme, a series of national free face-to-face events for CPD leads in teaching schools and improvement agents. These events are for:

- Specialist Leaders in Education (SLEs) and other colleagues from Teaching School Alliances charged with organising and running mathematics PD opportunities;
- teachers based in schools with a remit for supporting colleagues in their own and other schools such as Mathematics Specialist Teachers (MaST) and ASTs
- other teachers who are charged with organising and running mathematics PD opportunities;
- mathematics and/or numeracy advisers and consultants from Local Authority teams;
- independent mathematics consultants and organisations offering mathematics PD;
- colleagues from HE institutions offering PD.

This programme consists of four elements:

- an initial 24-hour residential development day, beginning at 17:30 on the first evening and ending at 15:30 on the second day;
- planning, execution and evaluation of an interim task based on input offered in the first residential;
- a second 24-hour residential (with timings the same as the first);
- a commitment to plan and offer future PD opportunities drawing on the input, discussions and experiences gained during the programme and to offer regular (termly) feedback regarding reach and impact for at least a year following accreditation (a re-accreditation process is offered after one year).

Colleagues completing this programme will be accredited by the NCETM to provide professional development in the priority areas of arithmetic proficiency in primary schools and algebraic proficiency in secondary schools and colleges.

Accredited PD Leads will:

- receive a certificate indicating their status as an 'NCETM Professional Development Accredited Lead';
- be entered into a directory of Accredited PD Leads which will be held on the NCETM portal;
- receive an 'NCETM Professional Development Accredited Lead' logo which can be used on any relevant documentation to signal your accreditation.

There is no cost attached to attendance at the two residentials: accommodation and meals are included, but please note that travel and supply costs if appropriate, should be met by those attending.

If you are interested in taking part, you can find out more - including details of how to book your place – here.

Videos to support the implementation of the new Curriculum

In case you missed the last issue, the NCETM has produced a suite of videos focussing on calculation and the associated skills and understandings - for example, the concepts of place value and exchange. The videos seek to demonstrate how fluency and conceptual understanding can be developed in tandem. The National Curriculum aim that children should 'reason mathematically' is demonstrated throughout. Each set of videos has an accompanying presentation to stimulate thought and discussion. We hope you enjoy the videos and find them helpful in supporting teacher professional development. We'd be delighted to hear your feedback and learn how you use them, together with any comments you have.

And finally…

A quick reminder: if you've enjoyed a particular feature and want to explore further it's easy to do! You can find all The Art of Mathematics, Focus On, A Little Bit of History, and Maths to Share articles grouped together by type in our 'Essentials' (Guidance) section.

The Art of Mathematics
Damien Hirst

Damien Hirst

Damien Steven Hirst was born on 7 June 1965. He is an English artist, entrepreneur, art collector and a prominent member of the group known as the Young British Artists (YBAs). This group dominated the art scene in Britain during the 1990s. He is internationally renowned and was awarded the Turner Prize in 1995. According to the 2013 Sunday Times Rich List, he is Britain's richest living artist, with wealth valued at £215m.

He was born in Bristol and grew up in Leeds. His father was reportedly a motor mechanic, who left the family when Damien was twelve. His mother, Mary Brennan, of Irish Roman Catholic descent, worked for the Citizens Advice Bureau. She admitted once that she lost control of her son when he was young. However, Damien thought differently, he believed she wouldn't tolerate rebellion. Apparently she cut up his bondage trousers and heated one of his Sex Pistols vinyl records on the cooker to turn it into a fruit bowl!!

He was arrested on two occasions for shoplifting.

It was his mother who encouraged his drawing, which was his only successful educational subject.

He went to sixth form and took two A-levels, achieving an 'E' grade in art. He applied to the Jacob Kramer School of Art but was not initially given a place. He succeeded when he applied again and took a Foundation Diploma course.

In 1984 he moved to London, where he worked in construction for a couple of years. From 1986 to 1989 he studied for a BA in Fine Art at Goldsmiths College.

Since the late 1980s, Damien has explored the relationship between art, life and death in his art. He once said: 'Art's about life and it can't really be about anything else…there isn't anything else.' He developed his interest in exploring death as a teenager in Leeds. From the age of sixteen, he made regular visits to the anatomy department of Leeds Medical School in order to make life drawings of dead parts of people! This interest stayed with him for many years. In his 2012 Tate exhibition there is a photograph of him with a man's head! It is called 'With Dead Head' and was taken in 1991. Many of his works appear a little macabre as death is often the main theme. One of his exhibitions was full of dead animals!

Dantrolene

In his second year at Goldsmiths, Damien began work on one of his most important series of sculptures, Medicine Cabinets. Also in this second year, he devised and organised an exhibition called Freeze, which was built in three phases. 16 students were involved in this. This exhibition is commonly acknowledged to have been the launching point not only for Damien, but also for a generation of British artists. For the final phase he painted two series of coloured spots on to the warehouse walls. He describes the spot paintings as a means of 'pinning down the joy of colour'. It has become one of his most prolific and recognisable

series. In January 2012 the works were exhibited in a show in eleven Gagosian Gallery locations worldwide.

In 1991 Damien began work on Natural History, possibly his most famous series. In this, he had intended to create a 'zoo of dead animals' by preserving creatures in minimalist steel and glass tanks filled with formaldehyde solution. In 1992, the shark piece, The Physical Impossibility of Death in the Mind of Someone Living, was unveiled at the Saatchi Gallery's exhibition, Young British Artists I. It is still one of the most iconic symbols of modern British art and popular culture in the Nineties. During the 1990s his career was closely linked with the collector Charles Saatchi, but increasing frictions came to a head in 2003 and the relationship ended.

Since 1987, over 80 solo Damien Hirst exhibitions have taken place around the world and his work has been included in over 250 group shows. His contribution to British art over the last two and a half decades was recognised in 2012 with a major retrospective of his work staged at Tate Modern.

Damien now lives and works in London, Gloucestershire and Devon.

Information from:

- Damien Hirst
- Wikipedia.

Let's explore some mathematical ideas from the work of Damien Hirst...

You might like to show Tate Modern's video walkthrough that shows some of art that went into Damien's 2012 retrospective exhibition there. It is the third clip. You could pause on the different pieces of art and discuss the maths that can be seen. There are some great links to 2D and 3D shape and symmetry, for example 'Boxes' and 'Spot painting'. You will need to watch it first as some of the work in his exhibition is a little morbid!

Show the children The Kingdom

Shark

Lots of children are fascinated by sharks. You could ask them to visualise this preserved shark as a drawing. What 2D shapes can they see? Ask them to sketch their own version of a shark using only 2D shapes.

You could then ask them to create a mathematical factfile about a breed of shark, for example the great white, black tipped reef shark.

Show them the video clip of a whale shark and ask them to look at its markings. Can they estimate how many spots it has? Can they estimate how long it takes to swim from one side of the photographer to the other? You could time this in seconds and see who was the closest. Can they estimate its length (they are generally about 5m long). You could ask them to pace out what they think is 5m and then measure to see how close they were. You might like to show the children a diver's video of a white tip reef shark. They could count the fins, time for how long the diver is filming, look for symmetry, and any other mathematical ideas that you or the children can think of!

Show the children Nessus

Ask the children to describe the painting. What creatures can they see? Can they name all the insects?

Can they see any symmetry in the painting? Discuss the symmetry of the whole painting and for each insect.

What shapes can they see? Focus on the circles, this painting shows an example of concentric circles. For more information and activity ideas on these see The Art of Mathematics in Issue 50.

You could print out a copy of this painting for each child and ask them to fold it in two or three different ways to show how it is symmetrical.

You could ask them to count the numbers of insects. Agree on an efficient method, e.g. counting in twos, counting the number in one quarter and then multiplying by four. Repeat this but for the different types of insect.

You could make a class version of Nessus. Ask the children to draw some of the symmetrical insects in Damien's painting, cut them out and then put them all together in a circular pattern the same way as Damien did in Nessus. Alternatively, they could make their own version.

He created 16 paintings around this theme. You might like to explore others which can be found on his website.

Show the children Basic Chromatic Entropy

Ask the children what shapes they can see. Agree hexagons. Discuss why it can't be another shape, e.g. other shapes have more or less than six sides and corners. Consider regular and irregular hexagons and ask the children to draw a variety.

How many hexagons can they count?

You could look at tessellation: a pattern made of identical shapes, the shapes must fit together without any gaps and they should not overlap. You could ask the children to make some tessellating patterns using one or two shapes of their choice.

Discuss the different colours that are in the painting. Do they know what the prime colours are? You could use this as an opportunity for exploring ratio and proportion through colour mixing. Give them the prime colours (blue, yellow and red), a spoon and a paintbrush. Ask them to try to make the colours in the painting. Once they have, they record the ratios of the two or three colours that they used. Can they change their ratios to proportions?

They could then use the colours they have made to create a painting similar to Damien's. You could ask them to use different shapes.

Show the children Explosion of Vanity Painting (with butterflies)

Another opportunity for estimating and counting! How many butterflies can the children see? What would be an efficient way to count them? You could circle groups of ten. Halfway through doing this, give them the opportunity to change their estimates.

You could ask the children to make butterflies by putting paint blobs on one side of a piece of paper, fold it in half, press firmly and then cut out a butterfly shape. You could ask the children to make a splatter painting as in the background of Damien's painting and display the butterflies. Of course the children could always make a small version of their own.


Eulogy

Show the children Untitled (with Black Dot)

Estimate the number of dots and discuss how these can be counted efficiently. Make the link to arrays and multiplication (10x11).

The children could count the individual colours making a tally as they count. They then put their tally into a frequency table and then show the information as a pictogram, bar chart or bar line chart.

Ask groups of children to make an array the same size with repeating colour patterns and to describe their patterns to another group.

The ideas here are just to give you a taster of the mathematical activities that could be involved when looking at artists such as Damien Hirst. We know you can think of plenty of others! If you try out any of these ideas or those of your own, please share them with us!

Explore further!

If you've enjoyed this article, don't forget you can find all the other *Art of Mathematics* features in the archive, sorted into categories: *Artists*, *Artistic styles*, and *Artistic techniques*.

Focus on…
Spring

You would be forgiven if you were wondering where spring has been for the last couple of months. In March 2012 we had temperatures of nearly 23°C, and this year has seen one of the coldest in the last 50 years. It's been more like winter. From 1 to 26 March the UK mean temperature was 2.5°C, three degrees below the long-term average. This makes it joint fourth coldest March on record in the UK.

March was extremely cold and snowy and joins 2006, 2001, 1995, 1987, 1979, 1970 and 1962 as years when March saw significant snowfall. Happily, things improved during April, the days got longer and the temperature got a little warmer, and now spring seems to be with us.

A few facts about spring...

Spring is a season that only occurs in the temperate parts of the world. It is an intermediate seasonal phase between winter and summer, and signifies the emergence of new life. The spring months are the blossoming months that bring growth, rejuvenation and new life.

Spring in South Ken

This season arrives during different parts of the year in the northern and southern hemispheres of the world. In the north, the spring season is from March to May. In the south, it is from September to November. The Vernal Equinox indicates the arrival of spring season, while the Summer Solstice marks its departure. The exact timing of spring varies according to local climate, cultures and customs.

Extreme weather conditions can characterise the spring season. During this season the warm winds coming from the southern regions of the world are accompanied by the cold air which originates from the Polar Regions. The jet streams also play an important role in the unstable and severe weather in the springtime in the Northern Hemisphere. The seas and rivers are full because the snow begins to melt. Rainfall is also heavy often leading to serious flood situations. In some parts of the world, for example the US, spring brings tornadoes, hailstorms and hurricanes.

In spring, the axis of the Earth is increasing its tilt toward the Sun and the length of daylight increases for the relevant hemisphere. The hemisphere begins to warm significantly causing new plant growth to 'spring forth' giving the season its name.

May 1 or the first Monday in May is marked as a public holiday in many countries - May Day is International Workers' Day, or Labour Day, which celebrates the social and economic achievements of the working people.

Information from:

- Maps of World
- Wikipedia.

A few mathematical ideas for spring...

Today's Weather

You could ask the children to explore the regions of the world shown on Maps of World and identify the countries in the temperate zones. They could make mathematical factfiles about a few of them, including average annual temperatures and rainfall, population and currency.

You could ask the children to research temperatures in March, April and May over the last few years. This would be a good opportunity for some data handling. They could record their findings in tables, grouped frequency charts and graphs and compare the temperatures over the years. They could do this for rainfall too.

You could ask them to compare our spring weather data with that of other temperate parts of the world. They could explore which country has had, for example:

- the coldest May over the last five years
- the warmest April
- the wettest March.

You could use this month of May as an opportunity for some mathematical work outside:

Ask the children to take a walk outside and make a list of all the new things that are growing, eg daffodils, blossom, buds on trees. They could collect the information and display it in a way that they choose.

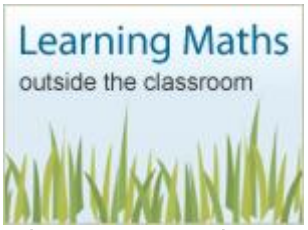
How about some estimation?

- ask the children to look at a tree and try to estimate its circumference and diameter and then work out how to measure it
- they could estimate the height of the tree and then work out how tall it is. You can get the information on how to do this from Focus on in Issue 36
- make a small circle out of string or use an elastic band and place it on the grass. Ask the children to estimate how many blades of grass are inside it. Then could then count them and compare with their estimate
- ask the children to lie on their backs and watch a cloud moving past. They try to estimate how long it will take to pass a tree. As they do this they start a stopwatch to find out how accurate their estimate was
- they could find the longest and shortest blooms in a flower bed and estimate, measure and compare their dimensions.

You could ask the children to record the following by entering data in spreadsheets and/or record daily numbers in a list:

- daily temperature highs and lows
- daily changes in the pollen count
- the daily growth of newly-planted indoor or outdoor plants from seeds or seedlings
- rainfall over a week
- the length of shadows at certain times during the day.

They could then display this information on graphs and charts.



The NCETM has a microsite Learning Maths Outside the Classroom. Why not explore that for more mathematical ideas that you can carry out before spring disappears?

Finally, you might be interested in exploring Maths Ideas for Spring, available on the National STEM Centre website. Ideas include designing a playground, growing cress (which has links to science as well as mathematics) and an activity relating to time. They are all well worth taking a look at.

Please let us know of any spring mathematical ideas that you have tried out with your children.

Explore further!
If you've enjoyed this article, don't forget you can find all previous *Focus on...* features in our archive.

A little bit of history – the Post-it Note

In this issue of the Primary Magazine we are continuing our short series of articles on inventions. We are looking at the Post-it Note…

In 1980 the Post-it Note was introduced nationally in the United States and has since become possibly one of the most used pieces of stationery in offices (and schools) all over the world.

Apparently Post-it Notes were invented by accident! In 1968, a chemist working at 3M in the US, Dr Spencer Silver, was developing a super-strong adhesive, but instead he accidentally created a very weak, reusable, pressure-sensitive adhesive called Acrylate Copolymer Microspheres.

Initially his adhesive did not interest 3M management as it was seen as too weak to be useful. It did have two interesting features, though. The first was that, when stuck to a surface, it could be peeled away without leaving any residue. The second was that the adhesive was re-usable. Despite these features, no one, not even Dr Silver, could think up a good marketable use for it. For five years, Dr Silver tried promoting his invention to the staff at 3M, both informally and through seminars, but he didn't have much success.

In 1973, when Geoff Nicholson was made products laboratory manager at 3M, Dr Silver approached him with the adhesive and gave him samples to play with. Dr Silver also suggested that they could make bulletin boards with the adhesive sprayed on it. Pieces of paper could then be stuck to it without pins or tape. The paper could be easily removed without any residue being left on the sheets. Unfortunately the idea wasn't seen as potentially profitable enough as bulletin board sales were fairly low.

In 1974, a colleague of his, Art Fry, who had attended one of Silver's seminars, came up with the idea of using the adhesive to secure the bookmark in his hymnbook. He sung in a church choir and was continually losing his page markers in his hymn book while singing. He used some of Dr Silver's adhesive to help keep the slips of paper in place. He then suggested that Dr Silver stuck the adhesive onto pieces of paper instead of bulletin boards so they could be stuck to anything.

Post-it Note

At first this was easier said than done. It was easy enough to get the adhesive on the paper, but in early prototypes the adhesive would often detach from the paper and stay on the object the paper was stuck to. Two other 3M employees, Roger Merrill and Henry Courtney were tasked with coming up with a coating that could be put on the paper to make the adhesive stay bonded to it and not be left behind on whatever the paper was stuck to when it was removed.

The management at 3M still didn't think the product had much potential so they shelved it for three years, even though the Post-It Notes were extremely popular internally at 3M labs during that time.

Finally in 1977, 3M tested the product in stores in four cities under the name Press 'n Peel. Sales were disappointing. The following year 3M issued free samples to the residents of Boise, Idaho, and 94 per cent of those who tried them said that they would buy the product.

On 6 April 1980, the product was introduced into American stores as Post-It Notes. In 1981 they were launched in Canada and Europe.

In 2003, the company came out with Post-it Brand Super Sticky Notes, that had a stronger glue which could be stuck to vertical and rough surfaces.

So, after five years of constant rejection of the adhesive and another seven years in development and initial rejection, Post-It Notes were finally a hit and have since become a one of the top five best-selling office supply products in the world.

Some Post-it Note fun facts:

- the yellow colour was chosen by accident; a lab next-door to the Post-it team had scrap yellow paper, which the team initially used in their development. These days the Post-it Note is produced in many colours and in different forms produced by several companies
- based on the earth's circumference of 24 000 miles and using 27⁄8" square Post-it Notes, it would take approximately 506 880 000 of them to circle the world once
- a family who evacuated their home due to Hurricane Hugo left a Post-it Note stuck to their door. It was still there three days later – unlike the eight oak trees in their yard!
- a Post-it Note clinging to the nose of a plane after a flight from Las Vegas arrived in Minneapolis after surviving speeds of 500 miles per hour and 50°F temperatures
- Rebecca Murtaugh, a Californian artist uses Post-it Notes in her artwork. In 2001 she covered her whole bedroom with $1 000 worth of the notes, using the ordinary yellow for objects she saw as having less value and neon colors for more important objects, such as the bed
- in 2000 the 20th anniversary of Post-it Notes was celebrated by having artists create artworks on the notes. One work, by artist R. B. Kitaj, sold for £640 in an auction, making it the most valuable Post-it Note on record
- in 2008 Shay Hovell used 12 000 Post-it Notes to create a replica of the Mona Lisa (you can find this on YouTube).

Information from:

- Post-it Products
- Today I found out
- Wikipedia.

Some mathematical ways to use Post-it Notes…

Make a collection of different colours and sizes of Post-it Notes for the children to sort according to their own criteria. They could display this using the Notes in a Venn or Carroll diagram.

The children could investigate the different companies that produce Post-it Notes. What do they call them? How do their prices vary? They could represent this information in a way that you might be practising in class or a way that they prefer.


String of notes

The children could explore the perimeters and areas of different sizes of Post-it Notes and order them from least to greatest.

You could explore the ideas given on these websites:

Playful learning has some great ideas for patterns to make with post it notes

Emergent math has an interesting Post-it Note animation.

The children could create individual or class art using different coloured Post-it Notes. Show them the Post-it Note Marilyn Monroe. Can they make a self-portrait or a picture of a friend? Ask them to make a tally of the different colours they used.

Post-it Marilyn

You could organise a Post-it Note scavenger hunt…
Take 20 to 30 Post-it Notes. Write a mathematical problem or calculation or whatever you want the children to practice on the front of the first one. Stick it somewhere in the classroom. Write the answer on the front of the second one and another problem on the back of it. Continue to do this until you have used up all the Post-its. On the back of the one with the last answer write a note of congratulation.

If there is any area of history that you would like us to make mathematical links to, please let us know.

Explore further!
If you've enjoyed this article, don't forget you can find all previous A little bit of history features in our archive, sorted into categories: *Ancient Number Systems*, *History of our measurements*, *Famous mathematicians*, and *Topical history*.

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National Centre
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Teaching of Mathematics

Maths to share – CPD for your school

The Primary National Curriculum for Mathematics

In *Maths to share* we are running a series on the changes to mathematics in the proposed draft of the National Curriculum. In the previous issue we looked at the changes for KS1. In this issue we will explore the changes for lower KS2. In Issue 52 we'll be looking at the changes for upper KS2. We are comparing the proposed National Curriculum with the expectations from the Primary Strategy framework as many schools are familiar with this and some still use this for guidance on what mathematics to teach. It would be a good idea to copy the mathematics-related objectives for Years 3 and 4 for colleagues to examine in detail. You could use the information below about the changes to stimulate discussion and work out the implications in the teaching of mathematics at your school. It would be a good idea to involve all staff in any discussions as teachers in KS1 and upper KS2 need to be aware of what the children are learning.

It is worth reminding colleagues that the National Curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- **reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to 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.

If you haven't already, share these aims with colleagues. What do they think of them? Hopefully they will think these are really sound and form a good basis for what we would wish for the children we teach. How does the teaching and learning in your school currently measure up to these aims?

Some key changes in Year 3

- children are now expected to count in multiples of 4, 8, 50 and 100
- they are expected to mentally calculate with three-digit numbers
- learning the eight-times table has been included
- tenths are new to Year 3
- children now need to add and subtract fractions
- measuring perimeters of simple shapes was in Year 4 but now it is in Year 3
- children are expected to be able to tell 24-hour time - this previously appeared in Year 5
- they are also expected to be able to read the time on clocks with Roman numerals
- children need to be able to identify perpendicular and parallel lines.

Ask colleagues to pick out the changes that most concern them. Are these common to all?

In both Years 3 and 4 there are greater expectations for counting in multiples and knowing times tables. Ask colleagues to share effective ways that they have found to work on these. It might be a good idea to build up a bank of effective strategies.

Do colleagues use the counting stick and pendulum to practice counting in multiples of the times tables the children need to learn? You could demonstrate them using the activities suggested in Maths to Share in Issue 47.

You could show colleagues the YouTube clip from the ATM where Jill Mansergh attempts to teach some of her students the 17-times table. Could this strategy be developed by colleagues to use with their children for appropriate multiplication tables?

How do colleagues feel about the increased expectations of mental calculation for addition and subtraction? Are they confident in the most common strategies to teach? These include:

- partitioning and recombining
- doubles and near doubles
- use number pairs to 10 and 100
- adding near multiples of ten and adjusting
- using patterns of similar calculations
- using known number facts
- bridging though ten, hundred, tenth
- use relationships between operations
- counting on.

It might be worth spending some time applying these to different and appropriate three-digit calculations.

How do colleagues feel about the introduction of tenths? Children use decimals when they work with money and when they measure in centimetres and half centimetres. How could these experiences be linked to tenths?

What about adding and subtracting fractions? Do colleagues think that if the new expectations for teaching fractions in KS1 are successful that this will be achievable? It might be worth demonstrating how simple this can be by giving everyone counters and asking them to count out 20 and then share them into five groups so making five groups of four or fifths of the whole amount. Next ask colleagues to use them to make up simple fraction number sentences, e.g. move one of the fifths to one side, then add another two and write a number sentence to show what they have done: $^1/_5 + {}^2/_5 = {}^3/_5$. They could also equate this with the numbers of counters: 4 + 8 = 12.

Focus on the expectations for time as these are quite challenging. Discuss ways in which these might be achieved.

You could begin by talking about why and when children need to tell the time. When does it become necessary for them? Often children are told what to do and when to do it at home and also at school, so they don't really need to be able to tell the time. Is there a way you could bring the necessity for knowing what time it is to them earlier? Could you encourage parents to get more involved in helping their children with the early expectations of time in Years 1 and 2 so that the children have more knowledge and understanding in this area before they arrive in Year 3? Could you encourage parents to be more actively involved in helping their children to learn to tell the times expected for Year 3?

Currently, if using the Primary National Strategy, children will visit time once a term and only for a few days. Do colleagues think this is enough if children are to achieve these expectations? How might this impact on mathematics future planning?

You might find it helpful to refer to the Maths to Share article on time in Issue 16.

What do colleagues think about the introduction of perimeter? Discuss possible activities that could include finding perimeters, for example in problem solving or shape.

What about perpendicular and parallel lines? You could remind colleagues that children often enjoy interesting words, so including these in their vocabulary might not be an issue especially when they describe squares and rectangles or use arm movements to describe the two words.

Some key changes in Year 4

- the new curriculum specifies that children need to count in multiples of 6, 7, 9 and 1 000 and also in negative numbers
- they need to be able to write Roman numerals to 100
- they need to carry out column addition and subtraction of numbers with four digits
- it is expected that the children know all their tables to 12x12; previously tables to 10x10 were required
- children need to understand hundredths which were previously explored in Year 5
- there is generally a greater emphasis on decimals
- translation has been included, this is an area which was previously introduced in Year 6
- children are expected to construct line graphs, previously these were expectations for Years 5 and 6.

Discuss the changes in the Year 4 curriculum. Ask colleagues to pick out those that most concern them.

What do colleagues think of teaching Roman numerals? Do they do a topic on Romans? Is this something that can be explored during that? You might be interested in looking at the article on Roman numbers in A little bit of history from Issue 2. You could engage colleagues in the following activity. Give copies of this table or write it on the board:

Ones	I	II	III	IV	V	VI	VII	VIII	IX
Tens	X	XX	XXX	XL	L	LX	LXX	LXXX	XC
Hundreds	C	CC	CCC	CD	D	DC	DCC	DCCC	CM

Ask colleagues to translate the Roman numerals below to our number system.
You could give this useful information to help you:

- to translate any Roman numeral, partition it into separate chunks, these are found where a lower value follows a higher one
- deal with each chunk separately
- once you have recombine to give the whole number.

Here is an example:

1. CCCXLVI = CCC + XL + V + I = 300 + 40 (10 before 50) + 5 + 1 = 346
2. CMXCIX
3. CCXLV
4. DCCLXXI.

They could then convert these numbers into Roman numerals:

1. 560
2. 984
3. 672.

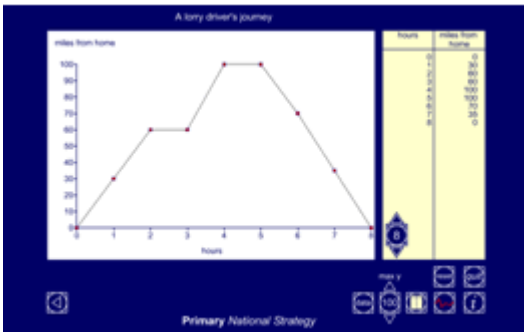
How proficient are the Year 4 children at using the column method for addition and subtraction of three-digit numbers? Do they have a conceptual understanding of what they are doing or do they simply follow a rule? Will there be an issue increasing these to four-digit numbers?

You might find it helpful to watch the video of Year 4 children working on the column method from the new suite of recently-launched NCETM videos.

How can linking decimals to measures work help the children to gain a clearer understanding of hundredths?

You might find it helpful to explore the Maths to Share article on fractions, decimals and percentages in Issue 17.

What do colleagues think of line graphs being introduced into Year 4? It might be worth showing the ITP Line Graph (free registration required) and show one of the graphs. Ask colleagues to make up a story about it. This could be a good way to introduce them to their children.



We hope that this has been helpful in possibly allaying some of the fears that might be present in implementing the new National Curriculum in lower KS2!

Explore further!
If you've enjoyed this article, don't forget you can find all previous *Maths to share* features in our archive, sorted into categories, including *Calculation*, *Exploring reports and research*, and *Pedagogy*.