Primary Magazine

Issue 32

National Centre for Excellence in the Teaching of Mathematics

Welcome to the 32nd issue of the Primary Magazine. Our history article focuses on the Romans, we look at the art of Gaudí and focus on buildings. Our CPD opportunity explores the use of the counting stick to support mathematical thinking and our ICT article looks at the use of video and animation. It's in the News! features the Roman remains found in Hounslow.

Contents

Editor's extras
In this issue we have some facts to play with, and information about a couple of conferences that are going on over the Easter holidays.

It's in the News!
Following the discovery of a Roman settlement complete with skeletons, swords and other Roman artefacts (and to link in to 'A little bit of history'), *It's in the News!* features the remains of a settlement discovered late last year at the site of a hotel development in Syon Park, Hounslow.

The Art of Mathematics
We feature the life and art of the artist Gaudí. He was actually an architect working in the 'Art Nouveau' period and was well known for designing some of the most amazing architectural masterpieces ever created. Gaudí is one of history's most original architects.

Focus on…
We focus on the use of buildings to aid the development of children's mathematical understanding. Areas of mathematics covered in this article are shape, counting, calculating, estimating and measuring.

A little bit of history
We are going cross-curricular once again and looking at some of the ways that you can link mathematics into a topic on the Romans. If you are looking at this period of history, you might like to try out some of the ideas.

Maths to share – CPD for your school
We look at the counting stick. This resource first became popular at the advent of the National Numeracy Strategy in 1999. Is it still in use in your school? If not, this CPD opportunity might be just for you.

ICT in the classroom
We consider how the use of video and animation can add an exciting dimension to mathematics lessons and enable children to be creative and take ownership of their learning through producing films that are a product of their mathematical understanding.

Editor's extras

In this issue, we have two more fun websites that you might like to explore:

- Number Dictionary is a site where you can type in any number from one to a million and a whole lot of facts come up about it. Great fun to explore with the children!
- Maths Kit where you can find various on-line resources for use in the classroom, for example, calculators, dice, stop watches and other timers.

We are really pleased to announce that our National Priority Project (NPP): Maximising opportunities for mathematical learning across the primary curriculum has now gone live on the portal. The main aim of our NPP was:

To engage teachers and their pupils in exciting projects involving mathematics in real life and across the curriculum in order to enhance and deepen the mathematics they are taught in the discrete maths lessons, so raising attainment and enjoyment.

Seven schools were involved in this project and each one had a key teacher who worked with the NCETM and their teachers to plan and carry out whole-school projects.

The overwhelming finding from this NPP was that most of the teachers involved in the individual school projects thoroughly enjoyed teaching in this way: they were excited by the way that all the children were engaged in mathematics and how they stretched and challenged themselves to solve problems and use and apply their mathematics in ways that often exceeded expectations. They liked the way that mathematics skills and knowledge were being reinforced regularly as a matter of course, more frequently than when they just plan from the framework and saw that the children were developing the thinking skills of information processing, reasoning, creativity, enquiry and evaluation naturally. They also felt that the way the children had opportunities to work together in mixed ability groups was very beneficial, they were doing similar tasks at levels that they could achieve. They all noticed that the children who were classed as lower attainers were making sense of maths and applying it well to tasks they were given, because there was a purpose and context to what they were doing. Many of them shone in ways that they didn't during the traditional mathematics lessons. Teachers found that the children were keen and motivated and often wanted to carry on with their mathematical tasks during breaks or lunchtimes and were developing a very positive attitude to maths. This project has proved to be very successful and an excellent piece of teacher PD, which will be on-going as many of the teachers are keen to continue to embed this approach into their school curriculum.

We are going to link to specific projects over the next few issues, so that you aren't too overwhelmed! To get you started you might like to check out the work at these schools: Tranmoor Primary School in Doncaster, and Holy Ghost RC Primary School in Wandsworth.

In Issue 8 of the primary magazine, the Up2d8 maths feature Arctic Snap focussed on the extreme weather we were having at the time. With all the snow that we have been having lately you might like to have a look at the mathematics opportunities it provides for work involving data handling and measures, and particularly temperature.

If you or your children are interested in birds you might like to take part in the 10th RSPB Big Schools' Birdwatch activity. It is free, fun, simple and a great way to do some 'real-life' data handling. It is rich in cross-curricular links and open to all schools and youth groups.

Finally, a reminder of the Mathematical Association (MA) and Association of Teachers of Mathematics (ATM) annual conferences that we mentioned in the last issue. Each has a special primary day which you might be interested in attending.

The MA conference Mathematics: The Big Picture takes place from Thursday 14 to Saturday 16 April and features key note speeches from Lynne McClure, director of NRICH, Rob Eastaway and Andrew Jeffrey, as well as a wealth of exciting workshops. Their primary day is on Friday 15 April. For more details and booking information visit their website.

The Association of Teachers of Mathematics conference Celebrating Gattegno takes place from Monday 18 to Thursday 21. As we all know, Caleb Gattegno made a significant impact on teaching and thinking about education. Within mathematics this included the creation of the ATM, the promotion and use of Cuisenaire Rods, the creation of geoboards, developments of the animated geometry work of Nicolet, and the Gattegno 'tens' chart for number. This conference also has a wealth of workshops and some significant speakers. For more information and booking forms visit their website.

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It's in the News!

At the end of November 2010, a Roman settlement was uncovered in Syon Park, Hounslow, as developers were preparing the land for the construction of a new hotel. Skeletons and Roman artefacts were found and the question was asked 'should we be building on a site like this?' As well as linking to A little bit of history, we explore the discovery of this site in more detail. There are links to geography and history, and the slides give opportunities for work on a variety of mathematical concepts including measurement and number.

Before you use the slides you might find it helpful to look at the following websites for further information:
- BBC News
- Daily Mail
- Hounslow Chronicle.

This resource provides ideas that you can adapt to fit your classroom and your learners as appropriate. As always, we would be extremely grateful if you could give us some feedback on how you have used it, if it has worked well and how it can be improved.

Download this *It's in the News!* resource - in PowerPoint format.

Download this *It's in the News!* resource - in PDF format.

A Department for Education initiative to enhance professional
development across mathematics teaching

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The Art of Mathematics
Antoni Gaudí (1852 – 1926)

Antoni Gaudí
by Pau Audouard

Antoni Plàcid Guillem Gaudí Cornet was born in Southern Catalonia in Spain, in 1852, to a family of coppersmiths. During his younger years, Gaudí suffered from frequent rheumatoid fevers. This resulted in him spending a great deal of time alone with nature. It is this period of his life which is thought to have inspired him to include so many natural shapes in his later work. This is reflected by the use of curved construction stones, twisted iron sculptures and organic forms. Gaudí also covered many of his buildings with coloured tiles arranged in patterns.

In 1868 Gaudí moved to Barcelona to study architecture at university. He was an architect working in the 'Art Nouveau' period, well known for his highly individual designs. His originality was at first ridiculed by his peers, but he was soon planning and designing what would become some of the most amazing architectural masterpieces ever created. Gaudí now stands as one of history's most original architects.

- Gaudí Club provides a comprehensive list of all of Gaudí's works, including those less well-known.
- the Sagrada Família website is available translated into English, and provides several striking images of Gaudí's most famous, unfinished, work.
- Wikipedia gives useful background information on Antonio Gaudí, and valuable weblinks to further informative sites.
- Teachers TV hosts a World of Maths series, containing six videos where students are set mathematical puzzles to encourage broader thinking. The fourth of these contains 11 video sequences all based on the Sagrada Família.

In the classroom
Park Güell dates back to 1900, when Gaudí's good friend Eusebi Güell commissioned him to build a garden for the elite of Barcelona society. Unfortunately, only two homes were ever built on it, but today it is a park owned by the city of Barcelona, showcasing Gaudí's work. Casa Museu Gaudí is the house at the entrance with a spire where the architect lived for most of his last 20 years. Parts of this magical park would not look out of place in a fairytale, and can provide some incredible mathematical opportunities.

Park Güell by Canaan

Show the pupils the image of Gaudí's window from Park Güell. How many mosaic circles can they see surrounding the window? Indicate the large white edging stones, each with two mosaic circles. Encourage young children to count in twos to find the total number of circles around the window. How else can the circles be grouped? Pupils may see six circles at the top and bottom, with ten down each side. If necessary, encourage them to 'see' the circles in other arrangements, including four at the top and bottom, eight down each side, and two at each corner. Ask pupils to mark the different groups of mosaic circles on the template sheet provided and write corresponding number sentences. One example has been completed for them. How many ways can pupils split the total?

Gaudí's '32 circle' window is two square panels wide, with its height made from one rectangular and two square panels. What if the window was only half as wide (i.e. one square)? Would Gaudí have only needed half the amount of circles, i.e. 16? Why/why not? Ask pupils to explore different sized windows to find how many mosaic circles Gaudí would have needed. Can they see any pattern in their results? Ask older pupils

to try to record their results in a systematic way, looking for patterns. Can they find a generalised formula based on the squares and rectangles making up the width and height of the window? Can they find out how many circles would be needed to surround a door three squares wide, with two rectangles and two squares in height?

Sagrada Família by Bernard Gagnon

Gaudí's most famous work is the 'Sagrada Família' Catholic church, recognised as a symbol of Barcelona worldwide. Work on the church was started by architect Francesc de P. del Villar in 1882 and continued by Gaudí the following year. He continued to work on the project until he died after being hit by a tram in 1926. Gaudí had completed less than a quarter of the final church, but work continues on the Sagrada Família today, with completion planned for 2026, the 100th anniversary of Gaudí's death.

The latest version of his design is for a church 95m long and 60m wide. The church will be able to accommodate 13 000 people. When complete, the Sagrada Família will have 18 towers in total. Four towers on each of the three facades represent the 12 apostles. The towers reach heights of between 90m and 120m. The central tower, dedicated to Jesus Christ, will measure 170m in height.

Ask pupils to research different images of the Sagrada Família. What shapes can they recognise? Are they two or three-dimensional? Encourage them to recreate some of the shapes using construction materials or card nets and discuss their properties. Which fit together easily? If they were completing the Sagrada Família, which shapes would they use? Why? Which of the shapes produce the strongest structures?

Contact us with details of activities you have tried in the classroom – we will happily shout about the wonderful work you are doing!

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Focus on…using buildings to support mathematical understanding

It is widely acknowledged that young children's first learning of mathematical ideas is in real life contexts (Hughes, 1986; and Gifford, 2005). Carruthers and Worthington (2006) argue from a social cultural perspective that children use whatever they can within the culture of their own lives to make personal meaning. Thus it can be argued that children's natural environment is a good starting point for learning. Indeed, this is a key feature of the Practice Guidance for the Early Years Foundation Stage (DfES, 2007). This article examines how you can use buildings, and indeed photographs of buildings, to support learning in mathematics.

Investigating shape

Asking children to examine buildings for shapes provides many opportunities to discuss the properties of shape, such as number of sides or vertices, angles, symmetry and tessellation. Using photographs or during visits to iconic buildings, you could ask children to examine the shapes in the design and construction of the building.

30 St Mary Axe, London.
Designed so that the building appears more slender than a rectangular block.

City Hall London.
Home to the Mayor of London and the Greater London Authority.

The Sage Gateshead is a regional music centre of international standing. The largest hall can seat up to 1 650 people.

These could also provide cross curricular opportunities for learning in science, for example, examining forces acting upon structures. Why are most doors and windows rectangular shapes? Why is the triangle often used in man-made structures? NRICH provides an investigation to support this level of questioning if you want to follow this up.

The inside of buildings also provide examples of geometric structures. Photographs with kind permission of Foster and Partners.

This staircase at City Hall will enable children to explore the Archimedean spiral – the path of a point that is either coming away from or going towards a point of origin at a constant speed. Take a look at the NRICH website to find out how to make one as a follow-up activity.

City Hall staircase
by Foster and Partners

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Counting
A high-rise building offers a vertical number line that can be used to support counting from zero (and if the building has a basement) extending beyond zero including negative numbers. It can also support the understanding of counting on and back to calculate more/less.

Calculation
Recent research by Harries and Barmby (2006) suggests that the array representation can be a powerful tool for supporting work in multiplication. Sets of windows on buildings can provide strong images to support the array representation. For example, in the picture below you could ask children to describe what they see. In this image there are three frames of windows in a 2 x 3 configuration, or could it also be described as a 3 x 2 configuration – this will initiate a discussion about the commutative law of multiplication.


Questions could then be extended, for example, what if the building had five floors, ten floors how many windows would there be? Higher attaining children could examine the number of panes of glass in each window. If each window has 12 panes of glass, how many panes in each frame? If there are 144 panes of glass how many windows would there be?

Estimation and Measure
If you are able to visit buildings you can ask children to estimate:
  • how tall the structure is
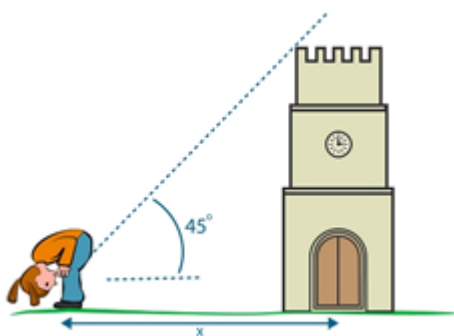
If possible ask children to walk far enough from the building to a find a place where they were just able to see the top of the building (from their upside down position as in the picture). The distance from this place to the base of the building is approximately the height of the building. How does this work? The angle that is formed as they look through their legs is approximately 45 degrees. The angle between the building and the ground is fairly close to 90 degrees and, using what you know about the angles and sides of a triangle you can work out the height of the building. The height of the building and the distance from the building to the person is about equal.

  • the capacity of the structure i.e. the number of people it can accommodate
 • the area the structure covers.

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American Air Museum Duxford.
Photograph with kind permission of
Foster and Partners, all rights reserved

This could be developed so that the children could measure out the area of building or your choice based on the information given.

To provide a challenge, children could examine the use of scale drawings to plan and build buildings. For example, you could use the information about the American Air Museum, Duxford, and measure out the size of the main hall in your playground. The museum was designed to house the B-52 bomber and other aircraft dating from World War I to the Gulf War. The dimensions of the B-52 (wing span 61m and tail fin height 16m) were used to inform the the height and width of the building entrance.

The children could use a scale of 1:100cm to work out how big the main hall was. They will need to think about the space either side of the wing tips too.
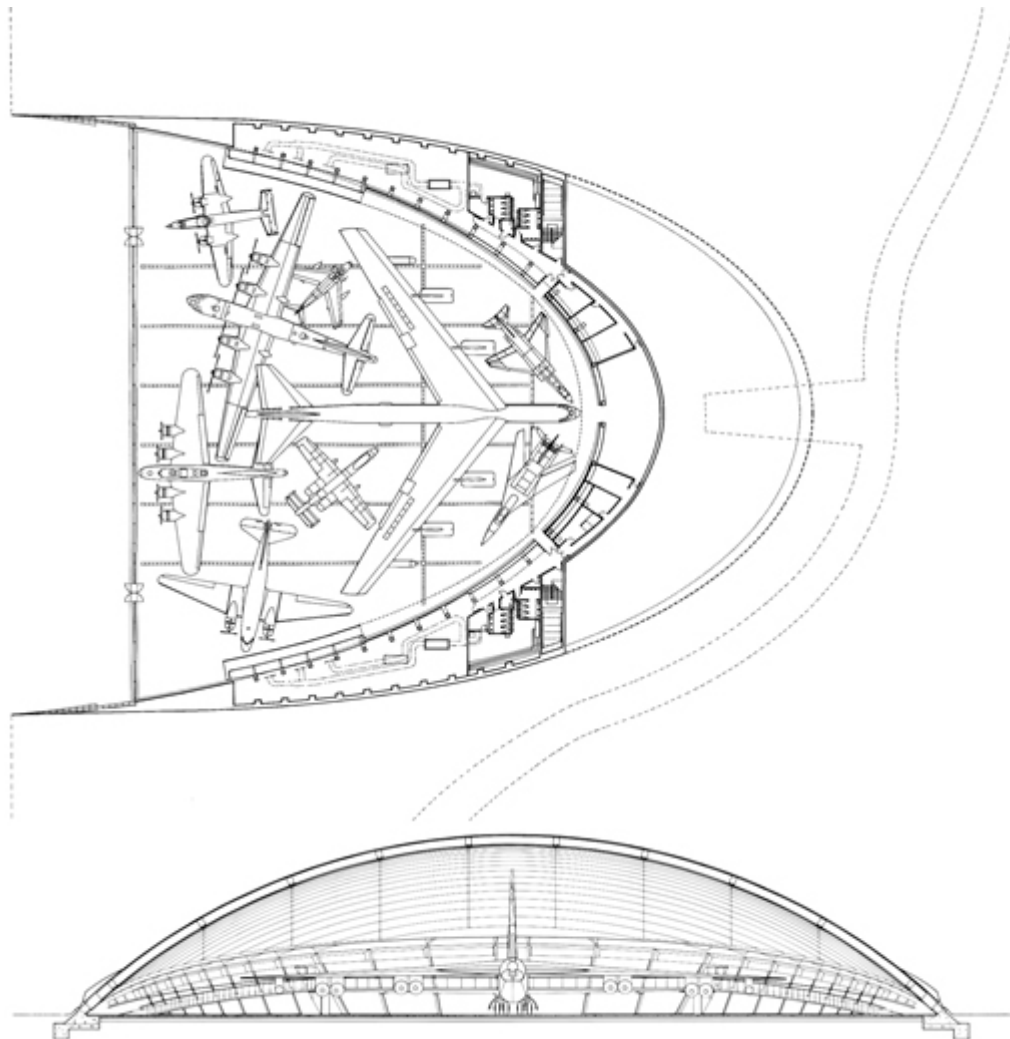
American Air Museum, Duxford.
Scale drawings used with kind permission of Foster and Partners, all rights reserved

The children could then be asked to produce a scale drawing of an area of the school, by measuring and converting between metric units of measurement.
Looking at buildings in this way can really illustrate the fact that mathematics is useful in everyday life.

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For further ideas for the use of buildings to support learning in mathematics look at our microsite Learning Maths Outside the Classroom, which has a particularly good feature on Built Environment and Heritage, and our pages, Giant Aspirations - Monumental Maths and Maths in Work - Architecture.

References for further reading
Carruthers, E and Worthington, M (2006) Children's mathematics: making marks making meaning Sage
Gifford, S. Teaching mathematics 3-5 OUP
Harries and Barmby British Society for Research into Learning Mathematics 26(3) November available
Hughes, M (1986) Children and Number. Blackwell Publishing.

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A little bit of history
The Romans

In this article, we are being really cross-curricular and looking at some of the ways that you can link mathematics into a topic of the Victorians. If you are looking at this period of history, try some of the ideas. This will mean you can double up on the maths that you do during the day!

However, due to the large amount of ideas and resources, this feature can only be read directly on the portal, otherwise the interactive nature of the way they are presented will be lost.

Maths to share – CPD for your school

Using a counting stick

The Maths to Share article in Issue 28 focused on using number lines and hundred squares. Towards the end of this article, the counting stick was mentioned.

The counting stick is a resource we will be exploring in this article. It is worthwhile remembering that it can be considered as part of a continuous or 'empty number line' with clearly marked intervals along the stick to represents specific points.

While this is indeed true, it is easy to forget the versatility of the counting stick. It is more flexible than the hundred square and most number lines. The counting stick was first introduced to many at the start of the National Numeracy Strategy. It was one of a suite of models and images suggested for counting on and back in ones and tens and for ordering numbers to 100. However, as time went on, teachers quickly realised how versatile the counting stick was and began to use it to support children's learning in other areas of mathematics. Many of the ideas for using a counting stick could just as easily be utilised with a bead string. Using a range of models and images will help children to make links and generalise their understanding.

You could begin a staff meeting on using the counting stick by asking colleagues when they last used one and what for. In many cases, it will not have been used for some time. If you ask why, the chances are that colleagues have simply got out of the habit.

You might like to watch the Teachers TV programme Numbers, part of the Great Primary Lesson Ideas series. The last section from 10:22 to 13:45 is about the counting stick and demonstrates using it for times tables. Notice that the teacher uses the beginning of the stick as 1, not zero, so the times table continues to the eleventh multiple.

During the staff meeting, you will be able to remind colleagues just how useful the counting stick is by sharing with them some of the following uses. Choose the ones relevant to your setting. Make sure you have collected some counting sticks so that participants can have a go, ideally in pairs. It might be worth reminding them that it can be held vertically as well as horizontally.

- tell the children the size of the step and practice counting forwards and backwards. Initially, make the start zero. This is particularly useful for times tables, and you might like to make sets of multiples cards to attach to the stick. Remember to make the link to division too e.g. how many threes are there in 27? How do you know? How could we write that? The beginning of the stick could be any number. Move on to statements like: If this is 20 and we are counting in twos, what number is this...and this...and this as you point to various parts of the counting stick. Count in patterns such as 3, 8, 13, 18, 23, 28... and ask the children what they notice.
- for number sequences, point to the centre of the stick and ask questions such as, if this is 36, what are the numbers either side? What are the numbers at the beginning and end of the stick? What else could they be? Children can specify any value for the numbers, provided they can justify their answers. So for the number stick with 36 in the middle, the numbers either side could be 26 and 46, with the ends – 4 and 86. But the numbers either side could have several other values. Children may find this easier with mini whiteboards to jot on initially.

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- for fractions, decimals and percentages initially identify the beginning of the stick as zero, the end as 1 (or 100). Again ask what decimal number (or fraction) is this...and this...and this. Switch between representations – for example if this is 20%, what fraction is that? Move on to identify the beginning of the stick as 1.5 and the end as 1.6, or the beginning as ½ and the end as 1 and again ask what number (or fraction) is this...and this...and this or, Where is 1.59? Where is 12/20 etc?
- for measures, hold the counting stick vertically. If the bottom is zero and the top is 1 litre (1 000ml), how many millilitres is this...and this...? How many millilitres to fill to the top? Where would 730 ml be? Use as a spring balance showing weight – this time the bottom is 0g, the top is 1 000g or 1 Kg. How many grams is this...and this...? Where would 270g be? Do the same for length. Use the stick to convert between grams and kilograms, millilitres and litres, centimetres and metres. Do the same for temperature. If this is 0, where is...? Specify Centigrade or Fahrenheit for a real challenge. For time, set a start time at the beginning of the stick and specify the time interval of each block. So if the beginning of the stick is 10 o'clock, where is ten past 11? Use digital time too.

1 000 ml
1 litre

1 000g
1 kilogram

0

0
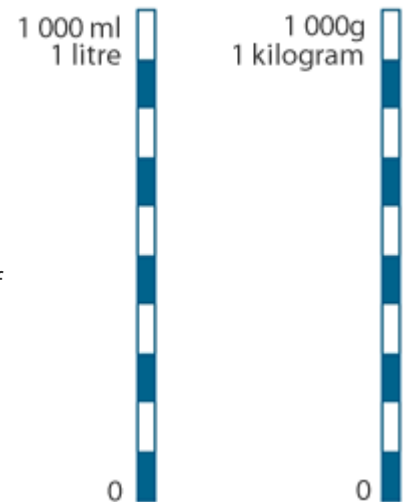
- once the children are confident with any of the activities above, start to use the in-between points to extend understanding. For example, if the counting stick is being used for the 9 times tables, where would 5, 50 or 62 be?
- you could also make individual counting sticks. On A4 landscape paper, draw a table ten columns across, with only one row. Make the row as deep as you want, then colour fill with black alternate cells. Mark what will be the first block with a circle, triangle or other mark of your choice. There is no point using colour unless you can colour photocopy your original. Copy three or four 'tables' onto the page. Print, enlarge to A3 and laminate. Give children a paperclip as a marker and ask them to place the marker where different numbers would go.
- the next step is to convert a PE hoop into a circular counting stick/number line. You can use number cards to label the circle, but an unlabelled one is far more versatile. If you are going to use the circular hoop as a number dial with ten intervals, do not use the same representation with 12 intervals as a clock since this will confuse many children.

Begin to draw the meeting to a close by showing colleagues some useful computer programmes using the counting stick, Try to leave enough time to demonstrate at least one of them:

- Mathematics spreadsheets: Counting stick
- Mathematics spreadsheets: Measures counting stick
- Mathematics spreadsheets: Converting measures
- Mathematics spreadsheets: Counting stick with further options
- Mathematics spreadsheets: Fractions
- Mathematics spreadsheets: Fractions 2.

Also useful:

- Mathematics ITP: Decimal Numberline.

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Save the last 10 minutes of the meeting for Jill Mansergh's amazing 17 times table video.

Encourage everyone to join in – Year 5 and 6 classes would love it too! They could demonstrate their knowledge of the 17 times table in an assembly – you pointing to a counting stick is all the support they'll need. Colleagues are likely to notice of the repetitive nature of the 'patter', the links (doubling and halving) made between the multiples, the visual, auditory and kinaesthetic nature of the exercise, the constant visual reference (Jill's left hand doesn't move from the middle of the counting stick) and the pace – would there be any advantage in going slower?

Participants should leave the staff meeting with a smile and the determination to dig out their counting sticks – and use them.

ICT in the Classroom - Using Video and Animation

Audience Creating video and animation can add an exciting dimension to mathematics lessons. Children can be creative and take ownership of their learning through producing films that are a product of their mathematical understanding.

Video and problem solving

A simple way to start is with worded problems. Interpreting what a problem is asking exactly, is a huge part of problem solving. Give small groups a word problem to consider, for example: "Stuart and Rhys bought a packet of 45 bars of chocolate. They ate one fifth of them on Saturday. They ate a twelfth of the remaining bars on Sunday. How many bars did they have left?"
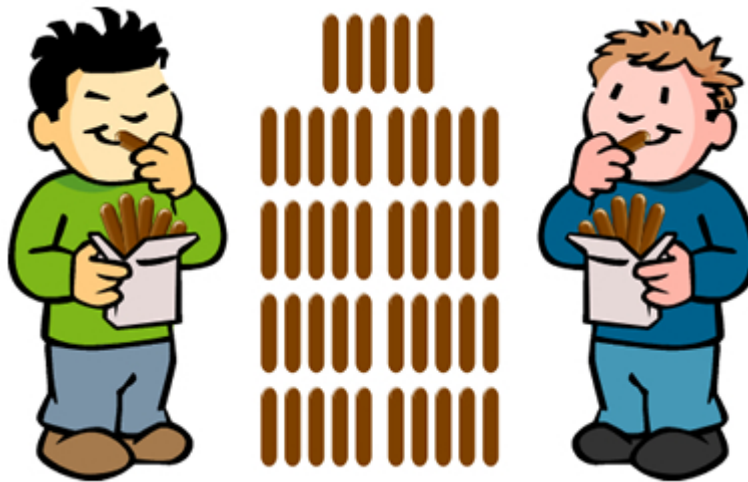
Ask the children to film themselves while they act out the problem, and then the solution. To share the problem-solving experience with the whole class, the group shows the first part of their video for the rest of the class and asks the others to write or say what they think the word problem was. After discussing what the word problem could be, they solve it and then watch the second part of the video, showing the solution, to check their answers.

The same strategy can be used for sharing logic puzzles, but with these problems the process of solving the problem is filmed as well as the context and the solution.
Here is an example:

Mr Young was interviewing five children to find out who had eaten the raffle prize, a beautiful cake, at the Christmas fair. This is what each child said:

> *Anya: "It wasn't Emily, it was definitely Bethan."*

> *Bethan: "It wasn't Charlotte and it wasn't Emily."*

> *Charlotte: "It wasn't Anya, it was Emily."*

> *Dee: "It was Charlotte and it was Bethan."*

> *Emily: "It was Dee, it wasn't Anya"*

> *Each child told one lie and one truth. Who ate the cake?*

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One way to solve problems such as this, is to choose one of the children in the problem at a time as the child who ate the cake and see if that makes the statements correct. The children solving the problem could film what would happen for each of the options to play back when the class makes their choice.

Try setting up a camera, fly-on-the-wall style, to record individual children or groups working with mathematical apparatus or on a problem for review in a plenary. Ask *What was …doing / learning? Why did you choose that … method / equipment?* Be aware that you might want to review the video with the children concerned before sharing with the whole class, so it may not be available to use in the plenary of the lesson in which it was filmed.

Video and animation for exploring and sharing patterns
To explore repeating patterns, children can create and film their own repeating dance routine with a specific number of steps. Watching the dance, children can consider all the questions usually associated with repeating patterns, such as *What will the next move be?*, *How many moves will the group have to do to get to the 4th jump?* and *If the dance continued, what would the 100th move be?* Discuss which questions we can check using the video, and which we will have to prove a different way.
Similarly, children can create a pattern by being videoed stepping around a floor hundred square to a particular rule e.g. even numbers, starting on 3 adding five, for other children to guess the rule and continue the pattern.

Stop-frame animation can be used to show patterns of shapes or numbers extending and repeating. The children should start by creating a storyboard of the pattern they will film. Then all they need to do is create the first section of their storyboard with a practical resource or modelling material, fix the camera into position and film one second of each storyboard section before changing the scene to the next. The stop-frame animation can become more complex if the experience of the children allows. Consider creating a bank of videos for children to access to support their learning in different units.

Video for explanation and communication
Children can record explanations in mathematics as a documentary, news report or children's educational programme.

Presenter (Jessica):	*Today, children in Class 5 found out that two even numbers added together will always make an even number. Phoebe is in the classroom with more information.*
Reporter (Phoebe):	*Yes, Jessica. Here in this classroom, this morning, children first tried out these calculations (holds up whiteboard) which suggested that the statement about addition was true. They then went further by using resources such as these (points to resources on the table) to prove that it was always true. Ethan and James were part of the group that made this discovery. James, tell me what happened.*
Interviewee (James):	*Well, we saw that all the even numbers we added together made even numbers so we wondered if that was always true.*
Interviewee (Ethan):	*We found out that even numbers always look like this (points to arrangements made with a resource) and can be made up by pairs of cubes. When we put any two even numbers together the answer can also be made with pairs of cubes (moves to groups of cubes together and points to the new group made) so that is even too.*
Reporter (Phoebe):	*Thank you. So it's true. Two even numbers added together will always make an even number.*

Although this type of role play can be carried out without filming the activity, the resource it produces can be used to celebrate mathematics work and reinforce concepts soon after the lesson, to remind

children of previous learning when returning to the strand of mathematics later in the year and used with other classes and year groups to introduce concepts.