Primary Magazine

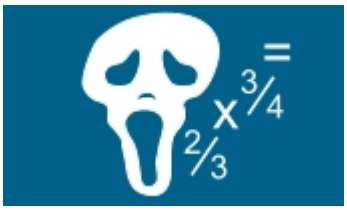
Issue 13

National Centre for Excellence in the Teaching of Mathematics

Welcome to the 13th issue of the Primary Magazine – and to the end of the school year!
In **Maths to share - CPD for your school**, we consider ways to involve parents in mathematics.
Our **Up2d8 maths** provides opportunities for work on such mathematical concepts as time and shape within the context of Big Ben's 150th birthday.

Contents

Primary Magazine
Issue 13



National Centre for Excellence in the Teaching of Mathematics

From the editor

A few years ago, The Independent published an article Why are we so frightened of maths? According to the experts, maths anxiety is a genuine condition! In their series Count Me In, the BBC asked parents to name which subject caused them most worry when they were helping their children with homework – maths was the most common answer by a long way. Apparently, our mathematical inferiority complex contributes to our poor performance in international comparisons. Brian Butterworth, of University College London, said: "Maths is a cumulative discipline. If you feel anxious about something, there is often a tendency to avoid doing it. There is a vicious circle which is more damaging in maths than it would be in anything else." This seemed pertinent because this issue's Maths to share, is about involving parents. Could this be a way to ease some of that anxiety? Why not look at the ideas and consider trying them with the parents of children at your school?

The NCETM Self-evaluation Tools are an enormously helpful resource, mentioned briefly in a previous issue of the magazine. You can assess your confidence with mathematics-specific pedagogy and areas of mathematics content knowledge by selecting a key stage and topic from the drop-down menus. You will find examples of what each question means, and you can submit your own examples.

After you've completed each section you can explore 'next steps' to improve your understanding, and areas you wish to develop; these next steps link both to the NCETM portal and beyond.

All your answers are private, and only you can see them in your learning journal - where any notes you make are saved. You can return at any time to continue your self-evaluation or to re-evaluate areas you have previously completed.

It is hoped that the NCETM Regional Coordinators around the country will have the opportunity to share it with you in subject leader sessions your local authorities may be running over the next term or two. Why not have a look and consider ways in which it might be helpful for staff development in your school?

Up2d8 maths

Big Ben celebrated its 150th birthday on 31 May this year – so, why not use this occasion and the bell itself to develop some interesting sessions on time. You could also use it when teaching shape, scaling down using mental calculation strategies such as doubling and dividing by ten.
This resource provides ideas that you can adapt to fit your classroom and your learners as appropriate.

In addition to the ideas in the resource, here are some more that you could adapt and try:

- Big Ben is cleaned every five years. Does your City Hall or similar building have a clock tower? Find out the matching information for that clock. Is it bigger or smaller? Cleaned more often or less often, etc?
- How many different clocks are there in your school and/or town centre? Go on a clock hunt/walk. Photograph the more unusual ones and have a 'Spot the Clock' quiz
- Practice converting the times on an analogue clock to 12- and 24-hour digital times
- Explore time zones around the world
- Locate cities in different countries in the world and work out time differences
- Explore and compare other interesting clocks such as:
    - Dreger Clock, California, USA
    - Peace Tower, Ontario, Canada
    - Town Clock, Iowa, USA
    - Astronomical Clock, Prague, Czech Republic
    - Eastgate Clock, Chester, UK
    - Astronomical Clock, Strasbourg, France.

Download this Up2d8 maths resource - in PowerPoint format.

Download this Up2d8 maths resource - in PDF format.

Primary Magazine
Issue 13

National Centre for Excellence in the Teaching of Mathematics

The Art of Mathematics
Islamic Patterns

Islamic faith

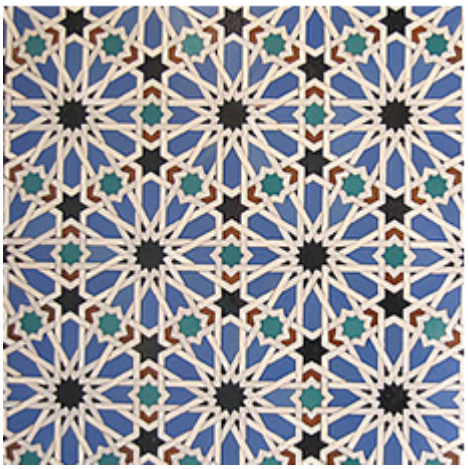
Islamic faith is based on the Islamic holy book, the Qur'an (sometimes spelt Koran), which followers of Islam believe to be the word of God as revealed through the Archangel Gabriel to the Prophet Mohammed in the early 7th century. The Prophet was born in Arabia in about AD 571 and died in AD 632. By the early eighth century, Islam had spread westward by military conquest as far as Spain and eastward to Samarqand and the Indus Valley. Islam continued to expand, into Turkey and deeper into the Indian subcontinent, into north-western China and South-East Asia. Followers of Islam are called Muslims.

Art and design

The Islamic faith provides laws to govern both religious observance and social behaviour. While the Qur'an contains no specific prohibition on figural imagery, most interpretations of Islamic law have tended to discourage such imagery as potentially idolatrous, and figural elements such as pictures are rigorously excluded from most religious settings. As is often the case with constraints of one kind or another, this restriction has led Islamic artists to become masters of abstract geometric patterns, tilings and calligraphy.

Geometry in Islamic design

A common feature of Islamic art is the covering of surfaces with geometric patterns. This use of geometry is thought to reflect the language of the universe and help the believer to reflect on life and the greatness of creation. Among the most important aspects of Islamic geometric design are repetition and variation. A series of tiles, for example, may consist of only one or two shapes but the patterns of the tiles may all be different. In other designs, a few different shapes may be combined to create a complex interlocking pattern. Geometry is seen to be spiritual because circles have no end, they are infinite and so they remind Muslims that Allah is infinite. Complex geometric designs create the impression of unending repetition, and this also helps a person get an idea of the infinite nature of Allah. The repeating patterns also demonstrate that in the small you can find the infinite, a single element of the pattern implies the infinite total.



Symmetry also plays a part in most Islamic patterns. There may be a single line of reflective symmetry, usually from the top to the bottom, or there may be three or four lines of symmetry. Straight (translation) and turning (rotational) movements are also used. Sometimes these, as well as reflective symmetry, are found in the same design.

National Curriculum links
The following activities based on geometric Islamic patterns support learning about shapes, space and measures. Pupils in Key Stage 1 and 2 can learn to recognise circles, triangles, squares and hexagons, and to create pictures using 2D shapes. They learn to identify lines of symmetry and to recognise reflective and rotational symmetry. Extension activities for more able pupils could include the study of transformational and symmetrical patterns to produce tessellations.

These activities will address the learning objectives in the Primary Framework Understanding Shape strand, particularly those for Year 5 and Year 6.

You will need a selection of Islamic patterns which you can find easily on websites on the internet or Google images.

KS1 Activities
Examine and discuss a range of Islamic patterns. What shapes can the children see? What are the properties of these shapes? Through these activities, the pupils will be able to discuss shape vocabulary in relation to circle, triangle, square, hexagon, and octagon.

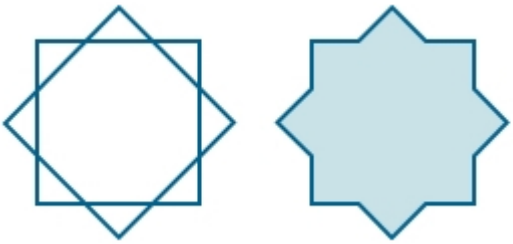
Shape investigation
Give children a range of 2D shapes (those you get from published materials) and ask them to fit them together so there are no gaps. After some time, ask the children which ones fit together and which ones don't. (Oblongs, rhombus, parallelograms, equilateral triangles, squares and hexagons will tessellate.) Once the children have had an opportunity to explore, ask them to draw a pattern by fitting their shapes together and drawing around them. This could be developed by asking the children to colour in, using a repeating pattern and explaining how they did it.

KS2 Activities
Examine and discuss a range of Islamic patterns. What shapes can the children see? What are the

properties of these shapes? Through these activities, the pupils will be able to discuss shape vocabulary in relation to regular and irregular polygons. Ask the children to look for the lines of symmetry in individual designs. Can they see a design with one line of symmetry and another with two or more? Which designs do not have a line of symmetry? In a design, identify a shape and demonstrate how this can be tessellated. If using an Interactive Whiteboard you could draw around the shape then translate or rotate it to show how it would tessellate. You could extend more able pupils by asking them to identify an example of a semi-regular tessellation where two different shapes are fitted together and repeated. Why do some shapes tessellate and others do not?

Most of the patterns that your pupils will see in Islamic artwork are based on the equilateral triangle, square, hexagon and octagon.

Squares and octagons



Pupils can choose to erase the lines in the centre if they wish.

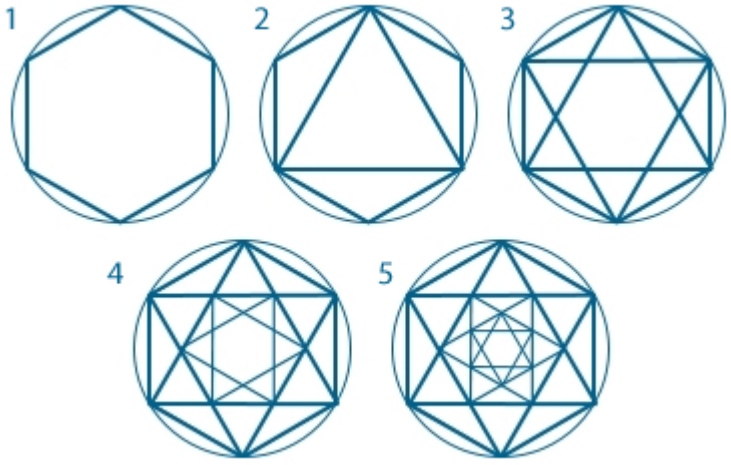
An eight-pointed star forms the basis of many Islamic patterns. This can be made by overlapping two squares.

Discuss the properties of the square. Ensure that pupils know that a square rotated about the centre of rotation is still a square!
Ask pupils to draw a square using a ruler.
Next ask them to rotate the paper by 45˚ or 1/8th of a turn and draw a second square directly over the first square. You could draw links between compass points.

For pupils that need extra help, provide a square template to draw round and then rotate 1/8 of a turn or 45˚. What do the pupils notice about the shape in the centre of the eight-pointed star?

Triangles and hexagons
Patterns based on equilateral triangles and hexagons are easy to make using a compass and straightedge because the radius of a circle divides its circumference into six equal parts.

Ask the pupils to draw a circle with the compass. Then ask them put the compass point anywhere on the circumference of the circle and swing the pencil leg so that a mark is made on the circumference. Move the point of the compass to the pencil mark and make another pencil mark on the circumference. Continue doing this round the circle until there are six marks. From these six marks, the series of hexagons and six-pointed stars can be made – see the illustrations below:

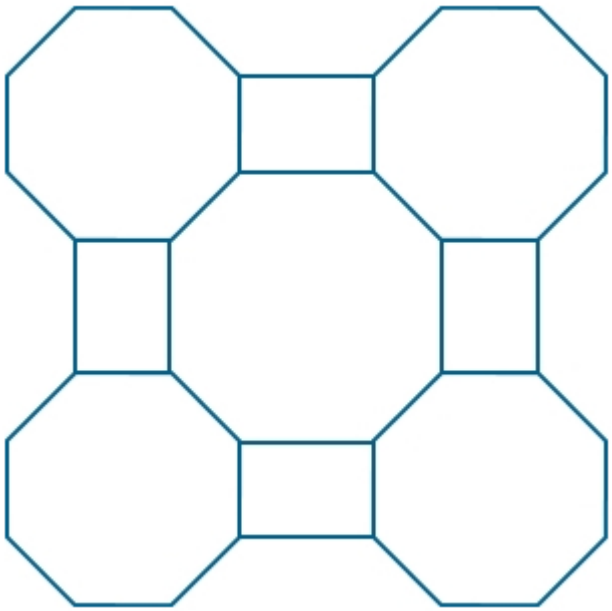


1. Join up the points in sequence round the circle to make the six-sided polygon into a hexagon. Ask the children to discuss the properties of the shape e.g. Is the shape regular/irregular? How many parallel sides? How many angles? Ask the children to measure the internal angles using an angle measurer, what do they notice?
2. Next pupils will need to join up every second point – they will now have an equilateral triangle. Ask pupils what shape they have now? How could they provide evidence to support their argument?
3. Then they must join up the other three points of the hexagon to make a second equilateral triangle. Together these two triangles make up a star. One triangle points up to heaven, the other points down to earth. Three pairs of parallel lines make up the star. In the middle of the star is another hexagon.
4. .Joining up every second point of the inner hexagon makes another equilateral triangle in the inner hexagon. Joining up the other points makes a second equilateral triangle and another six-pointed star with a hexagon in the middle.
5. This pattern can go on and on. In this sequence of patterns, the stars and hexagons change position. Ask pupils to discuss the relationship between triangles and hexagons.

You can find the source of this resource on the V & A website.

Health and Safety
When working with a compass it is a good idea to ask the children to place a piece of thin card under the piece of paper on which you are drawing, as this will help to stop the compass point from slipping.

Links with ICT
Ask pupils to try to make patterns based on hexagons, octagons and stars by manipulating the basic shapes in different ways.



You could ask the children to reproduce this image using Logo. More ideas like this are available from the Nrich website.

Primary Magazine
Issue 13

National Centre for Excellence in the Teaching of Mathematics

Focus on…Summer holidays

At last, the summer holidays are here! Anyone involved in teaching knows that you don't actually get six weeks' holiday. However, in the middle of the clearing up from last year and preparing for next year, there is the fabulous filling of some 'me' time. For many of us, there is only so much catching up with yourself and lazing around that you can take. You need a little project and here are some suggestions – nothing too onerous, just a little learning, updating or exploring.

Browse a few websites:

- The first suggestion just has to be the NCETM portal. Take some time to explore. Catch up on past issues of the Primary Magazine. Browse the Early Years Forum or the Primary Forum, and have your say on topics from The things children say to Raising the profile of mathematics.
- Take a look at the Children's Mathematics Network. The galleries guide you through young children's development of written number and early 'written' calculations and showcase examples from teachers who are exploring children's mathematical graphics in their settings and schools.
- Browse the Coxhoe website for useful activities.
- Visit Ocean Maths to find out how to improve pupils' mathematics through involving parents/carers.
- Browse Crickweb to find some fantastic IWB resources.
- Check out Maths is Fun for games, demonstrations and all sorts of useful stuff.
- And don't forget NRICH. There are some fascinating articles here that you probably haven't had time to read, as well as lots of puzzles and games.

Watch a bit of TV:

- Tune in to Teachers TV Primary Maths to find out How They Do It In Hungary? or watch The Shape Show
- Watch Flatland - The Movie by E Abbott ISBN 1604615370 (DVD). Amazing, you won't be disappointed. This is available from Amazon, among others.
- BBC BackPage has a good selection of videos covering Reception to Year 6, including a collection of Top Tips. You can even add your own.
- Don't forget the NCETM Talking Heads!

Read a book:

- Choose some of the books on the Mathematics Stories Booklist to find or buy. Read them and think about how you could use them in the classroom. Jot down a few notes and look up which Block and Unit they might be suitable for. Put the whole lot in a folder and store with your planning materials for future use.
- In between the novels, read something a bit deeper. Do you have a book about mathematics or teaching you've been longing to read? If not, try one of these:
  - *Primary Mathematics: Teaching for Understanding* by Patrick Barmby, Lynn Bilsborough, Tony Harries and Steve Higgins ISBN 0335229255. The book addresses the particular areas of mathematics within the primary curriculum that teachers find difficult to teach and in which children struggle to achieve.
  - *Teaching and Learning Early Number* by Ian Thompson ISBN 0335234119. This is an accessible guide to a wide range of research evidence about the teaching and learning of early number. New, rewritten and updated chapters mean it is well worth buying this second issue.

- *Children's Mathematics: Making Marks, Making Meaning* by Elizabeth Carruthers and Maulfry Worthington ISBN1412922836. The authors show us that we can learn just as much from children's mathematical graphics as we do from emergent writing – we just don't tend to look or listen in this area.
- *Children's Errors in Maths: Understanding Common Misconceptions* by Doreen Drews, John Dudgeon, Fiona Lawton and Liz Surtees. Edited by Alice Hansen ISBN1844450325. The book deals with the most common mathematical misconceptions in primary-age children and shows how you can deal with them. The authors have hit on the refreshing idea of how children learn the wrong things rather than how they learn.
- *Professor Stewart's Cabinet of Mathematical Curiosities* by Ian Stewart ISBN 9781846680649. Find out why the M25 is shorter anticlockwise than clockwise, and by how much.
- *My Brain is Open, The Mathematical Journeys of Paul Erdös* by Bruce Schechter ISBN 0684859807. This is on my shelf ready to read. Paul Erdös was one of the greatest and certainly most eccentric mathematicians, so this should be a fascinating read.
- *The Magical Maze* by Ian Stewart ISBN 0753805146. Subtitled *Seeing the world through mathematical eyes*, this will exercise your mathematical muscles.
- *Number Freaking, The Surreal Sums Behind Everyday Life* by Gary Rimmer ISBN 1840468130. According to the Good Book Guide, this is, "Addictive, fun and surprisingly educational... makes maths feel like an illicit thrill."
- *Dr. Riemann's Zeros* by Karl Sabbagh ISBN 1843541017. "A pleasurable and painless read for anyone intrigued by numbers," according to Ian Stewart.

Books go out of print regularly: check availability on a bookseller site such as Amazon.

Do a little personal CPD:

- Take time to go through the NCETM Self-evaluation Tools to strengthen your understanding of all areas of mathematics teaching. Choose from subject knowledge, pedagogy and embedding in practice.
- Take an NCETM Online Course. The Primary Module Making Connections has several short learning activities which will help you to develop your thinking about the nature of making connections between concrete, pictorial and symbolic representations of mathematical ideas, and much more.
- Browse the NCETM Teacher Enquiry section to find out what's going on in the world of mathematics education.

But whatever you do, do it all with your feet up and a glass of your favourite cooling beverage nearby. If there's any sun around, do it in the garden and chuckle over a few maths jokes. Special thanks to Sue for my favourite one – There are 10 types of people in the world... those who understand binary and those who don't.

Happy Summer!

Primary Magazine
Issue 13

National Centre for Excellence in the Teaching of Mathematics

Starter of the Month

While you are relaxing during the summer holidays, take a look at these fabulous websites. There are lots of fun activities and starters, some of which you can set up specifically for your class. These are sites you'll either visit again and again, or download and keep!

Foundation Stage

- CBeebies have some great games. Play dominoes with the Numberjacks or visit the Smarteenies Shape Store.
- Cheeky Monkey has a dartboard number bonds to 10 game and a number sequences game.
- Try Numberline Lane for lovable number characters.
- And then there's Barney.

Key Stage 1

Revisit some old favourites and some new:

- Woodlands Junior School is an old favourite - useful for KS2 as well.
- So is Coxhoe Primary School.
- Have you discovered ICT games at Toftwood Infant School? Aimed at Key Stage 1, there are also some Foundation Stage games.
- Discover Jenny Myzen.

Key Stage 2

Most of these games can be played again and again:

- Download 10 Quick Questions. Choose almost any primary school maths topic and the program will generate 10 random quick questions, with answers. Use for starters, plenaries, revision etc. It's well worth looking at the rest of the downloads too.
- For a great set of games to download and have available at anytime, including versions of Mathionaire and Countdown, go to Subtangent.
- On the Scholastic Magazines website you can download their Daily Times Tables Teasers interactive games. You might need to sign in (free), but you don't need to be a subscriber.

And finally, something for everyone. You'll need a cup of coffee or two as you browse Birmingham Grid for Learning. There is lots there, but you do need to check them our. And still going strong is Count On. Check out the games old and new. Don't forget the National Strategies site: the function machine is great!

So browse, download, bookmark and enjoy!

A little bit of history

The history of time; some snippets from the archives

From the evidence of historic records and artefacts, it seems that in every culture people were preoccupied with measuring and recording the passing of time. It began with people using the sun, moon, planets and stars as they moved in space to work out seasons, months and years.

The first known group of people were the Sumerians who lived in Sumeria which is now Iraq. They developed a calendar based on the movement of the moon and stars that divided their year into months of 30 days. Each of their days was divided into 12 periods which corresponded to two of our hours. These periods were divided into 30 parts which would be equivalent to four of our minutes.

The Babylonians devised a year of 354 days, which was divided into 12 months of alternating 29 and 30 days based on the movement of the moon. They then divided each day into 24 hours of equal length, 12 hours of day and 12 hours of night, so that time could be measured more accurately. The day and night were divided into 12 because of the number of moon cycles in a year. Over time, they then went on to divide the hour into 60 minutes and each minute into 60 seconds. This came from the sexagesimal number system they used.

You can find out more about the Babylonian number system in Issue 5 of the Primary Magazine.

Around the same time, in Central America, the Mayans developed two calendars, one of 260 days and the other of 365 days. For these they used the sun and the movements of the moon and the planet Venus. It was fairly complicated, with three different dating systems working in parallel: the 'Long Count', the 'Tzolkin' (divine calendar), and the 'Haab' (civil calendar). This system spread to the other nations across Central America, including the Aztecs and Toltecs. There is more information about the Mayan Calendar on the Webexhibits website.

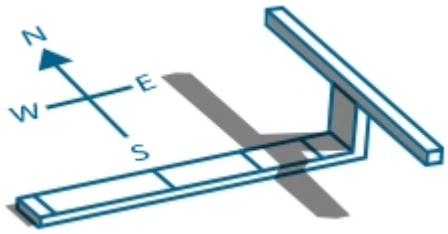
National Centre for Excellence in the Teaching of Mathematics

This Pyramid, built during the late Mayan period, was used as a calendar. It had four stairways, each with 91 steps and a platform at the top, making a total of 365, equivalent to the number of days in their calendar year.

The Aztec calendar was an adaptation of the Mayan one. It was a hieroglyphic and pictographic layout of how they measured time, showing both the 365-day agricultural calendar as well as a 260-day sacred calendar.

Now to Egypt...

The earliest Egyptian calendar was based on the moon's cycles. Years later, they noticed that the brightest star, Sirius, also known as the 'dog star', rose next to the sun every 365 days and heralded the flooding of the River Nile. Using this knowledge, they devised a 365-day calendar that seems to have begun around 3 100 BC. They then created a 24-hour day. The night was divided into 12 hours, according to the position of the stars in the sky. The day was divided into 10 hours and a shadow clock was used to keep track of these hours. The twilight hours were the hours before dawn and after sunset.



The shadow clock they developed was T-formed and the time was read by watching how far the shadow reached on the scale.

A Department for Children, Schools and Families initiative to enhance professional development across mathematics teaching

At the same time the Chinese, Babylonians, Greeks and Romans were using similar instruments to tell the time, for example, sundials and water clocks. Sundials were invented in about 800 BC and relied on the sun and the shadows cast. When the sun shone on a vertical or oblique pile, a shadow could be seen on the base on which the pile stood. This base, or plane, was divided into equal hours determined by the seasons and so the time could be told by the mark the shadow fell on.

Sundials were popular in Greece and Rome.



The main problem with sundials and shadow clocks is that they rely on the sun and therefore don't work at night. One of the kings of Ancient Egypt (Amenophis I) wanted to know what time it was throughout the night without having to get up and check the position of the stars. Someone made him a 'clepsydra' (or water clock) by filling a big bucket with water to a specific line, then cutting a small hole in the bottom of the bucket and marking off lines on the bucket after each hour had passed.

The water clocks had problems too. Water would flow more slowly or quickly when the temperature changed so they weren't reliable time keepers. Somebody, we don't know who, had the idea of using sand instead of water and so the hour glass arrived.

A German called Peter Henlein invented the first spring-powered clock around 1510 and then Jost Burgi invented the first clock with a minute hand in 1577. Both of them had problems to do with precision but they were a starting point for mechanical clocks. The mechanical clock was similar to the cuckoo clocks we still have today. They worked using weights that would slowly drop, turning a gear inside the clock that would move the hands to show the time. These clocks could only be built in tall towers because the weights needed to fall a great distance or the clocks would only work for a short amount of time. They tended to lose about two hours a day. Some were created with great care and still exist today: in Normandy, France, a big clock exists that was built in 1389 and in Salisbury, England, you can see the oldest clock in the world, built in 1386.

The first clock that kept better time was driven by a pendulum, and we can thank Galileo for that. Apparently in 1581, when he was 17, he was standing in the Cathedral of Pisa watching the huge chandelier swinging back and forth from the ceiling. As he watched, he noticed that each swing took exactly the same amount of time to complete. He decided that he could apply this principle to a clock, so making an accurate time piece!

It worked like this: as the pendulum swung from left to right it turned a wheel with teeth which, in turn, turned the hour and minute hands on the clock. One problem with these clocks was that they stopped running after a while and had to be restarted... until the arrival of the battery in the 1840s. By 1900, pendulum clocks had been finely tuned so as to be off by only 1/100 of a second each day and they worked using a battery so didn't stop until it failed.

In the 1920s, scientists discovered that quartz crystals could keep even more accurate time than a pendulum. Quartz is a type of crystal that looks like glass. When you apply voltage, or electricity, and pressure, the quartz crystal vibrates at a very constant frequency. This vibration moves the clock's hands very precisely. Many of the clocks and watches we use today are made using quartz.

Visit these websites for more details of any of the above:

- ThinkQuest
- National Institute of Standards and Technology (NIST)
- Arcytech
- Webexhibits

Primary Magazine
Issue 13

National Centre for Excellence in the Teaching of Mathematics

Maths to share – CPD for your school

Working with parents – planning for impact

"Don't worry... I was never very good at maths either."

"The maths they learn now won't be needed when they finish school anyway."

"We weren't taught these new-fangled methods and our maths is ok!"

"When will they ever need to know how many edges a tetrahedron has?"

"I try to help with maths homework, but they do things differently now."

Invite colleagues to consider the statements above. Do they sound familiar? Most primary teachers have heard similar phrases at some point; often from parents of their pupils, or even, in considerably more hushed tones, from colleagues!

In June last year, the final report from Sir Peter Williams was released following an independent review of mathematics teaching in early years settings and primary schools. The report commented on this very notion of parents openly admitting their feelings of unease about the subject of mathematics.

> *"The United Kingdom remains one of the few advanced nations where it is socially acceptable, fashionable even, to profess an inability to cope with mathematics. That is hardly conducive to a home environment in which mathematics is seen by children as an essential and rewarding part of their everyday lives."*

It is not often that we hear parents boasting about their inability to read, so why is it perceived to be acceptable for mathematics? Many parents do genuinely want to help their children and play an active part in their education, but simply don't know how. If both schools and parents are setting their sights on the same goal – helping their children to achieve their very best – then how can we all work together?

One of the initial hurdles might be convincing parents of the real value of supporting their children with their maths, and avoiding comments such as 'I'm not a teacher, that's why we send them to school'. When we calculate exactly how much time they spend at school compared to that spent at home with parents or carers, the results are quite astonishing. In fact, based on a child attending school every day for seven hours, for 39 weeks of the year, they are still at home over 80% of the time! That time could be a wonderful opportunity for parents to explore rich, meaningful mathematics with their children.

Spend some time 'brainstorming' as many ideas as possible for ways of involving parents with the mathematics taught in school. Allow time for feedback and short discussion of any suggestions if appropriate.

Suggestions might include:

- Mathematics homework
- Maths games library, where games are 'borrowed' and played at home
- Parents coming in to school to participate in maths lessons or special activities or events linked to maths
- Questionnaires for parents/children

- Maths trails for parents to complete with their child
- Information sheets for parents detailing strategies and teaching methods used in school
- Workshops for parents
- Links with other agencies, such as local colleges, for courses aimed at improving parents' own maths skills.

Take each of their suggestions (or those above) in turn, and establish staff thoughts on the feasibility and possible benefits. Any work needs to be supported by all staff so this initial meeting will be invaluable in gaining their views. Encourage them to get involved by assigning 'teams' of teachers to specific tasks once decisions are made at the end of the meeting.

Information Evenings

Mathematics is a demanding area of the curriculum and it is important that parents are supported in understanding the methods and strategies used in their child's school. Teaching methods have changed dramatically in recent years, and are likely to be very different from those with which they are familiar. This is often used as a good starting point for linking with parents, and many schools hold information evenings where parents are engaged in how their child is learning mathematics.

They are often led by the Mathematics Subject Leader, but local authority advisory teachers and consultants for mathematics are usually more than happy to help. These meetings can be extremely practical (and, dare we say, fun!) with parents taking part in some of the lively, interactive maths activities that their children experience every day. Many schools have run these sessions with children involved too, where they 'act out' a maths lesson, showing the parents what learning maths in their school is really like.

The focus is often on calculation methods, vocabulary used and how parents can help at home. There are several documents on the internet, posted by schools and local authorities, that have been used successfully in such meetings. Cumbria LA has produced some support materials.

Maths Homework

It is likely that staff are already sending children home with mathematics homework, but this is an ideal opportunity for considering its nature and possible implications for parents. Consider the questions below as a group:

- Is the homework always of a similar style, eg worksheet based, or does it vary?
- Is there a mixture of shared and independent tasks to complete?
- Are there clear instructions, even for older children, in case pupils 'forget' what they need to do?
- Are there expectations for how long the task should take?
- If the work is calculation based, is there an example of a suggested strategy to support unfamiliar parents?
- Is maths homework always sent home on the same night each week, or does it vary?
- The home environment of each pupil will vary, but clear instructions for parents, with guidance on suitable methods and resources and a time limit for homework tasks, will support everyone. Not all children will have someone available to play a game or a shared activity, so expectations need to be considered. The British Society into Research for Learning Mathematics carried out a small scale study into mathematics homework, and their summary report highlights many of these key issues.

A teacher at a primary school in Northamptonshire was keen to work with parents and sent out a questionnaire to establish their views about becoming more involved. She was particularly keen to establish a maths games library, where pupils would borrow maths games to play at home. A copy of the questionnaire and full details of the setting up of the games library are available to download.

Parents coming into school

Unless parents coming into school during the school day is already an established practice, this is likely to be one suggestion that frightens your colleagues! As teachers, we are used to having our own space where we are in control (or at least try to be!), and are often the only adult among 30 or so children. The suggestion of adding parents into the mix, particularly in a close classroom environment, can make even the most experienced teacher weak at the knees!

There are some independent projects and initiatives that schools can get involved in, which manage the sessions with parents working alongside their children. INSPIRE (run by Birmingham LA), IMPACT (Involving More Parents and Children Together) and Ocean Maths are three such projects which many schools have worked with.

Maths Trails are a wonderful way of getting parents into school, looking at maths outside the classroom and working with their children. Trails can be planned around the school building or grounds, or even the local area, for families to try at weekends or in the school holidays. All sorts of maths can be gained from the surrounding area for some images that could be used as a starting point. Trails can involve pupils looking for shapes, numbers or mathematical images – they often notice things for the first time that they may have walked past every day!

Whatever decisions are made, you'll soon find yourself writing information sheets and planning activities and resources for the parents of your pupils. It is easy at this point to lose sight of the purpose of all your hard work. Enjoyment and achievement in maths is not one individual's responsibility but is collectively fostered from our school environment – teachers and teaching assistants as well as the influence of parents. If children are to really succeed, then all these people need to be given the opportunity to become involved.
Have fun!

These websites provide useful advice, support materials and activities for teachers and parents who want to become more involved:

- DfES [now DCSF] produced a report, Every Parent Matters, setting out plans for the development of services for parents
- The BBC Schools website provides some useful tips, ideas and resources for parents wanting to help their children with maths
- Parents in Touch provides a wealth of information, resources, activities and games for parents to use with their children. It is constantly updated, and although many of the resources are freely accessible, there is a subscription fee for access to all the materials.
- Mad4Maths is a lovely interactive site with advice for parents as well as games and activities to use at home
- An article from NRICH talks about the common reluctance of parents to be involved with maths, and how one Suffolk school tackled it with great success
- A Maths Dictionary for Kids - a definite winner to share with parents to support all those "Mum...what does...mean?" moments!
- Cumbria Grid for Learning is a wonderful starting point when planning a maths trail.
- Janet Rees, an education consultant, has some advice on the planning and use of maths trails.