

# Mathematics Policy

## VALUES

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At Holy Trinity we welcome you to an exciting world of learning, discovery and friendship. We are passionate about nurturing every child, helping them to find and develop their own talents and be the best that they possibly can. Children will learn within a Christian community, surrounded by support, kindness, respect and fun; and will leave with fantastic memories to cherish forever.

## Pupils' Voice

"We need to learn mathematic so that when we are older we can work out things that involve money. If we have a good education then we can get a good job, like being an accountant. If we are good at Maths we will be able help our own children with their homework.

In Maths we like learning about co-ordinates; multiplication bingo is fun too. Our teachers work hard to make our Maths lesson fun"

Policy drafted by: Lee Reynolds

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# Introduction

## The importance of Mathematics

“The special power of Mathematics lies in its capacity not just to describe and explain but also to predict – to suggest possible answers to problems. It is not only taught because it is useful but it should also be a source of delight and wonder.”

(National Curriculum Working Group)

## Purpose of study

Mathematics is a creative and highly inter-connected discipline that has been developed over centuries, providing the solution to some of history’s most intriguing problems. It is essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, an appreciation of the beauty and power of mathematics, and a sense of enjoyment and curiosity about the subject.

(National curriculum 2014)

## National Curriculum Aims (2014)

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 develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **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.

## Aims

As well as embracing the aims from the NC 2014 we at Holy Trinity put particular emphasis on the following:

- We aspire that through the excellent teaching of Mathematics that is accurately pitched, interesting and stimulating, lessons in which children WANT to participate enthusiastically, and develop a positive attitude to the subject.
- All children achieve a high standard in Maths and gain a secure foundation of knowledge, skills and concepts
- Pupils are suitably challenged so they gain a sense of achievement and are aware of their progress so far and next steps to improve.
- Pupils are able to use Mathematical vocabulary appropriately and with confidence and understanding

- All pupils solve open ended investigations systematically, using reasoning skills and develop an ability to think clearly, logically, and systematically
- Pupils can analyse and communicate ideas and information effectively
- Develop skills, knowledge and concepts, both mentally and, within written work
- Achieve a breadth of understanding across all areas of Mathematics.
- Deeply embed the fundamentals and use and application of Maths
- Pupils understand how maths is used to meet the everyday demands of life, how it is useful in particular jobs and understand the importance and relevance to their own and others' lives. In particular they must be able to:
  - Use money and budget effectively to become financially competent
  - Use directions and map skills to navigate effectively
  - Use measures of time, length and weight accurately in context
  - Use data handling techniques and be able to interpretation of graphs, charts and tables

## Spiritual, Moral, Social and Cultural Aims

We aim that our pupils:

- develop a sense of wonder in Mathematics, e.g. in structure and patterns of shape and number, in concepts such as probability, infinity, Fibonacci nature patterns
- know that the Mathematics we know and use today is the result of human activity over a very long period of time and in many diverse cultures across the world.
- Engage with their maths learning and are encouraged to take responsibility for their own learning.
- use the best internationally recognised methods and embrace learning maths in different ways from different cultures.

## Skills for successful lifelong learning (The 5R's)

As in all other areas of the curriculum and school life we aim to encourage the children to:

use the 5R's for lifelong learning and

- be responsible
- be resilient
- be reflective
- use reasoning
- be ready for any challenge

# Organisation

## Early Years Foundation Stage

### CLASS STRUCTURE

Within EYFS the children remain with their class teacher for the maths input on a daily basis. They then work in smaller groups with either the teacher or TA on a daily basis to practise the skills taught. These group may be differentiated or mixed ability.

### THE LEARNING ENVIRONMENT

Pupils have opportunities to individually apply their maths in various ways that promote social and mathematical development and understanding. This could be through stories, songs, rhymes and finger games, board games, sand and water, construction on a large and small scale, imaginative play, outdoor play, cooking and shopping, 2 and 3-D creative work with a range of materials, by observing numbers and patterns in the environment and daily routines. The use of I pads and computer programmes are used to support this.

# Time Allocation

## EYFS

Pupils have a daily Maths focus as a whole class and group work with the teacher that amounts to at least 40 minutes.

## KS1

The lesson structure above should lend itself to the time allocation in year 1 but may be adapted to fill a slightly shorter lesson initially. Year 1 may well have slightly less than an hour session depending upon the maturity and focus of the children. They will still have approximately 50 – 60 minutes of maths learning every day and a full hour by the summer term.

## KS2

Years 3 – 6 will receive an hour long maths lesson every day.

# Timetable Disruption

In the event of school trips or disruption to Maths families we seek that whenever possible, maths families will continue as normal. If however this is not possible due to many classes being affected

we will always seek to keep as many maths families running as usual. If maths families do disband for a session cross-curricular themes, open ended investigations or topic based data handling lessons will be planned, differentiated and delivered by the class teacher to their form class.

## Pupil Grouping

After a trial process and gradual roll out programme beginning with the upper juniors we have established a system in which the pupils are organised into attainment and progress related families to maximise their learning potential and opportunities for challenge. All children in the Year group maths families will be taught the same national Curriculum objectives for their year.

## Key Stage One

In year one children are taught within their class groups for the first 2 terms. Differentiation for every ability is planned for within the class. In the summer term children are grouped according to attainment across the two classes and form their first 'Maths Families'. The teacher assessments inform these groups.

In year 2 the children will also be taught in maths families and the learning will continue to be differentiated across the two families. Year 2 receive a 1 hour maths session every day.

As children develop they can move between families if it is felt their learning needs would be better served in another family.

Teaching assistants and teachers work with focus groups of children in the main activities to ensure understanding and progression. All children work with an adult led group at least once a week.

## Key Stage Two

The children are organised within their year group into junior maths families based on both data from statutory and non-statutory assessment papers as well as teacher formative assessments.

The range from which children are grouped may well vary from year to year depending upon the abilities within the year groups as well as the size of the class. Children can move between Maths Families during the year depending on their attainment and progress and if it is felt their learning needs would be better served in another family.

We would always be mindful to ensure that pupils who are making slower progress are well supported in smaller families when possible and we always seek to keep maths families to below 30 pupils.

# Teaching and Learning

## The Learning Environment

A maths rich visual, auditory and kinaesthetic (VAK) environment with a working wall of current topic key words should be displayed. Visual images and physical representations of a broad area of maths should be seen and a wide range of concrete hands on equipment (manipulatives) to support learning should be readily available in class. Pupils should also know where to access these to support their own learning e.g. Numicon, number lines, bead strings, 100 squares, counters, balances, coins etc.

## Planning

### Teacher Resources

At Holy Trinity we do not use any published schemes to guide our planning but encourage staff to continually develop their pedagogical knowledge through attending courses, holding a staff surgery to discuss problems and ideas with peers, and meeting once a fortnight as Key Stage Maths families to discuss topic ideas and progress.

Teachers may use any materials to support their planning including The National Framework, The National Numeracy Strategy, Unit Plans or other publications. Teachers will construct a medium term plan for the year based on the objectives contained within the National Curriculum. The skills and knowledge that children are expected to learn should be clearly defined and the Holy Trinity planning grids should be used referencing the NC (2014) alongside. (See appendix)

### Learning Resources

Resources are centrally stored in the maths room. In addition, everyday classroom resources may be stored in each class according to need. Investment in hands on equipment is a fundamental ethos of the school.

## Teaching Assistants and Learning Support Assistants

At Holy Trinity we recognise our TA's and LSA's as a very valuable resource that should be carefully used and considered when planning and delivering a session. The TA/ LSA may be used in whichever way the teacher believes will be of benefit in moving the children's learning forward.

During the maths session the role of the TA/ LSA may be:

- In the challenge, oral and mental starters the TA or LSA should sit with an identified group of children and should model what the teacher is doing using similar or adapted resources or revisit insecure concepts
- In the main activity they should be assisting a group of children to understand and facilitate learning planned by the teacher

- In plenaries they should encourage pupils they have worked with to feedback and contribute to the overall session

We believe that all the children have an equal entitlement to teaching time from the teacher. Therefore the teaching assistant should not always work with the same group of pupils. It may be appropriate on some occasions for a group to be withdrawn with the teaching assistant during the main activity group work or for pre teaching, post teaching intervention. Generally these pupils should not be withdrawn for the oral and mental starter or for the teaching input.

To continually develop their pedagogical knowledge TA's and LSA's meet regularly for training and to discuss topic ideas and progress.

## Computing

*We recognise that computing plays a vital part in accessing learning in Mathematics. The use of Computing is an integral part of Mathematics teaching and learning. Teachers will use a variety of resources to enhance their teaching (e.g. ITPs). There will be increasing use of computers, Mathletics, Web sites, I pad apps and teaching tools. It is our policy to embed the use of technology to assist understanding throughout the whole curriculum.*

## Planning Guidelines

Teacher expertise and developing professional pedagogy is encouraged and valued at Holy Trinity. Staff are encouraged to seek help and advice to develop their knowledge of the subject. Teachers are expected to teach a concept using a process of reviewing knowledge and skills, teaching, achieving progress, reinforcement opportunities and depth of application through further practise, application and finally evaluation.

Logical progression is at the centre of both long and short term schemes of work. Differentiated tasks are planned appropriately to meet the needs of every child. Mathematics teaching should be LIVELY, HANDS ON, ENGAGING, CHALLENGING and involving a blend of approaches that direct the children's learning. The pitch and the pace of the work is sensitive to the rate at which the children learn while ensuring that expectations are kept high and progress is made by all children. At Holy Trinity we aspire for a real DEPTH of learning at the expense of BREADTH. We ensure that we offer a balance of visual, audio and kinaesthetic learning and encourage children to be active and independent learners. Children should be able to discuss, seek help and use resources as when they need them. Mathematics teaching should be a combination of concepts, facts, properties, rules, patterns and processes. Children are encouraged to share and explain their Mathematics verbally to staff and other children, using reasoning, with a high focus on talk for learning. Children investigate topics kinaesthetically to establish deep understanding. Sometimes a less directed approach and more open ended problem solving approach is a powerful tool involving a process of enquiry, experimentation and investigation.

We encourage our teachers to only skeleton plan for the coming week but be ready to adapt planning as necessary using their informed judgements of individual children's needs based on their marking and observations from the lesson just delivered.

## Breadth of Study

Teachers take their Medium Term Planning from the objectives outlined in the National Curriculum. Maths is a rich and diverse subject. It has seven strands for which we plan and focus our teaching and learning. These strands are as follows;

- Using and applying Mathematics
- Counting and understanding number
- Knowing and using number facts
- Calculating
- Understanding shape
- Measuring
- Handling data

The amount of time spent on any one area of maths will vary depending upon whether the learning has been embedded and if it is a fundamental skill that underpins others (e.g. we would ensure place value is secure before teaching operations).

'Mathematics is an interconnected subject in which pupils need to be able to move fluently between representations of mathematical ideas. The programmes of study are, by necessity, organised into apparently distinct domains, but pupils should make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems. They should also apply their mathematical knowledge to science and other subjects.' (National curriculum 2014)

## Lesson Structure

The structure for teaching maths varies depending on the age and stage of pupils. Generally in all year groups the lesson will begin with a whole class challenge, an active mental warm up followed by a new learning input by the teacher, then children work in groups, pairs or individually to reinforce, consolidate and practice their learning in carefully planned tasks. Activities are usually differentiated to best support the pupil's stage of learning. The teacher and TA will support a small focus group at least twice a week to enable them to achieve their learning objective. The lesson will end with an assessment for learning task.

Mathematics lessons (yr. 1-6) usually follow this structure:

- Some reflection time (5 minutes) on the last lesson and time to look at the teachers marking and respond to this.
- A 10 minute challenge starter where the teachers questioning will extend and challenge the children's reasoning and thinking processes.
- An active mental warm up for 10 minutes including teaching points, techniques and strategies for mental calculation not just practise of recall.

- Teacher input and activity for about 30 minutes (independent paired or small group focused tasks). During this time the class teacher and TA will work with different focus groups throughout the week. This activity will be differentiated and the use of success criteria and key higher order questions included where appropriate.
- In all learning pupils are given hands on experiences using concrete apparatus and then visual representations as they learn the written representations of maths concepts.
- The plenary session for approximately 10 minutes / or alternatively mini plenaries at points through the lesson to bring the learning together and allow pupils to reflect upon their learning.
- At the end of the lesson pupils will be asked to self-evaluate their learning and understanding against the learning objective and the agreed success criteria discussed in the lesson. They will also self-assess the effort and learning behaviour they have shown throughout the session

## Mental Arithmetic

This is a key focus, with children being taught a range of strategies to work out answers as well as quick recall of simple mathematical facts. The teacher should ALWAYS TEACH in these sessions, and give demonstrations and explanations, with an emphasis on the use of appropriate mathematical language. It is essential that all children are engaged with this session to ensure all children focus and progress. To achieve this teachers use a range of techniques such as; high order questioning talk partners, lolly stick random selection, whiteboards, number fans, agree and disagreement surveys.

Teachers and the children set mental targets that can be practised and improved upon over each half term.

Children from Year 1 participate in the Table Mountain and The Holy Trinity Maths Challenge Award. Certificates are awarded to children who know their tables and division facts in a random order and can orally answer a question in less than five seconds.

In testing division facts the inverse method applies. The multiples of the focus table will be asked and the child will need to say the missing factor for the times table being tested. The children move up Table Mountain and at the same time work towards the following maths certificates and awards:

Bronze certificate	awarded for knowing mixed up multiplication and division facts randomly by heart.	1 2 5 10
Silver certificate	awarded for knowing mixed up multiplication and division facts randomly by heart of the new	3 4

	times tables and review of the previous.	11
Gold certificate	awarded for knowing mixed up multiplication and division facts randomly by heart of the new times tables and review of all the previous.	6 7 9
Platinum certificate	awarded for knowing mixed up multiplication and division facts randomly by heart of the new times tables and review of all the previous.	8 12 Square numbers Square roots Prime numbers
Maths challenge award	awarded for knowing randomly by heart <ul style="list-style-type: none"> <li>• mixed up times tables</li> <li>• mixed up division facts</li> <li>• mixed up square numbers and square roots</li> <li>• prime numbers</li> <li>• divisibility rules</li> </ul>	All multiplication and division facts to 12 x 12  square numbers and square roots  Prime numbers  Divisibility test

## Recording / Pupils' books

Children all work in squared books appropriate for their stage of development with the exception of the beginning of Foundation Stage. Whilst written work and calculations becomes weightier in KS2, all children are expected to record, where and as appropriate, their work both informally and formally.

We encourage as little reliance on worksheets and schemes as possible and encourage children to learn to set out work in a manner to aid their calculations both formally and informally. Children are expected to form numbers with accuracy by Year 2 and use only one square per digit and symbol.

## Marking and Feedback

Effective marking of pupils work identifies what they have done well and any misconceptions they may have. It encourages children to explore and look for errors and why they may have been made. It sets short term next steps for progress in their learning. It is not necessary to mark every

calculation. Teacher judgements can be accurately made from an overview of a piece of work. The children will from time to time peer mark each other's learning and feedback.

Time should be allowed for some teacher marking to be done with the pupil so that discussion and explanation can take place.

Teacher feedback is given to the children as soon as possible.

- This aims to encourage and to give guidance for future work (next steps corrections of extra challenge)
- Some marking will be immediate, depending on the activity and the age of the children.
- Sometimes peer marking may be used.
- The teacher or another adult may mark work. This should be initialed and dated.

The pupils will regularly be given time to reflect on marking and respond to the teachers feedback.

## Inclusion and Differentiation

### **Differentiation**

Although in maths families we still recognise the need for differentiation. We would still expect to see plans adapted to cater for individual needs. This may be through allocated adult support, an extended example session in a maths 'workshop' or by differentiated tasks and differing equipment to support understanding.

Both teacher and pupil are expected to evaluate work using success criteria and either smiley faces if achieved or straight faces if unsure/ lacking confidence. This feeds directly into the teacher planning for the next lesson.

### **Equal Opportunities**

We aspire that all children will have equal access to Mathematical activities. We pay particular attention to ensuring there is no gender bias in materials or in access to resources. Teachers should pay attention to the equal distribution of their questions across all groups (random name generation using lolly sticks can assist with this). Any displays and references to Mathematics in society should show positive role models of gender, race, ethnicity and disabilities. We are committed to ensuring that the full Mathematics curriculum is accessible to all pupils regardless of gender, faith, cognitive ability and that both pupil premium and non-pupil premium achieve the same rate of progress.

## **Provision for a range of pupil attainment / Inclusion**

Although Maths families may help children enjoy suitable challenge, those children who have additional maths needs and are not making expected progress may need additional help and support. Special arrangements will be made for children with specific individual needs wherever necessary. Those children who are failing to make expected progress will receive targeted intervention sessions planned for and delivered by either the class teacher or teaching assistant (APT's Accelerated Progress Targets). Should APT's fail in achieving accelerated progress it may be necessary for these children to have more extensive help through the use of an individual Provision Plan written by the maths family teacher alongside the Inclusion Manager. This may involve extra time outside the maths lesson as well as the deployment of additional adults.

## **Very Able Pupils**

Whilst we believe that in all maths families every child is constantly challenged and progressing there may be the case of children who are truly gifted or talented. These children should be made aware of the Able, Gifted & Talented coordinator who will seek to offer additional challenge and experiences for these pupils possibly using brain academy, Mathletics or LGFL Maths Space tools. In yr. 5 and 6 our more able pupils may compete in more able challenges eg the Primary Maths Challenge, The Kings House maths masterclasses and the National Young Mathematicians award.

## **Children with English as an Additional Language (EAL)**

If children have limited language and (even when deemed conversationally fluent) an APT may be required to focus specific explicit attention to the development of the academic language of Mathematics. Google translate and 1:1 support will be offered to supplant any work in lessons but 1:1 initial language work may be required in the first instance.

## **Home Learning**

Home learning should be given as learning, practice, consolidation or extension of multiplication and division skills. Home learning will take the form of rich mathematical tasks requiring reasoning, exploration and inquiry. Sharing stories, poems, nursery rhymes and a variety of books are really good for Nursery and Reception children. If they are with you when you go shopping use this as an opportunity for talking about numbers and patterns.

Years 1 and 2: 20 minutes maths home learning each week

Years 3 - 6: 30 minutes maths home learning each week

## **Cross / Extracurricular Links**

It is our policy at Holy Trinity to link Mathematics lessons to other subjects where possible to provide enjoyment and cross curricular learning. Opportunities to ensure that appropriate mathematical

activities take place in other curriculum areas such as geography, technology, PE and science are regarded as valuable and is the remit of the class teacher as well as the maths family teacher.

We recognise that extra-curricular activities make a vital contribution to children's enjoyment and achievement and are keen to provide additional opportunities in Mathematics to make it come alive. These may include: school visits, workshops and talks provided by professionals, visits from parents, governors and other contacts with expertise.

## Assessment

Assessment of children's learning is always on-going to ensure clear understanding and that progress is being made. The school marking policy leads to consistency of expectation. Children's progress and attainment is monitored using the following methods:

- Standardised testing
- Diagnostic assessment at the beginning of units of work/topics.
- Mid unit assessment to track and monitor understanding and progress.
- End of unit assessment.
- Marking of learning
- Close observation in class.
- Questioning
- Book looks

**Formative Assessment** is carried out informally during the course of teaching and learning. It enables the teacher to identify a child's understanding and progress in particular aspects, to inform their immediate teaching and to plan for their coming lessons. This can take the following forms:

- Small group discussions in the context of a practical task
- Short tests given in oral or written form at the end of each unit of work
- Specific assignments for individual children
- Individual discussions with children to evaluate progress and to set new targets.

Both teacher and pupil are expected to evaluate work using success criteria and smiley faces. A green smiley face if the objective is achieved or an orange straight face if they feel unsure or are lacking confidence. This feeds directly into the next lessons planning.

## **Beginning of Topic Assessments.**

Assessments will be planned as discrete diagnostic assessments at the beginning of each topic for Year 1 - 6. They may take the form of short tests and serve to inform the child and the teacher of their existing knowledge and plan and differentiate the future teaching and learning of the topic.

## **Mid Unit assessments**

These will be planned as discrete assessments mid-way through a unit of work to inform the pupil and the teacher as to the pupils understanding and progress with the new unit learning being taught.

## **End of Topic Assessments**

End of topic assessments should be planned into the work as discrete assessment opportunities at the end of each topic for Year 1 - 6. They may take the form of short tests and serve to inform the child and teacher of the extent to which learning objectives have been met.

For all the above assessments the children are assessed using the Rising Stars unit specific tests. These are used to generate an accurate assessment of achievement and progress against age related expectations.

## **Summative Assessment and Record Keeping**

Teachers will be expected to provide an overall assessment of each child's outcomes against age related expectations in each area of Mathematics at the end of each school year. This should be recorded on target tracker to enable analysis and further diagnosis of children's needs and is reported to parents in the end of year reports. Attainment will be recorded using the following terms:

- Working towards age related expected outcomes
- Meeting age related expected outcomes
- Exceeding age related expected outcomes

## **Target Setting**

### **Pupil Mental Mathematics Targets**

Pupils, with teacher support set ongoing and fluid maths targets. These are written on yellow card and tucked into the cover of the maths book. They are also shared with parents in termly parents' evenings.

## National Curriculum Targets

Holy Trinity remains committed to aspirational target setting. The assessment method means that all children are set aspirational progress and attainment targets each academic year. The phase leader/ maths family teachers in agreement with the head teacher will agree expected progress as part of the appraisal cycle, making use of National Curriculum assessments, teacher assessments and knowledge of any individual circumstances the children may have.

Parents are informed of the targets, and progress towards them, at each parents' evening which is held after each assessment period.

## Reporting to Parents

Reporting is carried out through the regular parent / teacher consultation meetings and annually through the written report. Parents are given teacher assessments and the results of National Curriculum assessments. They should be provided with information on children's areas of strength and weakness and on their rate of progress in Mathematics. Where the class teacher is not their Maths family teacher notes outlining the above will be supplied. Parents may also make an appointment to see their child's Maths family teacher separately, if deemed necessary. We may also offer Maths evenings for parents to attend to gain insight into methods used and expectations for their children as well as a maths open afternoon when parents can see their child at work, look at their books and touch base with the maths family teacher.

## Monitoring and Evaluation of Teaching Standards

The purpose of monitoring and evaluation activities is to raise the overall quality of teaching and levels of pupil attainment. The Mathematics subject leader, Head teacher and sometimes the Senior Leadership team will monitor the quality of teaching and learning as part of the school's self-evaluation policy. Monitoring during a cycle will include:

- Scrutiny of planning
- Quality of teaching through lesson observation and feedback
- Moderation of standards in children's work, Book Looks
- Evaluation of children's attainment against targets
- Informal Lesson observations or Learning Walks to gain a sense of day to day practise

As part of external monitoring the LA inspector and Maths consultant may carry out similar evaluations from time to time.

## Health and Safety

Issues of Health and Safety in Mathematics (to be read alongside the school's policy) include care and safety when using scissors and a drawing compass.

## The Role of the Subject Leader

- Take the lead in policy development and review, including the continuing successful implementation of the most recent National Curriculum in Maths
- Support colleagues in their planning and delivery of maths concepts through Maths family meetings, staff meetings or 1:1 consultations
- Ensure accurate assessment and record keeping is performed
- Keep up-to-date on local and national initiatives and disseminate information
- Take responsibility for the purchase and organisation of mathematical resources
- Analyse pupils' test results to inform future policy
- Assist the head / SLT in setting school targets for Mathematics
- Assist staff in setting individual pupil and group targets
- Take the lead in writing the Mathematics section of the School Development Plan.
- Encourage the professional development of staff

### Maths Resources and Publications

- *Mathematical Vocabulary Book*
- *Using Assessment and Review Lessons (DfES 0632/2001)*
- *Assessment Toolkit to support pupils with EAL (Dfes 0319/2002)*
- *Guidance to support pupils with specific needs in the daily Mathematics lesson (DfES 0545/2001)*
- *Mathematics challenge for able pupils*