

*Primary Focus on*  
**Embedding ICT in Primary  
Practice**

Summer 2004

**Primary Practice**

Naace



Advancing education through ICT

# Embedding ICT in Primary Practice

## Contents

|   |   |    |
|---|---|----|
| Introduction  | <i>Rhona Dick</i>                         | 1  |
| Floppy book   | <i>Veronica Carter</i>                    | 2  |
| Happy and sad   | <i>Veronica Carter</i>                    | 4  |
| Lost owls   | <i>Rhona Dick</i>                         | 6  |
| *What am I?   | <i>Mary Richardson</i>                    | 8  |
| *In the style of ...                                  | <i>Rhona Dick</i>                         | 10 |
| *Park the robot                                       | <i>Betty Lumley</i>                       | 12 |
| Which material?                                       | <i>Mary Richardson</i>                    | 14 |
| Captioning pictures                                   | <i>Peter Jarrett</i>                      | 16 |
| *All about us   | <i>Roy Topping</i>                        | 18 |
| *Animal tree  | <i>Geoff Davies</i>                       | 20 |
| *Lampshade materials                                  | <i>Alan Rodgers &amp; Angella Streluk</i> | 22 |
| *Using the internet to find out about micro-organisms | <i>Heather Govier</i>                     | 24 |
| *Studying census data                                 | <i>Heather Govier</i>                     | 26 |
| *Number mystery                                       | <i>Roger Keeling</i>                      | 28 |
| *Electronic big books                                 | <i>Janice Staines</i>                     | 30 |

\*These materials were developed as part of a MAPE/Naace partnership with Becta for an online INSET entitled "Online Inset for primary education" in February 2004. They can be viewed online at:  
<http://forum.ngfl.gov.uk/WebX?13@74.nADza4pxgl8.0@.efa462f>

The materials are freely copiable for educational purposes provided no charge is made and the original source is acknowledged.

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# Embedding ICT in Primary Practice

## Introduction

It has always been an aim of MAPE, now the Naace Primary Community, to encourage teachers to use ICT more widely across the primary curriculum by whatever means available. In February of this year, in collaboration with Becta, we delivered four sessions of online INSET; each session targeting one specific aspect of ICT: communicating and presenting information, electronic communications, information handling and monitoring and control.

The concept of online INSET is one which has been developing in importance within the education arena over the last year, but it is still at an early stage of uptake for most people. Active participation will no doubt increase as Government initiatives, Becta activities and Naace's own plans to utilise the medium bring it more to the forefront. Although the uptake of our event was not huge, it was a useful experiment, and perhaps more people downloaded the materials and "watched" than the numbers of active participants suggested. As so much work had gone into the preparation of the



materials we felt justified in sharing them with as many people involved in primary education as possible.

This publication includes fifteen activities that use ICT in a meaningful way in other curriculum subjects including art, geography, science and history. Those that were written for the online INSET event are reproduced courtesy of Becta; others have been created especially for this publication. Veronica Carter's two lovely activities for children at the foundation stage, which could easily be adapted for older pupils, are reproduced courtesy of Nelson Thornes. At the upper end of the primary age range Roger Keeling provides Number Mystery, which uses an *Excel* file that can be found in the Curriculum Support section of the website. You can get there via the Curriculum Resources link from the Naace website ([www.naace.org](http://www.naace.org)).

We hope you will find these activities useful and stimulating. If you use them in your classroom or if you have any favourites of your own why don't you let us know?

# Floppy book

*Suggested ages 3–5*

|  |  |
|--|--|
| <p><b>Suitable for</b><br/>Individuals</p>   | <p><b>Foundation Stage Area of Learning</b><br/>CLL</p>  |
| <p><b>Curriculum references</b></p> <p><b>England</b><br/>Curriculum Guidance for the Foundation Stage<br/><b>CLL</b> Explore and experiment with sounds, words and texts. Read a range of familiar and common words and simple sentences independently. Show an understanding of the elements of stories, such as main character, sequence of events etc.</p> <p><b>Scotland</b><br/>A Curriculum Framework For Children 3 to 5<br/><b>Topic/Strand</b><br/>Communication and language<br/><b>Level C</b></p> <p><b>5–14 Guidelines</b> English Language<br/><b>Topic/Strand</b> Reading – Reading for Enjoyment<br/><b>Level A</b></p> | <p><b>Outcomes</b><br/>Pupils will:</p> <ul style="list-style-type: none"> <li>• produce a storybook for additional reading practice in which they have had choice as to the development of the storyline</li> <li>• practice cutting, gluing and sequencing skills</li> </ul>   |
| <p><b>Previous experience</b><br/>Suitable for children reading at Stage 2 or 3 of the Oxford Reading Tree reading scheme.</p>    | <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>• Microsoft PowerPoint</li> <li>• 'Floppy Book' PowerPoint file downloadable from <a href="http://www.camelsdale.w-sussex.sch.uk/teach_with_ict2.asp?pg=teach_with_ict2.asp">http://www.camelsdale.w-sussex.sch.uk/teach_with_ict2.asp?pg=teach_with_ict2.asp</a></li> <li>• Folded booklets – Fold a sheet of A4 into 8 sections, cut along the fold shown in bold and then fold to achieve a booklet as shown in the photographs.</li> </ul>  |
| <p><b>Activity</b></p> <p>This <i>PowerPoint</i> file is a branching storybook which includes 2 slides on which the child can make a choice between 4 options. This means there are 16 possible versions of the story. It can also be used simply as an onscreen activity, the final slide having a button on it to 'Return to Start'.</p> <p>Introduce the activity by having the whole class create a story. Show a completed booklet and explain that each child is going to make up their own version of the story, print it out and make their own booklet.</p>   |  |



After a child has made up their story by working through the file with an adult, right click and select End Show and go to Slide Sorter View so that all slides can be seen. Help the child to identify the 4 specific slides that they need for the story they chose. Go to Print and select Handouts, 4 slides to a page, and enter the numbers of the 4 slides that child needs. At this size the printouts are ideal for an A4 booklet made as above. The children can then cut out their four pages, sequence them and glue them in. For the cover, open a new *PowerPoint* file and make a slide saying, "My Floppy Book by ...". Make copies of this slide so that there is one for each child. Either print them out (as Hand-

outs, 4 slides to a page) for each child to handwrite their own name upon or have each child word process their name on a slide each, before printing out. Having stuck this on the front cover the child completes the activity by reading their story to a friend.

### Plenary

When all have completed their booklets ask the class what they liked/disliked about this activity or whether they found it easy or difficult. Use this discussion as a vehicle to recap the process they went through to make their booklets.

### Assessment

- Mouse skills – can they move the mouse pointer confidently and with accuracy and then click once, using the left button?
- Can the child cut with reasonable accuracy along a given line, persisting with the task until all four pages are cut out?
- Can they sequence the 4 pages of their story?
- Can they read their completed storybook?



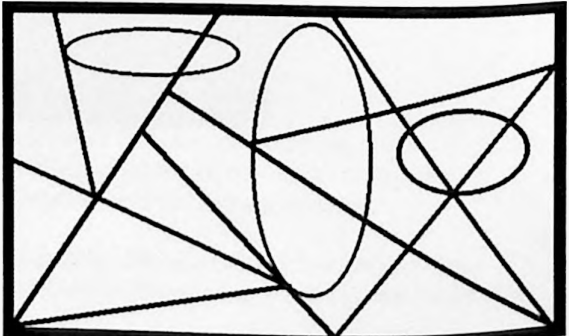
### Extension activities

The *PowerPoint* file can be left available for children to use individually, making up and reading through their own versions of the story without printing them out.

Children take their books home to read to others there. Make parents aware that this file is freely downloadable and that if they have Internet access and *PowerPoint* installed, then the child could continue with this activity with them at home.

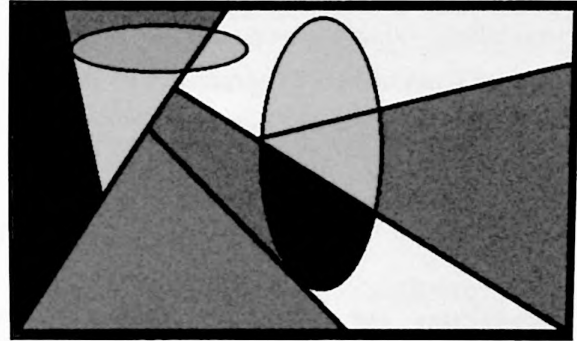
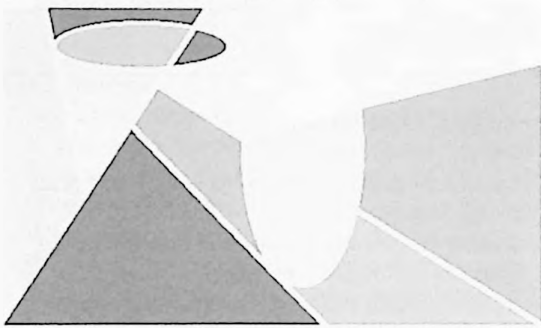
# Happy and sad

*Suggested ages 3–5*

|   |  |
|---|--|
| <p><b>Suitable for</b><br/>Whole class</p>  | <p><b>Foundation Stage Areas of Learning</b><br/>PSED, CLL, KUW, Creativity.</p>   |
| <p><b>Curriculum references</b><br/><b>England</b><br/>Curriculum Guidance for the Foundation Stage (CCGFS)<br/><b>PSED</b> Have a developing awareness of their own needs, views and feelings and be sensitive to the needs, views and feelings of others.<br/><b>CLL</b> Extend their vocabulary, exploring the meanings and sounds of new words.<br/><b>KUW</b> Find out about and identify the uses of everyday technology and use information and communication technology and programmable toys to support their learning.<br/><b>Creativity</b> Explore colour, texture, shape, form and space in two and three dimensions. Express and communicate their ideas, thoughts and feelings by using a widening range of materials, suitable tools etc.</p> <p><b>Scotland</b><br/><i>A Curriculum Framework For Children 3 to 5</i><br/><b>Topic/Strand</b> Emotional, personal and social development. Expressive and aesthetic development<br/><b>5–14 Guidelines</b> Expressive Arts<br/><b>Topic/Strand</b> Evaluating and appreciating – observing, reflecting, describing and responding<br/><b>Level A</b><br/><b>5–14 Guidelines</b> PSD<br/><b>Topic/Strand</b> Self awareness<br/><b>Level A</b><br/><b>5–14 Guidelines</b> Health Education<br/><b>Topic/Strand</b> Emotional health<br/><b>Level A</b></p> | <p><b>Outcomes</b><br/>Pupils will:</p> <ul style="list-style-type: none"> <li>• Increase emotional literacy through extension of emotional vocabulary</li> <li>• Develop confidence in expressing simple opinions about a painting</li> <li>• Know how to choose a colour and use a fill tool in a painting program</li> </ul> <p><b>Previous experience</b><br/>Some familiarity with a painting program preferable but not essential.</p> |
| <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>• Children’s painting program such as <i>Splash!</i> This activity could be done with Windows <i>Paint</i> but then requires greater skill with the mouse as the colours on the palette are much smaller and more difficult to select.</li> <li>• A book on the artwork of Paul Klee.</li> <li>• A template for colouring in on the computer, prepared with the same number of sections as there are children in the group.</li> </ul>   |    |

**Activity**

Look at a selection of paintings by Paul Klee, drawing out the fact that different choices of colours in an abstract painting can engender a different emotional feel for the painting. Encourage children to say how different paintings make them feel, stressing that there are no right or wrong answers and that different people will respond differently. Make two lists of the words used, one under a smiley face, one under a sad face. Open the prepared template and decide if you will make this painting happy or sad. With the Fill tool selected, each child takes a turn to come to the computer, click on a colour of their choice and then click on a chosen section of the painting to fill it with that colour. Repeat for the other emotion so that you have two contrasting pictures to print out and compare.

**Plenary**

Make a display of the classes two paintings with their happy words (cheerful, chirpy, glad etc.) around the happy one and their sad words (mopey, miserable, unhappy etc.) around the sad one. (Consider colour photocopying pictures to A3 size.)

Focus the children's attention on to one of their pictures. What kind of things make people feel like that? Repeat for the other picture. Periodically ask the children to stand near (or point to) the painting that is most like how they are feeling at that moment and invite them to explain what has made them feel like that.

**Assessment**

- Assess by reference to the sections in the Foundation Stage Profile which relate to the statements from CGFS identified above.

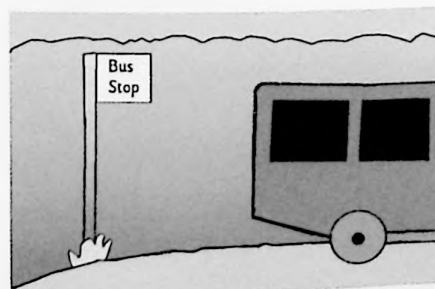
**Extension activities**

Encourage children to paint their own, individual, happy or sad pictures either on the computer or using traditional paints. (The language they use to talk about their work will be equally important to the physical work produced.)

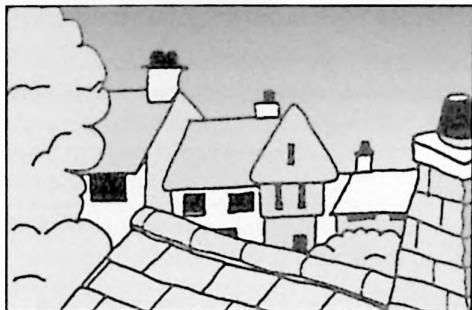
# Lost owls

*Suggested ages 5–6*

|  |   |
|--|---|
| <p><b>Suitable for</b><br/>Whole class, group/pair</p>   | <p><b>Subject</b><br/>This program can be used in a range of curriculum contexts including English and geography</p>  |
| <p><b>Curriculum references</b></p> <p><b>England</b><br/>QCA Scheme of Work ICT 1A An introduction to modelling – short focused tasks</p> <p><b>National Curriculum Programmes of Study</b><br/>Geography<br/>Geographical enquiry and skills – developing geographical skills<br/>Use geographical vocabulary<br/>Make maps and plans<br/>English<br/>Speaking and listening – knowledge skills and understanding<br/>Speaking<br/>Listening<br/>Group discussion and interaction</p> <p><b>Scotland</b><br/><b>5–14 Guidelines</b> Environmental Studies:<br/><b>Topic/strand</b> People and place, Using maps<br/><b>Level A</b><br/><b>Topic/strand</b> Science, Living things and the processes of life, Variety and characteristic features<br/><b>Level A</b><br/><b>5–14 Guidelines</b> English Language:<br/><b>Topic/strand</b> Talking, Conveying information, instructions and directions<br/><b>Level A</b><br/><b>Topic/strand</b> Listening, Listening for information, instructions and directions<br/><b>Level A</b></p> | <p><b>Outcomes</b></p> <ul style="list-style-type: none"> <li>• Pupils will learn that a computer can be used to simulate an environment where choices can be made</li> </ul> <p><b>Previous experience</b><br/>Children should have:</p> <ul style="list-style-type: none"> <li>• sufficient mouse control to select and drag using objects and tools</li> <li>• used a simple objects-based graphics program to communicate information</li> <li>• used a simple painting program to create pictures.</li> </ul> <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>• A computer with “Lost Owls” loaded.</li> <li>• If using this for whole class teaching you will need a projector and whiteboard or large screen monitor.</li> <li>• Blank map</li> </ul> |
| <p><b>Activity</b></p> <p>A simple adventure game that provides an introduction to modelling for young pupils. A mother owl has lost her three owlets. Pupils must explore a series of screens to find the owlets. Owlets and other animals appear randomly in various locations, either in daylight or at night. There is opportunity to demonstrate simple mapping skills.</p> <p>The suggested activities cover the key ideas that a computer can be used to represent a wide range of environments, and that some are more elaborate than others, and a computer model is not an exact replica of the original.</p> <p>Prepare some suitable questions that will focus children’s attention on the reality or otherwise of the adventure; you might relate this to the local environment and the children’s knowledge of animals.</p> <p>Describe the scenario to the children.</p>  |   |







Work through a few screens with the whole class, explaining the direction icons.

Continue using the program with small groups of children. Encourage the children to draw a plan of the game by providing each group/pair with a blank grid showing a large tree at the centre. As they explore the simulation the children should sketch each location they reach. Alternatively you could provide small print outs of the locations for children to stick on the plan. The rest of the class could undertake associated activities, for example using a word bank to describe the different scenes.

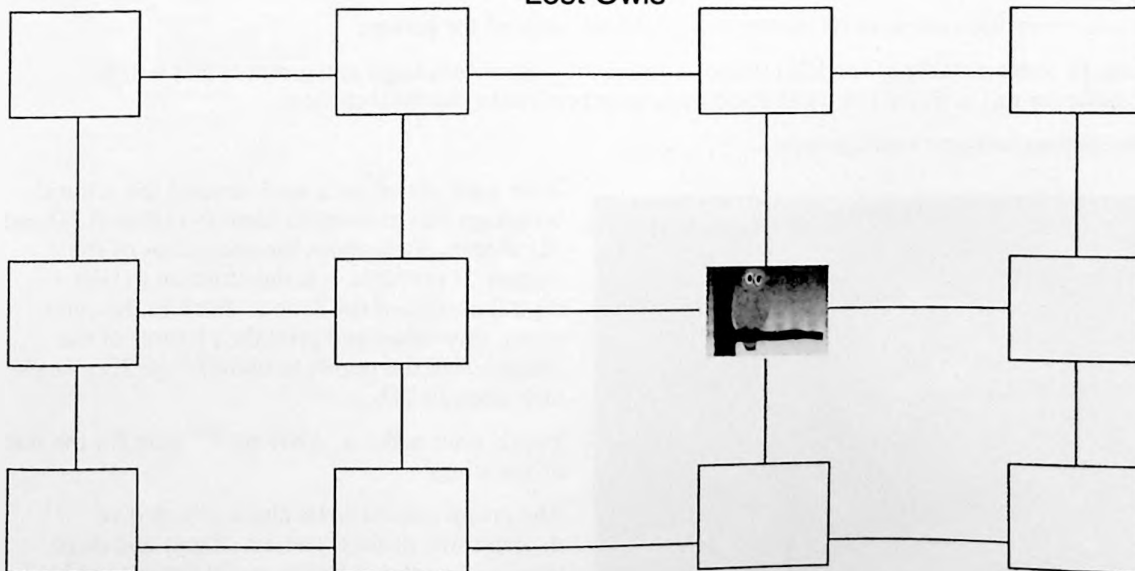
**Assessment**

- Are the screens realistic? Why/Why not?
- If you were there what would you see/hear?
- Why are there no humans in any of the scenes?
- Would you see the same animals at night time?
- What would you hear at night?
- Why did you choose to go that way?
- What did you find when you went that way?
- Do the animals ever sleep?
- Why do the animals always look the same?
- What other differences can you think of between the computer program and our locality?



Name..... Date.....

**Lost Owls**



**What am I?***Suggested ages 5–6*

|   |  |
|---|--|
| <p><b>Suitable for</b><br/>Groups/pairs</p>   | <p><b>Subject</b><br/>Mathematics</p>  |
| <p><b>Curriculum references</b><br/><b>England</b><br/>QCA Scheme of work ICT IC The information around us (integrated task)<br/>National Numeracy Strategy: Year 1, Shape and Space – use everyday language to describe features of familiar 3D and 2D shapes; begin to relate solid shapes to pictures of them.</p> <p><b>Scotland</b><br/>5–14 <b>Guidelines</b> Mathematics<br/><b>Topic/Strand</b> Shape, position and movement, range of shapes<br/><b>Level</b> A/B</p>  | <p><b>Outcomes</b><br/>Pupils will:</p> <ul style="list-style-type: none"> <li>• know that information can be conveyed in a variety of ways</li> <li>• use a cassette recorder to collect and store information as sound</li> <li>• use a digital camera to collect information in pictures</li> </ul> |
| <p><b>Previous experience</b><br/>Pupils should:</p> <ul style="list-style-type: none"> <li>• understand that materials tell us things in different ways – for example, pictures show us what things look like, maps show us where things are, and sounds can tell us that things are going to happen</li> <li>• know how to use a tape recorder</li> <li>• have used a digital camera, and watched an adult transfer images to a computer</li> </ul>   | <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>• Computer(s) with printer(s)</li> <li>• Digital camera(s)</li> <li>• Tape recorder(s)</li> </ul>   |
| <p><b>Activity</b><br/>This activity uses shape as its theme, but could be adapted for pattern.</p> <p>Identify some suitable 3D and 2D shapes around the school buildings and grounds that will be suitable for this activity, but try to encourage pupils to make the final choices.</p> <p>Divide the class into small groups.</p> <div data-bbox="198 1433 763 1856" data-label="Image"> </div> <p>Take each group on a walk around the school buildings and grounds to identify different 2D and 3D shapes. Talk about the properties of the shapes. If possible, ask the children to take digital photos of the shapes. Back in the classroom, download and print the pictures of the shapes. Ask the pupils to identify the 3D shapes now seen in 2D.</p> <p>Pupils now make a ‘what am I?’ quiz for the rest of the class.</p> <p>The group should write clues, which give descriptions of their chosen shapes and directions to find them. Pupils could use a word bank for this task. Then they can use a tape recorder to provide similar audio clues.</p> |  |

Print out the written clues for use later.

When each group has created their maths trail, they should attempt to solve other groups' 'what am I?' problems by listening to the clues, locating and identifying each shape, and photographing it.

Download the resultant photographs and print them; help children to create an appropriate display by using information in a variety of forms.



### Plenary

Help pupils to match the photograph to the written description. Discuss the different ways in which information has been conveyed.

### Assessment

- Can pupils operate a tape recorder properly?
- Can pupils operate a digital camera?
- Do pupils realise that the photographs on the computer were taken with the digital camera?
- Can pupils identify the different ways information is conveyed?
- Can pupils talk about the advantages and disadvantages of each?

### Extension activities

Have a large plan of the school and grounds on the wall. Create a display by getting the children to show where each of the 'trail' features is located. Pupils could annotate the plan by creating labels using ICT.

## In the style of ...

Suggested ages 6–7

|  |   |
|--|---|
| <p><b>Suitable for</b><br/>Whole class or individuals</p>  | <p><b>Subject</b><br/>Art and Design</p>  |
| <p><b>Curriculum references</b></p> <p><b>England</b><br/>QCA Scheme of Work ICT 2B Creating pictures – short focused task<br/>National Curriculum programme of study<br/>Art and design KS1</p> <p><b>Scotland</b><br/><b>5–14 Guidelines</b> Expressive Arts<br/><b>Topic/Strand</b> Investigating visually and recording<br/><b>Level B</b><br/><b>Topic/Strand</b> Using visual elements<br/><b>Level B</b><br/><b>5–14 Guidelines</b> ICT<br/><b>Topic/Strand</b> Creating and presenting, Graphic manipulation<br/><b>Level B</b></p>  | <p><b>Outcomes</b></p> <ul style="list-style-type: none"> <li>Children will use straight line, geometric shapes and flood fill tools to create a picture in the style of an established artist</li> </ul> <p><b>Previous experience</b></p> <ul style="list-style-type: none"> <li>Children should have developed some mouse control.</li> </ul>  |
| <p><b>URLs</b></p> <p>Josef Albers<br/><a href="http://www.guggenheimcollection.org/site/artist_work_lg_1_1.html">http://www.guggenheimcollection.org/site/artist_work_lg_1_1.html</a></p> <p>Piet Mondrian<br/><a href="http://www.soho-art.com/cgi-bin/shop/mondrian.cgi?page=4">http://www.soho-art.com/cgi-bin/shop/mondrian.cgi?page=4</a></p> <p>Kenneth Noland<br/><a href="http://www.nelepets.com/art/20c/70-79/1978kenneth%20noland%20draws%20plans.htm">http://www.nelepets.com/art/20c/70-79/1978kenneth%20noland%20draws%20plans.htm</a></p> <p>Bridget Riley<br/><a href="http://www.postershop.com/Riley-Bridget-p.html&amp;Partnerid=2922">http://www.postershop.com/Riley-Bridget-p.html&amp;Partnerid=2922</a></p> <p>Mark Rothko<br/><a href="http://www.mark-rothko.com/">http://www.mark-rothko.com/</a></p> <p>Theo Van Doesburg<br/><a href="http://www.guggenheimcollection.org/site/artist_work_md_157_1.html">http://www.guggenheimcollection.org/site/artist_work_md_157_1.html</a></p> | <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>If you are using this in whole class teaching you will need either a projector and whiteboard or a large screen monitor.</li> <li>Images of pictures by established artists; many of these are available online, and could be book-marked in advance.</li> <li>Computers with printers for children's use.</li> <li>A paint program that allows you to change the thickness of lines, create geometric shapes and flood fill.</li> <li>If the children have used many dark colours it may be impractical to print them all out. Teachers could use the children's images in a <i>PowerPoint</i> presentation that was set up to change slides automatically. This could be used as a classroom, or entrance hall display.</li> </ul> |
| <p><b>Activity</b></p> <p>Choose pictures that use a range of tools, for example <i>Composition in Blue and Yellow</i> by Mondrian, <i>Blue Extend</i> or <i>Another Time</i>, by Kenneth Noland, <i>Homage to a square</i> by Joseph Albers, or <i>Counter Composition 13</i> by Theo van Doesberg. The style of most of these is simple enough for pupils to imitate. At this stage do not tell the pupils the titles of the pictures you are using.</p> <p>If working with the whole class select two contrasting pictures and discuss with children how they have been created, talk about the key features used by each artist and their similarities and differences.</p> <p>Focus on the colours and tones used in the pictures. If you are working with groups of children you might choose to focus on a different artist's style and techniques with each group.</p>   |   |

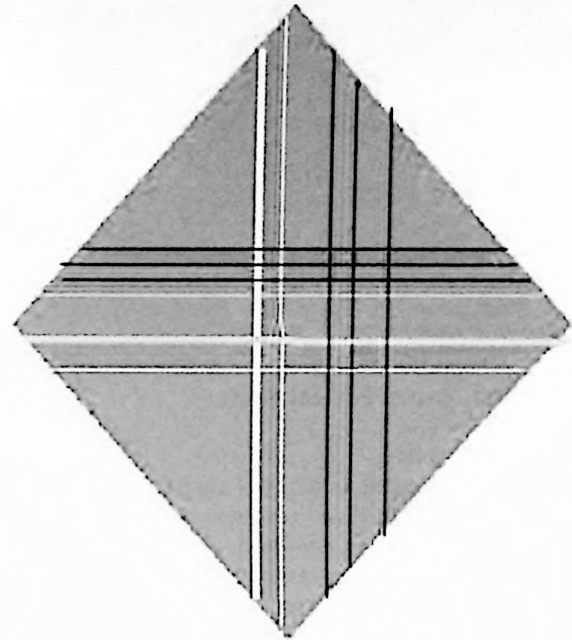
Show the children how to use the geometric tools, straight line tool and flood fill tool to create similar images.

Show them how to change the thickness of the brush.

Tell the children that many artists painted different versions of the same image, just amending the title slightly by changing a colour or number. The children will think of a suitable name for their picture and will save different versions of their pictures, by using the "Save as..." function. Show children how to do this giving each version a different name.

Ask the children to create two similar pictures, but using different colour combinations, warm, cool, contrasting, etc.

Remind children how to use the "undo" tool.



### Plenary

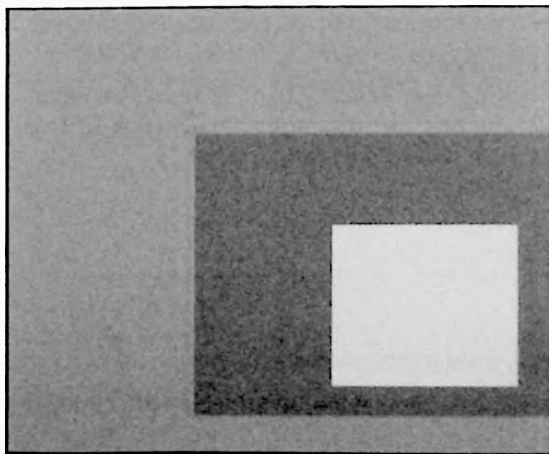
Display several of the pupils' pictures beside the originals and ask if anyone can identify the artist in whose style it has been "painted".

What are the similarities and differences?

Tell the children the titles of the original paintings and ask why the artists might have thought those appropriate.

What do pupils do to select a colour? What would the original artist have done?

Do the pupils think it is easier/harder to create the picture using ICT or paint and brush? Can they give reasons?




### Assessment

- Do pupils remember how to use the undo tool?
- Are pupils varying the width of their brush tool?
- Are pupils using the "save" and "save as" functions?
- Have pupils created two similar pictures using colour combinations that suggest different moods?

## Park the robot

*Suggested ages 5–7*

|   |  |
|---|--|
| <p><b>Suitable for</b><br/>Suitable for whole class, groups/pairs</p>   | <p><b>Subject</b><br/>Mathematics</p>  |
| <p><b>Curriculum references</b><br/><b>England</b><br/>QCA Scheme of Work ICT 2D Routes:<br/>controlling a floor turtle<br/><b>National Numeracy Strategy</b><br/>Year 2<br/>Shape and space</p> <ul style="list-style-type: none"> <li>• Use mathematical vocabulary to describe position, direction and movement.</li> <li>• Recognise whole, half and quarter turns, to the left or right, clockwise or anticlockwise.</li> <li>• Give instructions for moving along a route in straight lines and round right-angled corners.</li> </ul> <p><b>Scotland</b><br/><b>5–14 Guidelines Mathematics</b><br/><b>Topic/Strand</b> Position and movement<br/><b>Level C</b><br/><b>5–14 Guidelines ICT</b><br/><b>Topic/Strand</b> Controlling and modelling<br/><b>Level C</b><br/><b>5–14 Guidelines English Language</b><br/><b>Topic/Strand</b> Talking and listening – for information, instructions and directions<br/><b>Level C</b></p> | <p><b>Outcomes</b><br/>Pupils will:</p> <ul style="list-style-type: none"> <li>• Children will be able to give or follow directions, appreciate 90° turns</li> <li>• They will apply these skills to creating required routes for a robot</li> <li>• They will also appreciate the need for ‘on’ and ‘off’ and sequence of instructions</li> </ul>  |
| <p><b>Previous experience</b><br/>Children should have experienced moving forwards and backwards a specified number of steps and turning through 90° turns to the left and right, then following these instructions in a sequence.</p>  | <p><b>Resources</b><br/>Masking tape, bricks, chairs or books to make parking bays. A programmable toy (Pip, Roamer etc.) for children to use as robots.</p>   |
| <p><b>Activity</b><br/>Remind children of the instructions they have previously used to program each other.</p> <p>Demonstrate how to program a robot using similar instructions, one at a time to begin with and then short sequences.</p> <p>Show children how to clear the robot’s memory.</p> <p>Tell the children that the robot is a car (you could “dress” it appropriately) and that they are going to park it in a parking bay.</p> <p>Position the parking bays at the predetermined locations and place a robot at the starting point.</p> <p>The children should all be sitting behind the robot.</p> <p>Ask the children what directions they must give the robot to get it into the parking bay.</p>  |  |

Ensure the children are using mathematical vocabulary to describe the movements and turns; discourage pupils from just pointing in the direction they wish the robot to turn.

Discuss the children's suggestions, particularly the estimation of distances.

Ask a pupil to program in the instructions and to press go/start.

Discuss the outcomes.

Repeat several times.

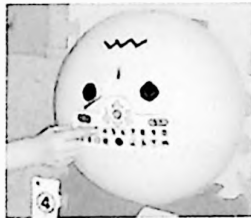
Children can then work in groups or pairs.



**Plenary**

What are the two most important commands? How did you decide the number of units to move forward?

When the bay is directly in front of the starting position what do we do?



Can we make the directions simpler (forward 3 then forward 6 will be forward 9)?

When the bay is not straight ahead what do we need to do?

Does the order of the command matter?

Now let's put in obstacles between the starting point and the bay, does the order of the commands matter?

Can you predict where the robot will be after these movements?

**Assessment**

- Can children work collaboratively?
- Can children estimate distance?
- Do children understand the difference between right and left turns?
- Do children appreciate the need for accuracy?
- Could children offer an alternative route/order?



**Extension activities**

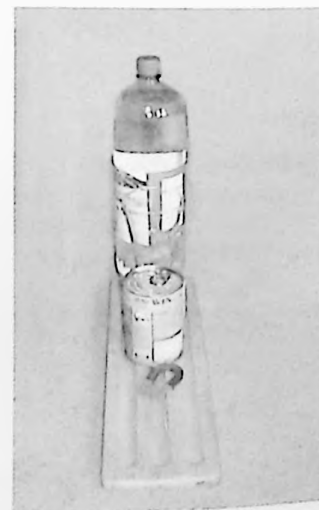
Have multiple parking bays (1, 2, 3, 4) and various starting points (A, B, C, D, E) all labelled. Have a set of cards with the labels. The new task is defined by choosing two cards one from 'start' pack and one from 'parking bay' pack.

Write directions for routes around the classroom or school.



**Which material?***Suggested ages 7–9*

|  |  |
|--|--|
| <p><b>Suitable for</b><br/>Whole class teaching, pairs</p>   | <p><b>Subject</b><br/>Science</p>  |
| <p><b>Curriculum references</b><br/><b>England</b><br/>QCA ICT 3C Introduction to databases<br/>QCA science 3C Characteristics of materials</p> <p><b>Scotland</b><br/><b>5–14 Guidelines ICT</b><br/><b>Topic/Strand</b> Collecting and analysing<br/><b>Level C</b><br/><b>5–14 Guidelines Environmental Studies, Science and Technology</b><br/><b>Topic/Strand</b> Knowledge and understanding – changing materials<br/><b>Level C</b></p>   | <p><b>Outcomes</b></p> <ul style="list-style-type: none"> <li>• Children will add to and use a database</li> </ul>   |
| <p><b>Previous experience</b></p> <ul style="list-style-type: none"> <li>• Children should understand that collecting and storing information in an organised way helps them find answers to questions.</li> <li>• They should have recorded information about properties of materials on record cards using fields.</li> </ul>  | <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>• Record cards giving information about different materials</li> <li>• Computer, data projector and whiteboard or large screen monitor</li> <li>• Prepared database using the same field names as the record cards</li> <li>• A series of question cards</li> </ul> |
| <p><b>Activity</b><br/>Show the children how to open the database program and to select the prepared file.</p> <p>Move between records, pointing out the different field headings and show how these relate to the information on their individual record cards.</p> <p>Indicate the different options available i.e. children can enter text, or possibly numbers (mass), or they can make a choice (magnetic/non magnetic) depending upon your materials and the fields you have set up.</p> <p>Demonstrate how to create a new record and with the help of the class complete this.</p> <p>Ask the children in turn to come and enter data.</p> <p>Remind the children of the importance of saving the file regularly.</p> <p>When all the data has been entered save the file and show the children how to exit the program.</p> <p>In the second lesson remind the children of their previous work and explain that they are going to use the computer database to answer simple questions.</p> |  |



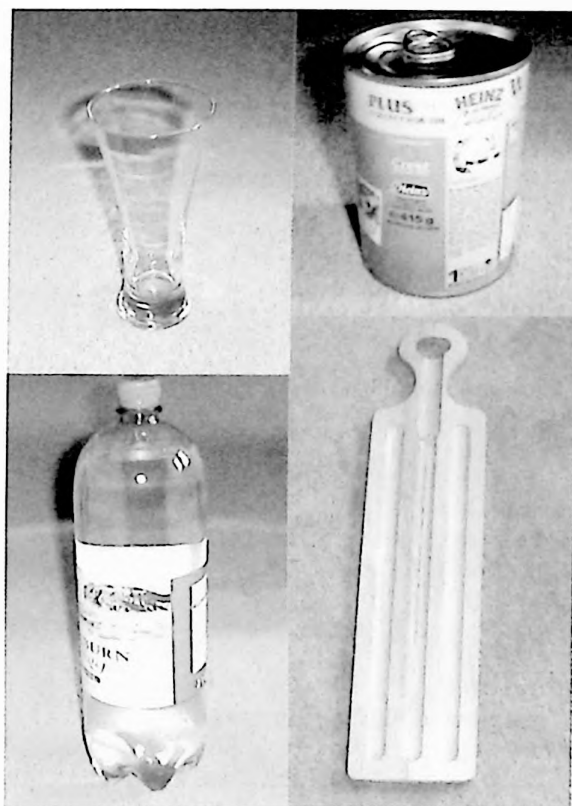


Select a question card, for example: Am I transparent?

Demonstrate to the children how to change the question into search criteria e.g. *Transparency field = yes.*

Demonstrate that there will be no records for some questions – you may have to use a complex search e.g. magnetic AND non-metallic objects.

When you have worked through your questions encourage the children to try to think of some to ask.



**Plenary**

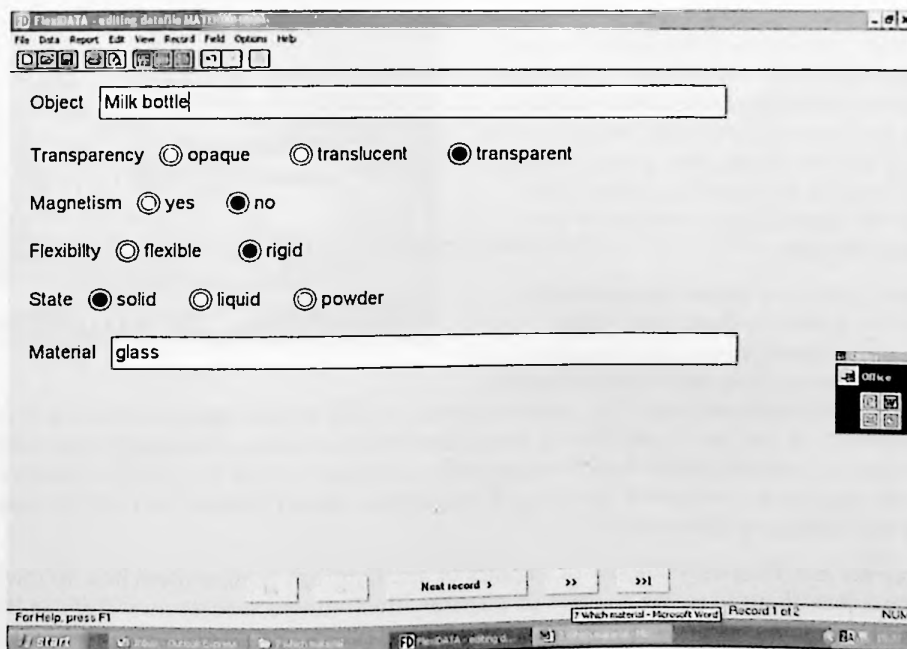
Discuss the similarities and differences between the computerised database and the record cards. What advantages and disadvantages are there to using a computerised database?

**Assessment**

- Do children recognise the similarities and differences between record cards and computer databases?
- Can children add records to a prepared database file?
- Can children translate questions into search criteria?
- Can children comment on their use of the two methods?



**Extension activities**

Create some complex searches where children have to search on two fields. You could create scenarios where inventors want to use a material that has two specific properties.



# Captioning pictures

*Suggested ages 7–8*

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| <p><b>Suitable for</b><br/>Whole class, groups/pairs, individuals</p>  | <p><b>Subject</b><br/>English</p>  |
| <p><b>Curriculum references</b><br/> <b>England</b><br/>         QCA Scheme of Work ICT 3A: Combining text and graphics<br/>         National Literacy Strategy Y3 T1<br/>         Text level 11 to develop the use of settings in own stories</p> <p><b>Scotland</b><br/> <b>5–14 Guidelines</b> English Language<br/> <b>Topic/Strand</b> Talking, talking about texts<br/> <b>Level</b> B/C<br/> <b>Topic/Strand</b> Listening, listening in order to respond to texts<br/> <b>Level</b> B/C<br/> <b>Topic/Strand</b> Writing, imaginative writing<br/> <b>Level</b> B/C</p>  | <p><b>Outcomes</b></p> <ul style="list-style-type: none"> <li>• Children will combine text and graphics</li> <li>• They will save their completed work</li> </ul>  |
| <p><b>Previous experience</b><br/>         Children should be able to:</p> <ul style="list-style-type: none"> <li>• locate, retrieve and insert a graphic into a word processing document</li> <li>• resize a picture</li> <li>• save a file with an appropriate file name</li> </ul>  | <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>• Projector and whiteboard</li> <li>• Individual computers with word processors</li> <li>• Scanned pictures saved in a suitable location</li> </ul>                                   |
| <p><b>Activity</b><br/>         Read sections from a suitable children's story to the class. If you choose one whose illustrations are out of copyright you will be able to scan and use those in this activity, otherwise the children could create their own illustrations, which can be scanned in. If you are doing this, select drawings that clearly illustrate an important point in the story so that the captions are relevant to the illustration and the plot.</p> <p>If you are using this as a whole class activity, show the children how to insert one of the illustrations into a word processing document. Ask several children to describe what is happening in the picture. Help them to use this information to decide what happened before and what happens afterwards in the story, and thus to sequence the illustrations. Encourage the children to use suitable vocabulary, similar to that used by the author. With the help of the children select a suitable caption for the picture and enter the text, or ask children to enter the text. Save the document. Repeat with the remaining illustrations.</p> <p>If the children are working individually or in pairs or small groups remind them how to retrieve and insert a picture. Ask them to insert a series of pictures illustrating a well-known story in the correct sequence and to write a detailed caption for each picture, saving the document with a suitable title.</p> |    |



### Plenary

With the children sequence the pictures. Ask the children to tell you some of the captions they have written.

Discuss with them the effect of the vocabulary they have chosen. Is it similar to that used in the original story?

Does the caption give clear information about what is happening in the picture?

### Assessment

- Can the children locate a picture?
- Can the children insert a picture into their word processing document?
- Can the children write a suitable caption for the picture?
- Can the children save their document?

### Extension activities

Give the children a file with a piece of text that would benefit from illustrating. Ask the children to select and insert suitable clipart.

**All about us***Suggested ages 7–9*

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|--|---|
| <p><b>Suitable for</b><br/>Pairs or small group work</p>   | <p><b>Subject</b><br/>English</p>   |
| <p><b>Curriculum references</b><br/><b>England</b><br/>QCA Scheme of work ICT:<br/>Unit 3E Email (short focused task)<br/>Unit 4A Writing for different audiences<br/>National Curriculum/Strategy references<br/>National Literacy Strategy: Year 4, Term 1<br/>Text level 24</p> <p><b>Scotland</b><br/><b>5–14 Guidelines</b> English Language<br/><b>Topic/Strand</b> Writing – personal writing<br/><b>Level C</b><br/><b>5–14 Guidelines</b> ICT<br/><b>Topic/Strand</b> Creating and presenting<br/><b>Level C</b></p>  | <p><b>Outcomes</b><br/>Pupils will</p> <ul style="list-style-type: none"> <li>• have prepared a word-processed document for an identified audience</li> <li>• shown that they can attach it to an email</li> </ul>        |
| <p><b>Previous experience</b><br/>Pupils should:</p> <ul style="list-style-type: none"> <li>• have composed, sent and received simple email messages</li> <li>• be able to copy and paste into a word document</li> <li>• be familiar with the use of digital still cameras</li> <li>• be able to crop and resize digital photographs</li> </ul>   | <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>• Magazine articles in the style of ‘Hello’ or ‘OK’</li> <li>• Digital camera(s) with associated software</li> <li>• Access to an email account</li> </ul> |
| <p><b>Activity</b><br/>Establish links with a partner school. You should have a valid reason for exchanging information with another school; this could be linked to the geography of a contrasting location or country.</p> <p>Discuss what pupils would like to find out about their partner school, and the sort of information they themselves would provide. Plan with the teacher at your partner school how the project will be undertaken.</p> <p>Discuss the layout and content of the magazines with the pupils.</p> <p>Prepare a template in the style of a magazine layout using a word-processing program. Allow for two picture boxes with frames/borders and text boxes for captions, and enough text boxes/columns to take magazine-style text, titles and subtitles.</p> <p>Remind the children of the sort of information their partner school wants, and what might be the most effective ways of providing this.</p> <p>Show the children the magazine articles focusing on the style of text. Tell the children that they are going to produce an information sheet in the style of a magazine article. The information sheet will describe an aspect of the school. When the information sheet is completed, they will email it to their ‘buddies’ in the partner school.</p> <p>Working in pairs, the children use the digital camera to photograph an area of the school or special event. Using the software supplied with the camera, the photographs are then downloaded to the computer.</p> |   |

Using paper and pencil, the children then plan the article to describe the place or event in the photographs. Once this has been done, the work can be completed in the prepared template. Using WordArt (or similar) the children can produce a title for their article. The article can be composed, and two relevant photographs inserted into the word-processed document. The children can then crop and resize these pictures to fit into the prepared picture boxes, after which the caption text boxes can be completed.

The completed article should be saved in an appropriate location inside the 'My Documents' folder. The pupils open their email account and produce a simple message explaining the attachment. (To add an attachment the children click on the attach/add button and then once the attachment box appears they click on browse. The browse button allows the children to search the computer's files and locate the folder where the document is saved. Having located their file, they click 'attach'. Once the attachment is complete, they click OK, and this will return them to their original message.)

The children's message will now be carrying the attachment; this will be noted, along with the size of the attachment, on the message. The children can now send their email in the usual way.

### Plenary

If you have access to a multimedia projector, the children's work can be shown to the rest of the class as they describe how they produced their article and attached it to their email.

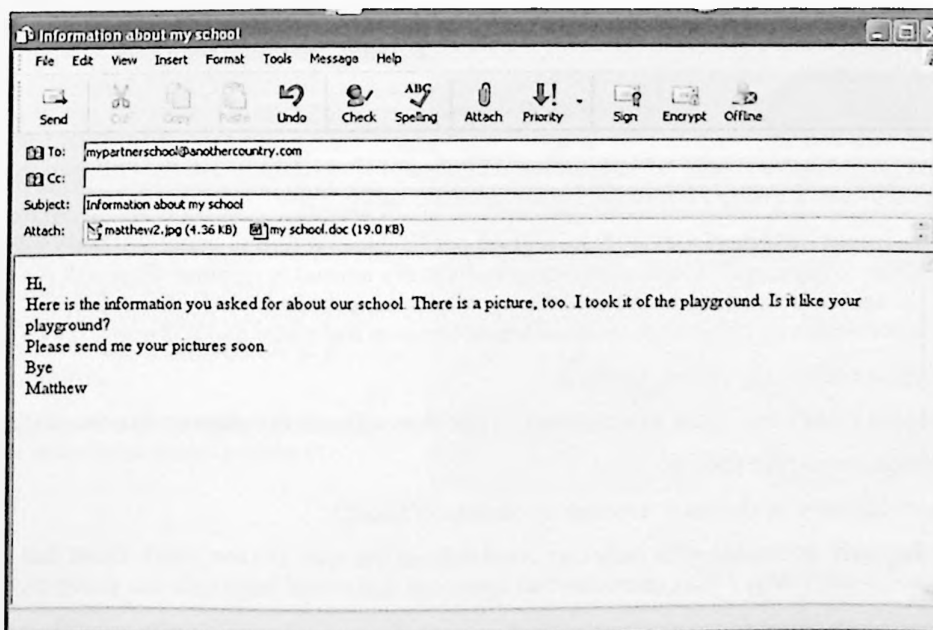
Discuss with pupils the size of the files they have created. What is the effect of sending a large attachment? How could the size of the file be minimised?

### Assessment

- Do the children know how to insert the photographs for their article?
- Can they resize the photographs independently?
- Can they open, compose and send emails independently?
- Are the children saving their work before sending it to the partner school?

### Extension activities

The children could conduct interviews with pupils or staff who work in a particular area of the school or who are involved with a special event. These interviews could then be included in their articles.



**Animal tree***Suggested ages 7–9*

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|--|---|
| <p><b>Suitable for</b><br/>Whole class, group and individual work</p>  | <p><b>Subject</b><br/>Science</p>   |
| <p><b>Curriculum references</b><br/> <b>England</b><br/> QCA Scheme of Work ICT 4C – Branching databases<br/> QCA Scheme of Work Science 4A Pupils should be taught to make and use keys<br/> <b>National Curriculum programmes of study</b><br/> <b>Science</b><br/> KS2 – Life processes; scientific enquiry (2f, 2h)<br/> ICT KS2 – Communicating and handling information</p> <p><b>Scotland</b><br/> <b>5–14 Guidelines ICT</b><br/> <b>Topic/Strand</b> Collecting and analysing<br/> <b>Level C</b><br/> <b>5–14 Guidelines English Language</b><br/> <b>Topic/Strand</b> Talking and listening – for information, instructions and directions<br/> <b>Level C</b></p>  | <p><b>Outcomes</b><br/> Pupils will:</p> <ul style="list-style-type: none"> <li>• learn to develop closed questioning to divide a set of objects into two subsets</li> <li>• learn to use and create a branching database to sort and classify information</li> <li>• learn to use a branching database to identify an object uniquely</li> <li>• have the opportunity to interpret data</li> </ul> |
| <p><b>Previous experience</b></p> <ul style="list-style-type: none"> <li>• Children should understand the nature of a database.</li> <li>• They should have had experience of dividing objects into subsets according to objective criteria.</li> </ul>  | <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>• A data projector and interactive whiteboard (useful but not essential)</li> <li>• Animal clip art</li> <li>• A branching database such as <i>Textease Branch</i>, or <i>FlexiTree</i></li> </ul>   |
| <p><b>Activity</b><br/> Using a branching database (and an interactive whiteboard if available), ask the children to think of a question that will sort a group of animal clip art into two sub-groups.</p> <p>The questions might include ‘Does it make a good pet?’, ‘Does it live in water?’, ‘Does it live on a farm?’ and ‘Does it lay eggs?’ Continue sorting until every animal is isolated. Now ask the children to describe an animal according to the criteria by which it has been sorted – for example, ‘It doesn’t make a good pet, it doesn’t live on a farm, it doesn’t live on the water and it doesn’t lay eggs.’</p> <p>If possible, print out a copy of the database.</p> <p>Ask the children if they can think of questions to ask that will sort the animals in other ways.</p> <p>Print this out and compare the two.</p> <p>Is there any difference in the total number of questions asked?</p> <p>Did any of the early questions split only one animal from the rest? Do the pupils think that was a good question to ask? Why? Was there another question that could have split the group more equably?</p> |   |

Look at the structure of the 'trees'. Are they relatively symmetrical? Do the children think one is better than the other? What makes it better?

Help them to identify what types of questions will sort the objects in the most efficient manner.

Once the database has been created, *Branch* gives you the option to 'play tree' (use a tree in *Flexitree*).

Play 'Guess which animal I am' with the pupils. When this option is selected, the outline of the tree remains visible, as does the first question used for sorting, but all the images disappear. Ask a child to think of one of the animals, and tell them that you will try to guess it in as few goes as possible. For example, if one child thinks of a fox and the first question is 'Does it make a good pet?', you can click on the appropriate part of the tree and a second question will appear.

This continues until all the questions have been answered and the fox is revealed. This feature can provide a lot of scope when tackling such concepts as the properties of shapes or sorting animals/people out more quantitatively at the top end of Key Stage 2.

### Plenary

At the end of the session, each group takes a turn at the whiteboard to demonstrate how they use the branching database to sort the photos. Reinforce the point that each answer to a question gives an additional piece of information about that person. Explain to the class that children share some common characteristics but that it is a unique combination of characteristics which ultimately determines the uniqueness of an individual.

### Assessment

- Can the children identify features of a set of objects?
- Can the children formulate questions that divide a set of objects into two distinct groups?
- Can the children understand why subjective questions should be avoided?
- Can the children appreciate why it is a good idea to formulate questions that divide a set of objects into near equal groups?

### Extension activities

**Language:** a branching database can be used to sort and classify spelling words.

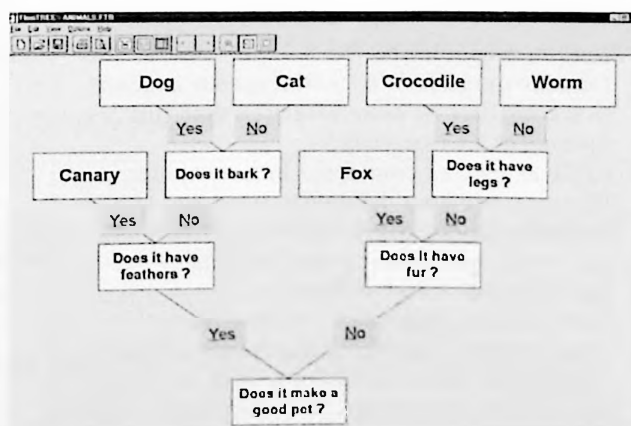
**Maths:** a branching database can be used to explore

- number – for example, sorting using criteria such as even and odd numbers, square numbers, prime numbers, multiples of three
- shape (knowledge of properties of shapes and the associated language would be necessary).

**Science:** an animal sort, requiring pupils to use more scientific knowledge of animals and the associated language.

Download and use Naace Primary's *Sorting Games* activity, and discuss with the children how this game relates to a branching database.

Can the children use the examples given to create their own branching database?



## Testing lampshade materials

*Suggested ages 9–10*

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| <p><b>Suitable for</b><br/>Whole class activity</p>  | <p><b>Subject</b><br/>Science or Technology</p>  |
| <p><b>Curriculum references</b></p> <p><b>England</b><br/>QCA Scheme of work ICT 5F Monitoring environmental conditions and changes<br/>This activity could be adapted to fit in various QCA units in other subjects. Some examples are given below.</p> <ul style="list-style-type: none"> <li>• Science 6F How we see things – adapt this unit to measure the light reflected off materials.</li> <li>• Science 5/6H Enquiry into environmental changes – investigate the light which passes through various leaves.</li> <li>• Technology 5C Moving toys and 5A Musical instruments – investigate the materials being used to decorate these toys and instruments for their brightness. This may involve adapting the activity to measure the light reflected by materials.</li> </ul> <p><b>Scotland</b><br/><b>5–14 Guidelines</b> Environmental Studies<br/>Science and Technology<br/><b>Topic/Strand</b> Knowledge and understanding – Changing materials<br/><b>Level D</b><br/><b>5–14 Guidelines</b> ICT<br/><b>Topic/Strand</b> Controlling and modelling<br/><b>Level D</b></p> | <p><b>Outcomes</b></p> <ul style="list-style-type: none"> <li>• To find out which material is best suited to the desired task, subdued or functional</li> <li>• To rigorously test the materials under experimental conditions</li> <li>• To discover that by using sensors connected to a computer reliable and consistent data can be collected</li> </ul>                   |
| <p><b>Previous experience</b></p> <ul style="list-style-type: none"> <li>• Discuss the task. Why will a sensor attached to a computer be more effective than just looking at the materials?</li> <li>• Look at sensors connected to a computer. Demonstrate how the connections and how to record readings. Allow pupils to freely use the sensor and observe the readings.</li> <li>• Revise work on spreadsheets.</li> <li>• How will the pupils ensure that they are carrying out a fair test? Each sample must be tested in the same conditions, with the same size sample of material. Will they repeat the test of each sample three times?</li> </ul>   | <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>• Computer and printer</li> <li>• Computer program – RM <i>Number Magic</i></li> <li>• Light detector connected to the joystick port on the sound card (in the case of <i>Number Magic</i>) or alternative light sensing apparatus</li> <li>• Materials to be tested</li> <li>• Torch</li> <li>• Box</li> </ul> |



**Activity**

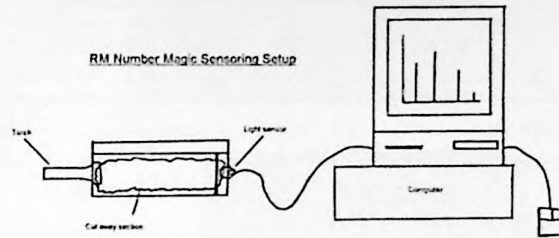
This activity measures the light which passes through various materials.

The light sensor will need to be secured firmly and the samples need to be mounted in a consistent manner.

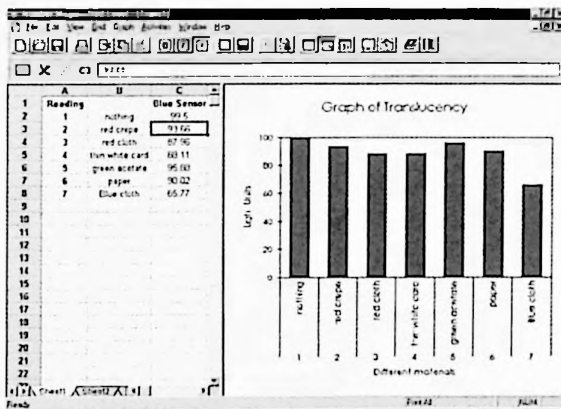
For this activity the snapshot function will be used. This takes a single reading when prompted.

This is done through the setup menu which appears when the user clicks on the *detector icon*. As each sample is ready click on the snapshot button. This enters data into the RM spreadsheet.

As good scientific practice pupils may wish to repeat this procedure three times for each sample. They could then enter a formula in a column to find the average of the three readings. This would



then be graphed. This is not as simple as it sounds! Try it out and if your version of RM Number Magic produces good results continue with this excellent scientific practice. If, however the program insists on putting in extra columns and headings it may be more trouble than it is worth. Another good scientific practice is shown in the spreadsheet below. A control measurement with no material being tested was included as one of the measurements.



When the snapshots are completed save the data. If the graph is not already set up do so now. Select a bar graph. Save and print out the data and graph.

**Plenary**

Look closely at the results of the monitoring.

Discuss whether the system collected accurate data. Were there any problems? In the sets of three readings were there any examples which were very different from other readings? What could have caused this?

Look at the graph. Which colours and materials let more light through? What reason might there be for this?

What other applications might there be for this type of testing?

**Assessment**

- Pupils should understand when it might be appropriate to use a computer device for data logging
- Pupils should be able to draw simple conclusions from the data

**Extension activities**

If the pupils tested light passing though materials, adapt the activity to investigate light reflected off the same materials. Compare the results.

If the pupils tested light reflected off materials, adapt the activity to investigate light passing though the same materials. Compare the results.

## Using the Internet to find out about micro-organisms

*Suggested ages 9–11*

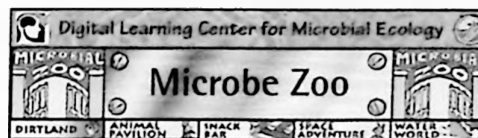
|  |  |
|--|--|
| <p><b>Suitable for</b><br/>Group/pair, individual</p>  | <p><b>Subject</b><br/>Science</p>  |
| <p><b>Curriculum references</b><br/><b>England</b><br/>QCA Scheme of work ICT 6D – Using the internet to search large databases and to interpret information<br/>QCA Scheme of work Science 6B – Micro-organisms<br/>National Curriculum programmes of study:<br/>ICT KS2 Finding things out<br/>Science KS2 Micro-organisms (5f)</p> <p><b>Scotland</b><br/><b>5–14 Guidelines</b> ICT<br/><b>Topic/Strand</b> Collecting and analysing<br/><b>Level</b> E<br/><b>5–14 Guidelines</b> Environmental Studies – Science<br/><b>Topic/Strand</b> Knowledge and understanding – living things and the processes of life<br/><b>Level</b> F</p>  | <p><b>Outcomes</b><br/>Pupils will:</p> <ul style="list-style-type: none"> <li>• use a 'Favorites' or 'Bookmarks' list to find information</li> <li>• add to their knowledge and understanding of the subject researched</li> <li>• use hyperlinks to find information on the internet</li> <li>• enter a URL to find a website</li> <li>• copy and paste from the internet into a word processing or other program for publication</li> <li>• use searches to locate, understand and interpret information</li> <li>• recognise that there are many very small organisms which can cause illness or decay, or which can be used in food production</li> </ul>   |
| <p><b>Previous experience</b><br/>It would be useful if the children knew how to access a website (either by a Favorite, a Bookmark, or by typing in the URL), and how to cut and paste text and pictures from the internet into a word-processing or desktop publishing program.</p>  | <p><b>Resources</b><br/>This activity makes use of the online resources of the Digital Learning Centre for Microbial Ecology (DLC-ME). This is a science education project developed at Michigan State University to help students to learn about microbial ecology – the study of microbes in the environment. Unlike medical microbiologists, who study disease-causing microbes, microbial ecologists are often concerned with communities of micro-organisms responsible for processes that are helpful to, or sometimes essential for, the health and survival of humans on Earth.<br/>URL: <a href="http://www.commtechlab.msu.edu/sites/dlc-me/index.html">http://www.commtechlab.msu.edu/sites/dlc-me/index.html</a></p> |
| <p><b>Activity</b><br/>Introduce the site to the whole class and explain how the sections are organised. The DLC-ME site contains a rich and child-friendly store of data on micro-organisms. The most useful section is the <i>Microbe Zoo</i>, which provides information about a wide range of microbes. This is organised in 'environments' representing the habitats in which the organisms are found. These include: Animal Pavilion, for microbes that can be found on and in animals, including humans; Dirtland, for micro-organisms found in places ranging from soil to dirty coffee cups; Snack Bar, which includes food makers and food contaminants. In each environment, detailed and illustrated information about many of the microbes is accessed via hyperlinks.</p> <p>Ask children to work in pairs or small teams to research one or more microbes, and then to prepare a short written document (perhaps based on a template) in which to present this information to their</p> |  |

peers. Alternatively, the groups could prepare a visual presentation for their peers using *PowerPoint* or another multimedia-authoring package.

One of the most difficult concepts in studying micro-organisms involves understanding their size. Help children to appreciate that these organisms are too small to be seen with the naked eye and that most of them are too small even to be seen with optical microscopes such as the computer microscope (one of which should be available in school). The common comparison is with a human hair, and it can help children to develop an understanding of relative sizes if they are able to look at a human hair with the computer microscope. The average human hair is one-tenth of a millimetre wide, whereas a micron, the unit in which microbial sizes are given, is one-thousandth of a millimetre. The simplest way to develop a feeling of scale is to wrap a hair around a transparent ruler and secure the end with a piece of sticky tape. View the hair and ruler under  $\times 10$ ,  $\times 60$  and  $\times 200$  magnifications, and take snapshots. Print the snapshots or view them on a large screen and discuss with the children. Under the  $\times 10$  magnification it is clear that the hair is much narrower than the mm markings on the ruler. Compare this with the sizes of various microbes. The world's largest bacterium is 0.5 mm long – five times the width of a human hair – and can be seen with the naked eye. Most microbes are far smaller. Get the children to draw microbes to scale on a printout of the  $\times 200$  magnification of the hair.

As with any research activity, it is important to stress to children the importance of taking ownership of the information and not just re-presenting the text and pictures they have found on a website. This is the benefit of using a template for the presentations. Children can start by cutting and pasting from the internet but will then have to read through the information and restructure it to fit the requirements of the template.

The information presented in *Microbe Zoo* is clear, brief and concise. The greatest detail is available for microbes that have hyperlinks to a page of data, which usually includes a picture and information about size. Advise children to focus on these hyperlinked microbes and follow any necessary links to find all the information to complete the template.



Information | DIRTLAND | Animal Pavilion | Snack Bar  
Space Adventure | Water World

Welcome to the Microbe Zoo!

### Plenary

When all the children have completed their research and prepared their presentations, allow the groups to present their work orally to the whole class in a plenary session. Help the children to keep these presentations short and snappy – not reading the printout but describing the key features in their own words. Ensure that each group has classified their micro-organism correctly and understands its place in the ecosystem. To share the information with a wider audience, collate the work into a booklet or wall display.

### Assessment

The presentations should provide evidence of all the learning objectives. If pupils are working in small groups or pairs, questioning will determine whether all the children have made all the learning gains.

### Extension activities

It may not always be possible to complete all sections of the template using data from the DLC-ME site. Where this is the case, children could use a search engine to try to find further information by typing in the name of the microbe they are researching. Many of the sites thus found will be written in a language too sophisticated for this age range, but most children should still find it possible to scan the text for specific information such as size, and all may be able to obtain extra images through this further research. (Check copyright restrictions before downloading text or images.) Searches for yeast or other fungi are likely to be more successful than searches for bacteria, which often throw up medical sites that are particularly difficult for children to understand.

## Studying census data

*Suggested ages 9–11*

|  |   |
|--|---|
| <p><b>Suitable for</b><br/>Group/pair</p>  | <p><b>Subject</b><br/>History</p>   |
| <p><b>Curriculum references</b><br/><b>England</b><br/>QCA Scheme of work ICT 5C – Evaluating information, checking accuracy and questioning plausibility; aspects of 5B – Analysing data and asking questions using complex searches<br/>QCA Scheme of work History 12 – How did life change in our locality in Victorian times?<br/><br/>National Curriculum Programmes of Study<br/><b>ICT</b><br/>KS2 – Finding things out; to interpret information, to check that it is relevant and reasonable, and to think about what might happen if there were any errors or omissions (1c)<br/><b>English</b><br/>NC programme of study: History, KS2 – Victorian Britain; a study of the impact of significant individuals, events and changes in work and transport on the lives of people from different sections of society (11a)</p>  | <p><b>Scotland</b><br/><b>5–14 Guidelines</b> ICT<br/><b>Topic/Strand</b> Collecting and analysing<br/><b>Level</b> D<br/><br/><b>5–14 Guidelines</b> Mathematics<br/><b>Topic/Strand</b> Information handling – Interpret<br/><b>Level</b> D/E<br/><br/><b>5–14 Guidelines</b> Environmental Studies – People in the Past<br/><b>Topic/Strand</b> Change and continuity, cause and effect<br/><b>Level</b> D/E</p> |
| <p><b>Outcomes</b><br/>Pupils will:</p> <ul style="list-style-type: none"> <li>• use a prepared databases to answer questions</li> <li>• carry out searches to check hypotheses</li> <li>• interpret, check and question data</li> <li>• use logical inference to identify implausible and inaccurate data</li> <li>• identify the reasons for errors in data</li> <li>• recognise that some data are more reliable than others</li> </ul>   | <p><b>Previous experience</b><br/>Pupils should have experience of:</p> <ul style="list-style-type: none"> <li>• gathering information from a range of sources</li> <li>• sorting and classifying information</li> <li>• entering and storing information in a database</li> <li>• retrieving information</li> <li>• interpreting, analysing and checking information</li> </ul>                                    |
| <p><b>Resources</b><br/>There are at least three sources of census data available online:</p> <ul style="list-style-type: none"> <li>• The Naace Primary Website <a href="http://www.mape.org.uk">http://www.mape.org.uk</a> has a ready-made database of the Greenfield Road census data compiled from the censuses of Greenfield Road, Harborne (near Birmingham) between the years 1841 and 1891. Records can be viewed and searched, and there are structured activities in the form of specific assignments. This data is an excellent starting point for a study of census material.</li> <li>• Data from the 1901 Census for England and Wales <a href="http://www.census.pro.gov.uk">http://www.census.pro.gov.uk</a> was made available to the public in 2001, and it is the first official UK census data to be accessible on the internet. The detailed data is presented in the form of direct copies of the enumerator's record forms, which can be downloaded and printed. There is a small charge for use of this material, which may be paid by voucher or credit card (details are available on the website).</li> <li>• The website of the Church of Jesus Christ of Latter-day Saints includes many genealogy resources, including the whole of the 1881 census for the British Isles <a href="http://www.familysearch.org/Eng/Search/frameset_search.asp?PAGE=census/search_census.asp">http://www.familysearch.org/Eng/Search/frameset_search.asp?PAGE=census/search_census.asp</a>. The Mormon faith places a high value on family and ancestry, and the site provides a number of resources for tracing family trees. However, this site is set up to allow initial searching using names of persons not names of streets, which limits educational use.</li> </ul> |   |

**Activity**

Census data provides a rich resource for historical study. This activity involves children studying census data to learn about life in Victorian times.

Every 10 years since 1801, the Government has conducted a census of the population of the United Kingdom. Early censuses were little more than head counts, but since 1841 more personal details have been collected such as names, ages, occupations and disabilities. The data from individuals was used to compile books of large tables for a particular area, each called an enumerator's return. Each enumerator's sheet contained details of 20–25 individuals, and the sheets were bound into a book listing up to 1,000 individuals. The law requires these records to be kept secret for 100 years after their collection. At the end of this period they are made available at the Public Records Office in London or Edinburgh. Local authorities usually hold copies of the census data for their area in the local archive or local studies collection. Ideally, a locality close to the school should be chosen for study. This could start with a visit to (or from) the local archivist or local studies librarian, and should involve looking at contemporary maps of the area. Ordnance Survey maps are very useful, but for most areas detailed street maps are available online at the *Multimap* [<http://uk2.multimap.com/>] website.

The area of study should be quite small – a street of 30–40 houses will provide a wealth of information. If it is not possible to obtain local data, most of the following can be carried out using the MAPE Greenfield Road data. The original returns were written in the variable handwriting of the Victorian enumerators and may be quite difficult for children to read at first. However, if they persist, Year 5 pupils should be able to 'tune in' to the style and learn to decode the script. It is important that the children are aware of what the original data looked like even if much of the work is carried out with the Greenfield Road material. It helps them to understand why transcriptions may have errors (such as different spellings of some names) and it encourages children to take a critical view of the data – checking accuracy and questioning plausibility. The data from the original forms can be used in its raw form or entered into a database to facilitate study.

Groups of children can work together to research questions of interest, which might include:

- Were most people born close to where they now lived?
- Were older people born further away than younger people?
- Had people who had come from further afield come from particular parts of Britain?
- Had anyone been born overseas?

These questions might encourage the class to speculate about how and why people move around the country. Why there were so few migrants, and why might those few have come to the area? How does this compare with migration patterns today?

Looking at occupations:

- Did people in similar work tend to live close together?
- Do people in the same household do similar work?
- Do heads of household who are employers employ their own children?
- Are there any people with 'Own Account'? What does this mean?
- Are there any people who are working at home? What might this mean?
- How many adult males were not in work?

Several other investigations may shed light on the nature of society in Victorian times:

- How many women were heads of households? How many of these were married?
- Were there any one-parent families?
- Did women live longer than men?
- Did children start work at a younger age in Victorian times than they do now?
- Were homes more crowded than they are today?
- How large were families compared with those of today?

**Plenary**

After the groups have completed their individual research, bring them together to discuss the issues and compare notes. Discuss issues of reliability – can the data always be trusted? What can the data reliably tell us about life in Victorian times?

**Assessment**

Pupils could prepare reports or presentations on their findings to share with the rest of the class. These could be used for assessment purposes.

**Extension activities**

Children could research their own family history – finding out where parents and grandparents lived as children, what jobs they did, what years they were born etc. They could devise and fill out their own census form for parents and grandparents. This information would be interesting to compare with the Victorian census data.

## Number mystery

*Suggested ages 9–12*

In this task, pupils can change the cells on a spreadsheet in order to look for a pattern in the relationship between numbers on a number grid. The spreadsheet offers the opportunity for a number of 'what if' type investigations.

|   |   |
|---|---|
| <p><b>Suitable for</b><br/>Individual or paired work</p>  | <p><b>Subject</b><br/>Mathematics</p>   |
| <p><b>Curriculum references</b><br/><b>England</b><br/>QCA Scheme of work ICT 6B – Spreadsheet modelling. The QCA refer to the fact that ICT can help pupils to:</p> <ul style="list-style-type: none"> <li>• recognise patterns, relationships and behaviours</li> <li>• model, predict and hypothesise</li> <li>• experiment and learn from feedback</li> <li>• think logically and develop problem-solving skills</li> </ul> <p>National Curriculum programme of study MathematicsKS2 – Number and algebra, specifically:</p> <ul style="list-style-type: none"> <li>• search for pattern in their results; develop logical thinking and explain their reasoning (1k)</li> <li>• recognise and describe number patterns .... make general statements, using words to describe a functional relationship (2b)</li> <li>• use a calculator to solve number problems (3k)</li> <li>• recognise, represent and interpret simple number relationships, constructing and using formulae in words rather than symbols (4d)</li> </ul> | <p><b>Curriculum references</b><br/><b>Scotland</b><br/><b>5–14 Guidelines</b> ICT<br/><b>Topic/Strand</b> Collecting and analysing<br/><b>Level</b> E<br/><b>5–14 Guidelines</b> Mathematics<br/><b>Topic/Strand</b> Number, money and measurement – patterns and sequences<br/><b>Level</b> E</p> <p><b>Outcomes</b><br/>Pupils will:</p> <ul style="list-style-type: none"> <li>• learn to record data systematically</li> <li>• look for relationships between numbers</li> <li>• learn to alter one parameter at a time when investigating relationships</li> <li>• discover that one investigation may trigger several others</li> </ul> <p><b>Previous experience</b><br/>Little previous experience of using spreadsheets is needed, other than the ability to enter data into a cell. Pupils may need to be reminded of how the co-ordinate system works in this particular example.</p> |
| <p><b>Resources</b><br/>A computer and spreadsheet software (such as <i>Excel</i>) for every pupil (or pair of pupils working together). Each task forms the lower half of an <i>Excel</i> sheet. The top part of the sheet contains the model and the lower half has the questions and recording sheet. The recording section can be completed using the computer, or it could be printed out and completed by hand. The pupils may need a calculator.</p>   | <p><b>Preparation</b><br/>The teacher needs an awareness of the scope of the spreadsheet model, where pupils have the facility to alter any one of six cells:</p> <ul style="list-style-type: none"> <li>• the grid size (4–10)</li> <li>• the base number in the top left cell (1–10)</li> <li>• the horizontal step size (1–5)</li> <li>• the vertical step size (1–5)</li> <li>• the co-ordinates of the cell that is central to their investigation (it will not be enough just to click in this cell).</li> </ul> <p>The rest of the spreadsheet is locked so that the pupils can't accidentally erase or modify the underpinning formulae.</p>  |
| <p><b>Activity</b><br/>There are four tasks based on a series of grids:</p> <ul style="list-style-type: none"> <li>• Grid A – the diagonal cross and the operation of addition</li> <li>• Grid B – the diagonal cross and the operation of multiplication</li> <li>• Grid C – the perpendicular cross and the operation of addition</li> <li>• Grid D – the perpendicular cross and the operation of multiplication</li> </ul> <p>Three files are available to download for this activity:</p> <ol style="list-style-type: none"> <li>1. Grid A suggests investigations for addition (but can also be adapted for the Grid C task).</li> <li>2. Grid B suggests investigations for multiplication (but can also be adapted for the Grid D task).</li> <li>3. Gridext is a modified spreadsheet involving different formulae for extension activities (see below).</li> </ol>  |   |

The tasks related to addition are easier than the tasks related to multiplication. The main idea is to ask pupils to hypothesise about what the results will be in a particular case and to formulate a general rule.

The focus on the spreadsheet is to compare the value of the central cell in the cross to those numbers appearing in the orange cells. For example, in the case of the diagonal cross with addition, the value of the number in the orange cells is twice that of the number in the central cell, regardless of the size of the grid, or the starting value, or the horizontal and vertical step sizes. Pupils may quickly deduce this result with respect to one particular example, but it will take them longer to appreciate that the result holds in all cases. Each of the four tasks can be approached in a similar way. The multiplication task is harder, but the clue in this case is to compare the value in the orange cells to the square of the number in the central cell (it might be useful to have calculators for this activity).

### Observation, intervention and questions to ask

The essence of this activity is to keep challenging the pupils. For example, in the case of grid A, ask questions such as:

- Can you set the values so that you get the number 48 in the orange cell?
- Can you set the values so that you get the number 48 in the orange cell with a grid size of 5?
- Can you set the values so that you get the number 48 in the orange cell with a grid size of 5 and a starting value of 3?
- Can you set the values so that you get an odd number in the orange cells?

### Plenary

One way to end a teaching session (scheme), of this type is for pupils to start making up their own investigations (and noting the answers). With the class assembled around a data projector, the pupils can then challenge each other or the teacher.

### Extension activities

The teacher could unlock the spreadsheet and add in some extra formulae. For example:

- In the case of the diagonal cross, the spreadsheet could sum vertically or horizontally instead of diagonally, or all four surrounding cells might be summed. If some formulae are deleted and others added, the new sheet should be locked again and stored as a separate model.

One extension spreadsheet is available to download – called *Gridext*.

The formulae in grid C have been altered to include the middle cell in the summations. The key question is:

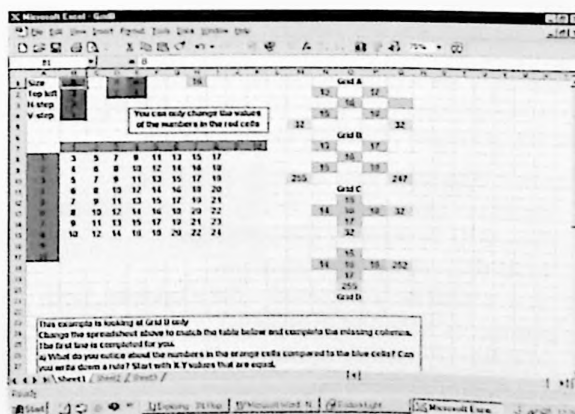
- Regardless of the settings you choose, will the two totals always be divisible by three?

Grids A and B show vertical and horizontal sums and products respectively, and lead to a number of possibilities:

- In Grid A, what is the rule that determines that each of the four orange cells has a different number in it?
- Can you generate odd numbers in the orange cells?
- In Grid B, try subtracting the two vertical products and comparing to the middle number, what do you notice? (Hint: compare the result with multiples of the middle cell.)

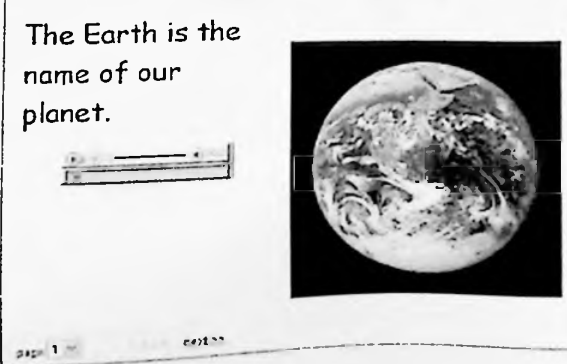
### Hints for the busy teacher

- Pupils should concentrate on one of the four grids at any one time.
- Altering the size of the grid is the least important variable to alter (in effect it only acts as a window on a larger grid). The initial value (top left) and step sizes are the key values.
- New or different instructions can be added to the spreadsheet simply by inserting a text box and then dragging it to the preferred position.
- Teachers who want to modify or create their own spreadsheets will need to unlock the spreadsheet first. Click on Tools, Protect and then Unprotect Sheet – after modifying, be sure to save the result under a different file name, having protected it again first.
- If the spreadsheet displays a page of #####, it is usually because a cell entry is outside the permitted range or is not a whole number.



# Electronic big books

*Suggested ages 10–11*

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| <p><b>Suitable for</b><br/>Group/pair or individual</p>  | <p><b>Subject</b><br/>Literacy</p>  |
| <p><b>Curriculum references</b><br/><b>England</b><br/>QCA Scheme of work ICT 6A – Multimedia presentation (integrated task)<br/>National Literacy Strategy Y6 T1 Text level 14<br/>Extended narrative writing</p> <p><b>Scotland</b><br/><b>5–14 Guidelines ICT</b><br/><b>Topic/Strand</b> Creating and presenting – Multimedia<br/><b>Level F5–14 Guidelines English Language</b><br/><b>Topic/Strand</b> Writing – functional writing<br/><b>Level</b> D/E</p>   | <p><b>Outcomes</b><br/>Children will learn:</p> <ul style="list-style-type: none"> <li>• that computer software can include a range of media and gives the user a range of options</li> <li>• to use a multimedia authoring program to organise, refine and present information in different forms, including images, sounds and text</li> <li>• to adjust their writing to make it suitable for a particular audience</li> <li>• to plan and design multimedia pages</li> <li>• to capture images and sample sounds</li> <li>• to produce a storyboard diagram that shows the content and links between pages</li> </ul> |
| <p><b>Previous experience</b></p> <ul style="list-style-type: none"> <li>• Literacy: Children should have experience of working in groups on an extended writing task. They should be used to listening to and evaluating suggestions from other people, and be able to adjust their writing style for a particular audience. They should have experience of storyboarding.</li> <li>• ICT: Children should have experience of using electronic big books. They should know how to combine text, images and sound into a document.</li> </ul>  | <p><b>Resources</b></p> <ul style="list-style-type: none"> <li>• Computer(s) with internet access – in the classroom or the computer suite</li> <li>• <i>Where Do Hedgehogs Go?</i> – a big book that can be downloaded from the <i>Big Books area</i> on the Naace Primary website</li> <li>• Access to the <i>Book Maker</i> program, also to be found on the Naace Primary website.</li> <li>• A digital projector and whiteboard or large-screen monitor will be an advantage</li> <li>• Storyboard planning sheets</li> </ul>  |
| <p><b>Lesson 1</b><br/>Introduce the children to the Big Book <i>Where Do Hedgehogs Go?</i></p> <p>Talk about the features of the Big Book – the illustrations, the amount of text used on each page, the level of the language used, the features that can be customised by the user, and the advantages/disadvantages of an electronic book.</p> <p>Allow the children to ‘enjoy’ the book.</p> <p>Explain to the children that they will be working in small groups to create an ‘electronic big book’ for the younger children in the school.</p> <p>Explain that they will need to consider:</p> <ul style="list-style-type: none"> <li>• the level and reading ability of the children they will be writing the book for</li> <li>• what their story will be about</li> <li>• how it will be illustrated – for example, with photos or scanned drawings</li> <li>• whether to include sound</li> </ul> <div data-bbox="812 1521 1392 1904" style="border: 1px solid black; padding: 10px;"> <p>The Earth is the name of our planet.</p>  <p>The screenshot shows a digital book interface. On the left, there is a horizontal menu bar with several icons. Below it, the text 'The Earth is the name of our planet.' is displayed. To the right of the text is a square image of the Earth as seen from space. At the bottom of the page, there are some small, faint text elements that appear to be 'PAGE 1' and '60122'.</p> </div> |   |



Discuss with the children the importance of planning their book and introduce the storyboard planning sheets. Remind the children how to use storyboarding for their book, and ask them to decide how they can show what sounds they might use to illustrate their pages – for example, speech bubbles, a separate script of what is being spoken and so on.

Working in their groups the children discuss their plans and prepare their books using the storyboard planning sheets.

### Plenary

In the plenary, different groups feed back on their progress and discuss their ideas for their electronic books.

### Lesson 2

Remind the children of their task from the previous lesson and ensure that they have their completed storyboard planning sheets to hand.

Show the children how to open the bookmarked Big Book Maker program in their internet browser. Demonstrate how they can enter the title of their book and the names of the authors by clicking in the appropriate boxes and typing in them. (If you are working in a computer suite, the children could complete these actions as you demonstrate them.) Demonstrate the choices of text and font size that the children can make, and discuss how their choices will affect the amount of text that can be displayed on each page of their book.

Explain that the children will need to reduce the text width of their book to 50 per cent if they want to include an illustration as well as text on the page.

Show them how to select the correct formats for their illustrations – for example JPEG – and any sound files – such as WAV.

Explain that they are now ready to start writing their stories, and show them how to enter their text. Make sure they understand that pressing the return key twice will force a new page in their book. Demonstrate this by typing in a couple of sentences, pressing return twice, typing another sentence and then by clicking on preview. A new window will open. Click on 'start' to see the story so far.

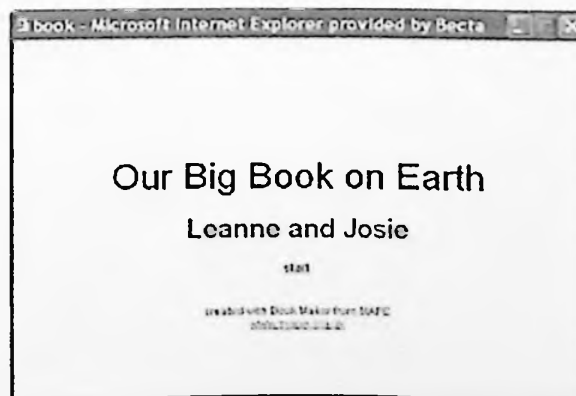
Explain that this window is only showing the text from their story as they haven't yet added any illustrations to the pages. Close that window by clicking on the X in the top right-hand corner of the window. You will notice that your story editor window is now also showing the text for each page separated by a line.

Ask the children to work in their groups to set up and enter the text for their stories, and to use the preview option occasionally to highlight and correct any typing errors.

When the groups have entered all the text for their stories, and proofread it using the preview option, show the children how to save their books to their computers by clicking on 'make book'. A new, small window will open up. Click on File > Desktop > Save as... and then give the book a name, such as redbook.htm.

Click on the newly created file, which has now appeared on the desktop, and tell the children that they can now start to add their images and any sounds.

Remind the children how to make a new folder on the desktop, give it a name and drag their book file into the folder. Show them how to make a subfolder in this folder called 'images' and, if they are including sounds, another folder called 'audio'. Explain that, once prepared, their images should be saved in the 'images' folder as pic1, pic2, and so on – pic1 will appear on page 1 of their book, pic2 on page 2 and so on. The sounds should be saved in the 'audio' folder as audio1, audio2, and so on – demonstrate this. Click on the 'redbook' file again, and this time the book will include images and sounds as well as text.



If, for any reason, the children don't complete their book in a single lesson, show them that their books can be saved online and returned to and completed later – provided they remember or make a note of the file name.

**Plenary**

Encourage the children to critically analyse their work and what they have learned from the experience of writing for younger children. How do they think it would be different if they were writing for another audience – their friends or parents, for instance? What might they do differently if they were writing a non-fiction book?

**Assessment**

As the children are working, move from group to group to ensure that they have correctly understood how to set up their books and adjusted the page width, font and formats for sound and images. Discuss with each group the text they are using for their story. Have they correctly used capital letters and full stops? Are speech marks being used correctly? Is the level of language appropriate for their target audience? Could they edit the text to improve it? Is the illustration/sound adding anything to the story that isn't already in the text?

**Extension activities**

Invite children of the appropriate ages to visit your classroom to read the big books created by the different groups. Encourage the groups to obtain feedback on their stories such as:

- how interesting/exciting the story is
- whether younger pupils can read the text by themselves or whether they need help
- how they might improve the story or the book

## Resources

This is by no means an exhaustive list of resources but it does provide some alternative solutions if you do not have the equipment used in the activities.

Many of the major software producers will have alternative products to those listed below and you should check out their websites.

*LogIt Explorer* starter pack, about £175 – various outlets including [http://www.commotiongroup.com/2003/pages/products/ict\\_1\\_2/datalogging.htm](http://www.commotiongroup.com/2003/pages/products/ict_1_2/datalogging.htm)

Deltronics – various options, around £120 – <http://www.deltronics1.co.uk/datalogging.htm>

*Data Harvest* – EasySenseQ – [http://www.data-harvest.co.uk/datalogging/pri\\_easysenseq.html](http://www.data-harvest.co.uk/datalogging/pri_easysenseq.html)

*Commotion* – Coco control – around £139 – <http://www.commotiongroup.com/2003/pages/index.html>

Roamer £95 – <http://www.valiant-technology.com/>

Pip £210.00 plus £10.50 P&P plus VAT – <http://www.swallow.co.uk/index.htm>

Pixie 130.00 plus £9.25 P&P plus VAT – <http://www.swallow.co.uk/index.htm>

*Textease Branch* Single user: £39 – <http://www.softease.com/branch.htm>

*FlexiTREE* Single user: £32 – <http://www.flexible.co.uk/FlexiTREE.html>

*Retreeval* Single user: £35 – <http://www.kudlian.net/>

*Splash!* Single user: £25.50 – <http://www.kudlian.net/>

*Number Box 2* £49 – <http://www.blackcatsoftware.com/>

*Softease Spreadsheet* Single user £39 – <http://www.softease.com/spreadsheet.htm>

For the Big Book Maker click on Curriculum Resources at [www.naace.org.uk](http://www.naace.org.uk) and follow the links to the Primary Community website. You will find the program under Classroom activities.

The files referred to in Number Mystery can also be downloaded from here.

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# **Primary Practice**



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