

Year 6 Spreadsheet Lessons			
Main Aim <b>Using spreadsheets for Investigation</b> (Revised February 8th 2007)			
<b>Learning Objective Lesson 1</b>		<b>Lesson Plan Investigating Shadow Height</b>	
<b>Science Question</b> How does the distance from torch to object affect the size (height) of the shadow in cm? <b>ICT L.O.</b> To know how to create a scatter graph for use within a science experiment		<b>This will be much more successful if the previous science lesson includes some introduction to this in the way of prediction writing, method writing or question raising.</b> This lesson lends itself to pupils carrying out the experiment on the floor near the computers and inputting data directly onto a spreadsheet before graphing the results. Average and High ability pupils should be able to create the spreadsheet themselves and graph the results using a scatter graph. Low ability pupils can work from the spreadsheet template on the Year 6 Science Resources called Shadow before creating their own graph. I recommend demonstrating how to do the test (Make sure there is 20cm between the wall and the 4 uni-cube high object and use the larger torches under the computer tables) First column should be distance of the torch to the object, start at 2cm and go up in 2cm increments. (don't type in the cm after the number or Excel will think the cell is not a number cell) Second column would be height of the shadow in cm (don't type in the cm after the number or Excel will think the cell is not a number cell) Highlight column headings and all the data in those two columns to make the graph. (don't highlight any extra columns with no data in them or you will get an inaccurate graph) Use a joined up xy scatter as this includes the data in the first column as the y axis.	
<b>ICT Skills</b>	<b>Able &amp; SEN Support</b>	<b>Notes</b>	<b>Resources</b>
Using the chart wizard Inputting data into a spreadsheet	SEN pupils use <b>Shadow</b> (Learning Resource inside Year 6 Science Resources)	Pupils work in pairs to carry out the test but record the results individually You may wish to analyse the data in more detail in further science lessons	Torches Objects Sheets of card to show the <b>shadows</b> Rulers
<b>Learning Objective Lesson 2</b>		<b>Lesson Plan Investigating Shadow 2</b>	
<b>Science Question</b> How does the angle of the torch (10° from flat increasing) affect the length of the shadow in cm? <b>ICT L.O.</b> To know how to create a scatter graph for use within a science experiment		<b>This will be much more successful if the previous science lesson includes some introduction to this in the way of prediction writing, method writing or question raising.</b> This lesson lends itself to pupils carrying out the experiment on the floor near the computers and inputting data directly onto a spreadsheet before graphing the results. Average and High ability pupils should be able to create the spreadsheet themselves and graph the results using a scatter graph. SEN ability pupils can work from the spreadsheet template on the Year 6 Science Resources called Angle before creating their own graph.	

	<p>First column should be angle of the torch to the object, start at flat and increase by 10° increments (don't type in the degrees after the number or Excel will think the cell is not a number cell)</p> <p>Second column would be length of the shadow in cm (don't type in the cm after the number or Excel will think the cell is not a number cell)</p> <p>Highlight column headings and all the data in those two columns to make the graph. (don't highlight any extra columns with no data in them or you will get an inaccurate graph)</p> <p>Use a joined up xy scatter as this includes the data in the first column as the y axis</p>		
ICT Skills	Able & SEN Support	Notes	Resources
Using the chart wizard Inputting data into a spreadsheet	SEN ability pupils can work from the spreadsheet template on the Year 6 Science Resources called Angle before creating their own graph.		<b>Angle</b> Spreadsheet Template
Learning Objective Lesson 3	Lesson Plan Addition & Multiplication Pyramids		
<ul style="list-style-type: none"> <li>Maths L.O. Using an addition and multiplication pyramid to investigate the importance of the order operations are completed in</li> <li>ICT L.O. Creating addition and multiplication formula to investigate a maths problem</li> </ul>	<p>Outside the suite order your class into three groups. Those who are in the top maths sets, Those in the middle and those in the bottom maths sets. If you don't want to use this language then find out who teaches these sets before so you can refer to the set by its teachers name. Sit pupils in these three groups together so it is easy later to stop a group independently of the class.</p> <p>Create your own three cell addition pyramid. Remind pupils how to create the addition formula starting with an = sign. Demonstrate how you can now use this to investigate the importance of the order numbers are inputted in at the base of the pyramid. Use 1,2&amp;3</p> <div style="text-align: center;"> </div> <p>Now direct your top group to download <b>pyramid1</b>, middle <b>pyramid2</b> and low <b>pyramid3</b> from the learning resources Year 6 Spreadsheet Module. The instructions are on the sheet see bottom tabs. There are extension activities on the tabs too. At the end ask pupils if they can explain what combinations make the highest and lowest totals?</p>		
ICT Skills	Able & SEN Support	Notes	Resources
<ul style="list-style-type: none"> <li>Addition Formula</li> <li>Multiplication Formula</li> </ul>	Able will be investigating multiplication pyramids SEN will have almost complete prepared pyramids	This idea was adapted from <i>Improving Numeracy Through Spreadsheets</i> By Bob Sykes Brilliant Publications ISBN 1 897675 53 4	<b>Pyramid1 Pyramid2 Pyramid3</b> Addition and multiplication <a href="#">video help files</a>
Learning Objective Lesson 4	Lesson Plan Random Number Generators		

<ul style="list-style-type: none"> <li>Maths L.O. Using a spreadsheet to investigate totals created by throwing dice</li> </ul>	<p>Create a three sided spinner from a pencil and card before the lesson as an aid to understanding.  Download <b>Dice</b> from the Y6 Spreadsheet resources area of the learning resources.  As a teacher model how to complete the three spinners investigation with the whole class  Now allow pupils to move onto investigating <b>3 dice</b> and then <b>5 dice</b> and then finally <b>creating there own investigation</b>.  <i>(It is best to get pupils to look at the formulas and adjust the ones that are there other than write their own. If they fail to see what is happening you could look at the formula with those who need it. The number to the right of the asterix * sets the maximum number that can be thrown =INT(RAND()*6+1). The +1 at the end stops it throwing a zero.)</i>  In conclusion what have the class discovered?</p>		
<b>ICT Skills</b>	<b>Able &amp; SEN Support</b>	<b>Notes</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>Filling in a spreadsheet</li> <li>Creating a graph</li> </ul>	Able pupils will move onto creating there own investigation and looking at the formula involved. SEN pupils may not move any further than 3 dice.	This idea was adapted from <i>Improving Numeracy Through Spreadsheets</i> By Bob Sykes Brilliant Publications ISBN 1 897675 53 4	Download <b>Dice</b> from the Y6 Spreadsheet resources area of the learning resources. Pupils bring in there general workbooks to keep tally charts
<b>Learning Objective Lesson 5</b>		<b>Lesson Plan</b>	
<b>Science Question</b> How does the mass of an object (in g) affect how much force is needed (in n) to move it? <b>ICT L.O.</b> To know how to create a scatter graph for use within a science experiment	<p><b>This will be much more successful if the previous science lesson includes some introduction to this in the way of prediction writing, method writing or question raising.</b></p> This lesson lends itself to pupils carrying out the experiment on the floor near the computers and inputting data directly onto a spreadsheet before graphing the results. Average and High ability pupils should be able to create the spreadsheet themselves and graph the results using a scatter graph. SEN ability pupils can work from the spreadsheet template on the Year 6 Science Resources called <b>force</b> before creating their own graph. First column should be weight in g, 100g increasing by 100g increments to 1kg (don't type in the g or kg after the number or Excel will think the cell is not a number cell) Second column would be force needed to move it in n (don't type in the n after the number or Excel will think the cell is not a number cell) To extend this you could have separate columns for different surfaces <ul style="list-style-type: none"> <li>Carpet</li> <li>Table</li> <li>Concrete</li> </ul> Highlight column headings and all the data in those two or more columns to make the graph. (don't highlight any extra columns with no data in them or you will get an inaccurate graph) Use a joined up xy scatter as this includes the data in the first column as the y axis		
<b>ICT Skills</b>	<b>Able &amp; SEN Support</b>	<b>Notes</b>	<b>Resources</b>

Using the chart wizard Inputting data into a spreadsheet	SEN pupils use <b>force</b> (Learning Resource inside Year 6 Science Resources) A piece of card with the angles marked on would help	Pupils work in pairs to carry out the test but record the results individually You may wish to analyse the data in more detail in further science lessons	Newton meters Boards with hooks Weights
<b>Learning Objective Lesson 6</b>	<b>Lesson Plan Assessment Lesson</b>		
<ul style="list-style-type: none"> <li>To know how to create a graph to show the affects of air resistance on different size objects.</li> </ul>	<ul style="list-style-type: none"> <li>How does the size of a parachute (in cm<sup>2</sup>) affect how long it takes to fall to the ground (in seconds)? or</li> <li>How does the area of a spinner (in cm<sup>2</sup>) affect how long it takes to fall to the ground (in seconds)?</li> </ul> <p>Go over the importance of only changing one variable (size of parachute canopy or area of spinner rotor blade) Also go over the variables that need to be kept the same to ensure that the test is fair (height of drop, method of drop etc) I would create a standard parachute or spinner template that can be cut out for a number of different sizes with the area in cm<sup>2</sup> recorded on the spinners/parachutes. Once you are clear that pupils understand what to do then let them get on with the lesson whilst you observe and record for assesment purposes. See report statement below.</p>		
<b>ICT Skills</b>	<b>Able &amp; SEN Support</b>	<b>Notes</b>	<b>Resources</b>
<ul style="list-style-type: none"> <li>Using a spreadsheet within science</li> <li>Creating a graph from real data</li> </ul>	As you are observing pupils to determine levels don't provide too much help unless you note this and reduce the level accordingly	Parachutes must have central holes cut in the middle or they will go all over the place (to do with aerodynamics) I would use squared paper with the spinners and attach a paper clip to the bottom.	Stopwatches Paper for parachutes Scissors, small paperclips, string for parachutes. Sellotape for parachutes

<b>Report Statement</b>	<b>Can use a spreadsheet within science and maths to investigate real problems</b>
Below	Pupils need help producing their graph either from the teacher or other pupils
Within	Pupils can set up their own graph correctly choosing the right amount of columns and rows. They can choose the correct graph type. Their axis are labelled correctly.
High	Can work independently recording data accurately using a relevant graph type. The graph will be easy to interpret and pupils should be able to use the graph to answer the key question. They would be able to spot anomalies on the graph if there are any and explain why they have occurred.