

<b>YEAR: 7</b>	<b>SUBJECT: D&amp;T</b>	<b>TITLE: STRUCTURES</b>
<b>OBJECTIVE:</b> To introduce the pupils to Structures and their importance in the world around us.		

STAGE	ADDITIONAL SKILLS	EXTENSION WORK	RESOURCES	H & S
<p><b>Stage One:</b> The pupils will be asked to explain the term 'structure'. Examples will be discussed ranging from famous examples such as the Eiffel Tower and the Golden Gate Bridge to more local examples such as Blackpool Tower.</p> <p>The importance of a 'frame' as part of a structure will be stressed.</p> <p>The pupils will start to construct a rich picture with 'Structures' at its centre. Drawing techniques will be discussed/demonstrated</p>	<p>N. Pupils asked about the shapes they know that may be strong ie. A triangle.</p> <p>L. Keywords relating to structures discussed and written down.</p> <p>ICT. Website references researched by pupils. Verbal report.</p> <p>HWK. Rich Picture to be drawn</p> <p>LESSON STARTER: pupils identify famous structures and places on worksheet.</p> <p>One the white board pupils called up to number the location of each one.</p>	<p>Pupils to collect ant information on famous structures</p>	<p>Internet site (structures section) used where necessary.</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>
<p><b>Stage Two:</b> The pupils will view the video clips of the Eiffel Tower and make notes regarding the important information.</p> <p>Pupils will attempt the question sheet</p>	<p>L. Video on Eiffel Tower watched. Pupils given a number of questions.</p> <p>ICT. Pupils work through section on Eiffel Tower .</p> <p>N. The height of the tower discussed with pupils. Feet converted into metres...</p>	<p>Pupils asked to highest buildings in the world, in order of rank.</p> <p>HWK. Pupils present information relating to the Eiffel Tower.</p>	<p>Video clips - Eiffel Tower</p> <p>Question Sheets</p> <p>Internet site</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>
<p><b>Stage Three:</b> The pupils will view the short video 'Bridging the Gap'. They will be asked a range of questions regarding the history of bridges and materials used by bridge builders.</p> <p>Notes and diagrams will be placed on the board relating to the following types of bridges: Wood Beam, Stone Slab, Stone Arch, Iron Bridges, Steel Bridges (box girder and suspension) Pupils may also work from the Structures Sheets in Adobe Acrobat form or worksheets</p>	<p>L. Key periods of bridge building history discussed and notes made.</p> <p>ICT. Internet used to study examples of different bridges.</p> <p>C. The role bridges have played in our society discussed.</p> <p>HWK. Presentation of information relating to the history of bridges.</p>	<p>Pupils collect names and details about the worlds longest bridges.</p>	<p>Video - 'Bridging the Gap'</p> <p>Structures Information Sheets (Adobe form or worksheets)</p> <p>Internet site (structures section) used where necessary.</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>
<p><b>Stage Four:</b> Recap regarding the history of bridges. The pupils will be shown a short video regarding the Royal Engineers and how they construct portable bridges. The pupils will answer the worksheets relating to this and the 'Pond de Normandie'. Emphasis will be placed on the triangulation involved and also the term 'centre of gravity'. Diagrams will be placed on the board as well as suitable notes.</p>	<p>L. Pupils given a question sheet. Answers found when listening to videos</p> <p>C. Importance of bridges in all societies discussed.</p> <p>ICT. Internet research on the Pond de Normandie.</p> <p>N. Key statistics collected on the Pond de Normandie.</p> <p>HWK diagrams of suspension and cable stay bridges.</p>	<p>Pupils to research information about other cable stay bridges</p>	<p>Video - 'Bridges / Structures'</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>

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<p><b>Stage Five:</b> The pupils will be asked to design a bridge to span a valley. They will be given a simple diagram of a valley and asked for suggestions regarding the type of bridge that would be most suitable. They will be asked to justify their choice. This initial planning will be carried out in pairs. As a resource the pupils will be asked to access the Technology Intranet Site or the Adobe Reader version of 'Structures' - viewing the history of bridges. They will list reasons for their choice. They will then present their findings to the class.</p>	<p>L. Pupils read through design problem with staff. Problem discussed. N. Statistics relating to distance to be spanned and number of vehicles crossing, discussed. C. Importance of new bridge to the community explained. Procedure for planning applications, enquiries ..... HWK. Two basic ideas and one final annotated idea.</p>	<p>Produce a poster to advertise the new bridge as a tourist attraction.</p>	<p>Computer suite Adobe Reader or Website version of 'Structures' Internet site (structures section) used where necessary.</p>	<p>CONTROL MEASURE  CLEAPPS REF.  RESIDUAL RISK</p>
<p><b>Stage Six:</b> The pupils will be shown how to present possible designs for their bridge solution. The following will be explained: The construction of a border and title block. The presentation of the drawing. The use of labels. The use of word processed notes.</p>				
<p><b>Stage Seven:</b> 'Triangular Structures'. The pupils will be introduced to the importance of the triangle as a part of many structures. They will be shown a simple demonstration using straws which will demonstrate the strength of a triangle composed of one straw as opposed to a straw lying horizontally. The pupils will be shown how to construct a simple girder bridge from straws. The bridges will be decorated with designs based on existing bridge types. These will be tested to destruction.</p>	<p>L. Create a sequence drawing with notes, explaining every stage of manufacture. N. Basic measurements of the bridge discussed. HWK. While manufacturing roughout sequence drawing and complete accurately at home (notes included). C. Pupils work together in teams, emphasis placed on team work and cooperation.</p>	<p>ICT. Draw at least one stage of construction using a graphics piece of software.</p>	<p>Art straws Internet site (structures section) used where necessary. Internet site (structures section) used where necessary.</p>	<p>CONTROL MEASURE Careful use of scissors emphasised.  CLEAPPS REF. <b>1.068</b>  RESIDUAL RISK Low</p>
<p><b>Stage Eight:</b> While constructing the girder bridge the pupils will draw each stage of making the model. This will be roughed out and simple notes will be added. The importance of writing the notes will be emphasised and so will the overall presentation. The pupils will be introduced to the concept of a sequence drawing. Using their rough notes they will carefully draw the stages of manufacture, adding appropriate notes. The use of a title block, border line and guidelines for notes will be demonstrated. Colour / shade will be added.</p>				

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<p><b>Stage Nine:</b> When all the bridge structures are constructed they will be tested using weights. Pupils will work in groups and the results will be recorded in a table. This table will be presented carefully using the usual title block and borderline. Alongside the original table the pupils will paste a spreadsheet version of the same data or complete a pictogram.</p>	<p>N. Completed bridges tested with weights and statistics collected in the form of a data table. ICT. Pupils spreadsheet table of results. C. Pupils determined the best bridge based on a test criteria for impartiality. HWK. Complete table presentation</p>	<p>List improvements that could be made to the bridge.</p>	<p>Computers and spreadsheet software. Weights and testing rigs.</p>	<p>CONTROL MEASURE Teacher to lift place small weights in position. Weights far below lifting limits.</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>
<p><b>Stage Ten:</b> The pupils will design a style of writing to depict different types of structures. For example, a suspension bridge could be represented by suspending each letter from a cable, an arch bridge may be represented by each letter fitting inside stones that make up an arch. The pupils will be shown some simple examples and rough out four representations. On a second piece of paper the pupils will present their drawings accurately, with colour.</p>	<p>L. Key words relating to bridges / structures discussed. N. Size of lettering and used of accurate guidelines. ICT. Pupils can use one style based on WP / graphics/ DTP package. C. Use of symbols in society. HWK. Complete design sheet. LESSON STARTER: Pupils look at a sample of writing styles and explain when each one may be used - ie 'Glacier' and 'Times Roman'.</p>	<p>Collect a range of examples of logos and symbols. And carefully present them.</p> <p>LESSON STARTER CONT.. Five minute exercise. Pupils draw two styles of writing , eg. 'horror', 'flame', 'happy', 'sad' etc... Pupils go round class and place tick alongside one they like.</p>	<p>Lettering Books. Computers / for selection of fonts</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>
<p><b>Stage Eleven:</b> Technology and other cultures. The pupils will be introduced to the fact that ancient cultures such as the Chinese Dynasties of 2500 years ago - were technologically advanced. The pupils will use the intranet site to investigate the Great Wall of China. They will draw a simplified map of China, showing the extent of the Great Wall. They will be shown a video of aspects of the Great Wall. They will use the internet to collect research regarding its history and construction. The pupils will also study the Terra-cotta Army</p>	<p>C. The way technology is linked to culture. How technology supports culture. Cross-cultural technology. L. Pupils view video of Great Wall of China and complete written work. ICT + HWK. Pupils collect research on Great Wall and present the information</p>	<p>Select one other aspect of Chinese history that shows how technology was used ie. The Terra-cotta Army.</p>	<p>Internet site (structures section) used where necessary. Video footage of China</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>
<p><b>Stage Twelve:</b> Technology and other cultures. The pupils will be introduced to the ancient culture surrounding Petra (Jordan) - The technological prowess of the Nabataei people will be discussed . The pupils will use the intranet site to investigate this famous archaeological site. They will draw a simplified map of Jordan, showing the location of Petra and watch a video regarding the site. They will use the internet to collect research regarding its history and construction.</p>	<p>C. The way technology is linked to culture. How technology supports culture. Cross-cultural technology. L. Pupils view video of Petra, Jordan and complete written work. ICT + HWK. Pupils collect research on Petra and present the information</p>	<p>Select one other aspect of history from the Middle East that shows how technology was used ie. The building of the Great Pyramids.</p>	<p>Internet site (structures section) used where necessary. Video on Petra.</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>

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<p><b>Stage Thirteen:</b> The pupils will be introduced to the environmental consequences of building large structures. Pupils will be asked to list large structures around the world. A discussion regarding the materials used to build such structures will be held. How the mining, quarrying, processing and processing of these materials affects the environment will be considered. The pupils will then produce a rich picture regarding positive and negative aspects of building structures. Key words/phrases will be discussed with the pupils.</p>	<p>C. The environment as an important issue to all citizens.  L. Develop a key word rich picture.  ICT. Pupils can present the work through use of software.  N. Figures on pollution and electricity generation discussed.  HWK. Complete rich picture.</p>	<p>List advantages and disadvantages to the environment of building a bridge.</p>	<p>Environment worksheets / information sheets.  Intranet connection to the technology site (structures).</p>	<p>CONTROL MEASURE   CLEAPPS REF.   RESIDUAL RISK</p>
<p>Stage Fourteen: The pupils will undertake an exercise in which they determine the location of a new bridge in Dublin, Eire. They will be shown two maps of the city, the first a full map and the second a zoom in map.</p> <ol style="list-style-type: none"> <li>1. They will determine the location.</li> <li>2. They will design a suitable bridge.</li> <li>3. Produce a leaflet promoting the bridge to tourists.</li> </ol>	<p>C. The need to reduce traffic congestion and the right of the individual to be involved in decision making.  L. Map reading and the production of a topological/simplified map. Emphasis placed on who will use the map.  ICT. Production of a topological map / leaflet using graphics software.  N. Map scales will be discussed.  HWK. Complete the leaflet.</p>	<p>Draw a topological map of the school labelling classrooms and other facilities.</p>	<p>Graphics software.  Maps.  Internet  Drawing and writing materials.</p>	<p>CONTROL MEASURE   CLEAPPS REF.   RESIDUAL RISK</p>
				<p>CONTROL MEASURE   CLEAPPS REF.   RESIDUAL RISK</p>

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<p>ADDITIONAL/REPLACEMENT STAGE: Pupils to search the internet for information on the Eiffel Tower.</p> <p>Some guidance given regarding websites to be searched. Pupils asked to look for good sites and to inform the class.</p> <p>Pupils to complete the worksheet, answering questions on Eiffel Tower. Answers discussed with class.</p> <p>Pupils to design two towers, using second worksheet. Pupils search the internet for famous towers, for ideas.</p>	<p>L. Key words relating to Eiffel Tower and structures.</p> <p>C. Understanding of National pride as a reason behind building advanced structures. Person pride in our work discussed.</p> <p>ICT. Search of websites and discussion of suitable sites.</p> <p>N. Weight of Eiffel Tower and other vital statistics investigated and discussed.</p> <p>HWK. Complete worksheets.</p>	<p>Pupils to collect images and text regarding famous structures. Present these on A4 paper using ICT.</p>	<p>Internet access. Computer suite. Basic drawing and writing equipment.</p>	<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>
<p>ADDITIONAL/REPLACEMENT STAGE: Pupils to show the difference between a triangular and a square based structure using straws. Each pupil builds a triangle and square structure and tests it.</p> <p>Draw the triangle (100mm sides) and square (80mm sides) using drawing equipment and accurate measurements. Bend straws around the shapes and secure with sellotape.</p> <p>Draw accurately a tower based on triangulated shapes, using traditional drawing equipment. Add flags and banners. Construct tower with straws and mark on basis of aesthetics and accuracy.</p>	<p>L. Key words such as triangulation discussed.</p> <p>N. Accurate drawing, measuring and cutting.</p> <p>ICT. Possibility of internet research. Use of WP / DTP / Graphics for flags and banners.</p> <p>HWK. Complete structure during lesson but complete decorative additions at home</p>	<p>Pupils to build a structure at home</p>	<p>Art Straws. Scissors and sellotape. Drawing and writing equipment. ICT access.</p>	<p>CONTROL MEASURE Demonstration—use of scissors</p> <p>CLEAPPS REF. 1.068</p> <p>RESIDUAL RISK Low</p>
				<p>CONTROL MEASURE</p> <p>CLEAPPS REF.</p> <p>RESIDUAL RISK</p>