YEAR 9	SUBJECT : DT	TITLE: CLOCK DESIGN
OBJECTIVE: The pupils will have a good understanding of the design process and the tools and equipment used in general workshop manufacture.		

STAGE	ADDITIONAL SKILLS	EXTENSION WORK	RESOURCES	H&S
Stage 1: The pupils will be shown a number of clocks and asked to name their favourite. A PowerPoint of existing unusual clocks will be shown. Each design will be discussed in detail with reference to the materials used and the style of design. The pupils will write a list of words / phrases connected to TIME. These will be discussed. The concept of rich picture will be introduced. Examples will be shown and discussed in particular its role in the design process. The pupils will produce a rough version of the rich picture.	C. The role of time in our lives, in the workplace, school and at home. Best productive use of time will be emphasized. L. Key words related to TIME listed and discussed. ICT. Pupils will be encouraged to use ICT to gather research for there clock project. HWK. Complete a well presented version of the rich picture. N. Understanding of minutes, hours etc… and time in general	Collect information relating to clock design. Pictures of clocks manufactured I the past.	General drawing and writing equipment. ICT - use of the computer network for research. PowerPoint of sample clocks.	CONTROL MEASURE CLEAPPS REF. RESIDUAL RISK
Stage 2: Working in groups, the pupils will be shown a number of clocks from the past (on card). They will be asked to arrange them in chronological order. They will be asked to justify their order. They will be shown a PowerPoint of the history of clocks. Pupils will then be shown examples of coversheets for the project. They will produce a rough layout for the clock project for the coversheet and move onto drawing the final sheet.	C. Understanding of the role history plays in the development of products. Understanding of how time is perceived by other cultures. L. Names of historical clocks emphasized. ICT. Use of PowerPoint an website to show and explain the history of clocks. HWK. Complete the coversheet for the clock project. N. Chronological order and dates.	Produce a chart that represents the history of clocks. This can be a flow chart or sequence drawing. Clipart or drawings or a combination can be used.	General drawing and writing equipment. ICT - use of the computer network for research. PowerPoint of history of clocks.	CONTROL MEASURE CLEAPPS REF. RESIDUAL RISK
Stage 3. Sundials. A recap of the history of clocks. Emphasis will be placed on sundials and various designs from history. A demonstration of the way sundials work and there relationship to North and the position of the sun. Latitude and longitude will be discussed. The pupils will manufacture a card sundial and test it weather permitting. Graphics will be added to the dial	C. Understanding that devices such as sundials have been used by many cultures from the Chinese to English. An understanding that time is important to all of us regardless of culture. L. Keywords such as longitude and latitude introduced. ICT. Facilities allowing, the pupils can place their computer aided designs on the card template. HWK. Design own card sundial and make simple model version.	Collect images of a range of sundials from different cultures. Explain how they work.	General drawing and writing equipment. ICT - use of the computer network for research. Powerpoint of history of clocks and sundials.	CONTROL MEASURE Teacher Instruction CLEAPPS REF. 1.0678 Scissors RESIDUAL RISK Low

STAGE	ADDITIONAL SKILLS	EXTENSION WORK	RESOURCES	H&S
Stage 4: The pupils will start to manufacture a sundial from materials such as MDF and Perspex. They will be shown how to mark out the materials accurately. They will be shown how the file perspex and the use of the buffing machine. Through and draw filing and the use of wet and dry paper will be discussed. Safety will be emphasized.	L: keywords in relation to equipment and tools will be introduced. C. Health and safety emphasized at all stages of manufacture. N. Measuring and marking out techniques demonstrated as well as units of measurement.	Collect images and pictures of the tools used during the practical lesson and explain their use.	Workshop facility. General tools and equipment including files, vices and wet and dry paper.	CONTROL MEASURE Teacher instruction Direct supervision CLEAPPS REF. 1.042 Hazards of plastics 1.066 Handsaws and files 1.049 Polishers RESIDUAL RISK Low
Stage 5: The pupils will be shown how to use a drilling machine for the drilling of the Perspex and the use of a forsner bit in the manufacture of the joint for the handle. The use of jigs to locate multiple holes. Marking out and cutting the handle joint will be demonstrated. Pupils will drill the four corners of the Perspex and cut handle joints.	L. Keywords in relation to the manufacturing will be introduced. C. Safe working practice and cooperation with others emphasized during the lesson. N. Careful measuring and marking out. Sizes of drills and accurate positioning. ICT. Use of CNC operation and batch production, facilities allowing.	Draw the drilling machine and explain its use in context of the manufacturing processes attempted during the project so far.	Workshop facility. General tools and equipment including files, vices and wet and dry paper. Drilling machine and a range of drilling bits. Appropriate jigs manufactured and used. CNC equipment, equipment allowing.	CONTROL MEASURE Teacher instruction Direct supervision CLEAPPS REF. 1.031 Drilling machine 1.066 Handsaws and files 1.062 Sanding Disk RESIDUAL RISK Low
Stage 6: Explanation of sequence drawings and their use. Bad and good examples explained. The use of glues and fixing of the MDF base to the pine handle demonstrated. The drilling of the blind hole for the compass and larger hole for the gnomon demonstrated. Safety emphasized at all times. The pupils produce a sequence drawing of the manufacturing process so far.	L. Keywords in relation to the manufacturing process. Keywords used during production of sequence drawing. C. Following simple instructions and health and safety - safe wellbeing. N. Use of jigs for accurate drilling and manufacture. Measuring to check accuracy. ICT. Use of CNC operation and batch production, facilities allowing. HWK. Complete sequence drawing with notes.	Collect a selection of instruction drawings / sequence drawings fro the internet. Select one good example and one poor example and explain your choice.	Workshop facility. General tools and equipment including files, vices and wet and dry paper. Drilling machine and a range of drilling bits. Appropriate jigs manufactured and used. CNC equipment, equipment allowing.	CONTROL MEASURE Teacher instruction Direct supervision CLEAPPS REF. 1.009 PVA 1.031 Drilling Machine RESIDUAL RISK Low

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Stage 7. The pupils will be shown how to complete the scale by adding appropriate graphics. Assembly of the manufactured item. The term Quality Control will be explained and demonstrated. Quality Control at every stage of manufacture. The pupils will draw up a list of quality checks for a final Quality control sheet. The pupils will check their own dial and that of one other pupil. They will follow an agreed criteria and mark each others work.	L. Quality control keywords introduced and quality control carried out. C. Understanding of quality in relation to market place and customers. Customer rights discussed. Standards that consumers expect. HWK. Complete the quality Control sheet with careful presentation. N. Marking to a number and converting to a grade. ICT. Use of ICT for the presentation of the quality control sheet - facilities allowing.	Explain the difference between quality control and quality assurance.	Workshop facility. General tools and equipment including files, vices and wet and dry paper. Drilling machine and a range of drilling bits. Appropriate jigs manufactured and used.	CONTROL MEASURE Teacher instruction CLEAPPS REF. 1.059 hand tools RESIDUAL RISK Low
Stage 8. The pupils will be shown a range of designs for clocks, some historical and others modern and unusual. The type of materials available for the project will also be shown. The properties and the materials will be explained in terms of durability, toughness, strength etc.… This will be explained by use of animations. The pupils will start designing their own clock. They will produce four rough designs with detailed notes.	L. New words in relation to the properties of materials introduced. C. Look at the designs of others and critically analyse each one. N. Sizes and proportion for the clock design discussed. HWK. Complete the four rough designs and notes.	Design a further two clocks with detailed notes.	General drawing and designing equipment. PowerPoint of sample clocks. Animations of properties of materials. Range of materials.	CONTROL MEASURE CLEAPPS REF. RESIDUAL RISK
Stage 9. The pupils will produce an accurate presentation of their clock designs. Each pupil will be asked to select their best design. They will justify their selection in terms of the style, choice of materials, overall size and overall effectiveness. They will draw a front, side and where appropriate a plan view of their clock. Dimensions will be added.	N. Use of accurate measurements and scale for orthographic drawing. L. Words relating to orthographic drawing such as ‘dimensions’ introduced. ICT. Use of Google Sketchup to demonstrate orthographic drawing. HWK. Complete orthographic drawing.	Draw an orthographic drawing of another clock design.	General drawing and designing equipment. PowerPoint of orthographic projection. Animation of orthographic projection..	CONTROL MEASURE CLEAPPS REF. RESIDUAL RISK

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Stage 10: Start manufacturing. The pupils will manufacture their designs. Safety will be emphasised at all times	L. Pupils follow written and verbal instructions at all times. Pupils will demonstrate a machine ie. A fretsaw to the whole class. N. Care taken over measuring and cutting accurately ICT. Sequence drawing produced by pupils using DTP software. HWK. Complete ate least one stage of a sequence drawing, each week, during manufacture.	Attend workshop sessions to complete a model of the clock.	Workshop facility. General tools and equipment including files, vices and wet and dry paper. Drilling machine and a range of drilling bits. Appropriate jigs manufactured and used. CNC equipment, equipment allowing.	CONTROL MEASURE Teacher supervision Teacher instruction CLEAPPS REF. 1.059 Hand tools 1.066 Hand saws 1.001 Adhesives 1.031 Drilling 1.067 Fretsaws 1.049 Polishers RESIDUAL RISK Low