



Year 7 Design & Technology RM Scheme of Learning Moving Toy & CAD/CAM

Year 1– (2 Terms - On Rotation)

Intent – Rationale

Students should: have an understanding of Health and Safety in the workshop; have a basic understanding of where different woods come from and how it is sourced from trees; understand categories of woods and how boards are made from wood.; understand how to use the workshop equipment safely; make different types of wood joint; understand how to develop a design brief; basic research into a theme with key word annotation; write a basic design brief using technical terminology; complete a design and make a finished product that fulfills the brief; document the making of the product step by step with simple diagrams; evaluate a product against the design specification identifying areas to improve; Understand how CAD can be used as a tool for designing, developing and presenting; understand how products can be made utilizing the principles of CAD/CAM

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
<p>Depending on the rotation a mixed level of understanding Later rotations benefit from seeing the designing and making process in another material area</p> <ul style="list-style-type: none"> Developing from any previous projects in KS2 Building on from Health and Safety in Food Tech and Resistant Materials from rotations 2 and 3. 	<ul style="list-style-type: none"> The strategy for designing and making an outcome How to present design idea and formulate them into a making plan Safe use of the workshop equipment for the production of an outcome How to use both hand tools and power tools to change materials How to use CAD as a designing tool How to use CAD to refine an item to make it suitable for making How to use CAD/CAM
What are the links with other subjects in the curriculum?	What are the links to SMSC, British Values and Careers?
<ul style="list-style-type: none"> Physics Structures, Motion Maths – Measurements and calculations, scale. Art – Stencils and printing 	<ul style="list-style-type: none"> Differentiation (GB3) Problem solving; independence; resilience; encouraging creativity; communication skills; confidence; organisation (GB4, SP, SO, C) Assessment for learning (GB8) Routine and structure (M)
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	What are the opportunities for developing mathematical skills?
<ul style="list-style-type: none"> Independent research Written instructions Subject specific vocabulary <p>FROM THE LIBRARY <i>Introduction to Woodwork</i>; Colin Holkham-684 <i>History of Toys and Games</i>; P. Crisp-688 <i>The Influence of Design and Technology on Everyday Life</i>; J. Gaff-909 <i>Cad/Cam Constructions</i>; S. Aikin-620</p>	<ul style="list-style-type: none"> Applying measuring skills for accurate making Unit conversions Scale and ratio within their making plans Geometric understanding.



Year 7 Design & Technology RM Scheme of Learning

Year 1– Term 6 (2 Terms - On Rotation)

Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?	
<p><u>Know</u> Students will need to understand: - Workshop safety – safe working practices and protective equipment; How natural wood is sourced and seasoned; The different categories of wood (Hardwoods & Softwoods); How different boards can be produced from wood; How wood can be used as a resistant material to make products; Different methods of joining wood and why this is necessary How to make frames using wood joints; How to present unique design ideas; That different cams can be used to convert different motion; How CAD can be used to create/refine design work; How CAD/CAM can be used to create outcomes; How CAD can be used for both 2D & 3D drawing</p> <p><u>Apply</u> Use a variety of power tools and hand tools in a safe and productive way. (Base material -Wood); Work with wood to produce different types of wood joints; Design and make an individual product using a range of wood based skills and techniques; Use cams to convert different types of motion to create a desired effect; Learn through the designing and making process to adapt and modify an outcome; Use CAD create and refine design ideas; Use CAD as a method of 2D and 3D presentation; Use CAD/CAM to produce a unique outcome (CAD & Laser Cutter)</p> <p><u>Extend</u> Understand how CAD/CAM can be used to produce a 3D item</p>	
What subject specific language will be used and developed in this topic?	What opportunities are available for assessing the progress of students?
<ul style="list-style-type: none"> • Hazard – a danger or risk • Risk – a situation involving exposure to danger • Risk assessment - a systematic process of evaluating the potential risks that may be involved in a projected activity or undertaking. • Risk control – a means of limiting the risk, including the use of PPE • Steel Rulers – use as an accurate measuring method • Specific names for hand tools. Cutting tools and Marking out tools • Specific names for power tools. Scroll Saw, Pillar Drill, Belt Sander. • CAD – Computer Aided Design • CAM – Computer Aided Manufacturing • CAD/CAM – For making products from drawing to outcome. • Annotation - a note by way of explanation or comment added to a text or diagram. 	<p>Outcomes & Key work for assessment: Full design & make of main outcome – moving toy Second outcome produced using CAD/CAM Regular marking of classwork Mid Project Review Tracking points.</p> <ul style="list-style-type: none"> • Final Assessment of completed project.



KESTEVEN AND SLEAFORD HIGH SCHOOL



Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
1.WORKSHOP INTRODUCTION & SAFETY Students must understand workshop safety rules Introduction to the use of wood as a material. Set books up using headers	Introduction to RM and Workshop Safety use of tools and equipment and PPE responsibilities	Production of rules for safe working by understanding the process of risk assessment, being able to select suitable equipment for the task.	Review of the tools & equipment to be used. Clear definitions of their contribution to workshop safety Workshop Safety Sheet, Aprons, Space, Hair Ties
2.WOOD AS A RESISTANT MATERIAL MAKING WOOD JOINTS	Students should understand wood as a material, Softwood, Hardwood & manufactured boards. Students should understand the process of marking out of wood joints. (Comb Joint & Lap Joint) Show all joint example (Comb, Lap, Mitre & Dowel)	Students working independently to demonstrate the marking out of chosen joint, working from independent notes.	Check safety sheet is mounted in book and initialled by the student and understood. Wood Sheet is issued as a homework. (detail on reverse) Give rationale and demonstrate the Marking out of wood joints. (Comb Joint & Lap Joint) Show all joint example (Comb, Lap, Mitre & Dowel) Show examples
3.MAKING TWO DIFFERENT WOOD JOINTS Issue materials & students make 2 joints	Students learn how to make wood joints. (Comb & Lap)	Students use own notes and those provided by teacher to independently produce joints	Issue and explain the use of softwood. Reminder of marking out techniques. Demonstrate use of scroll saws for Comb Joint. Demonstrate use of Bench hook, Tenon Saw & Chisel for lap joint
4.MAKING TWO DIFFERENT WOOD JOINTS Issue materials & students make 2 joints	Students learn how to make wood joints. (Comb & Lap)	Students use own notes and those provided by teacher to independently produce joints	Reminder of use of scroll saws for Comb Joint. Reminder of use of Bench hook, Tenon Saw & Chisel for lap joint
5.MAKING TWO DIFFERENT WOOD JOINTS Issue materials & students make 2 joints	Students learn how to make wood joints. (Comb & Lap)	Students use own notes and those provided by teacher to independently produce joints	Reminder of use of scroll saws for Comb Joint. Reminder of use of Bench hook, Tenon Saw & Chisel for lap joint
6.Introduce Mech Toy project	Students learn how cams work by using models	Students can demonstrate knowledge applied to real life examples of cams, share with the group	Cam models. Use of cams to demonstrate how rotary motion is converted in to reciprocating motion
7.Start Design stage of moving toy	Students learn how to use themes to generate different design ideas	Students work independently to investigate a range of themes	Demonstrate how to use different themes to start the generation of different ideas
8.Presenting design ideas	Students learn how to present design ideas for the moving toy project	Students apply their understanding to the Design work, which is annotated and well presented in colour.	Students are taught through demonstration of how to present their different designs showing both aesthetic and functional features HWK : complete design work
10. Introduction to CAD for CAD/CAM	Students learn how to use the CAD software TECHSOFT2D Design. Students use software for basic design	Students apply their K&U to develop more complex designs.	Demonstration of the use of CAD:- Drawing different shapes. Importing images and turning them in to engraving/outlines.
11. Start making the moving toy model	Students learn how to use their skills in wood to make the frame for the moving toy	Students demonstrate independence in produce an accurate frame	Demonstrate how the tools and techniques can be used for the making of the moving toy
12. Making the moving toy	Students learn how to use their skills in wood to make the frame for the moving toy	Students demonstrate independence in produce an accurate frame	Demonstrate how the tools and techniques can be used for the making of the moving toy
13.Using CAD for 3D presentation drawings / Diary of make	Students learn how to use CAD software to produce 3D pictorial drawings. Students develop understanding of the importance of a Diary of Make as a reflective tool	Students produce challenging 3D pictorial drawings. Students set out a template for producing their own diary of make.	Demonstrate how to use the CAD software to produce 3D drawings of their practice joints Hwk: Ss to use computers to set out template for Diary of make.

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15. Making the moving toy	Students learn & apply their skills in wood to make the frame for the moving toy	Independently and accurately apply their knowledge & skills to making the frame for the moving toy	Ss: using preidentified materials to make and construct moving toy. Working alongside designs already created.
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18. Making the moving toy	Students learn & apply their skills in wood to make the frame for the moving toy	Independently and accurately apply their knowledge & skills to making the frame for the moving toy	Ss: using preidentified materials to make and construct moving toy. Working alongside designs already created.
19. Making the moving toy	Students learn & apply their skills in wood to make the frame for the moving toy	Independently and accurately apply their knowledge & skills to making the frame for the moving toy	Ss: using preidentified materials to make and construct moving toy. Working alongside designs already created.
20. Evaluation of the outcome	Referring to their design criteria students learn how to evaluate an outcome. Identifying areas for further development	Students will evaluate their moving toy referring to the original brief. Identifying areas for further development and showing justification	T led: demonstrate an effective evaluation through exemplar work. Ss to produce independent evaluation using the product and specification
Extension Task: Produce an acrylic outcome using CAD/CAM	Students use the CAD software to produce a keyring design	Students use the CAD software to produce an original design for a key ring design, whilst identifying the target market.	Ss: using prior learning, design a keyring on an alternative material (Acrylic)
Produce an acrylic outcome using CAD/CAM	Students learn how CAD and CAD/CAM works in the production of an acrylic key ring	Students identify with the properties of acrylic and the function of the laser cutter in the production of this product	Ss: (technician support requires) produce a product to demonstrate and consolidate their knowledge and understanding.