Key Stage 3 Curriculum

Product Design

In Year 7 Students will study:

THE WINSFORD ACADEMY

Term 1	Term 2	Term 3
Baseline test **Essential Design Technology skills and knowledge:** **Drawing in 3D** **Rendering** **Dimensioning** **Product Analysis** **Design Process** **Green issues** **This** project refines the fundamental elements of product design that are touched upon at KS2 and introduces pupils to a coherent design process that will be refined and built upon in project throughout KS3. identify current level of prior knowledge from Key stage 2 and provide differentiated tasks to support knowledge gaps and to introduce the process of design, manufacture and evaluation of a product, set in a real-world context. To introduce basic manufacturing techniques of commercial products and to experience first-hand working in a workshop environment.	**Progress test** **Designing to a brief** **Target Markets** **Levels of production** **Writing a design specification** **Material sources** This project is designed to embed the design, making and risk management process and build upon the skills developed within **the key fob project,** using different materials, allowing the students to work more independently in the workshop To provide opportunities to deepen understanding and application of designing, making and evaluation. To provide opportunities to apply knowledge of processes in practical lessons that support real life risk management and encourage pupils to become independent learners. To introduce the students to sustainability and the need for resource management. To discuss ethical design and designing for diversity.	**Summative Test** **Manufacturing consideration** **Material properties** **Tools and Equipment** **Workshop safety in practise** **Writing a product evaluation** This project is designed to develop student's confidence in manufacture. To provide opportunities to make, refine and finish a product. To introduce CAD/ CAM To allow students to evaluate and improve on their product.

<table>
<tr><td>Homework
What Homework you will have set</td><td colspan="2">Knowledge retention quizzes
Personalised homework's to address misconceptions after base line testing
Health and safety
Adhesives
Man-made v hand made</td></tr>
<tr><td>Wider Curriculum Offer</td><td colspan="2">Cultural Capital
Environmental issues relating to use of fossil fuels within the manufacture of plastics.
Cross Curricular links:
Science
Mathematic
Geography

SMSC and British Values
• Designing for diversity.</td></tr>
<tr><td>Assessment</td><td>1.Progress / knowledge retention test /quiz
Deep marking
Areas of testing:
Knowledge
• Product Analysis
• Recycling symbols
Skill
• Application of pencil rendering techniques
• Connecting target market needs to product specifications

2. Health and Safety
Areas of testing:</td><td>Manufacture of a product based on a specific design brief
Areas of testing:
Knowledge
• Identifying differences between thermo forming and thermo set polymers and their environmental impact
• Identifying the key components used in the manufacture of plastics and the geological formation of oil and gas.
• Use of Solvents in the workshop, (CoSHH) and how to laminate.
• How to deconstruct a brief and write an appropriate specification and consider ergonomics in product design
• Manufacture/use of hand tools
• Correct sequence of events for manufacturing process's
• Target market needs
• Designing to develop diversity (
• Designing for Pride)
Skill
• Application of appropriate graphical rendering techniques.
• Selection of appropriate materials according to manufacturing specification
• To critique, evaluate and test ideas appropriately
• Use of hand tools according to risk management and intended design
• Being able to manage time effectively
• To identify quality when manufacturing a product
Careers links
• Jewellery designer
• Purchasing manager
• Materials engineer</td></tr>
</table>

	Knowledge • Retention of information relating to risk management • PPE *Skill* • To select and apply appropriate control measures according to risk	

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In Year 8 Students will study:

Term 1	Term 2	Term 3

Grapic Equipment and presentation techniques **Design Process** **Material properties , uses, sources and construction methods** **CoSHH** This project builds upon the foundations of the iterative design process of year 7 and will be developed further in year 9 whilst introducing a range of new materials such as Timber and Manufactured boards.	**Progress test** **Designing to a brief** **Writing a design specification** **Simple Mechanisms** This project is designed to embed the design, making and risk management process and build upon the skills developed within **the key fob project,** using different materials, allowing the students to work more independently and accurately in the workshop. The Health and Safety element is embedded in lesson practice and accuracy in manufacture is explored- including the use of tolerance. To provide opportunities to apply knowledge of processes in practical lessons that support real life risk management and encourage pupils to become independent learners. To develop student knowledge on renewable sources of materials and local industry.	**Summative Test** **Tools and Equipment** **Work shop safety in practise** **Planning for manufacture** **Writing a product evaluation** This project is designed to develop student's confidence in manufacture. To provide opportunities to make, refine and finish a product. To look at product safety and consumer led briefs. Market Push/ Technology Pull. To allow students to evaluate and improve on their product. Accurately measure, mark out, cut and waste material. High quality finishes produced.

<table>
<tr><td>Homework
What Homework you will have set</td><td colspan="2">Knowledge retention quizzes
Personalised homework's to address misconceptions after testing
Health and safety
Types of wood knowledge organiser</td></tr>
<tr><td>Wider Curriculum Offer</td><td colspan="2">Cultural Capital
Local Industry

Careers
Joiner
Wood machinist
Furniture maker
Graphic designer

SMSC and British Values
• Designing for diversity and ethical choices.</td></tr>
<tr><td>Assessment</td><td>1. Health and Safety Unit
Areas of testing:
Knowledge
• Retention of information relating to risk management
Skill
• To identify risk effectively
• To select and apply appropriate control measures according to risk
2. Design of a artifact :

Areas of testing:
Knowledge
• Design brief and specification connection
• ACCESS FM-
• Properties and types of wood: hard/soft/engineered
• Anthropometrics
• Ergonomics
• Isometric drawing uses
Skill
• Deconstruction of a brief
• Analysis of a specification
• Project costing
• Product analysis
• Accurate use of isometric drawing
• Applying the acronym ACCESS FM to product design
• Using the acronym SCARED to develop an idea</td><td>Manufacture of a product based on a specific design brief
Areas of testing:
Knowledge
• Identifying differences between hard woods, soft woods and manufactured boards being able to discuss their environmental impact
• Link local industry and environment to the topic
• Identifying the use of mm and m in British standards
• Use of paints, stains and varnishes, (CoSHH) and how to apply.
• How to deconstruct a brief and write an appropriate specification
• Manufacture/use of hand tools and marking out equipment
• Correct sequence of events for manufacturing process's
• Client needs

Skill
• Application of appropriate graphical drawing and rendering techniques.
• Selection of appropriate materials according to manufacturing specification
• To critique, evaluate and test ideas appropriately
• Use of hand tools / CAD/CAM according to risk management and intended design
• Being able to manage time effectively
• To self- direct and problem solve
• To work in tolerance
• To identify quality when manufacturing a product</td></tr>
</table>

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In Year 9 Students will study:

Term 1	Term 2	Term 3
The following aspects of the project will be introduced in year 7, and then expanded in year 8 and will covered in more depth in year 9: mind maps, influence research, product analysis, rendering, isometric drawing, design ideas, development, plan of making, evaluation. **Material properties , uses, sources and working characteristics**	**Progress test** **Designing to a brief** **Writing a detailed design specification for a specific target market**	**Summative Test** **Tools and Equipment** **Work shop safety in practise** **Planning for manufacture – Quality control/ Quality assurance** **Writing a product evaluation to include testing and client feedback** To enable pupils to develop their practical skills. To increase awareness of health and safety in a potentially dangerous area. To develop knowledge and understanding of materials, tools, machinery and processes.

<table>
<tr><td>Homework
What Homework you will have set</td><td colspan="2">Use of graphical mood boards
Knowledge retention quizzes
Wood characteristics
Manmade v mass produced
Product analysis</td></tr>
<tr><td>Wider Curriculum Offer</td><td colspan="2">Cultural Capital
Sustainability and ethical manufacture
Careers links
Product Designer
Machinists and Tool and Die Maker

SMSC and British Values
Ethical manufacture and design
Cross curricular links
Mathematics
Geography</td></tr>
<tr><td>Assessment</td><td>Areas of testing:
2. Design of a artifact- Mechanical Toy
Areas of testing:
Knowledge
• Design brief and specification connection
• ACCESS FM-
• Properties and types of wood: hard/soft/engineered
• Types of motion: Linear Motion/Rotation Motion/ Reciprocal Motion/Oscillating Motion
• Displacement graphs
• Leonardo da Vinci’s Cam hammer design
• CNC machining- Computer Numerical Control
• Anthropometrics
• Ergonomics
• Isometric drawing uses
• Orthographic projection uses
Skill
• Deconstruction of a brief
• Product analysis
• Accurate application of orthographic projection- first and third angle</td><td>1. Manufacture of a artifact- Mechanical Toy
Areas of testing:
Knowledge
• Health and safety with a focus on woodwork.
• Marking out techniques, the use of templates and accuracy.
• Understanding of wood & wood joints, joining techniques and materials.
• Gain knowledge or the working characteristics and properties of a range of different woods.
• Control systems.
• Different styles of motion.
• Differences between manufactured board, hardwood and softwood and its relationship to environmental concerns.
• Graphs

Skill
• Marking out.
• Cutting wood.
• Shaping wood.
• Using machinery and hand tools.
• Joining wood.
• Finishing wood to a high standard
• Using components
• Plotting and interpreting graphs to predict movement of a cam

Knowledge
• ACCESS FM

2.Progress Test.
• Woods
• Control measures/risk assessments and Health and safety signs</td></tr>
</table>

	• Accurate use of isometric drawing • How to predict the movement of a cam using displacement graphs • Applying the acronym ACCESS FM to product design • Using the acronym SCARED to develop an idea **3. Designing Test** • Design brief and specification connection • ACCESS FM- • Properties and types of wood: hard/soft/engineered • Types of motion: **Linear** Motion/**Rotation** Motion/ **Reciprocal** Motion/**Oscillating** Motion • Isometric drawing	• Wood joints • Hand tool usage • ACESSFM • Specification • Brief deconstruction • Anthropometrics • Ergonomics • Isometric drawing uses • Orthographic projection uses • Uses of CAD/CAM