Dallam School
Curriculum Overview

Department: Design and Technology
Year Group: 10

AUTUMN/WINTER		SPRING		SUMMER	
Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Theme / Topic **Materials and their working properties** ***Specialist technical principles – Timber*** ***Materials and their working properties: Timbers and Polymers*** ***Selection of Materials and components*** ***Mock NEA – Bottle Opener***		**Theme / Topic** **Common Specialist Technical Principles** **Practical: Architectural Challenge**		**Theme / Topic** **Energy Materials, systems and devices**	**Theme / Topic** **June 1st: NEA CONTEXTS RELEASED**
By the end of this half term pupils will know *(key knowledge, including tier 3 vocabulary)*					
Materials and their working properties: *Timbers* *Polymers* *Specialist technical principles – Timber* • *Timber Sources and Origins* *Selection of Materials and components:* Tolerances Material management Specialist tools & equipment Specialist techniques and processes ***Tier 3 vocab*** ➢ *Felling* ➢ *Seasoning* ➢ *Kiln* ➢ *Thermoforming* ➢ *Thermosetting* ➢ *Bioplastics* ➢ *Crude oil* ➢ *Blow moulding* ➢ *Extrusion* ➢ *Injection moulding* ➢ *Vacuum forming* ➢ *Softwood* ➢ *Hardwood* ➢ *Manufactured boards* ➢ *Forestry Stewardship Council*		Forces and Stresses Improving Functionality Ecological and Social footprint The 6 R's Scales of Production People, Culture and Society Enterprise **Tier 3 vocab:** ➢ *Tension* ➢ *Compression* ➢ *Torsion* ➢ *Bending* ➢ *Shear* ➢ *Greenhouse gases* ➢ *Product Miles* ➢ *Carbon Footprint* ➢ *Deforestation* ➢ *Milling* ➢ *Drilling* ➢ *Batch Production* ➢ *Continuous Production* ➢ *Mass Production* ➢ *One-off Production* ➢ *Just in time* ➢ *Technology Push* ➢ *Market pull* ➢ *Planned Obsolescence* ➢ *Inclusive design*		Modern materials Smart Materials Composite materials and technical textiles Systems approach to designing Electronic systems processing Designers Companies ***Tier 3 vocab*** ➢ *Stimuli* ➢ *Phosphorescent* ➢ *Thermochromic* ➢ *Permeable* ➢ *Shape Memory Alloy* ➢ *Digital* ➢ *Analogue* ➢ *Potential energy* ➢ *Kinetic energy* ➢ *Fossil fuels* ➢ *Fracking* ➢ *Photovoltaic cells* ➢ *Tidal power* ➢ *Hydropower* ➢ *Biomass* ➢ *Nuclear power*	Students are making progress on the research section of the NEA component of the course. *Mechanical Device* *Systems Approach to Design* *Anthropometrics* *Ergonomics* *Mathematics in technology* ***Tier 3 vocab*** ➢ *Researching design possibilities* ➢ *Product Analysis* ➢ *Client Profile* ➢ *Target market research* ➢ *Cams* ➢ *Followers* ➢ *Linkages* ➢ *Linear* ➢ *Reciprocating* ➢ *Oscillating* ➢ *Rotary* ➢ *Input* ➢ *Process* ➢ *Output* ➢ *5-95th percentile*

➢ *Stock forms*	➢ *Cultural design* ➢ *Primary* ➢ *Secondary* ➢ *Research and Development* ➢ *Life cycle* ➢ *Sustainability* ➢ *Finite* ➢ *Non-finite* ➢ *Virtual marketing* ➢ *Advertising* ➢ *Reliability* ➢ *Planned obsolescence* ➢ *Collaborative design* ➢ *User-centered design*		➢ *Input* ➢ *Process* ➢ *Output* ➢ *Aramids* ➢ *Monostable* ➢ *Astable* ➢ *Ethos and Philosophy* ➢ *Ideology*	➢ *Ergonomics* ➢ *Anthropometrics* ➢ *Data* ➢ *Ratio* ➢ *Volume* ➢ *Percentage waste* ➢ *Pie charts* ➢ *Graphs* ➢ *Interpreting data*
They will understand *(key concepts)*				
The sources and origins of timbers, how timber goes from trees to a working form. Stock forms of timbers and plastics. How plastics can be formed/shaped. Why different materials are fit for purpose dependent on their working properties. Surface treatments and finishes Mock NEA – Bottle opener Students will complete some practice pages on the key areas of the NEA. Client Profile/Interview Target market research Product Analysis Specification Students will then design their bottle opener for their client and create a prototype from card or foam. Students will design using sketching techniques as well as CAD. Client feedback on designs and then final design will be manufactured.	Students will understand the different scales of production and what they are used for. Students will also know what Just in time production is, and the associated advantages. Different forces and stresses applied to products will be identified and understood. Students will understand about the environmental impact of designs – and how designers, manufacturers and consumers can all adapt and improve their practice Practical skills: Methods of joining materials Forming of polymers: Line bending Vac Forming Creating prototypes CAM Functioning mechanisms	Different forms of research methods that can be carried out and why, why it is important for designers to consider a sustainable approach to design, how technological advancements have led to changes in design and manufacture, and considerations that designers must have with regard to inclusive design and manufacture. Students will begin to research the client for the bottle opener, carrying out primary and secondary research (Moodboard, Client profiles and Target market research and materials research). Practical – Architectural Challenge	Students will understand the difference between smart materials, modern materials and technical textiles and can name and explain examples. Students will understand the different linkages and their uses, as well as how cams and followers can change different motions. Wy is fracking so opposed, and what forms of energy, and energy storage are available. Practical – Architectural Challenge	The key steps in research and development for a particular client/target market with a user-centred design approach. How it is important to gather primary and secondary data

They will know how to *(key skills)*				
➢ I know the primary sources of materials for producing natural and manufactured timbers ➢ I am able to recognise and characterise different types of natural and manufactured timbers ➢ I understand how the physical properties of a range of natural and manufactured timbers affect their performance ➢ I know the primary sources of materials for producing polymers ➢ I am able to recognise and characterise different types of polymers ➢ I understand the physical and working properties for a range of thermoforming and thermosetting polymers ➢ I understand the main processes involved in producing workable forms of timber including: conversion, seasoning and the creation of manufactured timbers ➢ Be aware of sustainability and ethical factors in timber production and use ➢ I understand the advantages and disadvantages of manufactured board compared with natural wood ➢ I know why surface finishes are applied for functional and aesthetic reasons ➢ How surface finishes and treatments are applied	➢ Be able to recognise and characterise tension, compression, bending, torsion and shear forces and stresses ➢ Understand the impact of different forces and stresses on materials ➢ Understand how materials may be enhanced to resist and work with forces and stresses to improve functionality ➢ Understand that greenhouse gases and carbon are produced during the manufacture of products ➢ Understand the impact that a consumer society has on natural resources and the environment including deforestation, mining, drilling, farming and product miles ➢ Be aware of the need for social and governmental responsibility to address safe working conditions and pollution	➢ I Understand the impact of new and emerging technologies on: the workplace. ➢ I am aware of how computers and automation have changed manufacturing through the use of robotics. ➢ I Understand how innovation can drive product development and enterprise including the use of crowd funding and virtual marketing ➢ I Understand co-operative and fair trade organisation. ➢ I Understand how and why products are developed and produced in a sustainable way. ➢ I am aware of the impact that excessive use of certain materials has on the environment ➢ I understand how technology push and market pull affect consumer choice and employment ➢ I Understand changes in job roles due to the emergence of new ways of working ➢ I am aware of changes in fashion and trends	➢ Understand how power is generated from fossil and nuclear fuels ➢ Understand how power is generated from renewable energy sources such as: wind, solar, tidal, hydroelectric and biomass ➢ Be aware of the arguments for and against the selection of fossil fuels, renewable energy and nuclear power ➢ Be able to identify mechanical power and understand how it is stored ➢ Understand pneumatics and hydraulics as examples of kinetic pumped storage systems ➢ Understand the functional properties of alkaline and re-chargeable batteries ➢ Be able to recognise a range of modern materials ➢ Explain how modern materials can be used to alter functionality	➢ Gather and analyse primary and secondary data ➢ Evaluate different materials suitability ➢ Understand the impact on the environment of designs and raw materials

		and how they affect designers and manufacturers ➢ I understand how new products can have both a positive and negative impact on society ➢ I am able to evaluate the advantages and disadvantages of planned obsolescence from different perspectives ➢ I understand how products can be designed to be repaired and recycled ➢ I am aware of ethical and environmental concerns when designing with new technologies ➢ Be able to evaluate the advantages and disadvantages of planned obsolescence from different perspectives ➢ Understand how products can be designed to be repaired and recycled ➢ Be aware of ethical and environmental concerns when designing with new technologies	➢ Be able to recognise a range of smart materials ➢ Understand how the functional properties of a range of smart materials can be changed by external stimuli ➢ Understand how material properties can be enhanced by combining two or more materials ➢ Recognise a range of composite materials and technical textiles ➢ Understand how fibres can be manipulated to create technical textiles ➢ Understand the principles of electronic systems ➢ Use systems diagrams and flowcharts to analyse and solve a given problem ➢ Understand the use of open and closed loop systems and subsystems ➢ Recognise and understand common electronic input and output components ➢ Understand the difference between analogue and digital signals ➢ Understand how microcontrollers are programmed as	

			counters, timers and for decision making to provide functionality to products and processes ➢ Understand the use of buzzers, speakers and lamps to provide functionality to products and processes ➢ Be able to recognise and identify a range of movements ➢ Understand the functions of mechanical devices to produce linear, rotary, reciprocating and oscillating movements ➢ Understand how mechanisms can be used to change magnitude and direction of force, including levers, linkages and rotary systems	

	Dallam School Curriculum Overview	**Department: Technology – Resistant Materials** **Year Group: 11**

AUTUMN		SPRING		SUMMER	
Half term 1	**Half term 2**	**Half term 3**	**Half term 4**	**Half term 5**	**Half term 6**
Theme / Topic ➢ **NEA - *A*nthropometrics and Ergonomics** ➢ **Social, Moral and environmental investigationDesign Brief and Specification** ➢ **Design ideas** ➢ **Design Development (through sketching, modelling and CAD)**	**Theme / Topic** **NEA** ➢ **Design Development (through sketching, modelling and CAD)** ➢ **Final Design Material and component research and testing**	**Theme / Topic** **NEA** ➢ **Practical – Realising design**	**Theme / Topic** **NEA** ➢ **Manufacturing Specification** ➢ **Orthographic drawings** ➢ **Evaluation (Peer, Client and self)** ➢ **Strengths/Weaknesses**	**Theme / Topic** **REVISION**	**END OF COURSE**
By the end of this half term pupils will know *(key knowledge, including tier 3 vocabulary)*					
Theory **Design strategies** **Iterative design** ***Tier 3 vocab*** • Sketching • Isometric • Crating • 2-point perspective • 1-point perspective • Orthographic (3rd Angle)	**Theory** **Energy Generation** **Energy Storage** ***Tier 3 vocab*** • Finite and non finite • Renewable • Nuclear • Wind • Solar • Tidal • Biomass	Ensure the product is made safely, adhering to all Health and Safety in the workshop Adapting to changes in manufacture when required, overcoming problems with solutions	Complete a manufacturing specification, as in industry that could be followed to manufacture another replica. Draw in third angle orthographic, with dimensions which would be used in industry using CAD. Evaluate the finished product in comparison to the brief and design specification analysing strengths and weaknesses of the finished design.	Have understanding of all of the areas covered in theory knowledge. Practice of exam technique	**END OF COURSE**

• Rendering • Exploded • Research informed design • Cyclical • Testing and modification Gather important design information such as anthropometric data and consideration of ergonomics, and social, moral and environmental factors. Create a specification for the needs and wants for the product. Use different design strategies to demonstrate design ideas such as CAD, sketching and modelling	• Geothermal • Hydro • Kinetic Pump storage • Batteries • Alkaline • Lithium • Polymer batteries • Degrading • Chemical energy storage • WEEE directive from RoHS How to get feedback from client and develop designs to suit their needs and wants. To carry out testing and further research to ensure the product will be successful				
They will understand *(key concepts)*					
➢ How to take into consideration where and how raw materials are used and their impact on the environment ➢ Why it is important to get anthropometric data of the client ➢ Why a specification is needed and is important ➢ The advantages and disadvantages of different design strategies	➢ How to evaluate designs with client and listen to constructive feedback, as in industry	➢ Problem solve ➢ Safe practice in the workshop	➢ Why a manufacturing specification is required – global manufacturing ➢ Why it is important to draw in third angle orthographic alongside the manufacturing specification ➢ How to evaluate the product	➢ The theory from the course across core technical principles, specialist technical principles and designing and making principles	
They will know how to *(key skills)*					

➢ Measure for anthropometric data ➢ Write a detailed specification which outlines the wants and needs of a client with justification ➢ Create designs in 3D (computer based and through modeling) ➢ Use different design strategies to show client design ideas	➢ Carry out testing of materials and components to ensure high quality product ➢	➢ Find solutions and alternative ways when something isn't working ➢ Use different types of tools and machinery as required	➢ Draw in third angle orthographic ➢ Write a manufacturing specification ➢ Evaluate against a design specification and through testing	➢ How to answer exam style questions using theory knowledge from the course	**END OF COURSE**