YEAR 9 HALF TERM 1 DT - RESISTANT MATERIALS LEARNING PROGRAMME

Love God
Serve others
Work hard
Value all

Topic	Learning Objectives	Key Vocabulary	Learning Sequence	Linked Learning	Home Learning
Iterative thinking **Prototyping and modelling**	To understand the concept of iterative designing. To design and model various products that include a live hinge feature. To build a 3D prototype of one initial design idea using a 2D net of own creation.	Live hinge Form Proportion Prototype 2D Design Net	Students will learn about iterative designing, and why it is important, through a series of discussion tasks and real-life examples. Students will conduct research and testing on live hinges and the capabilities of different materials such as timbers and polymers. Students will design innovative products that must include a live hinge. Students will build a 3D prototype to test their best product idea.	Engineering - functionality of a product for its intended use Art - considering form/shape Maths - scale and proportion, measuring	Survey and questionnaires for target user about initial designs. Analysing survey results, justifying how they will be used to improve proposed product.
Computer Aided Designing (CAD) **Computer aided manufacture (CAM)**	To be able to translate 3D measurements to 2D computer design software. To utilise the use of CAM to produce high quality products. To understand the impact of computer aided manufacture on society and the economy.	2D Design Laser cutter Etching CAM Social impact Industry	Students will translate 3D prototypes to a 2D net of their product on complex computer design software. Students will develop their ideas as they work, continually testing and experimenting with different outcomes. Students will export their 2D computer files to be cut by the laser cutter.	Maths - translating of complex measurements from a 3D shape to a 2D net, plotting, tessellation.	Research on scales of production and the impact of CAD CAM on the design and manufacturing industries. Exam questions.
Assembling a final live hinge product	To be able to apply knowledge of 3D form and structure to assemble a successful live hinge product. To effectively evaluate your own product against a commercial product.	Manufacture CAM Tolerances Quality Control	Students will assemble their laser cut live hinge product. Students will need to use problem solving skills to independently assemble and adapt their final product to be fully functional.	Engineering - assembling separate working parts English - evaluating products	Presentation of final product prepared to be delivered to peers.

YEAR 9 HALF TERM 2 DT - RESISTANT MATERIALS LEARNING PROGRAMME

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Topic	Learning Objectives	Key Vocabulary	Learning Sequence	Linked Learning	Home Learning
The 6Rs **Sustainable design**	To be able to evaluate the effectiveness of the use of the 6Rs in existing products. To suggest developments to existing products / companies to allow for a more sustainable future.	Reduce Reuse Recycle Rethink Repair Refuse Planned obsolescence Sustainability	Students will investigate each of the 6Rs and conduct and in depth analysis of existing products' impact on the environment. A hands-on approach will allow students to see the real-life impact of planned obsolescence and the use of non-renewable materials. This will allow them to develop real -life solutions to barriers currently preventing a sustainable future.	Geography - environmental issues, sustainability. English - public speaking, presentation delivery, articulating coherent responses to peer questions.	Research homework on the effect of plastics on the environment.
Investigate, design and make	To investigate appropriate responses to a design context. To develop relevant and effective design solutions to a design problem. To apply skilful practical processes to manufacture an environmentally-friendly and functional prototype.	Natural timber Manufactured board Wastage Costing Tolerance Component	Students will analyse a design context centred on sustainable design. Students will design a range of products to fulfil their brief, critically evaluating their ideas against their ongoing research as they work. Students will build 3D prototypes for their ideas and test in use.	Science - working and physical properties of materials. Engineering - developing solutions to problems. Art - creativity in design. Maths - calculating tolerances, wastage, area, volume and the costing of materials.	Maths questions calculating the nesting, wastage and costings of materials needed.
Carbon footprint **Environmental impacts**	To critically evaluate the effect of a product on the environment from obtaining raw materials to the end of product life. To develop innovative ways to combat the environmental impact of products.	Product lifecycle Carbon footprint Emissions Renewable Non-renewable	Students will evaluate their own and others' prototypes against their design brief and specification. They will analyse their proposed product's lifecycle and suggest improvements as necessary.	English - presentation delivery, written evaluations. Science - carbon emission, pollution.	Preparation of presentation of final prototype idea. Students must prepare a 3 minute presentation to inform potential manufacturers of their proposed prototype.