

PRODUCT DESIGN

Knowledge Organiser



Year 7 - Desk Tidy Project

DESIGN

Product design is the process of imagining creating and iterating products that meet the needs of the user.

In isometric projection the drawing is made up of a series of parallel vertical lines and parallel 30 degree lines.

CAD designs can be sent anywhere in the world to be laser cut 3D printed or engraved onto a variety of materials.

Communicating ideas can be achieved through pencil drawings coloured rendering and annotating designs.

Creative designers often have a strong sense of open-mindedness.

MAKE

Pillar drills are used to accurately drill vertical holes into materials.

Sanding timber helps apply a smooth finish which improves the quality.

Junior hacksaws are used to cut through thin metals. A file is then used on the sharp edges.

Cross filing helps straighten metal edges. Draw filing helps smooth them which improves the quality.

Sanding plastic edges helps apply a smooth finish which improves the quality.

TEST

Quality control checks are used to ensure the product is safe and made to a high standard.

Analysing existing products can be a source of inspiration to your own design ideas.

Using ACCESS FM is a good method of evaluating your designs.

By analysing your own product in detail you can identify improvements that need to be made.

Everybody is responsible for Health & Safety in the workshop.

THEORY

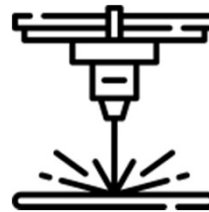
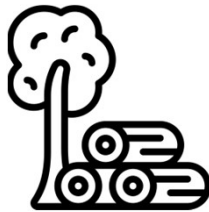
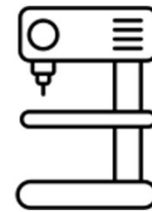
Timber comes from trees and is categorised into softwoods hardwood & manufactured boards.

Metal comes from ore and is categorised into ferrous non-ferrous and alloys.

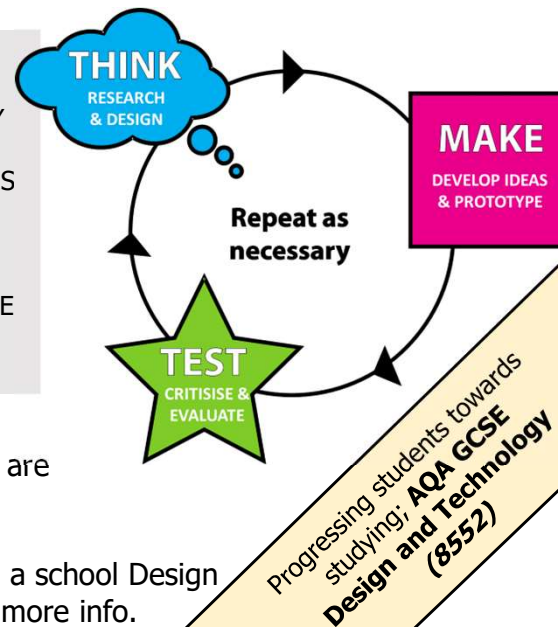
Plastic comes from crude oil and is categorised into thermoforming plastics and thermosetting plastics.

CAD stand for; Computer Aided Design and CAM stand for; Computer Aided Manufacturing.

A plan of making helps you explain how to make your product correctly.



TIMBER KNOT	ALUMINIUM JUNIOR	HEATER FILE	MATERIALS
GRAIN HARDWOOD	HACKSAW FLAT FILE	QUALITY CONTROL	TECHNIQUES
SOFTWOOD	CROSS FILING	2D DESIGN BITMAP	HEALTH & SAFETY
MANUFACTURED BOARD	DRAW FILING WET & DRY PAPER SHEET	VECTOR	ACCURACY
PILLAR DRILL	METAL FORMER	CAD/CAM LASER CUTTER BITMAP	PRODUCT ANALYSIS
SANDPAPER STEEL	CRUDE OIL	VECTOR	ACCESS FM
RULE DISC SANDER	THERMOFORMING	QUALITY CONTROL	INSPIRATION
FERROUS NON-FERROUS ALLOYS	THERMOSETTING	HEALTH & SAFETY	TEST MEASURE
ORES	BIOPLASTICS	ACCURACY	EVALUATE ANALYSE
	HOT WIRE STRIP	EQUIPMENT	ACCESS FM
			INSPIRATION



For further information on Design & Technology the following websites are recommended: **BBC Bitesize Technologiststudent.com DT Online**

For further guidance with working with materials and equipment within a school Design & Technology workshop come to the 'D&T club' – ask your teacher for more info.

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Year 8 - Automata Project

DESIGN

Design ideas can be inspired from anywhere as long as they can be explained.

Designers use mind maps to put their thoughts on paper when tackling problems.

Sketching rendering and annotating all help a reader to understand your design ideas.

In isometric projection the drawing is made up of a series of parallel vertical lines and parallel 30 degree lines.

Perspective drawings allows us to represent our world more realistically.

MAKE

Common woodwork joints include; butt joints mitre joints rebate joints finger joints & dowel joints.

Jigs and formers improve productivity by ensuring quicker and easier manufacturing processes.

Glue maintains the timber structure. Where as nails or screws create fractures that make the timber less stable.

Designers develop their ideas to make improvements so it is the best suited for the user and function.

Card is a versatile strong low cost material used to model design ideas quickly.

TEST

Culture & Society communication skills User-centred design

Form is to do with a design's size theme or aesthetics while function describes what the product does or is used for.

Iterative design is a process where you can repeatedly test and develop ideas to ensure you have suitable final design.

A drawing of the front side and top view of a product aligned on paper is used to get a better understanding of the product.

Quality assurance is aimed to avoid defects. Quality control is aimed to identify and fix any defects.

THEORY

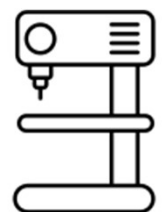
Any product that involve changes in movement and forces is an example of a mechanical system.

Cam mechanisms turn rotary motions into reciprocating motions.

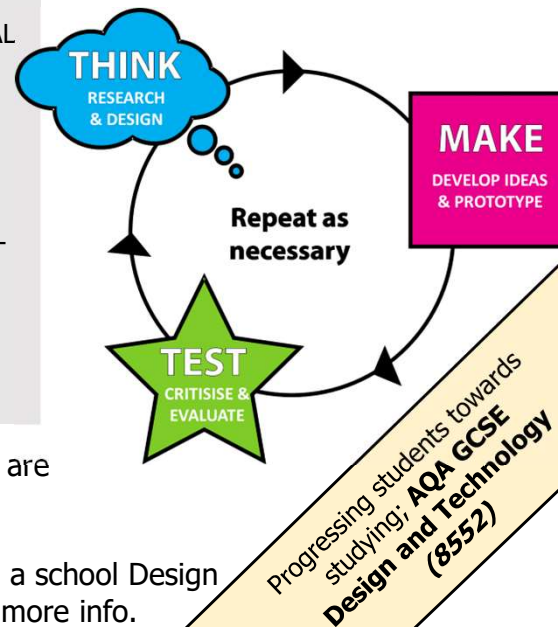
A plan of making helps you explain to someone how to make your product.

Quality assurance is aimed to avoid defects. Quality control is aimed to identify and fix any defects.

3rd angle orthographic is used to see a design from multiple angles accurately.



MOTIONS	BENCH DRILL	QUALITY	ISOMETRIC
MECHANISMS	COMMUNICATION	TOLERANCE	PARALLEL VERTICAL
FORCES	RENDERING	ACCURACY	HORIZONTAL
CAMS ROTARY	ANNOTATIONS	QUALITY	DIAGONAL
RECIPROCATING	FORM FUNCTION	ASSURANCE	TONE TEXTURE
DESIGN BRIEF MIND	AESTHETICS	CONTROL	SHADE
MAP SPECIFICATION	DEVELOPMENT	DIMENSIONS	ONE POINT
REBATE TENON SAW	ITERATIVE	ORTHOGRAPHIC	PERSPECTIVE
BENCH HOOK	MODELLING	INTERPERET	VANISHING POINT
REBATE ACCURACY	INNOVATE DEVELOP	WORKING DRAWING	HORIZON
JIG	EVALUATE	3RD ANGLE	TWO POINT
MEDIUM DENSITY	CARD REFINE	ORTHOGRAPHIC	PERSPECTIVE
FIBREBOARD PVA	IMPROVE	FORMAL WORKING	



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Year 9 - Pewter Project

DESIGN

Biomimicry design is where nature inspires a designer - 'bio' means life and 'mimicry' means to imitate.

You can research in books on the internet by analysing existing products understanding client's needs and wants and testing prototypes.

Designers use mind maps to put their thoughts on paper when tackling problems.

A designer has fixation when they consider only a single design concept.

Annotations help to explain the thinking behind the development of an idea.

MAKE

Metal casting processes can help manufacture complex shapes with complicated internal cavities.

The grit size of abrasive paper is usually stated as a number that is related to the particle size. The larger the number the smoother the paper.

Scroll saws are good for cutting complex and intricate designs in timber boards.

A disadvantage of casting is the time spent on creating a mould.

Sandpaper grit is a softer stone; wet & dry paper grit is a hard stone that can cut metal.

TEST

Ideation is a process where you generate a variety of ideas through sessions of as sketching modelling and brainstorming.

SCAMPER stands for; Squash Condense Add holes Mirror Pattern Enlarge/reduce Repeat.

A plan of making helps you explain to someone how to make your product.

Using ACCESS FM is a good method of evaluating your designs

Exploded drawings are a way of presenting an assembly drawing showing how separate parts join together.

THEORY

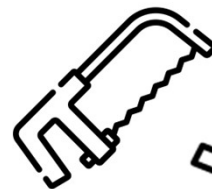
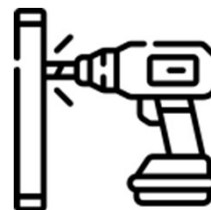
Smart materials have properties that can be changed by an external condition

Primary research involves collecting data first-hand while secondary research involves collecting data from previously published sources.

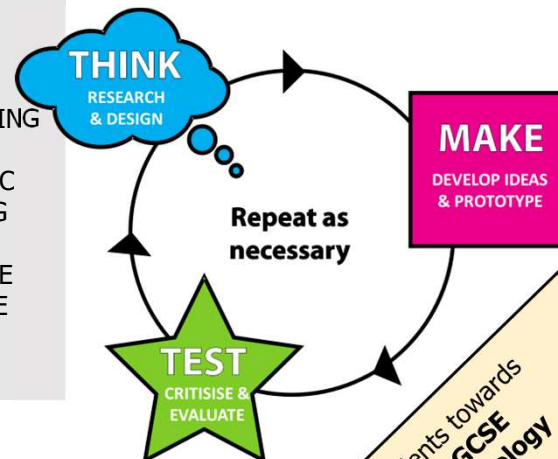
Die-casting means making an object by pouring molten metal or other material into a reusable mould.

CAD stand for; Computer Aided Design and CAM stand for; Computer Aided Manufacturing

Packaging is designed to inform a user protect and preserve the contents and promoting costs or deals.



SMART MATERIAL	IMPROVE	MODIFICATION	PROMOTE
STIMULI REACT	IDEATION	2D DESIGN CAD/CAM	EXPLODED
BIOMIMICARY	IMPROVEMENT	SCROLL COPING	ASSEMBLY
INSPIRATION	FIXATION GENERATE	NEEDLE FILE WET &	ISOMETRIC
DEVELOPMENT	VARIATION	DRY PAPER	WORKING DRAWING
RESEARCH CLIENT	JUNIOR HACKSAW	ABRASIVE GRIT	3RD ANGLE
INNOVATION	FILE WET & DRY	QUALITY CONTROL	ORTHOGRAPHIC
RESEARCH	PAPER	QUALITY ASSURANCE	CUBE CRATING
INSPIRATION	CENTRE PUNCH	ACCURACY	ISOMETRIC
DEVELOPMENT	POWER DRILL	TEST MEASURE	CRATING SCALE
MALLEABLE CASTING	POLISH	EVALUATE INFORM	COMMUNICATE
MOULD	INTERPRET INSPIRE	ACCESS FM	
INFORM INNOVATE	DEVELOP IMPROVE	PROTECT PRESERVE	



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Progressing students towards
studying: **AQA GCSE
Design and Technology
(8552)**