DESIGN & TECHNOLOGY

Design and technology EOYE knowledge organiser. Year 8 exam preparation has 4 areas of **Design and technology.** These are Investigating, Designing and making, Analysing and evaluating, demonstrating and applying knowledge.

1. Analysing using CCESS FAME key words
To help us remember key bits of information for investigating, designing, analysing and evaluating we use:

Aesthetics What does the product looks like? Doe it have a theme or is it inspired by a designer? What do you like about it? How could improve it's aesthetics?.

Cost How much does the product will cost? How much does it cost to manufacture? Is it affordable to its intended market?

Client Who is the product sold by? Is their branding? Is it necessary? Will the client be happy with the product?

Consumer Will the intended consumer for the product want to use it? Could it be developed further for the consumers needs?

Customer Has the designer considered the costumers needs? How can the ensure the customer will want to purchase the product?

Environment Is the product environmentally friendly? How can they ensure that the product has less impact on the environment?

Size- Is it too big/small? Do they need to rethink the dimensions of the product?

Safety Has the designer considered all safety considerations? Is it fully appropriate for the age range of the intended consumer?

Function Does the product work as intended? What other features could be included to improve the product?

Anthropometrics- Is the product fit for purpose in terms of the average size of it's intended consumer?

Materials and manufacture What it is made from and how it is made? Would an alternative material be better suited based on their working properties?

Ergonomics Is the product comfortable to use? Could it be shaped better?

2. Specification a list of requirements that your product must meet/include.
Design Context Gives you the background of the problem and the design brief so you have more information about why the design brief needs addressing.
Design brief The instructions that a client gives to a designer about what they want a product to be like and why they need/want it.
User profile knowing what the person who you are designing the product for likes/dislikes. This is used to inform design decisions.

3. Veneering Is when thin slices of wood thinner than 3 mm, are glued onto panels to produce a decorative finish such as doors and panels for cabinets.
Composite materials are made by bonding two or more different materials together to improve their working properties.

4. One off production- each product is unique/ its own individual design
Batch production The production method used to make a specific quantity(batch) of identical products. Normally 3-100 products
Mass Production Mass production enables companies to produce larger quantities with fewer workers. Instead of having to pay several workers to complete a task by hand, manufacturers use machines to produce goods much faster. This allows companies to sell their products at a lower cost without losing profit.
Continuous Production Similar to mass production in it's method. But, the demand/need for the product is a lot of higher, such as Toilet paper.

5. Tools and what they are used for.

Scribe for Marking on to metal.

File this has hundreds of teeth to remove small amounts of metal or make edges smoother. This used for smoothing and can also be used on metals and plastic.

Engineers Square for marking 90 degree lines from the edge of a piece of metal

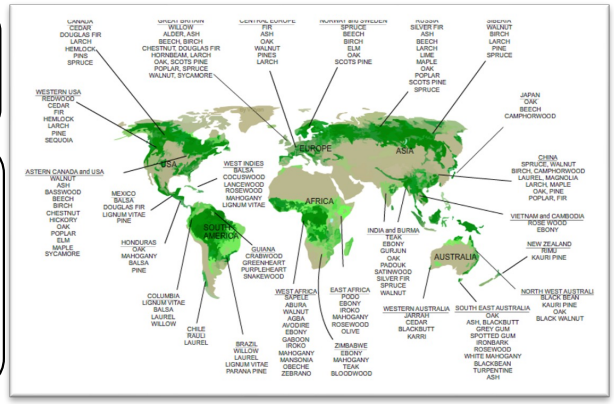
Centre punch for making an indent in a piece of metal for the drill bit to locate to

Engineers Vice. For holding pieces of metal in place while you work on them.

Steel rule Square edge ruler that 0 starts at the very end.

5. Clamp Holds materials in place when drying or working on the material itself.

6. Wood-Expensive hardwood - origins
Warmer climates Slow growing = more expensive broad leaves tighter grain denser and harder that soft wood **Oak**- tough, very strong, attractive grain, finishes well.
Mahogany-red/brown in colour easy to work with, expensive, good quality furniture/ jewelry box.



7. Health and safety-
1. Apron on to protect your clothes
2. Long hair tied back so it does not get caught in the machinery.
3. Listen carefully to instructions so you know how to use the tools and machinery
4. Only one person in the yellow zone so you do not distract students using the machinery.
5. Ensure all tools are put back safely and report any damaged tools so they can be mended for next lesson.
6. Wear goggles if using machinery like a pillar drill so saw dust does not get in your eye.

8. Planned obsolescence When a product is designed to become useless quickly. E.g. disposable razor/ phone

6. Wood-Cheap Softwood – Origins
Grown in colder climates fast growing=cheap and plentiful, Needles for leaves Evergreen **Pine**- Cheap but knotty use cheap furniture

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9. Properties of materials

Physical properties are the traits a material has before it is used.

Absorbency - the ability to soak up moisture, light or heat, eg natural materials (such as cotton or paper) tend to be more absorbent than man-made materials (such as acrylic or polystyrene)

density - how solid a material is. This is measured by dividing mass (grams) by volume (cm^3), eg lead is a dense material

fusibility - the ability of a material to be heated and joined to another material when cooled, eg webbing is fusible and can be ironed onto fabrics

electrical conductivity - the ability to conduct electricity, eg copper is a good conductor of electricity

thermal conductivity - the ability to conduct heat, eg steel is a good heat conductor, whereas pine is not

Working properties are how a material behaves when it is manipulated

strength - the ability of a material to withstand compression, tension and **shear**, eg in woven fabrics cotton isn't as strong as wool when pulled

hardness - the ability to withstand **impact** without damage, eg pine is easier to dent with an impact than oak; therefore, oak is harder

toughness - materials that are hard to break or snap are tough and can absorb shock, eg Kevlar in bulletproof vests is a very tough material

malleability - being able to bend or shape easily would make a material easily malleable, eg sheet metal such as steel or silver is malleable and can be hammered into shape

ductility - materials that can be stretched are ductile, eg pulling copper into wire shows it is ductile

elasticity - the ability to be stretched and then return to its original shape, eg elastane in swimming costumes is a highly elastic material

10. Textiles construction

Temporary construction is using pins and tacking thread to hold 2 pieces of fabric together.

Permanent constructions is using the sewing machine.

11. Natural fibres are harvested from plants and animals. They are **renewable** resource- (you can produce more of them) They are **biodegradable** (can be broken down). They can be recycled.

Plant- **Cotton**

Animal- **wool and silk**

A **property** of a fibre is what it can offer as a material for a product. E.g. Wool is a good insulator, so it would be good to use as a jumper to keep whoever wears it warm.

12. Synthetic fibres or man made fibres

These are made from fossil fuels Synthetic fibres are less sustainable, can be made to have any properties????resistant to mould and decomposing. They are not very absorbent to difficult to add colour.

Types of fabric

Elastane- stretchy used for sports wear

Polyester- does not crease and it is used for shirts

Polyamide- hardwearing and used for carpets.

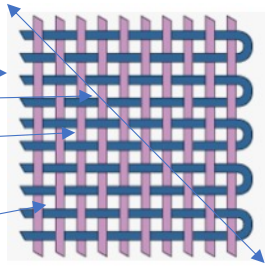
13. Woven fabric.

Selvage- the edge

Bias- the diagonal

Warp- yarns running from top to bottom

Weft- a continuous year running right to left then left to right weaving in and out of the warp



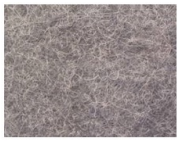
14. CAD/CAM stands for Computer aided design/ computer aided manufacture.

The advantages of using CAD. You can email the designs, You can make changes easily, you can work on the same designs all over the world.

Explain the process.

CAM – Machinery used to create products from CAD files. I.e. laser cutter. Produces identical products multiple times. Advantages – fast make more than one at a time and can produce difficult designs.

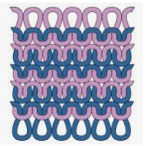
15. Bonded fabric/ Non woven fabric



Examples are **Felt** which is made from wool. The fibres are bonded together with pressure, moisture and head.

This fabric is not verystrong or they do not stretch.

Knitted fabrics are made by interlocking one or more yarns together using loops. Air is trapped so they insulate. They stretch more than woven fabrics.



16. Most **polymers** are synthetic and have been designed by **chemical engineers**. Polymers fall into two categories:

- **thermosetting** plastic or **thermoset**
- **thermoforming** plastic or **thermoplastic**

'Thermo' indicates that heat will be involved in the way the polymer is shaped, and 'set' means that once the polymer has been set in that shape, heat will not alter the form.

Thermoforming plastic, however, can be heated and shaped, then heated and shaped again. These polymers are also often referred to simply as 'thermoplastics'.

A popular polymer to use in schools is **acrylic**. This can be heated and bent using a **line bender** and, as it is a thermoforming polymer, it can then be reheated and reshaped. For example, a hairdryer would not be made from acrylic as it would not withstand the heat and would deform when used.

Four popular polymers used in schools are:

acrylic

polypropylene

high impact polystyrene (HIPS)

polylactic acid (PLA) (if the school has a 3D printer)