Year 8 Design and Technology – Enrichment tasks

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Task 1 (Timber research)

Objective: To look at Timber products in everyday use and investigate why different types of timber are used.

What you need to do: Read through the information on slides 2 to 4

Then answer the questions on slide 5

Word Bank:

Timber : Wood that has been cut from trees and turned into usable material

Hardwood: Timber from trees that lose their leaves in winter (oak trees for example)

Softwood: Timber from trees that keep their leaves in winter (pine trees for example)

Different Types of Timber.

There are many different types of timber but generally we can group them into three categories or main types:

Hardwood

Softwoods

Manufactured Boards (We will look at these in homework)

Hardwood

These are timber materials such as planks and boards of timber that are made from trees that lose there leaves in winter. They tend to be stronger and harder than other types of timber (hence the name)

Softwood

These are timber materials such as planks and boards of timber that are made from trees that don't lose there leaves in winter. This means they grow quicker than hardwoods but tend not to be quite as strong.

Timber Types

Pine
(Softwood)

Easy to work, inexpensive and light coloured. Reasonably strong. Most common timber used in the UK today. Used in internal products and furniture. Also in timber frames for buildings.

Softwood

Often from evergreen trees. Quick growing, less expensive but not as strong.

Larch
(Softwood)

Tough and naturally resistant to weathering and rotting. Reddish in colour. Used for outdoors products such as fence panels and sheds.

Western Red Cedar
(Softwood)

Lightweight but soft and not very strong. Weathers well. Often used for good quality outdoors products such as expensive sheds, summer houses and cladding for buildings.

Timber Types

Oak
(Hardwood)

Strong, tough and durable, BUT expensive. Darker colour. Used for high quality furniture (inside and outdoors), high quality kitchen units and flooring. Looks very good.

Hardwood

Often from trees that lose leaves in winter. Grow slower so often stronger or harder wood. More expensive as longer to grow.

Beech
(Hardwood)

Very Strong, and can take impacts well. Light colour. Fairly expensive. Used in furniture, kitchen ware and children's toys.

Ash
(Hardwood)

Very tough and flexible. Can absorb shocks and impacts well. Used in furniture, tool handles and sports goods (cricket bats).

Tasks

1 – Explain the difference between hardwood trees and Softwood trees using annotations and diagram

You need to sketch the different trees and add notes .

2 – Describe, sketch and explain one type of softwood and two types of hardwoods.

You need to explain what are the advantages and disadvantages about each type of timber and give examples of where they are used.

3 – For each of these products suggest a type of timber that it could be made from. Try and explain WHY(Justify) you would suggest that type of timber.

4 – Use the internet to research two other types of timber – Birch and Teak. For each try and find good and bad points as well finding examples of products

Task 2 (Tools and Machines)

Objective: Produce a guide to using the following tools and machine

Cutting Tools

- Tenon Saw
- Coping Saw

Measuring Tools

- Engineer Ruler
- Try Square

Machines
- Pillar Drill
- Disc Sander
- Vacuum Forming

For each tool you need to:
- Create a diagram or a picture .
- Explain WHAT it does and HOW you can use it
- Safety information

Mood Boards.

A mood board is a collection of images to do with some part of design.

This example mood board is looking at stylish electronic products – some modern, some retro.

Your mood board will be looking at IKEA's products

It has a lot of good images to show interesting products.

It also has some text to give the person's thoughts about each product.

Firstly visit the IKEA website and use the internet to find out about the company.

Then produce a mood board like the one on this slide. Include different products from the IKEA range to get an idea for the style that they use.

Try also to include some products that really make IKEA stand out from other designers, and explain why.

This product is simple and has a retro feel, but the curved shape and use of timber makes it more stylish

Although square and blocky the contrasting colour of the red case makes it stand out.

By Changing the shape of the product the designer has made this simple idea look much more expensive and 'designer'

The use of translucent green plastic gives this product a modern stylish look.

This radio has a fairly modern style but the angled edges make it stand out.

These headphones are chunky but the curved shapes and contrasting colours make this chunky design look very modern.

A very retro design that could work well in our modern age. The use of shiny metal to contrast with the red works well, as does the curved edges and lines that all flow together.

The designer has simply added a series of holes to this design and made it look very original as a result.

The curved shapes and use of lines for the speaker and a large circular dial combine to make this product look very interesting and contemporary.

This speaker has a very simple construction but the use of curved timer really gives it a sense of style.

Very typical of modern electronic smart products. These rely on a sleek design and expensive looking materials such as glass and metal.

Although blocky and old fashioned compared to smart devices the use of the chunky LED display gives a sense of retro stylishness

Task 4 (Smart Materials)
Objective: to research modern and smart materials and sketch some ideas that use them.

Research Task: (information on Slides 11+12

Find out about some modern and smart materials.

Write down (or type up) what you have found out. You can use pictures if you like.

Use the list on the right to help you. You do not need to find out about them all. Just pick some you are interested in and look at them.

For the materials you are looking at I would like you to find out:

1. What they are used for (what they do or what they are like)

2. What is different about them – why are they useful?

Research List:

Titanium

Thermochromatic Material

Graphene

D30 Smart Material

Nano Materials

Corn Starch Polymers

OR you could pick any of the other materials on slides 2 and 3 and look at those instead!

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Modern Materials

Modern Materials

These are materials that are new or recently developed. They have useful properties that can be used when designing new products.

Graphene

Discovered in 2004 graphene is a very thin layer of carbon film. It is harder than diamond, 300 times stronger than steel. It is also flexible, transparent and conducts heat and electricity. It is being developed for use in phones, protective clothing and even buildings.
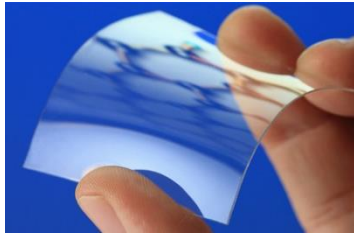
Metal Foam

Aluminium (and sometimes steel and titanium) can have gas blown into it when molten to make it into a foam. This makes it lightweight. When formed it is good when compressed (squashed). It can be used for sound proofing and crash protection in cars.

Titanium

A strong, tough metal it has a good strength to weight ratio and is resistant to corrosion. It is used in knee and hip replacements as well as in the aerospace industry and other applications.

Coated Metals

These can be coated with other types of metal. Aluminium can be anodised to make it corrosion resistant and to change it's colour. Steel can be plated with a thin coat of more expensive metals, such as brass or nickel. By heating the metal and dipping it into plastic granules it can also be coated with plastic.

Liquid Crystal Display

An LCD has a liquid crystal layer that blocks light when a voltage is applied. They are used in LCD Television, smartphone displays and computers.

Nanomaterials

Nanomaterials are arranged at a molecular level. By having such small parts they can be incredibly strong. They can also be used to make filters and textiles that are breathable and waterproof. Uses include coatings for boat hulls that reduce friction and water filters that are used to make fresh water from salt water.
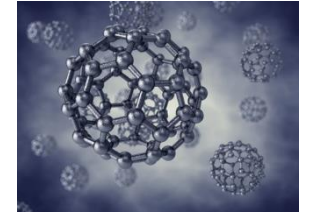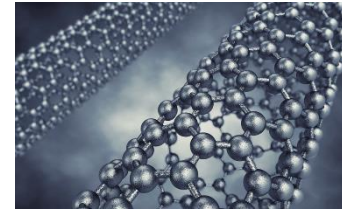
Teflon

This is a form of plastic that is used to coat cookware to stop food sticking.

Corn Starch Polymers

Instead of oil, plants such as potatoes and corn are used to manufacture plastics that break down over time. They are more eco-friendly as they do not use as much energy when being manufactured and they are easier to dispose of.

Smart and Modern Materials

Smart Materials

These are materials that do something extra or different. For example they may change colour when heated.

Thermochromic Smart Material

This is a material that changes colour when it gets hot. It can be supplied as Thread, Fabric, Plastic etc.

Fluorescent Smart Material

Emits light when exposed to UV rays.
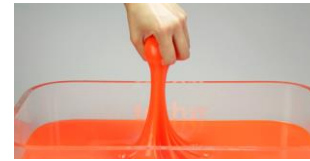
Phosphorescent Smart Material

Glow in the dark.

Pizoelectric Smart Material

Either emit electricity when pushed or twisted OR they change shape when electricity is put into them..

Nano Materials

These are materials that are made by manipulating individual atoms. This can make a material very strong or very smooth.

D30 Smart Material

D30 is a modern material that is soft and flexible, that locks together and hardens under impact. One use is ski beanies that double up as crash hats when you fall of.

1. SOFT & FLEXIBLE
2. LOCKS ON SHOCK
3. RETURNS TO FLEXIBLE STATE

Quantum Tunnelling Composites (QTC) Smart Material

This is a material that when squeezed or pushed turns from an electrical insulator to a conductor. Used to make flexible switches and controls (such as wearable technology).
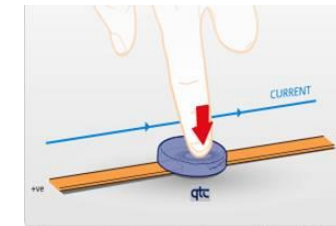
Under compression, the resistance drops gradually and QTC can be capable of passing high currents.

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What you need to do: you will need to produce design ideas to solve this design brief:

Design a stylish and futuristic concept mobile phone that uses a modern or smart material.

Try and make your ideas different from current smart phone designs (wearable fashion accessories?) and to do something different (Could the phone fold up and fit into a pocket? Could it turn into headphones?)

Label/annotate your ideas to explain them.

Folding or sliding phone that becomes smart device / tablet

Folds up into wearable headphones

Morphing phone can be changed into a bracelet or keyring idea