****

**Knowledge Rich Curriculum Plan**

GCSE Design Core

Core Technical Principles - 1.6 Materials and their properties



| **GCSE Design Core** | **Core Technical Principles**  **1.6 Materials and their properties** |  |  |  |
| --- | --- | --- | --- | --- |
| **Lesson/Learning Sequence** | **Intended Knowledge:**  *Students will know that…* | **Tiered Vocabulary** | **Prior Knowledge:**  *In order to know this students, need to already know that…* | **Assessment** |
| **Lesson:**  **Natural timbers** | * Students will know the different categories of timber * Students will know the terms Hardwood and Softwood * Students will know that Hardwood trees are more expensive, take longer to grow and are not as renewable * Students will know that Softwood trees are cheaper to use, they take less time to grow and are seen as the more renewable material | Hardwood: A slow growing tree which takes 75-100 years to grow  Softwood: A fast growing tree which takes 7-10 years to grow  Category: a class or division of people or things regarded as having particular shared characteristics. | * ***Students need to already know the basics of timber as a material*** * ***Students need to already know that timber is available is different categories*** * ***Students need to already know some particular types of timber from previous projects*** | Compare the properties of Hardwood and Softwood, which would be more suitable for furniture?  Are there any differences in manufacture of these materials? |
| **Lesson:**  **Natural timbers lesson 2** | * Students will know the different types of Hardwood timber * Students will know the types of hardwood timber are Oak, Ash, Mahogany * Students will know the different types of Softwood timber * Students will know the types of softwood timber are Pine, Larch and Spruce | Hardwood: A slow growing tree which takes 75-100 years to grow  Softwood: A fast growing tree which takes 7-10 years to grow | * ***Students need to already know some names of timber but may not know the classification they belong too*** * ***Students need to already know the properties of timber*** * ***Students need to already know the use of certain types of timber*** | What are the major differences between the different types of timbers?  Why do we use different types of timber? |
| **Lesson:**  **Manufactured boards** | * Students will know the term manufactured boards * Students will know that manufactured boards are manmade types of timber made up from recycled wood * Students will know that Plywood is a type of manufactured board and that it is made up of several layers place on top of each other at 90-degree angles * Students will know that MDF (Medium density fibre) is a type of manufactured board and that is made up of saw dust and glue then compressed together * Students will know that Chipboard is a type of manufactured board and is made up of wood shavings and glue then compressed together | Manufacture: make (something) on a large-scale using machinery.  Manufactured Board: A man made material used out of recycled properties  Plywood: manufactured board made up of several layers  MDF: a compressed board made up of saw dust and glue  Chipboard a compressed board made up of wood shavings and glue | * ***Students will already know timber can be recycled*** * ***Students need to already know what the term recycled means*** * ***Students need to already know certain types of timber are made from manufactured boards*** | Compare the differences of a manufactured board and natural timber?  How are the properties of manufactured board different between a natural timber? |
| **Lesson:**  **Metals and Alloys** | * Students will know the different categories of metals * Students will know that Ferrous and Non-ferrous are two of the categories of metal * Students will know that Ferrous metals rust and types of ferrous metals are Low carbon steel, High carbon steel and Cast Iron * Students will know that Non-ferrous metals do not rust and types of non-ferrous metals are a Aluminium, Tin and Copper * Students will know the types of products that use Ferrous metals, these are screws, man holes, vices | Ferrous: containing or consisting of iron  Non-ferrous: relating to or denoting a metal other than iron or steel. | * ***Students will already know the metal basics from science*** * ***Students will already be aware of metal as a material*** * ***Students will already know why metal is used for products*** * ***Students will already know the terms of ferrous and non-ferrous*** | What are the properties of ferrous and non ferrous metals?  How does the knowledge of metals affect a designers choice? |
| **Lesson:**  **Alloys** | * Students will know the term Alloy * Students will know that an Alloy is a mixture of a metal and another element, usually carbon * Students will know that Metal Alloys exhibit different properties than natural metals * Students will know that examples of Metal Alloys are Brass and Stainless Steel | Alloy: a metal made by combining two or more metallic elements, especially to give greater strength or resistance to corrosion. | * ***Students need to already know that metals can be combined*** * ***Students need to already know the benefits from combining metals*** * ***Students need to already know the term alloy from science*** | How do Alloys and other metals compare to each other?  What are the major properties of alloys to pure metals? |
| **Lesson:**  **Paper** | * Students will know the different sizes of paper * Students will know that paper sizes are A0, A1, A2, A3, A4, A5, A6 * Students will know the paper making process * Students will be able to describe how paper is produced | Paper size: size standards govern the size of sheets of paper used as writing paper | * ***Students need to already know different types of paper*** * ***Students need to already know paper sizes*** * ***Students need to already know that paper is made from trees*** | Why does a designer need to know the differences of paper?  How can a designer use different types of papers for modelling? |
| **Lesson:**  **Polymers** | * Students will know the different types of polymers * Students will know that polymers are categorised into Thermoplastics and Thermosetting plastics * Students will know that thermoplastics are recyclable and can be reused again and again * Students will know that Thermosetting plastics are not recyclable and cannot be reused | Polymer: substance which has a molecular structure built up chiefly or completely from a large number of similar units bonded together, e.g. many synthetic organic materials used as plastics and resins.  Thermoplastic: denoting substances (especially synthetic resins) that become plastic on heating and harden on cooling, and are able to repeat these processes.  Thermosetting: denoting substances (especially synthetic resins) which set permanently when heated. | * ***Students need to already know the basics of plastics*** * ***Students need to already know products that uses plastics*** * ***Students need to already know how plastic is made (this will be learnt in science)*** | How are plastics creating an issues for the environment?  How does a designer affect the use of plastic in a product? |
| **Lesson:**  **Textiles** | * Students will know the different types of textile categories * Students will know that textiles are either natural or synthetic * Students will know that natural fibres are Cotton, Silk, Wool * Students will know that Synthetic fibres are Lycra | Textile: a type of cloth or woven fabric.  Fibre: a thread or filament from which a vegetable tissue, mineral substance, or textile is formed. | * ***Students need to already know the basics of fabrics*** * ***Students need to already know some fabric properties*** * ***Students need to already know some fabric names*** | What are the major differences between textile manufacture?  How can the use of textile affect the aesthetic of a product? |