



Getting Ready for...

KS4 (GCSE) DT

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Design and Technology is a dynamic, evolving subject that brings learning to life. It requires you to use critical thinking, invention and design skills, and to make prototypes that solve real-world design problems.

The following activities are designed to help you to develop your design and thinking skills and your knowledge of materials and real-world manufacturing processes, as well as to appreciate the work of designers from the past and present.

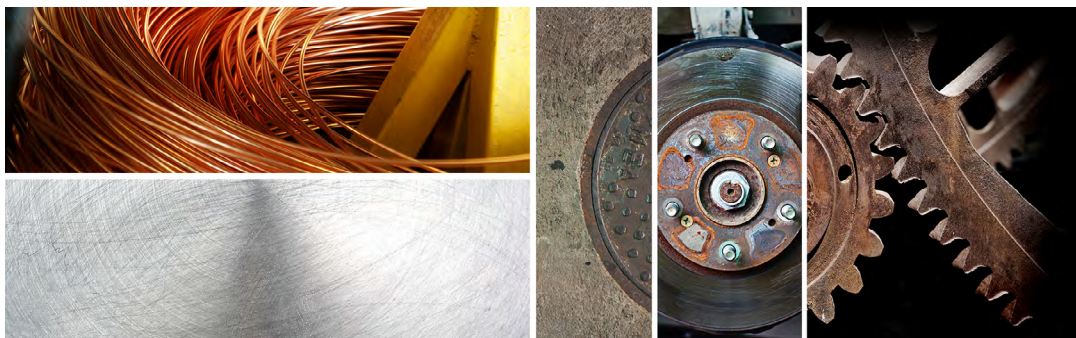
Activities

1. Material Categories

Knowledge of specific names of materials is essential to support your design work. General terms such as wood, metal and plastic are not detailed enough at this level of study.

- For each of the categories below, research and find suitable material examples. Create a table, like the one here, to display your results.

Classification	Category	Material examples
Wood	Hardwood	
	Softwood	
	Manufactured board	
Metal	Ferrous	
	Non-ferrous	
	Alloys	
Plastics	Thermoplastics	
	Thermoset polymers	
	Elastomers	





2. Properties of the Materials

Knowledge of the properties and working characteristics of materials will help you justify material choices in your design work.

Can you find out the definition of each of the technical properties below and support your answer with a material example?

- Malleability
- Durability
- Hardness
- Elasticity
- Strength to weight ration
- Corrosive resistance
- Electrical conductivity

3. Sources and Origins of Materials

Knowledge of where materials come from, their primary sources, and their conversion into workable forms can help you understand their impact on the environment.

In the example below, paper and boards come from the chemical processing of wood.



Using notes and diagrams, can you create your own flow chart to show the sources and origin of both polymers and metals?



4. The 6 Rs

The 6 Rs are often used as a starting point to discuss or evaluate the environmental impact of a product. It can help you in the iterative design process to improve or change a design to make it more environmentally friendly or sustainable.

Can you explain the meaning of each of the 6 Rs below? Can you illustrate your answers in terms of designing or redesigning a product and use real-life examples where possible?

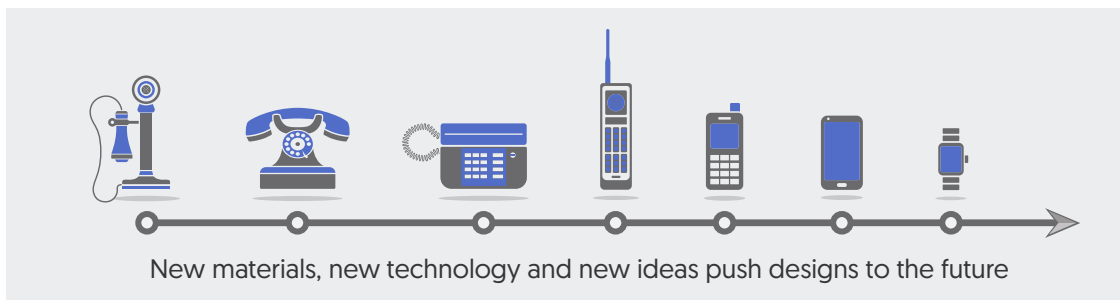
- Reduce
- Repair
- Reuse
- Rethink
- Recycle
- Refuse



5. Rethink and Redesign a Product

Completely rethinking a product and in particular redesigning it to be more efficient, environmentally friendly and make use of new materials is an important part of a modern-day designer's job.

- Choose a product that you own or have at home and redesign it to improve it.
- Sketch your ideas and use annotations to explain your thinking. Include your knowledge of the 6Rs to justify your designs.



6. Design Icons

Investigating the work of past and present designers and design companies can inspire and inform your own designing.

Explore the work of the following design icons and create a mood board that includes an example of the work of at least six from the list.



Add notes to explain their design style and your thoughts on the products you have chosen.

- Philippe Starck
- Ettore Sottsass
- Gerrit Rietveld
- Marcel Breuer
- Charles Rennie Mackintosh
- William Morris
- Norman Foster
- Vivienne Westwood
- Alec Issigonis



7. Manufacturing Processes

Products are made using a wide range of tools, equipment and manufacturing processes. To understand products and their design for manufacture, you will need to be aware of methods used to shape, fabricate and construct products.

Using a flow chart, can you explain the step by step process for the following manufacturing processes?

- Injection moulding
- Vacuum forming
- Casting metals

8. Scales of Production

When designing for manufacture, the planning process needs to consider the scale of production. This scale will determine what materials, equipment and manufacturing processes are required.

Can you define the following scales of production and give examples of products made to that scale?

- One-off
- Batch
- Mass
- Continuous





9. Design Strategies

When generating your design ideas, you will be expected to use a range of techniques and design strategies, for example:

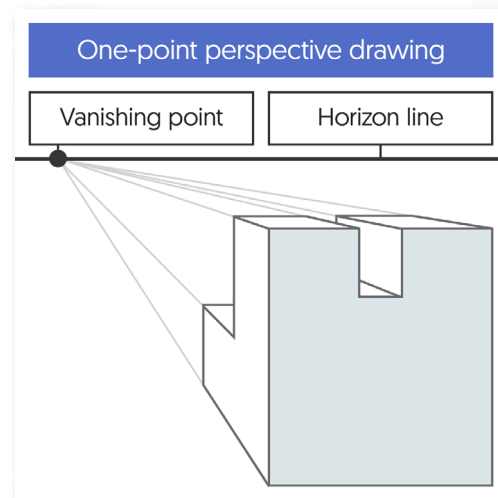
- Freehand sketching
- Perspective
- 2D and 3D drawings

One-point-perspective is a quick way of drawing in 3D. Learn and practise this useful technique:

Practice Guide

1. Draw a horizontal line known as the horizon line
2. Draw a square or rectangle above or below the horizon line. This is the face of the drawing
3. Join the corners of your shape back to the vanishing point – an X on the horizon line
4. Draw lines that are parallel to the face to create the depth of the drawing.

Note: the starting point (or face) can be any shape or size.



10. Working Drawings Challenge

Before manufacturing a product, you will need to produce detailed assembly drawings to show all the materials and parts of the product.

Exploded views are often used to show the components of a product. Each part is drawn separately to demonstrate how the product goes together and what materials are to be used.

An exploded view of a 3D picture frame:

- Draw an exploded view of a product of your choice. You can use free hand sketching or computer aided design.
- Label all the parts and suggest possible materials.

