

Unit R103 – Sustainable engineering

Types of materials used in engineered products

Instructions and answers for teachers

These instructions should accompany the OCR resource ‘Types of materials used in engineered products’ activity which supports OCR Cambridge Nationals in Engineering.



The Activity:

This resource comprises of 2 tasks. Learners may need to use online resources to research material uses or check their understanding to complete the activities.



This activity offers an opportunity for English skills development.

Associated materials:

'Types of materials used in engineered products' activity sheet

Suggested timings:

Task 1 and 2: 1 hour

This activity could be carried out using physical resources using a different engineered product if available as an alternative, to allow learners to recognise different materials used for component parts. It is **not** expected that learners will carry out a disassembly of a product to be able to complete the activities.

Modern engineered products often use a range materials and component types to make up the complete product.



Consider the modern microwave oven and how it is manufactured and what materials are used for different parts of the product.

Task 1

List the specific materials that could be used in the following parts and the assembly of the microwave:

Outer casing, rear and bottom panels

1.

2.

Door and mechanism

1. HIPS – High-Impact Polystyrene

2. Ceramics – Glass

3. Stainless steel

4. Aluminium

Controls and moving parts

1. Ceramics – Glass plate

2. HIPS – High-Impact Polystyrene

3. Aluminium

4. Aluminium, steel (motor frame)

5. Copper windings

Polymer materials used for the packaging

1. PS – Polystyrene
2. LDPE – Low-density Ployethylene
3. PVC – Poly-vinyl chloride

Task 2

Some of the materials used in the product help contribute to the sustainability of resources. Pick one of the materials that you have identified in Task 1 and write about the sustainability of this material and the environmental impact.

You may need to use online resources to research material to complete the activities. You could choose a different product to carry out the activities.

Candidates could give answers such as:

Aluminium is commonly recycled and can be recycled into a range of products. After collection the aluminium is taken to the treatment plant where the aluminium is sorted and cleaned ready for reprocessing. It then goes through a re-melt process and turns into molten aluminium, this removes the coatings and inks that may be present on the aluminium. The aluminium is then made into large blocks called ingots. Each ingot contains about 1.6 million drinks cans. The ingots are sent to mills where they are rolled out, this gives the aluminium greater flexibility and strength. This is then made into aluminium products such as drinks cans, foil wrapping. Recycling aluminium uses 95% less energy than it does to produce new aluminium. Here is a link to a video that I found about recycling aluminium <http://youtu.be/AOpGhAdQFEY>.

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