

Unit R109 – Engineering materials, processes and production

Machine processes: moulding

Instructions and answers for teachers

These instructions should accompany the OCR resource ‘Machine processes: moulding’ activity which supports OCR Cambridge Nationals in Engineering.



The Activity:

This resource comprises of 1 task.



This activity offers an opportunity for English skills development.

Associated materials:

‘Machine processes: moulding’ activity sheet

Suggested timings:

Task 1: 1 hour

Learning outcome 2 – Understand engineering processes and their application

Task 1

In this activity learners have been tasked to research and explain a range of different moulding processes and to state typical products produced using each process. The moulding processes are:

- Vacuum forming
- Injection moulding
- Blow moulding
- Rotational moulding
- Compression moulding

Learners may tabulate their findings, or present them in alternative forms such as a PowerPoint presentation or poster.

The table on the following page summarises how each moulding process works along with typical products manufactured using the process. Learners may describe each process in greater detail, and may find alternative products.

Learners have been supplied with internet video links showing each process in operation, and a link to the British Plastics Federation (BPF) website's 'Plastipedia':

<http://www.bpf.co.uk/Plastipedia/Default.aspx>

This website explains each process in detail and includes animations of each operation. Learners may use alternative information sources in their research.

Alternatively, the teacher might undertake this activity as a classroom-based session.

| Moulding type | Internet video | How it works | Typical products |
|--------------------|---|--|--|
| vacuum forming | https://www.youtube.com/watch?v=1GRLq13-uTA | <ul style="list-style-type: none"> • Mould produced of shape to be created in plastic • Plastic sheet held in frame above mould • Plastic sheet heated • Mould raised to heated plastic (or heated sheet pulled down over mould) • Vacuum applied to form shape | <ul style="list-style-type: none"> • Bath and shower trays • Yoghurt pots • Sandwich boxes • Refrigerator liners |
| injection moulding | https://www.youtube.com/watch?v=ibXqOihtC8 | <ul style="list-style-type: none"> • Plastic granules heated in injection unit until molten • Injection unit forces molten plastic into mould. • When cooled – mould opens and component(s) ejected | <ul style="list-style-type: none"> • Power tool housings • Telephone handsets • DVDs • Washing up bowls |

| Moulding type | Internet video | How it works | Typical products |
|---------------------|---|---|--|
| blow moulding | https://www.youtube.com/watch?v=T01i_vp2mJE | <ul style="list-style-type: none"> • Similar to injection moulding • Preform component made around hollow core • Preform inserted into second mould (blow station) • Air pressure applied to hollow core to form final component | <ul style="list-style-type: none"> • Bottles and jars • Plastic containers |
| rotational moulding | https://www.youtube.com/watch?v=VPLaUzMh3Rw | <ul style="list-style-type: none"> • Quantity of polymer placed in open mould • Mould heated • Mould rotated about 2 axis to distribute polymer on inside surface of mould • Mould cooled to set polymer • Mould opened and item removed | <ul style="list-style-type: none"> • Rainwater tanks • Fuel tanks • Traffic cones • Canoes |

| Moulding type | Internet video | How it works | Typical products |
|----------------------|---|--|---|
| compression moulding | https://www.youtube.com/watch?v=IDVyaaxic9U | <ul style="list-style-type: none"> • Mould is heated • A 'slug' or piece of plastic is placed into lower mould and warmed up • When warmed up, upper mould is forced down (compressed) onto lower mould • Plastic is compressed into shape of mould • Upper mould moves upwards and component removed | <ul style="list-style-type: none"> • Buttons • Electronic device cases • Car parts |

To give us feedback on, or ideas about the OCR resources you have used, email resourcesfeedback@ocr.org.uk

OCR Resources: *the small print*

OCR's resources are provided to support the teaching of OCR specifications, but in no way constitute an endorsed teaching method that is required by the Board, and the decision to use them lies with the individual teacher. Whilst every effort is made to ensure the accuracy of the content, OCR cannot be held responsible for any errors or omissions within these resources.

© OCR 2014 - This resource may be freely copied and distributed, as long as the OCR logo and this message remain intact and OCR is acknowledged as the originator of this work.

OCR acknowledges the use of the following content: Maths and English icons: AirOne/Shutterstock.com.