About this activity

This lesson introduces a range of plastic moulding processes to pupils, who then match a process to a range of products. Pupils must think about each product’s design features and user requirements and identify the process that will deliver the required features. The lesson introduces pupils to a key decision product designers make in order to design for manufacturing and deliver the right user experience.

Learning outcomes

Pupils will be able to:

- List and explain some common processes used to mould plastics, including when they might be used.
- Select an appropriate moulding process for products, which will deliver the features and benefits each one requires.

Curriculum links

Design and technology: properties of materials, manufacturing processes.

Resources and Preparation

Review the lesson and timings, slides and pupil sheets. Print one set of pupil sheets 1 and 2 for each group of 2 – 6 pupils. You may wish to cut up the cards but this is not essential as students can match products and processes using a simple a-a, b-b system using the two sheets.
Timings

60 minutes

Depending on prior learning, or if you have a shorter lesson time available, you may wish to omit some slides as suggested below. You could also spread the lesson over two 45 minute periods, building in some of the extension activities.

Starter activity

10 minutes

Show slide 1. Ask pupils to form groups of 2 – 4. Instruct pupils to brainstorm and list as many of the plastic products they have used today, at home or in school, as they can think of. Give pupils time to generate lists then share ideas, for example by using a typical ‘day in the life’ as a framework for inviting suggestions. You may wish to lists pupils’ ideas on your board.

Main activities

40 minutes

Ask groups to select two or three items from their list, or assign to groups items from the list on your board if you made one. Ask groups to discuss how the items may have been formed during manufacturing and share ideas.

(Some pupils might also identify the properties of the plastic used to make these items and how it contributes to each product’s performance. (E.g. hard, flexible, soft, smooth, textured, shaped etc.). They might also be able to identify some advantages the plastic offers over other materials such as wood, metal or glass.)

Establish that plastics are all around us, thanks to the ease with which they can be formed into useful shapes with other helpful properties, like being tough, flexible, or easy to keep clean and hygienic.

Ask pupils to suggest or explain where plastics come from and how they are made and then formed. Use slides 2 – 5 to review how plastics are produced from polymers.

Work through slides 6 – 13 (optional) and then 14 – 20 to explore types of plastic and how they can be formed into different products using a range of moulding processes. The later slides contain useful animations which help to explain these different processes.

(Note: Depending on prior learning, slides 6 – 13 which introduce the different types of plastic are optional. Equally for younger or less able pupils, or for timing reasons, you may wish to omit these slides and focus only on slides 14 – 20 which describe the six moulding processes.)

Ask pupils to suggest what other products each process might be well suited to manufacturing.

Explain to pupils that they are going to take on the role of a product development team. Teams have six products under development, which are suitable for making out of a plastic. Each product must have certain features that make them work well or be appealing to customers, and will need to be formed in a certain way.
Main activities (Cont)

Pupils will have summaries for the range of processes (and the plastics (polymers) they can form), and must identify which one will deliver the right product attributes and benefits, aligning the right manufacturing process with each product.

- Assign pupils into groups of two, three or six and hand out a set of product cards and process and polymer cards.
- Review the cards as a whole class (enough for groups to identify key information on each type of card). Give groups time to discuss each option and match the six products to the best manufacturing process and polymers.
- Invite groups to present one choice until you have covered all six products. (Some pupils might also be able to suggest a specific plastic / polymer for each product.)

Answers: see slide 21.

Plenary 10 minutes

Explain that product designers and manufacturers market their new products to retailers, who will want to know that the product’s design and materials will help it sell well.

Assign one product to each group, or allow pupils to make their own choice (groups of six can be assigned or choose two products). Ask pupils to write a brief promotional paragraph for their product that outlines the manufacturing method and links these to the product’s features and user benefits: how can the choice of process and the product features it creates help ‘sell’ the product to retailers?

Invite selected groups to read their paragraph and help pupils discuss one another’s ideas.

Ask pupils to identify some advantages of using plastics for product designers looking to deliver a range of functionality, features and benefits.

Extension ideas

Pupils could research the plastics used in a range of products – these are often identifiable via the product’s recycling information – and find out more about the polymer used and how it can be formed during manufacturing.

Pupils can research the sustainability of different polymers to find out which ones can currently be recycled and what products these recycled polymers can be used to make.