PRODUCT WARS: PACKAGE DESIGN

These activities are designed for 60-minute lessons. You may need to adapt the materials for use in longer or shorter lessons.

INTRODUCTION

In this activity, pupils are invited to consider drinks packages before designing and making a container for their smoothie.

This activity is mainly paper based. It has been designed for use with pupils in a maths classroom equipped with a data projector and whiteboard. It is suggested that pupils work together in pairs or small groups to encourage appropriate levels of participation and discussion.

The activity contains 3 options offering varying degrees of challenge. Different pupil pairs or groups within a class can work at different options. Alternatively, you may prefer to ensure each group has a mix of pupils. This will help to create appropriate conditions for peer support.

These different options are as follows:

- **Option A:** Pupils are presented with a worksheet asking them to decide which diagrams are nets for a cuboid. The main activity asks them to design and make a cuboid container, calculating its volume in cubic millimetres and its capacity in millilitres. A sheet with the net of a cuboid is provided. This option is considered appropriate for learners working at **level 3 – level 4 of the National Curriculum**.

- **Option B:** Pupils are presented with a worksheet similar to that in Option A but including nets for containers that are not cuboid. The main activity asks them to design and make a container that is not necessarily cuboid, calculating its volume in cubic millimetres and its capacity in millilitres. A sheet with the net of a container is provided. This option is considered appropriate for pupils working at **level 5 – level 6 of the National Curriculum**.

- **Option C:** Pupils are presented with a worksheet asking them to draw 3 nets for an equilateral triangular prism. The main activity asks them to design and make a container of any shape with a capacity of exactly 1 litre. This option is considered appropriate for learners working **at or above level 6 of the National Curriculum**.

OBJECTIVES

- Pupils will use problem-solving skills.
- Pupils will relate 2-D drawings to 3-D models.
- Pupils will construct accurately using a ruler (and compasses).
- Pupils will find volumes and relate them to capacity.

RESOURCES

Pupils will need the following:

- copies of the nets provided for the appropriate option
- copies of the homework sheet provided for the appropriate option
- card (an A3 sheet will be required for Option C)
- scissors
- glue sticks
- compasses
- rulers.

DELIVERING THE CASE STUDY

- The activity can be used to introduce or revise the idea of a net as a 2-D diagram that can be folded to make a 3-D model.
- Encourage pupils to open up various boxes and containers to find out the net used in their construction before they begin the activity.
- Once pupils have used the net provided they should design and make their own container.
- After they have completed the activity open up a juice container to see how it has been created by folding a rectangular sheet of card.
- Discuss why drink manufacturers would use this design, e.g. rectangles tessellate so many container nets can be cut from a large sheet of card with no waste.
- The activity can be used to revise, or to introduce, volume.
- It should be used to introduce, or reinforce, the connection between volume and capacity. The link with mass can also be stressed, i.e. for water:
    - 1 mm^3 ≡ 1 millilitre
    - 1 cm^3 = 1000 mm^3 ≡ 1000 ml =1 centilitre
    - 1000000 mm^3 = 1000 cm^3 ≡ 1000000 ml = 1000 cl = 1 litre
    - 1 litre of water weighs 1 kilogram
    - 1 ml of water weighs 1 gram
- If time allows, pupils can be asked to complete the extension worksheet provided.

HOMEWORK SUGGESTIONS

Pupils could be asked to produce a packaging display based on examples of packaging collected at home. This should include the dimensions and volumes of the packages used.

Alternatively, pupils could be asked to prepare for their presentations next lesson (see below).

FINAL PRESENTATION ACTIVITY

Extend the Product Wars case study by allowing additional lesson time for pupils to create a detailed presentation of their findings across all three activities. Pupils should be directed to deliver their presentations as if to Brad King himself, using mathematical reasoning to present their cases.

Introduce the presentation activity and encourage pupils to identify the success criteria that they think are relevant. These could include, for example, appropriate use of data.

Pupils will need to refer back to their records from each activity in order to produce their group reports or displays. Pupils should be encouraged to develop their results:

- calculating any summary statistics
- describing and attempting to explain the patterns within the results, and
- presenting the data using appropriate construction techniques.

Groups could then be asked to present their report or display to the rest of the class. Other pupils could then be invited to peer-evaluate the reports or displays offering suggestions on how they could still be improved relative to the success criteria identified earlier.