Lesson plan

Surface area and volume

Level 2

1. Lesson objectives

- Identify properties of common 3D shapes
- Through exploration, calculate volume and surface area of common 3D shapes
- Use knowledge of volume and surface area for problem solving questions

2. Functional Skills Level 2 curriculum

Common measures, shape and space
17 use formulae to find volumes and surface areas of 3D shapes including cylinders (formulae to be given for 3D shapes other than cylinders)

3. Lesson plan

This is an overview of the lesson. More notes can be found in the notes in the lesson slides.

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Introduction	To assess prior knowledge and recap the properties of 3D shapes, including their cross sections and areas of these	15	Introduce the lesson through a poster activity. Share the worksheet with learners and distribute 3D shapes (or 3D models) to pairs. Learners complete the poster for their shape and then feed back key points to the class. While peers feed back, learners are to record properties of all shapes down on both sides of the worksheet.	Starter task worksheet (3D solid shapes or models) Slides 2–6
Introduce	To introduce the context	5	The context of an ice-cream factory is introduced along with the aim of reducing the costs in the factory, starting off by looking at different container designs.	Slide 7
Activity	To discuss how different dimensions of cuboid with a constant volume result in different surface areas	10	The company are changing their packaging for 900 ml containers of ice-cream. What dimensions can they come up with? Discussion about using factors to determine shape dimensions. Learners roughly sketch three different cuboid containers.	Slide 8
Discuss	To discuss volume of prisms and cylinders	5	Learners think about how they calculate the volume of prisms and share with the class. Key ideas slide to reinforce this.	Slides 9 and 10

Activity	Purpose of this activity	Time (min)	Guidance	Materials
Explore and feedback	Learners are to explore volume and surface area of different shapes and the effect that dimensions have on surface area	30	Tutor introduces the explorative task and develops the concept of surface area (if not previously addressed). Key ideas slide reinforces this. Tutor hands out the worksheet. Scaffolding has been provided in some cases. Learners see whether they come to any conclusions about the effect of dimensions on the surface area. Which shape is best for minimal chocolate? Possible discussion about other factors: ease of eating, melting, strength, name, etc. Lower ability learners could just explore cuboids (not triangular prisms/cylinders).	Slides 11–15 Explore worksheet Explore answers
Exam Practice	To consolidate lesson objectives	20	Slide 16 provides some FS exam tips which can be applied to the questions that follow. Ask learners complete some of the FS exam questions that vary in difficulty. Answers are provided on the power point. Refer to the initial table if required and for support.	Slides 16–22 Exam questions worksheet
Review	To recap key learning points and re-visit learning objectives	5	Tutor to draw from the learners the key learning points and misconceptions. Review learning objectives.	Slide 23