

Surface area



Key idea

Surface area is the total area of all the outside faces of a 3D shape. Imagine wrapping the shape in paper — the amount of paper needed is the surface area. A good method is to find the area of each face, then add them all together.

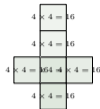
Step-by-step method

1. Identify every face on the outside of the shape.
2. Find the area of each face using the correct formula.
3. Multiply when faces are the same (congruent pairs).
4. Add all the areas together.
5. Write the final answer with square units (cm^2 , m^2 , etc.).

Common mistake

Forgetting a face. A cube and a cuboid each have **6 faces**. A closed cylinder has **2 circles** plus the curved surface — that's 3 parts, not 2!

Cube



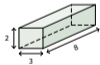
A cube has side length 4 cm. All faces are identical squares.

$$\text{Area of one face: } 4 \times 4 = 16 \text{ cm}^2$$

$$6 \text{ identical faces: } 6 \times 16 = 96 \text{ cm}^2$$

$$\text{Surface area} = 96 \text{ cm}^2$$

Cuboid



A box is 8 cm by 3 cm by 2 cm. Opposite faces are the same size.

$$\text{Top \& bottom: } 2 \times (8 \times 3) = 48$$

$$\text{Front \& back: } 2 \times (8 \times 2) = 32$$

$$\text{Left \& right: } 2 \times (3 \times 2) = 12$$

$$\text{Total: } 48 + 32 + 12 = 92$$

$$\text{Surface area} = 92 \text{ cm}^2$$