

The flat faces hiding on solids

CURRICULUM ALIGNMENT

SHA.SHP.2 examine, categorise and model 3-D and 2-D shapes.

INTERACTIVES Drag Sort · challenge, display, explore

WHAT THIS LESSON TEACHES

A face is a flat side of a solid shape. When you press that flat face in paint it leaves a flat footprint of the same shape.

→ A cube has six square faces so every print it makes is a square.

→ A cylinder stood on its end prints a circle; a cereal-box cuboid prints a rectangle.

MODEL THIS ON THE BOARD

CUBE PAINT PRINT

- 1 Look at the solid: a classroom cube has six flat square faces.
- 2 Press one face gently in paint.
- 3 The footprint left on paper is a **square**.

LESSON ARC

Open with three paint footprints on the IWB — square, circle, rectangle — named aloud before any solid appears. Walk each solid to its print: cube to square, cylinder on its end to circle, cuboid to rectangle, then pause on the sphere's smudge. Pupils match the four solids together at the board, draw a cube's square footprint in their maths copy, and run two brisk Class Challenge match sets. Close by revoicing why only a flat face can leave a flat print.

TEACHING MOVES

1. **Getting Started.** Draw or stick three clear footprints on the IWB — square, circle, rectangle. Point to each and have the class name the shape in unison. Hold every solid back; do not ask which solid made which print yet.
2. **Watch and Notice.** If real solids are to hand, press or show each one before pointing to its board display. Cube any face → square; cylinder stood on its end → circle; cereal-box cuboid → rectangle. On the sphere, pause and ask why it leaves only a smudge — wait for 'no flat face' or 'all curved'.
3. **Try It Together.** Call the solids in order: cube, cylinder, cuboid, sphere. Before each drop, ask the class to name the print out loud. On the sphere, hold for 'no flat face' and let the class agree or correct.
4. **Draw the cube's footprint.** Pupils draw the cube's footprint in their maths copy. Walk the rows glancing for a clear square — whole-class copybook practice, not marking.
5. **Class Challenge.** Keep the board work brisk. Run set 1 (cube, cylinder, cuboid → square, circle, rectangle) then set 2 (all four, adding no flat face). Check each answer before moving on. Watch for the sphere landing under the circle.
6. **What Did We Notice?.** Listen for 'no flat face' or 'it is all curved'. Revoice: 'so only a flat face can leave a flat print'. If a pupil says 'too round to press' without naming the missing face, ask what the sphere is missing.

COMMON MISCONCEPTIONS

⚠ Pupils drop the sphere under the circle — they think ‘round solid means circle footprint’.
Hold the sphere beside the cylinder stood on its end. Point: the cylinder has a flat circular face to press; the sphere has none. Ask which solid can leave a clean circle outline.

⚠ Pupils call the cuboid’s footprint a square because they have just matched the cube.
Trace a long face of the cuboid (or cereal-box picture). ‘Four sides, but not all equal — that is a rectangle, not a square.’

DIFFERENTIATION

EMERGING

- Match only the cube to the square first; bring in the cylinder once that pairing is secure.
- Give the solid name aloud and ask pupils only to point to the matching footprint on the board.

DEVELOPING

- After set 1, ask why the cylinder must stand on its end to print a circle — what fails if it rests on the curve?
- On the cuboid match, ask which faces of a cereal box still print a rectangle.

PROFICIENT

- Narrate at the board: a long cereal box on its side and on its end — both still rectangle. Ask why both ways show a flat rectangle face.
- Ask: name one classroom object that would print a circle and one that would leave no flat footprint — justify each out loud.

✂ **Cross-curricular:** Link to PE — a football is a sphere; roll it on the yard and notice it never stamps a flat shape.

ANSWER KEY

Q1: square

Q2: circle

Q3: rectangle

Q4: A sphere has no flat faces (only a curved surface).

Q5: cube → square; standing cylinder → circle; cuboid → rectangle

Q6: sphere

a) **Always** : Every face of a cube is a flat square.

b) **Never** : A cube leaves a square, a standing cylinder a circle, and a sphere no flat footprint.

c) **Never** : A sphere has no flat faces so it never leaves a flat outline print.

d) **Never** : A cuboid has six flat faces.

EXTENSION SHEET · STRETCH ANSWERS

S1: square

S2: circle

S3: rectangle

S4: sphere

Investigation: Paint prints — open-ended; scan pupils' working for valid solution paths rather than a single answer.