

3D shapes: faces, edges and corners

CURRICULUM ALIGNMENT

SHA.SHP.3a

investigate and analyse the properties of 3-D and 2-D shapes and identify classes of shapes based on these properties.

INTERACTIVES 3D Shape Inspector · challenge, display, explore

WHAT THIS LESSON TEACHES

A face is a flat or curved surface on a solid shape. An edge is the line where two faces meet and a corner is the point where edges meet.

→ A dice has 6 flat faces.

→ A cone has 1 corner at its pointy tip.

MODEL THIS ON THE BOARD

PARTS OF A BUILDING CUBE

- 1 Tap every flat side of the cube you are building: count **6** faces.
- 2 Trace each line where two faces join: count **12** edges.
- 3 Touch each pointy tip where edges meet: count **8** corners.

DISCUSSION STARTER

REFLECT When you count faces, edges and corners, which do you find trickiest?

LESSON ARC

Open with a real dice in hand — finger a flat side, a join line, then a pointy tip before any names. Watch and Notice walks cube → cuboid → cylinder → cone on the shape-inspector interactive, tallying faces, edges and corners aloud. Try It Together: pupils tap each solid on the board while the group's real solid is passed round to check. Copybook builds a three-column tally table for the cube. Class Challenge is brisk whole-class practice; maths talk pins why a cylinder has no corners but a cone has one.

TEACHING MOVES

1. **Getting Started.** Hold up a real dice and run your finger slowly over a flat side, then along a join line, then onto a corner. Take two or three hands-up answers pointing at each part before you name face, edge or corner.
2. **Watch and Notice.** On the shape-inspector interactive, count the cube with the class — six faces, twelve edges, eight corners — tapping the board and a real dice together. Pause on the cuboid: same counts, rectangle faces instead of squares. Hold out for the cylinder's zero corners and the cone's single tip — ask before you reveal each.
3. **Try It Together.** Rotate a pupil per solid. As they tap to tally on the board, pass the group's real solid round so others can check. Between solids, ask the room to predict the next count; listen for double-counted edges or missed back faces and have them turn the solid right round before finishing.
4. **Build the Table in Your Copy.** Pupils rule three columns — faces, edges, corners — and fill the cube row by counting a real dice or the board cube, not from memory. Walk the room glancing that headings are ruled and the count is live.

5. **Class Challenge.** Keep board turns brisk: pupil answers, class agrees aloud, Check, move on. On the cone-corner item, stop and ask why a cone has one corner but a cylinder has none before anyone presses Check.
6. **What Did We Notice?.** Ask why a cylinder has faces but no corners while a cone has just one. Revoice a strong answer: the cone comes to a single point; the cylinder is round all the way, nothing ever tips to a point. Head off 'a curved face doesn't count'.

COMMON MISCONCEPTIONS

⚠ Pupils say a curved surface isn't a face — 'only flat sides count' — so they give the cylinder two faces instead of three.

Hold the real cylinder up and wrap a finger all the way round the curved part. 'This whole surface is one face — it just isn't flat. Flat or curved, if it's a surface of the solid, it counts.'

⚠ Pupils miss the hidden back or bottom faces and tally five faces on a cube, or double-count an edge they've already traced.

Stop and turn the real solid right round in front of the class. 'We only finish when every side has been seen.' Have the pupil at the board tap each face once as the solid rotates.

⚠ Pupils give the cone zero corners (treating it like the cylinder) or invent corners where the curved face meets the base circle.

Point to the tip: 'Does anything come to a sharp point here?' Then trace the base circle: 'Edges meet at a point for a corner — a smooth circle join isn't a corner.' Compare beside the cylinder so the difference is visible.

DIFFERENTIATION

EMERGING

- Stay on the cube with a real dice in hand — finger-trace each face, edge and corner before any tally is written; leave cylinder and cone for teacher-supported turns.
- Pre-rule the three column headings in the copybook so the pupil only fills the cube counts from the solid in front of them.

DEVELOPING

- After the cube row, ask: the cuboid has rectangle faces, not squares — why are the face, edge and corner counts still the same?
- Before the board pupil taps the cylinder, take a silent predict: faces? edges? corners? Then check against the real solid.

PROFICIENT

- On the copybook page after the cube row, ask them to sketch and tally a square-based pyramid from reasoning alone — how many faces, edges, corners — then test the guess against the shape-inspector if time.
- During Class Challenge, have a fast finisher justify aloud why cube and cuboid match on all three counts before the next board turn.

✂ **Cross-curricular:** Link to SPHE packaging — unwrap a cereal box and tally its faces, edges and corners before recycling.

ANSWER KEY

b) 12

c) 8

Q1: 6

Q2: 12

Q3: 8

Q4: 3

Q5: 1

Q6: 0

Spot: A cube has ****6 faces****, ****12 edges**** and ****8 corners****. Cian swapped the edges and the corners.

EXTENSION SHEET · STRETCH ANSWERS

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