

Cylinder and sphere: the rolling shapes

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 sphere is round every way you turn it, with no flat faces and no edges, so it rolls anywhere. A cylinder has two flat circle ends and a curved middle, so it rolls in a straight line on its side.

→ A football, an orange and a marble are spheres: they roll wherever they please.

→ A tin of beans and a kitchen-roll tube are cylinders: they roll in a straight line on their curved side.

MODEL THIS ON THE BOARD

BALL OR TIN ON THE RAMP

- 1 Look at the **football**: it is round every way, with **no flat faces** and **no edges**, so it is a sphere.
- 2 A sphere rolls **anywhere**, so the football may roll off sideways down the slope.
- 3 Look at the **tin of beans**: it has **two flat circle ends** and a curved middle, so it is a cylinder.
- 4 A cylinder rolls in a **straight line** on its curved side, so the tin rolls straight down the ramp.

LESSON ARC

Open with the ramp photo of a tin and a ball; after quiet think-time, annotate a straight arrow for the tin and a sideways arrow for the ball. Reveal four object cards one by one, holding for flat circle faces or none before naming sphere or cylinder. Sort six known objects plus an egg together, saying rolls straight, rolls anywhere, or wobbles. Pupils write both words and draw a cylinder's circle face in their copybook, then run three Class Challenge trays at the IWB before the maths-talk close.

TEACHING MOVES

1. **Getting Started.** Show the ramp photo with tin and ball at the top. Give five seconds of quiet think-time, then take two or three ideas for each object. Annotate a straight arrow down from the tin and a sideways arrow from the ball. Name what the class sees: the tin rolls straight; the ball rolls anywhere.
2. **Watch and Notice.** Reveal one card at a time and hold for the reason before it lands: flat circle faces, or none at all? Football and orange — round every way, no flat faces, sphere. Tin and kitchen-roll tube — two flat circle ends and a curved middle, cylinder. Point at the circle face the tube stands on.
3. **Try It Together.** Pupils take turns on the first six cards; before each drop ask the class rolls straight or rolls anywhere. Flag the candle: tall and thin, but still a cylinder — two flat ends and a curved middle. Last card is the egg — curved, not round every way, not a tin shape; it wobbles, so Neither. Do not score yet.
4. **Write and draw in your copy.** Four minutes for both words and one drawing. Walk the row glancing for a clean round shape under the word cylinder — the circle face it stands on. Whole-class copybook practice, not marking.
5. **Class Challenge.** Keep board work brisk — practice, not re-teaching. Run three trays in about six minutes: four easy objects; six known objects adding marble and candle; then catch the egg in Neither and revoice wobbles, so neither. Stop after the egg tray if time is tight.

6. What Did We Notice?. Listen for pupils reusing flat ends and a curved middle for the cylinder, and round-all-over for the sphere. Revoice: the cylinder's curved side keeps it in a line; the sphere is round every way so it can go anywhere. Head off size deciding the roll — a marble and a football both roll anywhere.

COMMON MISCONCEPTIONS

⚠ Pupils call the egg a sphere because it is curved and looks roughly round.

Hold the egg photo and run the test aloud: round every way you turn it, with no flat faces? It wobbles rather than rolling freely, so it goes in Neither.

⚠ Pupils say the candle is not a cylinder because it is tall and thin, not tin-shaped.

Point back at the two flat circle ends and the curved middle on the photo. Same test as the tin of beans — the shape decides, not the height.

⚠ Pupils think a big ball rolls differently from a small marble because of size.

Revoice both as spheres: round every way, no flat faces, so both roll anywhere. Size does not change the roll rule.

DIFFERENTIATION

EMERGING

- On each card, point first at the ends only and ask flat circle faces — yes or no? before naming the shape.
- In the copybook, lightly pencil the two words for tracing; the pupil adds only the circle-face drawing under cylinder.

DEVELOPING

- After a correct sort, ask how does this one roll? so the pupil links the name to straight, anywhere, or wobble.
- On the candle card, ask why it still counts as a cylinder even though it looks nothing like a tin.

PROFICIENT

- During Class Challenge, ask them to justify Neither for the egg in one full sentence before the card drops.
- If a turn finishes early, invite: name one classroom object that would roll straight and one that would roll anywhere.

➤ **Cross-curricular:** Link to PE — spot spheres and cylinders in the PE store and say how each would roll.

ANSWER KEY

Q1: sphere

Q2: cylinder

Q3: rolls straight (it is a cylinder)

Q4: football = sphere; kitchen-roll tube = cylinder; orange = sphere

Q5: sliotar = sphere; candle = cylinder; match ball = sphere

Q6:

Cylinder has flat circle ends (curves only one way) so rolls straight; sphere is curved every way so rolls anywhere.

a) Never : A sphere has no flat faces and no edges at all.

b) Always : The two flat ends keep a cylinder rolling straight.

c) Always : A sphere is curved all over, with no flat faces and no edges.

d) Never : A sphere can roll anywhere because it is round every way.

EXTENSION SHEET · STRETCH ANSWERS

S1: sphere

S2: cylinder

S3: cylinder

S4: sphere

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