

Sorting 2D shapes by their properties

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 2D Shape Inspector · display, explore

WHAT THIS LESSON TEACHES

We sort 2D shapes into groups by checking a rule about their sides or corners.

→ A square has 4 sides and all sides the same length so it fits the rule '4 sides'.

→ If the rule is 'has 4 corners' then square and rectangle go in but circle stays out.

MODEL THIS ON THE BOARD

SORT THE SHAPES

- 1 Look at the shapes: triangle, square, rectangle, circle, hexagon.
- 2 Check the rule 'has 4 corners'.
- 3 Put square and rectangle in the group because they have 4 corners.
- 4 Leave out triangle, circle and hexagon.

LESSON ARC

Open with five shapes on the board and one spoken question — which have four corners? — taking three hands-up answers, no rule revealed yet. Model checking each shape's sides and corners against a named rule, pivoting on the square fitting two rules at once. Pupils sort together at the board, then draw two labelled boxes in their copy. The Class Challenge is hands-on: pupils sort their own cut-out cards through four narrowing rules until only the square is left.

TEACHING MOVES

1. **Getting Started.** Give a few seconds of quiet think-time, then take exactly three hands-up answers — not open call-outs. Hold the rules back; this is only about noticing that we can pick one feature to group by.
2. **Watch and Notice.** Name the property before you reveal it each time: 'our rule is four corners — does this shape pass?' On the square, stress it fits TWO rules (four corners AND all sides equal) — that's the seed of the two-groups idea later. On the circle, point out its edge is one smooth curve with no straight sides.
3. **Try It Together.** Say the rule aloud and keep it fixed for the whole round; a pupil taps to reveal the side or corner count, then the whole class calls pass or fail before naming the group. Watch for pupils sorting by how a shape looks — revoice 'we check the rule, not the tilt' for a tilted square. Between rules, ask 'name me one shape that passed our last rule.'
4. **Sort Into Two Boxes in Your Copy.** Walk the room as pupils draw their two boxes — glance for the circle and triangle landing in 'not 4 corners' and the square and rectangle in '4 corners'. No individual marking; this is whole-class copybook practice.
5. **Class Challenge.** Hand each group a set of printed cards so every pupil sorts real shapes at the desk — not a board demo. Give the four rules one at a time: say a rule, let groups sort, check together, reveal the next. Each rule narrows the set until only the square survives the last one.

6. What Did We Notice?. Listen for a pupil naming the square as the shape that fits two rules at once, and revoice it: 'the square is true for both — it has four equal sides, so it fits both groups.' Head off the idea that a shape can only ever sit in one group.

COMMON MISCONCEPTIONS

⚠ Pupils say a tilted square 'isn't a square any more' and won't put it in the 'four corners' group because it doesn't look right.

Rotate the paper card on the board and count the four corners aloud with the class while it sits at an angle. Revoice: 'we check the rule, not the tilt — it still has four corners.'

⚠ When asked if a square can belong to two groups, pupils insist a shape can only ever be in one group. Hold the square card against both labels in turn — '4 sides?' yes, 'all sides equal?' also yes. Show it passes both checks, so it honestly belongs in both groups at once.

⚠ Pupils count the hexagon as 'four sides' or wave it through the 'exactly four sides' rule without checking.

Pause and have the class point-and-count all six sides of the hexagon card together. It fails the 'exactly four sides' rule — naming six is the whole point of including it.

DIFFERENTIATION

EMERGING

- Give these pupils only three cards to sort in the Class Challenge — square, circle, triangle — so the corner rule and four-sides rule stay clear before more shapes join.
- For the copybook boxes, let pupils place the actual paper cards in two areas of the desk first, then copy that arrangement into the two drawn boxes.

DEVELOPING

- After the copybook boxes, ask pupils to relabel one box as 'all sides equal' and re-sort the same shapes — which shapes moved, and which stayed?
- Pose: which shape would land in BOTH a 'four corners' box and an 'all sides equal' box? Have them draw it sitting between the two.

PROFICIENT

- Ask pupils to invent a fourth secret sorting rule for the day's shapes, write it on the copybook page without the rule's name, and challenge themselves to predict exactly which shapes pass — then check by sorting the cards.
- Pose: 'find a single rule that puts the square and the rectangle together but leaves the triangle out — explain why your rule works.'

✂ **Cross-curricular:** Tie to Geography — pupils sort road signs they pass on the way to school (triangle warning, circle limit, rectangle direction) by their shape property.

ANSWER KEY

Scaffold: visual check on the page

Q1: square, rectangle, rhombus, parallelogram, trapezium (any 4-sided/4-cornered shapes)

Q2: all except circle/oval

Q3: square, rhombus

Q4: Yes, for example a square (4 sides and all sides equal)

a) Always : Every square has exactly four corners.

b) Never : A circle has no straight sides and no corners.

c) Never : Its long sides are longer than its short sides; only the opposite sides match.

d) Sometimes : True for a square, which fits '4 sides' and 'all sides equal'; false for a circle, which fits neither.

EXTENSION SHEET · STRETCH ANSWERS

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