

Classifying triangles and quadrilaterals by properties

CURRICULUM ALIGNMENT

SHA.SHP.4a

construct 3-D and 2-D models or structures given defined measurements and/or specific conditions.

ALG.PRR.4a

identify, explain and apply generalisations, including properties of operations, mathematical models and patterns.

INTERACTIVES [2D Shape Inspector · display, explore](#) [Drag Sort · challenge](#)

WHAT THIS LESSON TEACHES

Shapes are grouped by their **properties** — side lengths, equal angles and parallel sides.

→ Triangles: equilateral (all equal), isosceles (two equal), scalene (none equal).

→ A square is a special rectangle **and** a special rhombus.

LESSON ARC

Open with a hands-up split: is a square a rectangle? Don't settle it. Reveal three triangles on the shape-inspector interactive, naming them by sides then by angles, before adding the rhombus, parallelogram and trapezium. The class checks each shape against a named property on the board, then builds a sides/angles/parallel-lines tick-table in their copy. The Class Challenge sorts triangles and quadrilaterals into overlapping groups, looping back to settle the opening question.

TEACHING MOVES

- Getting Started.** Take three hands-up answers, not open call-outs, and resist settling the argument — it is the whole lesson. Listen for the pupil who says 'a square is a rectangle but not the other way round' and bank that phrasing for the wrap.
- Watch and Notice.** Reveal one triangle at a time on the shape-inspector interactive and say 'equal sides give equal angles' as the matching angles light up. Make the point explicitly that an equilateral triangle is acute (all 60°) — the Class Challenge sort depends on pupils holding this. When the trapezium goes up, point to its single parallel pair and contrast it with the rhombus's two.
- Try It Together.** Call one property at a time and send a pupil to the board to tag each shape that fits — this round is talking it through, not marking. Start easy ('three sides') and build to 'exactly one pair of parallel sides' to catch the trapezium. Revoice: 'so a square fits because it has two pairs of parallel sides AND four equal sides.'
- Build a Property Table in Your Copy.** Walk the room glancing at column headings and ticks — sides, angles, parallel lines. Watch for the square row: pupils routinely leave its parallel-lines column blank because the parallel sides aren't the 'obvious' feature. Prompt that pupil on the spot rather than at the end.
- Class Challenge.** Run the bank in order so the difficulty builds; pupils take turns at the board and the class confirms each answer before moving on. Keep it brisk — this is consolidation, not re-teaching. Before the first sort, remind the class that an equilateral triangle counts as acute.
- What Did We Notice?.** Display only — no writing. Push pupils to reason from properties, not appearance: 'a square ticks every rectangle box plus one more, so it fits inside the rectangle group; a rectangle is missing the equal-sides box so it does not fit inside the square group.' Head off the gut answer that 'they just look different.'

COMMON MISCONCEPTIONS

⚠ Pupils say 'no, a square isn't a rectangle — they look different', reasoning from the picture rather than the properties.

Run both shapes through the property table live: four right angles? two pairs of parallel sides? Both tick those. The square ticks one extra box (four equal sides), so it sits inside the rectangle group, not outside it.

⚠ When tagging 'has two pairs of parallel sides', pupils tag the trapezium — they assume every four-sided shape has two parallel pairs.

Stop at the trapezium on the shape-inspector and trace each side with a finger: only the top and bottom stay the same distance apart. Tag it under 'exactly one pair' and leave the 'two pairs' column empty for that row.

⚠ In the angle sort, pupils refuse to call an equilateral triangle 'acute' because it 'looks special' or already has a sides-name.

Point at all three 60° angles on the interactive: every angle is under 90° , so it is acute. A triangle gets a sides-name AND an angles-name — the two labels live in different columns.

DIFFERENTIATION

EMERGING

- Give these pupils the property table with the three column headings pre-drawn so they spend their effort on the ticks, not the structure.
- On the Try It Together board, start them on side-counting properties ('three sides', 'four sides') before any parallel-line property.

DEVELOPING

- After the copybook table, ask: which shape has the most ticks across the three columns, and why?
- Pose a missing-shape riddle — 'I have four equal sides but no right angles, what am I?' (rhombus) — and ask them to write the giveaway property.

PROFICIENT

- During the Class Challenge overlap, ask the strongest pupils to name every shape that lives in BOTH 'parallel sides' and 'equal sides', and justify each from its property ticks — narrate one for the class as the bridge back to the opening question.
- Challenge them to explain to a younger pupil, in one sentence each, why a square is a rectangle but a rectangle is not a square.

◦ **Cross-curricular:** Tie to Geography — pupils spot triangle and quadrilateral types in roof trusses and gable ends on buildings around the school, naming each by its properties.

ANSWER KEY

a) **Equilateral triangle:** three equal sides

b) **Isosceles triangle:** exactly two equal sides

c) **Square:** four equal sides and four right angles

d) **Rectangle:** opposite sides equal, four right angles

e) **Rhombus:** four equal sides, no right angles

Q1: a rectangle

Q2: an isosceles triangle

Q3: a regular hexagon

Q4: a regular hexagon

EXTENSION SHEET · STRETCH ANSWERS

S1: an isosceles trapezium

S3: a trapezium

S2: an isosceles triangle