

Making new shapes from old: shapes hiding inside shapes

CURRICULUM ALIGNMENT

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

INTERACTIVES Pattern Blocks · challenge, display, explore

WHAT THIS LESSON TEACHES

Smaller shapes fit together with no gaps and no overlaps to make one bigger shape. Join lines show where the small shapes still hide inside the big one.

→ Two squares side by side make one long rectangle.

→ Six triangles close up into a hexagon only when every side touches another side.

MODEL THIS ON THE BOARD

ONE SNIP MAKES TWO TRIANGLES

- 1 Start with 1 paper square.
- 2 Cut once from corner to corner.
- 3 The square becomes 2 triangles that still hide the join line where they met.

LESSON ARC

Open on the visualiser by snipping a paper square corner to corner so two triangles fall apart. Walk three pattern-block builds on the IWB—two squares into a rectangle, two triangles into a diamond, six triangles into a hexagon—tracing each join line. Pupils take turns placing those same builds in Try It Together, then draw the corner-to-corner cut in their copy. Class Challenge runs four brisk board builds; wrap by naming how the same small shapes still hide inside different big ones.

TEACHING MOVES

1. **Getting Started.** Cut the paper square corner to corner on the visualiser so both triangles drop clearly into view. Take three hands-up answers naming what came out—push for ‘two triangles’, not ‘two bits’—before you move on.
2. **Watch and Notice.** Run the three builds in order. On each one, point slowly along the join line and ask what the big shape is called. On the hexagon, pause: class counts the six triangles, then the six outer sides, then traces every join line so they see the small shapes still hiding inside.
3. **Try It Together.** Call targets in order: rectangle from 2 squares, diamond from 2 triangles, hexagon from 6 triangles. One pupil places; everyone else agrees or corrects out loud. After each build, have the class trace the join lines with a finger in the air. Clear the board between builds; repeat any build that left a gap before moving on.
4. **Cut the square in your copy.** Walk the room glancing at cut lines—corner to corner, not side to side. Offer the Shapes to cut out printable as a tracing template for anyone still steadying their square. Whole-class copybook practice; nothing is marked.
5. **Class Challenge.** Keep board turns brisk—practice, not a fresh teach. After each build, check with the class, then ask which small shapes are still hiding inside. Put the bigger triangle from 4 triangles before the hexagon; the six-triangle hexagon is the stretch turn where every edge must meet.

6. What Did We Notice?. Ask how the same small shapes can build so many different big shapes. Re-voice answers that name join lines: ‘so two triangles can hide inside a diamond, and six inside a hexagon—same triangles, different builds.’ Head off any idea that the small shapes vanish. Celebrate one neat join line by naming the child.

COMMON MISCONCEPTIONS

⚠ Pupils treat the finished build as only the big shape—‘it’s just a hexagon now’—as if the small shapes vanished.

Trace every join line on the IWB hexagon with your finger. Ask the class to count the six triangles still sitting inside. Re-voice: the join lines prove the small shapes never left.

⚠ A pupil places blocks with a gap or a slight overlap and still calls the build finished.

Freeze the board. Point at the gap or overlap: ‘does every edge meet another edge?’ Clear and rebuild until sides touch with nothing left open and nothing sitting on top.

⚠ In the copy, pupils draw the cut from mid-side to mid-side instead of corner to corner.

Stop beside them and mark the four corners. ‘Corner to corner—like the snip we watched on the visualiser.’ Offer the Shapes to cut out sheet to trace if the square itself is wobbly.

DIFFERENTIATION

EMERGING

- Invite them up only for the two-square rectangle and two-triangle diamond; teacher-place the hexagon while they watch for join lines from the carpet.
- Hand the Shapes to cut out printable so they trace a steady square before drawing the corner-to-corner line in their copy.

DEVELOPING

- After a clean hexagon, ask them to point out every join line in the air before the class moves on.
- On the copybook square, ask: if you drew the other corner-to-corner line as well, how many triangles would you see?

PROFICIENT

- Give them the Class Challenge hexagon turn and ask them to say each edge-meet aloud as they place the sixth triangle.
- After board work, pose on the IWB: ‘can four triangles make a bigger triangle?’—let them try the build and name the join lines they find.

✂ **Cross-curricular:** Link to Visual Art—arrange paper triangles into a simple quilt-block pattern and spot every join line.

ANSWER KEY

Scaffold: visual check on the page

Q1: a square

Q2: a bigger triangle

Q3: 4

a) Always : The outer edges form a rectangle and the shared side is the join line.

b) Always : The meeting edge stays visible as the line down the middle.

c) Never : Every side must touch another side with no gaps for a closed hexagon.

d) Sometimes : Different arrangements with no gaps can form different outlines.

EXTENSION SHEET · STRETCH ANSWERS

S1: rectangle

S2: a diamond

S3: hexagon

S4: two triangles

Investigation: Build a bigger shape — open-ended; scan pupils’ working for valid solution paths rather than a single answer.