

Lesson 74 SHAPE & SPACE

Regular and irregular polygons: pentagon, hexagon and octagon

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

Drag Sort · challenge

WHAT THIS LESSON TEACHES

A polygon is a closed flat shape made only of straight sides. It is regular when all its sides are equal and all its corners are equal; it is irregular when at least one side or corner is different.

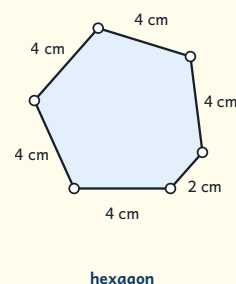
→ A regular hexagon has 6 equal sides, like a honeycomb cell.

→ An octagon has 8 sides; a pentagon has 5 sides.

MODEL THIS ON THE BOARD

IS THIS HEXAGON REGULAR OR IRREGULAR?

- 1 Count the straight sides: this shape has **6** sides, so it is a hexagon.
- 2 Compare the side lengths shown: five sides are **4 cm** but one side is only **2 cm**.
- 3 At least one side is different, so this hexagon is **irregular**.



DISCUSSION STARTER

REFLECT

How can you tell at a glance whether a polygon is regular or irregular?

LESSON ARC

Open with three real objects — honeycomb cell, stop sign, metal nut — and push pupils past counting sides to comparing them. On the IWB, drag four polygons into Regular and Irregular groups, running a finger along each side. Together, pupils take turns sorting pentagons, hexagons and octagons at the board. They draw both hexagons in copybook, then work the Class Challenge sorting bank, ending on why footballs use regular pieces.

TEACHING MOVES

1. **Getting Started.** Show the three object photos as pupils settle and take three hands-up answers. Don't stop at the side count — ask 'are the sides all the same length?' and hold out for the word equal before anyone says regular.
2. **Watch and Notice.** Drag each shape into its group, finger tracing the sides. On the odd hexagon, point to one wide corner and one narrow corner so pupils see uneven sides bring uneven corners. Ask 'what's the same about these two hexagons, and what's different?' before you name the rule.

3. **Try It Together.** Send a different pupil up per shape and make them run a finger along every side before dropping the card. Watch for the shape that looks regular but has one short side — press 'did you check every side, not just two?' Revoice: 'five sides either way — it's whether they all match that makes it regular.'
4. **Draw Both Hexagons in Your Copy.** Walk the room checking both hexagons have six sides and the regular one's sides look even. Glance at their one-sentence 'how to tell them apart' — you want 'all sides equal', not 'six sides'. No marking.
5. **Class Challenge.** Brisk board turns, Check after each so the class sees the ✓. Give the rotated-shape round extra breathing room — remind pupils to count sides, not judge by which way it points. Don't re-explain the rule each time; this is practice.
6. **What Did We Notice?.** Take answers on the football question and listen for pupils linking equal sides to pieces fitting neatly. Revoice: 'equal sides mean the pieces match up and the ball stays round.' Head off the idea that regular means a special number of sides.

COMMON MISCONCEPTIONS

⚠ Pupils sort a shape as regular because it has 'the right number of sides' — 'it's a hexagon so it's regular.'

Put the honeycomb hexagon next to the odd one on the IWB — same six sides, one clearly regular, one not. Say plainly: regular is about the sides being equal, not how many there are.

⚠ A regular pentagon is turned on its side and pupils call it irregular because it 'looks different'.

Rotate the shape back upright on the board, then turn it again — same sides, same lengths. Have the pupil run a finger and count the sides both ways so they trust the count over the orientation.

⚠ Pupils miss the trap shape — they check two sides, see them match, and call it regular even though one side is short.

Trace all the sides with them one by one, pausing on the short one. 'One side off is enough to make it irregular' — then point to the odd corner beside that short side.

DIFFERENTIATION

EMERGING

- Stay with clear regular-versus-irregular pairs on the IWB while the class moves to the trap shapes; these pupils sort by 'all sides match / one doesn't'.
- For the copybook, let them trace the regular hexagon from the printed shape card first, then draw the irregular one freehand beside it.

DEVELOPING

- After the copybook hexagons, ask them to draw a regular octagon too and predict how many corners will match before they check.
- Give the missing-clue task: 'I have a polygon with all equal sides — how many sides could it have, and what's it called for 5, 6 and 8?'

PROFICIENT

- Pose: 'draw an irregular pentagon that still has all five corners looking equal — can you? Why not?' Let them wrestle with it in copybook before you say anything.
- During the Class Challenge, narrate a harder variant aloud: 'this shape has all equal sides but I've made two corners bendy — is it regular?' and let them defend an answer to the class.

✂ **Cross-curricular:** Tie to Geography — pupils spot regular hexagons in a photo of the Giant's Causeway basalt columns in Co. Antrim.

ANSWER KEY

Scaffold: visual check on the page

Q1: regular

Q2: irregular

a) Always : Regular means every side and every corner match, so all sides are equal.

b) Always : Every hexagon, regular or irregular, has exactly 6 sides.

c) Never : A polygon is made only of straight sides, so it never has a curved side.

d) Sometimes : A hexagon is regular only when all six sides and corners match, otherwise it is irregular.

EXTENSION SHEET · STRETCH ANSWERS

S1: a rhombus

S2: a regular hexagon

S3: 15 cm

S4: a parallelogram

S5: 44 cm