

Line symmetry: finding lines of symmetry

CURRICULUM ALIGNMENT

SHA.TRN.3

model and explain the effects of transformations on shapes and line segments.

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 Symmetry Tool · display, find-lines

WHAT THIS LESSON TEACHES

A line of symmetry splits a shape into two halves that match exactly, like a mirror or a fold. If you fold along the line and both halves land right on top of each other, it is a line of symmetry.

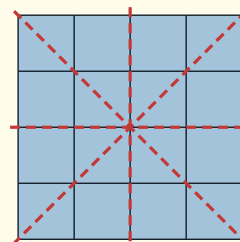
→ A square folded corner to corner makes two halves that match, so that fold is a line of symmetry.

→ The letter X folds straight down the middle and both halves match, but the letter S has no fold that matches.

MODEL THIS ON THE BOARD

LINE OF SYMMETRY OF A SQUARE

- ① The dashed line down the middle matches both halves, so that is **1** line of symmetry.
- ② The dashed line across the middle also matches, so that is **2**.
- ③ Fold along each diagonal and the halves match too, so a square has **4** lines of symmetry in all.



DISCUSSION STARTER

REFLECT

Did folding or using a mirror help you find lines of symmetry more easily?

LESSON ARC

Open by folding a paper heart down the middle on the IWB so the halves land together, then hold up a square and collect predictions on where it folds. Walk the symmetry interactive through square (four lines), rectangle (two), and letters X and T, pausing on each diagonal fold. Pupils rule every line of symmetry into their copy for a square, rectangle and X. The Class Challenge bank tests H, X, S and M — S is the no-symmetry trap.

TEACHING MOVES

1. **Getting Started.** Fold the paper heart down the middle slowly so the class sees the two halves land on each other, then hold up the square and ask 'where could this fold and still match?'. Collect two or three hands-up predictions but don't confirm any — bank them to test next.
2. **Watch and Notice.** Drag the mirror line on the symmetry interactive one shape at a time. Before each reveal ask 'how many folds will match here?' and take two answers. On the rectangle, pause on the diagonal fold and let the class predict before they see the halves miss — that contrast with the square is the whole point.

3. **Try It Together.** Name a shape, send one pupil up to drag the mirror line, and ask the class 'did the halves match?' before confirming. Watch for the rectangle slip — pupils try a diagonal expecting it to work like the square. Re-voice: 'so the diagonal works on a square but misses on a rectangle.'
4. **Rule the Lines in Your Copy.** As pupils rule lines into their copy, glance for the counts: square four, rectangle two, X two. The X horizontal fold is the one pupils miss — if you see only a vertical line on the X, prompt 'is there another fold that matches?' rather than correcting it for them.
5. **Class Challenge.** Keep the board brisk — one pupil per letter, set the lines, press Check, class confirms, move on. On the S, let the pupil try a fold and discover the miss themselves; don't pre-warn that it has none. Re-voice once: 'looking balanced is not the same as having a line of symmetry.'
6. **What Did We Notice?.** Ask how you'd check a fold line without folding. Listen for the mirror test — every point has a matching point the same distance from the line. Re-voice a strong answer: 'so you imagine folding and check each part lands on a matching part.'

COMMON MISCONCEPTIONS

⚠ Pupils rule a corner-to-corner fold on the rectangle and count it as a line of symmetry because the diagonal works on a square.

Drag the diagonal mirror line on the rectangle interactive so the class watches the halves slide past each other and miss. Set it side by side with the square's diagonal, which matches. 'The diagonal works on a square but misses on a rectangle.'

⚠ Pupils say the letter S 'must' have a line of symmetry because it looks even and balanced top to bottom.

Let a pupil drag a fold onto the S and watch it miss rather than telling them the answer. Name the big idea on the spot: looking balanced is not the same as the two halves matching.

⚠ Pupils find one line of symmetry on the X and stop, assuming a shape has at most one fold.

After the vertical fold, ask 'is there another fold that matches?' and drag the horizontal mirror line too. Stress that one shape can hold several lines — the square's four makes this concrete.

DIFFERENTIATION

EMERGING

- Hand these pupils the pre-cut paper square and rectangle and let them physically fold and test before ruling lines on screen or in copy.
- Stay with the square and rectangle only; bring in the letters once the fold-and-match idea is secure.

DEVELOPING

- After the copybook square and rectangle, give a regular pentagon or hexagon and ask how many lines of symmetry they'd predict before testing.
- Add the letters A, H and O to the copybook task and ask which has the most lines of symmetry.

PROFICIENT

- Pose a teacher-narrated harder Class Challenge variant: 'find a capital letter with exactly one line of symmetry, then one with none — explain how you know.'
- Pull fast finishers ahead into the Student Activity Book page while the class finishes the challenge bank.

✂ **Cross-curricular:** Tie to Visual Arts — pupils fold and cut a paper snowflake or butterfly, then count the lines of symmetry in their own design.

ANSWER KEY

Scaffold: visual check on the page

Q1: 3

Spot: The diagonals are not lines of symmetry on a non-square rectangle — the halves do not match when folded that way. A rectangle has only 2 lines of symmetry (through the midpoints of opposite sides).

EXTENSION SHEET · STRETCH ANSWERS

S1: rotation

S2: reflection

S3: rotation

S4: translation

