

Completing symmetrical pictures across a mirror line

CURRICULUM ALIGNMENT

SHA.TRN.3 model and explain the effects of transformations on shapes and line segments.

INTERACTIVES Symmetry Tool · challenge, display, explore

WHAT THIS LESSON TEACHES

A mirror line is the fold line that lets both halves of a picture land exactly on top of each other. To complete the missing half, count how many squares each part sits from the line and shade its match the same number of squares away on the other side.

- A square 2 squares left of a vertical mirror line matches a square 2 squares right of the line.
- A square that touches the mirror line stays put in the reflection.

MODEL THIS ON THE BOARD

REFLECTING A PLAY TOKEN

- 1 Find the shaded token sitting 2 squares left of the vertical mirror line.
- 2 Count the same 2 squares out to the right of the line.
- 3 Shade the matching square so the token pattern is symmetrical.

DISCUSSION STARTER

REFLECT When you finish a mirror picture, what do you check first — matching distance from the line, or matching each square?

LESSON ARC

Open with half a house drawn beside a vertical line on the IWB grid — pupils picture the mirror's missing half before anything is drawn. Walk through four prefilled examples (L-shape, staircase, arrow, tree), tracing each square's distance from the line with your finger. Pupils then complete two pictures at the board, counting before placing each match. Squared-paper copybook follows: pupils draw a mirror line, shade four squares, mirror them.

TEACHING MOVES

1. **Getting Started.** Display half a symmetrical house beside a vertical line as pupils settle. Take three hands-up answers to 'would the door move? would the roof slope the other way?' — but resist drawing the second half. That reveal is the whole lesson's work.
2. **Watch and Notice.** The examples on the board stay still: both halves show at once and nothing moves when tapped, so trace the counting yourself, finger on each square, counting its distance aloud. On the staircase, stop and ask a pupil 'how many squares is this step from the line?' before you point to its match. On the tree, flag that the trunk sits right against the line, so its match sits right against it too.
3. **Try It Together.** Shade four squares on one side, invite a pupil to shade one match, and have the class confirm the distance is equal before the next. Clear the board, shade a fresh pattern and run it again with a new volunteer. Watch for pupils counting from the grid edge — always return their eyes to the line first.
4. **Build Alongside in Your Copy.** Pupils rule a vertical mirror line on squared paper, shade four squares left, mirror them right. Walk the room checking they count from the line, not the page edge — this is practice alongside you, not marking.

5. **Class Challenge.** Brisk turns at the board through the challenges: 3-square, 5-square, then the picture touching the line. Pause there: ask whether the on-the-line square moves or stays put. Switch to a horizontal line for the last one so pupils transfer the counting up-and-down instead of left-and-right. Keep it moving; check each answer rather than re-explaining.

COMMON MISCONCEPTIONS

⚠ Pupils count a square's distance from the edge of the grid instead of from the mirror line, so the match lands in the wrong column.

Stop and put your finger on the mirror line. 'We always count back to the line, not the edge of the page.' Recount one square aloud from the line, then have the pupil recount their own before placing the match.

⚠ When a shaded square sits right on the mirror line, pupils give it a separate match a square or two across.

On the touching-the-line picture in the Class Challenge, ask the class whether that square moves or stays. Show on the IWB grid that its distance from the line is zero — so its match is itself. It stays put.

⚠ On the staircase, pupils copy the steps facing the same way rather than reversing direction in the mirror.

Hold the steps up against the line and ask 'which way do the steps climb in a real mirror?' Trace one step's distance, place its match, and let the class see the staircase reverse before completing the rest.

DIFFERENTIATION

EMERGING

- On the IWB, pre-shade the matching square one cell in from the line so pupils start with distance 1 before counting larger gaps.
- In the copybook, keep all four squares touching or one square from the line so the count stays at 1 or 2.

DEVELOPING

- After the copybook, ask pupils to shade a fifth square further from the line and predict its match's column before placing it.
- Hand a picture where two squares sit at different distances and ask which match lands further from the line, and why.

PROFICIENT

- Pose: shade a picture that looks the same on both sides of the line already — can you find one that's its own mirror image? Pupils try it in the copybook and explain why it works.
- Pull fast finishers ahead to the horizontal-line challenge early and ask them to narrate the up-and-down count to the class when it's reached.

✂ **Cross-curricular:** Tie to Visual Arts — pupils fold a painted sheet down a mirror line to print a symmetrical butterfly, then count the matching shapes on each wing.

ANSWER KEY

Scaffold: visual check on the page

Q1: 1 square

a) Always : Matching halves keep the same distance from the mirror line.

b) Never : Any part on the line stays on the line in the reflection.

c) Always : Equal counts from the line keep the picture symmetrical.

d) Never : You still count the same number of squares away on the opposite side.

EXTENSION SHEET · STRETCH ANSWERS

S1: 7

S2: in the 2nd row from the top, 3 squares to the right of the line

S3: The match should be 4 squares to the right of the line, the same distance as the first square.

S4: 1 square and 3 squares below the line, in the same column

S5: 4 squares (at the very right end of the row)

Investigation: Design a mirror creature — open-ended; scan pupils' working for valid solution paths rather than a single answer.