

Cambridge Primary Mathematics 0096 · Stage 2**CM2-U3**

Symmetry and shape

Geometry and Measure — shapes and symmetry · 4 source-bound 30-minute lessons.

Unit overview

This unit teaches geometry and measure — shapes and symmetry through 4 source-bound read-along lessons. Each lesson moves from concrete objects to a pictorial record and then an abstract record. Learners use the same maths question and evidence requirement across all three reading routes. The final task compares the representations learners made across the unit.

Guiding question

How can stories help us reason about symmetry and shape?

Success criteria

- I can build the maths from each story with objects.
- I can draw or diagram the same maths.
- I can record a result and explain the story evidence.
- I can demonstrate TWM.05 while I work.

Learning objectives

2Gg.09

Find a horizontal or vertical line of symmetry.

2Gg.01

Name, describe, sort and sketch 2D shapes by sides and corners, in any position.

TWM.05

Characterising: identify and describe the maths properties of an object.

1

Finding a line of symmetry

Seeing Symmetry · 2Gg.09

Shared maths question

How does Seeing Symmetry help us explore finding a line of symmetry?

Evidence required

A concrete model, a pictorial record and a matching abstract record, all checked against the read-along.

Governed source lesson: The Fold That Decides · Concept · Testing a figure for a line of symmetry by folding it in half

1

Find the maths in the story

4 min**2Gg.09**

Read-along: Listen with highlighting and pause at the passage used by "The Fold That Decides".

Teacher: Each child takes four paper figures from the tray and folds each one so the two halves land on each other. Hold the folded figure up to the window: if any edge sticks out past the other, the halves did not match. Say which of your four folded exactly in half.

Learners: Notice the story evidence and say the maths question in their own words.

2

Model it with objects

5 min

2Gg.09

Read-along: Replay the source passage while building the quantities, shapes or measures it supplies.

Teacher: Working in pairs, fold every one of the twelve figures and put it on the matched mat or the not-matched mat. A figure only goes on the matched mat if you folded it and the halves covered each other. Count both piles and write the two counts at the top of each mat.

Learners: Build a concrete model and check that each part matches the read-along.

3

Try the concrete task

6 min

2Gg.09

Read-along: Keep the relevant story page visible as the class tests the model.

Teacher: Open each figure from the matched mat and draw along the crease with a ruler. Say what the line you have just drawn does to the figure. Every figure on the matched mat gets exactly one line drawn on it in this step, even if you can find another fold later.

Learners: Change or compare the objects, then explain what stayed the same and what changed.

4

Draw the maths

5 min

2Gg.09

Read-along: Return to the same story evidence before learners make a pictorial record.

Teacher: Model a clear drawing, diagram or mark for the concrete work without adding a quantity the story does not supply.

Learners: Draw the model and label the important parts with maths language.

5

Record and solve

6 min

2Gg.09

Read-along: Use the read-along once more as the evidence check for the abstract record.

Teacher: Trace one of your hands, cut it out and try to fold it into matching halves. Then put the traced hand next to a tracing of your other hand and look at the pair. Say in one sentence what is true of the pair that was not true of the single hand.

Learners: Record the result with suitable numbers, words or symbols and link it back to the picture.

6

Reflect and convince

4 min

TWM.05

Read-along: Show the source passage and invite a final evidence-based check.

Teacher: Name the Thinking and Working Mathematically focus:
Characterising: identify and describe the maths properties of an object.

Learners: Use the concrete model, drawing and record together to justify the answer.

Solo

Read independently and mark the evidence used by the shared model.

Supported

Read with the audio, pause at the named source passage and use the response frame.

Listening

Listen with highlighting, build the same model and explain it orally.

Assessment check: The learner shows the objective with concrete, pictorial and abstract evidence and explains how the read-along supports the model.

2

Symmetry in a kite

Let's Fly a Kite · 2Gg.09

Shared maths question

How does Let's Fly a Kite help us explore symmetry in a kite?

Evidence required

A concrete model, a pictorial record and a matching abstract record, all checked against the read-along.

Governed source lesson: Fold the Kite So Both Sides Match · Concept · Partitioning a whole into two matching parts by folding

1 Find the maths in the story

4 min

2Gg.09

Read-along: Listen with highlighting and pause at the passage used by "Fold the Kite So Both Sides Match".

Teacher: Each child takes a paper kite cut in the diamond shape Laura cuts and folds it once so one side lands exactly on the other. Run a thumb along the folded edge and check the four corners: if a corner pokes out past its partner, open the paper and fold again. Keep folding and checking until nothing pokes out.

Learners: Notice the story evidence and say the maths question in their own words.

2 Model it with objects

5 min

2Gg.09

Read-along: Replay the source passage while building the quantities, shapes or measures it supplies.

Teacher: Open the kite flat and run a crayon down the crease so the line Laura draws is now on your own paper. Put one finger on each side of the line and say what the line did to the kite. Hold the traced kite up so a partner can see the line from across the table.

Learners: Build a concrete model and check that each part matches the read-along.

3

Try the concrete task

6 min

2Gg.09

Read-along: Keep the relevant story page visible as the class tests the model.

Teacher: Cut along the traced crease and set the two pieces one on top of the other. Slide the top piece until its point meets the bottom piece's point, then look at every edge for anything sticking out. Tell your partner whether the two pieces match, and show the edge you checked.

Learners: Change or compare the objects, then explain what stayed the same and what changed.

4

Draw the maths

5 min

2Gg.09

Read-along: Return to the same story evidence before learners make a pictorial record.

Teacher: Model a clear drawing, diagram or mark for the concrete work without adding a quantity the story does not supply.

Learners: Draw the model and label the important parts with maths language.

5

Record and solve

6 min

2Gg.09

Read-along: Use the read-along once more as the evidence check for the abstract record.

Teacher: Take the second kite and fold it across, the way Bob's first line went, so one part ends up bigger. Stack those two pieces and point at the part that sticks out past the other. Say which fold made two matching pieces and which one did not, with both stacks in front of you.

Learners: Record the result with suitable numbers, words or symbols and link it back to the picture.

6

Reflect and convince

4 min

TWM.05

Read-along: Show the source passage and invite a final evidence-based check.

Teacher: Name the Thinking and Working Mathematically focus: Characterising: identify and describe the maths properties of an object.

Learners: Use the concrete model, drawing and record together to justify the answer.

Solo

Read independently and mark the evidence used by the shared model.

Supported

Read with the audio, pause at the named source passage and use the response frame.

Listening

Listen with highlighting, build the same model and explain it orally.

Assessment check: The learner shows the objective with concrete, pictorial and abstract evidence and explains how the read-along supports the model.

3

Fold and check

Origami · 2Gg.09

Shared maths question

How does Origami help us explore fold and check?

Evidence required

A concrete model, a pictorial record and a matching abstract record, all checked against the read-along.

Governed source lesson: Testing paper folds for right angles · Concept · Identifying right angles and classifying figures by them

1

Find the maths in the story

4 min

2Gg.09

Read-along: Listen with highlighting and pause at the passage used by "Testing paper folds for right angles".

Teacher: Fold a scrap of paper in half, then fold it in half again so the second crease lands on the first. The corner you just made is a right angle, and you will use it all lesson. Slide that corner into the corner of your desk and into the corner of a book cover, and keep only the ones it fits exactly with no gap and no overlap.

Learners: Notice the story evidence and say the maths question in their own words.

2

Model it with objects

5 min

2Gg.09

Read-along: Replay the source passage while building the quantities, shapes or measures it supplies.

Teacher: Fold one square sheet in half so one edge lands exactly on the opposite edge, and press the crease flat. Test all four corners of the shape in your hand with your tester and count how many corners it fits. Write the shape's name and your count in the first row of the chart, and say the count aloud to your partner before you write it.

Learners: Build a concrete model and check that each part matches the read-along.

3

Try the concrete task

6 min

2Gg.09

Read-along: Keep the relevant story page visible as the class tests the model.

Teacher: Take a fresh square and fold it so one corner lands exactly on the corner diagonally across from it. Test all three corners of the triangle you made and count only the ones your tester fits. Find the corner that sits opposite the fold line and check it last. Enter the shape and the count in the second row of the chart.

Learners: Change or compare the objects, then explain what stayed the same and what changed.

4

Draw the maths

5 min

2Gg.09

Read-along: Return to the same story evidence before learners make a pictorial record.

Teacher: Model a clear drawing, diagram or mark for the concrete work without adding a quantity the story does not supply.

Learners: Draw the model and label the important parts with maths language.

5

Record and solve

6 min

2Gg.09

Read-along: Use the read-along once more as the evidence check for the abstract record.

Teacher: Put your rectangle and your right triangle side by side with the square sheet you started from. Test the untouched square and add it to the chart. Then sort all three figures from most right angles to fewest, and tell your partner which two tie and how your tester proved it.

Learners: Record the result with suitable numbers, words or symbols and link it back to the picture.

6

Reflect and convince

4 min

TWM.05

Read-along: Show the source passage and invite a final evidence-based check.

Teacher: Name the Thinking and Working Mathematically focus:
Characterising: identify and describe the maths properties of an object.

Learners: Use the concrete model, drawing and record together to justify the answer.

Solo

Read independently and mark the evidence used by the shared model.

Supported

Read with the audio, pause at the named source passage and use the response frame.

Listening

Listen with highlighting, build the same model and explain it orally.

Assessment check: The learner shows the objective with concrete, pictorial and abstract evidence and explains how the read-along supports the model.

4

Sort shapes by their properties

A Fishy Mystery · 2Gg.01

Shared maths question

How does A Fishy Mystery help us explore sort shapes by their properties?

Evidence required

A concrete model, a pictorial record and a matching abstract record, all checked against the read-along.

Governed source lesson: Label First, Then Let the Cards Move · Representation · Sorting a set of shapes into a two-circle diagram by two attributes

1

Find the maths in the story

4 min

2Gg.01

Read-along: Listen with highlighting and pause at the passage used by “Label First, Then Let the Cards Move”.

Teacher: Each pair draws one rectangle that fills the sheet, then draws two circles inside it that cross, so a lens opens where they overlap. Run a finger around the rectangle and say that everything you sort stays inside it. Leave both circles blank for now.

Learners: Notice the story evidence and say the maths question in their own words.

2

Model it with objects

5 min

2Gg.01

Read-along: Replay the source passage while building the quantities, shapes or measures it supplies.

Teacher: Write one label on each circle before any card moves: blue on the left, square on the right. Say both labels aloud and point to the circle each one names. The lens in the middle gets no label of its own, because it belongs to both.

Learners: Build a concrete model and check that each part matches the read-along.

3

Try the concrete task

6 min

2Gg.01

Read-along: Keep the relevant story page visible as the class tests the model.

Teacher: Turn over one card at a time and ask it twice: is it blue, is it square. Two yeses send it to the middle. One yes sends it into that label's circle only. Two noes park it inside the rectangle but outside both circles. Work the whole deck of twelve without going back to fix an earlier card.

Learners: Change or compare the objects, then explain what stayed the same and what changed.

4

Draw the maths

5 min

2Gg.01

Read-along: Return to the same story evidence before learners make a pictorial record.

Teacher: Model a clear drawing, diagram or mark for the concrete work without adding a quantity the story does not supply.

Learners: Draw the model and label the important parts with maths language.

5

Record and solve

6 min

2Gg.01

Read-along: Use the read-along once more as the evidence check for the abstract record.

Teacher: Hold up each rule card in turn and sweep the region it names, checking that every card sitting there obeys it. A card that breaks its rule comes off the mat and gets asked the two questions again, out loud, in front of your partner. Finish by counting the cards on the mat and confirming all twelve are still there.

Learners: Record the result with suitable numbers, words or symbols and link it back to the picture.

6

Reflect and convince

4 min

TWM.05

Read-along: Show the source passage and invite a final evidence-based check.

Teacher: Name the Thinking and Working Mathematically focus: Characterising: identify and describe the maths properties of an object.

Learners: Use the concrete model, drawing and record together to justify the answer.

Solo

Read independently and mark the evidence used by the shared model.

Supported

Read with the audio, pause at the named source passage and use the response frame.

Listening

Listen with highlighting, build the same model and explain it orally.

Assessment check: The learner shows the objective with concrete, pictorial and abstract evidence and explains how the read-along supports the model.

End-of-unit task

Choose one model from each read-along. Put the models in a useful order, compare them, and explain how the concrete, pictorial and abstract records show the unit's maths.