The National Strategies
Secondary

Assessing pupils' progress in mathematics at Key Stage 3

Year 8 assessment package
Shape, space and measures

Teacher pack

department for
children, schools and families

QCA Qualifications and Curriculum Authority

Year 8 Shape task: *How do you know? (area)* and *How do you know? (angles)*

Levels 3/4/5/6

The lesson plans in this pack are set out in two columns. The left-hand column has indicative times for activities, highlights the resource sheets required and also has some examples of questions which teachers may wish to use with pupils during the activities. The right-hand column describes each activity in detail.

APP ASSESSMENT CRITERIA
These lessons may generate evidence to help inform judgements against a number of assessment criteria, including the following:

Shape, space and measure

- level 4: find perimeters of simple shapes and find areas by counting squares
- level 4: use the properties of 2-D and 3-D shapes
- level 5: understand and use the formula for the area of a rectangle and distinguish area from perimeter
- level 6: deduce and use formulae for the area of a triangle and parallelogram, and the volume of a cuboid; calculate volumes and surface areas of cuboids
- level 6: identify alternate and corresponding angles; understand a proof that the sum of the angles of a triangle is 180˚and of a quadrilateral is 360˚

Using and applying mathematics

- level 5: show understanding of situations by describing them mathematically using symbols, words and diagrams
- level 6: use logical argument to establish the truth of a statement.

LESSON 1: *HOW DO YOU KNOW? (AREA)*
Resources

- The Flash resource:
  Shape task
  should be loaded before the lesson to be shown on a large-screen monitor or electronic whiteboard. Teachers who do not have access to the technology required can use the teacher resource sheet:
  Rectangles to parallelograms, and vice versa **(T6L1resource1)**
  This sheet is provided as a suggestion of how to make a concrete representation of how a parallelogram can be made from a rectangle, and therefore of how a rectangle can be made from a parallelogram. The sheet could be photocopied onto card and the component parts cut out, or adapted for 'sliding' OHTs. Although concrete representation may not be necessary for all activities in the lesson, many pupils find it easier to access the mathematics by 'seeing' rather than just trying to visualise
- Each pupil, or each group of pupils, needs one copy of the following pupil resource sheet:
  Toppling shapes **(T6L1pupil1)**
  (Note that to save paper and photocopying, two copies of this resource sheet are shown on the template.)
- Assessment sheets for pupils:
  Each pupil needs one or more of the following worksheets, depending on ability:
  Level 3/4 pupils: *Growing, growing, grown* **(T6L1assess1)**
  Level 4/5/6 pupils: *Toppling triangles* **(T6L1assess2)**
  Pupils who complete the assessment with confidence may wish to attempt the next in the series of worksheets. For level 5/6 pupils, the following worksheet is available:
  Extension activity: *Fiveses* **(T6L1assess3)**
- Squared paper for group activity, any rough working and the assessment activity, if needed

Starter
about 10 minutes

Flash demonstration:
Shape task
or
T6L1resource1

What can you say about the area of each triangle?

What information do you have? What information is important for solving the problem? Is there anything else you need to know? [This question could be asked at different points throughout both lessons.]

Why is this shape called a parallelogram?

If these are congruent halves, what must be true about the rotating line? [It must go through the centre of the rectangle.]

What dimensions do the rectangle and the parallelogram have in common? [Base length, perpendicular height]

If the height of the rectangle is …, tell me why the length of the sloping side of the parallelogram ***must*** *be longer.*
[Support with a visual prompt, such as rotating a ruler representing a vertical height and superimposing it on the slope length to show it must be shorter.]

Convince me that the area of the rectangle and the area of the parallelogram created from it are equal.

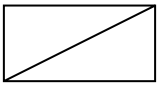
What does 'perpendicular' mean?

What does 'congruent' mean?

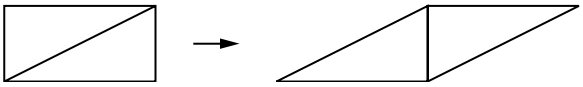
Click on **demonstration 1** (a rectangle appears). *An alternative method of showing all demonstrations is to use cardboard cut-outs or 'sliding' OHTs* **(T6L1resource1)**.

Tell the pupils the rectangle is 10cm by 5cm. Ask: What is the area of the rectangle? How do you know?

Click the forward arrow, and the diagonal of the rectangle appears:



Click again, and the shapes translate to make a parallelogram, i.e.

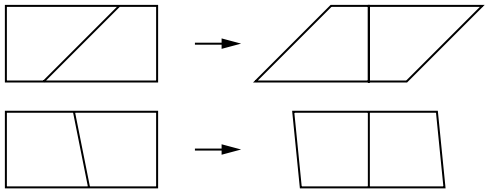


Ask: What is the area of the parallelogram? How do you know?

Discuss why the area of the parallelogram must be the same as the area of the rectangle. Note that you can click the backward arrow to see the parallelogram re-form into a rectangle.

Click 'back to index' and choose **demonstration 2** (another '10cm by 5cm' rectangle appears). Remind the pupils that in the last demonstration the 'cut' line was a diagonal. Ask where else could you cut the rectangle to make both sides exactly the same shape and size (congruent halves).

Click the forward arrow to see a line appear, then click again to see it rotate. Stop the rotation at any point to see different parallelograms formed, e.g.



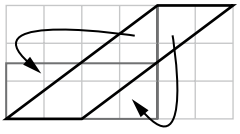
Ask: What can you say about the length of the base of each parallelogram? How do you know?

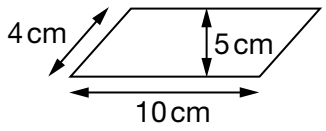
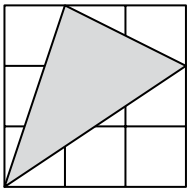
What about the perpendicular heights? How do you know?

What about the areas? How do you know?

Encourage pupils to realise that the area of a parallelogram is therefore found by multiplying the base by the perpendicular height.

Challenge the common misconception that the area of a parallelogram is found by multiplying the base by the length of one of the adjacent sides, i.e. emphasise that the side length is not the same as the perpendicular height. What sort of parallelogram has a side length equal to the perpendicular height? [A rectangle]

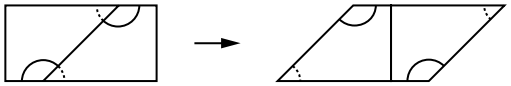
Explain why the area of a parallelogram is its base multiplied by its perpendicular height, not *by the length of a sloping side.* *Why do we multiply dimensions that are perpendicular (at right angles) to find an area? What do we count when we find an area?*	Now show **demonstration 3** (a parallelogram appears). Ask where a line could be drawn to make congruent halves. (There is an infinite number of possibilities, but only one that is perpendicular to the 'top' and 'bottom' of the parallelogram – click to show this line.) Then click to show the parallelogram forming a rectangle. Now show **demonstration 4** (another parallelogram appears). Before you click, ask if there is anywhere else you could cut the parallelogram, with one straight cut, to make the same rectangle? [Any cut parallel to the original cut.] Click to show the line moving; use the backward arrow and choose different places to stop the animation and watch the rectangle form. Will the line always cut the parallelogram into two trapeziums? Why might cutting the parallelogram to make a triangle and a trapezium be the 'easiest' option?
Group activity about 10 minutes **T6L1pupil1**	Give each pupil, or each group of pupils, a copy of the pupil resource sheet: *Toppling shapes* **(T6L1pupil1)** Pupils work together to establish the area of each of the parallelograms. Emphasise the need to justify the area of each shape, i.e. how they can be certain of the value of each area. Tell them that using a formula is not enough – how could they convince a friend… convince a pen friend? Note that the final parallelogram is more challenging and some groups will need teacher support. One 'subtraction method' is to construct a rectangle around the parallelogram, then subtract the area of each of the redundant triangles. Another method is as shown: 

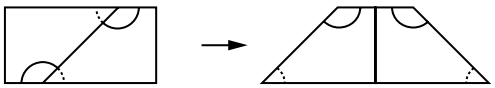
Mini-plenary about 5 minutes *What is wrong with this diagram?*  	Discuss how the pupils showed that all the parallelograms on the resource sheet have an area of six squares. Encourage the use of the formula *base* × *perpendicular height*, and other less formal methods. Draw pupils' attention to the 'subtraction method', since this is a useful mathematical tool. Stress again the meaning of 'perpendicular height' and how this differs from the length of the sloping side.
Assessment activity about 20 minutes **T6L1assess1** **T6L1assess2** **T6L1assess3**	Give out the assessment sheets as listed below: Level 3/4 pupils: *Growing, growing, grown* **(T6L1assess1)** If appropriate, level 4 pupils can continue with the worksheet: *Toppling triangles* **(T6L1assess2)** Level 4/5/6 pupils: *Toppling triangles* **(T6L1assess2)** If appropriate, level 5/6 pupils can continue with the worksheet: *Fiveses* **(T6L1assess3)** A further challenge for the most able pupils would be to find the area of the shaded triangle below:  [Note: answer $3\frac{1}{2}$]
Plenary about 5 minutes *Tell me what area formulae you know for triangles and quadrilaterals.* *How could we use the diagonals of a rhombus or a kite to find formulae for their areas? How are they related to rectangles?* *Can you give me examples of triangles and quadrilaterals for which it is difficult to find the area? What makes them difficult?* [E.g. no obvious paired perpendicular measurements; no way (without Pythagoras/trig) of knowing precise lengths, even if perpendicular.] [Aided by suitable sketch] *How can you use a rectangular frame to find the area of an awkward triangle/ quadrilateral?*	Ask pupils which shapes have formulae for working out their areas? What are the formulae? Which shapes do not have formulae? [e.g. L-shapes] Why don't they? What do the pupils know that could help them find the areas of these complex shapes?

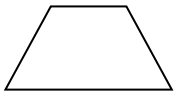
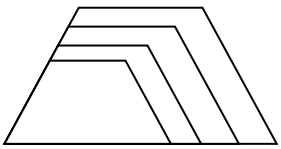
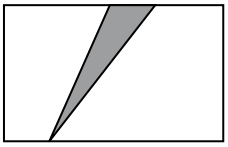
LESSON 2: *HOW DO YOU KNOW? (ANGLES)*

Resources

- The Flash resource:
  Shape task
  should be loaded before the lesson to be shown on a large-screen monitor or electronic whiteboard. Teachers who do not have access to the technology required can use the teacher resource sheet:
  Angles in rectangles and parallelograms **(T6L2resource1)**
- Assessment sheets for pupils:
  Each pupil needs one of the following worksheets, depending on ability:
  Level 3/4 pupils: *Kites* **(T6L2assess1a)** *and Kites (continued)* **(T6L2assess1b)**
  (Note that to save paper and photocopying, two copies of *Kites (continued)* are shown on the template.)
  Level 5/6 pupils: *Kites and rhombuses* **(T6L2assess2)**
- Other assessment resources needed:
  Level 3/4 pupils: scissors, glue, four different-coloured pens or pencils
  Level 5/6 pupils: four different-coloured pens or pencils, tracing paper (optional)
- Paper for group activity and any rough working, plus additional squared paper for assessment sheet *Kites and rhombuses*
- Teachers may wish to prepare some 'growing trapeziums' to show on an OHT/whiteboard, as described in the plenary

Starter about 5 minutes **Flash demonstration:** ***Shape task*** **or** **T6L2resource1** *Given what you know about the angles in any rectangle, what quick calculation shows us that they total 360°?* *What order of rotational symmetry does a rectangle/a parallelogram have? Does the line splitting it into two congruent trapeziums change this order?* *How can we use the rotational symmetry of the congruent halves to deduce facts about the angles?* *Can you convince me that a rhombus is a parallelogram but a parallelogram is not necessarily a rhombus?*	Click on **demonstration 5** (a rectangle appears). Click again, and a line appears. Say that this line goes through the centre of the rectangle, and ask what the pupils know about the two trapeziums. [They are congruent.] Now ask (without clicking): What can you tell me about the angles in this shape? Click to show angles to the left of the line. Remind the pupils that the right-hand trapezium is congruent to the left-hand trapezium. What can we work out about the other angles? Click again to see the other angles appear. Draw out the fact that the sum of these four angles is 360°. Why must this be true for all rectangles? Finally, click to see the trapeziums forming a parallelogram, i.e.  What can we deduce about the angles in the parallelogram? [Angles in opposite vertices are the same; the sum of the interior angles is 360°; adjacent angles add to 180°.] Will these facts be true for all parallelograms? How do you know?

Group/class activity about 15 minutes **Flash demonstration:** ***Shape task*** **or** **T6L2resource1** *What properties do you need to know about a quadrilateral to be sure it is a kite; a parallelogram; a rhombus; an isosceles trapezium?* *Why can't a trapezium have three acute angles?*	Click on **demonstration 6** (another rectangle appears). Click again to show the (alternate) angles, then again to see the line rotate and the angles change size. In groups, discuss: What can you see? What angle fact does this demonstrate? What if the angles on the other side of the line were labelled instead? Remind pupils of the formal terminology, i.e. alternate angles, and encourage its use, e.g. alternate angles on parallel lines are equal. Click on **demonstration 7** (another rectangle appears). Click again to show the angles (on the same side of the line this time), then again to see the line rotate and the angles change size. In groups, discuss: What can you see? What angle fact can you work out? Would it matter if we used the angles on the other side of the line? (Note that there is no formal terminology for these pairs of angles, presumably because their relationship can be deduced from alternate or corresponding angles and from angles on a straight line summing to 180°. Some people call them 'supplementary angles', which simply means that they sum to 180.) Finally, click on **demonstration 8**. Click to show the congruent halves, then click again to show all four angles. Click to show the shapes move to form a parallelogram, then click once more to show one part rotating to form a trapezium.  Questions: Why is this shape called an isosceles trapezium? What facts can you deduce about the angles in an isosceles trapezium?

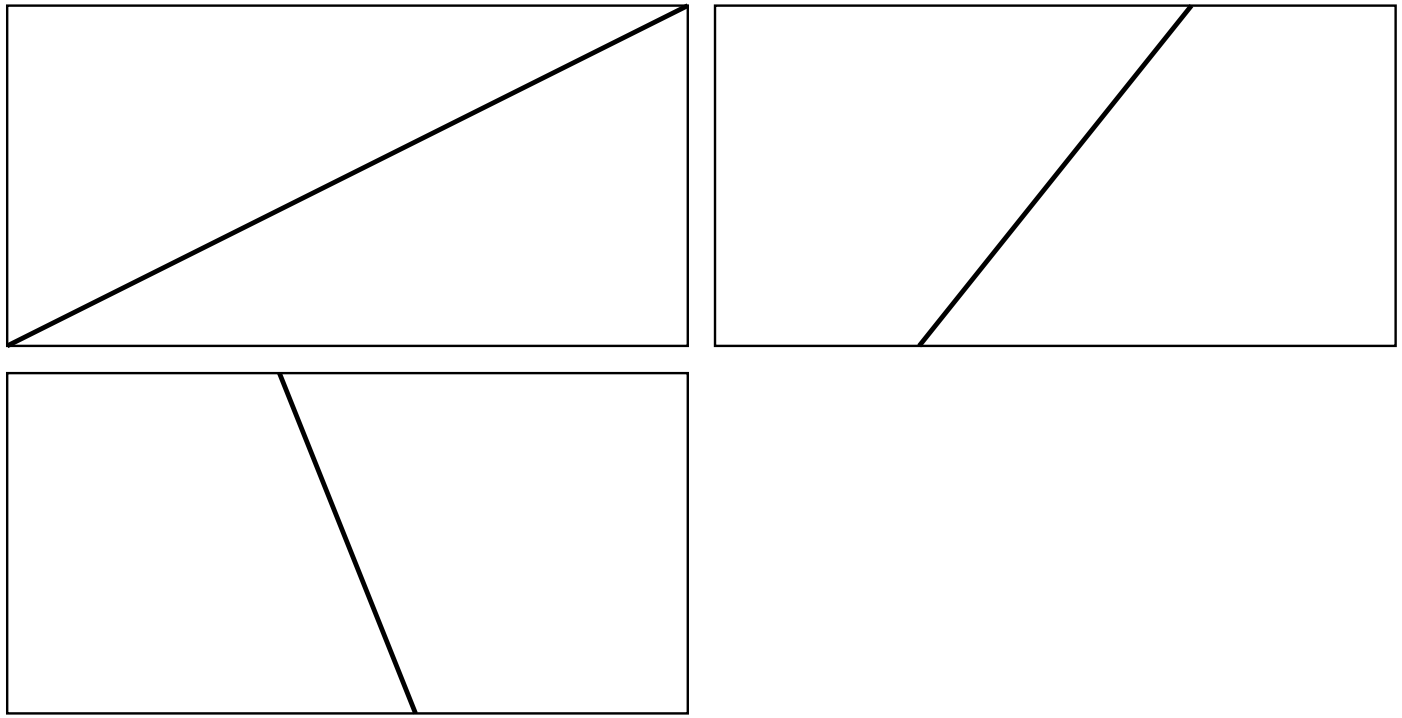
Assessment activity about 20 minutes **T6L2assess1a** **T6L2assess1b** **T6L2assess2**	Each pupil will need one of the following worksheets: Level 3/4 pupils: *Kites* **(T6L2assess1a)** and *Kites (continued)* **(T6L2assess1b)** Note that *Kites (continued)* has two copies of the sheet – cut the photocopied worksheet in two before the assessment. Pupils will have to turn some shapes over to assemble a kite, so should be encouraged to colour in the angles on both sides of the paper where appropriate. Level 5/6 pupils: *Kites and rhombuses* **(T6L2assess2)** Note that these pupils will need to continue on a separate sheet of paper, which they should write their name on. All pupils should be reminded to explain their answers and to be as thorough as possible.
Plenary about 10 minutes *What changes when you enlarge a shape? What stays the same?* *Explain why the area of the scalene trapezium cannot be the same as that of the original rectangle. Can their perimeters be equal?*	Show the pupils an isosceles trapezium, e.g.  If using an interactive whiteboard, teachers can find an isosceles trapezium in 'AutoShapes'/'Basic Shapes' in Word. Ask pupils what they can tell you about the angles in this trapezium. Now show the trapezium 'growing', e.g.  Ask what happens to the angles as the trapezium 'grows'. What if the trapezium were not an isosceles trapezium? Which angle facts would still be true? Which would not? Why not? Use this diagram to reinforce understanding of corresponding angles on parallel lines, i.e. that they are equal. An alternative plenary for able groups is to note that the work done earlier in the lesson focused on angle properties of isosceles trapeziums. How could pupils be certain that their findings hold for non-isosceles trapeziums? Hint: One way to create a non-isosceles trapezium from a rectangle is to remove a scalene triangle, as shown below. 

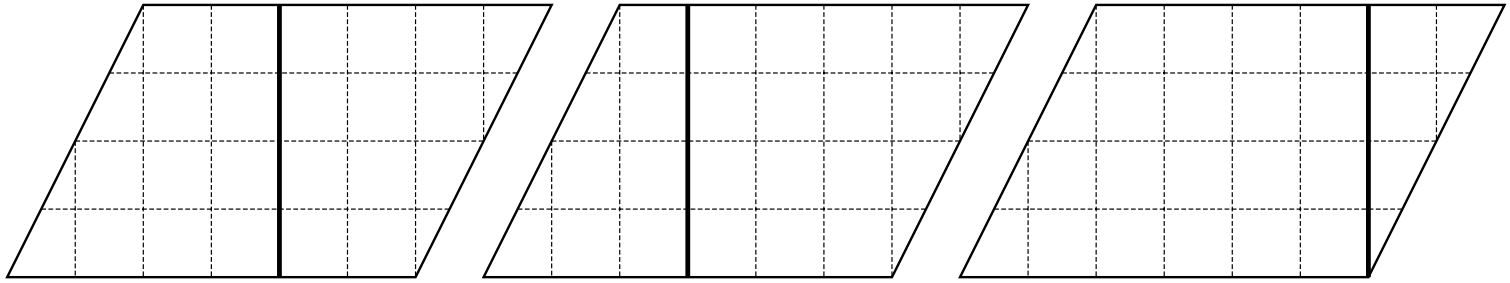
Teacher resource sheets

T6L1resource1

Rectangles to parallelograms, and vice versa

Print or stick onto card and cut out as an alternative to the computer demonstration.

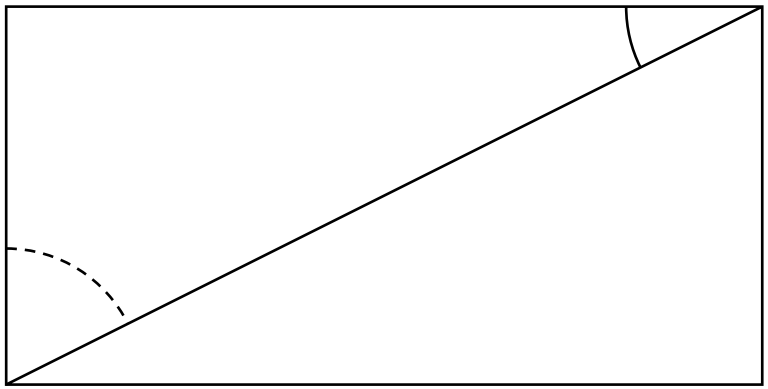


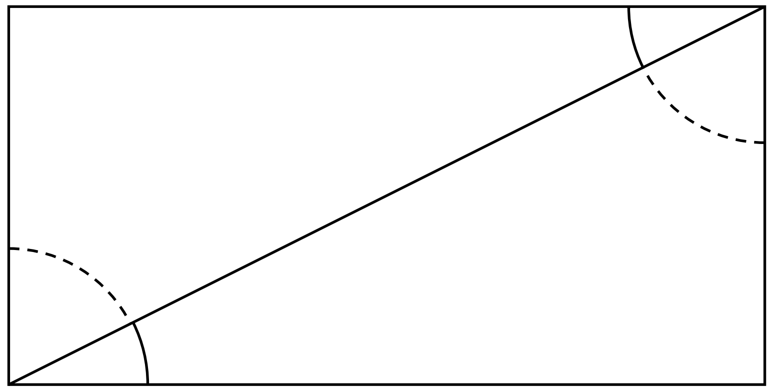


T6L2resource1

Angles in rectangles and parallelograms

Print or stick onto card and cut out as an alternative to the computer demonstration.



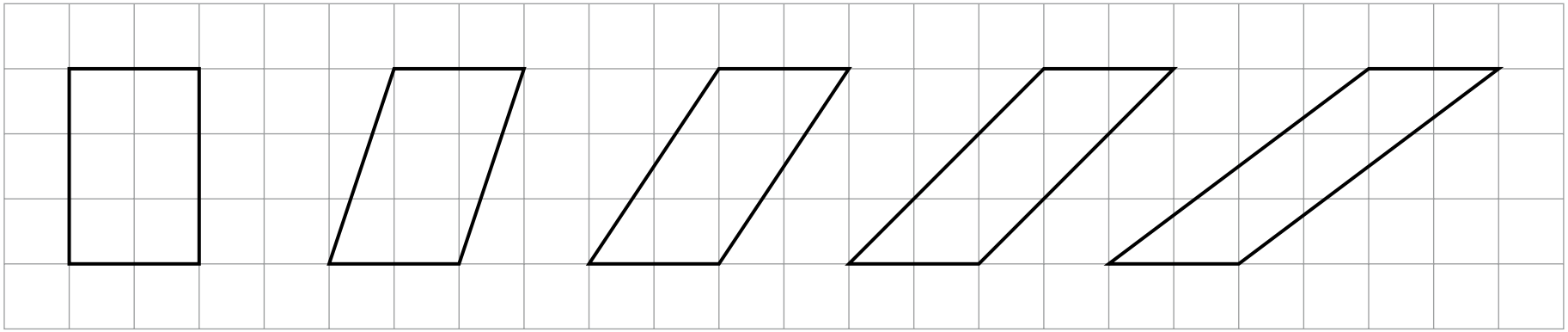


Pupil sheets

T6L1pupil1

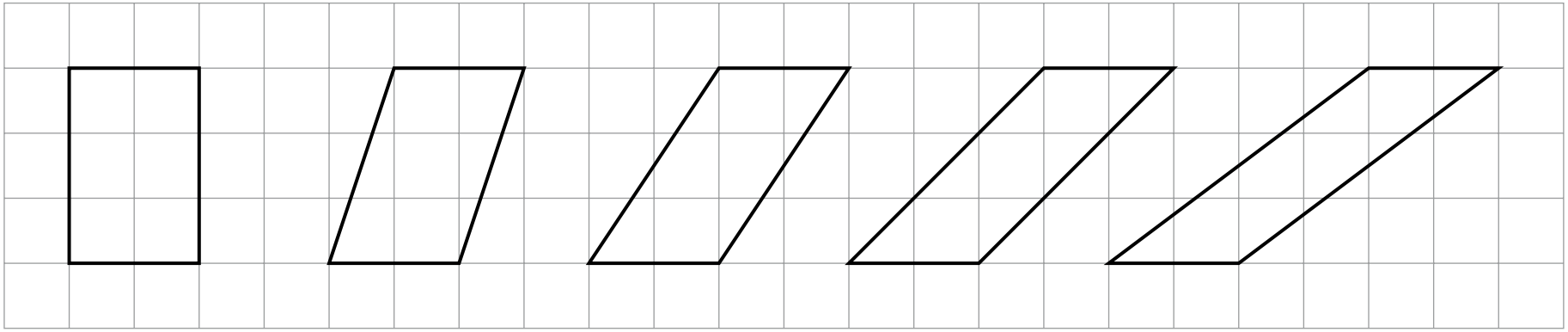
Toppling shapes

Name(s): _____



Toppling shapes

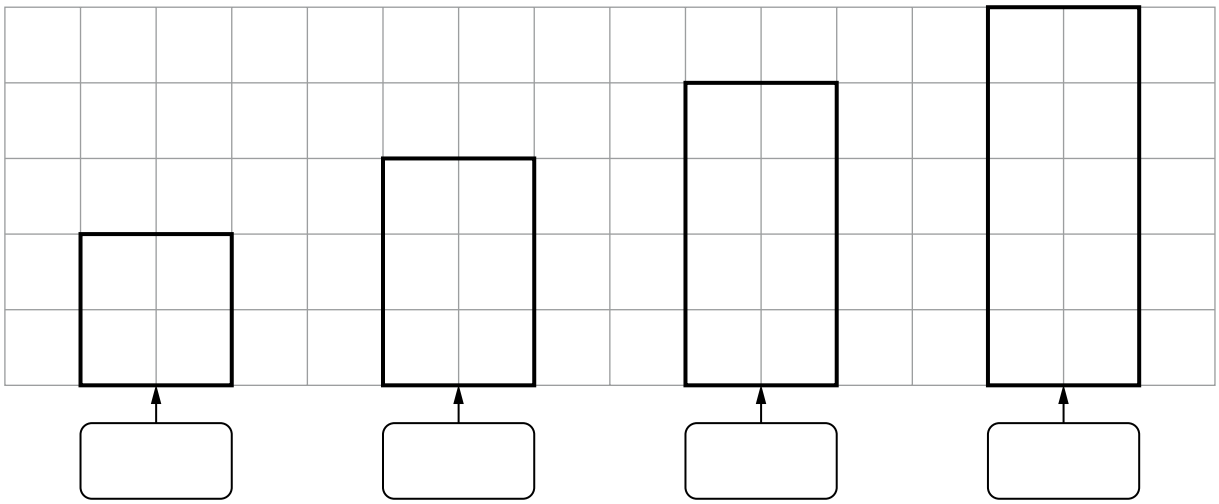
Name(s): _____



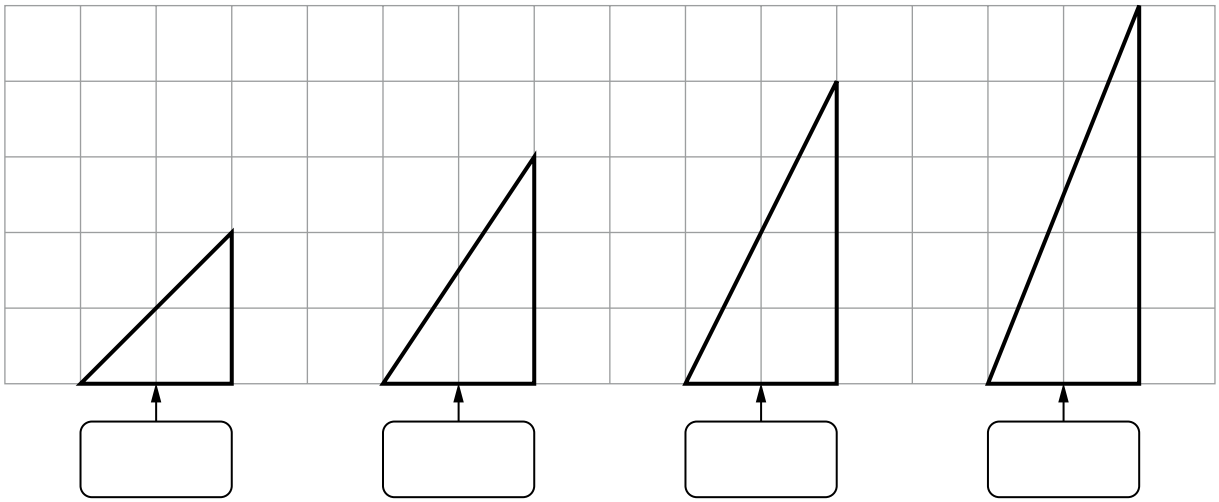
T6L1assess1

Growing, growing, grown Name: _____

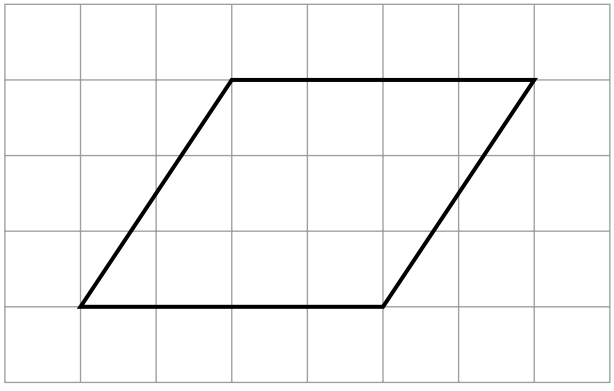
What is the area of each rectangle?



What is the area of each triangle?



What is the area of this parallelogram? Explain how you know.



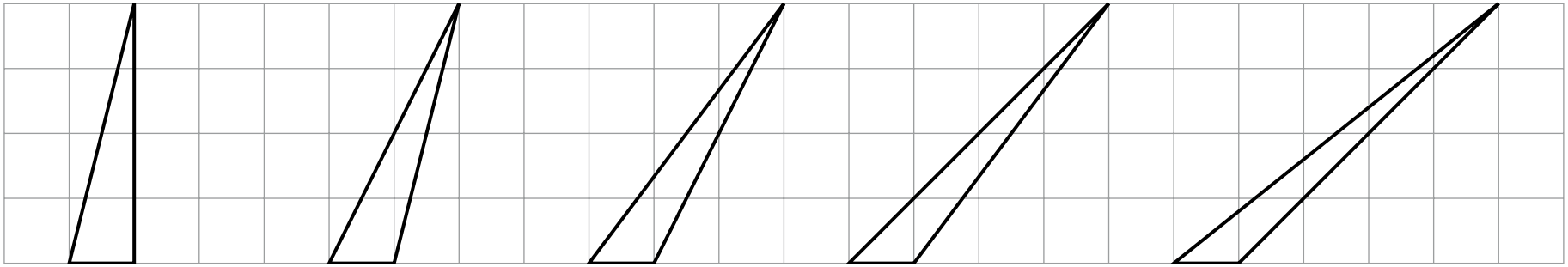
The area is ..... because

T6L1assess2

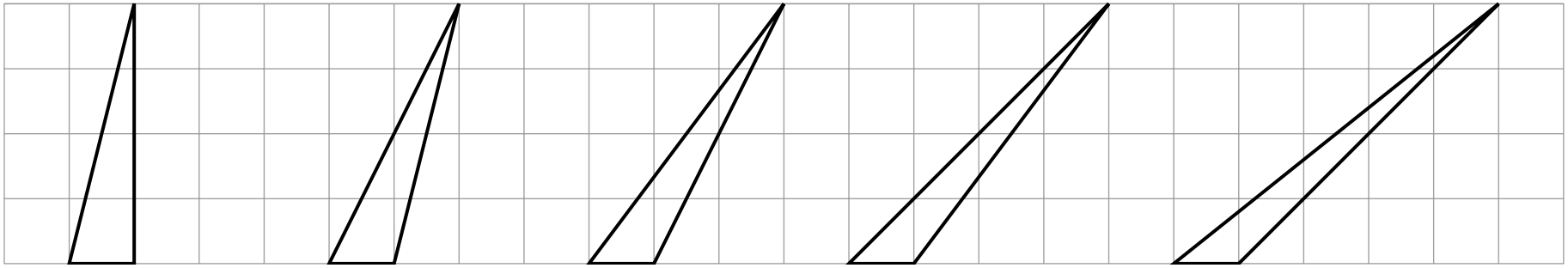
Toppling triangles

Name: _____

Show that the area of each triangle is **2cm^2**



Now show **in a different way** that the area of each triangle is **2cm^2**



Continue with more different ways on another piece of paper if you wish.

T6L1assess3

Fiveses

Name: _____

Draw a **rectangle** with area 5cm^2

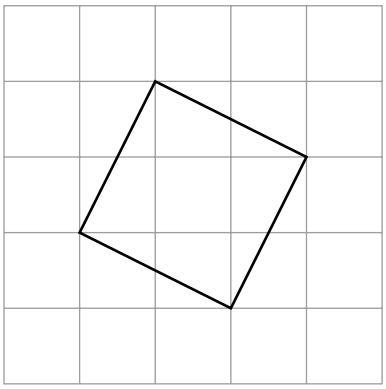
Draw a **triangle** with area 5cm^2

Draw a **triangle** with area 5cm^2 and **no right angles**.

Draw a **parallelogram** with area 5cm^2 and **no right angles**.

Do you agree that this diagram shows a square that has area 5cm^2?

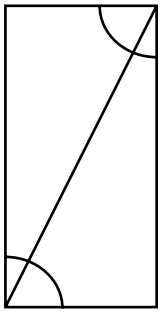
Explain your answer.

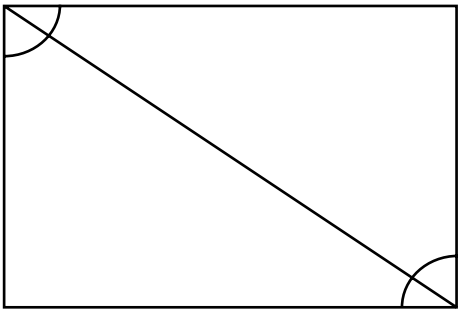


T6L2assess1a

Kites Name: _____

In the rectangles below, use different colours to shade **pairs of angles** that are **equal**.





The next worksheet shows the same rectangles joined together.

On that sheet, use different colours to shade **pairs of angles** that are **equal**.
Then **cut out** the rectangle to make **four triangles**.

Stick the triangles below to show **how they make a kite**.

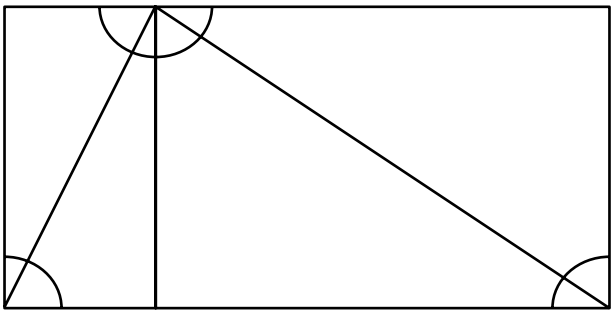
What does that tell you about the angles in your kite?

T6L2assess1b

Kites (continued) Name: _____

In the rectangle below, use different colours to shade **pairs of angles** that are **equal**.
Then **cut out** the rectangle to make **four triangles**.

(You will have to turn some over, so colour in the angles on both sides of the paper.)

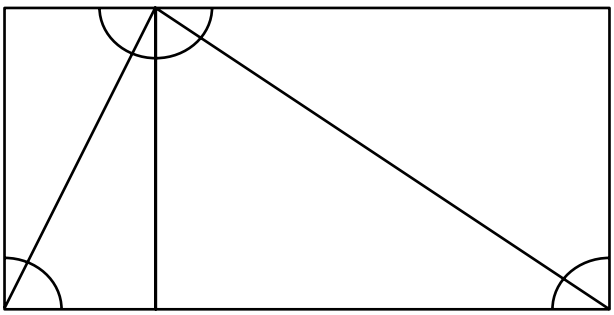


Now stick the triangles onto your worksheet to make a kite.

Kites (continued) Name: _____

In the rectangle below, use different colours to shade **pairs of angles** that are **equal**.
Then **cut out** the rectangle to make **four triangles**.

(You will have to turn some over, so colour in the angles on both sides of the paper.)

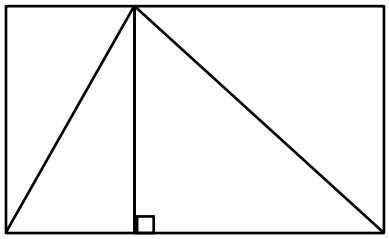


Now stick the triangles onto your worksheet to make a kite.

T6L2assess2

Kites and rhombuses Name: _____

Look at the rectangle.



Use different colours to shade **pairs of angles** that are **equal**.
Use angle facts to explain how you know.

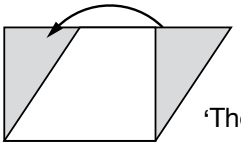
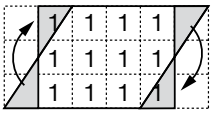
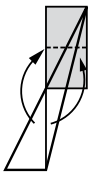
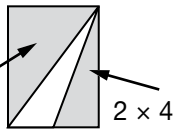
Imagine you have cut out the rectangle to make four triangles.
Draw a diagram to show how to make a **kite** from the four triangles.
You can use tracing paper if you wish.

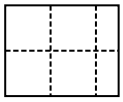
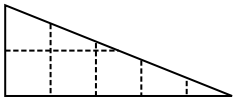
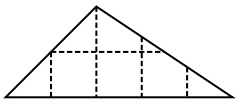
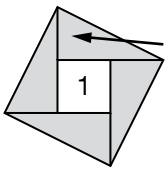
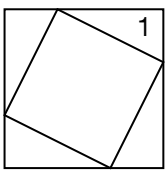
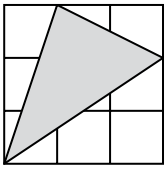
What does the diagram tell you about the angles in your kite?
Write down one angle fact.

On a separate sheet of paper, show how to make a **rhombus** from a rectangle.
What facts can you deduce about the angles in a rhombus?
What does that tell you about the angles in a rhombus?
Write down as many angle facts as you can.

Solutions and performance indicators

LESSON 1: *HOW DO YOU KNOW? (AREA)* Solutions

Growing, growing, grown (target level 3/4)	**T6L1assess1**
Solutions	Notes
Areas 4, 6, 8, 10 in the correct order (with or without correct units of cm^2)	**Good** responses show correct values for the areas. **Better** responses also show correct units.
Areas 2, 3, 4, 5 in the correct order (with or without correct units of cm^2)	**Good** responses show their previous rectangle areas divided by 2. **Better** responses show the correct triangle areas and correct units.
Area of 12 (with or without correct units of cm^2) A correct explanation or method to show how the area can be calculated, e.g. • 4×3 • 'Base × height' •  'Then it's a 3 by 4 rectangle' • 	**Good** responses show, using a diagram, a way in which the parallelogram can be dissected to find the area. **Better** responses communicate the method used more clearly and evaluate the area correctly with correct units.
Toppling triangles (target level 4/5/6)	**T6L1assess2**
Solutions	Notes
Different explanations or methods for showing that the area of each triangle is $2cm^2$, e.g. for all five triangles: • '$\frac{1}{2}$ × base × perpendicular height' • $1 \times 4 \div 2$ for the first triangle: • 'It's half of a 1 by 4 rectangle, so $4 \div 2$' for the second triangle: •  for the third triangle: • $12 - 6 - 4$ • $3 \times 4 \div 2 = 6$  $2 \times 4 \div 2 = 4$	**Good** responses show, using a diagram, a way in which the triangle can be dissected to find the area for some of the triangles. **Better** responses communicate a range of different methods more clearly and cover all five triangles.

Fiveses (extension activity)	**T6L1assess3**
Solutions	Notes
Rectangle with area 5cm^2 using the grid, e.g. •  • 	
Triangle with area 5cm^2 using the grid, e.g. • 	
Triangle with area 5cm^2 and no right angles using the grid, e.g. • 	**Good** responses show a different triangle with the same area as the previous one, with no right angles. **Better** responses show a triangle with area 5cm^2 and no right angles.
Parallelogram with area 5cm^2 and no right angles using the grid, e.g. • 	**Good** responses show a quadrilateral that is not a rectangle with area 5cm^2. **Better** responses show a parallelogram with area 5cm^2 and no right angles.
Indicates 'yes' A correct explanation or method to show how the area can be calculated, e.g. •  so 1 + 1 + 1 + 1 + 1 = 5 •  9 – 4 × 1 = 5	**Good** responses show, using a diagram, a way in which the square can be dissected or extended to find the area by addition or subtraction. **Better** responses communicate the method used more clearly, using calculations as well as a diagram.
For the further challenge, an area of $3\frac{1}{2}$ (cm^2) Note that the problem set was to find the area of the shaded triangle in this diagram: 	

LESSON 1: *HOW DO YOU KNOW? (AREA)* Performance indicators

Note that performance indicators involving an element of 'Using and applying mathematics' are given in **bold**.

<table>
<tr><th>Worksheet</th><th>Performance indicators</th></tr>
<tr><td>Growing, growing, grown
(target level 3/4)
T6L1assess1

Toppling triangles
(target level 4/5/6)
T6L1assess2

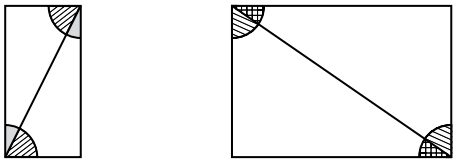
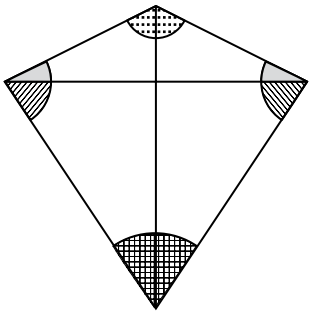
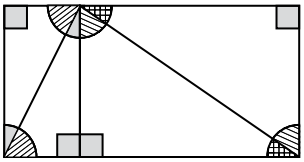
Fiveses
(extension activity)
T6L1assess3</td><td>Level 3:
At this level, pupils are generally able to:
• find areas of rectangles by counting squares;
• find or estimate areas of right-angled triangles by counting squares and part squares;
• estimate the area of a simple parallelogram by counting squares and part squares, even if the area is inaccurate.
However, they are less likely to be able to:
• show correct units for area, e.g. cm^2;
• find areas of right-angled triangles consistently accurately;
• show a clear method or explain how to find the area of a simple parallelogram and find the area accurately.

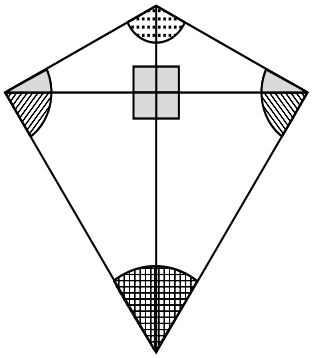
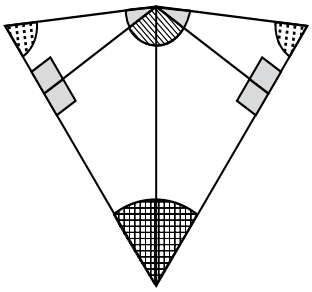
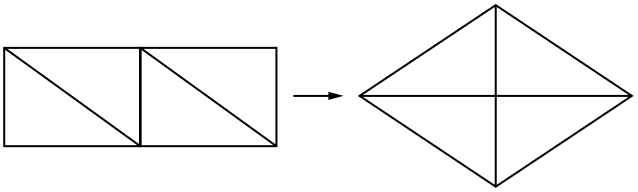
Level 4:
At this level, pupils are generally able to:
• find areas of rectangles and right-angled triangles;
• show correct units for area, e.g. cm^2;
• find the area of a simple parallelogram;
• show a clear method or explain how to find the area of a simple parallelogram and a right-angled triangle, by counting squares or dissection;
• show methods for finding areas of one or two different triangles using counting parts of squares or dissection.
However, they are less likely to be able to:
• show a clear method or explain how to find the area of a simple parallelogram using the correct area formula for a parallelogram;
• show methods for finding areas of triangles using counting parts of squares or dissection that ensures that part squares clearly 'fit' together to make whole squares;
• show methods for finding areas of triangles using subtraction or the correct area formula for a triangle.

Level 5:
At this level, pupils are generally able to:
• show methods for finding areas of triangles using counting parts of squares or dissection that ensures that part squares clearly 'fit' together to make whole squares;
• show methods for finding areas of triangles using subtraction or the correct area formula for a triangle;
• draw a rectangle and a right-angled triangle with areas of $5cm^2$;
• show some understanding when trying to draw a parallelogram with area $5cm^2$ or explain how to find the area of a square without horizontal and vertical sides.
However, they are less likely to be able to:
• draw a triangle or a parallelogram with no right angles with an area of $5cm^2$;
• show a clear method or explain how to find the area of a square without horizontal and vertical sides.

(See next page for level 6 and above indicators)</td></tr>
</table>

Worksheet	Performance indicators
Toppling triangles (target level 4/5/6) **T6L1assess2**	**Level 6 and above:** At these levels, pupils are generally able to: • give evidence for the performance indicators listed previously for pupils working at level 5, plus; • **explain clearly a range of methods for finding areas of triangles,** including using subtraction or the correct area formula for a triangle; • draw a triangle or a parallelogram with no right angles with an area of 5cm^2; • **show a clear method or explain how to find the area of a square or a triangle without horizontal and vertical sides**.
Fiveses (extension activity) **T6L1assess3**	

Kites and *Kites (continued)* (target level 3/4)	**T6L2assess1a and 1b**
Solutions	Notes
Pairs of equal angles shaded in different colours or ways, e.g. • 	**Good** responses repeat colours or types of shading in both rectangles. **Better** responses use four different colours or types of shading to identify all equal pairs of acute angles.
Correct kite using the four triangles, e.g. • 	**Good** responses show a correct kite. **Better** responses also include pairs of equal angles shaded in different colours or ways.
Fact(s) about the angles in the kite, e.g. • 'Two of them are equal' • 'Two opposite angles are the same and the other two are not' • 'They must add up to 360°'	**Good** responses state a fact that is true for the angles in the diagram but may not relate to the interior angles of the shape. **Better** responses state a fact about the interior angles of the kite that can be deduced from the previous rectangles.
Kites and rhombuses (target level 5/6)	**T6L2assess2**
Solutions	Notes
Pairs of equal angles shaded in different colours or ways, e.g.  Correct explanations, e.g. for any of the acute angles: • 'You just flip the triangles over to get the same one. There are two of each' • 'The sides of the rectangle are parallel and alternate angles are equal' • 'You can extend the lines and use corresponding angles and vertically opposite angles' for the right angles: • 'Angles in a rectangle are 90°' • 'Angles on a straight line add up to 180'	**Good** responses identify most sets of equal angles. **Better** responses identify all sets of equal angles and use geometric properties to explain how pupils know.

Kites and rhombuses (target level 5/6)	**T6L2assess2**
Solutions	Notes
Correct kite using the four triangles, e.g. •  • 	**Good** responses show a correct kite. **Better** responses also include sets of equal angles shaded in different colours or ways.
Fact about the angles in the kite, e.g. • 'Two of them are equal' • 'Two opposite angles are the same and the other two are not' • 'They must add up to 360°'	**Good** responses state a fact that is true for the angles in the diagram but may not relate to the interior angles of the shape. **Better** responses state a fact about the interior angles of the kite that can be deduced from the previous rectangle.
A rhombus made out of a rectangle, e.g. • 	**Good** responses show understanding that a rhombus must have two pairs of parallel sides. **Better** responses recognise that a rhombus also has four equal sides, and that dividing a rectangle into two congruent rectangles is an efficient starting point.
Fact(s) about the angles in the rhombus, e.g. • 'Both pairs of them are equal' • 'Opposite angles are the same' • 'They must add up to 360°' • 'Two are obtuse and two are acute' • 'If any of them are 90, then it's a square'	**Good** responses state a fact that is true for the angles in the diagram but may not relate to the interior angles of the shape. **Better** responses state a fact about the interior angles of the rhombus that can be deduced from the previous rectangle.

LESSON 2: *HOW DO YOU KNOW? (ANGLES)* Performance indicators

Note that performance indicators involving an element of 'Using and applying mathematics' are given in **bold**.

Worksheet	Performance indicators
Kites and *Kites (continued)* (target level 3/4) **T6L2assess1a and 1b**	**Level 3:** At this level, pupils are generally able to: • indicate pairs of equal angles on a diagram involving rectangles; • rearrange pieces of given shapes to form a kite. However, they are less likely to be able to: • use four types of shading to distinguish different pairs of equal angles from each other, at least on the pieces assembled to form the kite; • state a simple fact about the angles on the diagram. **Level 4:** At this level, pupils are generally able to: • indicate pairs of equal angles on a diagram involving rectangles; • rearrange pieces of given shapes to form a kite; • use four types of shading to distinguish different pairs of equal angles from each other, at least on the pieces assembled to form the kite; • state simple fact(s) about the angles on the diagram, even if this does not relate to the interior angles of the overall shape. However, they are less likely to be able to: • state or imply angle fact(s) about the interior angles of the kite, based on its former arrangement as rectangles.
Kites and rhombuses (target level 5/6) **T6L2assess2**	**Level 5:** At this level, pupils are generally able to: • indicate pairs of equal angles on a diagram involving rectangles, distinguishing different pairs of equal angles from each other; • give fact(s) about the angles within the rectangle, but do not refer to parallel lines; • state or imply angle fact(s) about the interior angles of the kite, based on its former arrangement as a rectangle; • **rearrange pieces of a rectangle to form a rhombus** (or a parallelogram in error); • state one or two angle facts about the rhombus (or parallelogram). However, they are less likely to be able to: • explain why pairs of acute angles are equal using properties of parallel lines; • ensure that their rhombus has four equal sides as well as two pairs of parallel sides; • **work out a way of dissecting a rectangle to ensure a rhombus can be formed**, e.g. start by dividing it into two congruent rectangles; • deduce angle facts about a rhombus based on its former arrangement as a rectangle. (See next page for level 6 and above indicators)

Worksheet	Performance indicators
Kites and rhombuses (continued) (target level 5/6) **T6L2assess2**	**Level 6:** At this level, pupils are generally able to: • attempt an explanation for why pairs of acute angles are equal, referring to parallel lines; • ensure that their rhombus has four equal sides as well as two pairs of parallel sides; • **work out a way of dissecting a rectangle to ensure a rhombus can be formed**, e.g. start by dividing it into two congruent rectangles; • deduce angle facts about a rhombus based on its former arrangement as a rectangle. However, they are less likely to be able to: • **give a clear explanation for why pairs of acute angles are equal using properties of parallel lines and formal mathematical language**. **Above level 6:** At these levels, pupils are generally able to: • give evidence for the performance indicators listed previously for pupils working at level 6, plus; • **give a clear explanation for why pairs of acute angles are equal using properties of parallel lines and formal mathematical language**.

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