

Autumn Block 3

Shape

Small steps

Step 1

Recognise and name 3-D shapes

Step 2

Sort 3-D shapes

Step 3

Recognise and name 2-D shapes

Step 4

Sort 2-D shapes

Step 5

Patterns with 2-D and 3-D shapes



Recognise and name 3-D shapes

Notes and guidance

This small step is the first in a block of learning on shape. Children start by looking at 3-D shapes, as these are tangible shapes that they can touch and feel to help understand their identifying features.

Children are required to name simple 3-D shapes such as cubes, cuboids, cylinders, pyramids, cones and spheres. While some questions require children to write the names of the shapes, at this point the focus should be more on verbally naming and matching.

Encourage children to make links to previous learning and to start to think about the 2-D faces on a 3-D shape, as this will support them later on when they look at 2-D shapes in detail.

Things to look out for

- Children may think that a 3-D shape can only be placed or viewed in a certain way. Ensure that children are exposed to shapes in different orientations.
- Children may be familiar with the names of 2-D shapes from earlier learning or real-life experience, and may confuse these names with the names of 3-D shapes.

Key questions

- What makes a shape 3-D?
- What 3-D shapes can you see in the classroom?
- What is the name of this 3-D shape?
- Do all cubes look the same?
- Does the shape change when you turn it around?
- Can you think of any everyday objects that are cones/cubes/cylinders?

Possible sentence stems

- The mathematical name of a football is a _____
- The mathematical name of a book is a _____
- The mathematical name of a tin of beans is a _____
- This is a _____ because ...

National Curriculum links

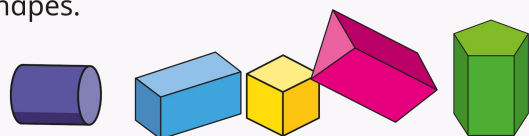
- Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

Recognise and name 3-D shapes

Key learning



Provide a selection of blocks in different sizes and shapes.



Can children name each shape?

Encourage children to handle the shapes by building towers with different numbers of blocks, asking them to name each shape as they select it.

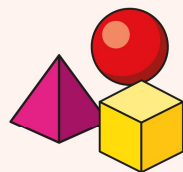
Challenge children to place their blocks to make the tower as tall as possible.



Ask children to make a variety of 3-D shapes using modelling clay.

Ask which shapes are the easiest and hardest to make, and why.

Ask children to describe how they made the flat faces.



- Match each shape to its name.



cube	cylinder	cuboid	pyramid	cone	sphere
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- Complete the sentences to describe the model.

There are _____ cuboids.

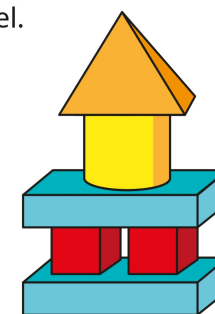
There are _____ cylinders.

There are _____ pyramids.

There are _____ cubes.

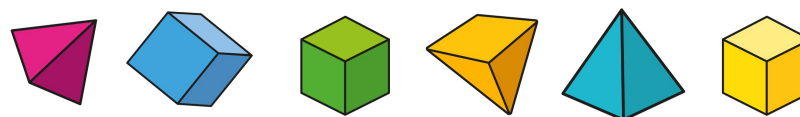
Use 3-D shapes to make your own model.

Ask a partner to describe it.



- Which shapes are cubes?

Which shapes are pyramids?



Recognise and name 3-D shapes

Reasoning and problem solving



Put a selection of 3-D shapes in a feely bag.

Ask a child to feel a shape in the bag without taking it out. Ask them to guess what shape it is and explain their choice.

multiple possible answers



Give children a selection of 3-D shapes and ask them to build a tower.

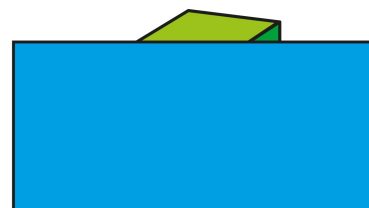
Encourage them to think about these questions:

- Which shapes are the best for the bottom of the tower?
- Which shapes can only go on the top of the tower?
- Does it matter which way round a shape is placed?

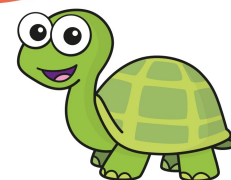
Possible positions for shapes will depend on whether they have flat or curved surfaces.

Mo has a 3-D shape.

He covers the bottom of the shape.



Mo's shape **must** be a cube.



No

Do you agree with Tiny?

Talk about it with a partner.



Sort 3-D shapes

Notes and guidance

In this small step, children start to sort 3-D shapes. They should be given the opportunity to explore similarities and differences between shapes as they play, and to sort them according to what they notice. While they may have naturally started to sort 3-D shapes already, in this step children sort and group 3-D shapes more formally according to simple properties, including type, size and colour. As well as sorting shapes themselves, children also identify how given groups of shapes have been sorted.

Encourage children to explain in detail what they notice about groups of shapes and to consider whether they could have been sorted another way. Children should think about the key features of each 3-D shape. Encourage them to consider questions such as “Will they stack, or will they roll?” as another method for sorting.

Things to look out for

- If children are not used to seeing 3-D shapes presented in different orientations, they may try to sort by shapes that are “upside down”.
- Children may think that cubes and cuboids can never be sorted into the same group, because they do not realise that a cube is a special type of cuboid.

Key questions

- Why is this shape the odd one out?
- What is the same about the shapes? What is different?
- Can you find an everyday object to add to each group?
- How can you test if the shapes roll? What do the shapes that roll have in common?
- How can you test if the shapes stack? What do the shapes that stack have in common?

Possible sentence stems

- A _____ has flat faces.
- A _____ has a curved surface.
- A _____ has both flat faces and curved surfaces.

National Curriculum links

- Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

Sort 3-D shapes

Key learning



Give children some 3-D shapes and ask them to sort the shapes into two groups.

Get them to explain why they put certain shapes together and how the sets are different. Then ask children how they could sort the shapes in another way.



Read the story of *Rapunzel*.

Discuss which shapes children could use to build Rapunzel's tower.

Which shapes would they use at the bottom of the tower, and which shapes at the top?

Ask whether they could add a staircase to help Rapunzel escape.

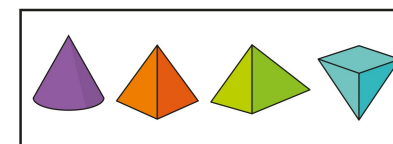
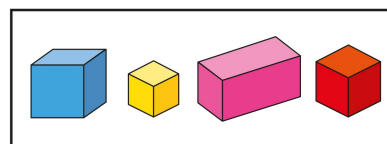


Play "Guess my rule".

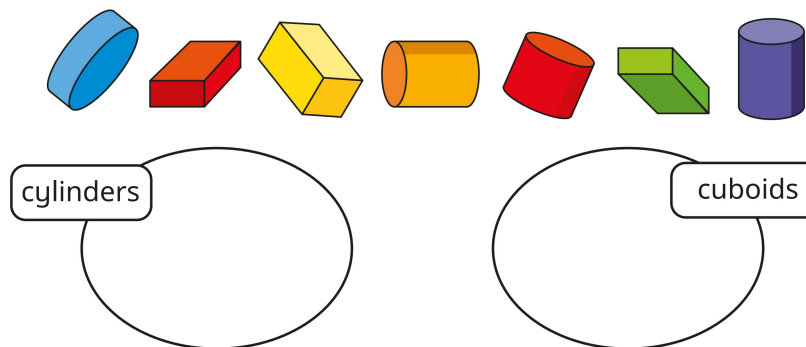
Sort a variety of 3-D shapes into two groups and ask children to work out how you are sorting them.

For example, you could sort shapes by those that stack and those that roll.

- Which is the odd one out in each group?

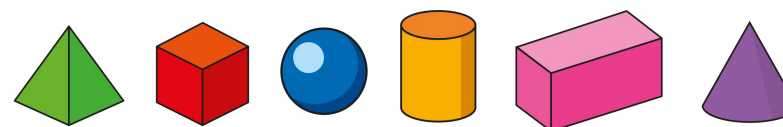


- Sort the shapes into the groups.



- Which shapes will roll?

Which shapes will stack?



Will any of the shapes roll **and** stack?

Sort 3-D shapes

Reasoning and problem solving

Tiny is sorting 3-D shapes.

cubes

Is Tiny correct?
How do you know?
Can you sort the shapes another way?

No

Sort the shapes into two groups.

Can you sort them another way?

various possible answers, e.g.
flat faces and curved surfaces

Recognise and name 2-D shapes

Notes and guidance

Now that children have looked in detail at 3-D shapes, they begin to look at 2-D shapes. They will have experience of 2-D shapes and may already know some of the names. Children are required to name simple 2-D shapes, such as triangles, squares, rectangles and circles. While some questions require children to write the names of the shapes, at this point the focus should be on verbally naming and matching.

As 2-D shapes cannot be physically explored in the same way as 3-D shapes, they can be difficult to introduce to children in a practical way. 3-D shapes can be used as a way of exploring 2-D shapes, where children focus on the faces of the 3-D shapes to identify which 2-D shapes they are made up of. They can also draw around 3-D shapes or use them to make prints of 2-D shapes. It is essential that children recognise that 2-D shapes are completely flat.

Things to look out for

- Children may not recognise that a square is a special type of rectangle.
- Children may think that each shape can only be placed or viewed in a certain way. Ensure that children are exposed to these shapes in different orientations.

Key questions

- What 2-D shapes do you know?
- What is the difference between a 2-D shape and a 3-D shape?
- Can you see any 2-D shapes on the faces of this 3-D shape?
- What does “2-D” mean?
- Describe the difference between a square and a cube.
- Describe the difference between a circle and a sphere.
- Where can you see 2-D shapes around the classroom?

Possible sentence stems

- On the face of a cylinder, I can see a _____
- On the face of a pyramid, I can see a _____ and a _____
- I know this shape is a _____ because ...

National Curriculum links

- Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

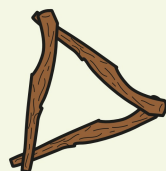
Recognise and name 2-D shapes

Key learning



Take the class outside to collect sticks.

Ask children how many triangles they can make from their sticks. Discuss whether they always use the same number of sticks for each triangle.



Repeat with squares and rectangles.

Ask whether it is possible to make a circle using sticks.



Show children a picture made of different shapes, for example a boat, a rocket or a house.



Ask children what shapes they can see in the picture.

Ask them how many triangles/squares/rectangles/circles they can count.

Give children shapes to make their own pictures.

Take the class on a shape hunt, looking for circles, squares, rectangles and triangles on the surface of everyday objects.



Give children some 3-D shapes to draw around. Ask them to name the shapes they have drawn.

Ask how many different 2-D shapes they can draw using 3-D shapes in this way.

Can they draw a circle? Can they draw a square?

- Match each shape to its name.



rectangle

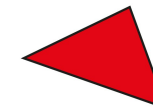
circle

square

triangle

- Which shapes are triangles?

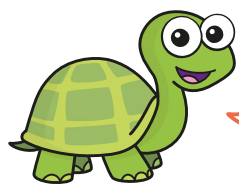
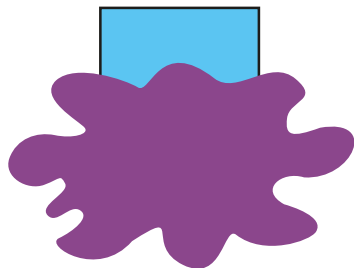
Which shapes are rectangles?



Recognise and name 2-D shapes

Reasoning and problem solving

Sam draws a shape.
She spills paint on the shape.



Sam's shape
must be a square.

Do you agree with Tiny?
Is there more than one answer?

No
The shape could be
a square or
a rectangle.

Here is part of a shape.



Draw straight lines to complete
the shape.
How many ways can you do it?
Compare shapes with a partner.



multiple possible
answers, e.g.
square, rectangle
or triangle

Sort 2-D shapes

Notes and guidance

In this small step, children start to sort 2-D shapes. While they may have naturally started to sort 2-D shapes already, in this step they sort and group 2-D shapes more formally according to simple properties, including type, size and colour. As well as sorting shapes into groups themselves, children also identify how given groups of shapes have been sorted.

Encourage children to explain in detail what they notice about groups of shapes and to consider whether they could have been sorted another way. They should think about what is the same and what is different about shapes, while also recognising that the orientation of a shape does not affect its properties.

Take time to explore the similarities between squares and rectangles, so that children see the connection.

Things to look out for

- Children may try to sort by shapes that are “upside down” if they are not used to seeing 2-D shapes presented in different orientations.
- Children may think that squares and rectangles can never be sorted together, because they do not realise that a square is a special type of rectangle.

Key questions

- What is the name of this shape?
- Can you describe the shape?
- Compare your shape to a different shape. What is the same and what is different?
- Compare your shape to other shapes with the same name. What is the same and what is different?
- How have the shapes been sorted?
- Could the shapes have been sorted in a different way?

Possible sentence stems

- I have sorted the shapes by _____
- These shapes are grouped together because ...

National Curriculum links

- Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

Sort 2-D shapes

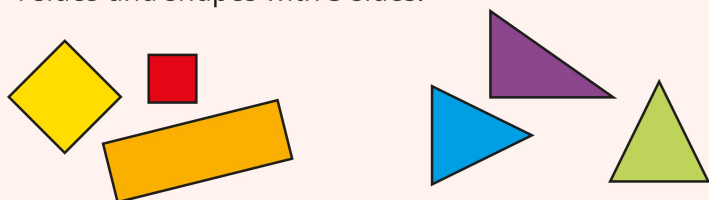
Key learning



Play “Guess my rule”.

Sort a variety of 2-D shapes into two groups and ask children to work out how you are sorting them.

For example, you could sort shapes by shapes with 4 sides and shapes with 3 sides.



Give children another shape and ask them which group it belongs in.



Read *Which One Doesn't Belong?* by Christopher Danielson.

Using the book as a prompt, ask children to explain which shape is different from the rest.

Can they find more than one answer?

Challenge them to find a reason why each of the shapes could be different from the rest.

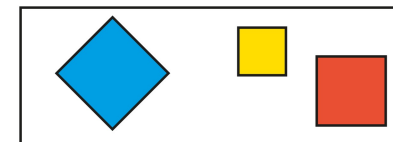
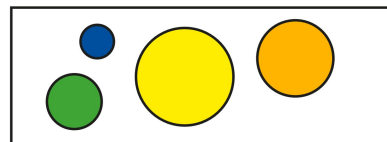


Take children on a shape hunt around the school.

Take photos of 2-D shapes then sort them by name.

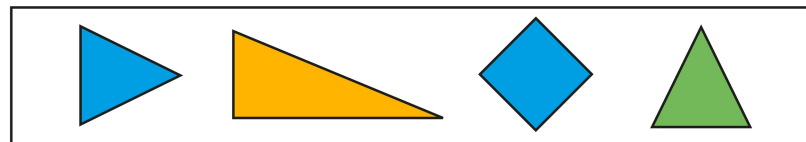
Can children sort them another way?

- How have the shapes been sorted?



Draw one more shape in each group.


- Which shape is the odd one out in each group?

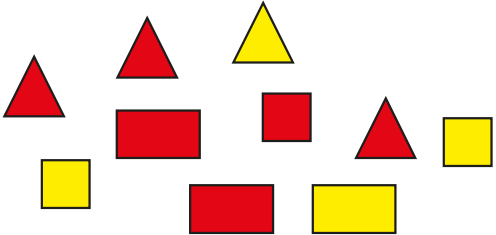


Is there more than one answer?

Sort 2-D shapes

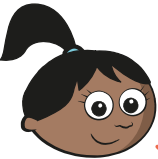
Reasoning and problem solving

Sort the shapes into two groups. 




Ask a partner to label your groups.
How many different ways can you sort the shapes?

multiple possible answers, e.g.
number of sides
colour



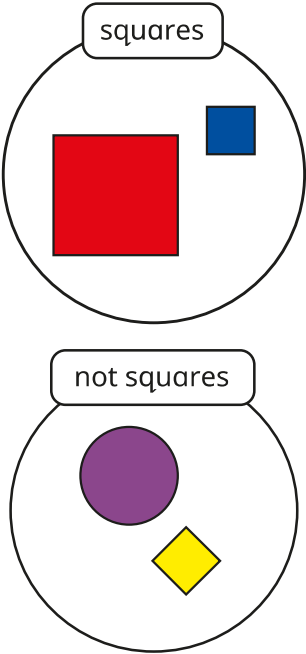
All shapes with 4 sides are squares.

Is Sam correct?
How do you know?




No

Max is sorting 2-D shapes.



Is Max correct?
How do you know?



No

Patterns with 2-D and 3-D shapes

Notes and guidance

In this small step, children create patterns with 2-D and 3-D shapes. They should experience both repeating patterns (ABAB) and symmetrical patterns (ABBCBBA), but do not need to know the names of these types of patterns.

Children use both 2-D and 3-D shapes to complete and make simple patterns, focusing on different shapes, sizes and colours. Encourage children to say the patterns aloud, consolidating their previous learning on naming shapes. Use shapes in different orientations to reinforce children's recognition of 2-D and 3-D shapes.

Children should be able to recognise the rule within a pattern and use this to continue it in any direction.

Things to look out for

- Children may find it harder when a pattern involves more than two shapes, as they may not find the rule as easy to spot.
- Where a pattern repeats the same shape multiple times in a row, for example ABBBB, children may find it more difficult to identify the rule and therefore to continue the pattern.

Key questions

- What is the order of the shapes in the pattern?
- Can you describe the pattern?
- What will the next shape be?
- How many different shapes are in the pattern?
- Can you say the names of the shapes out loud as you describe the pattern?
- What is the same and what is different about the patterns?

Possible sentence stems

- The next shape in the pattern is a _____
- There are _____ shapes before the pattern starts again.
- The pattern is made up of _____ shapes.

National Curriculum links

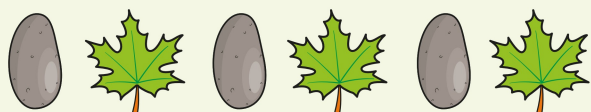
- Recognise and name common 2-D and 3-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles]; 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]

Patterns with 2-D and 3-D shapes

Key learning



Use natural objects to build a repeating pattern.



Ask children to describe and continue the pattern.

Ask children to continue longer patterns.



Challenge children to create a different pattern using similar structures.

Can their partners continue their patterns?



Tell each child to draw either a triangle or a circle on their whiteboard.

Now ask the children to line up and make a pattern from their whiteboards.

How many different patterns can they make?

Repeat for other shapes and patterns.

- Kay makes a pattern.



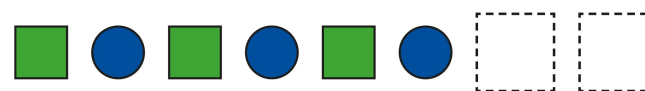
Say the pattern out loud: rectangle, triangle, circle, rectangle, triangle, circle ...

Which shape comes after the circle?

Which shape comes before the rectangle?

- Ben makes a pattern.

He uses 3-D shapes to print 2-D shapes.



Which 3-D shapes can Ben use to continue the pattern?

Use 3-D shapes to make your own print pattern.

- What are the missing shapes in this symmetrical pattern?



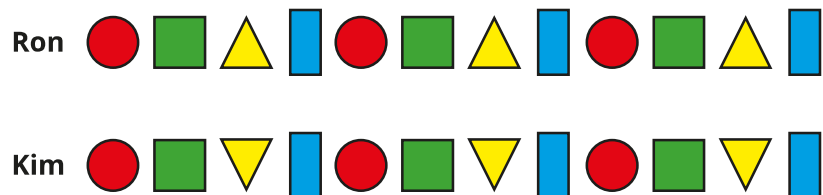
How do you know?

Can you make or draw your own symmetrical pattern?

Patterns with 2-D and 3-D shapes

Reasoning and problem solving

Ron and Kim each make a pattern.



Ron

The patterns are the same.



Kim

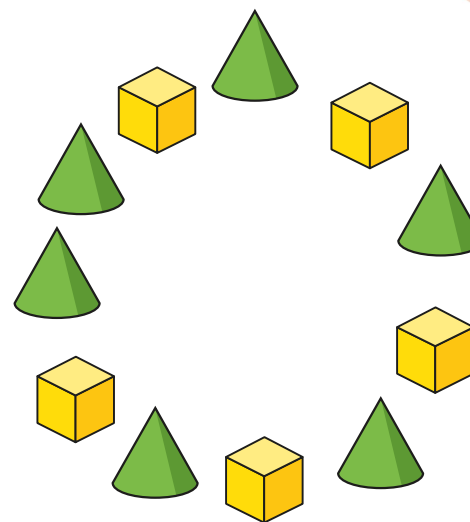
The patterns are different.

Who do you agree with?

Why?

Kim

Jo makes a pattern in a circle.



Is Jo's pattern correct?

How do you know?

Use 3-D shapes to make your own pattern in a circle.

No
Jo has put two
cones together.