Spring Scheme of Learning

Year 1/2

#MathsEveryoneCan

2019-20
How to use the mixed-age SOL

In this document, you will find suggestions of how you may structure a progression in learning for a mixed-age class.

Firstly, we have created a yearly overview.

For each block of learning, we have grouped the small steps into themes that have similar content. Within these themes, we list the corresponding small steps from one or both year groups. Teachers can then use the single-age schemes to access the guidance on each small step listed within each theme.

The themes are organised into common content (above the line) and year specific content (below the line). Moving from left to right, the arrows on the line suggest the order to teach the themes.

Each term has 12 weeks of learning. We are aware that some terms are longer and shorter than others, so teachers may adapt the overview to fit their term dates. The overview shows how the content has been matched up over the year to support teachers in teaching similar concepts to both year groups. Where this is not possible, it is clearly indicated on the overview with 2 separate blocks.
How to use the mixed-age SOL

Here is an example of one of the themes from the Year 1/2 mixed-age guidance.

**Subtraction**

Year 1 (Aut B2, Spr B1)
- How many left? (1)
- How many left? (2)
- Counting back
- Subtraction - not crossing 10
- Subtraction - crossing 10 (1)
- Subtraction - crossing 10 (2)

Year 2 (Aut B2, B3)
- Subtract 1-digit from 2-digits
- Subtract with 2-digits (1)
- Subtract with 2-digits (2)
- Find change - money

Points to consider

- Use the mixed-age schemes to see where similar skills from both year groups can be taught together. Learning can then be differentiated through the questions on the single-age small steps so both year groups are focusing on their year group content.
- When there is year group specific content, consider teaching in split inputs to classes. This will depend on support in class and may need to be done through focus groups.
- On each of the block overview pages, we have described the key learning in each block and have given suggestions as to how the themes could be approached for each year group.
- We are fully aware that every class is different and the logistics of mixed-age classes can be tricky. We hope that our mixed-age SOL can help teachers to start to draw learning together.

In order to create a more coherent journey for mixed-age classes, we have re-ordered some of the single-age steps and combined some blocks of learning e.g. Money is covered within Addition and Subtraction.

The bullet points are the names of the small steps from the single-age SOL. We have referenced where the steps are from at the top of each theme e.g. Aut B2 means Autumn term, Block 2. Teachers will need to access both of the single-age SOLs from our website together with this mixed-age guidance in order to plan their learning.
<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
<th>Week 4</th>
<th>Week 5</th>
<th>Week 6</th>
<th>Week 7</th>
<th>Week 8</th>
<th>Week 9</th>
<th>Week 10</th>
<th>Week 11</th>
<th>Week 12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Autumn</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number: Place Value</td>
<td>Number: Addition and Subtraction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y1 - Numbers to 20</td>
<td>Year 1: Numbers within 20 (including recognising money)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Y2 - Numbers to 100</td>
<td>Year 2 - Numbers within 100 (including money)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Spring</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number: Year 1: Division &amp; consolidation</td>
<td>Year 1: Place Value to 100</td>
<td>Measurement: Length and Height</td>
<td>Geometry: Year 1: Shape and Consolidation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 2: Division</td>
<td></td>
<td></td>
<td>Year 2: Properties of Shape</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 2: Statistics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Summer</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geometry: Position and Direction</td>
<td>Measurement: Time</td>
<td>Year 1: Place Value recap</td>
<td>Measurement: Year 1: Weight and Volume</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 2: Problem solving</td>
<td></td>
<td></td>
<td>Year 2: Mass, Capacity and Temperature</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 1: Four Operations recap</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 2: Consolidation and Investigations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© White Rose Maths 2019
In this section, content from single-age blocks are matched together to show teachers where there are clear links across the year groups. Teachers may decide to teach the lower year’s content to the whole class before moving the higher year on to their age-related expectations. The lower year group is not expected to cover the higher year group’s content as they should focus on their own age-related expectations.

In this section, content that is discrete to one year group is outlined. Teachers may need to consider a split input with lessons or working with children in focus groups to ensure they have full coverage of their year’s curriculum. Guidance is given on each page to support the planning of each block.

The themes should be taught in order from left to right.
Year 1/2 | Spring Term | Week 6 to 8 – Shape

Properties of Shape

Common Content

- **Recognise & Name Shapes**
  - Year 1 (Aut B3)
    - Recognise and name 3-D shapes
    - Recognise and name 2-D shapes
  - Year 2 (Spr B3)
    - Recognise 2-D and 3-D shapes

- **Sorting**
  - Year 1 (Aut B3)
    - Sort 3-D shapes
    - Sort 2-D shapes
  - Year 2 (Spr B3)
    - Sort 2-D shapes
    - Sort 3-D shapes

- **Patterns**
  - Year 1 (Aut B3)
    - Patterns with 3-D and 2-D shapes
  - Year 2 (Spr B3)
    - Make patterns with 2-D shapes
    - Make patterns with 3-D shapes

---

**2-D Shapes**
- Year 2 (Spr B3)
  - Count sides on 2-D shapes
  - Count vertices on 2-D shapes
  - Draw 2-D shapes
  - Lines of symmetry

**3-D Shapes**
- Year 2 (Spr B3)
  - Count faces on 3-D shapes
  - Count edges on 3-D shapes
  - Count vertices on 3-D shapes

---

**Year 1 focus on recognising and naming 2-D and 3-D shapes. It is important that children can recognise shapes in different orientations and to start seeing similarities and differences between the shapes.**

**Year 2 focus on the properties of 2-D and 3-D shapes including finding 2-D shapes with vertical lines of symmetry.**
Children name simple three dimensional shapes: cuboids (including cubes), cylinders, pyramids, cones and spheres. Ensure children see the shapes in a variety of orientations so they develop a deeper understanding of the shape.

Children start to consider the 2-D shapes they can see on the faces of the 3-D shapes which will support them when looking at 2-D shapes later in the block.

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

### Varied Fluency

- **Match the shape to its name.**

  - cube
  - cylinder
  - cuboid
  - pyramid
  - cone
  - sphere

- **Complete the sentences to describe the model.**
  
  There are _____ cuboids.
  There are _____ cylinders.
  There are _____ pyramids.
  There are _____ cubes.

  Build your own model using 3-D shapes and ask a partner to describe it.

- **Circle the cubes. Tick the pyramids.**
Put a selection of 3-D shapes in a feely bag.
Choose a shape. What do you think it is?

Possible answer:
I think it is a cuboid because I cannot feel any curved surfaces but I can feel a long and smaller face.

Explain how you know.

Use 3-D shapes to build a tower.
Which shapes are the best for the bottom of the tower?
Which shapes can only go on the top of the tower?
Can you use any of the shapes only in one orientation?

The bottom of a 3-D shape is hidden.

What shape could it be?
Explain how you know.

Possible answers:
Cube
Cuboid
Pyramid
Children see 2-D shapes on the surfaces of 3-D shapes. Children can use the 3-D shapes as stencils or prints to make 2-D shapes. It is important that children see 2-D shapes are flat.

Looking at 2-D shapes, children name triangles, squares, rectangles and circles.

What is the name of this 3-D shape?
What can you tell me about the surfaces?
What are the names of the shapes on the surfaces?
How many ______ are on the surface of this shape?
Is there more than one type of shape on the surfaces?
Where else can we see 2-D shapes around the classroom?

Choose a 3-D object. Use one of the faces as a stencil to draw around. Name the shape that you have drawn. How many different 2-D shapes can you draw using 3-D shapes as a stencil?

Match the 2-D shapes to their names.

Circle the triangles, tick the rectangles and draw a circle and a square.
Part of a shape is hidden.

What shape could it be?
Is there more than one possibility?
Explain your thinking.

It could be a square because it can have 4 sides the same length.

It could be a rectangle because it could have 2 longer sides.

Here is part of a shape.

How many different ways can you complete the shape using one or more straight lines?

Compare your shape with a partner.
What is the same and what is different?

Children could continue the shape to make a square, rectangle or triangle.
Before learning about their properties, children need to recognise and name both 2-D and 3-D shapes and to be able to differentiate between them. They begin to understand that 2-D shapes are actually flat and the manipulatives they handle in class are representations of the shapes. Children also need to be able to recognise 2-D shapes in different orientations and proportions.

What is the difference between a 2-D and 3-D shapes?
What shape is this? If I turn it around, what shape is it now?
Can you draw around any of the faces on your 3-D shapes?
Which 2-D shapes can you make?
Recognise 2-D and 3-D Shapes

Reasoning and Problem Solving

Which shape is the odd one out? Explain why.

The square is the odd one because it is the only 2-D shape or flat shape.

I'm thinking of a 2-D shape with more than 3 sides.

What shape could Whitney be thinking of?
Are there any other shapes it could be?
What shape is Whitney definitely not thinking about? How do you know?

Use true or false to say which shapes are triangles.

Possible examples:
- square
- rectangle
- pentagon
- hexagon
- octagon

Whitney is not thinking of a triangle because it only has 3 sides.

True, false, true, true, true, false, false, false

Which shape is the odd one out? Explain your reasoning.

Three of the shapes are triangles, one is not. Three of them have three sides, one has four.

Other answers can be accepted with a clear explanation.
Block 4 - Shapes

Theme 2 - 2-D Shapes
Children should be encouraged to develop strategies for accurate counting of sides, such as marking each side as it has been counted.

Children also need to understand that not all same-sided shapes look the same, such as irregular 2-D shapes.

**Mathematical Talk**

What is a side?

How can you check that you have counted all the sides?

Do all four-sided shapes look the same?

Why do you think the shapes have the names that they do?

**Varied Fluency**

- Match the shapes to the number of sides.
  - Six
  - Four
  - Three

- Colour the four-sided shapes.

- Complete the table.

<table>
<thead>
<tr>
<th>Name</th>
<th>Shape</th>
<th>Number of sides</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentagon</td>
<td><img src="image" alt="Pentagon" /></td>
<td></td>
</tr>
<tr>
<td>Rectangle</td>
<td><img src="image" alt="Rectangle" /></td>
<td></td>
</tr>
<tr>
<td>Square</td>
<td><img src="image" alt="Square" /></td>
<td></td>
</tr>
<tr>
<td>Triangle</td>
<td><img src="image" alt="Triangle" /></td>
<td></td>
</tr>
<tr>
<td>Hexagon</td>
<td><img src="image" alt="Hexagon" /></td>
<td></td>
</tr>
</tbody>
</table>
Here are 18 lollipop sticks. How many hexagons can you make?

Using one stick per side:
3 hexagons, 2 octagons with 2 lollipop sticks spare, 6 triangles, 4 squares or 3 pentagons. May also create shapes with more than one stick on each side.

If I put these shapes into order from the smallest number of sides to the largest, which shape would come third?

Where would a hexagon come in the list? Why?

A hexagon would come after the pentagon and before the octagon because it has 6 sides which is more than 5 and less than 8.

The pentagon would be third.

Mo makes a rectangle using the sticks.

Mo could make 3 rectangles using 6 sticks. Talk about how rectangles can look differently.

How many identical rectangles could he make with 18 sticks?

Make your own rectangle. How many sticks did you use? Is your rectangle the same as your friend's?
Children are introduced to the terms vertex and vertices. They understand that a vertex is where two lines meet at a point. They recognise that corners are vertices and will be able to identify and count them on shapes.

Ensure from this point forwards the word vertex is used in place of corner throughout all content.

**Mathematical Talk**

Show me a vertex.

Can you identify the vertices in this shape?

Would this be a vertex? Explain why.

If my shape has ___ vertices, what could my shape be?

What couldn’t it be?

**Varied Fluency**

- Match the shapes to the number of vertices.
  - Six
  - Four
  - Three

- Colour the shapes with 4 vertices.

- Complete the table.

<table>
<thead>
<tr>
<th>Name</th>
<th>Shape</th>
<th>Number of vertices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentagon</td>
<td><img src="image" alt="Pentagon" /></td>
<td></td>
</tr>
<tr>
<td>Rectangle</td>
<td><img src="image" alt="Rectangle" /></td>
<td></td>
</tr>
<tr>
<td>Square</td>
<td><img src="image" alt="Square" /></td>
<td></td>
</tr>
<tr>
<td>Triangle</td>
<td><img src="image" alt="Triangle" /></td>
<td></td>
</tr>
<tr>
<td>Hexagon</td>
<td><img src="image" alt="Hexagon" /></td>
<td></td>
</tr>
</tbody>
</table>
### Count Vertices on 2-D Shapes

#### Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>Amir says:</th>
<th>Square Rectangle</th>
<th>Jack has created a pattern using shapes.</th>
<th>Possible answer:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>My shape has half the number of vertices as an octagon.</strong></td>
<td>My shape has half the number of vertices as an octagon.</td>
<td><strong>4, 7, 11</strong></td>
<td>The next step could have another square (15 vertices) or another triangle (14 vertices).</td>
</tr>
<tr>
<td><strong>What shape could he have?</strong></td>
<td><strong>What shape could he have?</strong></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Put these shapes in order based upon the number of vertices they have.</strong></td>
<td><strong>Put these shapes in order based upon the number of vertices they have.</strong></td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Square, Rectangle</strong></td>
<td><strong>Square, Rectangle</strong></td>
<td><strong>Triangle, rectangle, pentagon, hexagon</strong></td>
<td><strong>Triangle, rectangle, pentagon, hexagon</strong></td>
</tr>
<tr>
<td><strong>How many vertices does each step in the pattern have?</strong></td>
<td><strong>How many vertices does each step in the pattern have?</strong></td>
<td><strong>What do you notice?</strong></td>
<td><strong>What do you notice?</strong></td>
</tr>
<tr>
<td><strong>What do you notice?</strong></td>
<td><strong>What do you notice?</strong></td>
<td><strong>Can you predict how many vertices the next step in the pattern will have?</strong></td>
<td><strong>Can you predict how many vertices the next step in the pattern will have?</strong></td>
</tr>
<tr>
<td><strong>Can you create your own pattern and explore how the vertices change?</strong></td>
<td><strong>Can you create your own pattern and explore how the vertices change?</strong></td>
<td><strong>Is there more than one way to continue the pattern?</strong></td>
<td><strong>Is there more than one way to continue the pattern?</strong></td>
</tr>
</tbody>
</table>
Children use their knowledge of properties of shape to accurately create 2-D shapes. Children could use geo-boards to make shapes with elastic bands and look carefully at the number of sides and vertices.

Using geo-boards is a practical step to take before children draw their own shapes on dotted or squared paper.

Mathematical Talk

Compare your shape with a friend's shape. Is it in the same position? Is it the same size?

Where are you going to start drawing the shape? In the middle of a side? At a vertex? Which is the most efficient way?

Why is it important to use a ruler?

Is your shape an exact copy? How do you know?

Varied Fluency

Use a geoboard to make different 2-D shapes. Can you make a rectangle? Can you make a square? Can you make a triangle?

Can you draw a rectangle on dotted paper? Start at a vertex and use a ruler to draw your first straight side. How many straight sides will you need? Rotate the paper to help you draw the shape more accurately. Try drawing other shapes in the same way.

Choose a 2-D shape. Build it on a geo-board. Can you copy the shape onto dotted paper and squared paper?
Using geoboards, how many different rectangles can you make?

What's the same about the rectangles?

What's different?

Has your friend made any different rectangles?

What shape could be hiding under the spilt paint?

Prove your answer by drawing it.

Possible answer:

Draw a large rectangle on squared paper or dotted paper.

Draw a square inside the rectangle.

Draw a triangle below the rectangle.

Draw a pentagon that is bigger than the square.

Could be any 2-D shape.

Encourage children to think about irregular pentagons, hexagon, etc.

Can you give instructions to your partner to help them draw different shapes?

Children may end up with a different picture from above however they should have four shapes drawn.
Lines of Symmetry

Notes and Guidance

Children are introduced to the concept of vertical lines of symmetry. They should be exposed to examples that are symmetrical and also examples that are not.

Children use a range of practical resources (mirrors, geoboards, paper folding) to explore shapes being halved along their vertical line of symmetry.

Mathematical Talk

Where is the vertical line of symmetry?

What does vertical mean?

Which is the odd shape out? How do you know?

What resources could you use to check if a shape has a vertical line of symmetry?

Varied Fluency

- Can you fold these shapes to find a vertical line of symmetry?

- Draw the vertical lines of symmetry on these shapes.

- Circle the shape with an incorrect line of symmetry. Can folding help you prove your answers.
### Lines of Symmetry

#### Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>Can you draw more than one four-sided shape that has a vertical line of symmetry?</th>
<th>Possible answers: square, rectangle, kite.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tommy has placed a mirror on the vertical line of symmetry. This is what he sees:</td>
<td></td>
</tr>
<tr>
<td>Can you complete the other half of the shape?</td>
<td></td>
</tr>
<tr>
<td>Which 2-D shapes can be made when a vertical line of symmetry is drawn on a square?</td>
<td>Rectangle and triangle.</td>
</tr>
</tbody>
</table>
Block 4 - Shapes

Theme 3 - 3-D Shapes
Children use their knowledge of 2-D shapes to identify the shapes of faces on 3-D shapes. To avoid miscounting the faces children need to mark each face in some way. Children identify and visualise 3-D shapes from 2-D representations. Cones should be described as having 1 face and 1 curved surface; cylinders as having 2 faces and 1 curved surface and spheres having 1 curved surface.

What do we mean by the ‘face’ of a shape?
What is the difference between a face and a curved surface?
What real life objects have 6 faces like a cube?
Does a cuboid always have 2 square faces and 4 rectangular faces?
Which 2-D shapes can you see on different 3-D shapes?
How can you make sure that you don’t count the faces more than once?
Count Faces on 3-D Shapes

Reasoning and Problem Solving

Teddy says my 3-D shape has 6 faces. Mo says he must have a cube. Is Mo correct? Explain your answer.

No because Teddy could have a cube or a cuboid.

Annie has sorted these 3-D shapes. Can you spot her mistake? Can you add another shape to each set?

The can should be in the ‘both’ set because it has flat faces and a curved surface.

Whitney says,

I have a 3-D shape with 2 square faces and 4 rectangular faces.

What shape does Whitney have?

Play this game with a friend. Describe the faces of a 3-D shape and they need to guess what it is.
Children use their knowledge of faces and curved surfaces to help them to identify edges on 3-D shapes. They learn that an edge is where 2 faces meet or where a face and a curved surface meet. To avoid over counting the edges children need to mark each edge in some way. Children identify and visualise the 3-D shape from a 2-D representation.

What do we mean by the ‘edge’ of a shape?
How can you make sure that you don’t count the edges more than once?
What do you notice about the shapes with ____ edges?

<table>
<thead>
<tr>
<th>Shape</th>
<th>Name</th>
<th>Edges</th>
<th>Faces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How many edges does this shape have?
The sphere (football) is in the wrong place because it doesn’t have any edges, it has one curved surface.

Dora is not correct, because a square-based pyramid has 8 edges.

Eva says her 3-D shape has 12 edges.

Dora says she could have a cube, cuboid or square-based pyramid.

Is Dora correct? Explain your answer.

Ron has sorted these shapes according to the number of edges. Which shape is in the wrong place? Explain why.

Compare these 3-D shapes.

What is the same and what is different?

Same – both have square faces, 6 faces, 12 edges, don’t roll, can stack, no curved edges.

Different – name, colour, size, one only has square faces the other has squares and rectangles….
Children use their knowledge of edges to help them to identify vertices on 3-D shapes. They understand that a vertex is where 2 or more edges meet. To avoid over-counting the vertices children need to mark each vertex in some way.

The point at the top of a cone can be referred to as an apex or a vertex.

What is the difference between vertex and vertices?
How can you make sure that you don’t count the vertices more than once?
How many edges meet to make a vertex on a 3-D shape?
How many sides meet to make a vertex on a 2-D shape?

<table>
<thead>
<tr>
<th>Shape</th>
<th>Name</th>
<th>Faces</th>
<th>Edges</th>
<th>Vertices</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Shape" /></td>
<td><img src="image" alt="Name" /></td>
<td><img src="image" alt="Faces" /></td>
<td><img src="image" alt="Edges" /></td>
<td><img src="image" alt="Vertices" /></td>
</tr>
</tbody>
</table>

Place 3-D shapes in order starting with the shape with the fewest vertices.
What is the same about these 2 shapes?
Example answer:
Same – both have a triangular face, both have 5 faces.
Different – name, colour, size, one has 6 vertices the other has 5 vertices, one has a rectangular face, one has a square face....

What is different about them?
Talk about faces, edges and vertices in your answer.

Jack says:
All 3-D shapes have at least one vertex.

Is this true or false?
Explain why

Alex has a shape with 8 vertices.
What 3-D shape could it be?

False.
A sphere has no vertices.
Could also be an opportunity to talk about the words apex and vertex.

Cube or cuboid.
Children sort and group 3-D shapes according to simple properties, including type, size, colour. They also consider sorting shapes based on whether they roll or stack. This will lead children to think about why a shape rolls (curved face) or why it will stack (flat face). Children should recognise that the orientation of a shape does not affect its properties.

Why is the 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 of the groups?
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?
Some 3-D shapes have been sorted.

Have the shapes been sorted correctly?

Explain how you know.

How else could the shapes be sorted?

Possible answers

The shapes have been sorted into cylinders and cubes. The dice needs to be moved.

The shapes have been sorted into colour. The green tin of beans and the red cube need to be moved.

How many ways can you sort the shapes into groups?

Possible answers:

Straight faces and curved surfaces.

Shapes with a circular face and shapes with a square face.

Big shapes and small shapes.
Sort 2-D Shapes

Notes and Guidance

Children sort and group 2-D shapes according to simple properties, including type, size, colour. Children should recognise that the orientation of a shape does not affect its properties.

Children consider what is the same and what is different about the shapes. Teachers highlight the similarities between squares and rectangles, however, it is not vital that children understand that a square is a type of rectangle at this stage.

Mathematical Talk

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?

Varied Fluency

- Go on a shape hunt around the school. Take photos of 2-D shapes then sort them by their name. Can you sort them any other way?

- How are the shapes grouped? Label each group.

- Circle the odd one out in each group.
**Sort 2-D Shapes**

**Reasoning and Problem Solving**

<table>
<thead>
<tr>
<th>Use a selection of triangles, rectangles, squares and circles.</th>
<th>Possible ways of sorting: Colour, name of shape, number of sides etc.</th>
</tr>
</thead>
</table>

Put your shapes into groups.

Ask a partner to label your groups.

How many different groups can you create?

<table>
<thead>
<tr>
<th>Tommy says that all shapes with 4 sides are squares.</th>
<th>Tommy is incorrect as there are many other 4-sided shapes including rectangles.</th>
</tr>
</thead>
</table>

Is Tommy correct? Prove it.

<table>
<thead>
<tr>
<th>Eva has sorted some shapes.</th>
<th>Has she sorted them correctly? Explain how you know.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Squares</th>
<th>Not Squares</th>
</tr>
</thead>
</table>

She has not sorted them correctly. The yellow shape is a square in a different orientation.

© White Rose Maths 2019
Children recognise and sort 2-D shapes including circle, square, triangle, rectangle, pentagon, hexagon and octagon using a range of different orientations. Children should be encouraged to sort the shapes in more than one way. They can then describe how they have sorted them using key language including side, vertex and symmetrical.

How have you sorted your shapes?

How do you know you have sorted your shapes correctly?

Can you sort the shapes in a different way?

Can you find a shape which is in the wrong place?

Can you see how these shapes have been sorted?

Sort 2-D Shapes

Notes and Guidance

Mathematical Talk

Year 2 | Spring Term | Week 6 to 8 – Geometry: Properties of Shape

Varied Fluency

Sort the 2-D shapes into the correct group:

- Rectangle
- Triangle
- Pentagon

How have the shapes been sorted?

Whitney sorted her shapes by the number of sides. What shapes could belong to each group?

<table>
<thead>
<tr>
<th>4 sides</th>
<th>Not 4 sides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Ron sorted the shapes in order of the number of sides. Has he ordered them correctly? Explain why.

No because the square should be before the pentagon.

Which shape is in the wrong set? Explain why.

The circle is in the wrong set because it does have a vertical line of symmetry.

Where should these shapes go in the Venn diagram?

Create your own labels and sort the shapes in a different way.

Possible labels:
Blue
Less than 4 vertices.
Sort 3-D Shapes

Notes and Guidance

Children use their knowledge of shape properties to sort 3-D shapes in different ways e.g. faces, shapes of faces, edges, vertices, if they roll, if they stack...

They should have access to a range of real life objects to sort and compare. Before sorting it may be useful to give children the opportunity to match the object e.g. a can of pop to a cylinder etc.

Mathematical Talk

How have you sorted your shapes?
How do you know you have sorted your shapes correctly?
Which method have you used to sort your shapes?
Can you sort your shapes in a different way?
Can your friend guess how you have sorted them?
Can you group your solids by shape, type of faces and size?

Varied Fluency

How could you sort these objects?
Can you find some other classroom objects to add to each set?

How are these shapes grouped?

Could you group them in a different way?

Sort the 3-D shapes on your table.
Label the groups.
Can you find more than one way?
Remove the labels. Can someone guess how you sorted?
Annie is sorting 3-D shapes. She puts a cube in the cuboid pile.

A cube is a type of cuboid.

Do you agree? Why?

Annie is right. They both have 6 faces. They both have 12 edges. A cube is a special kind of cuboid where all faces are squares.

Jack is investigating which shapes stack and which shapes roll.

He says:

Sort your shapes using the Venn diagram. Explain what you notice about each set. Do all shapes with flat surfaces stack?

Some shapes will stack and roll.

Some shapes with flat faces will stack – they will need to have flat faces on opposite sides. (cubes, cylinders, cuboids)

Shapes with a curved surface will roll. (cone, sphere, cylinder)

Some shapes with a flat face cannot be stacked (square based pyramid, cone)
Block 4 - Shapes

Theme 5 - Patterns
Patterns with 3-D & 2-D Shapes

Notes and Guidance

Children use 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 shape names. Use shapes in different orientations to reinforce children’s recognition of 2-D and 3-D shapes. Children recognise the core of each pattern (which part is being repeated) and use this to continue patterns in any direction as well as around a circle.

Mathematical Talk

What is the order of the shapes in the pattern?
How can we describe the pattern?
What is the same and what is different about the patterns?
What will the next shape be?
What is the core of the pattern?
How many shapes (elements) are in each repeat?

Varied Fluency

Annie is making a pattern.

Can you say the pattern aloud? Rectangle, triangle, circle, rectangle, triangle, circle …
Which shape comes after the circle?
Which shape comes before the rectangle?

Name the missing shapes in each pattern.

Jack is making a pattern by printing using 3-D shapes.

Which 3-D shapes could Jack use to continue the pattern?
Can you make your own printed pattern using 3-D shapes?
Amir and Eva are making patterns.

**Eva**

○ △ ⊙ □ ○ △ ⊙ □ ○ △ ⊙ □

**Amir**

○ △ ⊙ □ ○ △ ⊙ □ ○ △ ⊙ □

Eva: Our patterns are exactly the same.

Amir: Our patterns are different.

Who do you agree with?

Explain your answer.

Amir is correct because the triangle is in a different orientation.

Whitney is making a pattern in a circle.

Whitney’s pattern is incorrect. She has 2 cones together. She needs to make the circle a little bigger or smaller so the pattern continues all the way around the circle.

Is Whitney’s pattern correct? Explain why.

Can you make your own circular pattern using 3-D shapes?
Children use their knowledge of the properties of 2-D shapes to create patterns. They are encouraged to place the shapes in different orientations when making patterns and recognise that it is still the same shape. In particular, squares do not become diamonds when turned sideways.

Can you explain the pattern? How does circling the set of shapes that repeat help you see the pattern?

Continue the pattern. Which shape will be next?

How are these patterns similar? How are these patterns different?

How can you work out which shape will come ___\text{th}?
There are many ways to make different repeating patterns. Encourage children to orally describe the pattern they have created.

Dora says that the 12th shape in this pattern will be a triangle.

Is she correct? How do you know?

The 12th shape will be a triangle. Children may physically continue the pattern to find the answer or recognise that the triangle is the 3rd and count in 3s.

How many different ways can you arrange these shapes to make a repeating pattern?

Can you translate this pattern using shapes?
Clap, clap, snap, clap, clap, snap, clap, clap ......

Possible answer:
Square, square, triangle or pentagon, pentagon, circle.
Make Patterns with 3-D Shapes

Notes and Guidance

Children use their knowledge of the properties of 3-D shapes to create patterns. They are encouraged to place the shapes in different orientations.

A wide range of examples of shapes should be used, including, construction shapes, cereal boxes, different sized balls etc.

Mathematical Talk

Where can you see real life patterns with 3-D shapes?
Can you explain your pattern to a partner?
Does the shape always have to be a certain way up?
Can you work out what shape would be the ___th?

Varied Fluency

- Use some different coloured cubes to make a repeating pattern. Can you describe the pattern to your partner?
  Using colours? Using letters? Using sounds?

- Make a sequence of 3-D shapes.
  Can you build a similar pattern with real life objects?
  You could use food cans, boxes, balls, or other things in your classroom. Describe the pattern.

- How many times does the pattern repeat?
  What will the 10th cylinder look like?

- Can you make your own repeating patterns using only one 3-D shape?
**Make Patterns with 3-D Shapes**

**Reasoning and Problem Solving**

What is the same about these patterns? What is different about these patterns?

The first and second patterns use two shapes. Colour is a difference to note. In the 3rd pattern, one shape is used in different orientations. In the 2nd pattern, the shape is used twice each time.

Choose two 3-D shapes. What different repeating patterns could be made?

- Make a repeating pattern where there are more cones than cuboids.
- Make a repeating pattern where the third shape is always a cylinder.

Possible answer: Cube, cylinder, cube....

Cone, cube, cylinder...

Using the 3-D shapes:

- Answer will depend on the shapes used.