Summer Scheme of Learning

Year 5/6

#MathsEveryoneCan

2019-20
Notes and Guidance

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

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.

**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.
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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.
Both year groups start by looking at coordinates in the first quadrant. Year 6 then move on to looking at coordinates in all 4 quadrants.

Year 5 reflect and translate shapes within the first quadrant.

Year 6 reflect and translate shapes across all four quadrants.
Children recap their use of coordinates from Year 4. They start with an understanding of the origin (0, 0), before moving onto reading other coordinates. They understand that the first number represents the \( x \)-coordinate and the second number represents the \( y \)-coordinate. Teachers might explain how a coordinate is fixed (does not move) whereas a point can be plotted at different coordinates, so it can be moved.

Mathematical Talk

Which of the numbers represents the movement in the direction of the \( x \)-axis (from the origin)? Which of the numbers represents the movement on the \( y \)-axis (from the origin)? Does it matter which way around coordinates are written? Look at the point I have marked, what are the coordinates of this point? If I moved the point one place to the left, what would be different about the coordinates? If I moved the point down one, what would be different about the coordinates?

Plot the following points on the grid.

\[
(3, 5) \\
(4, 4) \\
(0, 2) \\
(4, 0)
\]

What are the coordinates of the vertices of the rectangle?

\[
(\ , \) \\
(\ , \) \\
(\ , \) \\
(\ , \)
\]
Who do you agree with? Can you spot the mistake the other child has made?

Mo is correct. Alex has made a mistake by thinking the first number is the $y$-coordinate.

Annie is finding co-ordinates where the $x$-coordinate and the $y$-coordinate add up to 8.
For example: $(3, 5) \quad 3 + 5 = 8$

Find all of Annie's coordinates and plot them on the grid. What do you notice?

Now do the same for a different total.

Annie's coordinates form a diagonal line $(8, 0)$ to $(0, 8)$.
The First Quadrant

Notes and Guidance

Children recap work from Year 4 and Year 5 by reading and plotting coordinates in the first quadrant (the quadrant where both $x$ and $y$ coordinates are positive).

Children draw shapes on a 2-D grid from given coordinates and may use their increasing understanding to write coordinates for shapes without plotting the points.

Mathematical Talk

Which axis do we look at first?

Does joining up the vertices already given help you to draw the shape?

Can you draw a shape in the first quadrant and describe the coordinates of the vertices to a friend?

Varied Fluency

Whitney plots three coordinates. Write down the coordinates of points A, B and C.

Tommy is drawing a rectangle on a grid. Plot the final vertex of the rectangle. Write the coordinate of the final vertex.

Draw the vertices of the polygon with the coordinates $(7, 1), (7, 4)$ and $(10, 1)$ What type of polygon is the shape?
Eva is drawing a trapezium. She wants her final shape to look like this:

Eva uses the coordinates (2, 4), (4, 5), (1, 6) and (5, 6). Will she draw the shape that she wants to? If not, can you correct her coordinates?

Eva has plotted the coordinate (4, 5) incorrectly. This should be plotted at (4, 4) to make the trapezium that she wanted to draw (an isosceles trapezium).

Mo has written the coordinates of points A, B and C.

A (1, 1)  B (2, 7)  C (3, 0)

Mark Mo's work and correct his mistakes.

A is correct. B and C have been plotted incorrectly because Mo has plotted the x and y coordinates the wrong way round.

Because the coordinates for point A are both the same number it does not matter if Mo incorrectly reads the y coordinate as the first and the x coordinate as the second.

Explain why Mo could not make the same mistake for point A as he made for points B and C.
Four Quadrants

Notes and Guidance

Children extend their knowledge of the first quadrant to read and plot coordinates in all four quadrants. They draw shapes from coordinates given.

Children need to become fluent in deciding which part of the axis is positive or negative.

Children need to develop understanding of how to find the length of a line by using the coordinates of its two endpoints.

Mathematical Talk

Which axis do we look at first?

If (0, 0) is the centre of the axis (the origin), which way do you move along the x-axis to find negative coordinates?

Which way do you move along the y-axis to find negative coordinates?

Varied Fluency

Dora plotted three coordinates. Write down the coordinates of points A, B and C.

Draw a shape using the coordinates (-2, 2), (-4, 2), (-2, -3) and (-4, -2). What is the name of the shape?

Work out the missing coordinates of the rectangle.

What is the length of side AB?
The diagram shows two identical triangles. The coordinates of three points are shown. Find the coordinates of point A.

A is the point (0, –10) B is the point (8, 0) The distance from A to B is two thirds of the distance from A to C. Find the coordinates of C.

A (9, 7)
B (8, 0)
C (12, 5)
Block 2 - Position and Direction

Theme 2 - Reflection
Reflection

Notes and Guidance

Children reflect objects using lines that are parallel to the axes. Children continue to use a 2-D grid and coordinates in the first quadrant. Teachers might want to encourage children to use mirrors, or to count how far the point is away from the mirror line, so that they can work out where the reflected point will be located. Children should be introduced to the language object (name of shape before reflection) and image (name of shape after reflection).

Mathematical Talk

When I reflect something, what changes about the object? Is it exactly the same?

What are the coordinates of this point? If I reflect it in the mirror line, what are the new coordinates?

If I reflect this point/shape in a vertical/horizontal mirror line, what will happen to the \(x\)-coordinate/\(y\)-coordinate?

Which of the diagrams show reflections in the given mirror line?

Reflect the coordinates and the shapes in the mirror line.
Reflection

Reasoning and Problem Solving

When you reflect a shape, its dimensions change.

Dora

Do you agree with Dora? Explain your thinking.

Dora is incorrect, the shape’s dimensions do not change, only its position is changed.

The rectangle is pink and green. The rectangle is reflected in the mirror line. What would its reflection look like?

The shape would remain in the same position, although the colours would be swapped – green on the left and pink on the right.
Reflection with Coordinates

Notes and Guidance

Teachers should explore what happens to points when they are reflected in lines parallel to the axes.

Children might use mirrors to do this. This might be done through investigation where children record coordinates of vertices of the object and coordinates of vertices of the image in a table.

Mathematical Talk

What is the \( x \)-coordinate for this vertex? What is the \( y \)-coordinate for this vertex?

If we look at this point, where will its new position be on the image, when it is reflected? What’s different about the coordinates of the object compared to the coordinates of the image?

Do you always need to use a mirror? How else could you work out the coordinates of each vertex?
Eva reflects the shape in the mirror line. She thinks that the coordinates of the vertices for the reflected shape are:

- (5, 5)
- (2, 5)
- (2, 9)

Is Eva correct? Explain why.

The (2, 9) coordinate is incorrect, it should be (5, 9).

This is a shape after it has been reflected. This is called the image.

Use the grid and the marked mirror lines to show where the original object was positioned.

Is there more than one possibility?

There are two possibilities for the object.
Reflections

Notes and Guidance

Children extend their knowledge of reflection by reflecting shapes in four quadrants. They will reflect in both the $x$-axis and the $y$-axis.

Children should use their knowledge of coordinates to ensure that shapes are correctly reflected.

Mathematical Talk

How is reflecting different to translating?

Can you reflect one vertex at a time? Does this make it easier to reflect the shape?

Which axis are you going to use as the mirror line?

Varied Fluency

Reflect the trapezium in the $x$-axis and then the $y$-axis. Complete the table with the new coordinates of the shape.

<table>
<thead>
<tr>
<th></th>
<th>Reflected in the $x$-axis</th>
<th>Reflected in the $y$-axis</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1, 2)</td>
<td></td>
<td></td>
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<tr>
<td>(4, 2)</td>
<td></td>
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<tr>
<td>(2, 4)</td>
<td></td>
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<tr>
<td>(3, 4)</td>
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</tbody>
</table>

Translate the shape 4 units to the right. Then reflect the translated shape in the $y$-axis.
Rectangle ABCD is the result of a rectangle being reflected in either the $x$- or the $y$-axis.

Where could the original rectangle have been? Draw the possible original rectangles on the coordinate grid, and label the coordinates of each vertex.

The two original rectangles are:
- Reflected in $x$-axis
  - Original coordinates: $(-5, 6), (-2, 6), (-5, 2), (-2, 2)$
- Reflected in $y$-axis
  - Original coordinates: $(2, -2), (5, -2), (2, -6), (5, -6)$

Annie has reflected the shape in the $y$-axis.
Is her drawing correct?
If not explain why.

Annie has used the correct axis, but her shape has not been reflected. She has just drawn the shape again on the other side of the axis.
Translation

Notes and Guidance

Children learn to translate shapes on a grid.

Children could focus on one vertex at a time when translating.

Attention should be drawn to the fact that the shape itself does not change size nor orientation when translated.

Mathematical Talk

What does translate mean?

Look what happens when I translate this shape. What has happened to the shape? Have the dimensions of the shape changed? Does it still face the same way?

Are there any other ways I can get the shape to this position?

Varied Fluency

A square is translated two squares to the right and three down. Draw the new position of this square.

Describe the translation of shape A to shape B, C and then D. Use the stem sentence to help you.

Shape A has been translated ________ left/right and ________ up/down.

Match the translations.

| 4 right, 2 down |
| 2 left, 3 up |
| 5 left, 5 down |
Triangle ABC is translated so that point B translates to point D. Amir is incorrect, the shape is translated two to the right and three down. It will fit on this grid.

Amir is incorrect, the shape is translated two to the right and three down. It will fit on this grid.

A triangle is drawn on the grid. It is translated so that point A translates to point B. What would be the coordinates of the other vertices of the translated triangle?
Children translate coordinates and also describe translations of coordinates.

Attention should be drawn to the effect of the translation on the \( x \)-coordinate and the \( y \)-coordinate. For example, how does a translation of 3 up affect the \( x \) and \( y \)-coordinate?

If we move this point down, what will happen to its coordinates? What if it moves up?

If I move the point two right, what will happen to the coordinates?

If these are the translated coordinates, what were the original coordinates?

Translate the coordinates below.

- \((3, 6)\) 3 left \((\text{ }, \text{ })\)
- \((5, 7)\) 2 right \((\text{ }, \text{ })\)

Translate each coordinate 2 down, 1 right. Record the coordinates of its new position.

<table>
<thead>
<tr>
<th>Before translation</th>
<th>After translation</th>
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<tbody>
<tr>
<td>A</td>
<td>(3, 8)</td>
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<tr>
<td>B</td>
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<tr>
<td>C</td>
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</tbody>
</table>

Rectangle ABCD is translated so vertex C is translated to (3, 5). Describe the translation. What are the coordinates of the other vertices of the translated rectangle?

Translate the coordinates below.

- \((3, 6)\) 3 left \((\text{ }, \text{ })\)
- \((5, 7)\) 2 right \((\text{ }, \text{ })\)
These three coordinates have all been translated in the same way.

Can you work out the missing coordinates?

Describe the translation.

Translation 2 right 2 down.

A rectangle is translated two to the left and 4 up.

Three of the coordinates of the translated rectangle are: (6, 8) (10, 14) and (10, 8).

What are the coordinates of the original rectangle?
Translaciones

Notas y guía

Los niños utilizan el conocimiento de coordenadas y el lenguaje positional para traducir figuras en todos los cuadrantes.

Describen las traducciones utilizando el lenguaje direccional, y usan instrucciones para dibujar las figuras traducidas.

Varias actividades de fluidez

Use el gráfico para describir las traducciones. 
Una ha sido realizada para usted.

Desde A a B traducir 8 unidades hacia la izquierda.

Desde C a D traducir __ unidades hacia la derecha y __ unidades hacia abajo.

Desde D a B traducir 6 unidades hacia el ___ y 7 unidades hacia el ___.

Desde A a C traducir __ unidades hacia el ___ y __ unidades hacia el ___.

Escribe las coordenadas para los vértices A, B, C y D.

Describe la traducción de ABCD al cuadrado azul.

ABCD se mueve 2 unidades hacia la derecha y 8 unidades hacia arriba. ¿Cuál es el color del cuadrado? ¿Cuál es la figura traducida a esa color?

Escribe las coordenadas de los vértices de la figura traducida.

¿Qué significa la traducción?

¿Qué punto vas a mirar cuando describas la traducción?

¿Cada vértice se traduce de la misma manera?

Be White Rose Maths
True or False?

Dexter has translated the rectangle ABCD 6 units down and 1 unit to the right to get to the yellow rectangle.

False. The translation is 6 units to the right and 1 unit down.

Explain your reasoning.

Spot the Mistake.

The green triangle has been translated 6 units to the left and 3 units down.

The triangle has changed size. When a shape is translated its size does not change.