Spring Scheme of Learning

Year 4/5

#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.
Notes and Guidance

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.
<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>
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<tbody>
<tr>
<td>Autumn</td>
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<td></td>
<td>Measurement: Length, Perimeter and Area</td>
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<tr>
<td>Number: Place Value</td>
<td>Number: Addition and Subtraction</td>
<td>Number: Multiplication and Division</td>
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<tr>
<td>Spring</td>
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<td></td>
<td></td>
<td>Number: Decimals (including Y5 Percentages)</td>
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<tr>
<td>Number: Multiplication and Division</td>
<td>Number: Fractions</td>
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</tbody>
</table>
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.
In this block, both year groups look at converting metric units. Year 4 could also look back at Year 3 conversions to ensure they are confident in converting between mm, cm and m.

Year 5 then look at imperial units and volume, giving Year 4 time to consolidate their learning from across the year.

**Metric Units**
- Year 4 (Aut B3)
  - Kilometres
- Year 5 (Sum B4)
  - Kilograms and kilometres
  - Milligrams and millimetres
  - Metric Units

**Imperial Units**
- Year 5 (Sum B4)
  - Imperial units

**Volume**
- Year 5 (Spr B3)
  - What is volume?
  - Compare volume
  - Estimate volume
  - Estimate capacity

**Year 4 Consolidation**
- While Year 5 focus on volume, Year 4 can consolidate their learning from across the year filling gaps in understanding.
Children multiply and divide by 1,000 to convert between kilometres and metres. They apply their understanding of adding and subtracting with four-digit numbers to find two lengths that add up to a whole number of kilometres. Children find fractions of kilometres, using their Year 3 knowledge of finding fractions of amounts. Encourage children to use bar models to support their understanding.

Complete the statements.

3,000 m = ____ km
8 km = _______ m
5 km = ____ m
3 km + 6 km = _______ m
500 m = ____ km
250 m = ______ km
9,500 m = ____ km
4,500 m – 2,000 m = ____ km

Complete the bar models.

Use <, > or = to make the statements correct.

500 m  
7 km  
5 km  

Can you research different athletic running races? What different distances are the races? Can you convert the distances from metres into kilometres? Which other sports have races over distances measured in metres or kilometres? If 10 children ran 100 metres each, how far would they run altogether? Can we go outside and do this? How long do you think it will take to run 1 kilometre? How can we calculate half a kilometre? Can you find other fractions of a kilometre?
Dexter and Rosie walk 15 kilometres altogether for charity.
Rosie walks double the distance that Dexter walks.
How far does Dexter walk?

Rosie walks 10 km.
Dexter walks 5 km.

Dexter and Rosie each raise £1 for every 500 metres they walk.
How much money do they each make?

Rosie raises £20
Dexter raises £10

Complete the missing measurements so that each line of three gives a total distance of 2 km.
Kilograms and Kilometres

Notes and Guidance

Children focus on the use of the prefix ‘kilo’ in units of length and mass, meaning a thousand. They convert from metres to kilometres (km), grams to kilograms (kg) and vice versa. It is useful for children to feel the weight of a kilogram and various other weights in order for them to have a better understanding of their value. Bar Models or double number lines are useful for visualising the conversions.

Mathematical Talk

What does ‘kilo’ mean when used at the start of a word?

Complete the stem sentence:
There are ______ grams in ___ kilograms.

How would you convert a fraction of a kilometre to metres?

What is the same and what is different about converting from kg to g and km to m?

Varied Fluency

Find the missing values on the double number line.

Write your conversions as sentences.

Complete the missing information.

\[ \frac{1}{10} \text{ kilogram} = \text{ grams} \quad \frac{3}{10} \text{ km} = \text{ metres} \]

\[ 7 \text{ kg} + \frac{1}{4} \text{ kg} = \text{ g} \quad 12 \text{ km} + \text{ km} = 12,500 \text{ m} \]

Compare the measurements using <, > or =

\[ 5 \text{ kg} \quad 4,500 \text{ g} \quad 12 \text{ kg} \quad 12,000 \text{ g} \]

\[ 3.7 \text{ km} \quad 370 \text{ m} \quad 37,000 \text{ m} \quad 3.7 \text{ km} \]
Amir buys 2,500 grams of potatoes and 2,000 grams of carrots. He pays with a £5 note. How much change does he get?

Amir receives 13 p change.

Eva is converting measurements. She says,

I have divided by 1,000 to convert the measurements.

Which conversions could Eva have completed?

- 3 km → 3,000 m
- 3,000 m → 3 km
- 5,500 g → 5.5 kg
- 2.8 kg → 2,800 g

Eva could have converted 3,000 m to 3 km or 5,500 g to 5.5 kg.
Children focus on the use of milli- in units of length and mass.
They understand that milli- means $\frac{1}{1,000}$
They convert from metres to millimetres (mm), litres to millilitres (ml) and vice versa.
Using rulers, metre sticks, jugs and bottles helps children to get a better understanding of the conversions.

Can you complete the stem sentences to convert from millimetres to metres...

What does ‘milli’ mean when used at the start of a word?

Would it be appropriate to measure your height in millimetres?

Where have you seen litres before?

1,000 mm = 1 m                           1,000 ml = 1 l
5,000 mm =             m
50,000 mm =            m                          ml = 30 l
500 mm =           m                         300 ml =            l
5,500 mm =            m                             ml = 0.3 l
1,000 ml = 1 l

$\frac{1}{1,000}$ m =           mm
$\frac{1}{100}$ m =           mm $\frac{1}{10}$ m =           mm

3 l + $\frac{1}{4}$ l =           ml 2 l +           ml = 2,500 ml

2 l  1,500 ml 60 l  6,000 ml
2.8 m  280 mm 3,700 m  3.7 mm
Cola is sold in bottles and cans.

Alex buys 5 cans and 3 bottles.
She sells the cola in 100 ml glasses.
How many glasses does she sell?

Alex sells 54 glasses.
Alex makes £19.83 profit.

Ribbon is sold in 225 mm pieces.
Teddy needs 5 metres of ribbon.
How many pieces does he need to buy?

Teddy would like to make either a bookmark or a rosette with his left over ribbon. Which can he make?

To make 5 bookmarks you will need:
1.2 metres of ribbon
1 pair of scissors

To make 1 mini rosette you will need:
4 pieces of ribbon cut to 35 mm
A stapler

Teddy buys 23 pieces of ribbon.
Teddy will have 175 mm left over.
A bookmark needs 240 mm, and a rosette needs 140 mm so he can make the rosette.

Alex charges 50 p per glass.
How much profit does she make?
Measure the height of the piles of books in centimetres.

Find the difference between the tallest and shortest pile of books in millimetres.

Line A is 6 centimetres long.
Line B is 54 millimetres longer than line A.
Line C is \(\frac{2}{3}\) of line B.
Draw lines A, B and C.

Here are the heights of 4 children.

Whitney 1.3 m
Jack 124 cm
Rosie 1.32 m
Mo 141 cm

Put the children in height order, starting with the shortest. Write their heights in millimetres.
Metric Units

Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>A plank of wood is 5.8 metres long.</th>
<th>There is 25 cm left.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two lengths are cut from the wood.</td>
<td></td>
</tr>
<tr>
<td>175 cm</td>
<td></td>
</tr>
<tr>
<td>3 $\frac{4}{5}$ m</td>
<td></td>
</tr>
<tr>
<td>How much of the wood is left?</td>
<td></td>
</tr>
<tr>
<td>Complete the conversion diagram.</td>
<td></td>
</tr>
<tr>
<td>$\div \square$</td>
<td>$\div \square$</td>
</tr>
<tr>
<td>$\div \square$</td>
<td>$\div 1,000$</td>
</tr>
<tr>
<td>$\div \square$</td>
<td></td>
</tr>
<tr>
<td>Can you make a diagram to show conversions from m and cm to mm?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A 10 pence coin is 2 mm thick.</th>
<th>The pile of coins is 2.6 cm tall.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eva makes a pile of 10 pence coins worth £1.30</td>
<td></td>
</tr>
<tr>
<td>What is the height of the pile of coins in centimetres?</td>
<td></td>
</tr>
<tr>
<td>Dora says,</td>
<td>Dora is incorrect. She has added the number of times bigger together rather than multiplying.</td>
</tr>
<tr>
<td>One metre is 100 times bigger than one centimetre.</td>
<td></td>
</tr>
<tr>
<td>One centimetre is 10 times bigger than one millimetre.</td>
<td></td>
</tr>
<tr>
<td>So, one metre is 110 times bigger than one millimetre.</td>
<td></td>
</tr>
<tr>
<td>Is Dora correct? Explain your answer.</td>
<td>One metre is 1,000 times bigger than one millimetre.</td>
</tr>
</tbody>
</table>
Imperial Units

Children are introduced to imperial units of measure for the first time. They understand and use approximate equivalences between metric units and common imperial units such as inches, pounds (lbs) and pints. Using the measurements in the classroom, such as with rulers, pint bottles, weights and so forth, helps children to get an understanding of the conversions. 1 kg is sometimes seen as approximating to 2.2 lbs.

Mathematical Talk

What do we still measure in inches? Pounds? Pints?

Why do you think we still use these imperial measures?

What does approximate mean?

Why do we not use the equals (=) sign with approximations?

How precise should approximation be?

Notes and Guidance

One inch is approximately 2.5 centimetres

1 inch ≈ 2.5 cm

Use the bar models to help with the conversions.

<table>
<thead>
<tr>
<th>? cm</th>
<th>? in</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 in</td>
<td>1 in</td>
</tr>
<tr>
<td>1 in</td>
<td>1 in</td>
</tr>
<tr>
<td>5 cm</td>
<td></td>
</tr>
</tbody>
</table>

16 in ≈ cm
15 in ≈ cm
33 in ≈ m
10 cm ≈ in
1 cm ≈ in
5.5 m ≈ in

1 kilogram is approximately 2 pounds

1 kg ≈ 2 lbs

Use this information to complete the conversions.

2 kg ≈ lbs
5 kg ≈ lbs
kg ≈ 22 lbs
55 kg ≈ lbs

There are 568 millilitres in a pint. How many litres are there in:

2 pints
5 pints
0.5 pints
2.5 pints
### Imperial Units

#### Reasoning and Problem Solving

Jack's house has 3 pints of milk delivered 4 times a week. How many litres of milk does Jack have delivered each week?

He uses about 200 ml of milk every day in his cereal. Approximately, how many pints of milk does Jack use for his cereal in a week?

<table>
<thead>
<tr>
<th>12 pints is approximately 6,816 millilitres, or 6.8 litres.</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 × 7 = 1,400 ml</td>
</tr>
<tr>
<td>1,400 ÷ 568 = 2.46 pints</td>
</tr>
<tr>
<td>So Jack uses approximately 2 and a half pints.</td>
</tr>
</tbody>
</table>

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- Dora weighed 7.8 lbs when she was born.
- Amir weighed 3.5 kg when he was born.

Who was heavier, Dora or Amir? Explain your answer.

Children convert both measures to the same unit.

Dora weighed approximately 3.9 kg and Amir weighed 3.5 kg so Dora was heavier.
Block 6 - Converting Units

Theme 3 - Volume
Children understand that volume is the amount of solid space something takes up. They look at how volume is different to capacity, as capacity is related to the amount a container can hold. Children could use centimetre cubes to make solid shapes. Through this, they recognise the conservation of volume by building different solids using the same amount of centimetre cubes.

Does your shape always have 4 centimetre cubes? Do they take up the same amount of space? How can this help us understand what volume is?

If the solid shapes are made up of 1 cm cubes, can you complete the table?

<table>
<thead>
<tr>
<th>Shape</th>
<th>Width (cm)</th>
<th>Height (cm)</th>
<th>Length (cm)</th>
<th>Volume (cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
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<td>B</td>
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<tr>
<td>C</td>
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</tbody>
</table>

Container ___ has a capacity of ___ ml. The volume of water in container ___ is ___ cm³.
How many possible ways can you make a cuboid that has a volume of 12cm³?

Possible solutions:

My shape is made up of 10 centimetre cubes.

The height and length are the same size.

What could my shape look like?

Create your own shape and write some clues for a partner.

Possible solutions include:
Work out the volume of each solid.

Shape A

Shape B

Shape A has a volume of ___ cm$^3$
Shape B has a volume of ___ cm$^3$

Which has the greatest volume?

Look at the 4 solids below. Put the shapes in ascending order based on their volume.

Count the cubes to find the volume of the shapes and use ‘greater than’, ‘less than’ or ‘equal to’ to make the statements correct.

What does volume mean?
What does cm$^3$ mean?

How can we find the volume of this shape?
Which shape has the greatest volume?
Which shape has the smallest volume?

Do we always have to count the cubes to find the volume?
Shape A has a height of 12 cm. Shape B has a height of 4 cm. Dora says Shape A must have a greater volume. Is she correct? Explain your answer.

Dora is incorrect. E.g.,

Shape A
12 cm × 1 cm × 2 cm = 24 cm³

Shape B
4 cm × 9 cm × 2 cm = 72 cm³

Amir, Whitney and Mo all build a shape using cubes. Mo has lost his shape, but knows that its volume was greater than Whitney’s, but less than Amir’s.

Amir’s

Whitney’s

What could the volume of Mo’s shape be?

The volume of Amir’s shape is 56 cm³
The volume of Whitney’s shape is 36 cm³
The volume of Mo’s shape can be anywhere between.

Eva has built this solid:

Tommy has built this solid:

Eva thinks that her shape must have the greatest volume because it is taller. Do you agree? Explain your answer.

Eva is incorrect, both solids have an equal volume of 10 cm³. Children might want to build this to see it.
Estimate Volume

Notes and Guidance

Children estimate volume and capacity of different solids and objects. They build cubes and cuboids to aid their estimates. Children need to choose the most suitable unit of measure for different objects e.g. using $m^3$ for the volume of a room. Children should understand that volume is the amount of solid space taken up by an object, whereas capacity is the amount a container can hold.

Mathematical Talk

What is the difference between volume and capacity?

Do you need to fill the whole box with cubes to estimate its volume?

Would unit to measure would you use to estimate the volume of the classroom?

Varied Fluency

- Estimate and match the object to the correct capacity.

- Use a box or drawer from your classroom. Use cubes to estimate the volume of the box or drawer when it is full.

- Estimate then work out the capacity of your classroom.

- Children estimate volume and capacity of different solids and objects.

- They build cubes and cuboids to aid their estimates.

- Children need to choose the most suitable unit of measure for different objects e.g. using $m^3$ for the volume of a room.

- Children should understand that volume is the amount of solid space taken up by an object, whereas capacity is the amount a container can hold.

- What is the difference between volume and capacity?

- Do you need to fill the whole box with cubes to estimate its volume?

- Would unit to measure would you use to estimate the volume of the classroom?
Each of the cubes have a volume of 1 m³
The volume of the whole shape is between 64 m³ and 96 m³
What could the shape look like?

Any variation of cubes drawn between the following:

Jack is using cubes to estimate the volume of his money box.

Jack is incorrect because he has not taken into account the depth of the money box.
The approximate volume would be 80 cm³

He says the volume will be 20 cm³
Do you agree with Jack?
Explain your answer.
What would the approximate volume of the money box be?
Estimate Capacity

Notes and Guidance
Children estimate capacity using practical equipment such as water and rice.

Children explore how containers can be different shapes but still hold the same capacity.

Children will understand that we often use the word capacity when referring to liquid, rather than volume.

Mathematical Talk
Can I fill the tumbler so it is ___ full?
Compare two tumblers, which tumbler has more/less volume? Do they have the same capacity?

Can we order the containers?
If I had ___ ml or litres, which container would I need and why?
How much rice/water is in this container? How do you know?

Varied Fluency

Use five identical tumblers and some rice.
- Fill a tumbler half full.
- Fill a tumbler one quarter full.
- Fill a tumbler three quarters full.
- Fill a tumbler, leaving one third empty.
- Fill a tumbler that has more than the first but less than the third, what fraction could be filled?

Show children 5 different containers.
Which containers has the largest/smallest capacity?
Can we order the containers?
If I had ___ ml/l, which container would I need and why?
Fill each container with rice/water and estimate then measure how much each holds.

Match the containers to their estimated capacity.

Use this to help you compare other containers. Use ‘more’ and ‘less’ to help you.
Estimate Capacity

Reasoning and Problem Solving

| Give children a container. Using rice, water and cotton wool balls, can children estimate how much of each they will need to fill it? | Possible response: Explore how cotton wool can be squashed and does not fill the space, whereas water and rice fill the container more. | Give children a container. Using rice/water and a different container e.g. cups, discuss how many cups of rice/water we will need to fill the containers. Link this to the capacity of the containers. | Various different answers. |