Spring Scheme of Learning

Year 3/4

#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.

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>Subtraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1 (Aut B2, Spr B1)</td>
</tr>
<tr>
<td>• How many left? (1)</td>
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<tr>
<td>• How many left? (2)</td>
</tr>
<tr>
<td>• Counting back</td>
</tr>
<tr>
<td>• Subtraction - not crossing 10</td>
</tr>
<tr>
<td>• Subtraction - crossing 10 (1)</td>
</tr>
<tr>
<td>• Subtraction - crossing 10 (2)</td>
</tr>
</tbody>
</table>

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>
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<tbody>
<tr>
<td><strong>Autumn</strong></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>
<tr>
<td>Number: Multiplication and Division</td>
<td>Measurement: Length, Perimeter and Area</td>
<td>Number: Fractions</td>
<td>Y3: Measurement: Mass and Capacity</td>
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<td>Y4: Number: Decimals</td>
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<td><strong>Summer</strong></td>
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<tr>
<td>Number: Decimals (including Money)</td>
<td>Measurement: Time</td>
<td>Statistics</td>
<td>Geometry: Properties of Shape (including Y4 Position and Direction)</td>
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</tbody>
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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.
Mass and Capacity / Decimals

Common Content

**Tenths**
- Year 3 (Spr B5)
  - Tenths
  - Count in tenths
  - Tenths as decimals
- Year 4 (Spr B4)
  - Recognise tenths and hundredths
  - Tenths as decimals
  - Tenths on a place value grid
  - Tenths on a number line

In this block, the year groups start the block together looking at tenths.

Due to the difference in National Curriculum content, the year groups then move onto two separate topics with Year 3 looking at Mass and Capacity and Year 4 continuing to focus on Decimals.

**Mass & Capacity**
- Year 3 (Sum B4)
  - Measure mass (1)
  - Measure mass (2)
  - Compare mass
  - Add and subtract mass
  - Measure capacity (1)
  - Measure capacity (2)
  - Compare capacity
  - Add and subtract capacity

**Decimals**
- Year 4 (Spr B4)
  - Divide 1-digit by 10
  - Divide 2-digits by 10
  - Hundredths
  - Hundredths as decimals
  - Hundredths on a place value grid
  - Divide 1 or 2-digits by 100
Tenths

Notes and Guidance

Children explore what a tenth is. They recognise that tenths arise from dividing one whole into 10 equal parts.

Children represent tenths in different ways and use words and fractions to describe them. For example, one tenth and \( \frac{1}{10} \)

Mathematical Talk

How many tenths make the whole?

How many tenths are shaded?

How many more tenths do I need to make a whole?

When I am writing tenths, the _________ is always 10

How are fractions linked to division?

Varied Fluency

- If the frame represents 1 whole, what does each box represent?
  Use counters to represent:
  - One tenth
  - Two tenths
  - Three tenths
  - One tenth less than eight tenths

- Identify what fraction of each shape is shaded.
  Give your answer in words and as a fraction.

  e.g.

  Three tenths \( \frac{3}{10} \)

Annie has 2 cakes. She wants to share them equally between 10 people. What fraction of the cakes will each person get?

There are ____ cakes.
They are shared equally between ___ people.
Each person has \( \boxed{\text{}} \) of the cake.

\[ \frac{\boxed{\text{}}} {\boxed{\text{}}} = \boxed{\text{}} \]

What fraction would they get if Annie had 4 cakes?
Fill in the missing values. Explain how you got your answers.

Odd One Out

Children could use practical equipment to explain why and how, and relate back to the counting stick.

The marbles are the odd one out because they represent 8 or eighths. All of the other images have a whole which has been split into ten equal parts.
Count in Tenths

Notes and Guidance

Children count up and down in tenths using different representations.

Children also explore what happens when counting past \( \frac{10}{10} \).

They are not required to write mixed numbers, however, children may see the \( \frac{11}{10} \) as \( 1 \frac{1}{10} \) due to their understanding of 1 whole.

Mathematical Talk

Let’s count in tenths. What comes next? Explain how you know.

If I start at ___ tenths, what will be next?

When we get to \( \frac{10}{10} \) what else can we say? What happens next?

Varied Fluency

The counting stick is worth 1 whole. Label each part of the counting stick. Can you count forwards and backwards along the counting stick?

Continue the pattern in the table.

- What comes between \( \frac{4}{10} \) and \( \frac{6}{10} \)?
- What is one more than \( \frac{10}{10} \)?
- If I start at \( \frac{8}{10} \) and count back \( \frac{4}{10} \), where will I stop?

Complete the sequences.
Count in Tenths

Reasoning and Problem Solving

Teddy is counting in tenths.

Teddy thinks that after ten tenths you start counting in elevenths. He does not realise that ten tenths is the whole, and so the next number in the sequence after ten tenths is eleven tenths or one and one tenth.

Can you spot his mistake?

True or False?

Five tenths is \(\frac{2}{10}\) smaller than 7 tenths.

Five tenths is \(\frac{2}{10}\) larger than three tenths.

Do you agree?

Explain why.

This is correct. Children could show it using pictures, ten frames, number lines etc. For example:
Tenths as Decimals

Notes and Guidance

Children are introduced to tenths as decimals for the first time. They compare fractions and decimals written as words, in fraction form and as decimals and link them to pictorial representations.

Children learn that the number system extends to the right of the decimal point into the tenths column.

Mathematical Talk

What is a tenth?
How many different ways can we write a tenth?
What does equivalent mean?
What is the same and what is different about decimals and fractions?

Varied Fluency

Complete the table.

<table>
<thead>
<tr>
<th>Image</th>
<th>Words</th>
<th>Fraction</th>
<th>Decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="1" alt="Image" /></td>
<td>One tenth</td>
<td>(\frac{1}{10})</td>
<td>0.1</td>
</tr>
<tr>
<td><img src="2" alt="Image" /></td>
<td>Nine tenths</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Write the fractions and decimals shown.

Here is a decimal written in a place value grid.

Can you represent this decimal pictorially?
Can you write the decimal as a fraction?
True or False?

10 cm is one tenth of 1 metre

Dora

10 cm is 0.1 metres.

Amir

They are both correct.

10 cm $= \frac{1}{10} \text{ m} = 0.1 \text{ m}$

Explain your answer.

Place the decimals and fractions on the number line.

$0.7 \quad \frac{3}{10} \quad \frac{1}{10} \quad 0.9 \quad \frac{10}{10}$

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Children recognise tenths and hundredths using a hundred square.

When first introducing tenths and hundredths, concrete manipulatives such as Base 10 can be used to support children’s understanding.

They see that ten hundredths are equivalent to one tenth and can use a part-whole model to partition a fraction into tenths and hundredths.

**Mathematical Talk**

If each row is one row out of ten equal rows, what fraction does this represent?

If each square is one square out of one hundred equal squares, what fraction does this represent?

How many squares are in one row? How many squares are in one column? How many hundredths are in one tenth?

How else could you partition these numbers?

### Tenths & Hundredths

**Notes and Guidance**

<table>
<thead>
<tr>
<th>Shaded</th>
<th>Tenths</th>
<th>Hundredths</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 squares</td>
<td>$\frac{2}{10}$</td>
<td>$\frac{20}{100}$</td>
</tr>
<tr>
<td>4 columns</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 rows</td>
<td>$\frac{7}{10}$</td>
<td></td>
</tr>
</tbody>
</table>

We can use a part-whole model to partition 56 hundredths into tenths and hundredths.

Partition into tenths and hundredths:
- 65 hundredths
- $\frac{31}{100}$
- 80 hundredths
Who is correct?

Dora
5 hundredths is equivalent to 50 tenths.

Amir
50 hundredths is equivalent to 5 tenths.

Amir is correct. \( \frac{50}{100} = \frac{5}{10} \)
This can be demonstrated with Base 10 or a hundred square.

50 squares is \( \frac{50}{100} \)
5 rows is \( \frac{5}{10} \)

Ron says he can partition tenths and hundredths in more than one way.

Children may partition 42 hundredths as:
- 4 tenths and 2 hundredths
- 3 tenths and 12 hundredths
- 2 tenths and 22 hundredths
- 1 tenth and 32 hundredths
- 0 tenths and 42 hundredths

Other methods of partitioning are possible.

Use Ron’s method to partition 42 hundredths in more than one way.

Year 4 | Spring Term | Week 9 to 11 – Mass, Capacity and Decimals
**Tenths as Decimals**

**Notes and Guidance**

Using the hundred square and Base 10, children can recognise the relationship between $\frac{1}{10}$ and 0.1. Children write tenths as decimals and as fractions. They write any number of tenths as a decimal and represent them using concrete and pictorial representations. Children understand that a tenth is a part of a whole split into 10 equal parts. In this small step children stay within one whole.

**Mathematical Talk**

What is a tenth?

How many different ways can we write a tenth?

When do we use tenths in real life?

Which representation do you think is clearest? Why?

How else could you represent the decimal/fraction?

**Varied Fluency**

Complete the table.

<table>
<thead>
<tr>
<th>Image</th>
<th>Words</th>
<th>Fraction</th>
<th>Decimal</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image.png" alt="Diagram" /></td>
<td>five tenths</td>
<td></td>
<td>0.9</td>
</tr>
</tbody>
</table>

What fractions and decimals are represented in these diagrams?

What’s the same? What’s different?
Who is correct?

Annie
1.2 is equivalent to 1 whole and 2 tenths.

Dexter
1.2 is equivalent to 12 tenths.

Explain why.

Both children are correct. 1 whole is equal to 10 tenths so 1.2 is equal to 12 tenths.

What is the same? What’s different? Show me.

six tens six tenths

Children use concrete and pictorial representations to show the difference.

Which ten frame is the odd one out?

Three of the ten frames represent 0.5

This ten frame is the odd one out because it represents 6 tenths not 5 tenths.
Children read and represent tenths on a place value grid. They see that the tenths column is to the right of the decimal point. Children use concrete representations to make tenths on a place value grid and write the number they have made as a decimal. In this small step children will be introduced to decimals greater than 1.

**Mathematical Talk**

- How many ones are there?
- How many tenths are there?
- What’s the same/different between 0.2, 1.2 and 0.8?
- How many different ways can you make a whole using the three decimals?
- Why do we need to use the decimal point?
- How many tenths are equivalent to one whole?

**Varied Fluency**

Complete the stem sentences for the decimals in the place value grid.

<table>
<thead>
<tr>
<th>Ones</th>
<th>Tenths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There are ___ ones and ___ tenths.

The decimal represented is ___.

Use counters or place value counters to make the decimals on a place value grid.

<table>
<thead>
<tr>
<th>Ones</th>
<th>Tenths</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.2</td>
<td>1.2</td>
</tr>
<tr>
<td>0.8</td>
<td></td>
</tr>
</tbody>
</table>

There are ___ ones and ___ tenths.

The decimal represented is ___.

Use the place value grid and stem sentences to describe the decimals:

<table>
<thead>
<tr>
<th>Ones</th>
<th>Tenths</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

There are ___ ones and ___ tenths.

___ ones + ___ tenths

= 3 + 0.2

= 3.2

Use the place value grid and stem sentences to describe the decimals:

<table>
<thead>
<tr>
<th>Ones</th>
<th>Tenths</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.0</td>
<td>5.9</td>
</tr>
<tr>
<td>2.2</td>
<td></td>
</tr>
</tbody>
</table>
Use five counters and a place value grid. Place all five counters in either the ones or the tenths column.

How many different numbers can you make?

Describe the numbers you have made by completing the stem sentences.

There are ___ ones and ___ tenths.

___ ones + ___ tenths = ___

Two children are making eleven tenths.

Amir and Rosie have both made eleven tenths correctly. Amir has seen that 10 tenths is equivalent to 1 one.
Tenths on a Number Line
Notes and Guidance
Children read and represent tenths on a number line.
They link the number line to measurement, looking at measuring in centimetres and millimetres.
Children use number lines to explore relative scale.

Mathematical Talk
How many equal parts are between 0 and 1?
What are the intervals between each number?
How many tenths are in one whole?
What is 0.1 metres in millimetres?

Varied Fluency
Place the decimals on the number line.

Complete the number lines.

How long is the ribbon?
The ribbon is ___ metres long.
What could the start and end numbers on the number line be? The start and end numbers could be 6 and 6.9 respectively, or 5.6 and 7.4. Children can find different start and end numbers by adjusting the increments that the number line is going up in.

Place the decimals on the number line.

Which order did you place your numbers on the number line?

Some children will draw on 20 intervals first. This method will allow them to identify where the numbers are placed but can be considered inefficient. Encourage children to think about the numbers first and consider which numbers are easiest to place e.g. 2.5 is probably easiest, followed by 1.9 or 2.9 etc.
Measure Mass (1)

Notes and Guidance

Children learn how to read a range of scales to measure mass, including scales with missing intervals. In this step, children read scales in either kilograms or grams.

Use kilogram and gram weights to reinforce the difference in the units. Represent the intervals on the scale on a straight number line to highlight the link back to place value.

Mathematical Talk

How can we measure the mass of an object?

When would we use kilograms or grams to measure the mass of something?

What’s the same, what’s different about the scales?

How do we know what each interval is worth?

Varied Fluency

Use balance scales to measure the mass of a range of objects. Decide whether to use gram or kilogram weights to balance the scales. Can you estimate the mass of each object before you weigh them?

Find the mass of each item.

Draw each scale as a straight number line. Can you identify the missing intervals?
<table>
<thead>
<tr>
<th>Who do you agree with? Explain why.</th>
<th>Amir is wrong – he has counted on 3 from 10 kg when he should have counted back 3 kg. Jack is wrong because we can work out the scale by using the 10 kg and counting back. They weigh 7 kg. Rosie is correct because half of 10 is 5 and the arrow is past where 5 kg would be. The weight of the potatoes is 7 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amir</td>
<td>The chocolate bar weighs 100 g. How much does one muffin weigh?</td>
</tr>
<tr>
<td>Jack</td>
<td>How much does each side weigh?</td>
</tr>
<tr>
<td>Rosie</td>
<td>Using only 3 objects and a weighing scale, try to get as close to 2 kg as possible. Explain why you chose those objects. Work out how much more or how much less is needed to make it 2 kg.</td>
</tr>
</tbody>
</table>

The potatoes weigh 13 kg

We don't know how much the potatoes weigh because the number is hidden.

The potatoes weigh more than half of 10 kg

Can you calculate the weight of the potatoes? Explain how you did it.

Children could use a bar model to work this out. They would see the chocolate bar must weigh the same as two muffins so one muffin must weigh 50 g. Each side weighs 150 g.

The chocolate bar weighs 100 g.

How much does one muffin weigh?

How much does each side weigh?

Using only 3 objects and a weighing scale, try to get as close to 2 kg as possible. Explain why you chose those objects. Work out how much more or how much less is needed to make it 2 kg.

The weight of the potatoes is 7 kg.
Measure Mass (2)

Notes and Guidance

Children measure the mass of objects and record them as a mixed measurement in kilograms and grams. When given a mixed measurement, children can record the mass on scales by calculating the intervals and identifying where the arrow will go.

Recap counting in different multiples to support children's reading of scales with different intervals.

Mathematical Talk

Which is heavier, 7 kilograms or 8 grams?

How is a scale like a number line?

Does drawing a number line help you to find the intervals?

Where do we use measuring mass on a daily basis?

Varied Fluency

What weight is on the scales?

How do the scales show this?

Complete the missing information.

The toy car weighs 4 kg and _____ g

The potatoes weigh 2 kg and _____ g

Use your own scales to measure how much objects weigh and record the mass in kg and g.

Draw an arrow on the scales to show the mass of each object.
Tommy is weighing a toy car.

Use this to work out what the other children's cars weigh.

**Alex**
My car weighs 1 kg more than Mo's.

**Mo**
My car weighs 200 g less than Tommy's.

**Dexter**
My car weighs 1 kg and 300 g less than Alex's.

**Tommy's car**
weighs 4 kg and 500 g.

**Alex's car**
weighs 5 kg and 300 g.

**Mo's car**
weighs 4 kg and 300 g.

**Dexter's car**
weighs 4 kg.

Here is a balance.

One circle weighs 3 kg.
The square weighs 100 g.

Work out the value of

Can you create your own version for a partner?
Compare Mass

Notes and Guidance

Children build on Year 2 knowledge and use ‘lighter’ and ‘heavier’ to compare mass. They use their understanding that kilograms are used for heavier objects and will use this to help them compare mass. For example 500 g is less than 500 kg. Children compare mixed measurements using the inequality symbols. For example, 1 kg and 500 g < 2 kg.

Mathematical Talk

Which item is heavier or lighter? How do you know?

Using the symbols <, > or =, what can you tell me about each of the scales?

If I added an extra item, what would happen?

Can I work out how much one item weighs? Would this be more or less than the other item?

Varied Fluency

Complete the sentences.

- Pineapples are equal to apples.
- 1 pineapple is equal to apples.

Can you write sentences using ‘heavier’ or ‘lighter’ about the image?

Use <, > or = to compare the mass of each pair of objects.

A pack of tarts weighs 220 g.
Two cartons of orange juice weigh 140 g.
Draw an arrow to show the weight of the 3 items.
Three children are weighing potatoes and flour.

Whitney is wrong because the scales are different. Mo is wrong because he hasn’t noticed the flour is weighed in kg and the potatoes are weighed in g. Alex is correct because 2 kg is the same as 2,000 g which is more than 700 g.

The potatoes weigh more because the arrow is further than the arrow on the flour scale.

The flour weighs less because 2 is less than 700.

Who do you agree with? Explain your answer.

Here are three masses.

- 20 kg and 600 g
- 18 kg and 500 g
- 20 kg

Match each mass to the correct child.

Dora: My mass weighs more than \(\frac{1}{2}\) of 40 kg.

Mo: My mass is more than Eva’s mass.

Eva: My mass weighs more than 18 kg but less than 20 kg.

Eva: 18 kg and 500 g
Mo: 20 kg
Dora: 20 kg and 600 g
Add & Subtract Mass

Notes and Guidance

Children add and subtract mass. They use a range of mental and written methods, choosing the most efficient one for each question.

Children may use concrete resources to represent kilograms and grams. Children could also use bar models to support them to represent calculations.

Mathematical Talk

How many grams are in a kilogram? How could I represent this using concrete resources?

What do you know about kilograms or grams that can help you solve this question?

How can you represent this problem with a bar model?

Varied Fluency

Amir uses a part-whole model to add 2 kg and 300 g to 3 kg and 250 g. He partitions each mass into kilograms and grams and calculates them separately.

Use Amir’s method to calculate:

- 3 kg and 450 g + 4 kg and 200 g
- 4 kg and 105 g + 2 kg and 300 g
- 4 kg and 400 g − 2 kg and 100 g
- 8 kg and 600 g − 1 kg and 550 g

The jar of cookies has a mass of 800 g. The empty jar has a mass of 350 g. How much do the cookies weigh?

Choose an appropriate approach to solve:

- 7 kg − □ = 5 \frac{1}{2} kg
- 3 kg and 200 g + □ = 4 \frac{1}{2} kg
- 4 kg + □ − 1 \frac{1}{2} kg = 3 kg
The green parcel weighs 5 kg.
Can you work out what the blue and brown parcel weigh?

Blue parcel = 4 kg and 400 g
Brown parcel = 2 kg and 850 g

Green and brown parcel = 7 kg and 850 g

Dora buys two peaches and three pears.
One peach weighs 75 g.
Three pears weigh the same as two peaches.
How much does one pear weigh?
Measure Capacity (1)

Notes and Guidance

Children use litres, millilitres and standard scales to explore capacity. In this step, children focus on the capacity in either litres or millilitres and not as a mixed measurement, for example 5 l and 500 ml.

Children continue to use place value skills to explore scales. Children build on their knowledge from KS1, recognising the capacity is the amount of liquid a container can hold and the volume is how much liquid is in the container.

Mathematical Talk

What’s the same and what’s different about capacity and volume?

What does capacity mean? What does volume mean?

What do we measure capacity and volume in?

What unit of measure (ml or l) would we use to measure ____?

How much liquid is in the container?

What is the scale going up in?

Varied Fluency

Use a variety of scales, discuss what’s the same, what’s different about the scales. Using different containers explore which measurement (litres or millilitres) would be used to measure the liquid inside. Discuss what things would be measured in litres and in millilitres.

Use the sentence stem to describe the capacity and volume of each container.

The volume of liquid is _____.
The capacity of the container is _____.

Identify what the scale is going up in to find out the volume in each container. Use the stem sentence.

The increments are in _____.
The volume is _____.

Year 3 | Spring Term | Week 9 to 11 – Mass, Capacity and Decimals

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Use a variety of containers. Can you estimate how much liquid they hold? Check your estimates using measuring jugs and cylinders to see how accurate you were.

Children will use a variety of containers and gather a range of measurements. Encourage children to record their results in a table.

Use the clues to work out who has which container.

- Annie has container B
- Ron has container A
- Eva has container C

Annie: I have exactly half a litre
Amir: I have 1,000 ml
Eva: I have more than 300 ml but less than 400 ml
Measure Capacity (2)

Notes and Guidance

Children use litres and millilitres and standard scales to explore capacity.
Children measure capacity with litres and millilitres together and record measurements as __ l and __ ml, for example 5 l and 500 ml.
Children continue to use place value skills to read and interpret scales.

Mathematical Talk

How many millilitres are in 1 litre? If we know this, what else do we know?

Look at the scale, show me where ____ would be.

What is the capacity of the _____? How can we record this as l and ml?

How would I show how much water is left on the scale?

Varied Fluency

Use equipment and liquid to count in increments of 100 ml. Discuss what happens when you reach 1,000 ml. Explore other connections linked to this. For example, 2 l = 2,000 ml.

Complete the missing information.

The pot’s capacity is ____ l and ____ ml

The barrel’s capacity is ____ l and ____ ml

The capacity of the full fish bowl is 8 l and 750 ml.
Hannah pours 5 l of water out of the bowl.
Show how much water is left in the measuring jugs.

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Amir and Alex work out the capacity of the pot by filling it with water, then pouring the water into the measuring cylinders.

Amir says the capacity of the pot is 302 ml. Alex says the capacity of the pot is 2 l and 300 ml.

Who do you agree with? Explain why.

Alex is correct because there are 2 full litres and 300 millilitres in the third cylinder.

True or False?

The tallest container has the largest capacity.

Use containers to decide whether the statement is true or false.

Record the capacity of the different containers in a table.

Children will collect different measurements of capacities from different containers. Children will hopefully find that as well as height, the capacity of the container also depends on its width.
Complete the sentences.

____ cans of pop are equal to ____ jug of orange juice.

1 can of pop is equal to ____ jug of orange juice.

Use <, > or = to compare the volume of liquid in each pair of containers.

800 ml ____ 1 l

____ l and ____ ml ____ 750 ml

Whitney has 3 bottles of water with 500 ml in each.
Sophie has one bottle of water with 1 and a half litres in it.
Who has the most water?
Can you prove it?
Rosie has a litre bottle of water.

She pours a drink for herself and two friends. Their glasses can hold up to 250 ml.

Teddy has more than Amir. Rosie has the most.

How much could each child have in their glass?

How much would be left in the bottle?

There are a range of possible answers the children could find. Rosie should have the most and Amir should have the least. The total should not exceed 750 ml.

Possible answer:

Rosie: 250 ml
Teddy: 200 ml
Amir: 150 ml

There is 400 ml left in the bottle.

Eva is not correct. The measurements show that container 1 has 700 ml in it whereas container 2 has 750 ml in. Container 2 is wider than container 1 which is why it looks like it has less in it.

Eva

I know container 1 has more than container 2 in it because the water goes further up the side.

Container 1

Container 2

Is Eva correct? Explain your answer.
**Add & Subtract Capacity**

**Notes and Guidance**

Children add and subtract volumes and capacities. They can apply their understanding of different methods such as column addition/subtraction, finding the difference etc. Children should choose the correct method depending on the context of the problem. They continue to use mixed measures.

Children may use concrete resources to represent litres and millilitres. Children could also use bar models to represent calculations.

**Mathematical Talk**

How many millitres are in one litre? How could I show this using concrete resources?

How many litres are there in total?

How many millilitres are there in total?

What methods can we use to add volumes or capacities?

What methods can we use to subtract volumes or capacities?

**Varied Fluency**

Teddy uses Base Ten and a place value chart to add 3 l and 500 ml and 3 l and 300 ml

Use the same approach to calculate:

- 4 l and 600 ml + 2 l and 100 ml
- 7 l and 320 ml + 1 l and 125 ml
- 3 l and 950 ml – 3 l and 50 ml
- 800 ml – 375 ml

To make Summer Punch for 2 people:

- 300 ml of pineapple juice
- 250 ml of orange juice
- 500 ml of lemonade

- How much liquid is used in total to make Summer Punch for 2 people?
- How much orange juice would be need to make enough for 4 people?
- Would a 1 l bottle of lemonade be enough to make drinks for 6 people?

Rosie keeps a record of how much milk she has in her café. Work out how much milk is used for each order.

<table>
<thead>
<tr>
<th>Amount of milk to start</th>
<th>Amount of milk used</th>
<th>Amount of milk left</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 l and 430 ml</td>
<td></td>
<td>1 l and 100 ml</td>
</tr>
<tr>
<td>1 l and 100 ml</td>
<td></td>
<td>890 ml</td>
</tr>
<tr>
<td>890 ml</td>
<td></td>
<td>545 ml</td>
</tr>
</tbody>
</table>

© White Rose Maths 2019
Tommy is pouring drinks using these jugs. A drink is 125 ml.

Is Tommy correct? If not, how much juice will be left in jug 2?

Tommy is not correct. If Tommy makes three more drinks he will use a further 375 ml of juice. 

\[1 \text{ l} - 375 \text{ ml} = 625 \text{ ml}\]

Here are some measuring cylinders. The total liquid in all three cylinders is 400 ml.

Cylinder A has half of the total amount in it.

Cylinder B has 67 ml less than Cylinder A.

How much liquid does each cylinder contain?

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 ml</td>
<td>133 ml</td>
<td>67 ml</td>
</tr>
</tbody>
</table>

If I pour three more drinks using jug 2, both jugs will have the same amount of juice in.
Children need to understand when dividing by 10 the number is being split into 10 equal parts and is 10 times smaller.

Children use counters on a place value chart to see how the digits move when dividing by 10. Children should make links between the understanding of dividing by 10 and this more efficient method.

Emphasise the importance of 0 as a place holder.

What number is represented on the place value chart?

What links can you see between the 2 methods?

Which method is more efficient?

What is the same and what is different when dividing by 10 on a Gattegno chart compared to a place value chart?
Divide 1-digit by 10

Reasoning and Problem Solving

Choose a digit card from 1 – 9 and place a counter over the top of that number on the Gattegno chart.

Ron is incorrect. Children will see that you move down one row to divide by 10 on a Gattegno chart whereas on a place value chart you move on column to the right.

Complete the number sentences.

- $4 \div 10 = 8 \div \_ \div 10$
- $15 \div 3 \div 10 = \_ \div 10$
- $64 \div \_ \div 10 = 32 \div 4 \div 10$

Ron says,

To divide by 10, you need to move the counters to the right.

Do you agree? Use the Gattegno chart to explain your reason.
Divide 2-digits by 10

Notes and Guidance

As in the previous step, it is important for children to recognise the similarities and differences between the understanding of dividing by 10 and the more efficient method of moving digits. Children use a place value chart to see how 2 digit-numbers move when dividing by 10. They use counters to represent the digits before using actual digits within the place value chart.

Mathematical Talk

What number is represented on the place value chart?

Do I need to use 0 as a place holder when dividing a 2-digit number by 10?

What is the same and what is different when dividing by 10 on a Gattegno chart compared to a place value chart?

Varied Fluency

Teddy uses counters to make a 2-digit number.

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
<th>Tenths</th>
<th>Hundredths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To divide the number by 10, we move the counters one column to the right.

What is the value of the counters now?

Use this method to solve:

42 ÷ 10 = \_
35 ÷ 10 = \_
\_
26 ÷ 10

Here is a 2-digit number on a place value chart.

When dividing by 10, we move the digits 1 place to the ________.

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
<th>Tenths</th>
<th>Hundredths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

82 ÷ 10 = \_

Use this method to solve:

55 ÷ 10 = \_
\_
90 ÷ 10
3.2 = \_
10
Jack has used a Gattegno chart to divide a 2-digit number by 10. He has placed counters over the numbers in his answer.

Jack's original number was 26. You can move each counter up one to multiply them by 10, which is the inverse to division.

Dexter says,

When I divide a 2-digit number by 10, my answer will always have digits in the ones and tenths columns.

Show that Dexter is incorrect.

Children should give an example of when Dexter is incorrect. For example, when you divide 80 by 10, the answer is 8 so there does not need to be anything in the tenths column.
Children recognise that hundredths arise from dividing one whole into one hundred equal parts.

Linked to this, they see that one tenth is ten hundredths.

Children count in hundredths and represent tenths and hundredths on a place value grid and a number line.

One hundredth is one whole split into how many equal parts?

How many hundredths can I exchange one tenth for?

How many hundredths are equivalent to 5 tenths? How does this help me complete the sequence?

How does Base 10 help you represent the difference between tenths and hundredths?
Here is a Rekenrek made from 100 beads.

If the Rekenrek represents one whole, what fractions have been made on the left and on the right?

On the left, there are 46 hundredths, this is equivalent to 4 tenths and 6 hundredths. On the right, there are 54 hundredths, this is equivalent to 5 tenths and 4 hundredths.

Children could also explore hundredths using a 100 bead string.

Can you partition both of the fractions into tenths and hundredths?

Complete the statements.

3 tenths and 2 hundredths = 2 tenths and □ hundredths

14 hundredths and 3 tenths = 4 tenths and □ hundredths

5 tenths and 1 hundredth < 5 tenths and □ hundredths

5 tenths and 1 hundredth > □ tenths and 5 hundredths

Can you list all the possibilities?

12

4

Anything more than 1

0, 1, 2, 3 or 4
**Hundredths as Decimals**

**Notes and Guidance**

Using the hundred square and Base 10, children can recognise the relationship between \( \frac{1}{100} \) and 0.01.

Children write hundredths as decimals and as fractions. They write any number of hundredths as a decimal and represent the decimals using concrete and pictorial representations.

Children understand that a hundredth is a part of a whole split into 100 equal parts.

In this small step children stay within one whole.

**Mathematical Talk**

One hundredth is one whole split into ____ equal parts.

What is the same and what is different about a number written as a fraction and a number written as a decimal?

What is the same and different between 0.3 and 4 hundredths?

### Varied Fluency

Complete the table.

<table>
<thead>
<tr>
<th>Image</th>
<th>Words</th>
<th>Fraction</th>
<th>Decimals</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td>56 hundredths</td>
<td>( \frac{17}{100} )</td>
<td>0.2</td>
</tr>
<tr>
<td><img src="image2.png" alt="Image" /></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><img src="image3.png" alt="Image" /></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Write the number as a fraction and as a decimal.

How else could you represent this number?
Hundredths as Decimals

Reasoning and Problem Solving

Dora says,

17 hundredths is the same as 1,700

Is she correct?
Explain your answer.

Dora is wrong as she has mistaken hundredths for hundreds.

Alex and Eva have been asked to write the decimal shaded on the 100 grid.

Alex says the grid shows 0.70
Eva says the grid shows 0.7
Who do you agree with?
Explain your answer.

They are both correct. The grid shows 70 hundredths or 7 tenths and this is what Alex and Eva have given as their answers. In Alex’s answer the 0 in the hundredths column isn’t needed as it is not a place holder and doesn’t change the value of the number.
Children read and represent hundredths on a place value grid. They see that the hundredths column is to the right of the decimal point and the tenths column.

Children use concrete representations to make numbers with tenths and hundredths on a place value grid and write the number they have made as a decimal.

What is a hundredth?

How many hundredths are equivalent to one tenth?

Look at the decimals you have represented on the place value grid and in the part whole models. What’s the same about the numbers? What’s different?
Hundredths on a Place Value Grid

Reasoning and Problem Solving

Use four counters and a place value grid. Place all four counters in either the ones, tenths or hundredths column.

How many different numbers can you make?

Describe the numbers you have made by completing the sentences.

Children can either make:
4, 3.1, 3.01, 2.2, 2.11, 2.02, 1.3, 1.21, 1.12, 1.03, 0.4, 0.31, 0.22, 0.13, 0.04

e.g. There are 2 ones, 0 tenths and 2 hundredths.

There are □ ones, □ tenths and □ hundredths.

□ ones + □ tenths + □ hundredths = □

Ron says he can partition 0.34 in more than one way.

Children may partition 0.45 into:
0 tenths and 45 hundredths
1 tenth and 35 hundredths
2 tenths and 25 hundredths
3 tenths and 15 hundredths
4 tenths and 5 hundredths

Other ways of partitioning are possible.

Use Ron’s method to partition 0.45 in more than one way.
Divide 1 or 2-digits by 100

Notes and Guidance

Children need to understand when dividing by 100 the number is being split into 100 equal parts and is 100 times smaller. Children use counters on a place value chart to see how the digits move when dividing by 100. Children should make links between the understanding of dividing by 100 and this more efficient method. Emphasise the importance of 0 as a place holder.

Mathematical Talk

What number is represented on the place value chart? Why is 0 important when dividing a one or two-digit number by 100? What is the same and what is different when dividing by 100 on a Gattegno chart compared to a place value chart? What happens to the value of each digit when you divide by 10 and 100?

Varied Fluency

Dexter uses counters to make a 1-digit number.

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
<th>Tenths</th>
<th>Hundredths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To divide the number by 100, we move the counters two columns to the right. What is the value of the counters now?

Use this method to solve:

4 ÷ 100 = 0.04  5 ÷ 100 = 0.05  6 ÷ 100 = 0.06

Here is a two-digit number on a place value chart.

<table>
<thead>
<tr>
<th>Tens</th>
<th>Ones</th>
<th>Tenths</th>
<th>Hundredths</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When dividing by 100, we move the digits 2 places to the right. 72 ÷ 100 = 0.72

Use this method to solve:

82 ÷ 100 = 0.82  93 ÷ 100 = 0.93  0.23 = x ÷ 100
Describe the pattern.

7,000 ÷ 100 = 70
700 ÷ 100 = 7
70 ÷ 100 = 0.7
7 ÷ 100 = 0.07

Can you complete the pattern starting with 5,300 divided by 100?

Children will describe the pattern they see e.g. 7,000 is 10 times bigger than 700, therefore the answer has to be 10 times bigger as the divisor has remained the same.

For 5,300:
5,300 ÷ 100 = 53
530 ÷ 100 = 5.3
53 ÷ 100 = 0.53
5.3 ÷ 100 = 0.053

Teddy says,

45 divided by 100 is 0.45 so I know 0.45 is 100 times smaller than 45

Mo says,

45 divided by 100 is 0.45 so I know 45 is 100 times bigger than 0.45

Who is correct? Explain your answer.

Teddy and Mo are both correct. Children may use a place value chart to help them explain their answer.