Spring Scheme of Learning

Year 2/3

#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.
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.
 Fractions

Common Content

Unit & Non-Unit Fractions
Year 2 (Spr B4)
• Unit fractions
• Non-unit fractions
• Count in fractions
Year 3 (Spr B5)
• Unit and non-unit fractions
• Making the whole
• Fractions on a number line

Fractions of an Amount
Year 2 (Spr B4)
• Find a half
• Find a quarter
• Find a third
• Find three quarters
Year 3 (Spr B5)
• Fractions of an amount (1)
• Fractions of an amount (2)
• Fractions of an amount (3)

Equivalence
Year 2 (Spr B4)
• Equivalence of $\frac{1}{2}$ and $\frac{3}{4}$
Year 3 (Sum B1)
• Equivalent fractions (1)
• Equivalent fractions (2)
• Equivalent fractions (3)

Recognising Fractions
Year 2 (Spr B4)
• Make equal parts
• Recognise a half
• Recognise a quarter
• Recognise a third

Tenths
Year 3 (Spr B5)
• Tenths
• Count in tenths
• Tenths as decimals

Compare & Order
Year 3 (Sum B1)
• Compare fractions
• Order fractions

Add & Subtract
Year 3 (Sum B1)
• Add fractions
• Subtract fractions

In this block, both year groups look at unit and non-unit fractions and find fractions of amounts. Year 3 move on to comparing, ordering, adding and subtracting fractions.
Year 2 should focus on halves, quarters and thirds to ensure a good understanding.
Children understand the concept of a whole as being one object or one quantity.

Children explore making and recognising equal and unequal parts. They should do this using both real life objects and pictorial representations of a variety of shapes and quantities.

**Mathematical Talk**

What is the whole? What are the parts?

How many parts is the object/quantity split into?

Are the parts equal? How do you know?

Do equal parts always look the same?

Is there more than one way to split the object/quantity into equal parts?

**Varied Fluency**

Use different colours to show how this shape can be split into equal parts.

How many ways can you find?

Look at the representations. Decide which show equal parts and which show unequal parts.

Can you make some of your own representations of equal and unequal parts?

Can you split the teddies into three equal groups?

Can you split the teddies into three unequal groups?

How many ways can you split the teddies into equal parts?

Be systematic in your approach.
Three children are splitting a square into equal parts.

Teddy

All children have split the square into equal parts. Children may need to cut out the pieces and manipulate them to prove why.

Alex

Who has split the square into equal parts? Explain why.

Mo

How many different ways can you put these beanbags into equal groups?

Children can sort the beanbags into groups of 1, 2, 3, 4, 6 and 12
Year 2 | Spring Term | Week 9 to 12 – Number: Fractions

Recognise a Half

Notes and Guidance

Children understand that halving is splitting a whole into two equal parts. They are introduced to the notation $\frac{1}{2}$ for the first time and will use this alongside sentence stems and ‘half’ or ‘halves’.

They should be introduced to the language of numerator, denominator and what these represent.

Children must explore halves in different contexts, for example, half of a length, shape or set object.

Mathematical Talk

How many equal parts has the shape/object/length been split into?

What fraction is this part worth?

In the notation $\frac{1}{2}$, what does the 1 represent? What does the 2 represent?

Varied Fluency

- The whole gummy bear is split into ____ equal parts.

- Each part is worth a ________.

- This can be written as __________.

- Which pictures show $\frac{1}{2}$?

- Which pictures show $\frac{1}{2}$?
Children need to link their explanation to the shape not having two equal parts.

Rosie says the shaded part of the shape does not show a half because there are four parts, not two equal parts. Possible answer: I disagree because you can swap the red and white squares/rectangles and you would have two equal parts with one part shaded.

Which is the odd one out? Explain your answer.

Odd One Out

One half
Children extend their knowledge of the whole and halves to recognise quarters of shapes, objects and quantities.

They continue to work concretely and pictorially, understanding that they are splitting the whole into 4 equal parts and that each part is one quarter.

**Mathematical Talk**

How many equal parts have you split the whole into if you have split it into quarters?

In $\frac{1}{4}$, what does the 1 represent? What does the 4 represent?

Can you shade one quarter in different ways? How do you know that you have shaded one quarter?

How many quarters make a whole?

**Varied Fluency**

Four friends are sharing a cake. The cake is split into _____ equal parts.

Each part is worth a _______.

This can be written as _______

Shade $\frac{1}{4}$ of each shape.

Circle the shapes that have a quarter shaded.

Which shapes do not have a quarter shaded? How do you know?

Draw the shapes again and split them into quarters correctly?
Recognise a Quarter

Reasoning and Problem Solving

Alex is folding two identical paper strips.

Possible answer: When the whole is the same, one quarter will be smaller because it is one of four equal parts compared to a half which is one of two equal parts.

Use paper strips to prove Alex is incorrect.

I think \( \frac{1}{4} \) of the strip will be bigger than \( \frac{1}{2} \) of the strip because 4 is bigger than 2

True or False?

\( \frac{1}{4} \) of the shape is shaded.

Explain your answer.

Children will need to split the shape into four equal parts in order to show that this is true.

Giving children paper to fold will help them understand this concept.

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Recognise a Third

Notes and Guidance

Children apply understanding of fractions to finding thirds. They continue to use the language of ‘whole’ and ‘equal parts’ and understand that one third is equal to one part out of three equal parts.

They write one third as a fraction and explain what each of the digits represents in the fractional notation.

Mathematical Talk

How many equal parts have you split the whole in to if you have split it into thirds?

In $\frac{1}{3}$, what does the digit 1 represent? What does the digit 3 represent?

Can you shade $\frac{1}{3}$ in a different way? How do you know that you have shaded $\frac{1}{3}$?

How many thirds make a whole?

Varied Fluency

Three friends are sharing a pizza.

The pizza is split into _____ equal parts.

Each part is worth a ________.

This is the same as

Shade $\frac{1}{3}$ of each shape.

What is the same? What is different?

Which shapes represent one third?

Explain why the other circles do not represent one third.
Recognise a Third

Reasoning and Problem Solving

Dora says,

I have one third of a pizza because I have one slice and there are three slices left.

Do you agree? Explain your reasoning.

Dora is incorrect. She has one quarter of a pizza because there were four slices altogether and she has one of them. There would need to only be three slices altogether for her to have one third.

Alex, Annie and Whitney each show a piece of ribbon.

Whitney shows $\frac{1}{2}$ of her whole ribbon.

Alex shows $\frac{1}{4}$ of her whole ribbon.

Annie shows $\frac{1}{3}$ of her whole ribbon.

Whose whole piece is the longest? Whose is the shortest? Explain why.

Alex’s piece will be the longest because she will have four parts altogether. Whitney’s piece will be the shortest because she will only have two parts.
Unit Fractions

Notes and Guidance

Children understand the concept of a unit fraction by recognising it as one equal part of a whole. They link this to their understanding of recognising and finding thirds, quarters and halves. Children also need to understand that the denominator represents the number of parts that a shape or quantity is split into.

Mathematical Talk

How can we represent these unit fractions in different ways?

Why do we call them a unit fraction? Where can we see the unit?

Show me $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ of the model/counters etc. What is the same? What is different?

Which unit fraction is bigger/smaller if the whole is the same?

Varied Fluency

What is the same and what is different about each bar model?

What fraction is shaded in each diagram?

What do you notice? Complete the sentence.

The ________ the denominator the __________ the fraction.

Match the unit fraction to the correct picture.
True or False?

This shows \( \frac{1}{4} \)

True. There are 12 squares altogether and 3 are shaded. One quarter of 12 is 3.

Can you shade the same shape so that it shows \( \frac{1}{3} \)?

I am thinking of a number.

One third of my number is 12

Which will be greater, one half of my number or one quarter of my number?

Use cubes or a bar model to prove your answer.

The whole number is 36
One half is 18
One quarter is 9

One half of the number will be greater.
Children are introduced to the non-unit fractions $\frac{2}{3}$ and $\frac{3}{4}$ for the first time.

They also need to look at fractions where the whole is shaded and how these fractions are written. Children see that the numerator and denominator are the same when the fraction is equivalent to one whole.

How many quarters make a whole? How many thirds make a whole? What do you notice?

How many quarters are there in $\frac{3}{4}$?

In $\frac{3}{4}$ what does the digit 3 represent? What does the digit 4 represent?

Give me an example of a unit fraction and a non-unit fraction.
Alex says,

I have shaded $\frac{2}{2}$ of the shape.

What mistake might Alex have made?

She has shaded two quarters of the shape. She may have thought that the numerator represents the number of parts that are shaded and the denominator represents the number of parts that aren't. She doesn't realise the denominator represents the whole.

Sort the fractions into the table.

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<thead>
<tr>
<th>Fractions equal to one whole</th>
<th>Fractions less than one whole</th>
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<tbody>
<tr>
<td>Unit fractions</td>
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<td>Non-unit fractions</td>
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What do you notice?

Are there any boxes in the table empty?

What fraction could you write here?

Top left: Empty
Top right: $\frac{1}{3}$, $\frac{1}{4}$ and $\frac{1}{2}$
Bottom left: $\frac{2}{2}$, $\frac{3}{3}$ and $\frac{4}{4}$
Bottom right: $\frac{3}{4}$ and $\frac{2}{3}$

There are no unit fractions that are equal to one whole. $\frac{1}{1}$ would fit here.
Using their knowledge of halves, thirds and quarters, children count in fractions from any number up to 10.

They begin to understand that fractions can be larger than one whole.

Teachers can use a number line, counting stick or hoop to support them in counting in fractions.

Which number are you starting on?

How many parts are there in your fraction whole?

Which fraction will come next?

What patterns can you spot?

Continue the pattern: \( \frac{1}{3}, \frac{2}{3}, 1, 1\frac{1}{3}, 1\frac{2}{3}, 2, 2\frac{1}{3}, 2\frac{2}{3}, \)

What would the next image in the sequence look like?

What do you notice about the fraction of yellow cubes?

Can you count the fractions represented?

In groups of 4, give each child an identical strip of paper. Fold each of them into 2 equal parts. Count how many halves there are on two strips of paper, on three strips, on 4 strips. Predict: how many halves will there be on six, seven, eight strips?

Shade the correct number of parts for each fraction.

Complete each number line.

What’s the same, what’s different?
Count in Fractions

Reasoning and Problem Solving

Look at this pattern.

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Five thirds, \( \frac{5}{3} \)

Children may think that the later models are in sixths, it is important to stress that the whole one is still made up of three and so we are still counting in thirds.

What would come next?
Write the next fraction and draw the representation.

What would be the 8th fraction in the pattern?

The 8th fraction would be \( \frac{8}{3} \) or \( 2 \frac{2}{3} \)

Alex and Whitney are counting in quarters.

One quarter, two quarters, three quarters, four quarters...

Alex

One quarter, one half, three quarters, one whole...

Whitney

Who is correct? Explain your answer.

They are both correct. Two quarters is equivalent to one half and four quarters is equivalent to one whole.
Children recap their understanding of unit and non-unit fractions from Year 2. They explain the similarities and differences between unit and non-unit fractions.

Children are introduced to fractions with denominators other than 2, 3 and 4, which they used in Year 2. Ensure children understand what the numerator and denominator represent.

What is a unit fraction?
What is a non-unit fraction?
Show me $\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}$ What’s the same? What’s different?
What fraction is shaded? What fraction is not shaded?
What is the same about the fractions? What is different?

A unit fraction always has a numerator of ____
A non-unit fraction has a numerator that is _____ than ____
An example of a unit fraction is ____
An example of a non-unit fraction is ____

Can you draw a unit fraction and a non-unit fraction with the same denominator?
True or False?

\[ \frac{1}{3} \] of the shape is shaded. True or False?

False, one quarter is shaded. Ensure when counting the parts of the whole that children also count the shaded part.

Sort the fractions into the table.

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<th>Unit fractions</th>
<th>Non-unit fractions</th>
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Top left: Empty
Top right: \( \frac{1}{3}, \frac{1}{4} \) and \( \frac{1}{2} \)
Bottom left: \( \frac{2}{2} \) and \( \frac{4}{4} \)
Bottom right: \( \frac{3}{4}, \frac{3}{5} \) and \( \frac{2}{5} \)
There are no unit fractions that are equal to one whole other than \( \frac{1}{1} \) but this isn’t in our list.
Making the Whole

Notes and Guidance

Children look at whole shapes and quantities and see that when a fraction is equivalent to a whole, the numerator and denominator are the same.

Building on using part-whole model with whole numbers, children use the models to partition the whole into fractional parts.

Mathematical Talk

Is a fraction always less than one?
When the fraction is equivalent to one, what do you notice about the numerator and denominator?
In the counter activity, what’s the same about the part-whole models? What’s different?

Varied Fluency

Complete the missing information.

1 whole is the same as

Complete the sentences to describe the apples.

of the apples are red.
of the apples are green.

Use 8 double sided counters.
Drop the counters on to the table, what fraction of the counters are red? What fraction of the counters are yellow? What fraction represents the whole group of counters?
Complete part-whole models to show your findings.
Teddy says,
I have one pizza cut into 6 equal pieces. I have eaten $\frac{6}{6}$ of the pizza.

Does Teddy have any pizza left? Explain your answer.

Complete the sentence.

When a fraction is equal to a whole, the numerator and the denominator are ________________.

Use pictures to prove your answer.

No because $\frac{6}{6}$ is equal to one whole, so Ted has eaten all of his pizza.

Rosie is drawing bar models to represent a whole. She has drawn a fraction of each of her bars.

Can you complete Rosie’s bar models?
Children use a number line to represent fractions beyond one whole. They count forwards and backwards in fractions.

Children need to know how to divide a number line into specific fractions i.e. when dividing into quarters, we need to ensure our number line is divided into four equal parts.

How many equal parts has the number line been divided into?
What does each interval represent?
How are the bar model and the number line the same? How are they different?
How do we know where to place \( \frac{1}{5} \) on the number line?
How do we label fractions larger than one.

Show \( \frac{1}{5} \) on the number line. Use the bar model to help you.

The number line has been divided into equal parts. Label each part correctly.

Divide the number line into eighths. Can you continue the number line up to 2?
Eva has drawn a number line.

Tommy says it is incorrect.

Do you agree with Tommy?

Explain why.

Can you draw the next three fractions?

Tommy is correct because Eva has missed 1 whole out.

Alex and Jack are counting up and down in thirds.

Alex starts at $5\frac{1}{3}$ and counts backwards.

Jack starts at $3\frac{1}{3}$ and counts forwards.

What fraction will they get to at the same time?

They will reach $4\frac{1}{3}$. 
Block 5 – Fractions

Theme 3 - Tenths
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.

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 ___ of the cake.

What fraction would they get if Annie had 4 cakes?
Tenths

Reasoning and Problem Solving

Fill in the missing values. Explain how you got your answers.

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

Odd One Out

Which is the odd one out? Explain your answer.

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.
Teddy is counting in tenths.

Seven tenths, eight tenths, nine tenths, ten tenths, one eleventh, two elevenths, three elevenths...

Can you spot his mistake?

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.

**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="image1.png" alt="Image" /></td>
<td>One tenth</td>
<td>(\frac{1}{10})</td>
<td>0.1</td>
</tr>
<tr>
<td><img src="image2.png" alt="Image" /></td>
<td>Nine tenths</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Write the fractions and decimals shown.

![Image](image3.png)

Here is a decimal written in a place value grid.

<table>
<thead>
<tr>
<th>Ones</th>
<th>Tenths</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

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

- Dora: 10 cm is one tenth of 1 metre
- Amir: 10 cm is 0.1 metres.

They are both correct.

10 cm = \(\frac{1}{10}\) m = 0.1 m

**Reasoning and Problem Solving**

Place the decimals and fractions on the number line.

- 0.7
- \(\frac{3}{10}\)
- \(\frac{1}{10}\)
- 0.9
- \(\frac{10}{10}\)
Find a Half

Notes and Guidance

In this small step children find a half of a set of objects or quantity.

Links should be made here to dividing by 2. Children may need to use the concept of sharing to find a half. Paper plates, hoops and containers can be used to share objects into 2 equal groups.

Mathematical Talk

How did you halve the sweets?

What is the value of the whole? What is the value of half of the whole? What do you notice?

What do you notice about your answers?

How can you use your answer to a half of 4 to help you work out a half of 40?

Varied Fluency

Share 20 beanbags equally between two containers, then complete the stem sentences.

The whole is ____. Half of ____ is ____.

Circle half the cakes.

Circle half the triangles.

Fill in the blanks. Use counters to help you if needed.

\[
\frac{1}{2} \text{ of } 4 = \quad \frac{1}{2} \text{ of } 40 = \\
\frac{1}{2} \text{ of } 6 = \quad \frac{1}{2} \text{ of } 60 = \\
\frac{1}{2} \text{ of } 8 = \quad \frac{1}{2} \text{ of } 80 =
\]
### Find a Half

#### Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dora is asked to shade half of her shape. This is what she shades.</td>
<td>Yes because there are 12 squares altogether and 6 squares are shaded. 12 is the whole, half of 12 is 6.</td>
</tr>
<tr>
<td>Is she correct? Explain why.</td>
<td></td>
</tr>
<tr>
<td>I am thinking of a number. Half of my number is more than 10 but less than 15. What could my number be?</td>
<td>22, 24, 26, 28</td>
</tr>
<tr>
<td>Annie has some gummy bears.</td>
<td></td>
</tr>
<tr>
<td>She circles half of them.</td>
<td></td>
</tr>
<tr>
<td>How many gummy bears did she have at the start?</td>
<td></td>
</tr>
<tr>
<td>Annie started with 16 gummy bears.</td>
<td></td>
</tr>
</tbody>
</table>
Find a Quarter

Notes and Guidance

Children find quarters of shapes, objects and quantities. They begin by physically sharing amounts into four equal groups, or drawing around quantities then move towards working in the abstract. The link between the concrete, pictorial and abstract representations should be made explicit.

Support children in seeing the relationship between half of an amount and a quarter of an amount.

Mathematical Talk

What is the whole? What is a half? What is a quarter?

Can you circle a quarter in a different way?

How do you know you have found \( \frac{1}{4} \) ?

What do you notice about half of 12 and one quarter of 12? Can you explain what has happened?

If a quarter is \( \_\_\_\_\_\_ \) then the whole is \( \_\_\_\_\_\_ \)

Varied Fluency

Share the smarties equally between 4 people.

Each part is worth a ________.

This can be written as ________.

Circle one quarter of the cars.

One quarter of \( \_\_\_\_\_\_ \) is \( \_\_\_\_\_\_ \)

Complete:

\( \frac{1}{2} \) of 12 = \( \_\_\_\_ \) \hfill \frac{1}{4} \) of 12 = \( \_\_\_\_ \)

\( \frac{1}{2} \) of 20 = \( \_\_\_\_ \) \hfill \frac{1}{4} \) of 20 = \( \_\_\_\_ \)

\( \frac{1}{2} \) of 8 = \( \_\_\_\_ \) \hfill \frac{1}{4} \) of 8 = \( \_\_\_\_ \)
Who has more? Explain why.

Whitney has more because half of £6 is £3, whereas a quarter of £8 is only £2.

Mo has two ribbons. He cuts $\frac{1}{4}$ from each ribbon.

How long were Mo’s whole pieces of ribbon?

Which ribbon was the longest? How much longer?

Ribbon A was 20 cm
Ribbon B was 16 cm
Ribbon A was 4 cm longer.
Find a Third

Notes and Guidance

Children build on their understanding of a third and three equal parts to find a third of a quantity.

They use their knowledge of division and sharing in order to find a third of different quantities using concrete and pictorial representations to support their understanding.

Mathematical Talk

How many objects make the whole? Can we split the whole amount into three equal groups?

What is a third of ____ ?

What is staying the same? What is changing?

How does changing the whole amount change the answer? Is the answer still worth a third? Explain why?

Varied Fluency

Use the cubes to make three equal groups.

There are ____ cubes altogether.

One third of ____ is ____

____ of ____ is ____

Rosie is organising her teddy bears. She donates \( \frac{1}{3} \) of them to charity. How many bears does she have left?

Complete:

\[ \frac{1}{3} \text{ of } 9 = \quad \frac{1}{3} \text{ of } 15 = \]

\[ \frac{1}{3} \text{ of } 12 = \quad \frac{1}{3} \text{ of } 18 = \]
Find a third

Reasoning and Problem Solving

Annie has a piece of ribbon. She cuts it into three equal parts. One third of the ribbon is 6 cm long. How long would half the ribbon be?

Half the ribbon would be 9 cm. (6 \times 3 = 18\text{cm} \quad \text{Half of } 18 = 9\text{cm})

A bar model would be a particularly useful pictorial representation of this question.

Ron is thinking of a number.

One third of his number is greater than 8 but smaller than 12. What could his number be?

27, 30, 33
Find Three Quarters

Notes and Guidance

Children use their understanding of quarters to find three quarters of a quantity.

They work concretely and pictorially to make connections to the abstract.

Children should be encouraged to spot patterns and relationships between quarters of amounts.

Mathematical Talk

How many quarters make a whole?

Can you represent this in a bar model?

How many equal parts is \( \frac{3}{4} \) ?

Can you spot any patterns?

What has stayed the same? What has changed? What do you notice?

Varied Fluency

Amir shares 12 beanbags into 4 equal groups. Use the image to complete the sentences.

One quarter of 12 is equal to _____.
Two quarters of 12 is equal to _____.
Three quarter of 12 is equal to _____.
Four quarters of 12 is equal to _____.

Use counters and a bar model to help you find \( \frac{3}{4} \) of 8 and \( \frac{3}{4} \) of 16. What do you notice?

Use counters, cubes, or bar models to help you fill in the blanks:

\[
\begin{align*}
\frac{1}{4} \text{ of } 24 &= 4 \\
\frac{2}{4} \text{ of } 24 &= 12 \\
\frac{3}{4} \text{ of } 24 &= 15 \\
\frac{4}{4} \text{ of } 24 &= 24 \\
\frac{1}{4} \text{ of } 4 &= 1 \\
\frac{3}{4} \text{ of } 4 &= 3 \\
\frac{3}{4} \text{ of } 8 &= 6 \\
\frac{4}{4} \text{ of } 8 &= 8 \\
\end{align*}
\]
Amir is using beanbags and hoops to find three quarters of 20.

Can you spot his mistake?

\[ \frac{3}{4} \times 20 = 14 \]

Amir hasn’t created equal groups. 20 should be shared into 4 equal parts. There should be 5 beanbags in each hoop so three quarters of 20 is 15 not 14.

Eva eats three-quarters of her sweets. She eats these sweets.

How many sweets does Eva have left?

Eva has 2 sweets left. Encourage children to do this practically.
Fraction of an Amount (1)

Notes and Guidance

Children find a unit fraction of an amount by dividing an amount into equal groups.

They build on their understanding of division by using place value counters to find fractions of larger quantities including where they need to exchange tens for ones.

Mathematical Talk

Which operation do we use to find a fraction of an amount?

How many equal groups do we need?

Which part of the fraction tells us this?

How does the bar model help us?

Varied Fluency

Find \( \frac{1}{5} \) of Eva’s marbles.

I have divided the marbles into \( \square \) equal groups.

There are \( \square \) marbles in each group.

\( \frac{1}{5} \) of Eva’s marbles is \( \square \) marbles.

Dexter has used a bar model and counters to find \( \frac{1}{4} \) of 12

Use Dexter’s method to calculate:

\( \frac{1}{6} \) of 12 \quad \frac{1}{3} \) of 12 \quad \frac{1}{3} \) of 18 \quad \frac{1}{9} \) of 18

Amir uses a bar model and place value counters to find one quarter of 84

Use Amir’s method to find:

\( \frac{1}{3} \) of 36 \quad \frac{1}{3} \) of 45 \quad \frac{1}{5} \) of 65
Whitney has 12 chocolates.

On Friday, she ate \( \frac{1}{4} \) of her chocolates and gave one to her mum.

On Saturday, she ate \( \frac{1}{2} \) of her remaining chocolates, and gave one to her brother.

On Sunday, she ate \( \frac{1}{3} \) of her remaining chocolates.

How many chocolates does Whitney have left?

**Fill in the Blanks**

\[
\frac{1}{3} \text{ of } 60 = \frac{1}{4} \text{ of } \square
\]

\[
\frac{1}{5} \text{ of } 50 = \frac{1}{5} \text{ of } 25
\]
Fraction of an Amount (2)

Notes and Guidance

Children need to understand that the denominator of the fraction tells us how many equal parts the whole will be divided into. E.g. \( \frac{1}{3} \) means dividing the whole into 3 equal parts.

They need to understand that the numerator tells them how many parts of the whole there are. E.g. \( \frac{2}{3} \) means dividing the whole into 3 equal parts, then counting the amount in 2 of these parts.

Mathematical Talk

What does the denominator tell us?

What does the numerator tell us?

What is the same and what is different about two thirds and two fifths?

How many parts is the whole divided into and why?

Varied Fluency

Find \( \frac{2}{5} \) of Eva’s marbles.

I have divided the marbles into \( \square \) equal groups.

There are \( \square \) marbles in each group.

\( \frac{2}{5} \) of Eva’s marbles is \( \square \) marbles.

Dexter has used a bar model and counters to find \( \frac{3}{4} \) of 12

Use Dexter’s method to calculate:

\( \frac{5}{6} \) of 12 \hspace{1cm} \( \frac{2}{3} \) of 12 \hspace{1cm} \( \frac{2}{3} \) of 18 \hspace{1cm} \( \frac{7}{9} \) of 18

Amir uses a bar model and place value counters to find three quarters of 84

Use Amir’s method to find:

\( \frac{2}{3} \) of 36 \hspace{1cm} \( \frac{2}{3} \) of 45 \hspace{1cm} \( \frac{3}{5} \) of 65
This is \( \frac{3}{4} \) of a set of beanbags.

How many were in the whole set?

Ron has £28

On Friday, he spent \( \frac{1}{4} \) of his money.

On Saturday, he spent \( \frac{2}{3} \) of his remaining money and gave £2 to his sister.

On Sunday, he spent \( \frac{1}{5} \) of his remaining money.

How much money does Ron have left?

What fraction of his original amount is this?

Ron has £4 left. This is \( \frac{1}{7} \) of his original amount.
**Fraction of an Amount (3)**

**Notes and Guidance**

Children will apply their knowledge and understanding of fractions to solve problems in various contexts.

They recap and build their understanding of different measures.

**Mathematical Talk**

Do we need to make an exchange?

Can we represent the problem in a bar model?

When finding $\frac{5}{6}$, what will we need to do and why?

What is the whole? How can we represent this problem?

**Varied Fluency**

Ron has £3 and 50p

He wants to give half of his money to his brother.

How much would his brother receive?

A bag of sweets weighs 240 g

There are 4 children going to the cinema, each receives $\frac{1}{4}$ of the bag.

What weight of sweets will each child receive?

Find $\frac{2}{3}$ of 1 hour.

Use the clock face to help you.

1 hour = ☐ minutes

$\frac{1}{3}$ of ☐ minutes = ☐

$\frac{2}{3}$ of ☐ minutes = ☐
Mo makes 3 rugby shirts.

Each rugby shirt uses 150 cm of material.

He has a 600 cm roll of material.

How much material is left after making the 3 shirts?

What fraction of the original roll is left over?

150 cm

This is $\frac{1}{4}$ of his original roll of material.

Alex and Eva share a bottle of juice.

Alex drinks $\frac{3}{5}$ of the juice.

Eva drinks 200 ml of the juice.

One fifth of the juice is left in the bottle.

How much did Alex drink?

What fraction of the bottle did Eva drink?

What fraction of the drink is left?

Alex drank 600 ml of the juice.

Eva drank one fifth of the juice.

The fraction of juice left is $\frac{1}{5}$ of the bottle.
Year 2 | Spring Term | Week 9 to 12 – Number: Fractions

**Equivalence of \(\frac{1}{2}\) and \(\frac{2}{4}\)**

**Notes and Guidance**

Children explore the equivalence of two quarters and one half of the same whole and understand that they are the same.

Children tackle this practically, using strips of paper and concrete apparatus (e.g. counters, Cuisenaire rods, number pieces).

**Mathematical Talk**

What does equivalent mean? What symbol do we use?

Are these two fractions equal? (half and two quarters)

Are the numerators the same? Are the denominators the same?

How many quarters are equivalent to a half?

**Varied Fluency**

- Using two identical strips of paper, explore what happens when you fold the strips into two equal pieces and four equal pieces. Compare one of the two equal pieces with two of the four equal pieces. What do you notice?

- Shade one half and two quarters of each shape.

- Give children an amount of counters or concrete objects, can you find one half of them? Can you find two quarters of them? What do you notice?
Tommy has a jar of 12 cookies. He gives half of them to Alex, and \(\frac{2}{4}\) of them to Mo.

Who gets the most cookies?

They both get the same amount. They will each get 6 cookies.

Whitney says:

I have shaded a third of my shape.

Do you agree? Explain why.

Why do you think Whitney thinks this?

Whitney has shaded half or 2 quarters of her shape.

She thinks that she has shaded one third because one part out of three is shaded, but the parts are not equal.

Using red and blue cubes, build two towers to convince me that \(\frac{1}{2}\) and \(\frac{2}{4}\) are equal.

Answers vary depending on the amount of cubes used. Key point is that the towers should be the same height.
Equivalent Fractions (1)

Notes and Guidance

Children begin by using Cuisenaire or number rods to investigate and record equivalent fractions. Children then move on to exploring equivalent fractions through bar models.

Children explore equivalent fractions in pairs and can start to spot patterns.

Mathematical Talk

If the ____ rod is worth 1, can you show me 1/2? How about 1/4? Can you find other rods that are the same? What fraction would they represent?

How can you fold a strip of paper into equal parts? What do you notice about the numerators and denominators? Do you see any patterns?

Can a fraction have more than one equivalent fraction?

Varied Fluency

The pink Cuisenaire rod is worth 1 whole.

Which rod would be worth 1/4?
Which rods would be worth 2/4?
Which rod would be worth 1/2?

Use Cuisenaire to find rods to investigate other equivalent fractions.

Use two strips of equal sized paper. Fold one strip into quarters and the other into eighths. Place the quarters on top of the eighths and lift up one quarter, how many eighths can you see? How many eighths are equivalent to one quarter? Which other equivalent fractions can you find?

Using squared paper, investigate equivalent fractions using equal parts. e.g. \[ \frac{2}{4} = \frac{4}{8} \]

Start by drawing a bar 8 squares along. Label each square \( \frac{1}{8} \). Underneath compare the same length bar split into four equal parts. What fraction is each part now?
Explain how the diagram shows both \( \frac{2}{3} \) and \( \frac{4}{6} \)

The diagram is divided into six equal parts and four out of the six are yellow. You can also see three columns and two columns are yellow.

Which is the odd one out? Explain why

This is the odd one out because the other fractions are all equivalent to \( \frac{1}{2} \)

Teddy makes this fraction:

Mo says he can make an equivalent fraction with a denominator of 9

Dora disagrees. She says it can't have a denominator of 9 because the denominator would need to be double 3

Who is correct? Who is incorrect?

Mo is correct. He could make three ninths which is equivalent to one third.

Dora is incorrect. She has a misconception that you can only double to find equivalent fractions.
Children use Cuisenaire rods and paper strips alongside number lines to deepen their understanding of equivalent fractions.

Encourage children to focus on how the number line can be divided into different amounts of equal parts and how this helps to find equivalent fractions e.g. a number line divided into twelfths can also represent halves, thirds, quarters and sixths.

Mathematical Talk

The number line represents 1 whole, where can we see the fraction? Can we see any equivalent fractions?

Look at the number line divided into twelfths. Which unit fractions can you place on the number line as equivalent fractions? e.g. \( \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5} \) etc. Which unit fractions are not equivalent to twelfths?

Varied Fluency

- Use the models on the number line to identify the missing fractions. Which fractions are equivalent?

- Complete the missing equivalent fractions.

Place these equivalent fractions on the number line.

Are there any other equivalent fractions you can identify on the number line?
Alex and Tommy are using number lines to explore equivalent fractions.

Alex

\[ \frac{2}{6} = \frac{1}{3} \]

Tommy

\[ \frac{3}{6} = \frac{1}{3} \]

Who do you agree with? Explain why.

Alex is correct. Tommy’s top number line isn’t split into equal parts which means he cannot find the correct equivalent fraction.

Use the clues to work out which fraction is being described for each shape.

- My denominator is 6 and my numerator is half of my denominator.
- I am equivalent to \( \frac{4}{12} \)
- I am equivalent to one whole
- I am equivalent to \( \frac{2}{3} \)

Can you write what fraction each shape is worth? Can you record an equivalent fraction for each one?

- Circle
- Triangle
- Square
- Pentagon

Accept other correct equivalences

- \( \triangle = \frac{1}{3} \) or \( \frac{2}{6} \)
- \( \bigcirc = \frac{1}{2} \) or \( \frac{3}{6} \)
- \( \square = \frac{2}{3} \) or \( \frac{4}{6} \)
- \( \pentagon = \frac{3}{6} \) or \( \frac{1}{2} \)
Children use proportional reasoning to link pictorial images with abstract methods to find equivalent fractions. They look at the links between equivalent fractions to find missing numerators and denominators. Children look for patterns between the numerators and denominators to support their understanding of why fractions are equivalent e.g. fractions equivalent to a half have a numerator that is half the denominator.

Why do our times tables help us find equivalent fractions?

Can we see a pattern between the fractions?

Look at the relationship between the numerator and denominator, what do you notice? Does an equivalent fraction have the same relationship?

If we add the same number to the numerator and denominator, do we find an equivalent fraction? Why?

### Complete the table. Can you spot any patterns?

<table>
<thead>
<tr>
<th>Pictorial representation</th>
<th>Fraction</th>
<th>Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Fraction Image]</td>
<td>(\frac{6}{8} = \frac{3}{4})</td>
<td>Six eighths is equivalent to three quarters</td>
</tr>
<tr>
<td>![Fraction Image]</td>
<td>(\frac{1}{3} = \frac{\square}{9})</td>
<td>_____ is equivalent to _____</td>
</tr>
<tr>
<td>![Fraction Image]</td>
<td>(\frac{\square}{4} = \frac{\square}{12})</td>
<td>Three twelfths is equivalent to _____ quarters</td>
</tr>
<tr>
<td>![Fraction Image]</td>
<td>(\frac{4}{12} = \frac{\square}{\square})</td>
<td>_____ is equivalent to _____</td>
</tr>
</tbody>
</table>

### Use the fraction wall to complete the equivalent fractions.

\[
\frac{1}{2} = \Box = \Box = 6
\]
\[
\frac{1}{4} = \Box = 3
\]
Equivalent Fractions (3)

Reasoning and Problem Solving

Always, sometimes, never.

If a fraction is equivalent to one half, the denominator is double the numerator.

Always, children could also think of the numerator as being half of the denominator.

Prove it.

Can you find any relationships between the numerator and denominator for other equivalent fractions?

Dora has shaded a fraction.

She says,

I am thinking of an equivalent fraction to the shaded fraction where the numerator is 9.

Is this possible? Explain why.

This is impossible. Dora may have mistaken the numerator for the denominator and be thinking of \( \frac{6}{9} \) which is equivalent to \( \frac{2}{3} \).
**Compare Fractions**

**Notes and Guidance**

Children compare unit fractions or fractions with the same denominator.

For unit fractions, children’s natural tendency might be to say that \(\frac{1}{2}\) is smaller than \(\frac{1}{4}\) as 2 is smaller than 4. Discuss how dividing something into more equal parts makes each part smaller.

**Mathematical Talk**

What fraction of the strip is shaded? What fraction of the strip is not shaded?

Why is it important that the strips are the same length and are lined up underneath each other?

Can you think of a unit fraction that is smaller than \(\frac{1}{10}\)? Can you think of a unit fraction that is larger than \(\frac{1}{3}\)?

**Varied Fluency**

Use >, < or = to compare the fractions.

\[
\begin{array}{c|c|c|c}
\frac{1}{10} & \frac{1}{4} & \frac{1}{3} & \frac{1}{6} & \frac{1}{5} & \frac{1}{4} \\
\end{array}
\]

When the numerators are the same, the ______ the denominator, the ______ the fraction.

Use paper strips to compare the fractions using >, < or =

\[
\begin{array}{c|c|c|c}
\frac{3}{4} & \frac{1}{4} & \frac{1}{6} & \frac{5}{6} & \frac{3}{8} & \frac{5}{8} \\
\end{array}
\]

When the denominators are the same, the ______ the numerator, the ______ the fraction.
### Compare Fractions

#### Reasoning and Problem Solving

<table>
<thead>
<tr>
<th>I know that $\frac{1}{3}$ is larger than $\frac{1}{2}$ because 3 is larger than 2</th>
<th>$\frac{1}{3}$ is smaller because it is split into 3 equal parts, rather than 2 equal parts. Children could draw a bar model to show this.</th>
</tr>
</thead>
</table>

Do you agree with Dora? Explain how you know.

<table>
<thead>
<tr>
<th>Complete the missing denominator. How many different options can you find?</th>
<th>Examples could include $\frac{1}{3}$, $\frac{1}{4}$ etc.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Here are three fractions.</th>
<th>$\frac{3}{8}$, $\frac{3}{5}$, $\frac{1}{8}$</th>
</tr>
</thead>
</table>

Which fraction is the largest? How do you know?

$\frac{3}{5}$ is the largest when the numerators are the same, the smaller the denominator the larger the fraction. Children could also explain that $\frac{3}{5}$ is the only fraction larger than a half.

Which fraction is the smallest? How do you know?

$\frac{1}{8}$ is the smallest when the denominators are the same, the smaller the numerator, the smaller the fraction.
Children order unit fractions and fractions with the same denominator. They use bar models and number lines to order the fractions and write them in ascending and descending order.

Continue to encourage children to use stem sentences to explain why they can compare fractions when the numerators or the denominators are the same.

Mathematical Talk

How many equal parts has the whole been divided into?

How many equal parts need shading?

Which is the largest fraction? Which is the smallest fraction?

Which fractions are the hardest to make as paper strips? Why do you think they are harder to make?

Divide strips of paper into halves, thirds, quarters, fifths and sixths and colour in one part of each strip. Now order the strips from the smallest to the largest fraction.

When the numerators are the same, the _______ the denominator, the _____ the fraction.

Place the fractions on the number line.

Order the fractions in descending order.
Is Jack correct? Prove it.

Jack is incorrect. When the denominators are the same, the larger the numerator, the larger the fraction. Children could prove this using bar models or strips of paper etc.

<table>
<thead>
<tr>
<th>Fractions in ascending order</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="#" alt="Diagram A" /></td>
</tr>
<tr>
<td><img src="#" alt="Diagram B" /></td>
</tr>
<tr>
<td><img src="#" alt="Diagram C" /></td>
</tr>
<tr>
<td><img src="#" alt="Diagram D" /></td>
</tr>
</tbody>
</table>

Shade the blank diagrams so the fractions are ordered correctly.

<table>
<thead>
<tr>
<th>Fractions in descending order</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="#" alt="Diagram E" /></td>
</tr>
<tr>
<td><img src="#" alt="Diagram F" /></td>
</tr>
<tr>
<td><img src="#" alt="Diagram G" /></td>
</tr>
</tbody>
</table>

Either 7 or 8 parts shaded.

Either 2 and 1 parts shaded or 1 and 0 parts shaded.
Add Fractions

Notes and Guidance

Children use practical equipment and pictorial representations to add two or more fractions with the same denominator where the total is less than 1.

They understand that we only add the numerators and the denominators stay the same.

Mathematical Talk

Using your paper circles, show me what \( \frac{1}{4} + \frac{1}{4} \) is equal to.
How many quarters in total do I have?

How many parts is the whole divided into?
How many parts am I adding?
What do you notice about the numerators?
What do you notice about the denominators?

Varied Fluency

Take a paper circle. Fold your circle to split it into 4 equal parts. Colour one part red and two parts blue. Use your model to complete the sentences.

____ quarter is red.
____ quarters are blue.
____ quarters are coloured in.
Show this as a number sentence: \( \frac{1}{4} + \frac{1}{4} = \frac{2}{4} \)

We can use this model to calculate \( \frac{3}{8} + \frac{1}{8} = \frac{4}{8} \).

Draw your own models to calculate

\[ \frac{1}{5} + \frac{2}{5} = \frac{3}{5} \]
\[ \frac{2}{7} + \frac{3}{7} + \frac{1}{7} = \frac{6}{7} \]
\[ \frac{7}{10} + \frac{1}{10} = \frac{8}{10} \]

Eva eats \( \frac{5}{12} \) of a pizza and Annie eats \( \frac{1}{12} \) of a pizza.
What fraction of the pizza do they eat altogether?
Rosie and Whitney are solving:

\[
\frac{4}{7} + \frac{2}{7}
\]

Rosie says,

The answer is \(\frac{6}{7}\)

Whitney says,

The answer is \(\frac{6}{14}\)

Who do you agree with? Explain why.

Rosie is correct. Whitney has made the mistake of also adding the denominators. Children could prove why Whitney is wrong using a bar model or strip diagram.

Mo and Teddy share these chocolates.

They both eat an odd number of chocolates. Complete this number sentence to show what fraction of the chocolates they each could have eaten.

\[
\square + \square = \frac{12}{12}
\]

Possible answers:

\[
\frac{1}{12} + \frac{11}{12}, \quad \frac{3}{12} + \frac{9}{12}, \quad \frac{5}{12} + \frac{7}{12}
\]

(In either order)
Subtract Fractions

Notes and Guidance

Children use practical equipment and pictorial representations to subtract fractions with the same denominator within one whole.

They understand that we only subtract the numerators and the denominators stay the same.

Mathematical Talk

What fraction is shown first? Then what happens? Now what is left? Can we represent this in a number story?

Which models show take away? Which models show finding the difference? What’s the same? What’s different? Can we represent these models in a number story?

Can you partition \( \frac{9}{11} \) in a different way?

Varied Fluency

Eva is eating a chocolate bar. Fill in the missing information.

Can you write a number story using ‘first’, ‘then’ and ‘now’ to describe your calculation?

Use the models to help you subtract the fractions.

Complete the part whole models. Use equipment if needed. Can you write fact families for each model?
Find the missing fractions:

\[
\frac{7}{7} - \frac{3}{7} = \frac{2}{7} + \frac{\Box}{7}
\]

\[
\frac{7}{9} - \frac{5}{9} = \frac{4}{9} - \frac{2}{9}
\]

How many fraction addition and subtractions can you make from this model?

There are lots of calculations children could record. Children may even record calculations where there are more than 2 fractions e.g. \(\frac{3}{9} + \frac{1}{9} + \frac{3}{9} = \frac{7}{9}\).

Children may possibly see the red representing one fraction and the white another also.

Jack and Annie are solving \(\frac{4}{5} - \frac{2}{5}\).

Jack has taken two fifths away. Annie has found the difference between four fifths and two fifths.

They both say the answer is two fifths. Can you explain how they have found their answers?