Planning Overview
Year 3 Fractions

Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10.
Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators.
Recognise and show, using diagrams, equivalent fractions with small denominators.
Add and subtract fractions with the same denominator within one whole.
Compare and order unit fractions, and fractions with the same denominators
Solve problems that involve all of the above.

3F–1 Interpret and write proper fractions to represent 1 or several parts of a whole that is divided into equal parts.
3F–2 Find unit fractions of quantities using known division facts (multiplication tables fluency).
3F–3 Reason about the location of any fraction within 1 in the linear number system.
3F–4 Add and subtract fractions with the same denominator, within 1.

<table>
<tr><th>Objective</th><th>Teaching and Learning</th></tr>
<tr><td>Unit Fractions</td><td>Discuss the language of unit fraction.

<table>
<tr><th>Say</th><th>Write</th></tr>
<tr><td>“The whole has been divided…”</td><td>The fraction bar: –</td></tr>
<tr><td>“…into 3 equal parts.”</td><td>The denominator: 3</td></tr>
<tr><td>“1 of these parts is shaded.”</td><td>The numerator: 1</td></tr>
</table>

Language focus
“The whole is divided into 3 equal parts. Each part is one-third of the whole.”

3F–1 Example assessment questions
1. What fraction of each diagram is shaded?

2. Does each diagram show the given fraction? Explain your answers.

Is $\frac{1}{2}$ shaded? Is $\frac{1}{3}$ shaded? Is $\frac{1}{2}$ shaded? Is $\frac{1}{4}$ shaded?

Taken from - Mathematics guidance: Key stages 1 and 2 - Non-statutory guidance for the National Curriculum in England</td></tr>
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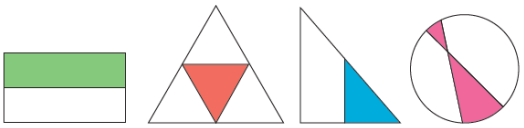
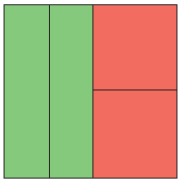
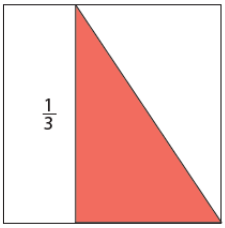
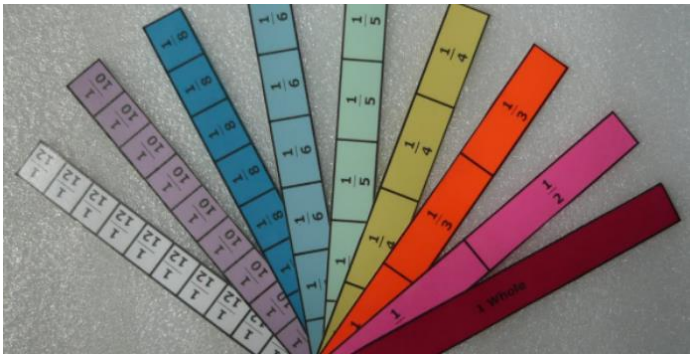
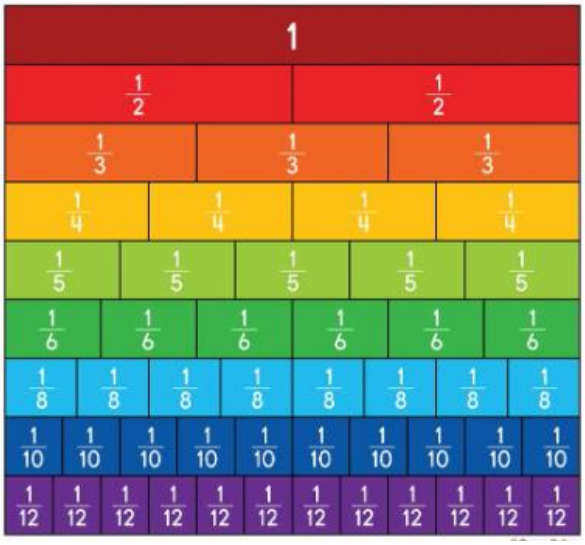
	NRICH activity Paper Halving – children to explore a range of ways of finding ½. **Mastery** True or false? Explain why.  $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{2}$ $\frac{1}{4}$ **Mastery with Greater Depth** The shape is divided into 4 equal parts. Do you agree? Explain why.  What fraction of the square is shaded? Explain your reasoning.  $\frac{1}{3}$
Non-Unit Fractions	Children to develop understanding of non-unit fractions using a range of resources and images. Use the fraction strips to support with counting on in steps. What happens when we get to the far end of the strip? Do they realise that this is now the whole? **Language focus** "The whole is divided into 8 equal parts and 5 of those parts are shaded. $\frac{5}{8}$ of the shape is shaded. $\frac{5}{8}$ is 5 one-eighths." 4. Tick or cross each diagram to show whether $\frac{3}{5}$ is shaded. Explain your answers.  Taken from - Mathematics guidance: Key stages 1 and 2 - Non-statutory guidance for the National Curriculum in England

Applying the language of fractions to a fraction wall	Give children a fraction wall cut into strips.  Children to build a fraction wall using the strips Can you use the fraction strips to explain to your partner what you know about fractions? Discuss the number of pieces each strip is split into – that is our denominator Can you show me where ¼, ¾, is on your fraction wall? What is the same and what is different about ¼ and ¾? Children to use their fraction wall to identify different unit and non-unit fractions.
Making a whole or a half	Using the strips from the previous session ask the children to explore ways of making a whole. How many ¼ pieces do we need to make a whole?  Repeat this question but for different fraction strips. Can the children come up with a rule around making a whole? *'When the numerator and the denominator are the same then we have a whole'*

Relate to food. If I cut a cake into quarters and ate all 4 quarters, I would have eaten the whole cake

Complete
____ = 1
____ < 1

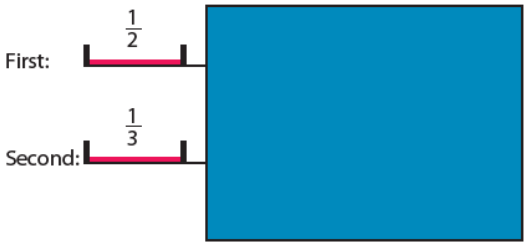
I have $\frac{2}{6}$ how many more pieces do I need to make the whole?

Give your partner part of a fraction wall – can they make a whole by drawing the rest of the strip?

Mastery with Greater Depth

Only a fraction of each line is shown. The rest is hidden behind the blue screen.
Which whole line is the longer?

Explain your reasoning.



Can they explore ways of making half? What do they notice about the numerator in comparison to the denominator?

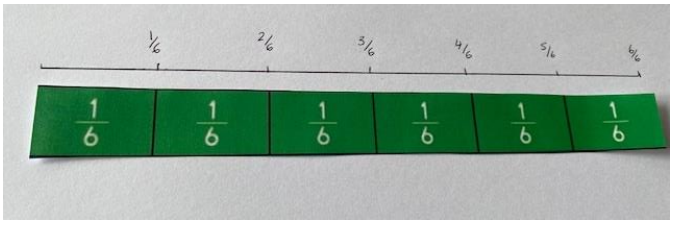
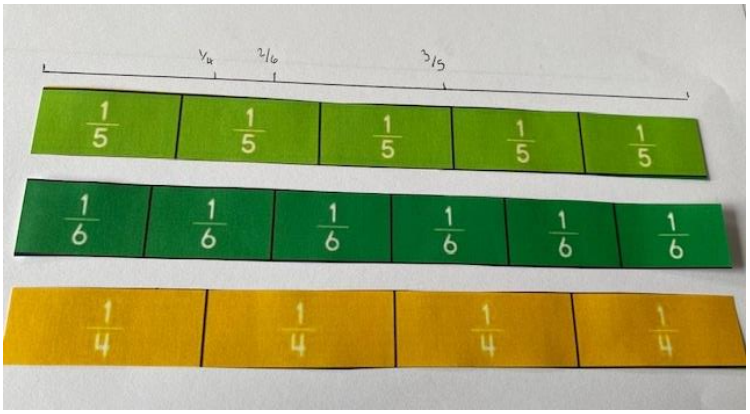
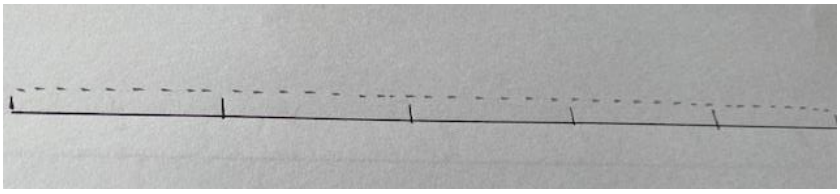
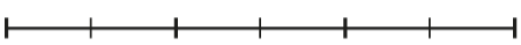
Complete
____ = ½
____ < ½
____ > ½

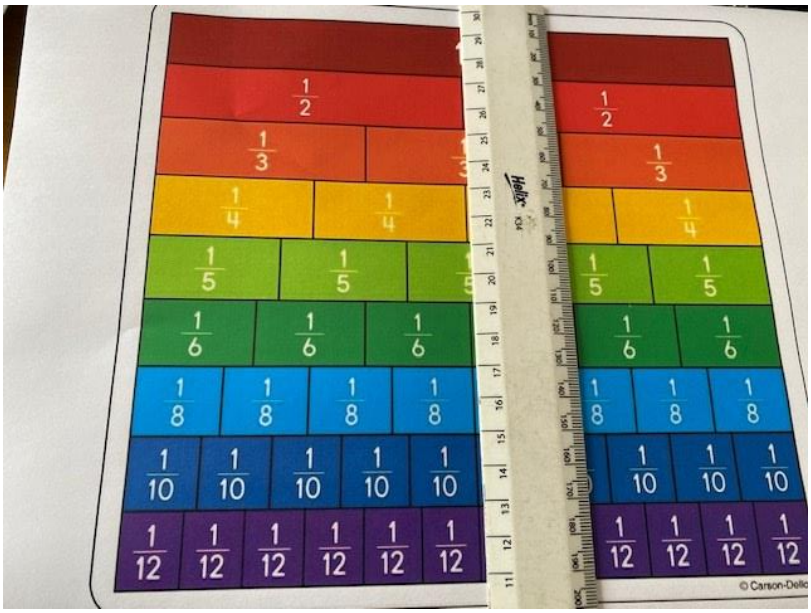
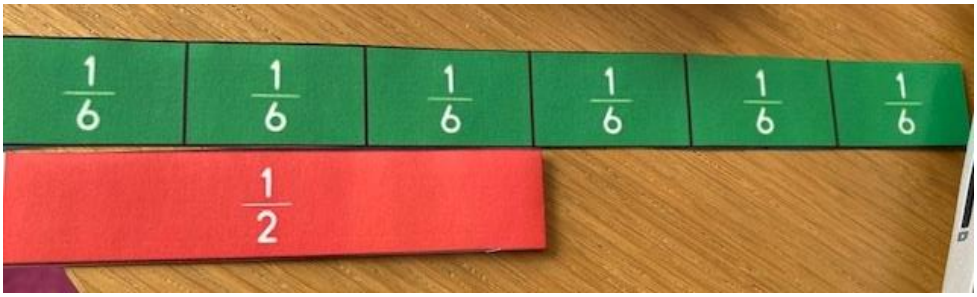
I have $\frac{4}{6}$ of a cake left – how many pieces would I need to eat so that I had half a cake left?

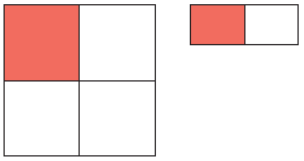
Can you give an example of a fraction that is less than a half? And another?

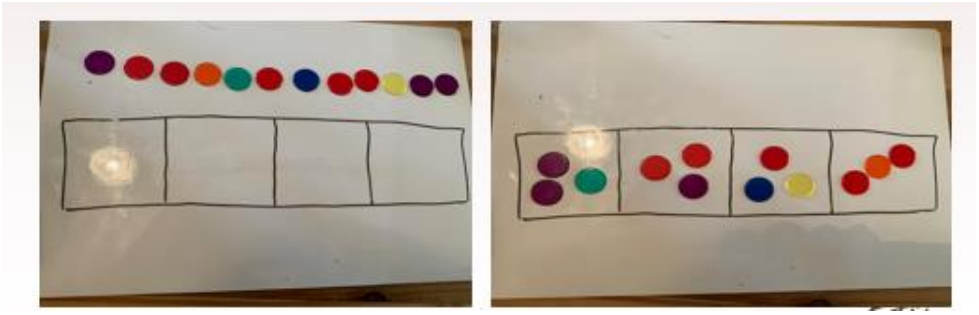
Can you give an example of a fraction that is more than a half? And another?

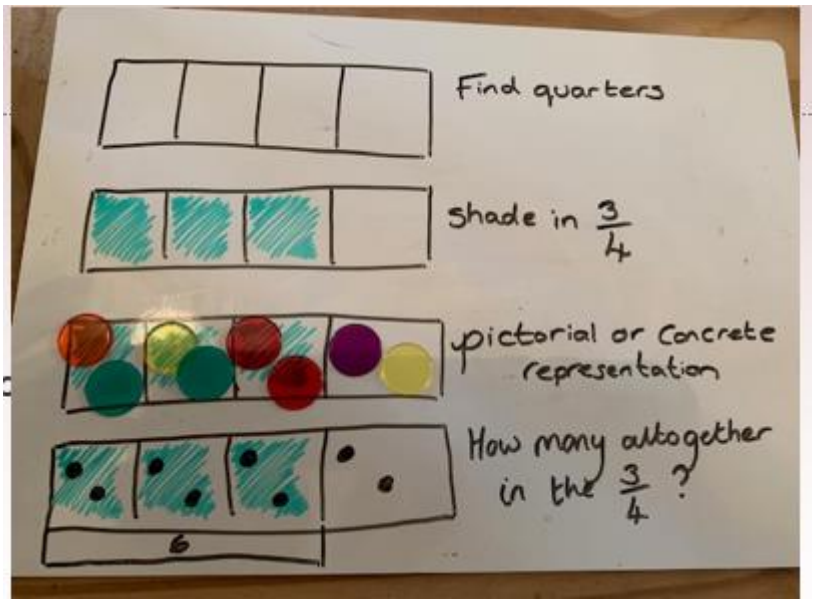
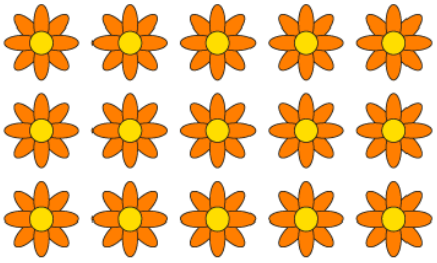
How do you know that a fraction is more or less than a half?

Placing fractions on a number line – introducing equivalents	Take a range of fraction strips and create a number line for each strip. Use the fractions strip to draw a number line – lay the fraction strip down and children use this straight edge to draw their number line against.  Children to complete number line activities such as spot the mistake, can you complete this number line, can you position these fractions on a number line? The fraction strips can support the children with their understanding and reasoning.  For children who are struggling to know what the intervals are on a blank fractions number line, teach them to put a 'top' on the number line to turn it back into a section of the fraction wall. Children may become confused by the 6 markers on the number line and think they are positioning sixths – by putting a top on the number line they can see it's the fifths strip of the fraction wall.  What happens if you place quarters and eighths on the same number line? Which equivalents can you find? Which eighths have equivalent quarter fractions and which don't? Complete ? = ? using eighths and quarters. d. Colour $\frac{1}{3}$ of the line.  Taken from - Mathematics guidance: Key stages 1 and 2 - Non-statutory guidance for the National Curriculum in England

Equivalent fractions	Using fraction strips, children to explore equivalence. Can they find any sections of the fraction wall that are the same size as one half? Children could do this by using a ruler or by folding their fraction half strip to show only on half.   Complete number sentences to show equivalences to a half $\frac{1}{2} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10}$ Do children need to use the fraction wall or can they make the links to the fact that if the numerator is half of the denominator then the fraction will be equivalent to a half. Which of these fractions is the odd one out? $\frac{1}{2'} \frac{2}{4'} \frac{4}{6'} \frac{4}{8}$

Compare and order fractions	Using fraction strips, ask children to complete the number sentences comparing either unit fractions or non-unit fractions with the same denominator. _____ < _____ Can they explain why ½ is larger than $\frac{1}{3}$ even though the number on the bottom is bigger? **Mastery** Hamsa says the diagrams below show that $\frac{1}{4} > \frac{1}{2}$. Do you agree? Explain why.  What fraction of the bar does each section represent?  Draw two more bars of the same size and divide one into eighths and the other into sixths. Which number is greater, a tenth, an eighth or a sixth? How do the bars help you to explain your reasoning? Revisit work on number lines and ask children to order a range of fractions with the same denominator or unit fractions. **Mastery** On a number line labelled 0 to 1, mark $\frac{1}{5}$, $\frac{2}{5}$ and $\frac{4}{5}$. On a number line labelled 0 to 1, mark $\frac{1}{6}$, $\frac{1}{3}$ and $\frac{1}{2}$. **Mastery with Greater Depth** On a number line labelled 0 to 1, mark $\frac{1}{6}$, $\frac{1}{3}$ and $\frac{1}{2}$. How big is the interval from $\frac{1}{6}$ to $\frac{1}{3}$? How big is the interval from $\frac{1}{6}$ to $\frac{1}{2}$? Can children explain their reasoning about why the answers are the same?

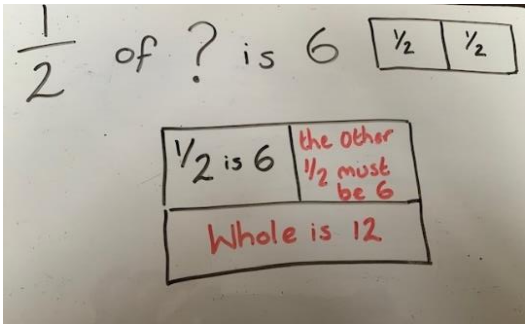
Placing fractions on a number line – exploring tenths	Take the strip split into tenths and link to a number line. $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ $\frac{1}{10}$ If 0 is at the beginning and 1 at the end what are the other points on a number line? Introduce the decimal notation underneath. Introduce the tenths column. 'If we have a fraction that is $\frac{1}{10}$ and we wanted to write this as a decimal then we would put 1 in the tenths column, we don't have any whole fraction strips so the number we would write would be 0.1' Where would halfway be on the tenths strip? It would be $\frac{5}{10}$ along. How would we write this as a decimal? We would need to put 5 in the tenths column. 0.5 and $\frac{5}{10}$ would both be another way to say ½. Ask questions such as, what is the difference between ½ and $\frac{6}{10}$? Which is larger 0.3 or 0.5? **Mastery** Shade in 0·7 of this rectangle. 
Fraction of an amount	Using a fraction wall and counters as the concrete representation and the bar model as the pictorial representation show children how to find fractions of quantities, first with unit fractions and then with non-unit. So to find ¼ of 12 we draw a bar, split it into 4 equal sections, share 12 equally across the 4 sections and then record how much is in one of those 4 sections.  Discuss how the model supports the fact that to find a unit fraction of a quantity then we divide by the denominator. We divided the bar into 4 equal sections and shared the counters out therefore we shared the counters into 4 groups, we divided the counters by 4. If I eat ¼ of my bag of 20 sweets, how many are left?

	Use the bar model to show what was eaten and what was left. Repeat with non-unit fractions. To find ¾ of 8 draw a bar and split it into 4 equal sections. Colour in 3 of those sections because we are interested in 3 of the 4 quarters. Share 8 counters across equally. Now count how many counters are in the 3 coloured in sections altogether.  c. Circle $\frac{4}{5}$ of the flowers.  Taken from - Mathematics guidance: Key stages 1 and 2 - Non-statutory guidance for the National Curriculum in England Consolidate comparing and finding fractions of amounts with questions such as, Would you rather have ½ of £20 or ¼ of £20? They should be able to answer these without calculating and explain their reasoning.

Extend to finding the whole if we only know one part.

Half of ? is 6

Draw a bar and split it in half. We know one of those halves is worth 6. So both halves must be worth 6 so our whole is 12.



If there are 15 sweets left after ¼ of a bag of sweets has been eaten, how many sweets were in a full bag?

Use the bar model to support.

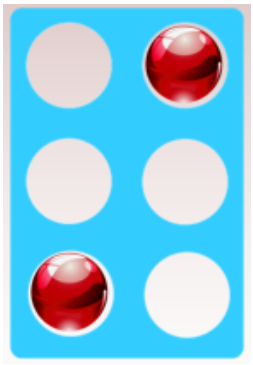
3F–2 Example assessment questions

1. Rohan saved £32. He spends $\frac{1}{4}$ of his money on a toy. How much does he spend?
2. Find:
   a. $\frac{1}{5}$ of 35
   b. $\frac{1}{10}$ of 40
   c. $\frac{1}{8}$ of 24
3. The school caretaker buys 50 litres of paint. She uses $\frac{1}{5}$ of it to paint the year 3 classroom. How many litres of paint is this?
4. There are 16 apples in a fruit bowl. Some children eat $\frac{1}{4}$ of the apples. How many are left?

Taken from - Mathematics guidance: Key stages 1 and 2 - Non-statutory guidance for the National Curriculum in England

Mastery with Greater Depth

This is 0·4 or $\frac{2}{5}$ of a bag of marbles. How many marbles are in a full bag?

<table>
<tr>
<td>Problem Solving with Fractions of Amounts</td>
<td>
Finding fractions of numicon tiles.
In pairs give the children numicon tiles 1 -10 and some counters.
One child covers a fraction of a numicon tile with counters and slides it across to their partner.
Their partner confirms what fraction of the tile has been covered – can they express this with equivalent fractions where approprate.

After spending some time investigating this, ask children to pile up the numicon tiles that they can find a half of and the ones that they can't find a half of. What do the tiles that they can find a half of have in common? All of these tiles are in the 2 times table.

Next ask the children to make a pile of tiles that they could find a quarter of. What do these tiles have in common? They are all in the 4 times table.

Now ask the children to make a pile of tiles that they could find a third of. Again ask the children what these have in common – they are in the 3 times table.

Ask children to predict what tiles that they could find $\frac{1}{5}$ of.

What is the relationship between the denominator and times tables?
</td>
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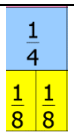
<tr>
<td>Add fractions</td>
<td>

Using the NCETM fraction cards, ask children to complete calculations such as $\frac{2}{8} + \frac{4}{8} =$
Ensure that they understand why the denominator doesn't change unless we are simplifying the answer at the end.

Mastery
Fill in the numerators to make the answer less than 1.
Find three different ways to complete the calculation.

$\frac{\quad}{8} + \frac{\quad}{8} =$

Mastery with Greater Depth
Fill in the numerators to make the calculation correct.
How many ways can you do it?

Explain how you know you have found them all.

$\frac{\quad}{8} + \frac{\quad}{8} = 1$

Ensure that children use a systematic approach to explain how they have found all of the possibilities.
</td>
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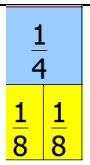
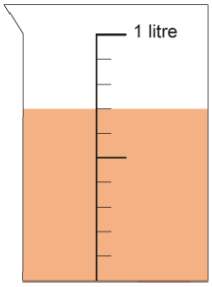
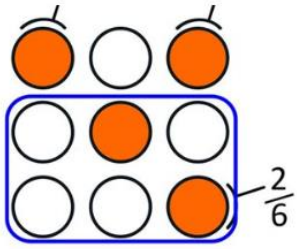
</table>

Subtract fractions	 Using the fraction cards, ask children to complete calculations such as $\frac{5}{8} - \frac{2}{8} =$ Ensure that they understand why the denominator doesn't change unless we are simplifying the answer at the end. 3. Decide whether each calculation is correct or not. Explain your answers. **Correct (✓) or incorrect (×)?** / **Explanation** $\frac{7}{12} - \frac{2}{12} = \frac{5}{12}$ $\frac{4}{7} - \frac{2}{7} = \frac{2}{0}$ $\frac{8}{10} - \frac{2}{10} - \frac{1}{10} = \frac{3}{10}$ $\frac{7}{9} - \frac{7}{9} = 0$ $\frac{5}{8} - \frac{2}{8} - \frac{2}{8} = \frac{1}{8}$ 4. Sofia had a jug containing $\frac{7}{10}$ of a litre of juice. She drank $\frac{4}{10}$ of a litre. How much does she have left?  Taken from - Mathematics guidance: Key stages 1 and 2 - Non-statutory guidance for the National Curriculum in England
Consolidation and Problem Solving	Fruzzles by Mathsticks Can the children circle an array to make the fraction correct?  Children then have to circle all of the dots making sure to satisfy all of the fractions listed.