At-Home Investigation

Comparing the size of fractions:

Today we are going to draw each of the fractions listed below, then compare them and place them in order. If you know about equivalent fractions (e.g. $\frac{1}{4} = \frac{3}{12}$) then you can use that to help you.

Draw the lines to show each fraction. Take a photo of what you have made to send to your teacher.

$\frac{1}{2}$	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$
$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{5}$	$\frac{2}{5}$
$\frac{3}{5}$	$\frac{4}{5}$	$\frac{1}{10}$	$\frac{6}{10}$

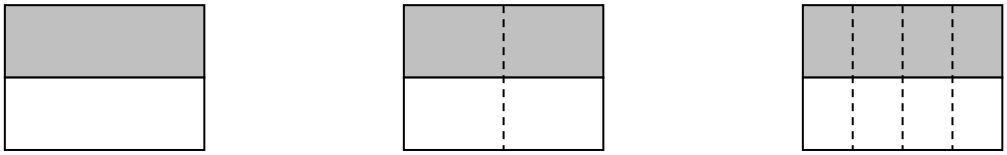
Ordering fractions:

Now that you have made each fraction, order the each of the fractions from smallest to largest. Show any that are the same. Explain how you did it. If you know how to use equivalent fractions, then make sure to include that in your working.

Revising equivalent fractions

Different common fractions can be used to represent the same amount. These are called ***equivalent fractions****. Use the diagrams below to help you to identify the common fractions.*

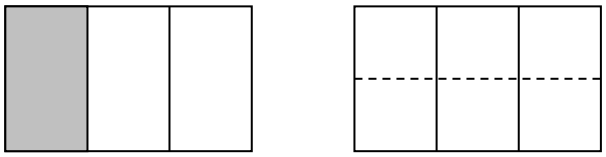
Example:



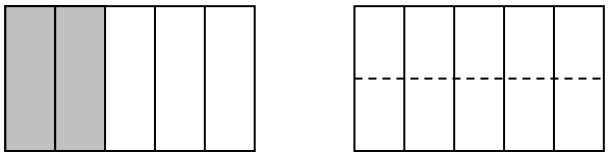
$^{1}/_{2}$ = $^{2}/_{4}$ = $^{4}/_{8}$

Colour the diagrams below and use them to help you answer the questions.

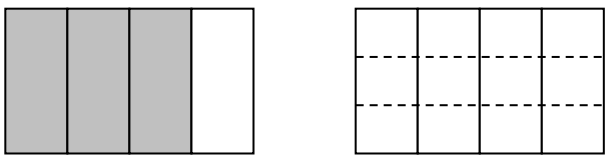
1. $^{1}/_{3}$ = how many sixths? What is the pattern?



2. $^{2}/_{5}$ = how many tenths? What is the pattern?



3. $^{3}/_{4}$ = how many twelfths? What is the pattern?



Look at the numbers in each numerator and denominator in the set of equivalent fractions.
What patterns do you see between the numbers?

Think it through:
Is there a way that you could use your understanding of equivalent fractions to add different fractions together? Try drawing what it would look like to add $\frac{1}{2}$ to $\frac{1}{4}$
If you can, also try adding on $\frac{1}{8}$

C6. Adding fractions with related denominators

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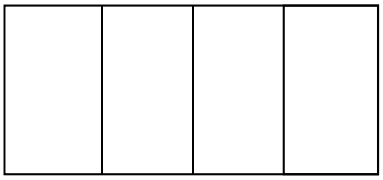
Using pictures is a good way to understand a concept. Today we will learn how to add and subtract fractions with related denominators.

Example:

$^1/_4 + {}^1/_2$



Colour ¼ of the rectangle in blue: how many pieces do you shade? _____

Colour ½ of the rectangle in red: how many pieces do you shade? _____

How many pieces would this make altogether? _____ What fraction is this? _____

What would you have done if it was ½ - ¼? Can you think of how to do it using an eraser?

Try these: some are addition and some are subtraction. For some you will need to cut the shape into more parts before you can add or subtract. Make sure that you think about how many pieces you need altogether before getting started.

1. $^3/_4 + {}^1/_8 =$

2. $^2/_5 - {}^1/_{10} =$

3. $^2/_6 + {}^1/_3 =$

4. $^1/_2 - {}^3/_{10} =$

Finding any fraction of a whole number

Fractions are related to multiplication and division facts. Examine the examples below to find the pattern, then use the pattern to complete the following questions.

Words	Fractions	Expanded form
½ of 10 =	10 x ½ =	10 ÷ 2 x 1 = 5 *or* 10 x 1 ÷ 2 = 5
¼ of 12 =	12 x ¼ =	12 ÷ 4 x 1 = 3 *or* 12 x 1 ÷ 4 = 3
$^2/_5$ of 20 =	20 x $^2/_5$ =	20 ÷ 5 x 2 = 8 *or* 20 x 2 ÷ 5 = 8

Thinking about the examples:

1. Which operation do you think the word "of" refers to? Explain why:

2. How does the "fractions" column relate to the "words" column? How are they similar?

3. Describe what you think is happening in order to turn the "fractions" column into the "expanded form" column:

4. Guess: Do you think that you would get the same answer if the fraction was written first in the equations? (e.g. ½ x 10 instead of 10 x ½) Why?

5. Try it with a calculator and see. For ½ x 10 you would need to type 1 ÷ 2 x 10 = _____
   Describe what happens:

6. Describe how you think fractions are related to multiplication and division facts:

Questions: For each of these questions work out which operations to use to calculate the answers. List the operations after the first = sign, and then put the answer after the second = sign.

7. $^{1}/_{3}$ of 30 = =

8. $^{2}/_{3}$ of 30 = =

9. $^{1}/_{5}$ of 25 = =

10. $^{3}/_{5}$ of 25 = =

11. $^{1}/_{6}$ of 30 = =

12. $^{5}/_{6}$ of 30 = =

13. $^{1}/_{7}$ of 28 = =

14. $^{4}/_{7}$ of 28 = =

15. $^{2}/_{3}$ of 18 = =

16. $^{3}/_{5}$ of 45 = =

17. $^{2}/_{9}$ of 54 = =

18. $^{3}/_{6}$ of 42 = =

Extension Question:
$^{9}/_{7}$ of 14 =

Interleaved practise

Year 7, week 7

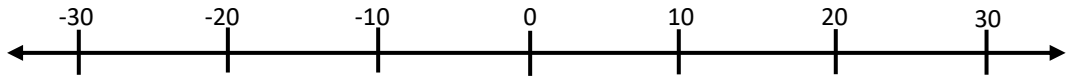
Number:

1. Write out the repeated multiplication for these and use a calculator (or phone app) to find out what numbers they represent e.g. $2^3 = 2 \times 2 \times 2 = 8$

   2^5 4^4 11^3

2. Write this product using index notation: 2 x 3 x 2 x 3 x 3

3. Use the number line to help you answer the questions below:



-12 + 15 = ☐ 2 + -7 = ☐ 5 + ☐ = -11 ☐ - 22 = -28

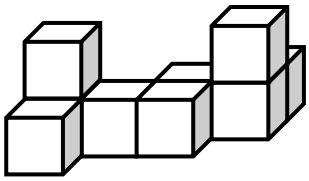
4. True or False? Explain your answer 3 (15 + 27) = (3 x 15) + 27

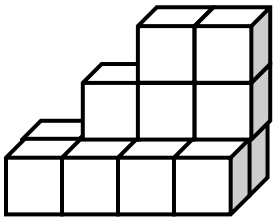
5. I pay $27.30 per week for milk. How much does it cost me for one day? Show how you worked it out.

Measurement/Geometry:

6. Write the volume of these objects in cm^3

 = 1cm^3





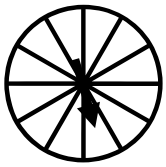
7. Fill in the missing numbers:

   41.35 kg = _____ g _____ L = 12 450 mL 3.57 m = _____ mm

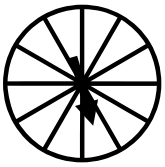
8. Draw a square based pyramid and describe its properties

Chance/Data:

9. Use as many colours as you like to make sure that this spinner gives you an equal chance of spinning each colour.



Use as many colours as you like to make sure that this spinner gives you a different chance of spinning each colour.



Friday: Connecting and Generalising Lesson

Visually adding and subtracting fractions

Today we will learn how to make equivalent fractions using pictures so that we can add fractions easily.

What ways are there to draw one third on the following rectangles? Draw as many ways as possible:

What ways are there to draw one fifth on the following rectangles? Draw as many ways as possible:

Let's try adding one third and one fifth by drawing them onto the same rectangle.

Is there a way that you can overlay these representations so that you could determine what one third + one fifth would look like? Try drawing it below:

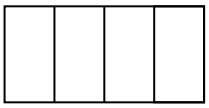
What problems have you found?

How might you be able to get around these problems? Try your ideas and come up with something that works. Working through the next page will help if you are stuck.

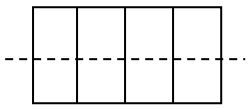
Adding fractions with pictures example:

$^1/_4 + {}^1/_2$

Think of a rectangle that is broken into **quarters** vertically:



What would it look like if you broke it into **halves** horizontally?



How many pieces do you have now altogether? _____

If you shade ¼ of this shape, how many pieces do you shade? _____

If you shade ½ of this shape, how many pieces do you shade? _____

How many would this make altogether? _____ What fraction is this? _____

How could you apply this to adding one third and one fifth? Draw it below and explain what you are doing to find the answer:

Try these on your own:

1. $^2/_5 + {}^1/_2 =$

2. $^2/_7 + {}^1/_3 =$

Explain the pattern for adding fractions using pictures:

Below are sets of fractions for you to add and subtract. You can use pictures if they help or you can do it in your head. Give an explanation for how you did each one.

Questions:	Working Space and Explanation:
$^2/_3 + {}^3/_4$	
$^4/_5 - {}^1/_2$	
$^3/_8 + {}^1/_4$ See if you can do this one in your head. Hint: what is $^1/_4$ the same as?	
$^1/_5 - {}^1/_7$	
$^1/_{10} + {}^3/_5$ See if you can do this one in your head. Hint: what is $^3/_5$ the same as?	

Extension Questions:

If the answer was $^7/_{12}$ and one of the fractions that was added was $^1/_2$, what was the other fraction?

How would your answer change if one of the fractions was $^1/_4$ instead of $^1/_2$?