Work Program for B2FMaths@Home Week 7 Year 5

Contents – click on the link below

How to use this work program

Accessing the online resources

To access the online resources, please go to: https://www.backtofrontmaths.com.au/b2fmathshome

Running the program each week

Each week is designed with five maths lessons so that you can do it each day. Different days have different types of lessons to make sure that students experience the kind of thinking that they need to continue growing in maths. The types of lessons include:

- **At-home investigation:** This is a hands-on task where students explore a new idea before they are taught that skill. They need to come up with an idea to try to solve the problem, try out their idea, decide if it worked or not, try again if needed, and explain what they did. If your child has time with your teacher with a webcam, the teacher will generally be doing this lesson with your child. This is the lesson that will require the heaviest input from you to help your child think through an idea and generally requires the use of some hands-on materials that are listed in the information page.
- **Connecting lesson:** This type of lesson has questions that lead students to develop their ideas and learn a new skill. It should be fairly easy for a student to do, but you will need to be available to read the question to your child as needed, encourage them to think further, and make sure that they complete the work. Most of these lessons will include 10 minutes of practising number operations or concepts through activities or games.
- **Interleaved practise lesson:** This type of lesson provides 8-10 questions from different areas of maths so that students practise remembering what they have previously been taught. Some of the questions may not be easy for your child, so feel free to help whenever you see them struggling.
- **Number practice:** This lesson contains games and number tasks to do regularly with your child. Number is the most important concept to establish in Foundation, so we will be using similar activities each week to help your child develop a very firm understanding of "how many", to be able to picture that amount in their head, and to be able to add and subtract small amounts very flexibly. **These sessions will not focus heavily on counting, as counting is far less important than making amounts, drawing those amounts and recognising that the amount is still the same when the objects move.**

Getting help

The website above will have answers to frequently asked questions as well as videos to help you successfully teach your child at home. If you have further questions or need support, please contact your child's teacher directly using the contact details that they have provided to you. If they can't answer your questions, they will contact the B2FMaths@Home team directly to get an answer within 3 days.

What you need to know this week

Week overview

This week we are teaching the concept of fractions (especially: $^1/_2$, $^1/_3$, $^1/_4$, $^1/_5$, $^1/_8$ and multiples of any of these such as $^2/_3$, $^4/_5$, $^3/_8$…). We will look at fractions of shapes (2D), fractions of lengths, fractions of capacity (e.g. $^1/_3$ of a glass), and fractions of a collection or group.

Students at this age need to work out:

- Fractions need to be "fair". If the pieces are to be given the same name, then the **size** of each piece needs to be the same. That includes fractions of a group of objects (e.g. half of 6 shells is 3 shells).
- We can have fractions of different types of wholes. We can have "half full" glasses, halves of string or ribbon, halves of amounts (e.g. half of $4 is $2) and also halves of shapes (e.g. rectangles, circles).
- Fraction names are related to the **size** of the pieces compared to the whole, not about how many pieces there are. If we cut a cake into 4 different sized pieces, they would not be quarters. Likewise, we could cut the cake into 1 half and 2 quarters, making 3 pieces altogether. They would not be called thirds.
- We can have different sized pieces in the same whole as long as we name them according to their size (e.g. one half, one quarter and two eighths cut into the same circle).
- Fractions can be compared to each other to work out which is bigger and to order them.
- The "whole" needs to be the same when comparing fractions. You can't compare fractions if one is from a small pizza and one is from a family-sized pizza!
- Fraction names are related to ordinal numbers (e.g. position in a race: third, fourth, fifth…)
- When using a fraction symbol, e.g. ½, the bottom number refers to how many parts there are in the whole (2 parts), and the top tells us how many we are talking about right now (1 out of the 2 parts is ½). When they return to school, children will refer to the bottom number as the denominator and the top number as the numerator. You don't need to use or remember those terms right now though.
- Fractions and division are different expressions of the same concept: 3 ÷ 4 = ¾
- Fractions, decimals and percentages are all different ways of expressing the same amount. We can use the context "of a dollar" to help with conversions. For example, what is half of a dollar? 50c. The number of cents is the same as that fraction converted to a percent, ½ = 50%. If we write the amount in dollars, we are converting it to a decimal, ½ = 0.50 or 0.5
- In real life, we use fractions as numbers far more often than fractions of pizzas and cakes. For example, we express probability as a fraction, decimal or percentage (e.g. a 5% chance of rain), we use fractions in equations for measurement, we use fractions in budgeting. We will be using probability next week as a natural extension of what we learn about fractions this week.

You will need the following objects:

- Lots of scrap paper for Monday (at least 12 pieces)

Teacher Overview

Students will be considering simple fractions, equivalence and the idea of sharing fairly. We will not be dealing with mixed numbers or improper fractions this week. Ideally, we would use the following sequence of thinking to develop fractions. For all year levels, we need to make sure that we include all of the following models or representations: **shapes (2D), objects (3D), collections or groups and lines**. For older children we also consider fractions of numbers, and fractions as numbers themselves.

1. Understand and describe a "whole" and a "part". Make halves and consider what is a half and what is not a half. Understand that halves must be fair. This includes understanding sharing a collection fairly (e.g. half of 8 lollies).
2. Understand that we could cut a shape into more than two pieces, but still divide the pieces fairly between 2 people so that each person gets half E.g. cut in 4 pieces, each person gets 2.
3. Understand that the concept of the size of parts being fair applies to other fractions as well, not just halves. Fractions are named for the size of the part, not the number of parts.
4. Fraction names are related to ordinal numbers: third, fourth, fifth etc.
5. One fourth has a special name: one quarter. Quarters are fourths, not other fractions.
6. Understand that fractions and division are related to each other.
7. Use the symbol (vinculum) for fractions. Understand that the denominator represents the number of parts altogether in the whole and the numerator represents how many of the parts we are specifically talking about.
8. We can compare the size of fractions. The larger the number of pieces that a whole is divided into, the smaller the size of each piece. That means that eighths are smaller than thirds.
9. Sometimes fractions can be the same size as each other even if they have different denominators (number of parts altogether). E.g. 3/6 is equivalent to 2/4.
10. Unit fractions mean one of. Simple fractions are between 0 and 1. Mixed numbers or improper fractions are more than one.
11. There are just as many fractions between 1 and 2 as there are between 0 and 1. Fractions are used more often as numbers than as pizzas. This means that we can write fractions larger than one as improper fractions (larger numerator than denominator) or mixed numbers (whole number and a simple fraction).
12. Fractions, division, decimals and percentages are all different ways to express the same concept. Arrays help us to link all of these concepts together. Money is another great connecting concept to help children understand.
13. Fractions between 0 and 1 are used to express probability or chance.
14. We can have negative fractions just like we can have negative whole numbers.

Tracking student achievement

This week we are focusing investigating equivalent fractions, and also adding fractions with the same denominator. Next week we will link this to chance and order fractions on a number line, including linking to decimal numbers.

To achieve the C standard students need to:

- Order fractions and locate them on number lines (**N6C**) – number lines will happen next week
- Add and subtract fractions with the same denominator (**N7C**)

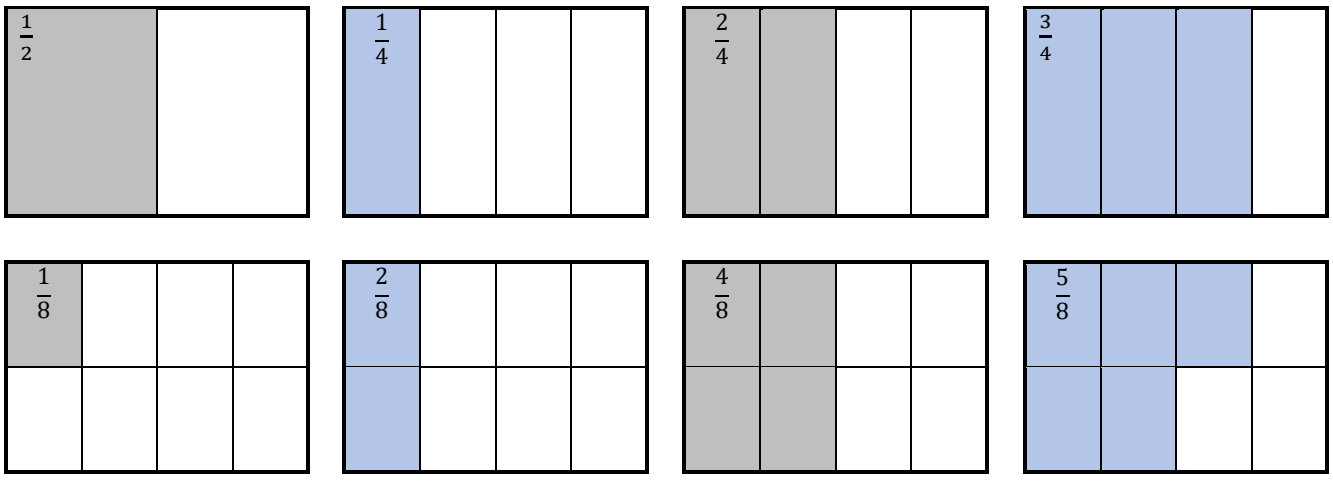
Monday: At-Home Investigation

Today we are revising what we know about halves, quarters, eighths, thirds and fifths then using our representation to order and compare fractions. You may wish to consider providing your child with paper to make and colour each fraction, then comparing the size of each.

Steps:

1. Make sure you have read "What you need to know this week" so that you know what to emphasise with your child.
2. Read the sheet to your child. Ask for their ideas on how to fold/draw each fraction. Focus on using the terms "fair", "the same amount", or "the same size". One example of answers for the first two lines is shown below.
3. When making thirds and fifths, make sure that you try out their ideas first before you try to help them come up with a better plan. This is important because then they will know *why* their idea didn't work.
4. Help your child think about what worked and what didn't, then come up with a new plan if needed. Focus on the idea of "fair". For example, thirds should all be the same as each other. One half and two quarters is not thirds.
5. Encourage your child to draw or write answers to the questions on the page. It is important to make a record of this page, whether as a photograph showing their folded fractions or by keeping the page with the drawings.
6. Discuss what your child found out with them. Keep in mind the ideas from the "What you need to know this week" section so that you can ask questions that are appropriate to the issues identified.
7. At the end: consider writing a comment on the page to say what went well or what you are concerned about. Fractions can be hard to understand for children, so please contact your teacher for help as needed.

Example answers:



For the final question, the order for all the fractions is as follows:

$\frac{1}{10}\ \frac{1}{8}\ \frac{1}{5}\ \frac{1}{4}\ \left(same\ as\ \frac{2}{8}\right)\ \frac{1}{3}\ \frac{2}{5}\ \frac{1}{2}\ \left(same\ as\ \frac{2}{4}\ \frac{4}{8}\ \frac{5}{10}\right)\ \frac{3}{5}\ \frac{5}{8}\ \frac{2}{3}\ \frac{3}{4}\ \frac{4}{5}\ \frac{7}{8}$

At-Home Investigation

Comparing the size of fractions:

Today we are going to draw each of the fractions listed below. Draw the lines in with a pen, then take a photo of what you have made to send to your teacher.

- One half $\frac{1}{2}$
- One quarter, two quarters, three quarters $\frac{1}{4}$ $\frac{2}{4}$ $\frac{3}{4}$
- One eighth, two eighths, five eighths, seven eighths $\frac{1}{8}$ $\frac{2}{8}$ $\frac{5}{8}$ $\frac{7}{8}$
- One third, two thirds $\frac{1}{3}$ $\frac{2}{3}$
- One fifth, two fifths, three fifths, four fifths $\frac{1}{5}$ $\frac{2}{5}$ $\frac{3}{5}$ $\frac{4}{5}$
- One tenth, five tenths $\frac{1}{10}$ $\frac{5}{10}$

$\frac{1}{2}$	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$
$\frac{1}{8}$	$\frac{2}{8}$	$\frac{5}{8}$	$\frac{7}{8}$
$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{5}$	$\frac{2}{5}$
$\frac{3}{5}$	$\frac{4}{5}$	$\frac{1}{10}$	$\frac{5}{10}$

Ordering fractions:

Now that you have made each fraction, order the following fractions from smallest to largest. Explain how you did it. $\frac{3}{4}$ $\frac{4}{8}$ $\frac{2}{3}$ $\frac{3}{5}$ $\frac{5}{10}$ $\frac{5}{8}$

Teacher Overview

This is a ***Problem Solving and Reasoning*** task.

The emphasis is on *designing* an investigation, *developing* a plan, *testing* it out, *verifying* that the plan worked, changing it as needed and *communicating* the procedure. There is also an emphasis on *generalising* an appropriate process that can be replicated for sharing any amount fairly.

If you are at school: Focus on making fractions using rectangles of paper as well as the other models (lines, volumes…). Make sure that you discuss what is half and what is not half (same for quarters and eighths). Make sure that students understand that a quarter is a fourth, or half of a half, not just a "bit". Focus on applying the thinking "eighths have 8 pieces" to work out thirds have 3 pieces etc. This will be a big focus for the rest of the week.

Please note: Watch out for using the word "even" to mean "equally sized" when describing fractions. This tends to lead to students thinking that only fractions with even numbers for denominators can be evenly sized. Instead, try using any of the following terms or phrases: equal, fair, same-size, equivalent, same amount.

Watch out for:

- Any three pieces are thirds – no need to be equally sized or shared fairly
- Only understanding fractions of shapes
- Any number of pieces are "quarters" (e.g. thirds are three quarters…)
- All fractions start when we fold in half (this won't work for thirds, fifths…)

Good questions to prompt thinking:

- Is it fair? What would fair look like? Fractions have to be fair to have the same name.
- How can we compare the size of the fractions? Which is biggest/smallest? Which are the same size even though they have different names?

Students requiring support:

- Use physical manipulatives
- Make sure that you do not limit the thinking to squares and circles – shapes AND collections are required to meet the C standard
- Watch for misconceptions listed

Extension:

- Provide "one third" and ask "what would the whole look like?" Repeat for simple fractions that are not unit-fractions.
- Find thirds and fifths of collections (e.g. 30)
- Link with time: "half an hour", being 5 and a half years old
- Link with measurement: "quarter of a metre", "half a litre"
- Link with chance: one quarter of the time the card drawn will be a heart, half the time it will be black
- Link with money: half a dollar is 50c
- Link with a number line: half way between 0 and 100 is 50, one quarter of the way is 25

Tuesday: Connecting lesson

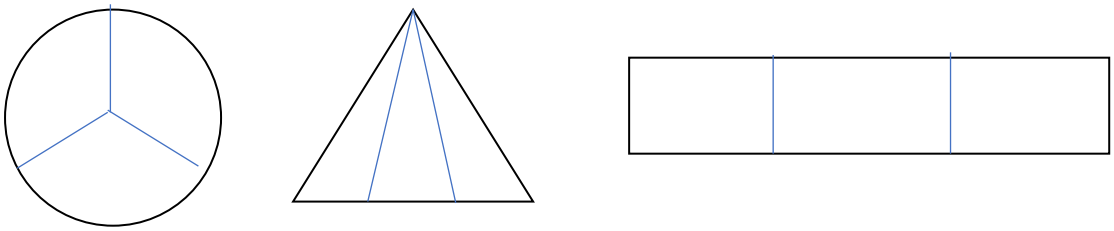
This lesson should mostly be revision for students.

In this lesson we will look at the concept naming fractions and link names with positions in a race (ordinal numbers). After first and second places, fractions follow the same naming patterns as ordinal numbers: third, fourth, fifth… This simple connection should help your child to understand the number of parts needed for each fraction. The tricky part will be understanding that each part needs to be "fair" – just like it isn't fair to have a bigger half, it also isn't fair to have a bigger third or a bigger fifth.

When children are working on the second page they may have trouble dividing the shapes fairly. Just do what you can. If you get stuck, examine the table on the second worksheet from yesterday and let your child's teacher know that you have had trouble. They can review this concept once we return to school.

Here is an example

Draw thirds:



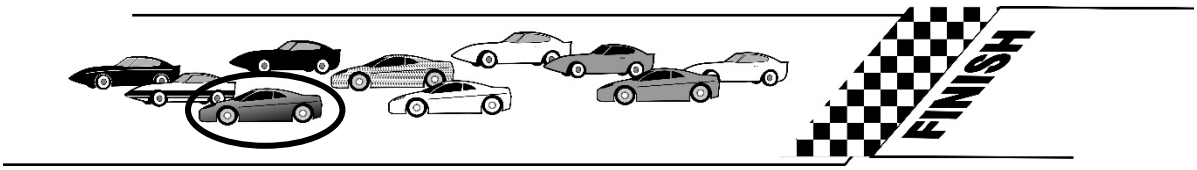
For the triangle: splitting the base into equal lengths will really make that fraction. An explanation is provided below, however as this involves year 8 level algebra and measurement formulas you really don't need to show it to your children 😊

For those of you who are interested:
The area of a triangle is ½ x base x height. As each smaller triangle has the same height, as long as you divide the base to make 3 equal lengths then you are keeping that dimension the same as well.

Fraction names are like racing

Fractions are named similarly to places in a race. Use this information to help you answer the questions below:

The cars below are having a race. Car number one crossed the finish line in first place.
Car number two came in second place. What place did car number three come in?



This is the **same word** as that used for when one whole is broken into three fair parts.
What would one of these parts be called?

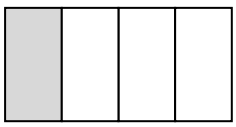
Divide the whole rectangle below into three fair parts. Write the name of each part on your picture.

What place would car number five come in?
This is the same word as that used for when one whole is broken into five fair parts.
What would one of these parts be called?

Divide the rectangle below into five fair parts. Write the name of each part on the picture

Fraction symbols

Use the picture below to work out what the one means and what the four means for the symbol of one quarter. Fill in the boxes.

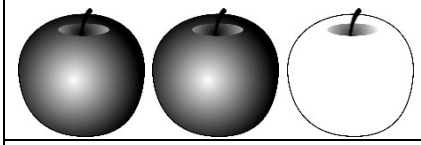
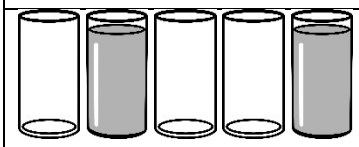


$$\frac{1}{4}$$

Numerator: The 1 means:

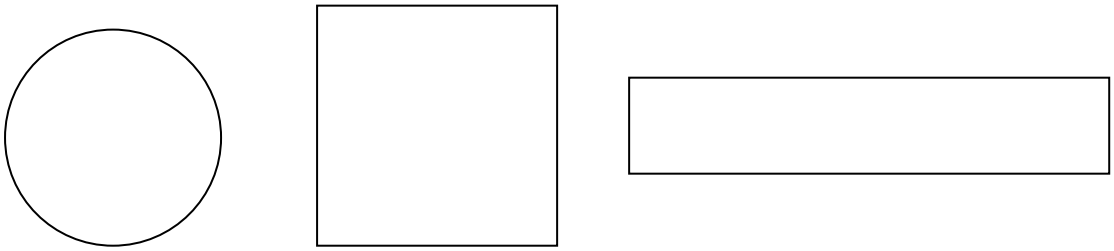
Denominator: The 4 means:

Putting it altogether: fill in the table

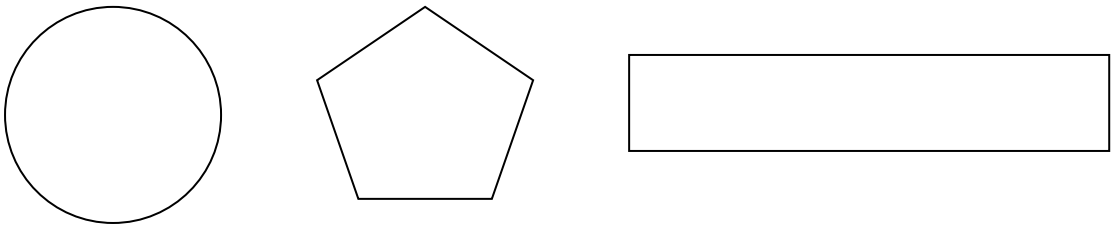
Picture	Words	Symbols
	*One third* of the apples are peeled	$\frac{1}{3}$
	Two thirds of the stickers are stars	
		

Draw the following fractions onto the shapes below:

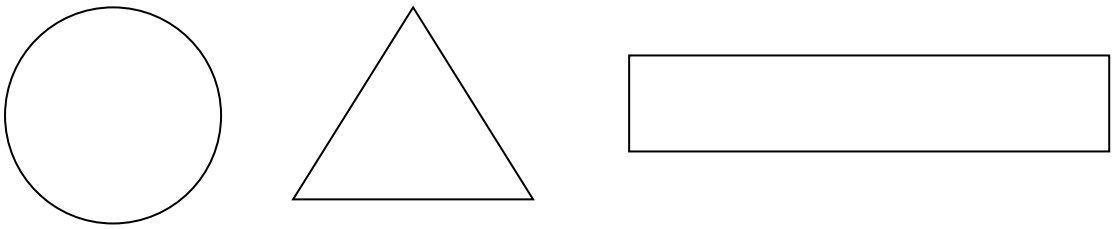
Draw halves:



Draw fifths:

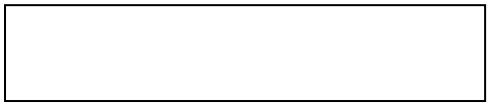


Draw thirds:



Why are the fifths smaller than the thirds?

What do you think tenths might look like? Try drawing them here.



How are the tenths similar to and different from fifths?

Teacher Overview

This is a ***Reasoning and Understanding*** lesson. It gives students an opportunity to revise what they should already know about naming fractions and use deductive reasoning to make connections to any simple fractions. This allows them to compare the size of fractions, which leads into locating fractions on a number line next week (Achievement Standard). You will need to review this concept when we return to school along with introducing fractions greater than one.

You may also want to review concepts of arrays, shapes, length, area and capacity that students were working on in previous weeks to build retention.

Wednesday: Connecting lesson

In this lesson we will revise the concept of equivalent fractions that students were introduced to in Year 4. Equivalent fractions are the same size as each other. For example, 2 quarters of a cake is the same as half a cake. $\frac{2}{4} = \frac{1}{2}$

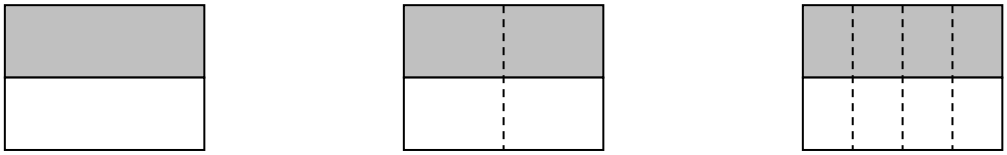
If the children worked through Monday and Tuesday's task properly, they should have been introduced to several fractions that were the same size as each other (equivalent). This worksheet should not be too difficult. If you have trouble, use the pictures or folding that your child did on Monday to compare sizes. Find ones that are the same and consider introducing others (e.g. $\frac{6}{8}$)

Terms you need to know: *NB these were introduced on the worksheet yesterday*
Denominator (bottom number in a fraction) represents the number of parts altogether in the whole and the
Numerator (top number in a fraction) represents how many of the parts we are specifically talking about.

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.*

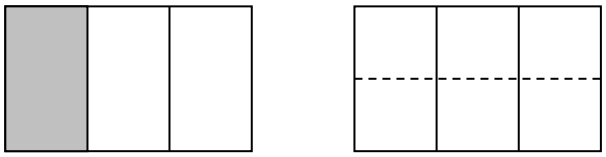
Example:



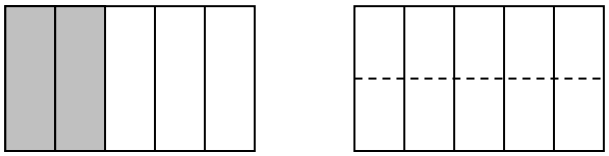
$^{1}/_{2}$ = $^{2}/_{4}$ = $^{4}/_{8}$

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

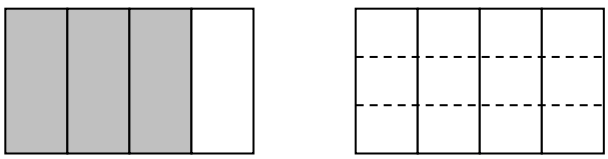
1. $^{1}/_{3}$ = how many sixths? What is the pattern?



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?

Extension question:
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 $\frac{1}{8}$

Teacher Overview

This is an ***Understanding*** lesson. It gives students an opportunity to reflect on what they know about comparing the size of fractions and use deductive reasoning to work out equivalent fractions. The extension question uses equivalent fractions to add fractions with related denominators. While this is not Year 5 standard, it is a good extension from what we have been doing this week.

Thursday: Interleaved Practice Questions

Why we are using mixed up questions:
In this lesson your child will be reviewing a range of skills that they have learned previously. Each question is unrelated to the previous question, because we want your child to have to *think hard* about what to do. Mixing up questions like this, rather than just practising related questions, has been shown in research to improve student retention of concepts by 60% over a 4 month period.

What to expect:
Your child will probably have forgotten how to complete quite a few of the questions. If needed, change the numbers in each question to make them easier because this will still require your child to think hard and remember a process. If they still can't work it out, feel free to show them, but try using different numbers rather than the exact same question. There are answers to each question on the website in case you get stuck.

Interleaved practice

Number:

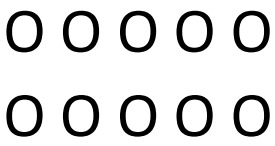
1. Complete the pattern and then rewrite it using decimal numbers.

   $3^{7}/_{10}$, $3^{9}/_{10}$, _____ , $4^{3}/_{10}$, _____ , _____ , _____ , _____

   _____ , _____ , _____ , _____ , _____ , _____ , _____ , _____

2. Write 0.2 as a fraction and show what 0.2 of this line, rectangle and collection of coins represents.

3. Show the answer in two different ways

   $5\overline{)36}$

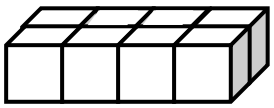
4. Make a prime factor tree for 36

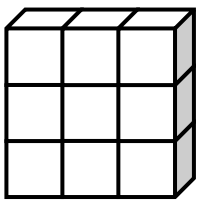
5. While I was shopping, I spent $14.70 on lunch, $23.95 on a t-shirt and had $6.35 left over. How much did I have to start with?

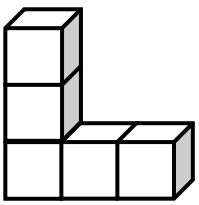
Measurement/Geometry:

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

    = $1cm^3$

7. Draw 3 angles: one less than, one equal to and one greater than a right angle.

8. Show what time it will be on a clock 12 minutes after 13:40.

Chance/Data:

This spinner made with 4 colours doesn't have an equal chance of spinning each colour.

Use as many colours as you like to design a spinner that has an equal chance of spinning each colour.

Teacher Overview

The questions on this worksheet are drawn from the “C standard” of the Achievement Standard. See your tracking sheet for more detail. Each week the interleaved questions will get a little harder, and more concepts will be reviewed throughout the program as we teach that concept. We have included answers to these questions on B2FMaths@Home so that parents can find them if needed.

Support for struggling students:
You might like to reduce the numbers in the questions. You might also give the student the answer, then ask them to work out how the answer was obtained.

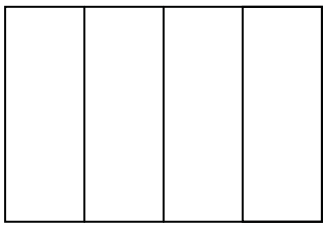
C9. Adding and subtracting fractions

TR p75

Today we will learn how to add and subtract fractions with pictures.

Example:

$^1/_4 + {}^2/_4$



Colour $^1/_4$ of the rectangle in blue:

Colour $^2/_4$ of the rectangle in red:

How many pieces do you have now altogether? _____

If you shade $^1/_4$ of this shape, how many pieces do you shade? _____

If you shade $^2/_4$ of this shape, 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 $^3/_4$ - ¼? Can you think of how to do it using an eraser?

Try these: some are addition and some are subtraction

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

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

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

4. $^8/_{10} - {}^3/_{10} =$

Teacher Overview

This is a ***Problem Solving and Reasoning*** lesson. It is designed to apply students' understanding of fractions to addition. Hopefully it will not be a big leap given what we have already been working on this week. Next week we will use fractions of a line to link in with probability.

If students get stuck, consider replacing this lesson with counting in fractions along a number line.