• Work with a partner.
• Take two pieces of different-coloured A5 paper.
• Look at them. Are they the same size?
• Now take one piece. Fold the paper and then tear it in half.

What fraction of the whole piece have you made? ____________
What did you divide the piece of paper by? ____________

• Now stick the smaller piece in the middle of the larger piece like this:

What fraction is the piece in the middle? ____________
What fraction is the piece around the outside? ____________
• Cut out the piece around the outside.
What two fractions do you have? ____________
• Now cut the outside piece into four strips of the same length.
• Stick these strips onto the other shape.
What do you notice?

Aadil doesn’t think that this rectangle is divided into quarters.
What do you think?
Take a piece of A5 paper.
• Divide the paper into four pieces as in the picture.
• Cut out the four pieces.

Are the four pieces equal sizes? ____________
Can you prove that these are quarters? ____________
Discover

- Take four strips of paper.
- Keep one strip whole.
- Fold the second strip in half.
- Open it up and label each section with the fraction it shows:
  \[
  \frac{1}{2} \quad \frac{1}{2}
  \]
- Fold the third strip into half and half again.
- Open it up and label each section with the fraction it shows:
  \[
  \frac{1}{4} \quad \frac{1}{4} \quad \frac{1}{4} \quad \frac{1}{4}
  \]
- Fold the fourth strip into half, half again and half once more.
- Open it up and label each section with the fraction it shows.
- Put your fraction strips in order, largest to smallest, under the first whole strip.
- Draw lines and write labels on this diagram to show the fractions you made.

Now write down all the equivalent fractions that you can see:

Mussaret wants to know how many sixths are the same as \(\frac{2}{3}\).

- Use other strips of paper to show her.
- Draw the equivalent fractions on this diagram:

Write some new equivalent fractions that you can see from both diagrams:

Explore

- Use your fraction strips and counters from the Discover activity to help you find:
  1. \(\frac{2}{3}\) of 24
     - Write another fraction that is equivalent to this, for example: \(\frac{4}{6}\)
  2. \(\frac{5}{6}\) of 24
     - Can you think of another fraction and amount that give the same answer? For example: \(\frac{1}{2}\) of 40
  3. \(\frac{3}{4}\) of 32
     - Write another fraction that is equivalent to this:
  4. \(\frac{4}{5}\) of 20
     - Write another fraction that is equivalent to this:
  5. \(\frac{3}{10}\) of 40
     - Can you think of another fraction and amount that give the same answer?
  6. \(\frac{5}{8}\) of 16
     - Can you think of three other fractions and amounts that give the same answer?
  7. \(\frac{2}{5}\) of 30
     - Write another fraction that is equivalent to this: Can you think of three other fractions and amounts that give the same answer?
  8. \(\frac{4}{8}\) of 40
     - Write two other fractions that are equivalent to this: Can you think of three other fractions and amounts that give the same answer?
2B Improper fractions

**Discover**

- Draw a line to match the improper fraction with the equivalent mixed number.

![Diagram showing matching of improper fractions to mixed numbers]

**Explore**

Follow these steps for each of the statements:

- Change the improper fractions into mixed numbers.
- Find the equivalent fractions to the fraction part.
- Write a number sentence to show what you think.

Is each statement true or false?

For example:

- \(\frac{8}{5}\) is less than \(\frac{18}{10}\)
  - This is true because \(\frac{8}{5} = 1 \frac{3}{5}\), \(\frac{18}{10}\) is 1\(\frac{8}{10}\) or 1\(\frac{4}{5}\), and \(1\frac{3}{5} < 1\frac{4}{5}\)

- \(\frac{7}{4}\) is greater than \(\frac{11}{8}\)
  - This is true/false because...

- \(\frac{14}{3}\) is less than \(\frac{18}{6}\)
  - This is true/false because...

- \(\frac{23}{5}\) is greater than \(\frac{46}{10}\)
  - This is true/false because...

- \(\frac{7}{2}\) is greater than \(\frac{26}{8}\)
  - This is true/false because...

- \(\frac{7}{5}\) is greater than \(\frac{18}{15}\)
  - This is true/false because...
Discover

- Work with a partner
- Use two sets of digit cards.
- Shuffle the digit cards together and place them face down on the table.
- Take it in turns to pick three cards.
- Make a 3-digit number with one decimal place.
- Put your number on the ladder, with the smallest number at the bottom and the largest at the top.
- Put your cards at the bottom of the pile.
- Continue to make new 3-digit numbers with one decimal place.
- When you make a number that can’t fit onto the ladder, you score 2 points.
- When you have a full ladder, count your points.
- The player with the lowest score wins. Play the game three times. Who is the winner?

- Write the decimal fractions you made as mixed fractions:


draw a ladder diagram

Explore

- Write these numbers on the number line:

\[ \frac{1}{2}, \frac{1}{4}, \frac{3}{5}, \frac{3}{5}, \frac{5}{10}, \frac{10}{10}, 1 \]

- Now write the equivalent decimal fractions under the number line.

- Use your number line to answer these problems.

1. Taima thinks that 0.3 is bigger than \( \frac{1}{2} \).
   - Is she correct? How do you know?
   - I think she is correct/not correct because

2. Mehtab thinks that \( \frac{4}{5} \) and 0.6 are equivalent.
   - Is he correct? How do you know?
   - I think Mehtab is correct/not correct because

3. Chan tried to order some numbers, smallest to largest. He wrote his numbers in this order:
   - 0.1, \( \frac{1}{2} \), 0.3, \( \frac{3}{5} \), 0.6.
   - Write the numbers in the correct order:

4. Naomi thinks that 0.7 of a dollar is more than \( \frac{3}{4} \) of a dollar.
   - Is she correct? How do you know?
   - I think she is correct/not correct because

5. Poppy can choose 0.8 of $10 or \( \frac{3}{4} \) of $10.
   - She wants to choose the largest amount.
   - She chooses 0.8 of $10.
   - Is this the correct decision? Why?
   - I agree/don’t agree with her decision because

1. \( \frac{1}{2} \), \( \frac{1}{4} \), \( \frac{3}{5} \), \( \frac{3}{5} \), \( \frac{5}{10} \), \( \frac{10}{10} \), 1
Discover

• Pick four digit cards and write them in the table.
• Make a number with two decimal places and write them in the table.
• Round your number to the nearest whole number.
• Then round your number to the nearest tenth.
• Write your answers in the table.
• Use the same cards to make a second number and write them in the table.
• Round your number to the nearest whole number.
• Then round your number to the nearest tenth.
• Write your answers in the table.

Explore

• Use four digit cards to make numbers with two decimal places.
• Choose for your numbers to be quantities of metres, kilograms or litres.
• Use a mixture of them all as you work through the activity.
• Put your numbers and amounts in the table.
• Complete the rest of the table by rounding, following the instructions.

An example is shown for you.

How many numbers can you make and round in the time allowed?

<table>
<thead>
<tr>
<th>Digits</th>
<th>1st number</th>
<th>Rounded to nearest whole number</th>
<th>2nd number</th>
<th>Rounded to nearest whole number</th>
<th>Rounded to nearest 10th</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>7, 6, 3, 1</td>
<td>36.17</td>
<td>36</td>
<td>36.2</td>
<td>71.36</td>
<td>71</td>
<td>71.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Numbers picked</th>
<th>Amount made</th>
<th>Round to the nearest 10th</th>
<th>Round to the nearest whole number</th>
</tr>
</thead>
<tbody>
<tr>
<td>6, 4, 9, 2</td>
<td>49.62 kg</td>
<td>49.6 kg</td>
<td>50 kg</td>
</tr>
</tbody>
</table>

Fractions, Decimals, Percentages, Ratio and Proportion
2E Percentages

Discover

- Imagine that 100% is $260.
- Write down other percentages of this amount.
  How many can you find in two minutes?
- Write your percentages in the diagram.
  Some examples are shown:
  \[
  10\% = 26 \\
  20\% = 52 \\
  5\% = 13 \\
  50\% = 130 \\
  100\% = 260
  \]
- Use your percentages to answer these problems.
  1. My friend bought a TV in a sale.
     Before the sale the price was $260.
     In the sale it was 15% cheaper.
     How much cheaper, in $, is the TV now?
  2. My friend bought a coat in the sale.
     Before the sale it cost $260.
     In the sale it was 55% cheaper.
     How much did it cost in the sale?
  3. Brian had $260.
     He spent 30% of his money on a laptop.
     How much did he spend?
     How much money did he have after he bought the laptop?

Explore

- Pick two digit cards and a zero.
  Make a 3-digit multiple of 10.
- Calculate as many percentages of that number as you can in two minutes.
- Write your percentages here:
  50% = $130
  20% = $52
  10% = $26
  5% = $13

- Now solve these problems:
  Show how you work them out.
  1. There are 100 loaves of bread in a shop. 40% are sliced.
     How many loaves are not sliced?
     How do you know?
  2. There were 680 people at a carnival.
     Half of the people were children.
     25% of the children were girls.
     The other children were boys.
     How many girls were at the carnival?
     How many boys were at the carnival?
  3. Sam wants to buy a pair of jeans.
     Before the sale the jeans cost $50.
     In the sale the jeans are reduced by 20%.
     How much do they cost now?
  4. There are 30 students in Trudy’s class.
     40% of the class are boys.
     How many boys are there in the class?
     How many girls are there in the class?
  5. Jeans cost $45 before a sale.
     In the sale there is a 20% discount.
     What is the new price of the jeans?
Discover

1. There are 10 counters.
   - 6 counters are yellow,
   - 4 counters are green.
   What proportion is yellow?
   Write this using another fraction:

2. A pizza is divided into 12 pieces.
   Sami eats three pieces.
   What proportion of the pizza is left?
   Draw a picture to show this:

3. A bowl contains 12 different kinds of fruit.
   There are 6 kiwi fruit, 4 mangos and 2 bananas.
   What proportion of the fruit are:
   - bananas?
   - kiwi?
   - mangos?
   Write this using another fraction:

4. A pie is made with bananas and oranges.
   There is a total of 6 kg of fruit in the pie.
   The proportion of bananas is \(\frac{2}{3}\).
   How many kilograms of oranges are there?

5. There are 28 students in a class.
   16 of the students are girls.
   What proportion are boys?
   Write your answer in two ways.

Explore

1. Aran has a collection of toy animals.
   - \(\frac{1}{2}\) are lions,
   - \(\frac{3}{10}\) are monkeys and
   - \(\frac{1}{5}\) are giraffes.
   Calculate possible numbers of each animal.
   For example: There are 20 animals in total.
   There are 10 lions, 6 monkeys and 4 giraffes.
   Work out another possibility.

2. India has a bowl of fruit.
   - \(\frac{1}{4}\) are apples,
   - \(\frac{1}{3}\) are papayas,
   - \(\frac{1}{6}\) are mangos and the other fruit are bananas.
   Calculate possible numbers of each fruit.
   For example: There are 24 fruit in total.
   There are 6 apples, 8 papayas, 4 mangos and 6 bananas.
   Work out another possibility.

3. Cian has a collection of coins.
   - \(\frac{1}{3}\) are cents,
   - \(\frac{1}{6}\) are 10c coins and the other coins are 25c coins.
   Calculate possible numbers of each coin.
   For example: Cian has 30 coins in total.
   There are 10 cent coins, 5 10c coins and 15 25c coins.
   Work out another possibility.
These are the ingredients needed for a fruit salad. It serves 4 people.

2 apples
3 peaches
4 bananas
5 kiwi fruit
1 litre orange juice

• Rewrite the ingredients needed to serve 8 people:

• Now rewrite the ingredients needed to serve 2 people:

• Use what you know to write the ingredients needed to serve 10 people:

The ratio of apples to peaches is 2:3.

What is the ratio of:
1. Apples to bananas?
2. Peaches to kiwi fruit?
3. Apples to kiwi fruit?
4. Peaches to bananas?
5. All of the fruit used?

1. Hope has 8 bars of chocolate. \( \frac{3}{4} \) are dark chocolate. The other bars are white chocolate.
   What is the ratio of dark to white chocolate?
   • Draw a picture to show this.
   • Write the ratio beside your picture.

2. Grace has 20 hair braids. \( \frac{3}{4} \) of the hair braid beads are red. The other hair braid beads are blue.
   What is the ratio of red to blue hair braid beads?
   • Draw a picture to show this.
   • Write the ratio beside your picture.

3. Shafi has 15 animals on his farm. \( \frac{2}{5} \) of the animals are chicken. The other animals are sheep.
   What is the ratio of chicken to sheep?
   • Draw a picture to show this.
   • Write the ratio beside your picture.

4. Dom has 24 counters. \( \frac{1}{3} \) of the counters are blue, \( \frac{1}{2} \) are red. The other counters are yellow.
   What is the ratio of blue, red and yellow counters?
   • Draw a picture to show this.
   • Write the ratio beside your picture.

Here’s a challenge!
Fractions, Decimals, Percentages, Ratio and Proportion
**Connect**

How quickly can you complete this table of equivalences? Time yourself!

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal fraction</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{6}{10}$</td>
<td>0.6</td>
<td>60%</td>
</tr>
<tr>
<td>$\frac{9}{10}$</td>
<td>0.9</td>
<td>90%</td>
</tr>
<tr>
<td>$\frac{3}{5}$</td>
<td>0.6</td>
<td>60%</td>
</tr>
<tr>
<td>$\frac{1}{2}$</td>
<td>0.5</td>
<td>50%</td>
</tr>
</tbody>
</table>

- Share your answers with your group. Do you all agree?
- Work as a group to complete this table of equivalences:

**Review**

- Work with a partner.
- What do you now know about fractions, decimal fractions, percentages, proportion and ratio?
- Write your information around the mind map.
- Give examples to support your information. Some examples are shown.

- The bottom number of a fraction is the denominator.
- A percentage is out of 100.

- Fractions
  - Decimal fractions
  - Percentages
- Ratio
- Proportion

<table>
<thead>
<tr>
<th>Fraction</th>
<th>Decimal fraction</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{4}{5}$</td>
<td>0.8</td>
<td>80%</td>
</tr>
<tr>
<td>$\frac{1}{5}$</td>
<td>0.2</td>
<td>20%</td>
</tr>
<tr>
<td>$\frac{3}{5}$</td>
<td>0.6</td>
<td>60%</td>
</tr>
<tr>
<td>$\frac{2}{5}$</td>
<td>0.4</td>
<td>40%</td>
</tr>
</tbody>
</table>

- Fractions, decimals, percentages, ratio and proportion