Sorting Fractions of ...

Overview

This sorting activity forms a bridge between the concept of fractions of single shapes and fractions of a number. It uses familiar quantities such as 'half an hour = 30 minutes' to link the process of dividing numbers and finding a fraction of them.

It is designed for pairs or small groups to encourage discussion and sharing knowledge, but can be done individually if necessary.

Skills and Knowledge

- Linking simple fractions and familiar quantities
- Calculating fractions such as ½ ; ¼ ; ¾
- Linking minutes and fractions of an hour

Preparation and Materials

Photocopy: Activity Sheet 1 (1 per small group) [Optional - see below]

Copy Activity Sheet 2 *Sorting Fractions of...*' onto stiff paper or card, cut them into pieces and place in labelled envelopes (1 for each pair or small group of students).

Collect a small pile of pens, pencils, paper clips, identical coins or counters (enough to demonstrate halving a group of objects)

Optional (see below):
Cut also some blank pieces of paper or card roughly the same size as those in the sets (4 – 8 per pair or small group of students).

Follow up practice
Photocopy Practice Sheets 1 – 4 (1 per student)

Suggested Procedure

Note: These cards could be used as an open-ended sorting exercise or as a more structured activity. Hints for both methods are included below. How you use them depends on your preference and the ability of your student group.

Introducing the activity

Arrange students in pairs or small groups and give one envelope of *Sorting Fractions of..* to each group.

Explain:

- *You are not expected to know everything about these cards by yourself*
- *You are working together to share what you know*
- *This activity will help you learn more about fractions*

Ask learners to tip the contents of the envelope onto the table.

An open-ended approach

Ask learners to sort the cards into 4 groups that **they think** should go together.

Circulate:

- to observe how familiar these quantities are to the learners
- to encourage students to explain clearly why they have grouped the cards

This beginning could lead to the structured approach, as described below, or could take you on a different journey altogether, according to the students' choice of groupings, particularly if you insist on four groups only.

Arranging the cards into fraction groups – structured approach

Distribute Activity Sheet 1. (You could just write the fractions on the board and ask students to copy them on to a blank page.)

Ask students to:

- *Sort the cards into the four corners of the paper to go with the fraction shown.*

Extension for early finishers

If some pairs finish early, give them some of the blank cards and suggest that they create some new cards to go in each fraction group.

Discussing the ideas

The follow series of suggested questions is intended to assist you get the maximum from the activity. Their main aim is to clarify that finding a fraction of a number is the same as dividing.

These questions could be used:

- In a whole class discussion
- As questions to pairs or individuals
- By asking students to create the appropriate cards to go with their sets

½ of ... = ÷ 2

Pick up a card in the ½ set (50 cents, 30 mins or 6 months)
Ask:

- *How did you know to put this card here?*
- *For example, how could we explain that..*
  - *50 cents is ½ of a dollar?;*
    30 mins is ½ of an hour?

You want to establish that finding ½ of is the same as dividing by 2.

Possible prompts:

- *If you wanted to find ½ of this pile of things (... pens, paper clips, coins...) show me how you would do it*
  [you share or 'divide' them into two piles]
- *When you work it out is it like adding, multiplying ..... ?*
- *What would you get if you divided 100 by 2 ... or 60 by 2 ... or 12 by 2?*

Writing it in symbols

Ask:

- *How many different ways can you think of to write what we are doing?*

Indicate on the board several ways it can be expressed and emphasize they **mean the same thing**.

$\frac{1}{2}$ *of 100* $\qquad \frac{100}{2} \qquad$ *100 ÷ 2*

¼ of ... = ÷ 4

Repeat these type of questions for ¼ to establish that ¼ of something is the same as dividing it by 4.

Note – for students who find division by 4 difficult it may be easier to halve then halve again. Many of your students may do this instinctively rather than even think of division. It is an effective method, but it is useful to make them aware that they are, in effect, dividing by 4.

For example 'quarter of an hour'

$\frac{1}{4}$ *of 60* $\qquad \frac{60}{4} \qquad$ *60 ÷ 4*

Calculating more halves and quarters

Distribute some blank cards to each group.

Pick up the **one metre** measure in the first group of cards.

Explain:

- *There is no card with a tape measure like this in the ½ group.*

Ask:

- *If we were going to make one, how many centimetres should it show?*

Prompts:

- *How many centimetres in a metre?*
- *So how many centimetres in a ½ of 100 cm?*

[½ metre = 50 cm]

Get students to make a card with the tape showing 50 cms at half way and add it to their ½ group.

Repeat this for several cards in the ½ and ¼ groups, either working as a class and considering them one by one, or by asking by students in groups or pairs to free wheel and create their own new cards.

Some examples:

- *What about litre jug ½ filled?*
  - *How many millilitres would it be?*
  - *How many millilitres in one litre? .. so half is?*

- *What about litre jug ¼ filled?*
  - *How many millilitres would it be?*

[1/2 of 500 ml = 250 ml]

- *What about this ¼ time at the footy – how many minutes is that?*
  - *The whole game is?*

[100 mins for AFL]

  - *How many equal parts do you need for a quarter?*
  - *So ¼ is ... ?*

[25 mins for AFL]

  - *How many minutes would they have played by half time?*

Practice sheets 1 & 2 provide further examples of finding a half and a quarter of a number.

The activity *Doubling and Halving* also looks in the head methods for finding a quarter by halving then halving again and provides further practice for finding a half and a quarter of quantities.

Calculating ¾

Explain:

- *Let's look again at the football game*
- *We know a whole game is 100 minutes*
- *And we worked out 25 minutes was one quarter*

Ask:

- *How many minutes of play by ¾ time?*
- *How could you work it out?*

Some students may suggest adding ½ and ¼ (50 + 25 mins).

Either of these methods is helpful. Students should be encouraged to use whichever feels comfortable to them.

Others may realise that it is 3 lots of one quarter or 3 x ¼ (3 x 25 mins)

If you know some students will go on to higher levels of numeracy then it is worth emphasising the 3 x ¼ method with them and extending it to other fractions – see below.

Ask:

- *How many months is ¾ of a year?*
  - *We know ¼ is 3 months, so 3 of these ¼ s would be ..?*
    or
  - *We know ¼ is 3 months, and ½ is 6 months so ...?*

Continue with other possible ¾ amounts: 75 cms, 750 mls, 750 grams.

Broadening the discussion

An activity like this could take you in many different directions according to the group of students. For example, to be more inclusive you may want to discuss a range of sports.

Suggested questions:

- *What other sports do you like? eg Soccer, basketball, netball, rugby*
- *Do they have quarters? – How long are they?*
- *Do you hear any other fraction words in sport?*
- *What do you think they mean?*

To relate the fractions to common percentages ask:

- *What percentage goes with each group?*

Extending the mathematical concepts

For students who are likely to progress to higher numeracy levels it is probably a good time to emphasise the idea of division. But don't push too hard at this point, especially if they are not yet comfortable with the other fractions.

Suggested questions:

- *How many minutes in 1/3 of an hour?*
- *What about 2/3?*
- *How many cents would be one fifth of a dollar?*
- *What about 2/5 of a dollar?*

Extension Activity – One tenth cards

With students in pairs or small groups, give them some blank cards and ask them to:

- *Make your own set of cards for the fraction 1/10*
- *Use the other sets as your model.*

This extension should make it clear whether or not students have understood the ideas discussed.

It also lays valuable **foundation for decimals** and for shortcut percentage calculations.

For students who are receptive mention that 1/10 = .1 and 1/10 = 10%.

1. Ticket prices

Children pay half-price when they go to the Circus or the Movies. How much would they pay:

TO the Movies  Adults: $14 Children: ……	 *CIRCUS* *Adults $17* *Children pay: …….*

2. Celery is sold in half sticks. How much will half a stick of celery cost?

$3.00

3. How much for the cabbages?

 Cabbage $4.20	 Half a cabbage Price: ……..	 Quarter a cabbage Price: …….

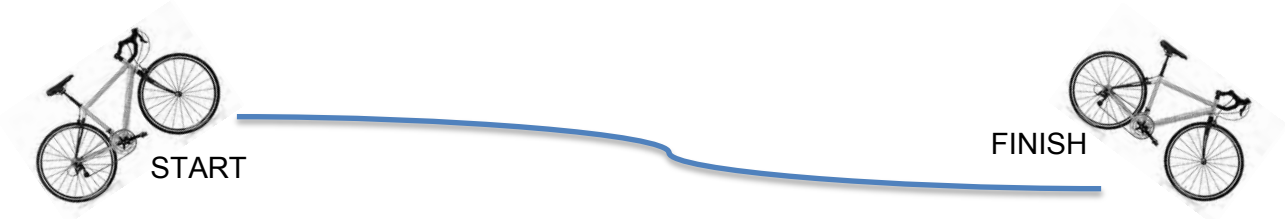
Fractions of: Sales

Practice Sheet 2

How much will these clothes be?

How much will these cost?

20 Km Bike Ride



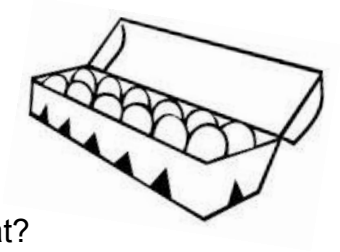
You need to organise some breaks on a 20 km bike ride. Show:

1. A break $^1/_4$ of the way.
   How many km? …….

2. A break $^1/_2$ of the way.
   How many km? …….

3. A break $^3/_4$ of the way.
   How many km? …….

EGGS!!!



How many eggs in $^1/_2$ a dozen?

How many eggs in $^1/_4$ a dozen?

A rich fruitcake uses $^3/_4$ of a dozen eggs. How many is that?

How many eggs in $1^1/_2$ dozen?

NUTS A kilogram is 1000 g.

¼ kilogram of nuts = …… grams.

¾ kilogram of nuts = …… grams.

Mark the position of the minute hand after it has moved:

1. Half an hour

How many minutes?

……. minutes

2. $^{1}/_{4}$ of an hour

How many minutes?

……. minutes

3. $^{3}/_{4}$ of an hour

How many minutes?

……. minutes

At the Footy

When the siren goes for the first break in an AFL match, how much of the game has been played?

When the siren goes for the second break, how much of the game has been played?

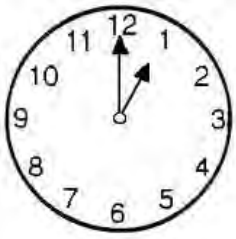
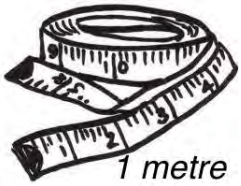
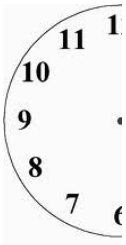
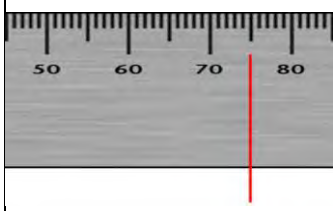
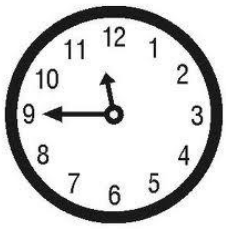
When the siren goes for the third break, how much of the game has been played?

1	$1/2$
$1/4$	$3/4$

Sorting Fractions of

Activity Sheet 2

Copy onto card and cut.

		100%	1 year
		6 months	30 MINUTES
			
9 MONTHS	3 months	15 minutes	75 cents
	750 grams		45 MINUTES