21. Money Magic

See how far you can get with this table. You can do the easy ones first if you want to.

a half of R1
a third of R1
a fourth of R1
a fifth of R1
a sixth of R1
a seventh of R1
an eighth of R1
a ninth of R1
a tenth of R1
a twentieth of R1
a fiftieth of R1
a hundredth of R1

Teacher Notes:

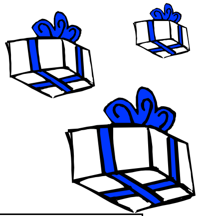
The table is an important activity. Fractions have different meanings according to how they are used. A fraction can be used to signify a *quantity* (e.g. half an apple), but it can also be used to signify a *proportion* (e.g. I always save a tenth of my income, no matter what my income is). But even if a fraction is used as a quantity, it can also be used in two ways: to signify part of a *single* object or to signify part of a *collection* of objects. For example, a third of a chocolate bar is a part of an object and it cannot be simplified further, but a third of a class of sixty learners can be taken further to obtain 20. If learners do not meet fractions used in this sense as well, they find this very difficult to handle later on.

This table exposes learners to this way of using fractions (as signifying part of a collection of loose objects).

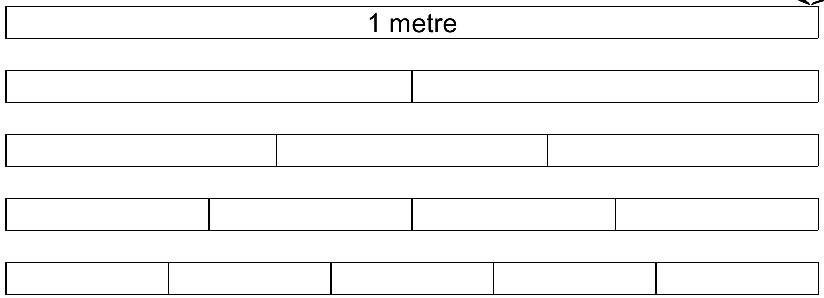
Note that not all these amounts can be given as whole numbers; accept approximate answers.

The table has another purpose too; the bigger the denominator, the smaller the fraction. Teachers should not point this out; learners should simply carry on with the table as far as they can. They may be asked whether they have noticed anything, and if they then reply that the number of cents is getting less, that is sufficient.

22. Ribbons (Assessment)



1) You have some 1 metre strips of ribbon, cut into different sized pieces:
Name each of the pieces



2) Which piece of ribbon is the longest?

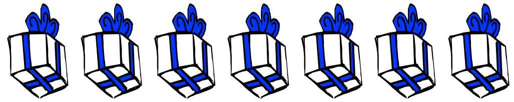
(a) $\frac{1}{2}$ metre or $\frac{1}{4}$ metre

(b) $\frac{1}{2}$ metre or $\frac{2}{4}$ metre

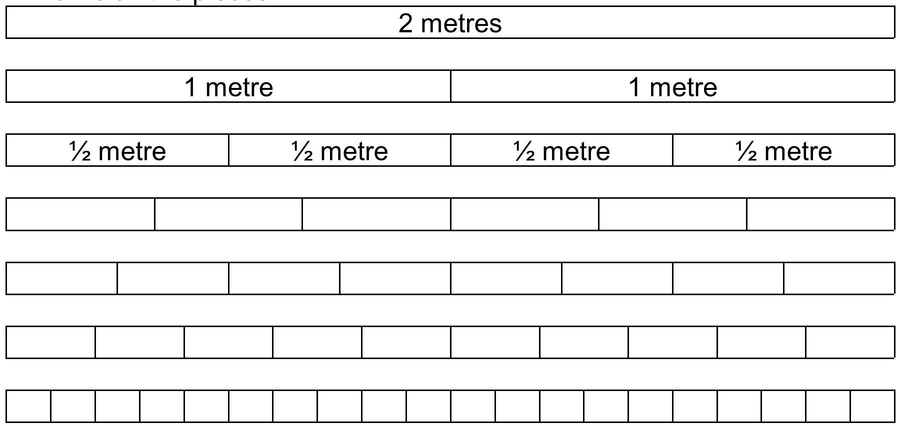
(c) $\frac{1}{3}$ metre or $\frac{1}{5}$ metre

(d) $\frac{1}{2}$ metre or $\frac{3}{5}$ metre

23. Ribbons Again (Assessment)



1) You have some 2 metre ribbon strips cut up into different sized pieces:
Name all the pieces.



2) Which piece is the longest?

(a) $\frac{1}{2}$ metre or $\frac{1}{10}$ metre

(b) $\frac{1}{5}$ metre or $\frac{5}{10}$ metre

(c) $1\frac{1}{5}$ metre or $\frac{6}{5}$ metre

(d) $\frac{5}{10}$ metre or $\frac{2}{4}$ metre

(e) 1 metre or $\frac{3}{3}$ metre

Teacher Notes:

The idea of these two activities is to assess any problems that the children might still have with comparing fractions.

The completion of the fraction wall can easily become automatic and therefore the fraction wall in RIBBONS AGAIN begins with 2 metres instead of one. This will force the children to *think* about what they are doing.

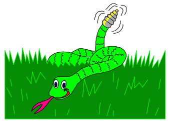
Problems should be diagnosed specifically. Comparison of unit and non-unit fractions are both very important and the teacher should ensure that all possible misconceptions in this respect are cleared up before continuing.

One of the specific things to watch out for is children that compare fractions only by looking at the denominators. They do this in two different ways:

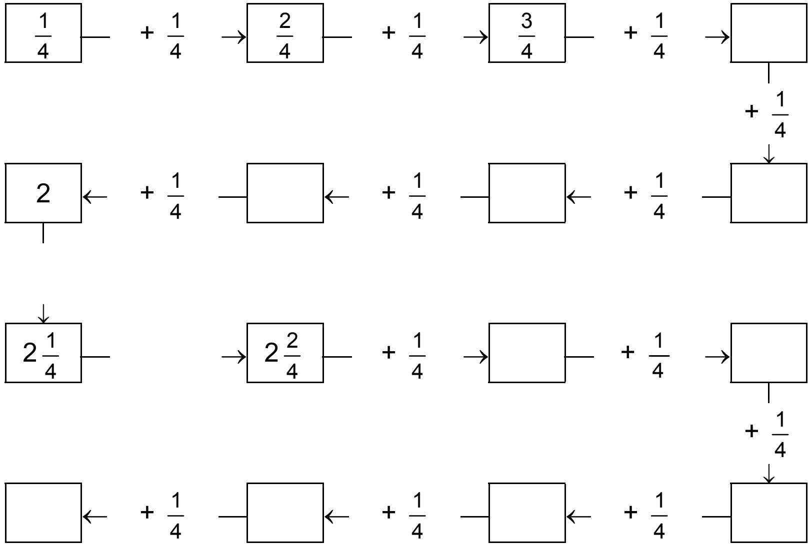
- by saying that $\frac{1}{5}$ is bigger than $\frac{1}{2}$, because 5 is bigger than 2, or
- by saying that $\frac{1}{2}$ is bigger than $\frac{3}{5}$ and not taking the numerator into account, because 'the bigger the denominator, the smaller the fraction'. (This can be caused be limited exposure to only unit fractions for too long)

This activity also serves as consolidation for the naming of fractions and the use of the fraction wall.

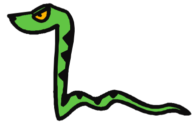
24. Rattlesnake



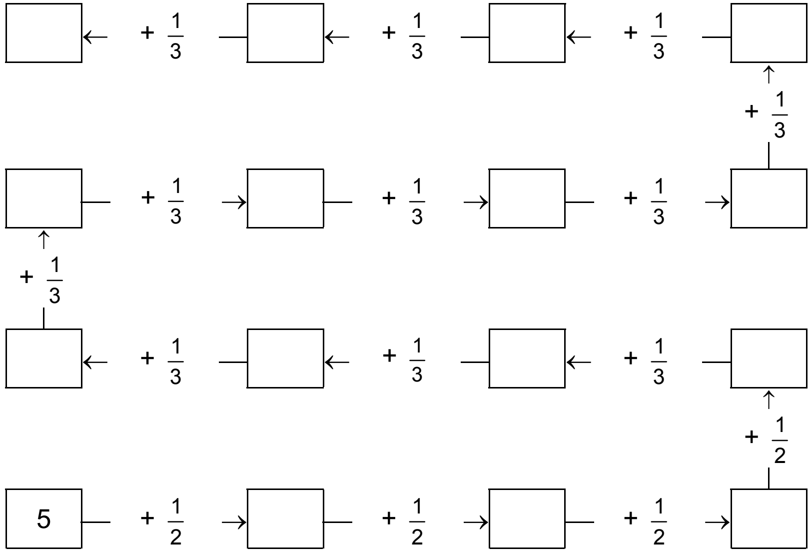
Complete this chain:



25. Egyptian Snake



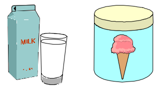
Complete this chain:



Teacher Notes (Worksheet 24 and 25):

These problems feature the first chains involving fractions and not only whole numbers. The purpose of the fraction chain is the same as for whole numbers - the exploration of a number range through *easy* movements so that learners can get a feeling for the numbers, also in relation to one another. It is not necessary to simplify the fractions at this stage - it is much better to leave $\frac{2}{4}$ as such and not to replace it with $\frac{1}{2}$.

26. Leftovers



Lisa wants to know what she has left over after a party. How much of each does she have?

3 big packets of chips, each $\frac{1}{2}$ full

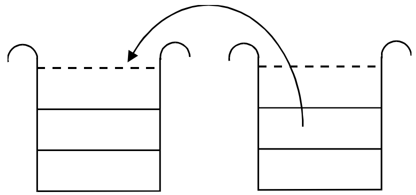
5 containers of ice-cream, each $\frac{1}{4}$ full

2 jugs of milk, each $\frac{2}{3}$ full

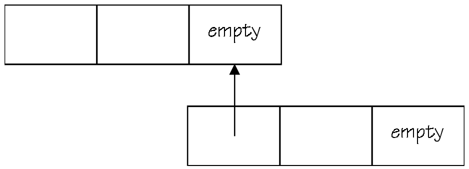
Teacher Notes:

This is another task concerning the addition of fractions. The two jugs of milk, $\frac{2}{3}$ full, may require more thinking than the other leftovers and learners should be encouraged to sketch the situation and/or consult a fraction wall to clarify the idea that moving across a whole is necessary.

One third of the second jug goes to fill up the first jug completely and then there is still one third left.



Or, more schematically:

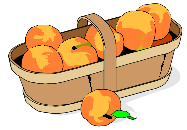


27. Reading

1. John's book has 88 pages. He says: "I have read more than half of the book. I am on page 41."
   Is it true? Explain.

2. Mary has 27 sweets. She gives 10 sweets to Peter. She says: "Peter, I have given you a third of my sweets."
   Is it true? Explain.

28. Peaches for the School



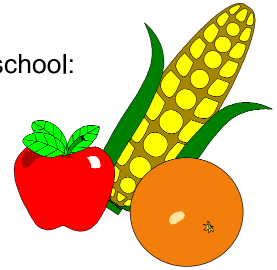
1. Sam promises to give a tenth of his peaches to the school. He has 90 trays of peaches. How many trays must he give to the school?

2. Simba gives $\frac{1}{3}$ of a box of chips to Dodi's class. If there are 90 packets in a box, how many packets of chips does the class get?

Teacher Notes (Worksheet 27 and 28):

The problems all use fractions to represent part of a collection of objects. It is possible that learners may first determine what the fraction is actually supposed to be, and then check the child's statement against it, e.g. half of 88 is 44, so Vusi's claim is not true. The other way round (finding what fraction 41 is of 88) would be exceptionally difficult.

29. Giving to the School (Assessment)



A rich farmer decides to donate the following to the local school:

- $\frac{1}{3}$ of all his boxes of apples
- $\frac{2}{3}$ of all his pockets of oranges
- $\frac{1}{4}$ of all his mealies

1. On a certain day, the farmer produces 48 boxes of apples, 75 pockets of oranges and 120 tons of mealies. How much of each of these foodstuffs does the school receive on this day?

2. The school writes a letter to the farmer asking him for more apples. They suggest that he considers donating $\frac{1}{5}$ instead of $\frac{1}{3}$ of his bags of apples. What should he reply?

Teacher Notes:

This activity is intended to diagnose problems with calculating a fraction of a collection of objects, in this case boxes of apples, pockets of oranges and tons of mealies. Learners may struggle to see that a fraction is not always part of one whole, but can be part of a collection. At this point, remediation is then necessary.

Teachers should be careful to assess exactly where the problem lies – for example, some learners might not have problems calculating $\frac{1}{3}$ or $\frac{1}{4}$ of a given amount, but might well have problems calculating $\frac{2}{3}$, because of the numerator being larger than one. Appropriate activities should be given to remediate the precise problem. Such activities would include finding fractions of any collection of objects, such as people, sweets or an amount of money.

The second question is a brief assessment of learners' ability to compare fractions. Learners may think that $\frac{1}{3}$ is less than $\frac{1}{5}$ (because of the size of the denominators). They should be challenged to examine the fractions wall and discuss this.

Other than serving as a diagnostic assessment, this activity also provides consolidation of the concept of fractions as part of a collection of objects, and of the comparison of the size of fractions.

30. Sharing Food

The children have brought different things to eat and drink.

1. They have three chocolate bars to share equally among four children. How much chocolate does each child get?

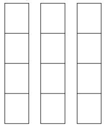
2. They have two litres of cooldrink to share equally among eight children. How much cooldrink must each child get?

3. They have nine oranges to share equally among four children. How much orange must each child get?

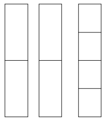
Teacher Notes:

Problems 1, 2 and 3 are all equal sharing problems. Problems 1 and 2 are very different from the previous equal sharing problems involving fractions - there are *fewer* objects to be shared than the number of children who must get shares, i.e. there is no whole part in the answer. Learners seem to find this situation more difficult than the situation where there are more objects than "sharers".

It is possible to share problem 1's three chocolate bars in different ways:



- Each of the 3 bars can be shared into 4 equal pieces, giving each child a piece from each bar. The answer is then $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ of a bar for each child.



- Two of the 3 bars can be cut into half, giving each child half a bar. The remaining bar can then be divided into 4 equal pieces, giving each child a total of $\frac{1}{2} + \frac{1}{4}$ of a bar.

The remaining problem that has to be resolved is whether $\frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ is the same as $\frac{1}{2} + \frac{1}{4}$ which is not too difficult.

Problem 2's answer should be given as a fraction and not as millilitres.

TO PREVIOUS

TO NEXT