11. Wire Animals and Cars

The children are making different animals and cars from wire.
A car needs $2\frac{1}{2}$ metres of wire. They can sell a car for R30.

An animal needs $1\frac{1}{2}$ metres of wire. They can sell an animal for R20.

1. The children have 20 metres of wire.

   (a) How many cars can they make from 20 metres of wire?

   (b) How many animals can they make from 20 metres of wire?

2. Look at the two answers you get for question 1. Look at the selling prices for the cars and the animals.
   Now help the children to decide what they must make, cars or animals, to earn the most money.

12. Wire per Metre

The wire to make animals and cars costs six cents per metre. Complete the following table:

Length in metres	Cost in cents	Length in metres	Cost in cents
1	6	10	
$1\frac{1}{2}$		20	
2	12	30	
$2\frac{1}{2}$		40	
3	18	50	
$3\frac{1}{2}$		60	
4		70	
$4\frac{1}{2}$		80	
5		90	
$5\frac{1}{2}$		100	

Now show the children how to use this table to find the cost of:

$7\frac{1}{2}$ metres of wire
$11\frac{1}{2}$ metres of wire
25 metres of wire
$61\frac{1}{2}$ metres of wire
85 metres of wire
$91\frac{1}{2}$ metres of wire

Teacher Notes: (Worksheet 11 and 12)

Problem 1 of Worksheet 10 is a grouping problem. Learners must determine the number of lengths of $2\frac{1}{2}$ metres each that can be cut from 20m as well as the number of lengths of $1\frac{1}{2}$ metres each that can be cut from 20m. Learners will probably add the lengths:

$2\frac{1}{2} + 2\frac{1}{2} \rightarrow 5 + 5 \rightarrow 10 + 10 \rightarrow 20$
$1 + 1 \rightarrow 2 + 2 \rightarrow 4 + 4 \rightarrow 8$
Answer: 8 cars

$1\frac{1}{2} + 1\frac{1}{2} \rightarrow 3 + 3 \rightarrow 6 + 6 \rightarrow 12 + 6 \rightarrow 18 + 1\frac{1}{2} \rightarrow 19\frac{1}{2}$
$1 + 1 \rightarrow 2 + 2 \rightarrow 4 + 4 \rightarrow 8 + 4 \rightarrow 12 + 1 \rightarrow 13$
Answer: 13 animals

Problem 2 of Worksheet 10 requires two calculations and a decision:

8 cars at R30 each bring in R240
13 animals at R20 each bring in R260.
It would therefore be better for the children to make animals.

The table in problem 1 of Worksheet 11 is a little more complex than those used before since it involves calculating the prices for half-metres as well. The cost of $1\frac{1}{2}$m is equal to the cost of a metre plus the cost of a half-metre, therefore 6 + 3.

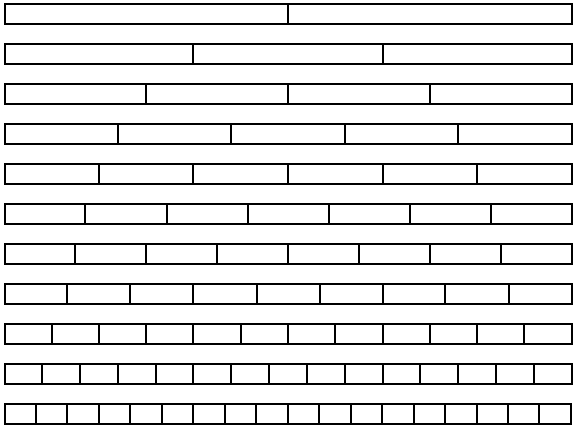
Once again, learners should be encouraged to use previous answers (the numbers already in the table) to obtain their answers.

13. Finding the Biggest Piece of Chocolate

A short way to write a fifth is $\frac{1}{5}$

A short way to write three fifths is $\frac{3}{5}$

Here are chocolate bars that have been cut:



Which would you rather have? Why?

$\frac{1}{3}$ or $\frac{2}{6}$?

$\frac{1}{2}$ or $\frac{3}{5}$?

$\frac{2}{4}$ or $\frac{3}{6}$?

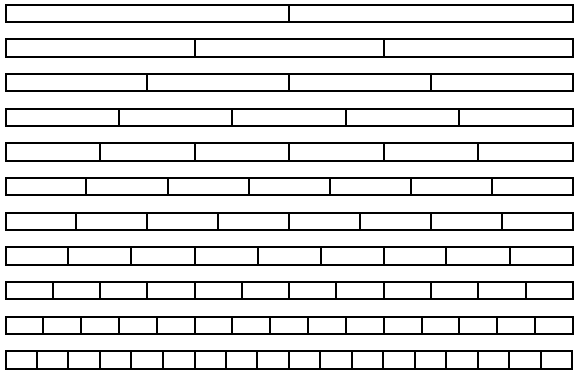
$\frac{5}{10}$ or $\frac{2}{5}$?

$\frac{1}{7}$ or $\frac{1}{8}$?

$\frac{7}{15}$ or $\frac{4}{8}$?

$\frac{9}{18}$ or $\frac{6}{10}$?

14. Chocolate Pieces of the Same Size



Here are some pieces of a chocolate bar:

$\frac{6}{18}$	$\frac{5}{10}$	$\frac{1}{3}$	$\frac{2}{4}$	$\frac{3}{6}$
$\frac{4}{12}$	$\frac{6}{12}$	$\frac{5}{15}$	$\frac{5}{6}$	$\frac{4}{5}$
$\frac{12}{18}$	$\frac{12}{15}$	$\frac{10}{12}$	$\frac{2}{3}$	$\frac{2}{6}$

1. First say which of the above pieces of chocolate do you think are the same size. Explain why you say so.

2. Then check on the drawing if you were right.

3. Now use the drawing to find all the other pieces of the same size that you may have missed on this list.

Teacher Notes (Worksheet 13 and 14):

These two worksheets involve the equivalence of fractions and comparisons between the sizes of different fractions. The problems should simply be solved by *direct* physical comparison of the fractions, e.g. with the use of the fraction wall. The main purpose of this task is simply to have learners handle and inspect fractions.
Learners may make very bad guesses for worksheet 13. It is quite in order if they prefer not to guess but rather use the fraction wall immediately.

The teacher should not talk about simplifying fractions, or point out the effect of the denominator on the size of the fraction.

It is not necessary to find all the possible answers to problem 3 of worksheet 13.

15. Grandmother's 80th Birthday Party

There are 24 people at Grandmother's 80th birthday party. Timothy counts all the people and writes down the following puzzles. Can you solve them?

1. Half of the people at the party are related to Grandmother. How many people are related to her?
2. A quarter of the people at the party are children. How many children are there?
3. Two thirds ($\frac{2}{3}$) of the people at the party are female. How many females are there?
4. Grandmother's eldest son is $\frac{3}{4}$ of her own age. How old is he?

Teacher Notes:

This activity uses fractions to represent part of a collection of objects, and not as part of one whole. Children may have a natural intuition for understanding this if the 'objects' are people.

Learners may 'just know' that half of 24 is 12, and may therefore only begin to use a conscious method when they have to use more difficult fractions such as a quarter, $\frac{2}{3}$ or $\frac{3}{4}$.

They may reason that a quarter of 24 is 6 because 24 ÷ 4 is 6 or because there are four sixes (or six fours) in 24.

Many of them may first calculate that $\frac{1}{3}$ of 24 is 8, before calculating $\frac{2}{3}$ of 24. They should be encouraged to discuss their methods.

16. How Many People?

1. Fair Mountain Primary school is arranging an outing. They can only arrange one bus, so only one fifth ($\frac{1}{5}$) of the people in each class can go on the outing.
   (a) There are 35 people in Robert's class. How many people from his class will go on the outing?
   (b) There are 55 people in Zolile's class. How many people from his class will go on the outing?
   (c) There are 49 people in Warren's class. How many people from his class will go on the outing?
2. The school finds another bus. Now $\frac{2}{5}$ of each class can go on the outing.
   (a) How many people from Robert's class will go on the outing?
   (b) How many people from Zolile's class will go on the outing?
   (c) How many people from Warren's class will go on the outing?
3. Do you think this is a fair way of choosing people to go on the outing? Why?

Teacher Notes:

This activity also addresses fractions as part of a collection of objects. Please see the teacher notes for 'Grandmother's 80th birthday party'.

As regards Question 3, the issue at hand is that alternative methods of choosing people for the outing, such as selecting a pre-decided number of children from each class (say 5), would be unfair, because learners in big classes might feel that they were losing out. If the same *fraction* (ratio) of each class can go, then the class size is taken into account and it is fairer.

17. Wire Ducks

1. The children make a small duck from $\frac{1}{3}$ of a metre of thin wire. They have $5\frac{1}{2}$ metres of thin wire. How many small ducks can they make?

2. In a needlework class, they use $\frac{1}{4}$ metre of ribbon to trim one apron. If each child is given $2\frac{1}{2}$ metres of ribbon, how many aprons can each child make?

18. Planting Stakes

David needs some stakes to put labels on his vegetable seed-beds.

He needs stakes that are $\frac{1}{5}$ metre long. He has $1\frac{1}{2}$ metres of rod. How many stakes of $\frac{1}{5}$ metre can he cut from this rod?

Teacher Notes (Worksheet 17 and 18):

These problems are almost identical to the second and third problems of Worksheet 9. This is intentional. These are grouping problems; they can formally be classified as division with a fraction, a problem type that normally only appears in much higher grades. In the old system learners found this difficult because they had not been given the opportunity to familiarise themselves with the problem type over a long period. This is a grouping problem where the size of the group is a fraction. It is essential that learners meet this problem type at this level in a context that makes sense to them. Learners will probably solve the problems as before. There are several possibilities:

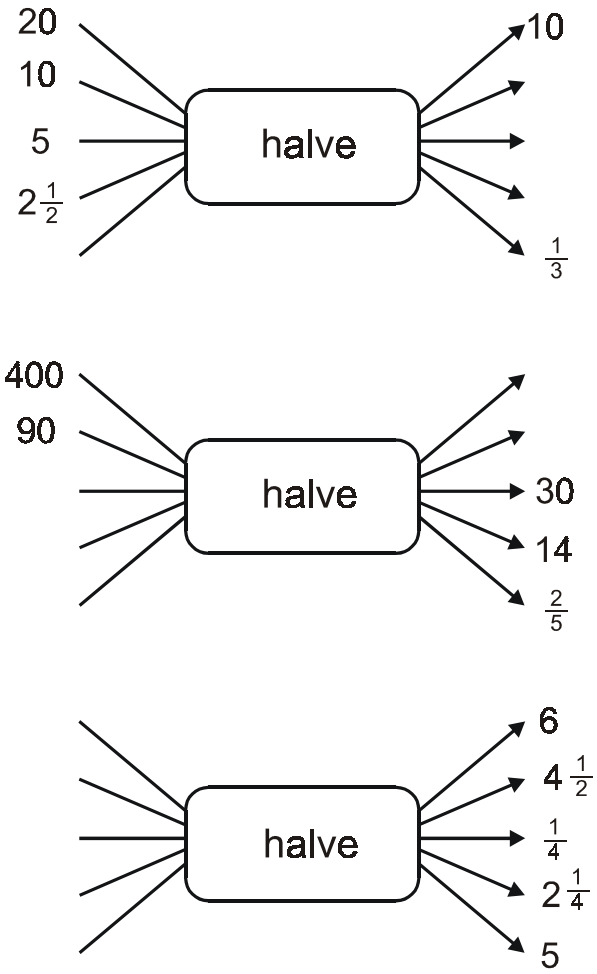
- 1 metre gives 3 ducks
  5 metres give 15 ducks
  $\frac{1}{2}$ metre is enough for another duck
  Answer: 16 ducks

- $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} \rightarrow 1 + 1 \rightarrow 2 + 2 \rightarrow 4 + 1 \rightarrow 5 + \frac{1}{3} \rightarrow 5\frac{1}{3}$
  1 1 1 3 3 6 6 12 3 1 16

- a drawing of $5\frac{1}{2}$ metres of wire, cutting each metre into three pieces.

19. Spiders

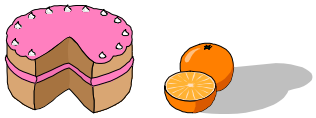
Complete these flow diagrams:



Teacher Notes:

The flow diagrams involve fractions. The last flow diagram will actually be completed by *doubling* the output numbers to obtain the input numbers, so it is slightly easier than it looks.

20. Birthday Cake



1. Lisa uses the juice of $1\frac{1}{2}$ oranges for a large birthday cake. She has 8 oranges. How many cakes can she bake?

2. Bingo and Mary have $1\frac{1}{2}$ bars of chocolate. They want to share the chocolate equally. How much chocolate must each child get?

Teacher Notes:

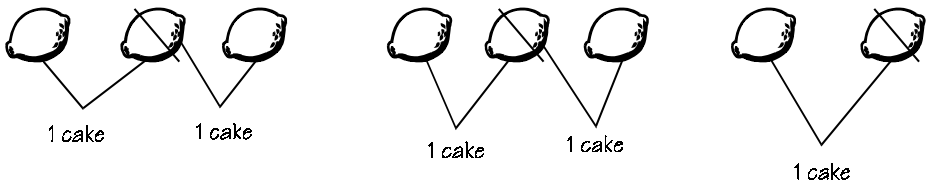
Problem 1 is a grouping problem that can easily be solved by addition and doubling:

$1\frac{1}{2} + 1\frac{1}{2} \rightarrow 3 + 3 \rightarrow 6 + 1\frac{1}{2} \rightarrow 7\frac{1}{2}$

2 4 1 5

Answer: 5 cakes \\

Learners may also prefer to draw the eight oranges and mark groups of $1\frac{1}{2}$:



Problem 2 requires that the whole bar is divided into two equal parts (halves) and that the half-a-bar is also divided into two equal parts. Each child therefore gets a half and a quarter. The teacher should accept this as an answer. Learners who want to go further may consult one of the fraction walls to find out what fraction is obtained if you add a half and a quarter.

BACK TO FRAC1(1)

FORWARD TO FRAC1(3)