## 21. Sewing (Assessment)

1. Mrs Nxu wants to buy material.
   The assistant at the shop says: 'there are 16 metres of material left on the roll'. Mrs Nxu says: 'I will only need $\frac{3}{4}$ of that, thank you'.
   How many metres of material does Mrs Nxu need?

2. After Mrs Nxu has cut out the pattern, she is left with a quarter of the material she has bought.
   (a) What fraction of the original 16 metres of material is that?
   (b) How many metres of material is that?

3. Mrs Nxu is making dolls. To make one doll she needs:

   $1\frac{1}{2}$ metres of material (for the body)
   $\frac{1}{4}$ metre of black wool (for the nose and eye brows)
   2 plastic eyes
   $\frac{3}{4}$ metre of floral material (for the dress)
   $\frac{1}{3}$ metre of ribbon (to trim the dress)
   3 buttons (to put on the dress)
   $\frac{3}{4}$ metre of sponge stuffing (to stuff the doll)
   thread

   If she wants to make three dolls for her three grandchildren, how much of each does she need?

4. She finds 4 metres of sponge stuffing in her cupboard. How many dolls can she make with this? Does she need to buy some more to make the three dolls for her grandchildren?

**Teacher Notes:**

The purpose of this activity is to diagnose any problems that children might have at this stage with multiplication of fractions (fraction of a whole number, fraction of a fraction and repeated addition of fractions).

It was not expected from the children to use the number sentences when they did the previous problems concerning multiplication, so we are not assessing that at all. This activity is merely to see if children understand the concept, without having to formalise yet.

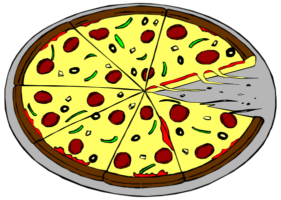
**What learners may do:**

- In question 2(a) the learners might work out how many metres $\frac{1}{4}$ of a $\frac{3}{4}$ is and then convert this back to a fraction. This is permissible.
- Draw the situation if they need to - encourage them to do this if necessary.

This can also serve as consolidation for working out fractions of wholes, working out fractions of fractions and repeated addition.

**22. The Pizzaman**

The Pizzaman sells pizza slices in various sizes - a Maxi, a Midi and a Mini.
A large pizza is cut in five pieces of equal size to get 5 Maxi slices. A large pizza is cut in ten equal pieces to get 10 Midi slices and a large pizza is cut in fifteen equal pieces to get 15 Mini slices.
Joey bought two Maxi's;
Jack bought four Midi's and
Jane bought six Mini's.
Donald bought one Maxi and one Midi.



1. Who bought the most pizza?

2. What fraction of a pizza did Donald buy altogether?

3. Did Jane buy more or less pizza than Donald?

4. The Pizzaman wants to sell a mixed portion to make it possible for customers to buy only a third of a pizza, but to make it up out of several different "flavours".
This means that a few of these small slices put together must be equal in size to a third of a pizza. What fraction of a whole pizza must these small slices be? Think of more than one possibility.

5. If you were the Pizzaman, in what sizes would you sell pizza slices? (The sizes must be fractions of a whole pizza.)

**Teacher Notes:**

Questions 4 and 5 are optional - fast workers can tackle them when they have finished the first three.

**What learners may do:**

- Joey: $\frac{1}{5}+\frac{1}{5}=\frac{2}{5}$
  Jack: $\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}=\frac{4}{10}=\frac{2}{5}$
  Jane: $\frac{1}{15}+\frac{1}{15}+\frac{1}{15}+\frac{1}{15}+\frac{1}{15}+\frac{1}{15}=\frac{6}{15}=\frac{2}{5}$
  Donald: $\frac{1}{5}+\frac{1}{10}=\frac{2}{10}+\frac{1}{10}=\frac{3}{10}$
- Question 2 and 3 can be answered just by referring back to question1
- In question 4 the learners should be allowed time to think up different possibilities.
  E.g: $5\times\frac{1}{15}$ or $\frac{1}{5}+\frac{2}{15}$ or $\frac{2}{10}+\frac{2}{15}$
- Question 5 is an open ended question, but the answers must be realistic. You cannot sell $\frac{1}{100}$ pieces of pizza.

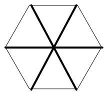
**What learners may learn:**

- Comparing fractions with different denominators.
- Fraction names.
- Revisiting adding of fractions with different denominators. (See Painting Job)
- Revisiting the iterative meaning of fractions.
- Equivalent fractions.
- Constructing a realistic idea of the relative size of fractions compared to a whole.

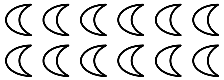
## 23. Different Shapes

1. (a) Shade $\frac{1}{3}$ of each of the following:

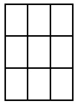
(i)



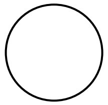
(ii)



(iii)

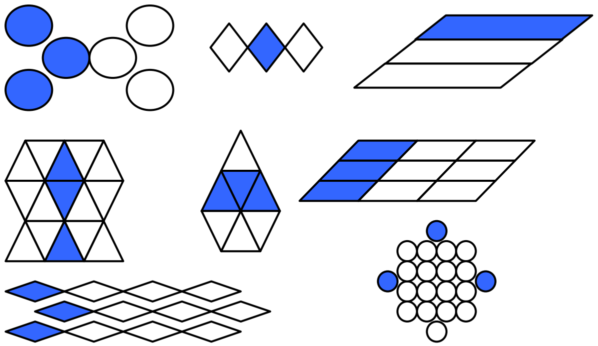


(iv)



(b) Give new names to the shaded regions where possible.

2. (a) What fraction is shaded in each figure?



(b) Do the shaded parts in each drawing represent the same fraction? Why?

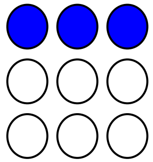
3.

(a) Shade $\frac{1}{5}$ of the diagram.

(b) Give another name for $\frac{1}{5}$.

(c) How many fifteenths are in $\frac{1}{5}$?

4. The shaded circles show the smarties eaten by Kate and Craig:



Kate's smarties Craig's smarties

(a) What fraction of her smarties did Kate eat?
(b) What fraction of his smarties did Craig eat?
(c) Who ate the most smarties?
(d) Is it possible that $\frac{1}{3}$ can be bigger than $\frac{2}{3}$? How?

**Teacher Notes:**

In this activity learners revisit the meaning of fractions using geometric shapes. They are expected to reflect on various different representations of fractions.

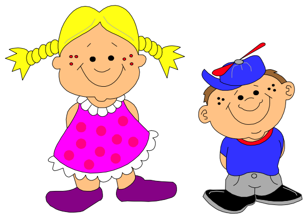
**What learners may do:**

- In Question 1 learners are required to shade a third using different pre-divided shapes and, in one case, a collection of objects. They may struggle with the idea that ONE third can represent SEVERAL different parts.
- In Question 2, the number of parts shaded in each case is three, but the fraction shaded is not always the same. Some learners may give the answer '3' by simply counting the number of the shaded portions. They should then discuss their answers to confront such problems.
- In the third question, learners should see that $\frac{1}{5}$ is the same as $\frac{3}{15}$.
- In the fourth question, learners are confronted with the fact that $\frac{1}{3}$ can be bigger than $\frac{2}{3}$. This may confuse them, but discussion should highlight the fact that the size of the whole must be taken into account when comparing the size of fractions

**What learners may learn:**

- Reflection on fractions which have the same name but look different in shape and/or the number of divisions.
- The importance of taking the whole into account when comparing fractions of different geometric shapes.
- Equivalent fractions
- The fraction as part of one whole, and as part of a collection of objects.

## 24. Diane and Her Brother James



1. Diane and her brother James visit a strawberry farm. They buy lots of strawberries. Because James is smaller, he eats only about half the strawberries that Diane eats.

   (a) If Diane eats 40 strawberries, how many does James eat?

   (b) If James eats 27 strawberries, how many does Diane eat?

2. Diane and James work in the garden. Diane is older and works faster than James, but they work the same number of hours. James gets paid $\frac{3}{4}$ of what Diane gets paid.

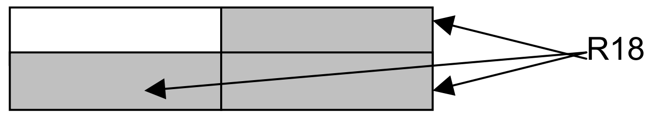
   If James gets R18, how much should Diane be paid?

### Teacher Notes:

**What learners may do:**

- Learners may make the mistake of calculating half of 27 and $\frac{3}{4}$ of R18.

  Through discussion it should become clear that the answers obtained are not reasonable, because Diane must eat MORE strawberries and be paid MORE than James.
- Learners may struggle with the concept of a fraction as a ratio. In this case, the teacher should first give them a simpler problem in which the fraction is not explicitly stated, for example: For every strawberry James eats, Diane eats two. Refer to the activity ‘Gifts of Biltong’ in Phase 1 for an example of such a problem.
- Learners may ‘just know’ that Diane eats 54 strawberries because 27 is half of 54. By solving a problem intuitively, it does not mean that they know the how or the why of their solution process.
- However, the learners have to reflect on a more explicit method when solving the second problem.
- They may reason that R18 is three quarters, so one quarter is R18 $\div$ 3 = 6, and Diane gets four quarters: R6 x 4 = R24 OR R18 and another R6 gives R24.



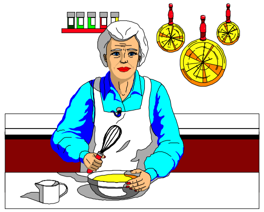

- Learners may think that it is unfair that James gets paid less than Diane. This should be discussed in the class.

**What learners may learn:**

- A different meaning of a fraction, namely the fraction as a ratio.

## 25. Aunt Daisy Bakes

| **COCONUT BISCUITS** | |
|---|---|
| 2 cups of flour | $\frac{3}{4}$ cups of coconut |
| $\frac{2}{5}$ cups butter | 1 teaspoon vanilla essence |
| $\frac{3}{4}$ cups of sugar | $\frac{1}{5}$ cup milk |
| 1 egg | $\frac{1}{4}$ teaspoon salt |
| 2 teaspoons baking powder | |
| This recipe will be enough for about 40 biscuits | |



1. Aunt Daisy wants to bake a lot of coconut biscuits. She has enough of all the ingredients, but she has only 3 cups of coconut. How many coconut biscuits can she bake?

2. How much of all the other ingredients is she going to use? Write the new recipe down.

**Teacher Notes:**

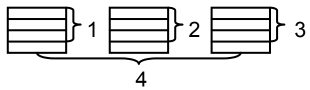
This problem is not so difficult as other problems on the same idea that we have already covered. (See Mrs. Daku's apple tarts and Making Candles). This is to give the children confidence. They must feel comfortable with the mathematics.

**What learners may do:**

- How many three quarters are there in 3. $\frac{3}{4}+\frac{3}{4}\rightarrow\frac{6}{4}\rightarrow 1\frac{2}{4}+\frac{3}{4}\rightarrow 1\frac{5}{4}\rightarrow$

  $2\frac{1}{4}+\frac{3}{4}\rightarrow 3$

  OR $\frac{3}{4}+\frac{3}{4}\rightarrow\frac{6}{4}\rightarrow 1\frac{2}{4}\rightarrow 1\frac{1}{2}+1\frac{1}{2}\rightarrow 3$
- The weaker ones may still draw:




- They now have to realize that you can make the recipe 4 times – 160 biscuits (40 × 4)

**What learners may learn:**

- Preparation for division
- Revisiting fraction OF a whole number

## 26. Recipes Go Metric

One cup is the same as 250 mℓ and one teaspoon is 5 mℓ.
Write all the measurements in millilitres.

| SPICY BISCUITS | |
|---|---|
| 4 cups of flour | $\frac{1}{4}$ teaspoon salt |
| 1 cup of sugar | $\frac{3}{4}$ teaspoon cream of tartar |
| $\frac{1}{4}$ cup butter | $\frac{1}{2}$ teaspoon ground cloves |
| $\frac{1}{4}$ cup soft fat | 1 teaspoon ground cinnamon |
| 1 egg | $\frac{2}{5}$ cup water |

| COCONUT BISCUITS | |
|---|---|
| 2 cups of flour | $\frac{3}{4}$ cups of coconut |
| $\frac{2}{5}$ cups butter | 1 teaspoon vanilla essence |
| $\frac{3}{4}$ cups of sugar | $\frac{1}{5}$ cup milk |
| 1 egg | $\frac{1}{4}$ teaspoon salt |
| 2 teaspoons baking powder | |

**Teacher Notes:**

This activity help with conversions between fractions and units. It is very important that children realise beforehand that 1 cup equals 250 mℓ and one teaspoon equals 5 mℓ.

**What learners may do:**

- Try to convert the egg to millilitres as well. It is important that they realise that this is not possible.
- Confuse the cups and the teaspoons. This can be sorted out in the groups.

**What learners may learn:**

- How to convert between fractions and units.

## 27. A Counting Calculator

Program your calculator to count in groups of 20, 30, 50, etc.

1. How many 50s are in (a) 600, (b) 2000, (c) 2010, (d) 2020?
2. How many 20s are in (a) 500, (b) 2020, (c) 2010?
3. What fraction is 20 of 500? Explain your thinking.
4. What fraction is 10 of 50? Explain your thinking.
5. What fraction is 10 of 20? Explain your thinking.
6. What fraction is 10 of 30? Explain your thinking.
7. What fraction is 5 of 15? Explain your thinking.
8. What fraction is 10 of 15? Explain your thinking.
9. What fraction is 2 of 7? Explain your thinking.

**Teacher Notes:**

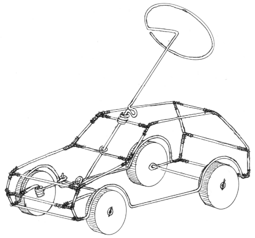
If the children do not know how to program the calculators, the teacher will have to help them. For simple calculators usually 50+= = = =…and for scientific calculators 50 + + = = = =
If they have calculators that cannot be programmed to do this, they can simply do questions 1 and 2 by adding.

This is a diagnostic activity that can actually be slipped in when it seems necessary to see whether the children are grasping the concepts and if they are forming stable concepts.

**What learners may do:**
- They can make silly calculator mistakes – Watch out for those! It is a good thing if somebody makes such an error to focus the class' attention on the fact that a calculator's answers must always be verified and checked mentally.

**What learners may learn:**
- Fractions of collections
- Calculator skills

## 28. Wire Toys



Piet bought a piece of wire to make wire toys. He used $\frac{1}{3}$ of the piece of wire to make a small car. Then he used $\frac{1}{6}$ of the piece of wire to make a trailer.

He then used $\frac{1}{4}$ of the piece of wire to make a bicycle.

To find out what fraction of the whole piece of wire he used, you have to add $\frac{1}{3}$ and $\frac{1}{6}$ and $\frac{1}{4}$.

1. What do you have to do before you can add these fractions?
2. Explain exactly how you are going to add the three fractions.

## Teacher Notes

This is a consolidation problem of the sequence of adding fractions.
In this problem they are explicitly asked to verbalise the procedure. It is important to get the learners to talk about what they are doing.

If necessary, refer the learners to A Painting Job, Baking Biscuits, The Pizzaman or any other activity where the same concept was addressed.

**What learners may do:**

- They may find it difficult to express themselves, but is important to give them the opportunity to do so.

**What learners may learn:**

- How to describe their procedures.
- To get a chance to express their thinking in words

## 29. Adding Fractions (Assessment)

1. Add the following fractions together. If you are struggling, remember the Pirates' Pizza Parlours, or think of anything else that you need to cut into different sized pieces and add the pieces. Draw a picture to help you if you need to.

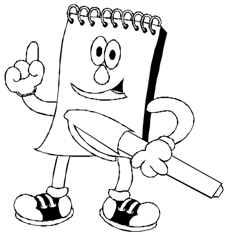
   (a) $\frac{1}{2}+\frac{1}{3}$

   (b) $\frac{1}{2}+\frac{1}{4}$

   (c) $\frac{1}{2}+\frac{3}{4}$

   (d) $\frac{3}{8}+\frac{1}{6}$

   (e) $\frac{3}{8}+\frac{5}{24}$



2. Subtract the following fractions:

   (a) $\frac{3}{8}-\frac{5}{24}$

   (b) $\frac{1}{5}-\frac{1}{7}$

   (c) $\frac{2}{3}-\frac{1}{4}$

3. If I need $1\frac{2}{5}$ m of material to make a shirt, and I have $\frac{4}{5}$ m, how much material do I still need to buy?

4. Thandi is changing tenths to hundredths and hundredths to tenths. Can you help her?

   (a) How many hundredths is $\frac{3}{10}$? How do you know?

   (b) How many hundredths is $\frac{5}{10}$? Can you think of another way to write this fraction?

   (c) How many tenths is $\frac{90}{100}$? How do you know?

   (d) How many hundredths is $\frac{2}{5}$? How do you know?

**Teacher Notes:**

This activity can be used to diagnose problems with equivalence and with addition and subtraction of fractions. The exact problem needs to be diagnosed, for example:

- learners may not see the need for finding equivalent fractions before adding or subtracting fractions
- others may see the need, but may not be able to find the correct equivalent fractions
- some may be able to add fractions, but not subtract them
- some may have problems only in the case of fractions where the denominators are not 1.

Problems such as 'Pirates' Pizza Parlour' and "new Pirates' Pizza Parlour' can be given (in a variety of contexts) in order to remediate problems with these concepts.

**What learners may do:**

- Draw or imagine pre-sliced pizzas (or other objects) in order to help them add and subtract the fractions (drawing may be tedious in Question 3, and learners may then be forced to reason in other ways)
- Find common denominators which are not the lowest common denominator but are still correct
- Solve the last question by saying that $\frac{2}{5}$ is $\frac{4}{10}$ (because there are two tenths in each fifth) which is $\frac{40}{100}$ (because there are ten hundredths in each tenth)

  OR $\frac{2}{5}$ is $\frac{40}{100}$ (because there are twenty hundredths in each fifth)

**What learners may learn:**

- Consolidation of choice of appropriate common denominators
- Consolidation of addition and subtraction of fractions with different denominators, without a context
- Addition and subtraction of fractions of which the denominator of one is a multiple of the denominator of the other (Note: These examples are not given first as this may lead to learners making 'rules' and then applying these inappropriately).
- Finding equivalent fractions between tenths and hundredths, as an important foundation for decimal fractions.

**TO PREVIOUS**