**Multiplicative Reasoning**

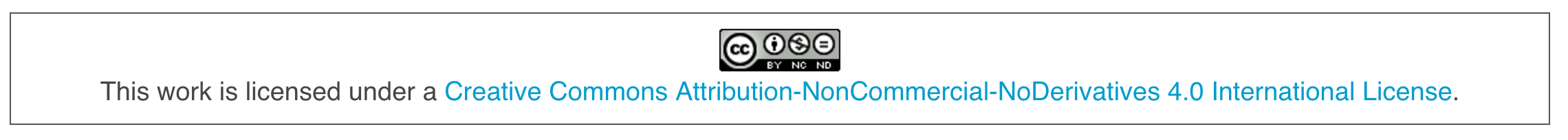
**in**

**Foundation Phase (MR–FP)**

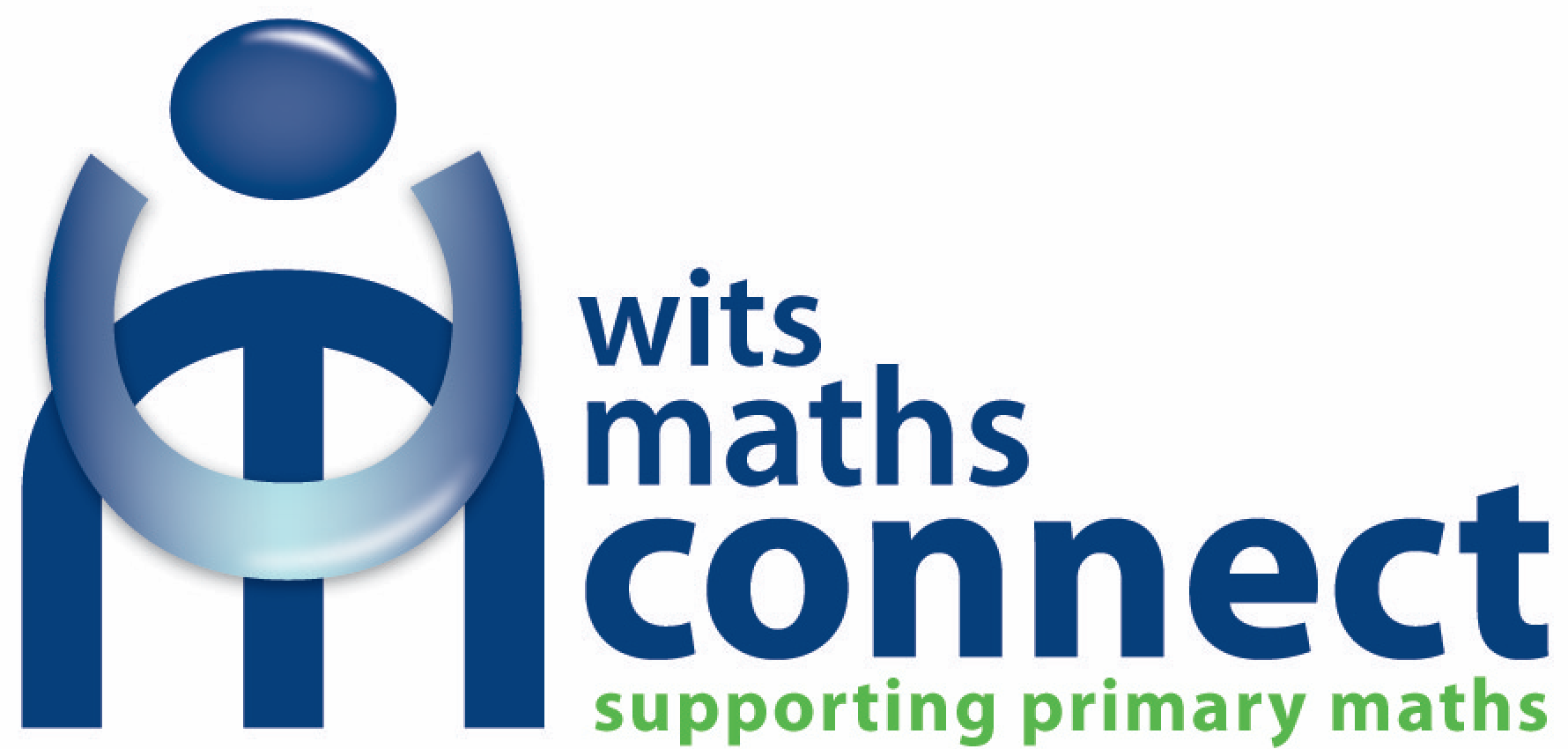
**Teacher Resource Pack**

**Grade 3**

**Mike Askew**

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You may not alter it or sell it.

****

**Overview of problems in the lessons**

|  |
| --- |
| **CAPS G3 Expectations** |
| **For calculating** Multiply any number by 2, 3, 4, 5, 10 to a total of 100  Divide numbers up to 100 by 2, 3, 4, 5, 10 |
| **For multiplication and division word problems**  Solve word problems and explain own solution to problems with products up to 100 |
| **Lesson 1: Arrays of objects - multiplication** |
| **Q1:** Samir puts blueberry cupcakes in rows on a tray. Each row has **5** blueberry cupcakes.  Samir puts out **4** rows. How many blueberry cupcakes does Samir put out?  **Q2:** Samir puts chocolate cupcakes in rows on a tray. Samir puts out **5** rows.  Each row has **4** chocolate cupcakes. How many cupcakes does Samir put out on the tray?  **Q3:** Corin puts out rows of chairs. Each row has **4** chairs. Corin puts out **5** rows.  How many chairs does Corin put out? |
| **Lesson 2: Arrays of objects - division** |
| **Q1:** Corin puts out **30** chairs in rows. He puts **5** chairs in each row.  How many rows of chairs does Corin put out?  **Q2:** Nomonde lays out **36** bricks in rows. She lays **4** bricks in each row.  How many rows of bricks does Nomonde put out?  **Q3:** Russell packs out **40** counters into **10** rows equally  How many counters does Russell pack into each row? |
| **Lesson 3: Equal groups of objects – multiplication** |
| **Q1:** Children are playing games in teams. There are **9** players in each team.  How many children in **3** teams altogether?  **Q2:** Constance is packing bags of mangoes. She packs **9** bags of mangoes  There are **3** mangoes in each bag. How many mangoes does Constance pack?  **Q3:** Mother gives **10** children some sweets. She gives each child **5** sweets.  How many sweets does mother give out? |
| **Lesson 4: Equal groups of objects – division** |
| **Q1:** Hamsa is packing bananas into bags. She puts **5** bananas into each bag.  How many bags does Hamsa need to pack **45** bananas?  **Q2:** Buyelwa makes pots. He must stick **3** legs to each pot.  Buyelwa has **27** legs. How many pots can Buyelwa make?  **Q3**: Thulelah has baked **48** cupcakes. She has **8** boxes. She puts the same number of cupcakes in each box.  How many cupcakes does Thulelah put in each box? |

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**Multiplicative Reasoning in Foundation Phase (MR–FP)**

***Introduction***

This booklet arises out of the Wits-Maths Connect (WMC) Project.

It contains everything you need to help you:

* Diagnose your learners’ understanding of multiplication and division and the relationship between them
* Lesson plans and pupil materials for four lessons that will help to improve your learners’ understanding.

The materials are based on research and development, and have been shown to help improve foundation phase learners’ skills in and understandings of multiplication and division.

You are free to copy the tests and worksheets for use with your learners.

You are also free to share the materials here with other teachers as long as you acknowledge where the materials come from.

**Diagnostic assessment**

On pages 8–14 there is a ***diagnostic test*** for you to copy and use with your learners.

The test has been organized around key types of multiplication and division problems that:

* are typical of the problems included in CAPS
* research shows learners need to be able to solve to develop a good understanding of multiplication and division.

Use the test to diagnose your learners’ understanding as follows:

* Make copies of the test. Give the test to your learners to write before you start teaching the lessons.
* When learners are writing the test, read each question out loud, twice, to the class and then give them time to work on the problem before moving on to the next question.
* Mark the test. Instead of just marking whether or not your learners get each question right or not, we suggest scoring as:

1. Question not attempted

1 Question attempted but the wrong operation used (for example, adding the numbers in the question, rather than multiplying them)

2 Correct operation was used, but incorrect answer (for example, multiplying 3 x 5 but getting 14 as the answer)

3 Correct operation and correct answer

* Look at the numbers of 1’s, 2’s and 3’s scored – this will give you a sense of your learners’ strengths and weaknesses of. It will also help you plan what to focus on in the lessons.
* Teach the four lessons – we suggest teaching one lesson each week across four weeks.
* A few days after you have taught all four lessons, set the test to your learners again.

We hope and expect that you will see an improvement in their understanding!

**Lesson Structure**

Each lesson is built around four parts.

1. ***Practicing oral skip counting***

Being fluent in skip counting helps learners to count in groups.

1. ***Talking about and describing arrays***

Working with arrays so that learners can develop the language of ‘groups of’ and find totals by counting in groups rather than counting in ones.

1. ***Solving a linked set of problems***

Finding the solutions to three problems that have been carefully designed helps learners learn to use the key representations and to work efficiently.

1. ***Identifying the links between the problems.***

After the problems have been solved, discuss with learners what is the same and what is different about the problems and help them to develop the vocabulary to describe and identify different problem types.

**Lesson Resources**

Each lesson plan provides the following resources:

1. ***Arrays***

Along with this booklet are copies of arrays for you to put up on the board and talk about to encourage the language of ‘groups of’. You can download further copies of these arrays from [here](https://www.wits.ac.za/wits-maths-connect/wits-maths-connect-primary/multiplicative-reasoning/foundation-phase/)

1. ***Photocopies of the three problems***

Each problem is provided in a form to copy (and enlarge) to put up on the board (or you can write it up).

1. ***Lesson plan***

Guidance on how to teach the lesson: what to look out for in the learners’ solutions to each problem, how to help them work more efficiently, what to draw their attention to.

1. ***Practice problems***

A photocopiable sheet of more problems for learners to consolidate what they have done in the lesson, either to work on in the lesson or to give as homework.

**Lesson Principles**

Three principles underpin the design of each lesson.

1. ***Learners need to be encouraged to think in terms of ‘groups of’.***

Central to understanding multiplication and division is a move from counting single objects (one pebble, two pebbles, three pebbles, and so on) to counting groups of objects (one bag of five pebbles, two bags of five pebbles, that’s ten pebbles altogether, three bags of five pebbles, that’s 15 pebbles altogether, and so on).

Counting dots arranged in rectangular arrays is a good way to encourage learners to talk about ‘groups of’ and move away from counting in ones. You can draw arrays of dots on the board, or photocopy and enlarge the arrays provided at the end of this booklet.

Working with an array of, say, three rows of five dots encourage learners to describe this in different ways using the language of early multiplication:

*There are fifteen dots altogether*

*There are three groups of five dots, that’s fifteen altogether*

*There are five groups of three dots, that’s fifteen altogether*

*There are five dots in each row and three rows, that’s fifteen altogether*

*There are three dots in each column and five columns, that’s fifteen altogether*

*Fifteen can be put into three groups of five*

*Fifteen can be put into five groups of three.*

1. ***Learners need to be able to identify different problem types and have the language to describe these***.

Seeing problems as examples of particular types means **not** treating each problem from scratch – encourage learners to talk about how a problem is similar to one they have seen before. To help with this, each lesson contains two or three linked problems. Once learners have worked on each of the problems separately, talk about how the problems are similar in terms of the underlying mathematics. This helps learners to see multiplication and division problems as linked.

Four types of problems are worked on in the lessons:

*Array problems: Multiplication*

*Array problems: Division*

*Equal groups of objects: Multiplication*

*Equal groups of objects: Division*

1. ***Learners need to work with key representations to help them be more efficient.***

Working with a small number of key representations helps learners use what they know more effectively.

Two types of representations are worked on in the lessons:

*Arrays*

*T-tables*

**MR Assessment Grade 3**

**First name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Surname: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

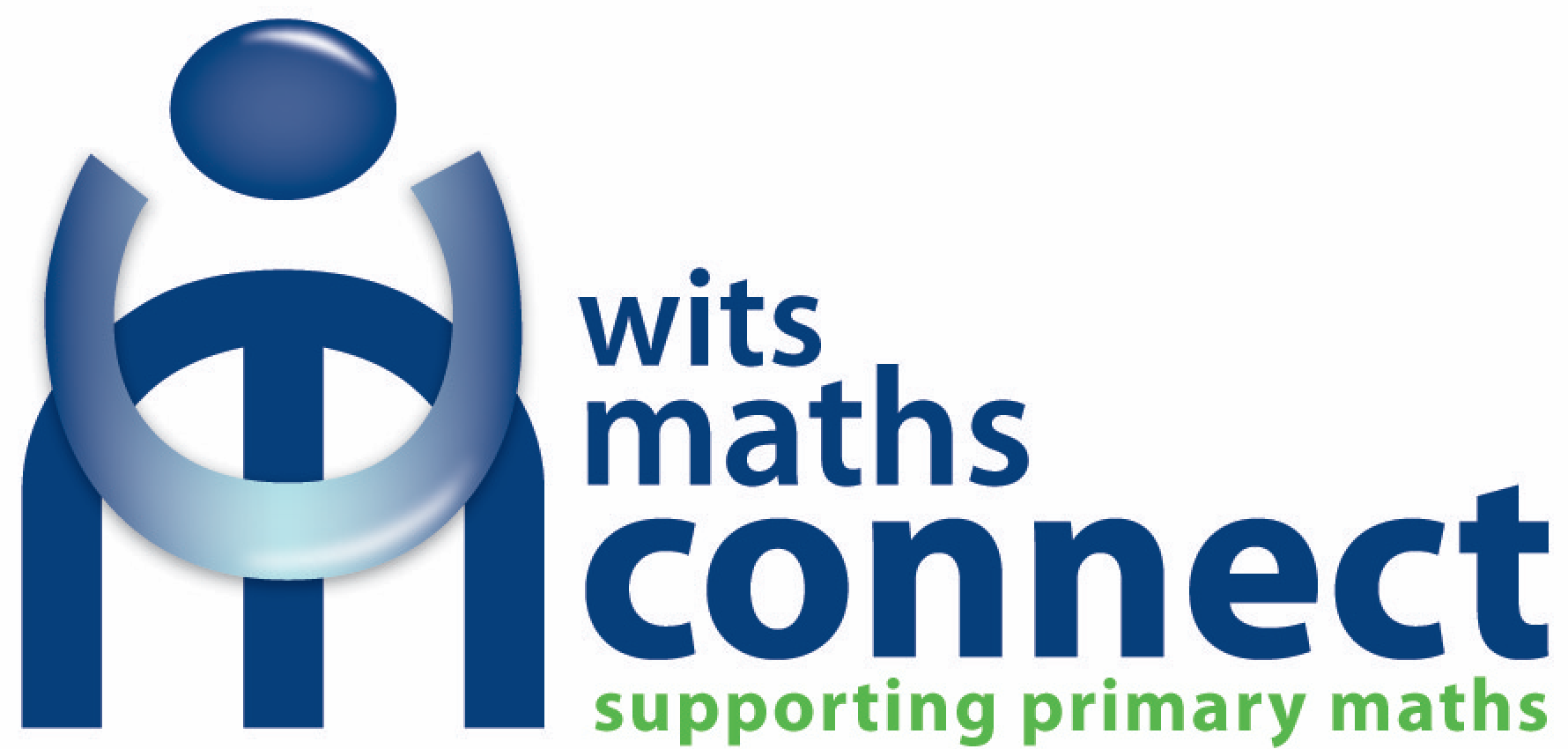
**Boy or girl: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Your date of birth: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Day/month/year**

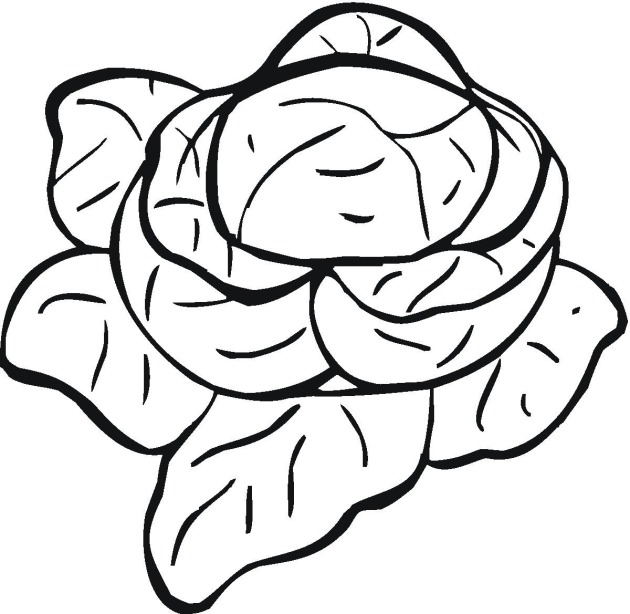
|  |
| --- |
| **Instructions**   * **Show all your working in this booklet.** * **Do not rub anything out.** * **If you make a mistake, put a line through it.** |

|  |
| --- |
| **Teacher to complete:** |
| **School: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
| **Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

****

|  |  |
| --- | --- |
| **1**.  On Thursday Lerato picked 17 apples.  On Friday Lerato picked 33 apples.  How many apples did Lerato pick altogether? |  |
| Lerato picked \_\_\_\_\_\_ apples altogether**.** | |

|  |
| --- |
| **2**.  Look at this pot.  There are 3 legs on one pot.  How many legs are on 9 pots? |
| There are \_\_\_\_ legs on 9 pots. |

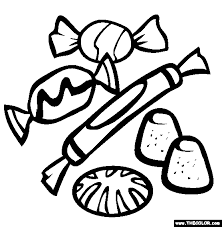
**3**.

Sam plants 4 rows of cabbages.

She plants 6 cabbages in each row.

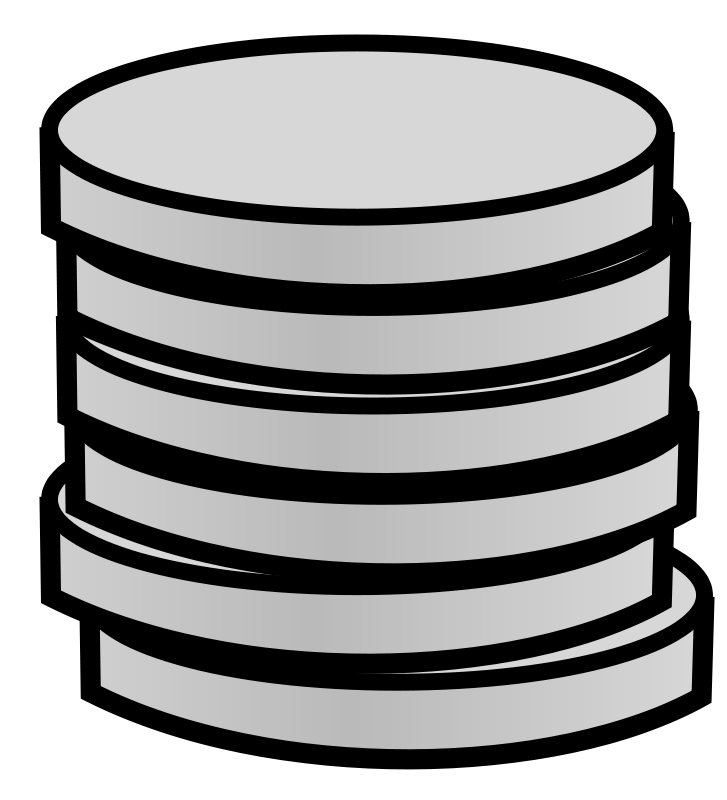
How many cabbages does Sam plant?

|  |
| --- |
| Sam plants \_\_\_\_\_\_\_\_\_\_ cabbages. |

**4**.

Four friends share 40 sweets.  
They each get the same number of sweets  
How many sweets do they each get?

|  |
| --- |
| They each get \_\_\_\_ sweets. |

**5**.

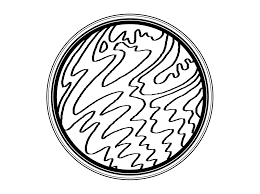
Busi packs out 5 rows of counters.

Each row has the same number of counters.

Busi packs out 40 counters altogether.

How many counters are in each row?

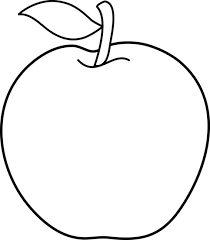
|  |
| --- |
| There are \_\_\_\_ counters in each row. |

**6**.

Thami had 25 marbles in his pocket.

He lost some on the way home and was left with 18 marbles.   
How many marbles did he lose?

|  |
| --- |
| Thami lost \_\_\_\_\_ marbles. |

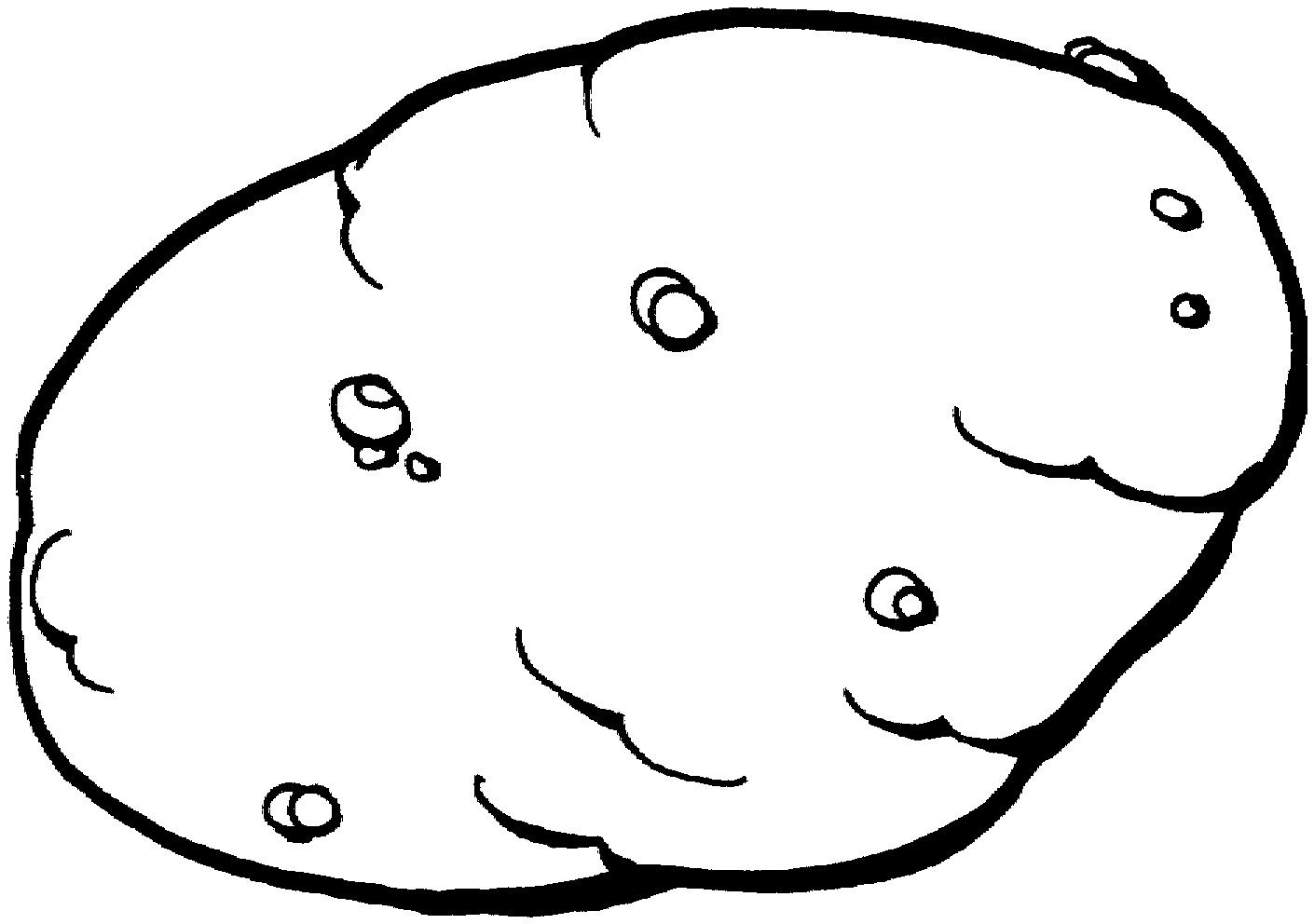
**7**.

Mongezi has 3 bags of apples.

There are 8 apples in each bag.

How many apples does Mongezi have?

|  |
| --- |
| Mongezi has \_\_\_\_\_\_\_\_\_\_ apples. |

**8**.

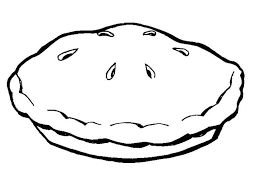
Sonny plants rows of potatoes.

Each row has 4 potatoes.

Sonny plants 48 potatoes altogether.

How many rows does Sonny plant?

|  |
| --- |
| Sonny plants \_\_\_\_ rows. |

**9**.

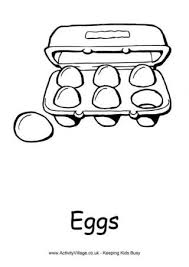
Lawan puts pies in rows on a tray.

Each row has 8 pies.

He puts out 5 rows.

How many pies does Lawan put out on the tray?

|  |
| --- |
| Lawan puts out \_\_\_\_\_ pies. |

**10**.

Hamsa is taking 42 eggs to the shop.

She puts the eggs into egg boxes.

Each box can hold 6 eggs.

How many boxes does Hamsa need?

|  |
| --- |
| Hamsa needs \_\_\_\_ boxes. |

**11.**

33 + 17 =

**12.**

25 – 18 =

**13.**

3 x 9 =

**14.**

48 ÷ 4 =

**Lesson 1**

**Lesson 1, problem 1: Blueberry cupcakes**

Samir puts blueberry cupcakes in rows on a tray.

Each row has 5 cupcakes.

Samir puts out 4 rows.

How many cupcakes does Samir put out?

**LESSON 1 Aims:** Introducing arrays

|  |
| --- |
| **Oral skip counting Approx. 5 mins** |
| Count on in 5s – 5, 10, 15 …  Repeat starting at 20 and then 35.  Count on in 4s – 4, 8, 12 …  Repeat starting at 24 and then 32.  Play with this in different ways. For example:  Take it in turns for the teacher and learners to count, saying alternate numbers in the sequence.  Split the class in two – each half takes it in turns to say the next number. |
| **Finding totals in arrays Approx. 10 mins** |
| Put a 4 x 5 array (that is 4 rows of 5 dots) on the board.  Ask learners to agree in pairs how many dots they can see.  Agree with the class that there are 20 dots.  Talk about three methods for finding the total:  Count all the dots  Count 4 groups of 5  Count 5 groups of 4.  For the counting in groups methods, circle these groups on the array and record, for example, ‘4 groups of 5 = 20’. If any learner uses the terms: ‘times’ or ‘multiply’ or ‘groups of’ or ‘each’ or ‘row’ or ‘column’ record that as well.  (*Leave these arrays on the board.)*  Repeat this for a 5 x 4 array (that is 5 rows of 4 dots – this is the same as the first array, but rotated through 90 degrees)  Talk about what is the same and what is different for 4 x 5 and 5 x 4 arrays. |
| **Problem 1 Approx. 10 mins** |
| Act out and involve children as much as possible to set the problem context.  Samir is a baker, he bakes cupcakes. These are set out on trays. On a small tray, there are 5 cupcakes in each row, and 4 rows. Can anyone come and draw this on the board? How many cupcakes are on the tray altogether?    Look out for learners who have solved the problem by drawing an array, or who saw that the arrays on the board gave the answer. Select 2 or 3 of these learners to share their solutions with the class.  If necessary draw their solutions on the board for them – both to save time and for accurate arrays  Leave their solutions on the board as you turn to problem 2. |

**Lesson 1, problem 2: Chocolate cupcakes**

Samir puts chocolate cupcakes in rows on a tray. Samir puts out 5 rows.

Each row has 4 chocolate cupcakes.

How many cupcakes does Samir put out on the tray?

|  |
| --- |
| **Problem 2 Approx. 10 mins** |
| Samir also bakes chocolate cupcakes. Invite some children to the front to act out the story.  Set everyone off to solve the problem.  Look out for learners who:  Make a clear representation of an array  See the connection with the first problem  See the connection with the arrays that are on the board.  Choose 2 or 3 children to share their solution with the class.  Discuss efficient ways to find the total number of cupcakes. For example:  Is it better to count groups of 4 or groups of 5?  Can anyone see groups of 10?  How does setting out a clear array help?  **Discuss**  What is the same about the two problems?  How are the problems different?  If there is time talk about:   * What if … there were 6 cupcakes in each row? * How does this change the problem? * What if … these were not cupcakes. What else could Samir bake on a tray? Would that change the problem? |

**Lesson 1, problem 3: Rows of chairs**

Corin puts out rows of chairs. Each row has 4 chairs.

Corin puts out 5 rows.

How many chairs does Corin put out?

|  |
| --- |
| **Problem 3 Approx. 10 mins** |
| Set up the context that Corin is putting out rows of chairs. Invite some children to the front to act out the story, using real chairs.  Set everyone off to solve the problem.  Look out for learners who:  Make a clear representation of an array  See the connection with the first two problems  See the connection with the arrays that are on the board.  Choose 2 or 3 children to share their solution with the class.  Discuss efficient ways to find the total number of chairs. For example:  Is it better to count groups of 4 or groups of 5?  Can anyone see groups of 10?  How does setting out a clear array help?  **Discuss**  What is the same about the three problems?  How are the problems different?  Ask learners to work in pairs and to make up another story problem which is like these one of these problems. |
| **Practice or homework** |
| Give out the practice sheet, either for learners to do in class or for homework.  Tell them to look out for the problem that is not an array problem (the problem that does not have ‘equal groups’) |

**Grade 3 Problem practice 1**

1. Samir puts cherry cupcakes in rows on a tray.

Each row has 3 cherry cupcakes.

Samir puts out 5 rows. How many cherry cupcakes does Samir put out?

Samir puts out cherry cupcakes.

**2.** Corin is putting our chairs in rows.

He puts 4 chairs in each row.

He has puts out 4 rows.

How many chairs does Corin put out?

Corin puts out chairs.

**3.** Val is packing out counters.

She puts 6 counters in a row.

She makes 5 rows of counters.

How many counters does Val pack out?

Val packs out counters.

**4.** Viren is packing books into boxes.

He puts 5 books onto one box.

He puts 6 books onto another box.

How many books does Viren pack into the two boxes?

Viren packs books.

**5.** Herman is putting out rows of chairs.

He puts 4 chairs in each row.

There are 6 rows.

How many chairs will Herman use?

Herman will use chairs.

**Lesson 2**

**Lesson 2, problem 1: Chairs in rows**

Corin puts out 30 chairs in rows.

He puts 5 chairs in each row.

How many rows of chairs does Corin put out?

**LESSON 2 Aims:** Linking arrays to division

|  |
| --- |
| **Oral skip counting Approx. 5 mins** |
| Count on in 5s – 5, 10, 15 …  Count back in 5s starting at 60 and then 45.  Count on in 4s – 4, 8, 12 …  Count back in 4s starting at 40 and then 28.  Play with this in different ways. For example:  Take it in turns for the teacher and learners to count, so each says every other number in the sequence.  Split the class in two – each half takes it in turns to say the next number. |
| **Finding totals in arrays Approx. 10 mins** |
| Put a 3 x 5 array (that is 3 rows of 5 dots) on the board.  Ask learners to agree in pairs how many dots they can see.  Agree with the class that there are 15 dots.  Talk about three methods for finding the total:  Count all the dots  Count 3 groups of 5  Count 5 groups of 3.  Ask:  How many 3s in 15?  How many 5s in 15?  Can learners explain how the array helps them to answer these questions?  (*Leave the array on the board.)*  Repeat this for a 5 x 3 array (that is 5 rows of 3 dots – this is the same as the first array, but rotated through 90 degrees)  Talk about what is the same and what is different for 3 x 5 and 5 x 3 arrays. |
| **Problem 1 Approx. 10 mins** |
| Can anyone remember the problem about Corin and chairs from the last lesson.  Remind the learners that the problem then was:  *Corin puts out rows of chairs. Each row has 4 chairs. Corin puts out 5 rows.*  *How many chairs does Corin put out?*  Talk about what is the same and what is different between that problem and this new one:  Same: Putting out rows of chairs, knowing the number of chairs in each row.  Different: Last week, we were finding the total number of chairs, this week we know the total number of chairs and need to find the number of rows.  Help the learners find a solution by making a representation of an array where they draw rows of 5 and keep adding rows until they get to a total of 30.  Look out for learners who solve the problem by setting up an array, or who saw that the arrays on the board can help them to find the answer. Select 2 or 3 of these learners to share their solutions with the class.  If necessary draw their solutions on the board for them – both to save time and for accurate arrays  Leave their solutions on the board as you turn to problem 2. |

**Lesson 2, problem 2: Laying bricks**

Nomonde lays out 36 bricks in rows.

She lays 4 bricks in each row.

How many rows of bricks does Nomonde put out?

|  |
| --- |
| **Problem 2 Approx. 10 mins** |
| Nomonde is laying out rows of bricks. Invite some children to the front to act out the story.  Set everyone off to solve the problem.  Look out for learners who:  Make a clear representation of an array  Keep a running total of the bricks as they build up their array:  • • • •  4  • • • •  8  • • • •  12  and so on.  Choose 2 or 3 children to share their solution with the class.  Discuss efficient ways to find the total number of rows. For example:  Is it better to count in ones or in groups of 4 up to 36?  How does setting out a clear array help?  **Discuss**  What is the same about the two problems?  How are the problems different?  If there is time talk about:   * What if … there were 6 bricks in each row? * How does this change the problem? * What if … these were not bricks. What else could Nomonde set out in rows? Would that change the problem? |

**Lesson 2, problem 3: Packing out counters**

Russell packs out 40 counters into 10 rows equally.

How many counters does Russell pack into each row?

|  |
| --- |
| **Problem 3 Approx. 10 mins** |
| Set up the context that Russell is packing out rows of counters. Invite some children to the front to act out the story, using real counters.  Set everyone off to solve the problem.  Look out for learners who:  Make a clear representation of an array  See the connection with the first two problems  Choose 2 or 3 children to share their solution with the class.  Discuss efficient ways to find the total number of rows. For example:  Is it better to count groups of 10 or count in ones up to 40?  Can anyone see groups of 20?  How does setting out a clear array help?  **Discuss**  What is the same about the three problems?  All three problems are about putting things in rows.  All three problems involve putting things into **arrays.**  How are the problems different?  In the first two problems, we were told how many things there were in each row and needed to find the number of rows.  In the third problem, we knew the number of rows, but not how many things were in each row.  Ask learners to work in pairs and to make up another story problem which is like these one of these problems. |
| **Practice or homework** |
| Give out the practice sheet, either for learners to do in class or for homework.  Tell them to look out for the problem that is not an array problem. |

**Grade 3 Problem practice 2**

1. Russell packs out 30 counters into 10 rows equally.

How many counters does Russell pack into each row?

Russell puts counters in each row.

1. Sonny lays out 35 tiles in rows.

He lays 5 tiles in each row.

How many rows of tiles does Sonny put out?

Sonny puts out chairs.

**3.** Val is packing out counters.

She puts 6 counters in one row.

She puts 5 counters in another row.

How many counters does Val pack out?

Val packs out counters.

**4.** Paulos is planting cabbages in equal rows.

He plants 5 rows of cabbages.

He has 35 cabbages.

How many cabbages does Paulos plant in each row?

Paulos plants cabbages in each row.

**5.** Sameera is putting out rows of tiles.

She puts 4 tiles in each row.

She has 32 tiles.

How many rows will Sameera make?

Sameera will make rows.

**Lesson 3**

**Lesson 3, problem 1: Teams**

Children are playing games in teams.

There are 9 players in each team.

How many children in 3 teams altogether?

**LESSON 3 Aims:** Introducing equal groups

|  |
| --- |
| **Oral skip counting Approx. 5 mins** |
| Count on in 4s – 4, 8, 12 …  Repeat starting at 20 and then 12.  Count on in 3s – 3, 9, 12 …  Repeat starting at 18 and then 30.  Play with this in different ways. For example:  Take it in turns for the teacher and learners to count, so each says every other number in the sequence.  Split the class in two – each half takes it in turns to say the next number. |
| **Finding totals in arrays Approx. 10 mins** |
| Put a 3 x 6 array (that is 3 rows of 6 dots) on the board.  Ask learners to agree in pairs how many dots they can see.  Agree with the class that there are 18 dots.  Talk about three methods for finding the total:  Count all the dots  Count 3 groups of 6  Count 6 groups of 3.  For the counting in groups methods, circle these groups on the array and record, for example, ‘3 groups of 6 = 18. If any learner uses the terms: ‘times’ or ‘multiply’ or ‘groups of’ or ‘each’ or ‘row’ or ‘column’ record that as well.  (*Leave these arrays on the board.)*  Repeat this for a 6 x 3 array (that is 6 rows of 3 dots – this is the same as the first array, but rotated through 90 degrees)  Talk about what is the same and what is different for 3 x 6 and 6 x 3 arrays. |
| **Problem 1 Approx. 10 mins** |
| Act out and involve children as much as possible to set the problem context.  Get children to come to the front and make different sized ‘teams’. How many children in total in, say, 4 teams of 3? Five teams of 4?  Look out for learners who have solved the problem by drawing a 3 x 9 array, or who recorded their solutions systematically in a table, for example  Teams Players   1. 9 2. 18 3. 27   Select 2 or 3 of these learners to share their solutions with the class.  If necessary put their solutions on the board for them – both to save time saving and for accurate representations.  Leave their solutions on the board as you turn to problem 2. |

**Lesson 3, problem 2: Packing mangoes**

Constance is packing bags of mangoes.

She packs 9 bags of mangoes.

There are 3 mangoes in each bag.

How many mangoes does Constance pack?

|  |
| --- |
| **Problem 2 Approx. 10 mins** |
| Invite some children to the front to act out the story. Use counters or cubes to represent mangoes.  Set everyone off to solve the problem.  Look out for learners who:  Use a clear representation of an array to help find the answer  Set out a table to help find the answer:  See the connection with the first problem.  Bags Mangoes   1. 3 2. 6   3 9  and so on  Choose 2 or 3 children to share their solution with the class.  Discuss efficient ways to find the total number of mangoes. For example:  Is it better to count groups of 9 or groups of 3?  Can anyone see how counting in groups of 10 might help?  How does setting out a clear T-table (clue table) help?   |  |  | | --- | --- | | Bags | Mangoes | | 1 | 3 | | 2 | 6 | | 3 | 9 | | 4 | 12 | | 5 | 15 | | 6 | 18 | | 7 | 21 | | 8 | 24 | | 9 | 27 |   **Discuss**  What is the same about the two problems?  How are the problems different?  If there is time talk about:   * What if … there were 8 mangoes in each bag? * How does this change the problem? * What if … these were not mangoes. What else could Constance pack in bags? Would that change the problem? |

**Lesson 3, problem 3: Giving out sweets**

Mother gives 10 children some sweets.

She gives each child 5 sweets.

How many sweets does mother give out?

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| **Problem 3 Approx. 10 mins** |
| Set up the context that mother is giving out sweets. Invite some children to the front to act out the story, using counters or cubes to represent sweets.  Set everyone off to solve the problem.  Look out for learners who:  Use an array to help them find the answer  See the connection with the first two problems.  Choose 2 or 3 children to share their solution with the class.  Discuss efficient ways to find the total number of chairs. For example:  Is it better to count groups of 10 or groups of 5?  How does setting up a T-table help?   |  |  | | --- | --- | | Children | Sweets | | 1 | 5 | | 2 | 10 | | 3 | 15 | | 4 | 20 | | 5 | 25 | | 6 | 30 | | 7 | 35 | | 8 | 40 | | 9 | 45 | | 10 | 50 |   Look at ways of making the T-table shorter. For example:   |  |  | | --- | --- | | Children | Sweets | | 1 | 5 | | 2 | 10 | | 4 | 20 | | 8 | 40 | | 10 | 50 |   Or   |  |  | | --- | --- | | Children | Sweets | | 1 | 5 | | 5 | 25 | | 10 | 50 |   **Discuss**  What is the same about the three problems?  How are the problems different?  Ask learners to work in pairs and to make up another story problem which is like these one of these problems. |
| **Practice or homework** |
| Give out the practice sheet, either for learners to do in class or for homework.  Tell them to look out for the problem that is not an equal groups problem. |

**Grade 3 Problem practice 3**

1. Samir puts cherry cupcakes into bags.

Each bag has 4 cherry cupcakes.

Samir packs 6 bags. How many cherry cupcakes does Samir put into bags?

Samir puts cherry cupcakes into bags.

**2.** Helen is putting cups onto tables.

She puts 4 cups on each table.

She puts cups on 8 tables.

How many cups does Helen put out?

Helen puts out cups.

**3.** Manono is packing books into boxes.

She puts 6 books into each box.

She fills 8 boxes.

How many books does Manono pack?

Manono packs books.

**4.** Fatou is packing books into boxes.

She puts 6 books onto one box.

She puts 8 books onto another box.

How many books does Fatou pack into the two boxes?

Fatou packs books.

**5.** Blue class gets into teams.

There are 5 children in each team.

There are 8 teams.

How many children are in blue class?

There are children.

**Lesson 4**

**Lesson 4, problem 1: Packing bananas**

Hamsa is packing bananas into bags.

She puts 5 bananas into each bag.

How many bags does Hamsa need to pack 45 bananas?

**LESSON 4 Aims:** Linking grouping to division

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| **Oral skip counting Approx. 5 mins** |
| Count on in 4s – 4, 8, 12 …  Count back in 4s starting at 40 and then 28.  Count on in 3s – 3, 6, 9 …  Count back in 3s starting at 30 and then 21.  Play with this in different ways. For example:  Take it in turns for the teacher and learners to count, so each says every other number in the sequence.  Split the class in two – each half takes it in turns to say the next number. |
| **Finding totals in arrays Approx. 10 mins** |
| Put a 5 x 10 array (that is 5 rows of 10 dots) on the board.  Ask learners to agree in pairs how many dots they can see.  Agree with the class that there are 50 dots.  Talk about three methods for finding the total:  Count all the dots  Count 10 groups of 5  Count 5 groups of 10.  Ask: How many 10s in 50?  How many 5s in 50?  Repeat this for a 10 x 5 array (that is 10 rows of 5 dots – this is the same as the first array, but rotated through 90 degrees)  Talk about what is the same and what is different for 5 x 10 and 10 x 5 arrays. |
| **Problem 1 Approx. 10 mins** |
| Can anyone remember the problem about Constance and mangoes from the last lesson.  Remind the learners that the problem then was:  *Constance is packing bags of mangoes. She has 3 bags of mangoes*  *There are 9 mangoes in each bag. How many mangoes does Constance pack?*  Talk about what is the same and what is different between these two problems.  Same: Putting fruit into bags; knowing the number of pieces of fruit in each bag.  Different: Last week, we were finding the total number of pieces of fruit, this week we know the total number of pieces of fruit and need to find the number of bags.  Help the learners find a solution by making setting up a T-table and adding rows adding rows until they get to a total of 45.   |  |  | | --- | --- | | Bags | Bananas | | 1 | 5 | | 2 | 10 | | 3 | 15 | | 4 | 20 | | 5 | 25 | | 6 | 30 | | 7 | 35 | | 8 | 40 | | 9 | 45 | |

**Lesson 4, problem 2: Making pots**

Buyelwa makes pots.

He must stick 3 legs to each pot.

Buyelwa has 27 legs.

How many pots can Buyelwa make?

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| **Problem 2 Approx. 10 mins** |
| Buyelwa is making pots. Invite some children to the front to act out the story.  Set everyone off to solve the problem.  Look out for learners who:  Keep a running total of the legs as they build up their solution:  • • •   3  • • •   6  • • •  9  and so on.  Use a T-table to help:   |  |  | | --- | --- | | Pots | Legs | | 1 | 3 | | 2 | 6 | | 3 | 9 | | 4 | 12 | | 5 | 15 | | 6 | 18 | | 7 | 21 | | 8 | 24 | | 9 | 27 |   Choose 2 or 3 children to share their solution with the class.  Discuss efficient ways to find the total number of rows. For example:  Is it better to count in ones or in groups of 3 up to 27?  How does setting out a T-table help?  **Discuss**  What is the same about the two problems?  How are the problems different?  If there is time talk about:   * What if … there were 4 legs on each pot? * How does this change the problem? * What if … these were not legs and pots. What else could Buyelwa be making? Would that change the problem? |

**Lesson 4, problem 3: Packing cupcakes**

Thulelah has baked 48 cupcakes.

She has 8 boxes.

She puts the same number of cupcakes in each box.

How many cupcakes does Thulelah put in each box?

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| **Problem 3 Approx. 10 mins** |
| Set up the context that Thulelah is packing cupcakes into boxes. Invite some children to the front to act out the story, using real counters.  Set everyone off to solve the problem.  Look out for learners who:  Make a clear representation of their solution  See the connection with the first two problems  Choose 2 or 3 children to share their solution with the class.  Discuss efficient ways to find the total number of rows. For example:  Is it better to count groups of 8 or count in ones up to 48?  How does setting out a clear array or T-table help?  **Discuss**  What is the same about the three problems?  All three problems are about putting things in **equal groups**.  How are the problems different?  In the first two problems, we were told how many things there were in each group and needed to find the number of groups.  In the third problem, we knew the number of groups (boxes), but not how many things were in each group.  Ask learners to work in pairs and to make up another story problem which is like these one of these problems. |
| **Practice or homework** |
| Give out the practice sheet, either for learners to do in class or for homework.  Tell them to look out for the problem that is not an equal groups division problem. |

**Grade 3 Problem practice 4**

1. Jill packs 30 apples into 10 bags equally.

How many apples does Jill pack into each bag?

Jill puts apples in each bag.

1. Lucky puts 45 pencils into boxes.

He puts 5 pencils into each box.

How many boxes of pencils does Lucky fill?

Lucky fills boxes.

**3.** Venkat is packing potatoes into bags.

He puts 7 potatoes in one bag.

He puts 6 potatoes in another bag.

How many potatoes does Venkat pack?

Venkat packs potatoes.

**4.** There are 42 oranges in a bag.

Six friends are sharing the oranges equally.

How many oranges does each friend get?

Each friend gets oranges.

**5.** Rosie is putting muffins into boxes.

She puts 6 muffins in each box.

She has 36 muffins.

How many boxes will Rosie fill?

Rosie will fill boxes