Addition, Subtraction, Multiplication and Division

The aim of this overview is to support teachers using PlanIt Maths to show the most logical sequence to teach each area of maths. We also want to fully support teachers who use the **White Rose Maths** scheme of learning to make full use of the resources available within PlanIt Maths. Whenever possible, lesson packs have been matched to each of the small steps on the **White Rose Maths** scheme of learning.

Y6 Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value		Number: Addition, Subtraction, Multiplication and Division				Fractions				Geometry: Position and Direction	Consolidation
Spring	Number: Decimals		Number: Percentages		Number: Algebra		Measurement: Converting Units	Measurement: Perimeter, Area and Volume		Number: Ratio		Consolidation
Summer	Geometry: Properties of Shapes		Problem Solving			Statistics		Investigations				Consolidation

Teacher Note:

The White Rose small step **Mental calculations and estimation** appears in more than one sequence of lessons within this unit and is covered within two National Curriculum objectives in our 'perform mental calculations, including with mixed operations and large numbers' and 'use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy'.

Introduction

In Year 6 Addition, Subtraction, Multiplication and Division, children develop their ability to solve problems demanding efficient written and mental methods of calculation and use estimation to check answers to calculations. Children will build upon previous learning of addition and subtraction written methods and use long and short written methods for multiplication and division. Children will begin to use their knowledge of the order of operations to carry out calculations involving the four operations and identify common multiples, common factors and prime numbers.

Resources

In addition to your standard maths resources, you will need: a beanbag, sports equipment, bottle-top lids or large counters, packs of cards with the Jack, Queen and King cards taken

Assessment Statements

By the end of this unit...

...all children should be able to:

- multiply numbers by a one-digit number using long multiplication;
- solve reasoning questions using the formal method of long multiplication;
- divide numbers by a two-digit number using long division;
- solve one-step division problems, rounding the answer depending on the context;
- divide four-digit numbers by a two-digit number using short division without remainders;
- perform one-step mental calculations with increasingly large numbers;
- solve reasoning questions involving mental addition, subtraction, multiplication and division;
- add and subtract whole numbers using a formal written method;
- correctly use the order of operations to carry out calculations;
- explore the order of operations using brackets;
- find missing numbers using the inverse;
- select the correct operation/s to use and solve a problem, checking the answer using estimation;
- solve one-step problems and check their answer using estimation;
- round numbers to a specified degree of accuracy;
- use rounding to check answers to problems;
- sort one-step problems in a sorting diagram;
- solve two-step problems involving addition and subtraction.

...most children will be able to:

- multiply numbers by a two-digit number using long multiplication;
- divide using a formal written method and use rounding depending on the context;
- solve two-step division problems, rounding the answer depending on the context;
- divide four-digit numbers (with decimals) by a two-digit number using short division;
- practise mental calculations with increasingly large numbers using all four operations;
- perform mental calculations with mixed operations;
- perform two-step mental calculations with increasingly large numbers;
- add and subtract numbers, including decimals, using a formal written method;
- identify missing brackets within a calculation;
- solve two-step problems and check their answer using estimation;
- round a number taking into account the context;
- sort one and two-step problems in a Venn diagram;
- solve multi-step problems involving addition and subtraction.

...some children will be able to:

- solve missing digit problems involving long multiplication;
- divide using a formal written method and use rounding depending on the context in multi-step calculations;
- solve missing digit problems involving long division;
- create comparison sentences involving long division calculations;
- create their own word problems involving addition, subtraction, multiplication and division;
- solve multi-step problems and check their answer using estimation;
- sort and solve one, two and multi-step problems in a Venn diagram;
- solve complex multi-step problems.

Lesson Progression

Addition and Subtraction Multi-Step Problems (1): Pop-Up Shop

NC Statement: solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

White Rose Maths Small Step: Add and subtract whole numbers

Description: Children are introduced to RUCSAC as a method for working through contextual problems requiring them to add and subtract whole numbers. They work through RUCSAC one step at a time, led by the teacher, then decide which operations to use as a class for a range of word problems. Children learn to add and subtract whole numbers.

Addition and Subtraction Multi-Step Problems (2): Open the Box

NC Statement: solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

White Rose Maths Small Step: Add and subtract whole numbers

Description: Using RUSCAC, children are guided through multi-step problems, working out how many steps are required. They then complete differentiated multi-step problems independently. Children learn to add and subtract whole numbers.

Addition and Subtraction Multi-Step Problems (3): Multi-Step Problems Reasoning

NC Statement: solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

White Rose Maths Small Step: Add and subtract whole numbers

Description: As a class, children complete a series of multi-step reasoning problems with increasingly large numbers of steps required to solve them. They move on to complete problems in pairs, where they are required to explain if a given answer is correct through checking each step. Children learn to add and subtract whole numbers.

Long Multiplication (1): Tell a Joke

NC Statement: multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

White Rose Maths Small Step: Multiply up to a 4-digit by 1-digit number

Description: Children revise the long multiplication method to multiply a 4-digit number by a 1-digit number by identifying incorrect answers from children on the Lesson Presentation. Children then find the punchline to a joke by performing multiplications and using the answers to crack a code. Children learn to multiply up to a 4-digit by 1-digit number.

Long Multiplication (2): Multiplication Battle

NC Statement: multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

White Rose Maths Small Step: Multiply up to a 4-digit by 1-digit number

Description: Children are introduced to multiplying 3-digit numbers by 2-digit numbers using the formal written method. The method is modelled several times for children to follow and join in with before they move on to work in pairs to practise the method. Children learn to multiply up to a 4-digit by 2-digit number.

Long Multiplication (3): Multiplying Millipede

NC Statement: multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

White Rose Maths Small Step: Multiply up to a 4-digit by 1-digit number

Description: The teacher models how to multiply a 4-digit number by a 2-digit number and children practise this alongside them. Children then apply their long multiplication skills to complete a set of differentiated loop cards. Children learn to multiply up to a 4-digit by 2-digit number.

Long Multiplication (4): Long Multiplication Reasoning

NC Statement: multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication

White Rose Maths Small Step: Multiply up to a 4-digit by 1-digit number

Description: Children apply their knowledge of how to multiply using the formal method of long multiplication to a variety of reasoning and mastery style questions, both teacher-led and independently. Children learn to multiply up to a 4-digit by 2-digit number.

Long Division (1): Jungle Division

NC Statement: divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

White Rose Maths Small Step: Long division (1). Long division (2). Long division (3). Long division (4).

Description: Children are introduced to the formal written method of long division. They have the method modelled by the teacher. This lesson requires children to divide 3-digit numbers by 1-digit numbers as a class and individually, then challenges them to answer a reasoning question in the plenary. Children learn to use long division.

Long Division (2): Monster Maths

NC Statement: divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

White Rose Maths Small Step: Long division (1). Long division (2). Long division (3). Long division (4).

Description: Children begin to divide by 2-digit numbers using the formal written method of long division. They will find decimal remainders to 2 decimal places and are asked to explain their working in the plenary. Children learn to use long division.

Long Division (3): Tic-Tac-Toe Problem Solving

NC Statement: divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

White Rose Maths Small Step: Long division (1). Long division (2). Long division (3). Long division (4).

Description: This lesson asks children to continue practising long division, with the addition of contexts. They will apply the formal written method to a range of scenarios and decide when to round a remainder up or down as appropriate. Children learn to use long division.

Long Division (4): Long Division Reasoning

NC Statement: divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context

White Rose Maths Small Step: Long division (1). Long division (2). Long division (3). Long division (4).

Description: Children are taken step by step through a variety of reasoning and mastery level long division problems. They will complete an activity sheet, guided by the teacher, then move on to working in a pair. They will be shown how to take relevant information from a longer word problem and decide if they need to find a remainder, decimal remainder or round their answer. Children learn to use long division.

Short Division (1): Gone Fishing

NC Statement: divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context

White Rose Maths Small Step: Short division

Description: Children have short division modelled for them, dividing by single-digit numbers. They are presented with short division problems in context, led by the teacher, then practise their method through playing a fishing game. Children learn to use short division.

Short Division (2): Engines Ready

NC Statement: divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context

White Rose Maths Small Step: Short division

Description: Children have short division modelled for them, dividing 4-digit numbers by 2-digit numbers. They are presented with short division problems in context, led by the teacher. They will also decide whether to round remainders up or down depending on the context, then play a differentiated pairs game. Children learn to use short division.

Short Division (3): Inspector Clue

NC Statement: divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context

White Rose Maths Small Step: Short division

Description: Children are asked to search for clues in contextual division problems to help them decide whether their remainders need rounding up or down. They will be challenged to set their own division problems for a partner. Children learn to use short division.

Short Division (4): Short Division Reasoning

NC Statement: divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context

White Rose Maths Small Step: Short division

Description: Children are asked to solve a variety of reasoning and mastery level questions using short division. They will be taken through problems with a teacher to pick out the relevant information for each context, then complete differentiated word problems independently. Children learn to use short division.

Mental Calculations (1): Number Puzzle

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children are asked to choose the most appropriate strategies for mentally calculating using increasingly large numbers, before applying them as a class. They are encouraged to explain why they chose a particular method. They use mental calculations and estimation in pairs to complete the Number Puzzle activity. Children learn to perform mental calculations and estimation.

Mental Calculations (2): Players, Are You Ready?

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children recap how to choose an appropriate mental method. They use mental calculations and estimation to solve problems involving increasingly large numbers and all four operations. In pairs, children compete with each other to complete a 4-in-a-row game. Children learn to perform mental calculations and estimation.

Mental Calculations (3): Code Busters

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children recap how to choose an appropriate mental method. They use the strategies learned in previous lessons to solve problems involving increasingly large numbers and all four operations in context. Children apply RUCSAC to work through word problems which reveal an answer through cracking a code. Children learn to perform mental calculations and estimation.

Mental Calculations (4): Gotta Find Em All!

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children look more in depth at the reasons for picking certain strategies when performing mental calculations. In pairs, they will compete in a star grid battleships-style game, performing mental calculations to uncover squares on a grid. As a plenary, they will be asked to explain why an answer is incorrect, drawing on their knowledge of order of operations. Children learn to perform mental calculations and estimation.

Mental Calculations (5): Calcu-late!

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children review mental strategies, in particular making notes on the important information in a problem and the order of steps needed. They play a simple board game in pairs that requires them to perform mental calculations and estimation. Children learn to perform mental calculations and estimation.

Mental Calculations (6): Mental Calculations Reasoning

NC Statement: perform mental calculations, including with mixed operations and large numbers

White Rose Maths Small Step: Mental calculations and estimation

Description: Children apply their knowledge of mental calculations and estimation to a variety of reasoning questions. They will work through a number of problems as a class, guided by a teacher, before tackling problems independently. Finally, they will look at the answers as a class and discuss why answers are incorrect or correct. Children learn to perform mental calculations and estimation.

Common Factors, Multiples and Prime Numbers (1): Fun Factory

NC Statement: identify common factors, common multiples and prime numbers

White Rose Maths Small Step: Common factors

Description: Children are introduced to 'factor' as a piece of mathematical vocabulary and are asked to find common factors shared by two numbers and record these in a diagram. Children learn to identify and use common factors.

Common Factors, Multiples and Prime Numbers (2): Marine Multiples

NC Statement: identify common factors, common multiples and prime numbers

White Rose Maths Small Step: Common multiples

Description: Children are reminded of the word 'multiple' and find common multiples of numbers rolled on a dice. They discuss 'lowest common multiple'. In pairs, they will complete a painting-by-numbers-style activity using their knowledge of common multiples before moving on to problems involving common multiples in context. Children learn to identify and use common multiples.

Common Factors, Multiples and Prime Numbers (3): Prime Detectives

NC Statement: identify common factors, common multiples and prime numbers

White Rose Maths Small Step: Primes

Description: Children are introduced to prime numbers and are given a timed task to find as many as they can in five minutes, followed by a whole-class activity where they identify consecutive primes. Detective skills are put into practice to reveal a saboteur using their knowledge of prime numbers. Finally, children generate their own prime numbers using the digits given. Children learn to identify primes.

Common Factors, Multiples and Prime Numbers (4): Common Factors, Common Multiples an

NC Statement: identify common factors, common multiples and prime numbers

White Rose Maths Small Step: Primes. Common factors. Common multiples

Description: Children work through a range of reasoning and contextual problems led and modelled by a teacher involving primes, factors and common multiples. They try similar problems independently and check their answers as a class. Children learn to apply their knowledge of primes, common factors and common multiples.

Order of Operations (1): Pyramid Puzzles

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations. Add and subtract whole numbers

Description: Children are reminded of the formal written methods for addition and subtraction. They complete number pyramids, adding or subtracting to find the next tier of the pyramid. Children learn about the order of operations.

Order of Operations (2): Colour Me In

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations. Add and subtract whole numbers

Description: Children practise using the formal written method for addition and subtraction. They complete calculations with increasingly large numbers to complete a paint-by-numbers-style activity. Children learn about the order of operations.

Order of Operations (3): Monster Multiplication

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations. Multiply up to a 4-digit by 1-digit number

Description: Children recap long multiplication with a teacher leading, then independently work across a variety of tasks. Children learn about the order of operations.

Order of Operations (4): Division Doughnuts

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations. Long division (1). Long division (2). Long division (3). Long division (4). Short division

Description: Children recap long and short division methods, including contextual word problems, led by a teacher. They move on to a differentiated independent task. Children learn about the order of operations.

Order of Operations (5): Bonkers BODMAS

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations

Description: Children are introduced to the correct order of operations where there are multiple steps to a problem, using BODMAS to remember. They will apply this rule to some practice questions before working independently. Children learn about the order of operations.

Order of Operations (6): Bonkers Brackets

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations

Description: Children are introduced to performing calculations inside brackets first when looking at the order of operations. They work through teacher-led examples and complete similar work independently. In the plenary, children are invited to add operations to make the calculations correct. Children learn about the order of operations.

Order of Operations (7): Bonkers Brackets 2

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations

Description: Children apply their knowledge of brackets from the previous lesson to add missing brackets from multistep calculations to make them correct. As a class, they then consider how the location of brackets can change an answer drastically and use < and > symbols to show this. Children learn about the order of operations.

Order of Operations (8): Order of Operations Reasoning

NC Statement: use their knowledge of the order of operations to carry out calculations involving the 4 operations

White Rose Maths Small Step: Order of operations

Description: Children are guided through a selection of contextual problems requiring BODMAS to help solve them. They apply their knowledge of order of operations to a variety of reasoning and mastery questions. Children learn about the order of operations.

Solve Problems (1): The Vault

NC Statement: solve problems involving addition, subtraction, multiplication and division

White Rose Maths Small Step: Reasoning from known facts

Description: Children are reminded of the term 'inverse' and how we can use inverse operations to find missing numbers. They work in pairs to complete a missing number pyramid puzzle, before solving missing number problems to reveal a code to the vault. Children learn about reasoning from known facts.

Solve Problems (2): Problem Sorter

NC Statement: solve problems involving addition, subtraction, multiplication and division

White Rose Maths Small Step: Reasoning from known facts

Description: Children complete quiz-show-style multiple-choice word problems. They will be asked to identify the operations needed in a range of problems by moving to the correct sign in the classroom, before independently working through a variety of problems. Children learn about reasoning from known facts.

Solve Problems (3): Cupcake Creator

NC Statement: solve problems involving addition, subtraction, multiplication and division

White Rose Maths Small Step: Reasoning from known facts

Description: Children apply their known facts to a range of baking problems. They will work in pairs to complete problems in context to complete a cake. Children learn about reasoning from known facts.

Solve Problems (4): Games Galore

NC Statement: solve problems involving addition, subtraction, multiplication and division

White Rose Maths Small Step: Reasoning from known facts

Description: Children briefly review how to apply RUCSAC to a word problem and use estimation to check answers. They quickly match a problem to a correct answer using estimation and move on to playing a problem-solving game in pairs. They are also tasked with writing their own problems to add to the game. Children learn about reasoning from known facts.

Solve Problems (5): Problem Solving Reasoning

NC Statement: solve problems involving addition, subtraction, multiplication and division

White Rose Maths Small Step: Reasoning from known facts

Description: Children are led by a teacher through a series or longer multi-step problems, each involving more than one operation, some including measures and money. They then independently solve problems and show their working for each one. They are given the opportunity to see the correct answers and working for each on the Lesson Presentation. Children learn about reasoning from known facts.

Estimation (1): Tabletop Olympics

NC Statement: use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy

White Rose Maths Small Step: Mental calculations and estimation

Description: By looking at various pictorial representations, children are asked to estimate values and explain their answers. They are asked to perform mental calculations and use estimation to check their answers to record times and distances in sporting events. Children learn to apply mental calculations and estimation.

Estimation (2): The Dog Chewed My Home Learning

NC Statement: use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy **White Rose Maths Small Step:** Mental calculations and estimation	**Description:** Children discuss the usefulness of rounding numbers when checking answers, as a form of estimation. They use rounding to check answers, choosing an appropriate degree of accuracy. Independently, children perform calculations, explain how they would use rounding and estimation to check their answer and use this information to decide if their answer looks correct. Children learn how to use estimation.

Estimation (3): Estimation Reasoning

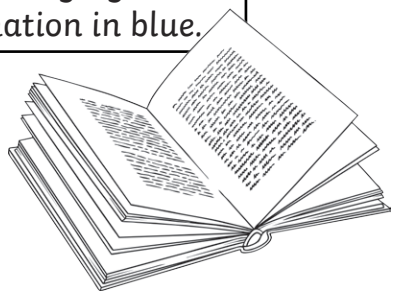
NC Statement: use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy **White Rose Maths Small Step:** Mental calculations and estimation	**Description:** In pairs, children practise using estimation in context, then calculate the accurate answer to see if their estimation was close. They independently tackle mastery-style reasoning questions and work through their answers to self-assess after. Children learn how to use estimation.

Extra Challenge

I can divide using a formal written method and use rounding depending on the context.

Complete the questions below:

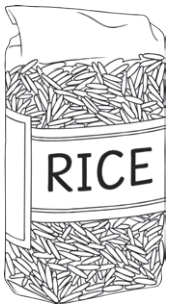
Printing Charges		
Front Cover: £6.78	Pages: 7p	A sign saying the information in blue.



1) Fabian has £19.49. He pays for a front cover.
How many printed pages for his book can he afford?

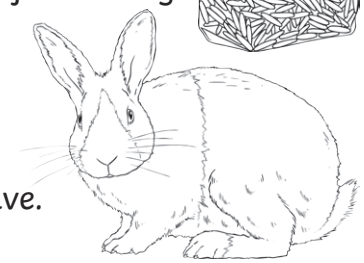
_____

2) A full bag of rice contains 3kg. Nadiya has one bag that has $\frac{1}{4}$ of rice left and another bag that has $\frac{3}{8}$ of rice left. There are 62 grams of rice in one portion.
How many portions of rice can Nadiya make?



_____

3) A packet contains 1.5kg of rabbit food. A rabbit eats 87 grams of food a day.
How many days will the food last?



_____

Write your own one and two-step division problems for a partner to solve.

4) _____

_____

_____

5) _____

_____

_____

Extra Challenge **Answers**

Question	Answer
1.	Fabian has £19.49. He pays for a front cover. How many printed pages for his book can he afford?
	181 pages
2.	A full bag of rice contains 3kg. Nadiya has one bag that has $\frac{1}{4}$ of rice left and another bag that has 3/8 of rice left. There are 62 grams of rice in one portion. How many portions of rice can Nadiya make?
	30 portions
3.	A packet contains 1.5kg of rabbit food. A rabbit eats 87 grams of food a day. How many days will the food last?
	17 whole days.

Problem Solving Tic-Tac-Toe

I can divide using a formal written method and use rounding depending on the context.

524 children and 2385 adults need to ride the elevator to the top of the Empire State Building. The elevator can hold 64 people at a time. How many trips will the elevator need to make? _____	Sascha has 4829g of flour. Each bun requires 38 grams of flour. Whilst baking, she drops 583 grams of flour on the floor. How many buns can she make with the remaining flour? _____	A school has £4928 to purchase new music equipment. If a set of ukuleles cost £83, how many sets can the school purchase? _____
There is a queue of 438 children and 1898 adults for the new ride at the theme park. If the ride holds 67 people, how many times must the ride run before all of the people have had one turn? _____	Kaia has won £690 worth of gaming vouchers. She also takes £275 in cash to spend. If each game costs £73, how many games can she buy? _____	A school raises £495 through bake sales, £284 through craft fairs and £957 at the annual celebration concert. The school shares the money raised equally by 27 chosen charities. How much does each charity receive to the nearest pound? _____
An English teacher wants to buy 7948 new books for the school. Books come in packs of 83. How many packs does she need to buy? _____	Rudy and his friends want to go to the Football World Cup. Here is how much money they each have: Rudy £95 Ralph £185 Raj £859 Raymon £17 Tickets cost £78. How many tickets can they buy altogether? _____	A party organiser needs 5274 slices of pizza. If each pizza has 26 slices, how many pizzas should the organiser buy? _____

Problem Solving Tic-Tac-Toe **Answers**

Question	Answer
1.	524 children and 2385 adults need to ride the elevator to the top of the Empire State Building. The elevator can hold 64 people at a time. How many trips will the elevator need to make?
	46
2.	Sascha has 4829g of flour. Each bun requires 38 grams of flour. Whilst baking, she drops 583 grams of flour on the floor. How many buns can she make with the remaining flour?
	111
3.	A school has £4928 to purchase new music equipment. If a set of ukuleles cost £83, how many sets can the school purchase?
	59
4.	There is a queue of 438 children and 1898 adults for the new ride at the theme park. If the ride holds 67 people, how many times must the ride run before all of the people have had one turn?
	35
5.	Kaia has won £690 worth of gaming vouchers. She also takes £275 in cash to spend. If each game costs £73, how many games can she buy?
	13
6.	A school raises £495 through bake sales, £284 through craft fairs and £957 at the annual celebration concert. The school shares the money raised equally by 27 chosen charities. How much does each charity receive to the nearest pound?
	£64
7.	An English teacher wants to buy 7948 new books for the school. Books come in packs of 83. How many packs does she need to buy?
	96
8.	Rudy and his friends want to go to the Football World Cup. Tickets cost £78. How many tickets can they buy altogether?
	14
9.	A party organiser needs 5274 slices of pizza. If each pizza has 26 slices, how many pizzas should the organiser buy?
	203

Problem Solving Tic-Tac-Toe

I can divide using a formal written method and use rounding depending on the context.

A box holds 16 chocolates. How many full boxes can be made from 827 chocolates?	A school of 683 people are going on a visit to the coast. Each coach holds 46 people. How many coaches are needed?	A school has £572 to purchase new sports equipment. If a cricket set costs £58, how many sets can the school purchase?
There is a queue of 284 people for the new rollercoaster. If the rollercoaster holds 38 people, how many times must the rollercoaster run before all of the people have had one turn?	Kayla has 958p to spend on trading cards. Each trading card costs 37p. How many cards can she buy?	A school has £485 to spend on new carpet tiles. Each carpet tile costs £11. How many carpet tiles can the school buy?
An art teacher wants to buy 748 new paint brushes for the school. Brushes come in packs of 27. How many packs does she need to buy?	Kristoph is on holiday. He has £194 and wants to buy his friends a souvenir. Souvenirs cost £23 each. How many souvenirs can he buy?	A parent needs 848 slices for a pizza party. If each pizza has 12 slices, how many pizzas should the parent buy?

Problem Solving Tic-Tac-Toe **Answers**

Question	Answer
1.	A box holds 16 chocolates. How many full boxes can be made from 827 chocolates?
	51
2.	A school of 683 people are going on a visit to the coast. Each coach holds 46 people. How many coaches are needed?
	15
3.	A school has £572 to purchase new sports equipment. If a cricket set costs £58, how many sets can the school purchase?
	9
4.	There is a queue of 284 people for the new rollercoaster. If the rollercoaster holds 38 people, how many times must the rollercoaster run before all of the people have had one turn?
	8
5.	Kayla has 958p to spend on trading cards. Each trading card costs 37p. How many cards can she buy?
	25
6.	A school has £485 to spend on new carpet tiles. Each carpet tile costs £11. How many carpet tiles can the school buy?
	44
7.	An art teacher wants to buy 748 new paint brushes for the school. Brushes come in packs of 27. How many packs does she need to buy?
	28
8.	Kristoph is on holiday. He has £194 and wants to buy his friends a souvenir. Souvenirs cost £23 each. How many souvenirs can he buy?
	8
9.	A parent needs 848 slices for a pizza party. If each pizza has 12 slices, how many pizzas should the parent buy?
	71

Problem Solving Tic-Tac-Toe

I can divide using a formal written method and use rounding depending on the context.

1843 visitors need to ride the elevator to the top of the Empire State Building. The elevator can hold 47 people at a time. How many trips will the elevator need to make?	Madison is making buns. She has 5825g of flour. Each bun requires 53g of flour. How many buns can she make?	A school has £1945 to purchase new music equipment. If a set of ukuleles cost £87, how many sets can the school purchase?
There is a queue of 1385 people for the new ride at the theme park. If the ride holds 68 people, how many times must the ride run before all of the people have had one turn?	Boris has won £1090 to spend in a gaming store. If each game costs £57, how many games can he buy?	A school has £2973 to spend on the computer suite. Each camera costs £87. How many cameras can the school buy?
A geography teacher wants to buy 1947 new atlas for the school. Atlases come in packs of 74. How many packs does she need to buy?	Rudy and his friends want to go to the Football World Cup. Tickets cost £78. How many tickets can he buy for £2956?	A party organiser needs 3627 glasses of champagne. If each champagne bottle holds enough liquid to fill 17 glasses, how many bottles should the organiser buy?

Problem Solving Tic-Tac-Toe **Answers**

Question	Answer
1.	1843 visitors need to ride the elevator to the top of the Empire State Building. The elevator can hold 47 people at a time. How many trips will the elevator need to make?
	40
2.	Madison is making buns. She has 5825g of flour. Each bun requires 53g of flour. How many buns can she make?
	109
3.	A school has £1945 to purchase new music equipment. If a set of ukuleles cost £87, how many sets can the school purchase?
	22
4.	There is a queue of 1385 people for the new ride at the theme park. If the ride holds 68 people, how many times must the ride run before all of the people have had one turn?
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5.	Boris has won £1090 to spend in a gaming store. If each game costs £57, how many games can he buy?
	19
6.	A school has £2973 to spend on the computer suite. Each camera costs £87. How many cameras can the school buy?
	34
7.	A geography teacher wants to buy 1947 new atlas for the school. Atlases come in packs of 74. How many packs does she need to buy?
	27
8.	Rudy and his friends want to go to the Football World Cup. Tickets cost £78. How many tickets can he buy for £2956?
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9.	A party organiser needs 3627 glasses of champagne. If each champagne bottle holds enough liquid to fill 17 glasses, how many bottles should the organiser buy?
	214

Blank Tic-Tac-Toe Sheet

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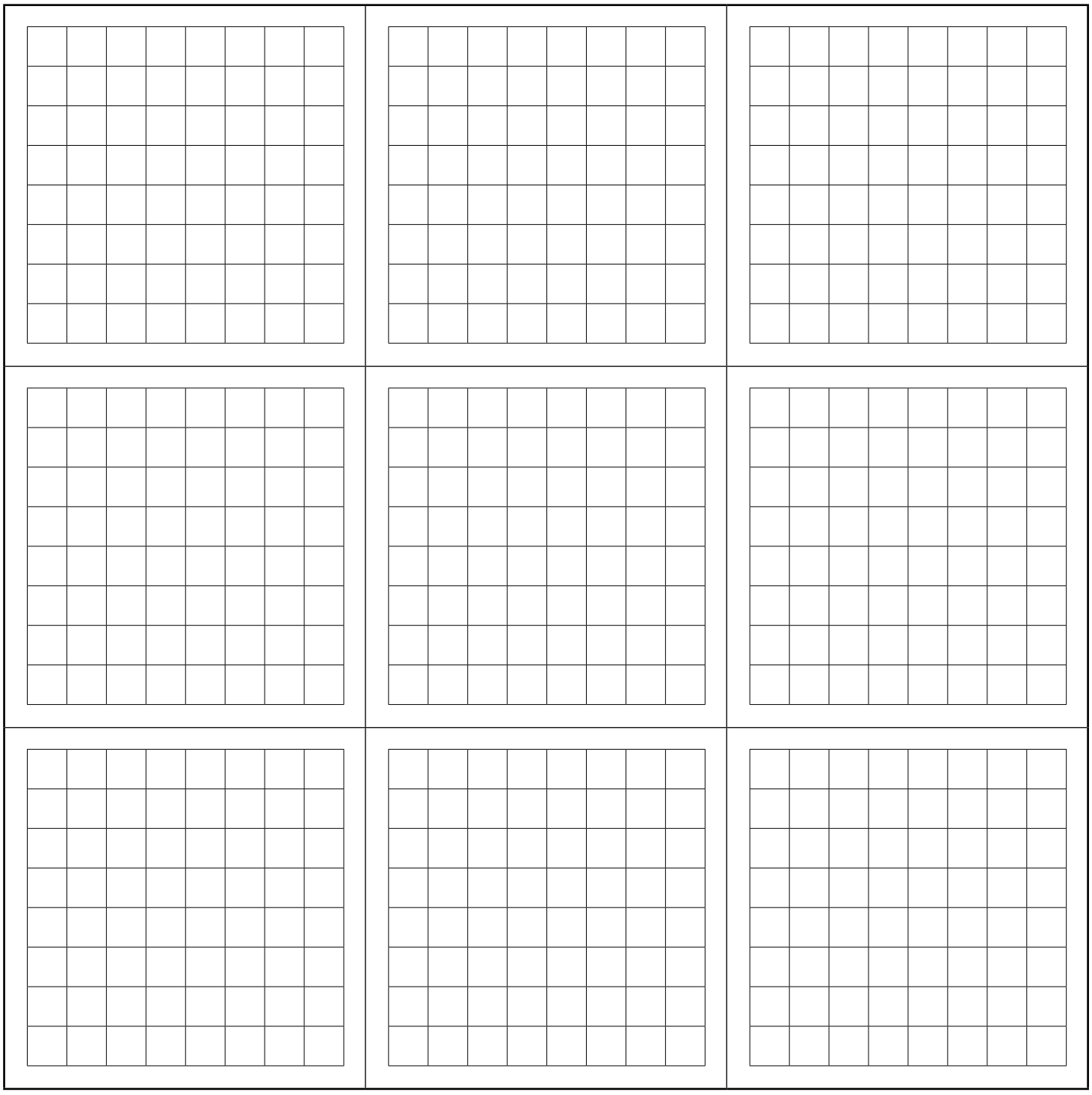


Addition, Subtraction, Multiplication and Division: Tic-Tac-Toe Problem Solving

Aim:	**Success Criteria:**	**Resources:**
Divide numbers up to four digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. I can divide using a formal written method and use rounding depending on the context.	I can use known multiplication facts to complete calculations. I understand why place value is important whilst performing written calculations. I can use a written method to solve a calculation. I can round up or down depending on the context.	**Lesson Pack** Whiteboard and pens
	Key/New Words: Division, divide, how many, long division, place value, calculation, number sentence, written method, dividend, divisor, round up, round down.	**Preparation:** Differentiated **Problem Solving Tic-Tac-Toe Activity Sheets** – 1 per pair **Long Division Record Sheet** – 1 per child **Extra Challenge Activity Sheet** – as required **Blank Tic-Tac-Toe Sheet** – as required

Prior Learning: It will be helpful if children understand place value and know their multiplication facts up to 12 × 12 prior to the lesson.

Learning Sequence

	Make My Number: Using the **Lesson Presentation**, children use the digits 1-9 to make 3 three-digit numbers to make 999 and create a calculation that equals 100.	
	Searching For Clues (1): Revise the written strategy, long division and interpret remainders depending on the context, by talking through the information on the **Lesson Presentation**. Repeat with additional examples if necessary.	
	Searching For Clues (2): Using the **Lesson Presentation**, the children solve the word problems using the formal written method, long division, and interpret the remainders by rounding up or down depending on the context. Can the children explain how they completed the calculation? Did they choose to use long division? Did any known facts help them to complete the calculation? Did children round their answers correctly? Did the children check their answer?	
	Problem Solving Tic-Tac-Toe: Explain to the children that they will be completing a range of questions on the differentiated **Problem Solving Tic-Tac-Toe Activity Sheets** that will require them to perform calculations using the strategy demonstrated earlier in the lesson. Taking turns, the children choose a problem to complete before allocating a 'nought' or 'cross' over the problem once completed. The aim is to try and get three noughts or crosses in a line – horizontally, vertically or diagonally. Children can use the **Long Division Record Sheet** to work their answers out. To extend, children can populate the **Blank Tic-Tac-Toe Sheet** with division calculations to play additional games. Children complete the two and three-digit division calculations using the written method, long division and interpret the remainders depending on the context. Children complete the two and four-digit division calculations using the written method, long division and interpret the remainders depending on the context. Children complete one and two-step calculations involving two and four-digit division equations and interpret remainders according to the context. An **Extra Challenge Activity Sheet** is provided as an extension activity if required.	
	Problem Creator: Ask the children to create their own division problems for a partner to solve. Alternatively, you could use some of the examples generated from the children who have completed the **Extra Challenge Activity Sheet**.	

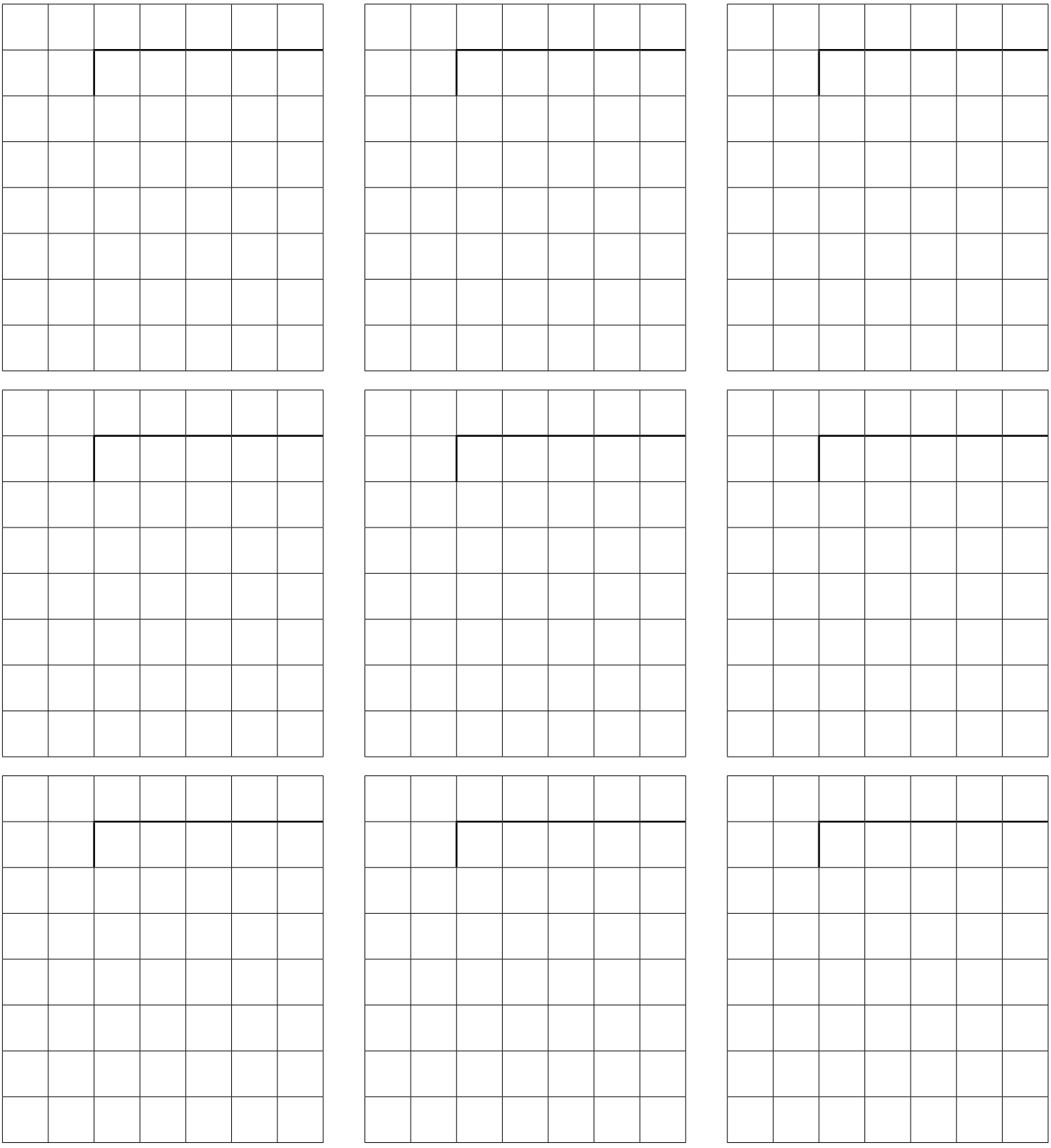
Masterit

Playit: Children play this fabulous

Thinkit: Children think of as many scenarios as possible where they would need to round up or down in sixty seconds.

Long Division Record Sheet

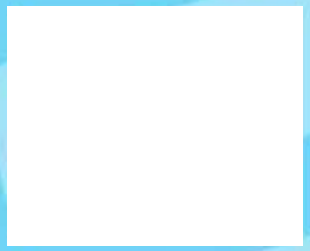
I can divide using a formal written method and use rounding depending on the context.



Maths

Addition, Subtraction, Multiplication and Division

Tic-Tac-Toe Problem Solving



Aim

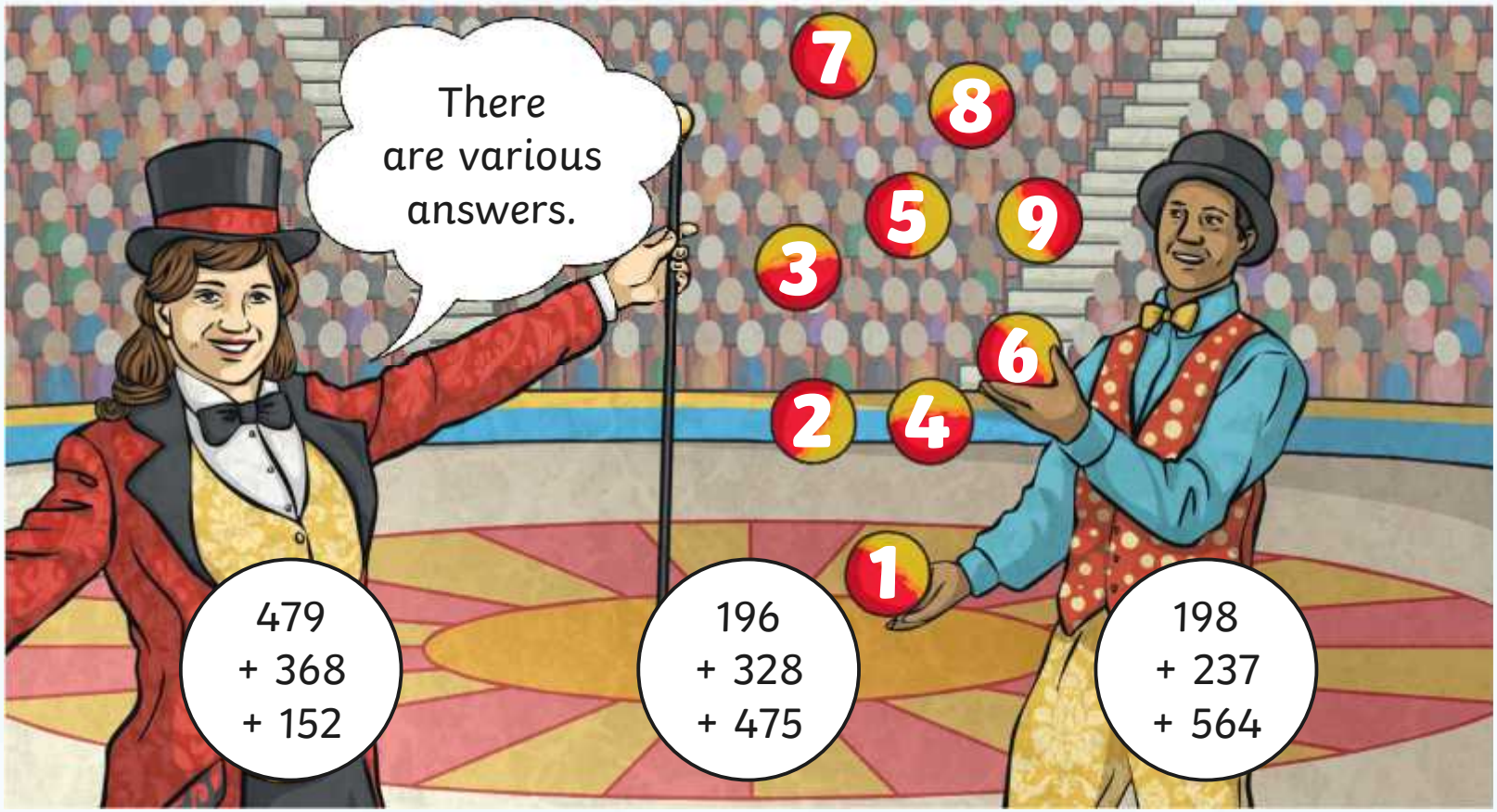
- I can divide using a formal written method and use rounding depending on the context.

Success Criteria

- I can use known multiplication facts to complete calculations.
- I understand why place value is important whilst performing written calculations.
- I can use a written method to solve a calculation.
- I can round up or down depending on the context.

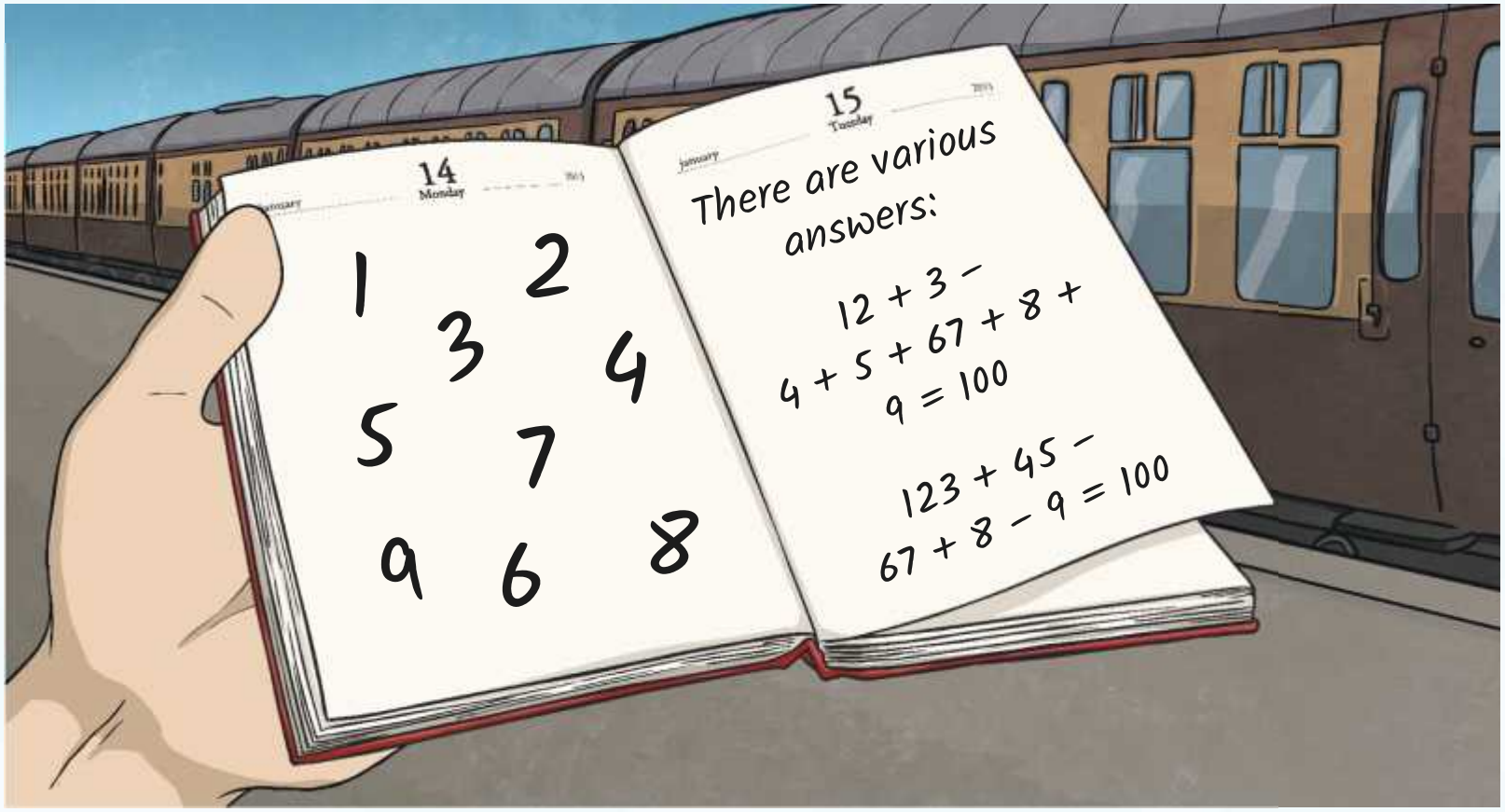
Make My Number

Use the digits 1-9 to make 3 three-digit numbers to make 999.



Make My Number

Use the digits 1-9 to create a calculation that equals 100 using addition and subtraction. You can place the digits together, e.g. 1 and 2 to make 12.

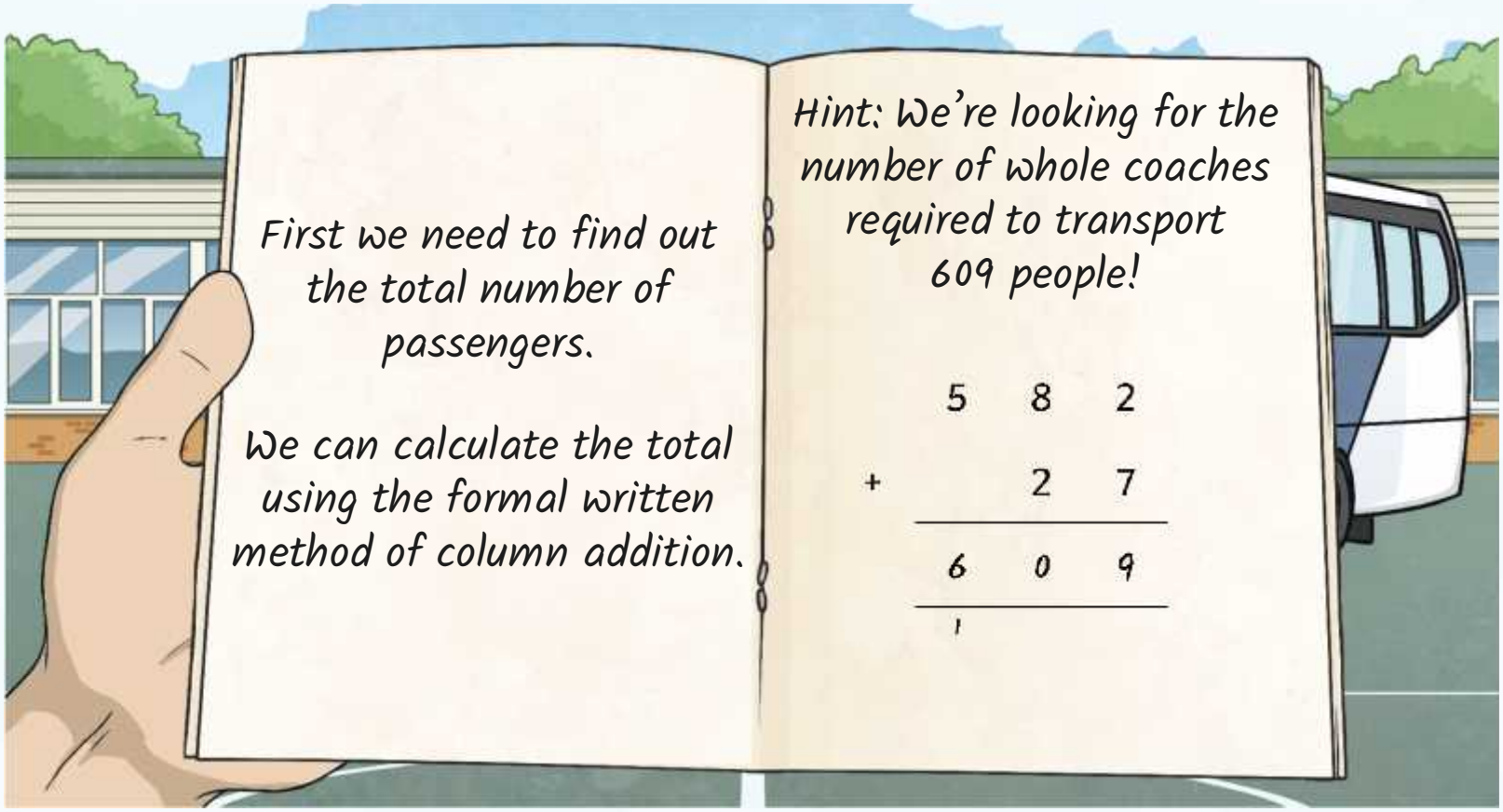


Searching For Clues (1)

Today, we will be learning about the written method, long division and interpret remainders depending on the context.

Searching For Clues (1)

A school of 582 children and 27 teaching staff are going on a visit. Each coach holds 46 people. How many coaches will be needed for the visit?



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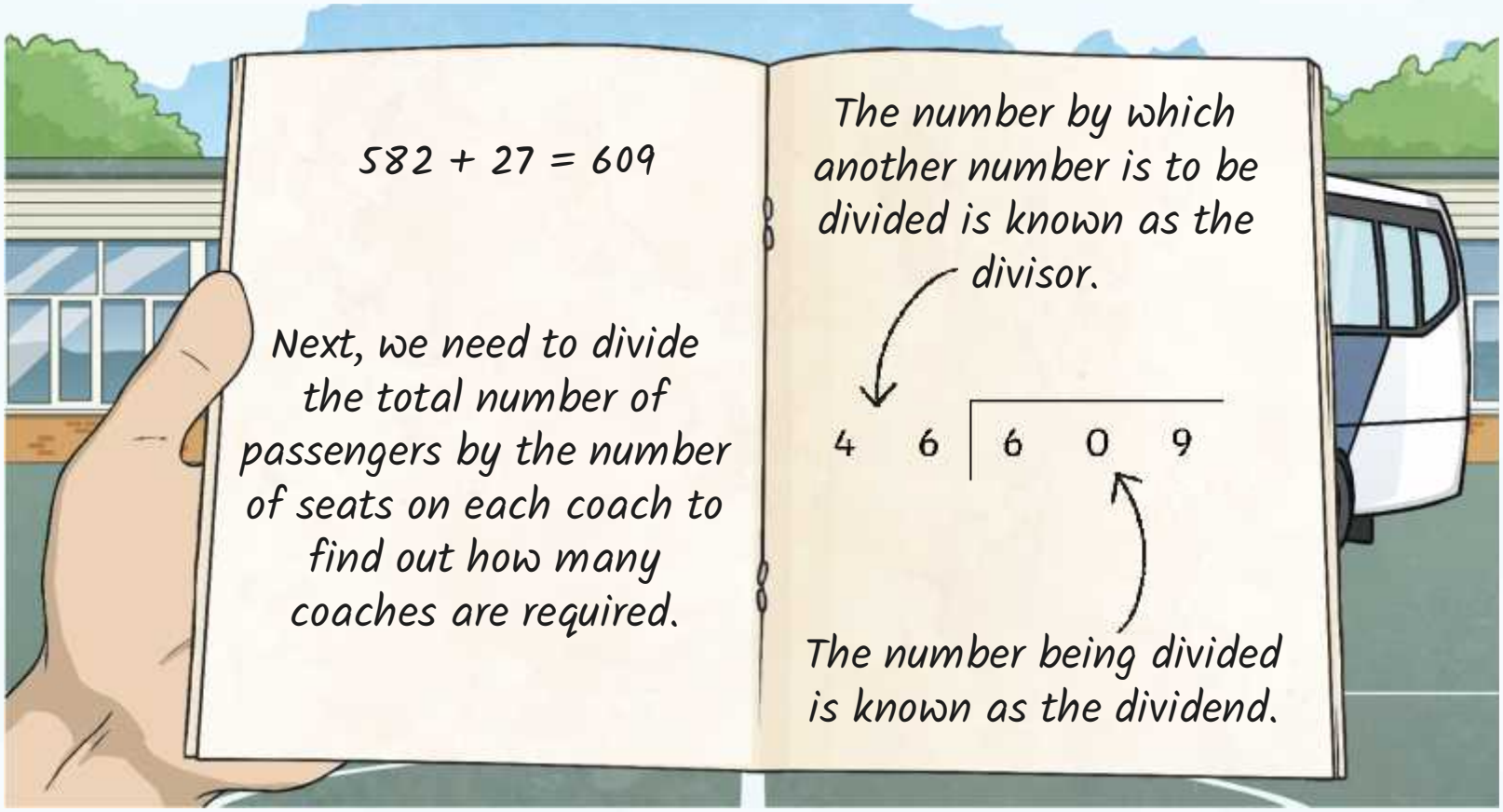

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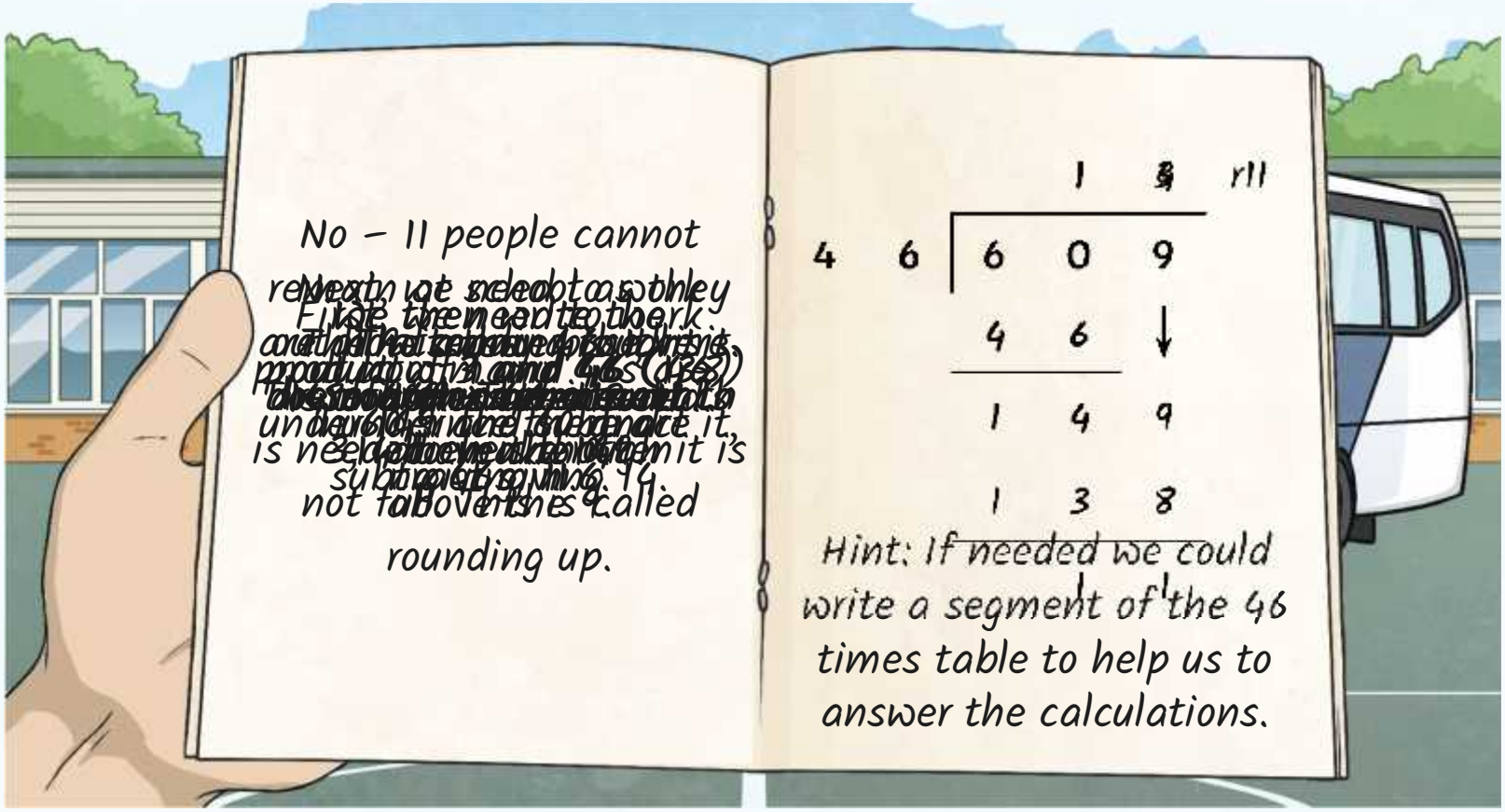

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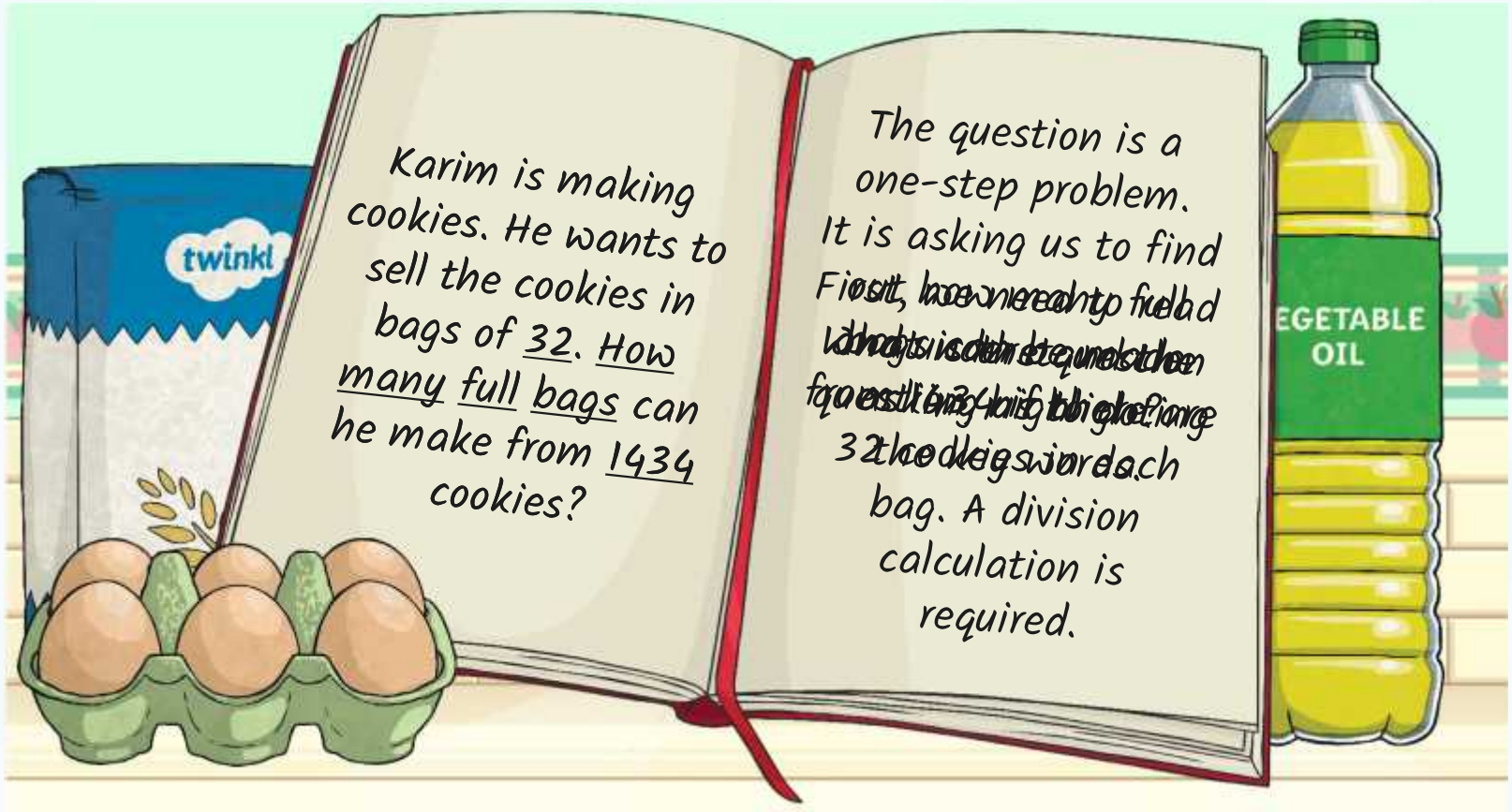
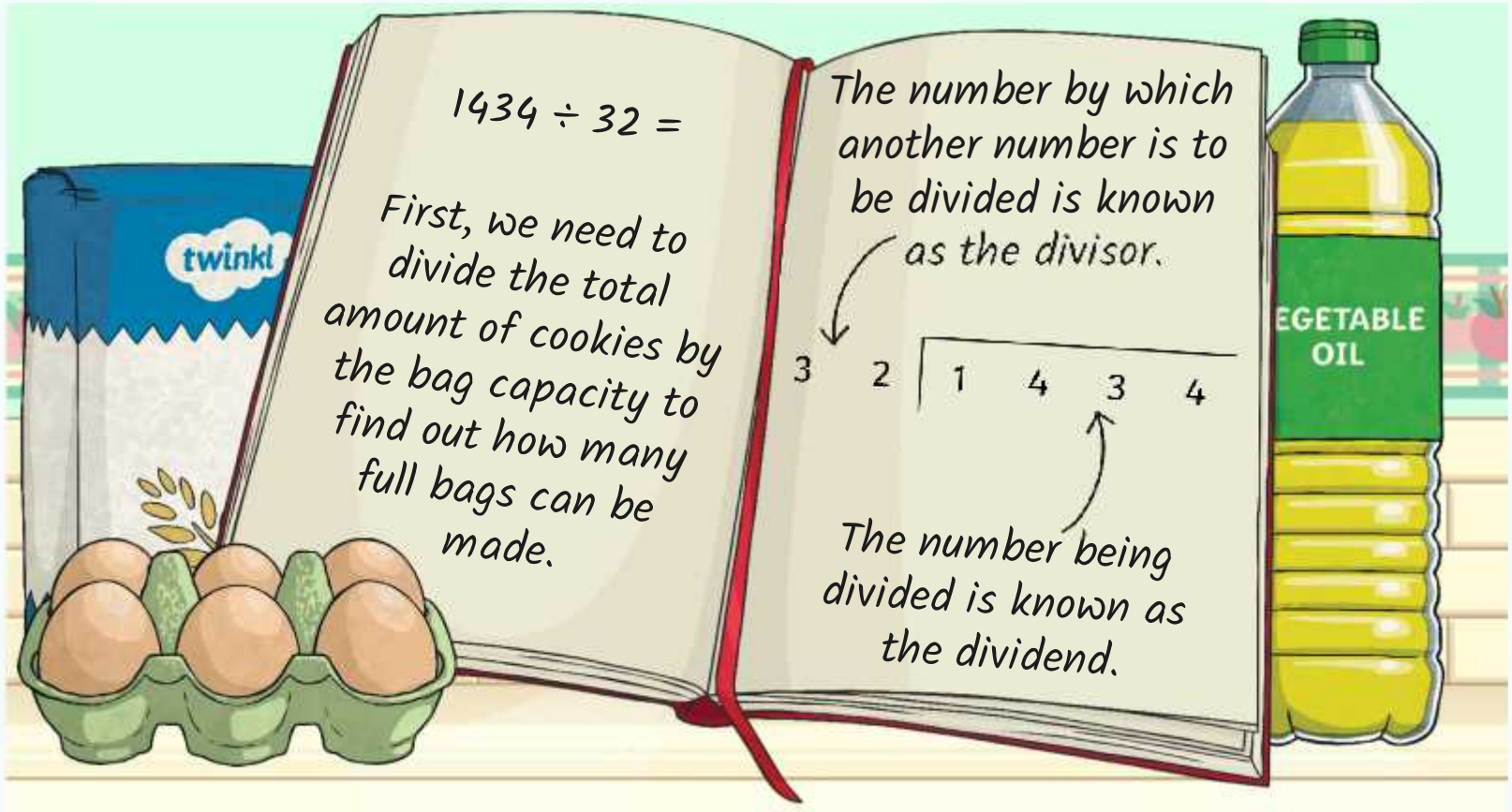


Searching For Clues (1)

Karim is making cookies. He wants to sell the cookies in bags of 32.
How many full bags can he make from 1434 cookies?



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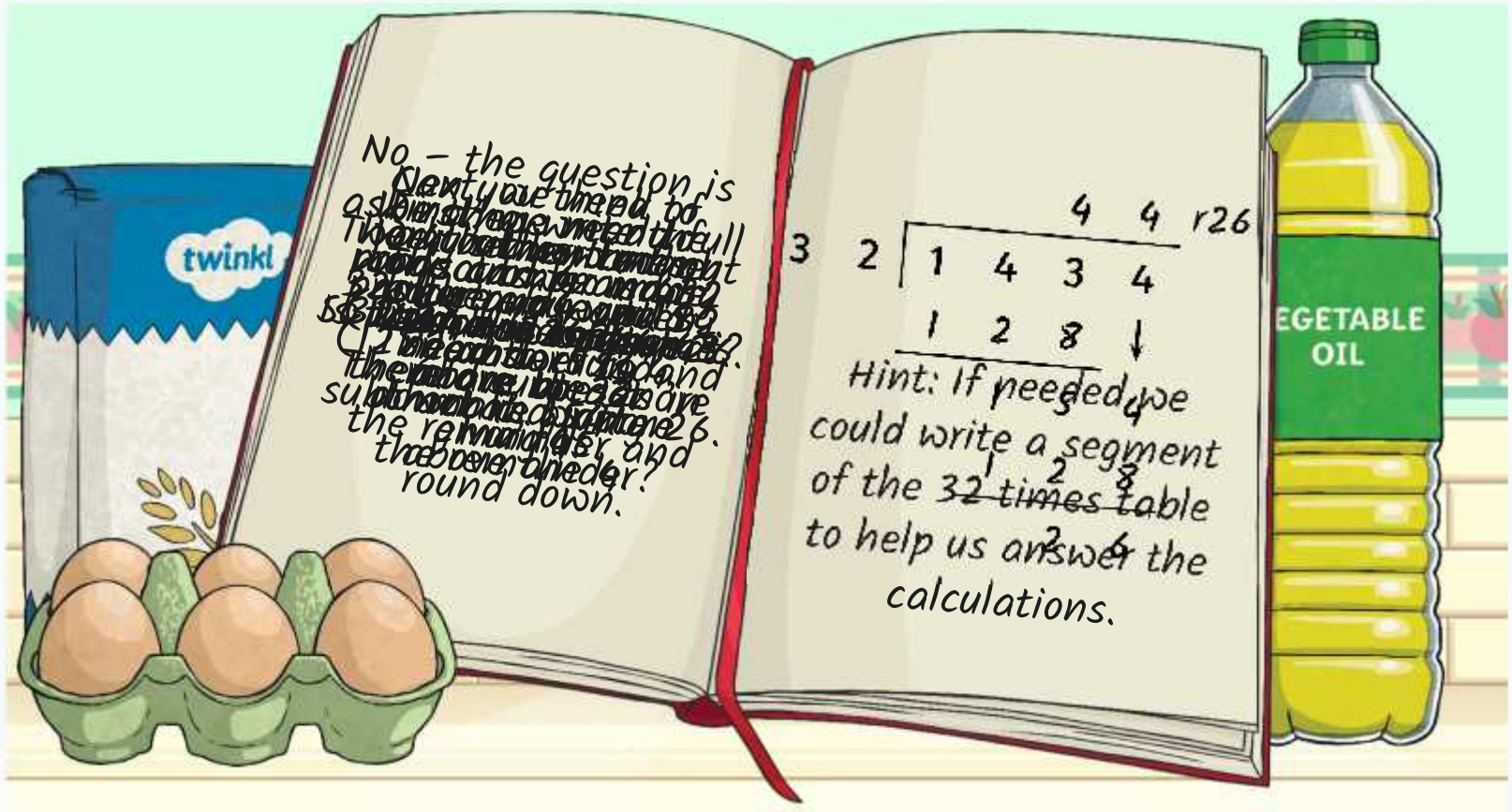
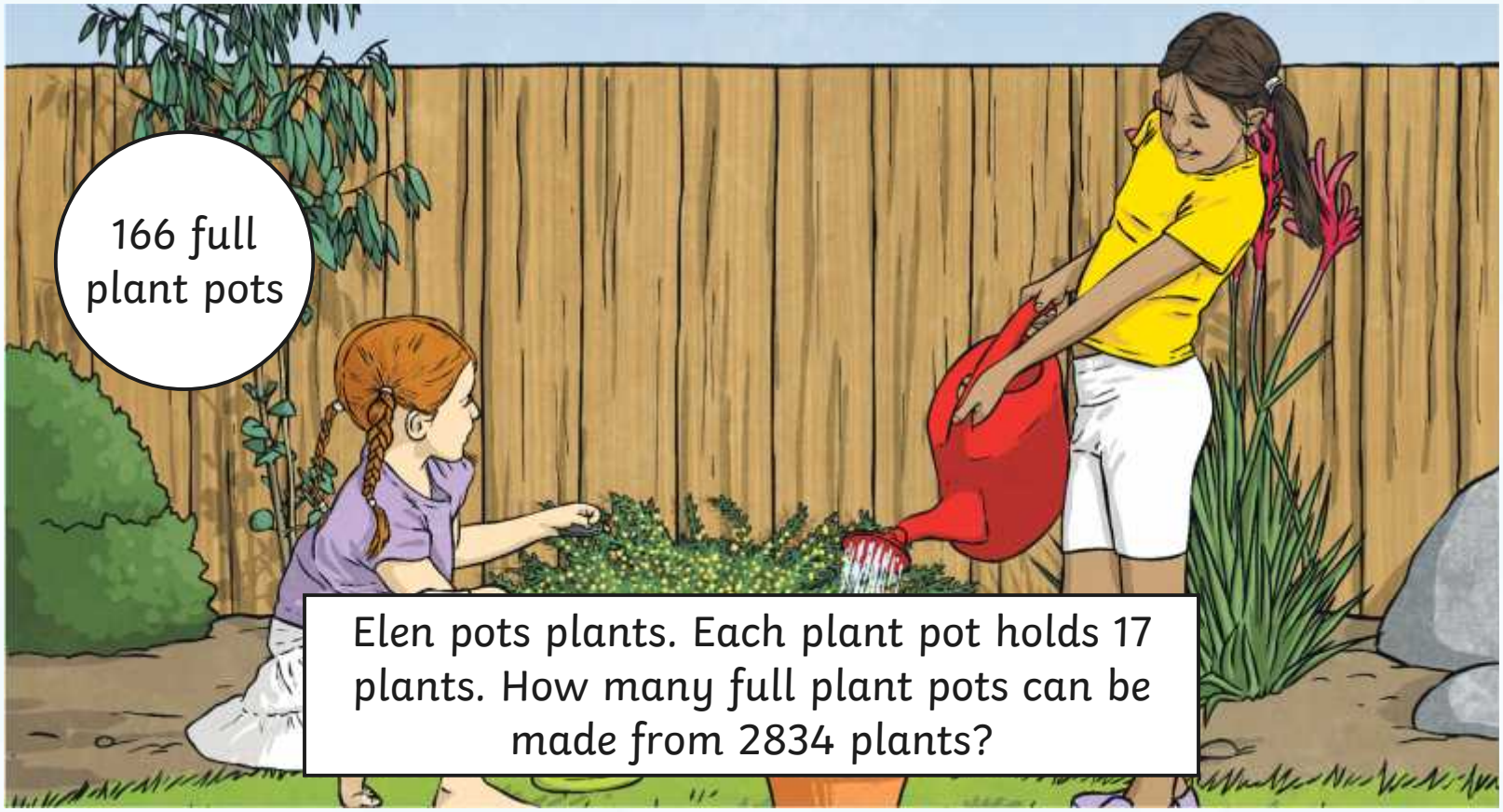


Searching For Clues (2)

Complete the calculation, remembering to round the answer up or down depending on the context.



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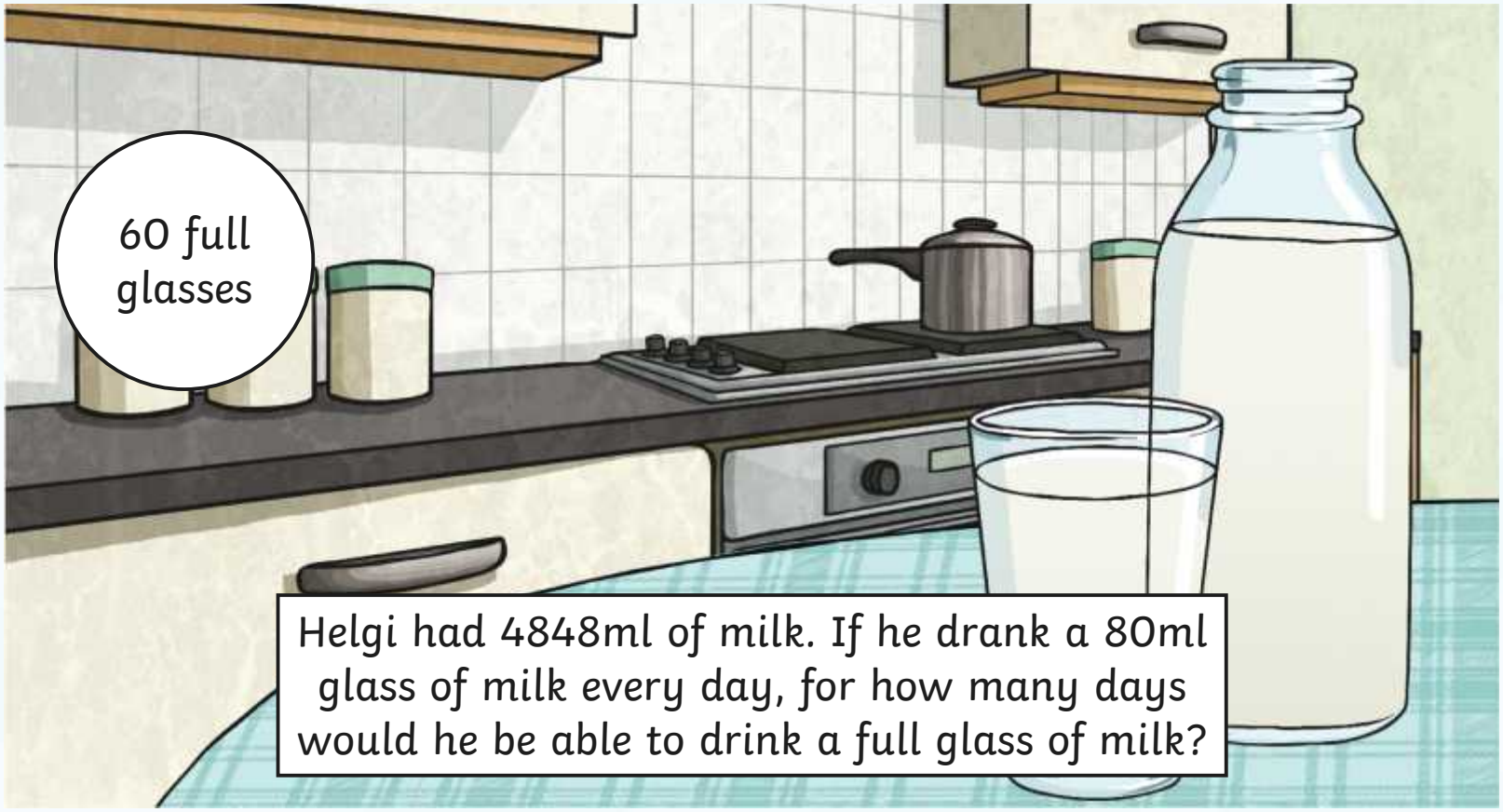

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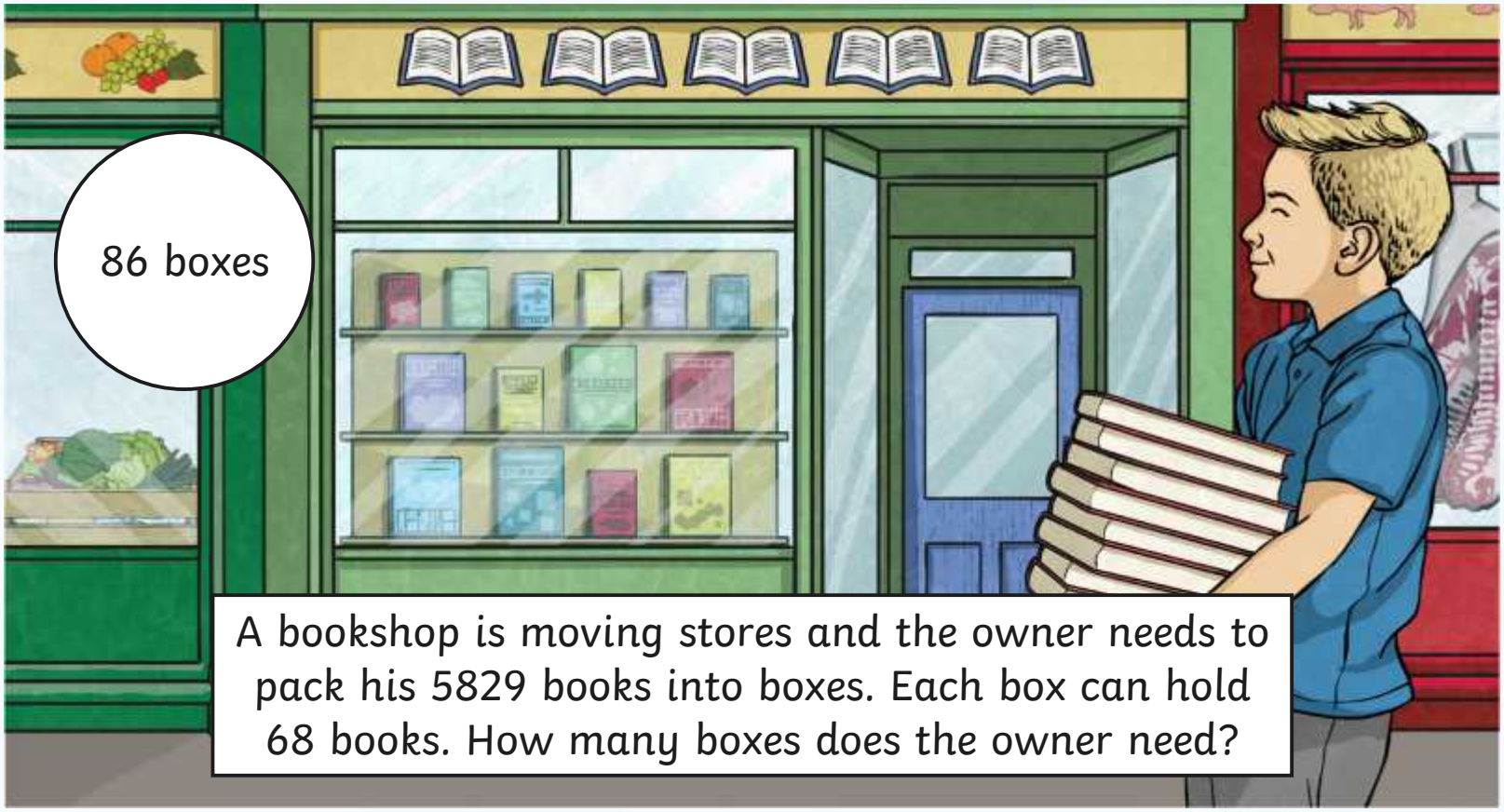
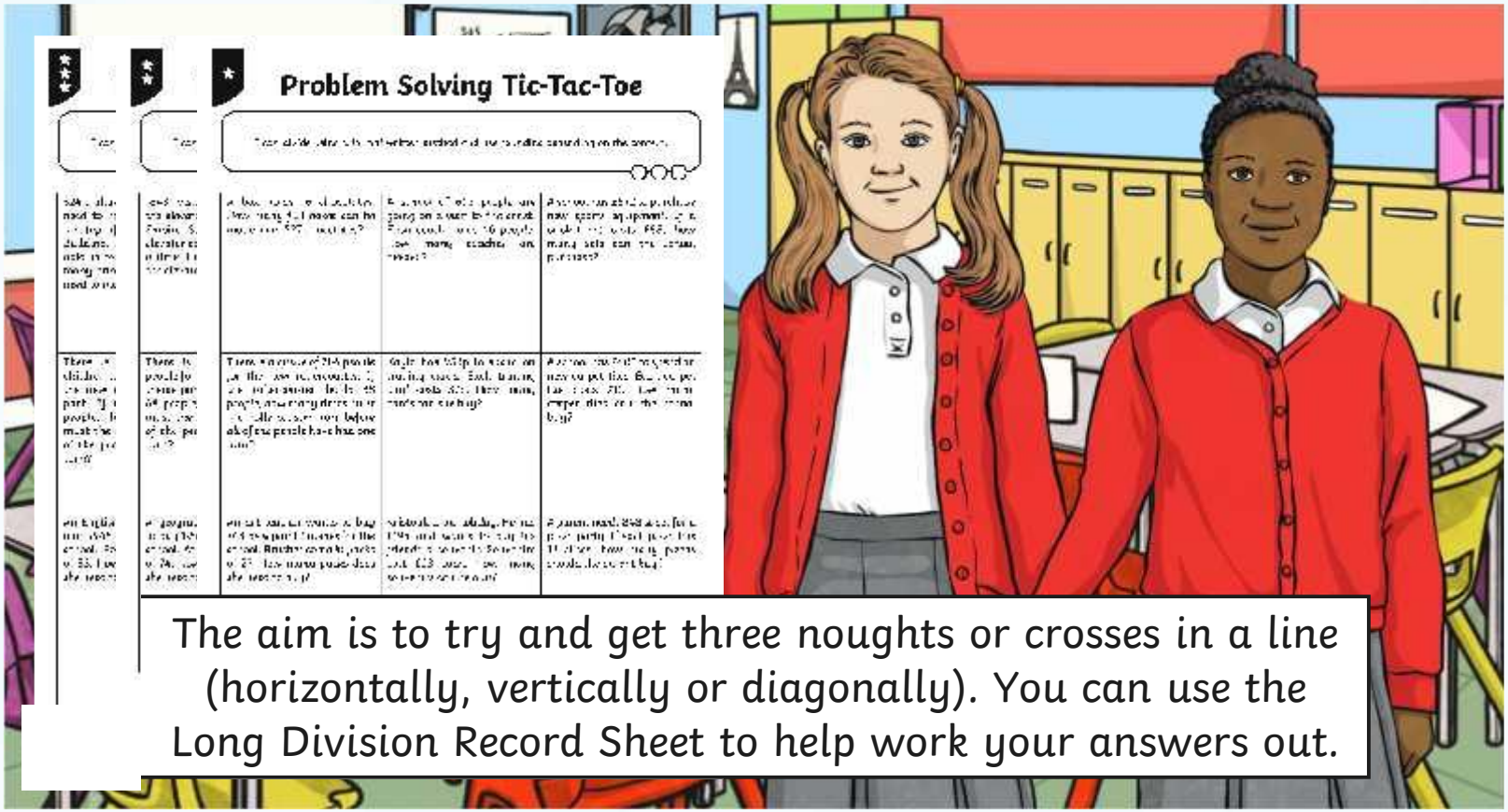


Problem Solving Tic-Tac-Toe

Taking turns, choose a problem to complete before allocating a 'nought' or 'cross' over the completed problem.



The aim is to try and get three noughts or crosses in a line (horizontally, vertically or diagonally). You can use the Long Division Record Sheet to help work your answers out.

Problem Creator

Create your own division problem for a partner to solve.

Aim

- I can divide using a formal written method and use rounding depending on the context.

Success Criteria

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