# 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 and

**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<br><br>**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<br><br>**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. |

# Long Division Reasoning

I can solve reasoning questions using the formal method of long division.

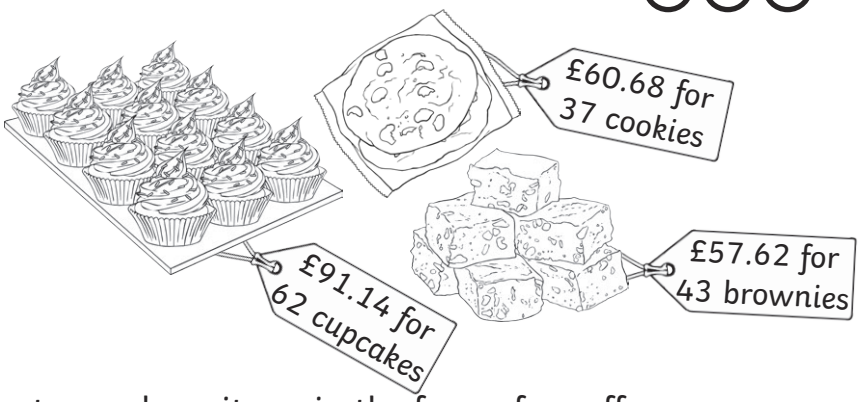
Solve these reasoning questions.

1) Calculate the cost of each item.

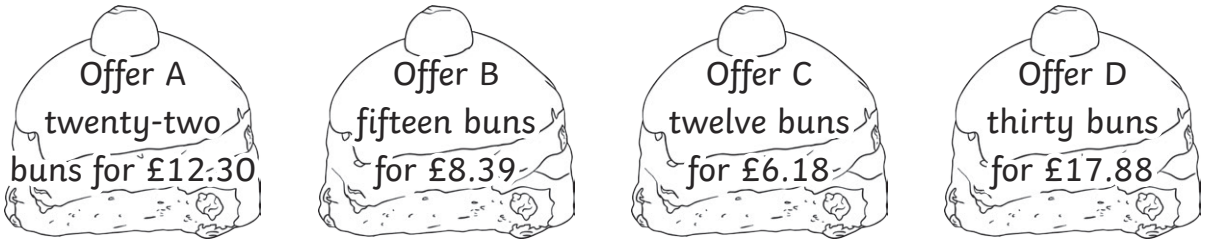
Each cookie costs _____.

Each cupcake costs _____.

Each brownie costs _____.




2) The bakery only allows customers to purchase items in the form of an offer.




a) Which of the offers gives customers the best value for money?

Offer: _____ Cost per bun: _____

b) Karin wants to buy 2112 buns for a school disco. She wants to use Offer A. How much will it cost her altogether?

Offer: _____ Total cost: _____

c) How much would it cost her to use Offer C?

Total cost: _____

Which offer should she use?

Offer: _____

How much money will she save by choosing this offer?

_____

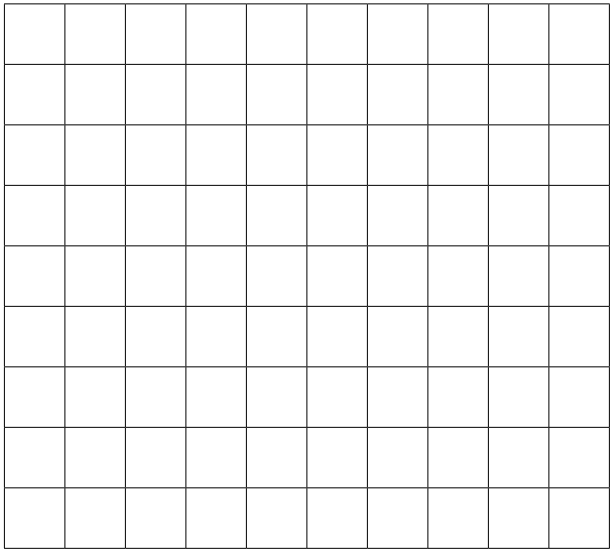
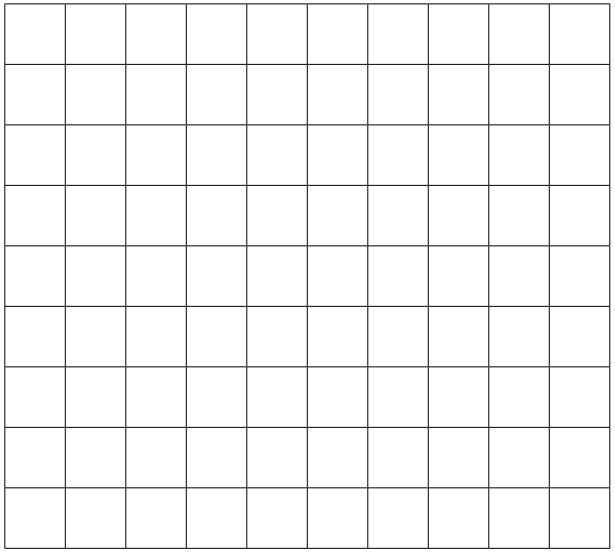
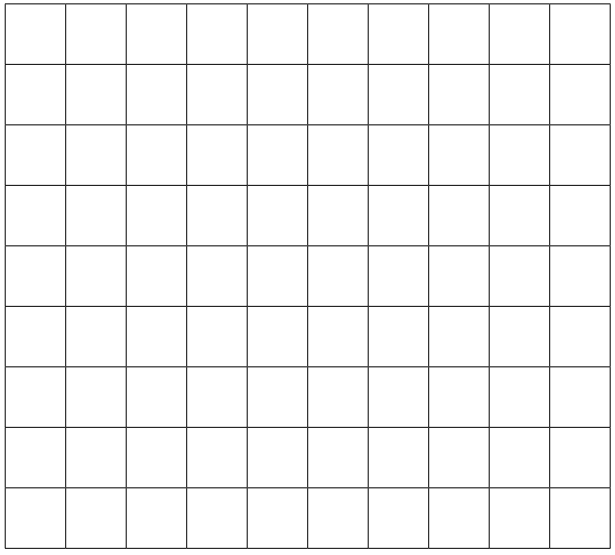
# Long Division Reasoning **Answers**

| Question | Answer |
|---|---|
| **1.** | Calculate the cost of each item. |
| | Each cookie costs **£1.64**. |
| | Each cupcake costs **£1.47**. |
| | Each brownie costs **£1.34**. |
| **2.** | The bakery only allows customers to purchase items in the form of an offer. |
| a | Which of the offers gives customers the best value for money?<br>Offer: ***twelve buns for £6.18***<br>Cost per bun: ***52p*** |
| b | Karin wants to buy 2112 buns for a school disco. She wants to use Offer A. How much will it cost her altogether?<br>Total cost: ***£1180.80*** |
| c | How much would it cost her to use Offer C?<br>Total cost: ***£1087.68***<br>Which offer should she use? Offer: ***C***<br>How much money will she save by choosing this offer? ***£93.12*** |

# Talk Partner Long Division

I can solve reasoning questions using the formal method of long division.

Work with your partner to discuss and solve these reasoning questions.

| | | |
|---|---|---|
| Biscuits come in packs of 34. How many packs can be produced from 9214 biscuits? | The hotel is having a revamp! 55 new dining tables and accompanying chairs have been ordered. The total cost is £9647. How much did each dining table and accompanying chairs cost? | A baker has baked 4284 muffins. Muffins are sold in packs of 23. How many full packs can the baker make? |
| Use this space for your method:<br>  <br>_____ packs. | Use this space for your method:<br>  <br>_____ | Use this space for your method:<br>  <br>_____ packs. |

# Talk Partner Long Division **Answers**

| Question | Answer |
|---|---|
| **1.** | Biscuits come in packs of 34. How many packs can be produced from 9214 biscuits? |
| | ***271*** packs. |
| **2.** | The hotel is having a revamp! 55 new dining tables and accompanying chairs have been ordered. The total cost is £9647. How much did each dining table and accompanying chairs cost? |
| | ***£175.40*** |
| **3.** | A baker has baked 4284 muffins. Muffins are sold in packs of 23. How many full packs can the baker make? |
| | ***186*** packs. |

# **Addition, Subtraction, Multiplication and Division:** Long Division Reasoning

| **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.<br><br>I can solve reasoning questions using the formal method of long division. | I can break down complex problems into smaller steps.<br><br>I can use mathematical language to explain solutions to problems. | **Lesson Pack** |
| | **Key/New Words:**<br>Problem solving, Solutions, predict, identify, RUCSAC, reasoning. | **Preparation:**<br>**Long Division Talk Partner Activity Sheet** – 1 per pair<br>**Long Division Reasoning Activity Sheet** – 1 per pair |

| **Prior Learning:** | It will be helpful if children are familiar with the formal written method of long division prior to the lesson. |
|---|---|

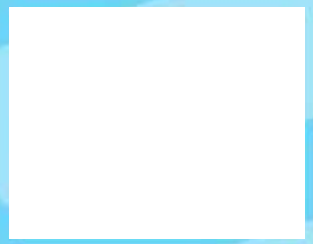
**Learning Sequence**

| | | |
|---|---|---|
| | **Long Division Reasoning 1a:** Use the step-by-step slides from the **Lesson Presentation** to model how to solve whole number division problems. | |
| | **Long Division Reasoning 1b:** Recording their answers on the **Long Division Talk Partner Activity Sheet**, the children work with a partner to apply the strategy to a similar question, explaining their reasoning. Display the answers on the **Lesson Presentation** and discuss. | |
| | **Long Division Reasoning 2a:** Use the step-by-step slides from the **Lesson Presentation** to model how to solve division problems involving decimals. | |
| | **Long Division Reasoning 2b:** Recording their answers on the **Long Division Talk Partner Activity Sheet**, the children work with a partner to apply the strategy to a similar question, explaining their reasoning. Display the answers on the **Lesson Presentation** and discuss. | |
| | **Long Division Reasoning 3a:** Use the step-by-step slides from the **Lesson Presentation** to model how to solve division problems and round remainders according to context. | |
| | **Long Division Reasoning 3b:** Recording their answers on the **Long Division Talk Partner Activity Sheet**, the children work with a partner to apply the strategy to a similar question, explaining their reasoning. Display the answers on the **Lesson Presentation** and discuss. | |
| | **Reasoning Practice:** In mixed-ability pairs, the children complete the **Long Division Reasoning Activity Sheet** to show that they can solve division reasoning questions involving long division. | |
| | **Reasoning Answers:** Using the slides from the **Lesson Presentation**, discuss the answers to the activity questions. Children self-assess how confident feel about solving reasoning questions involving division using a formal written method. | |

# Maths

## Addition, Subtraction, Multiplication and Division

# Long Division Reasoning



# Aim

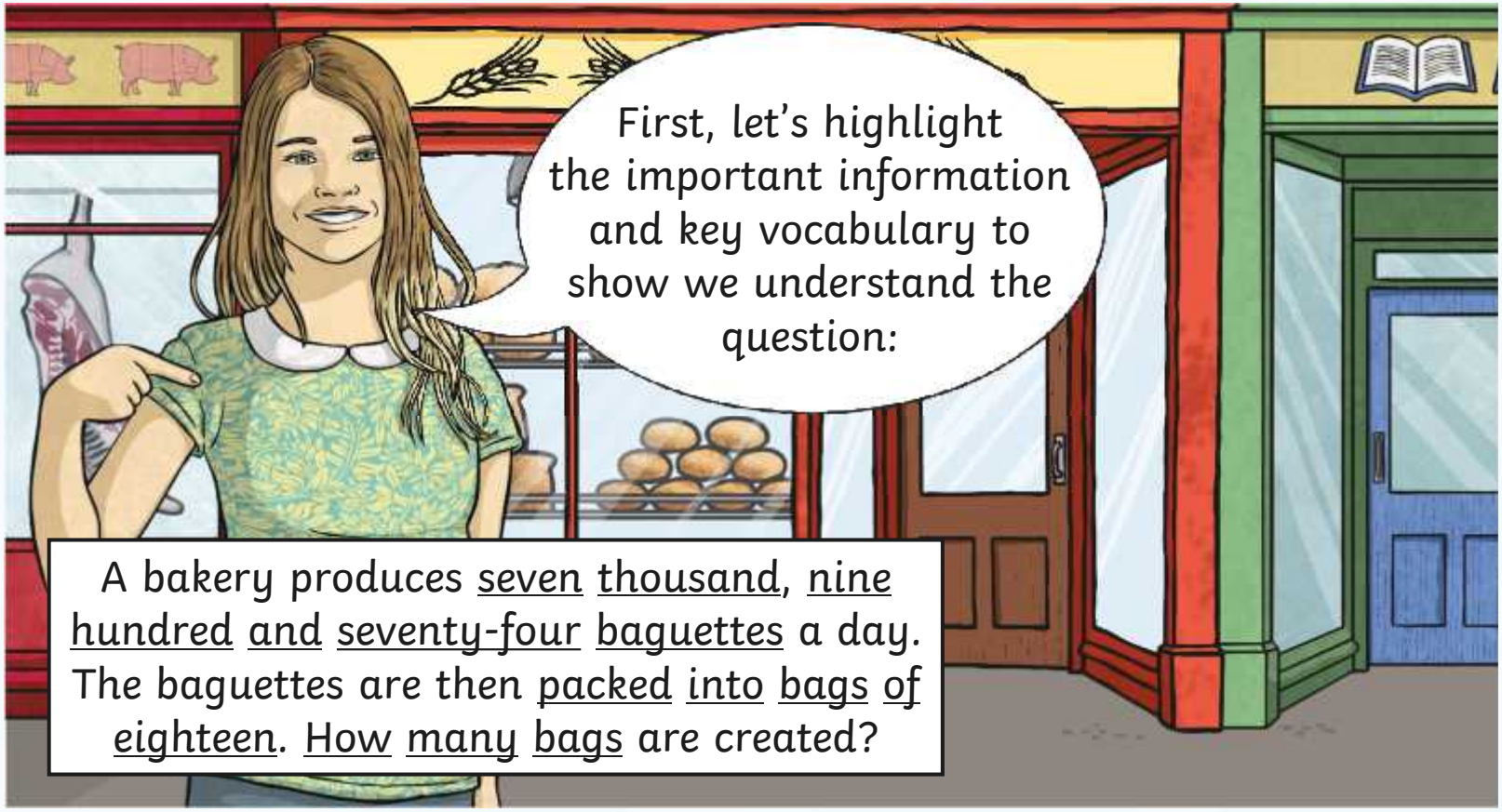
- I can solve reasoning questions using the formal method of long division.

# Success Criteria

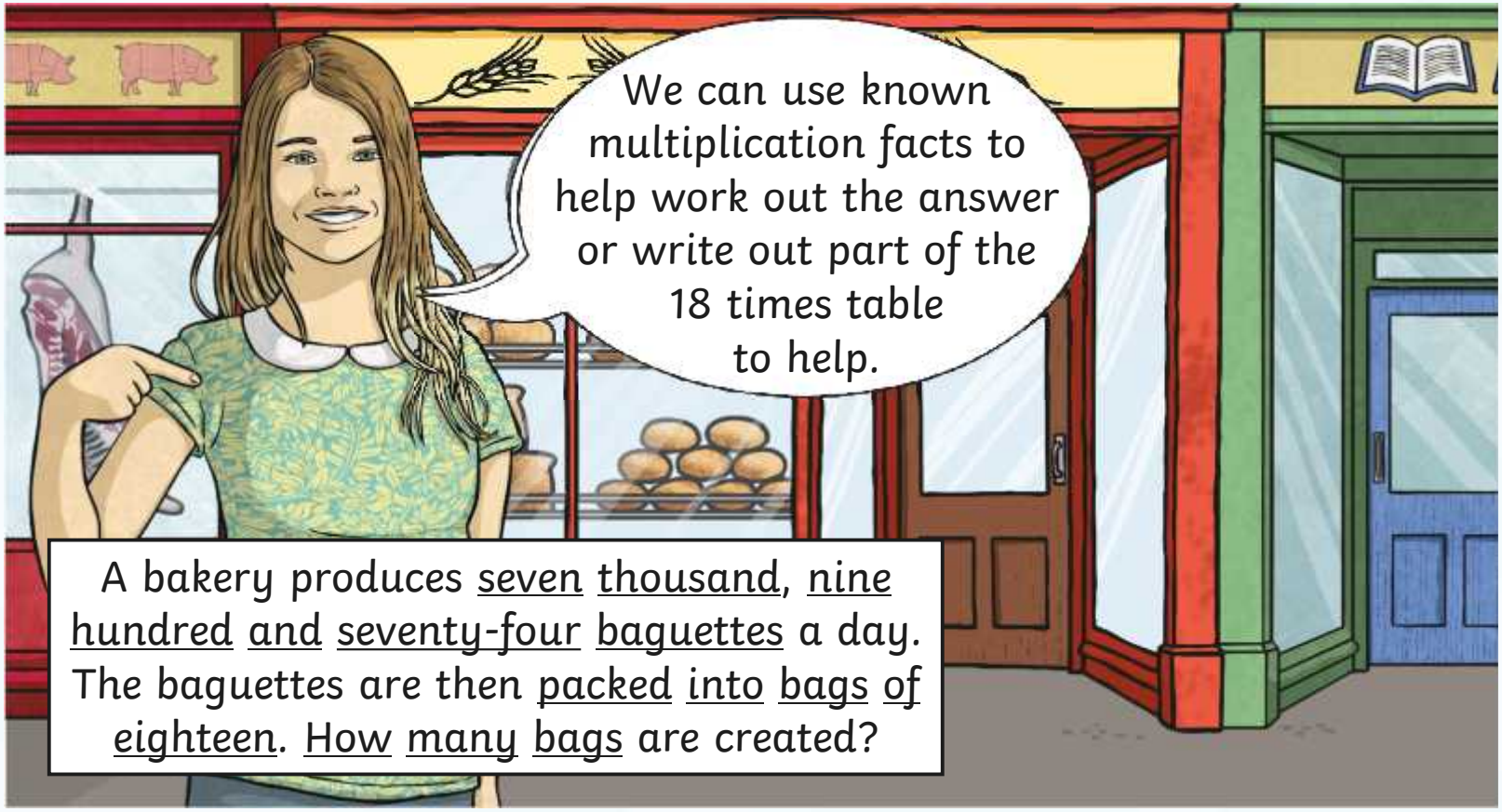
- I can break down complex problems into smaller steps.
- I can use mathematical language to explain solutions to problems.

# Long Division Reasoning 1a

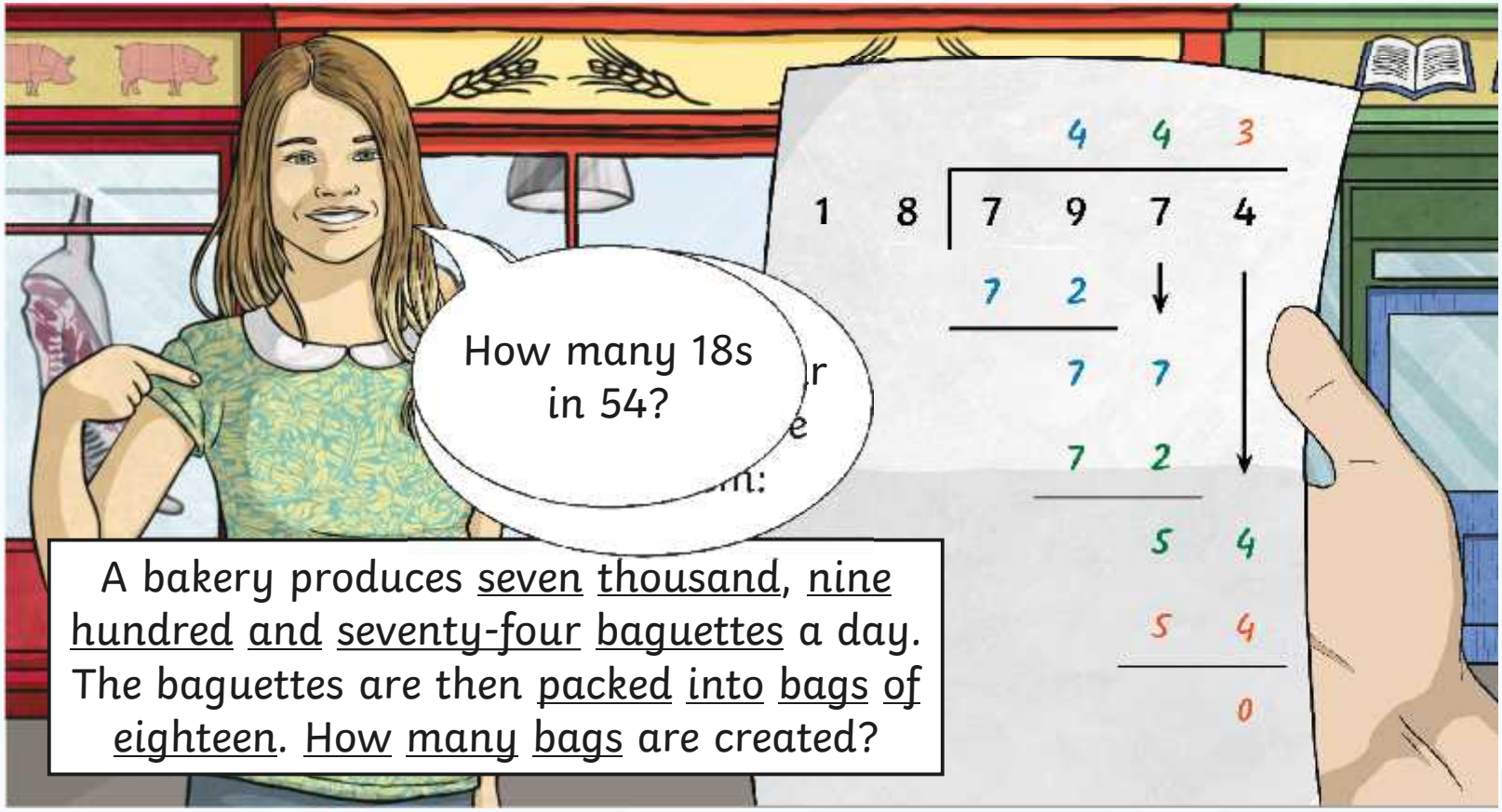
Read this reasoning question carefully.



# Long Division Reasoning 1a



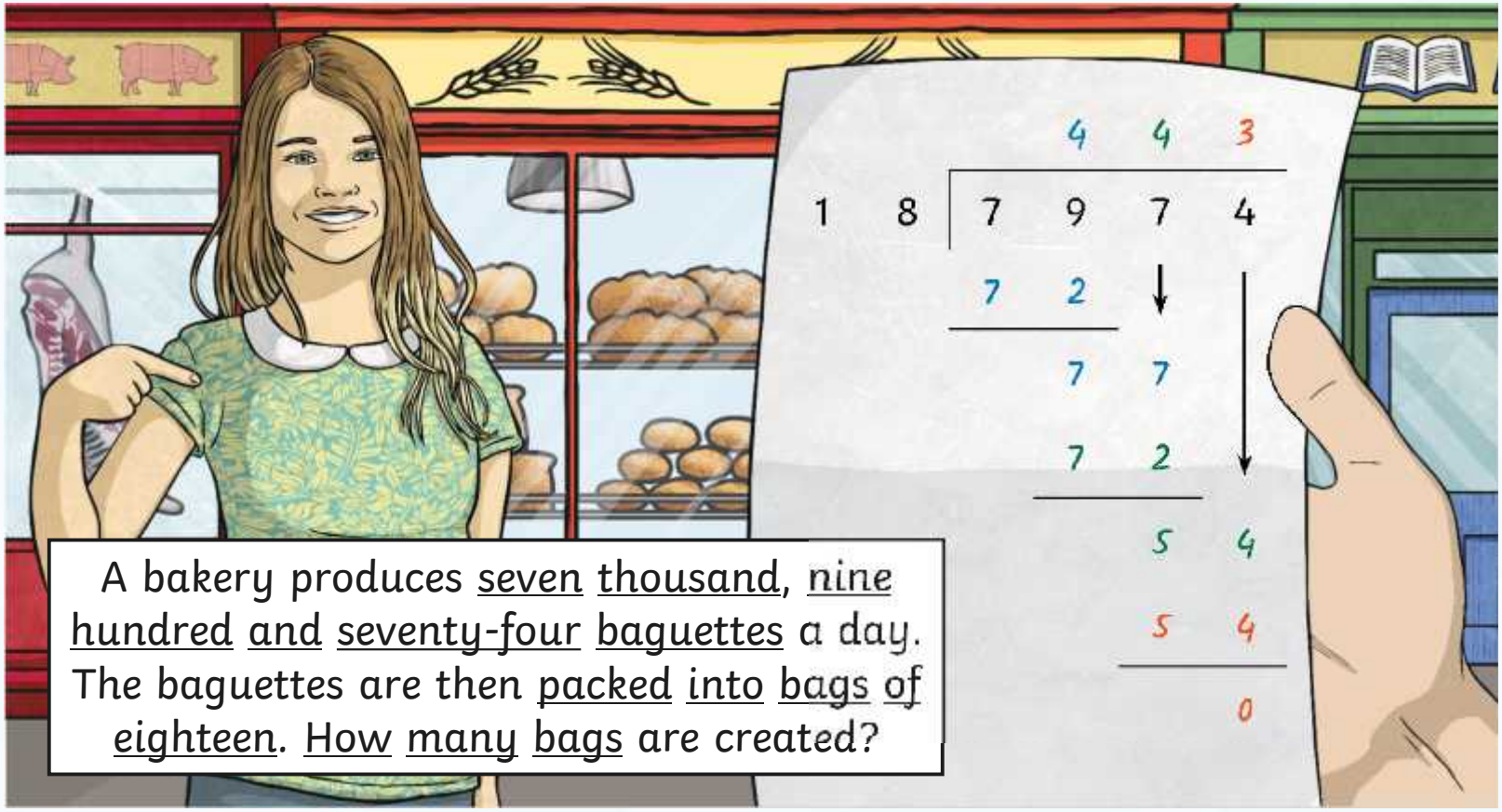
# Long Division Reasoning 1a




A bakery produces seven thousand, nine hundred and seventy-four baguettes a day. The baguettes are then packed into bags of eighteen. How many bags are created?

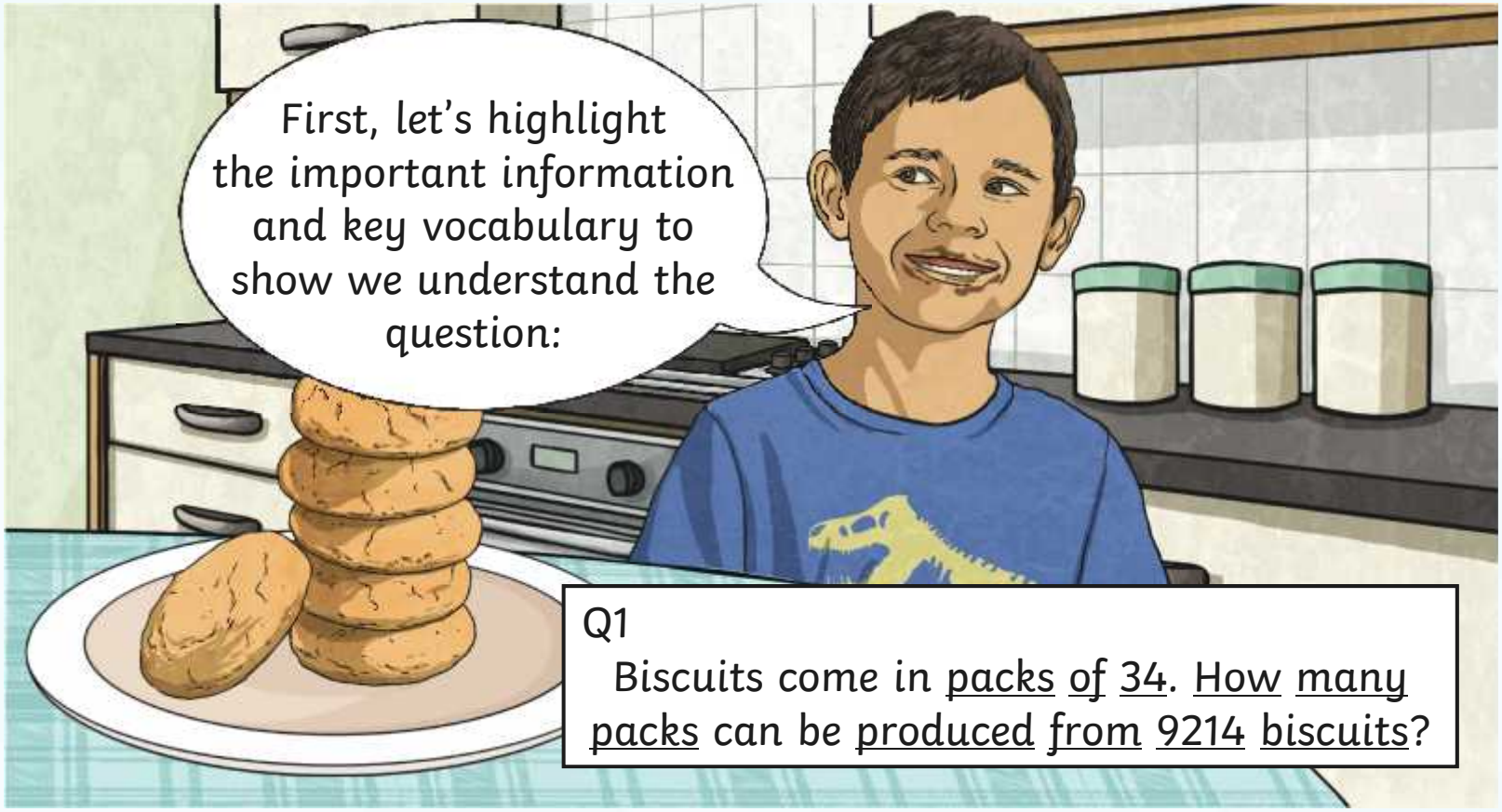
# Long Division Reasoning 1a

Finally, let's check our answer with the information and key vocabulary in the question to make sure we have answered the question fully:



# Long Division Reasoning 1b

Working with a partner, use your reasoning skills to solve the first question on your Long Division Talk Partner Activity Sheet.



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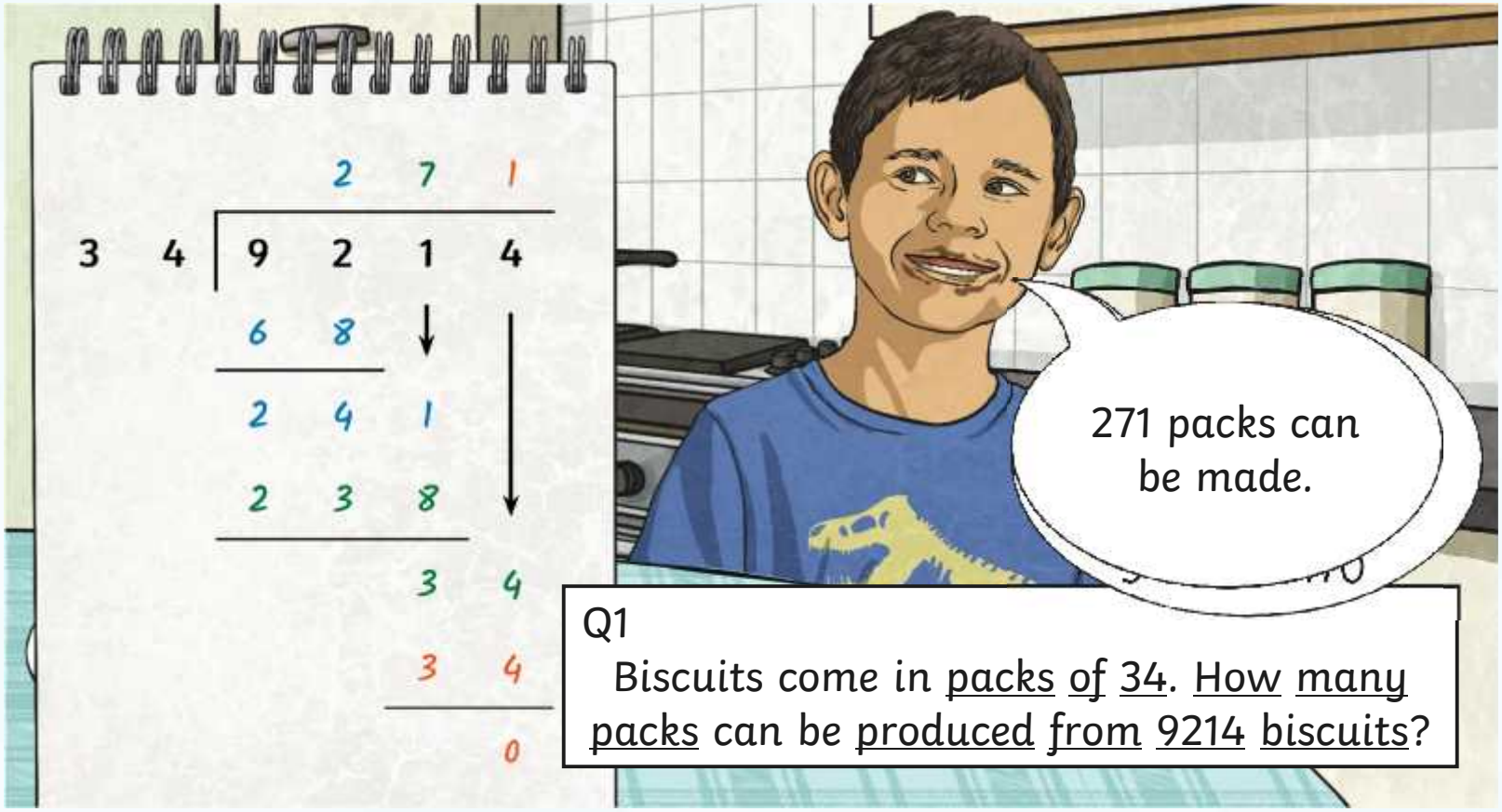
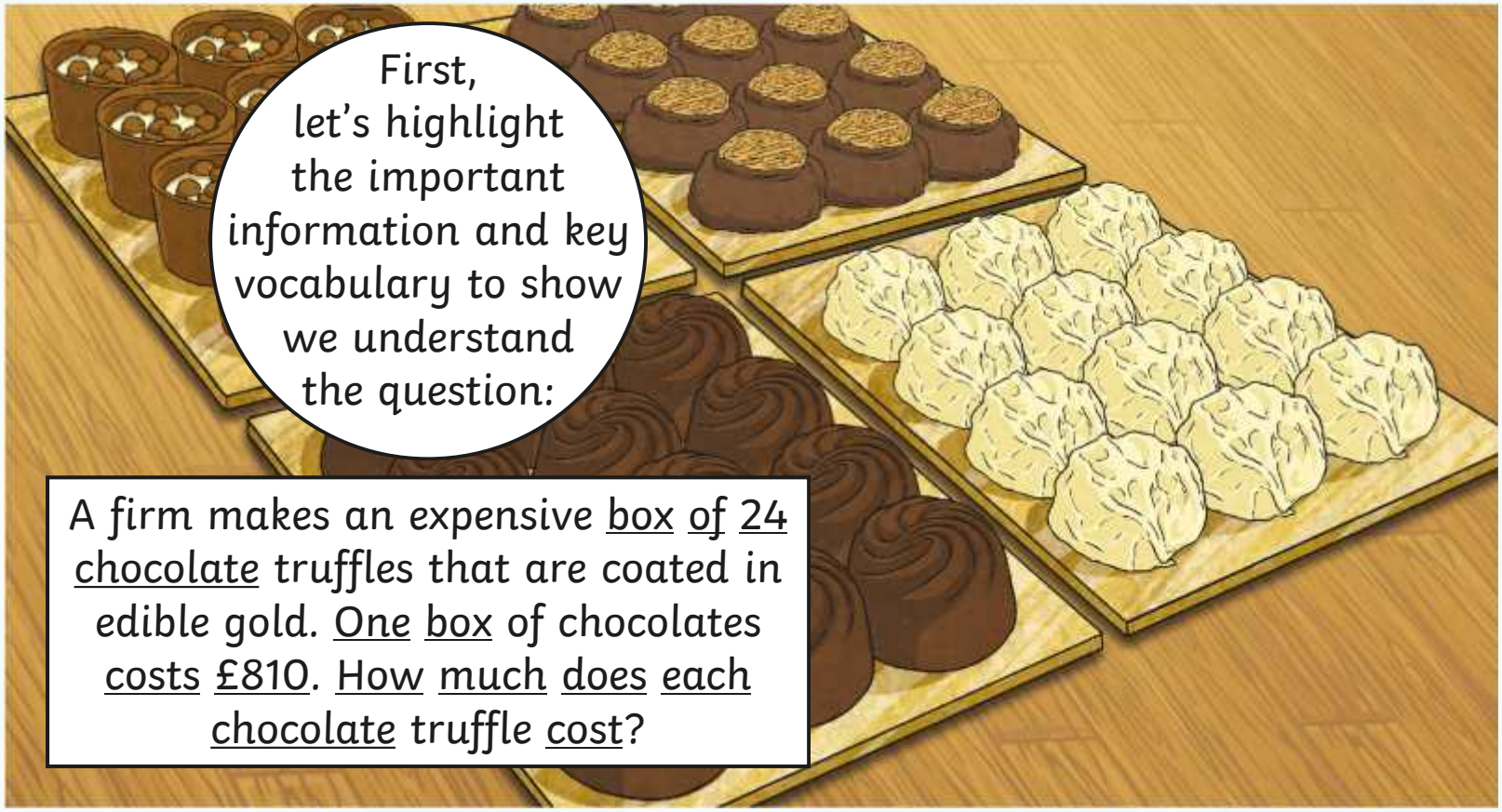



Q1

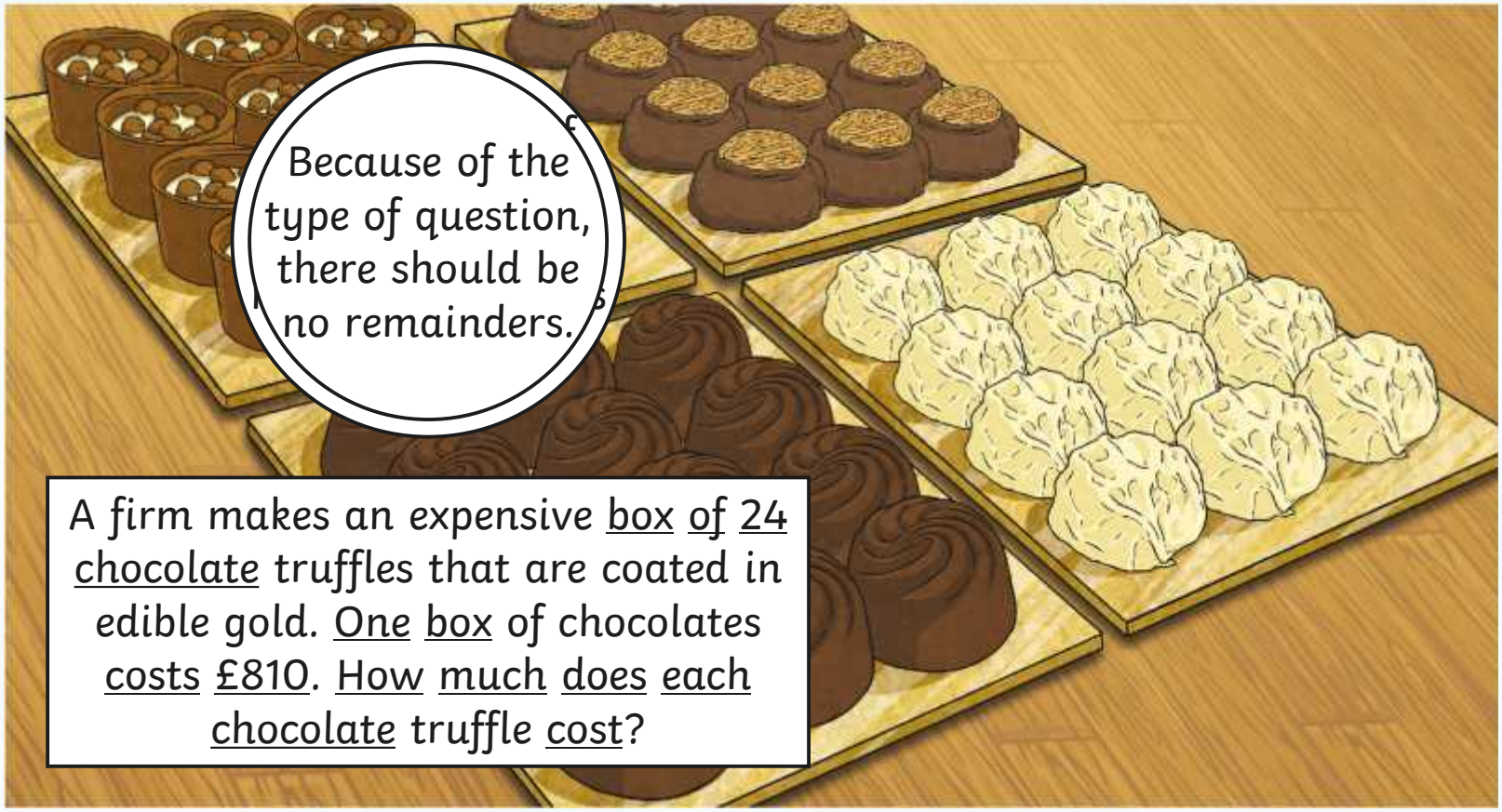
Biscuits come in packs of 34. How many packs can be produced from 9214 biscuits?

# Long Division Reasoning 2a

Read this reasoning question carefully.

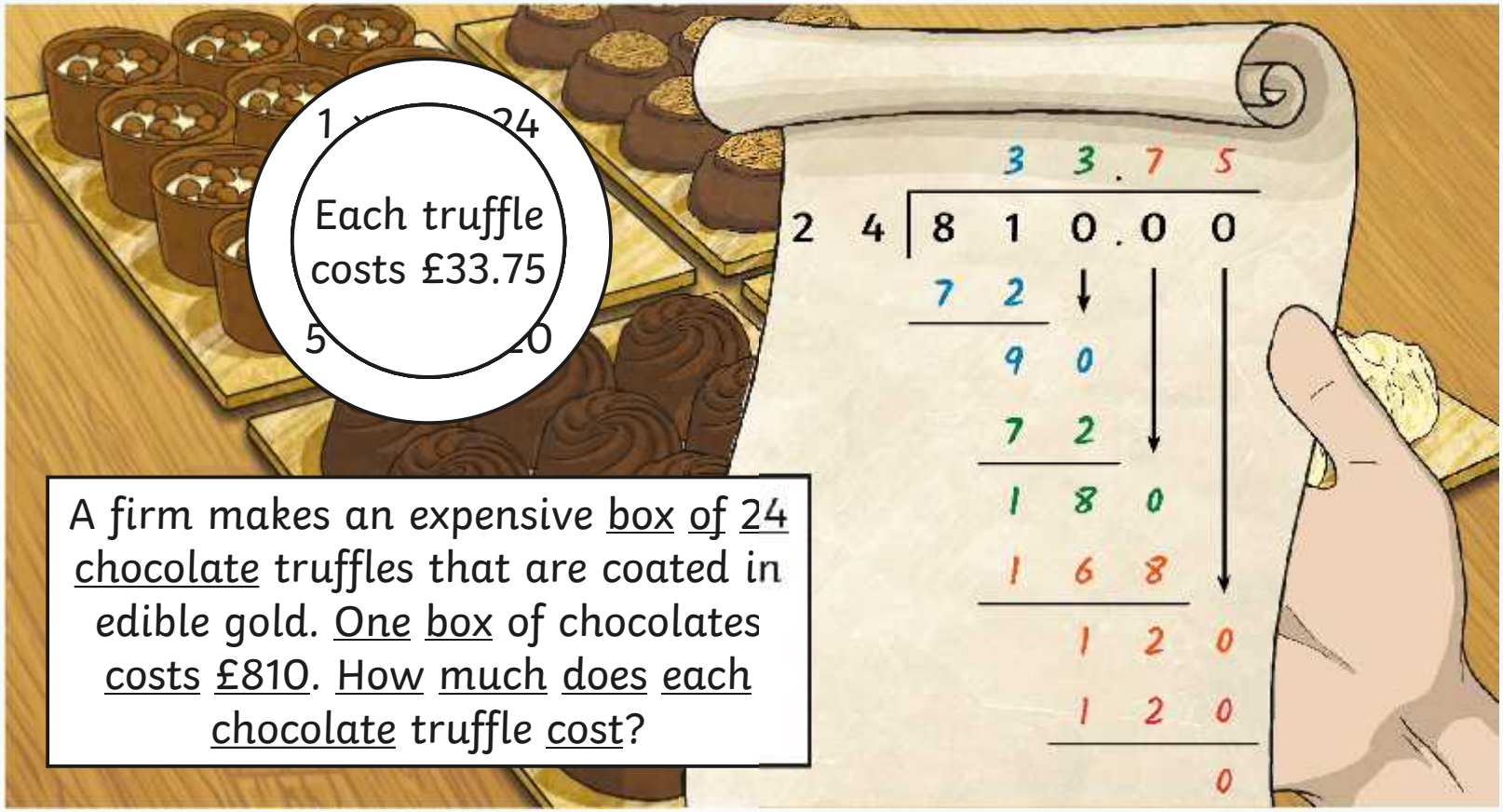


# Long Division Reasoning 2a




A firm makes an expensive box of 24 chocolate truffles that are coated in edible gold. One box of chocolates costs £810. How much does each chocolate truffle cost?

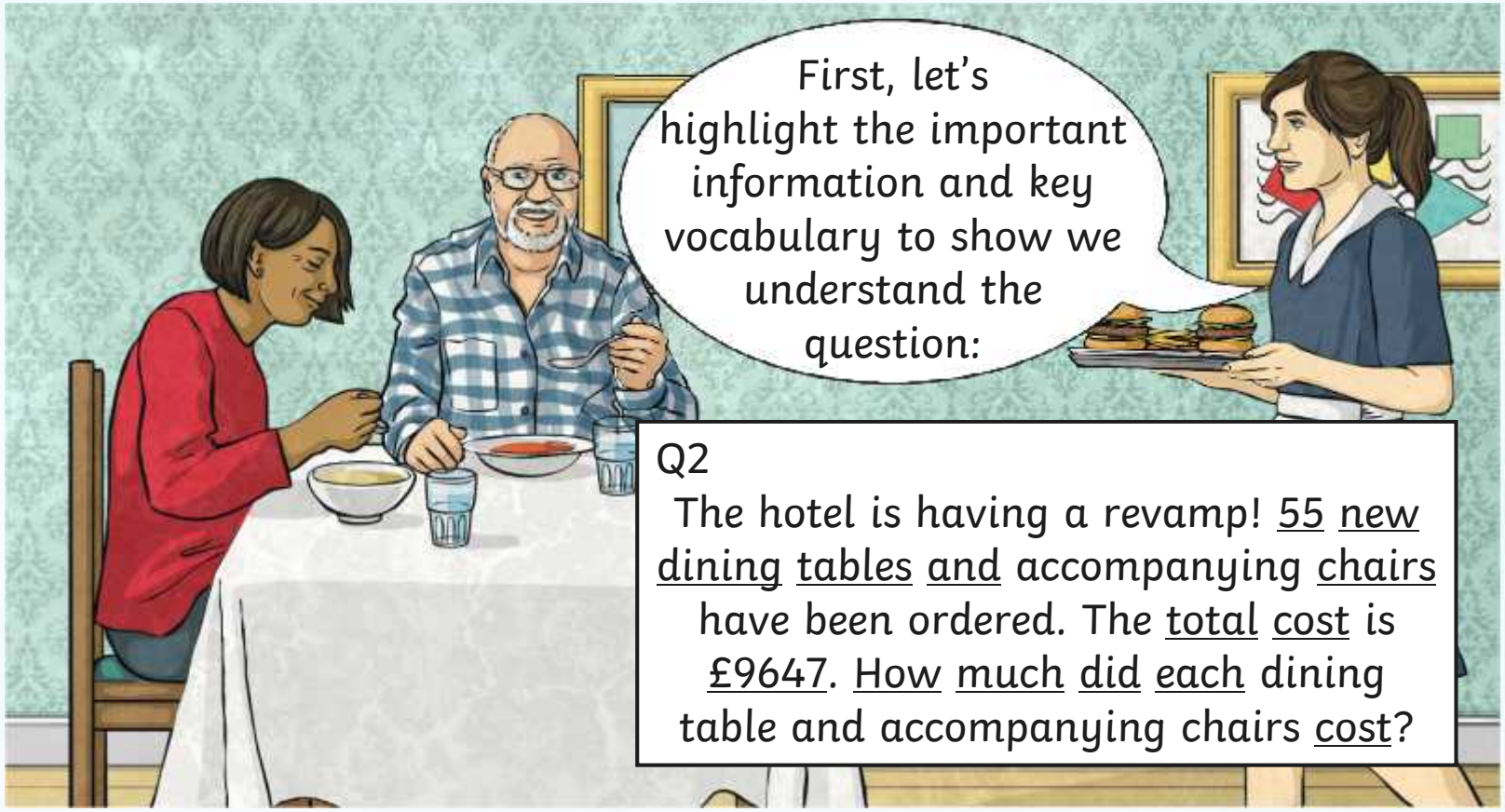
# Long Division Reasoning 2a




A firm makes an expensive box of 24 chocolate truffles that are coated in edible gold. One box of chocolates costs £810. How much does each chocolate truffle cost?

# Long Division Reasoning 2b

Working with a partner, use your reasoning skills to solve the second question on your Long Division Talk Partner Activity Sheet.



# Long Division Reasoning 2b

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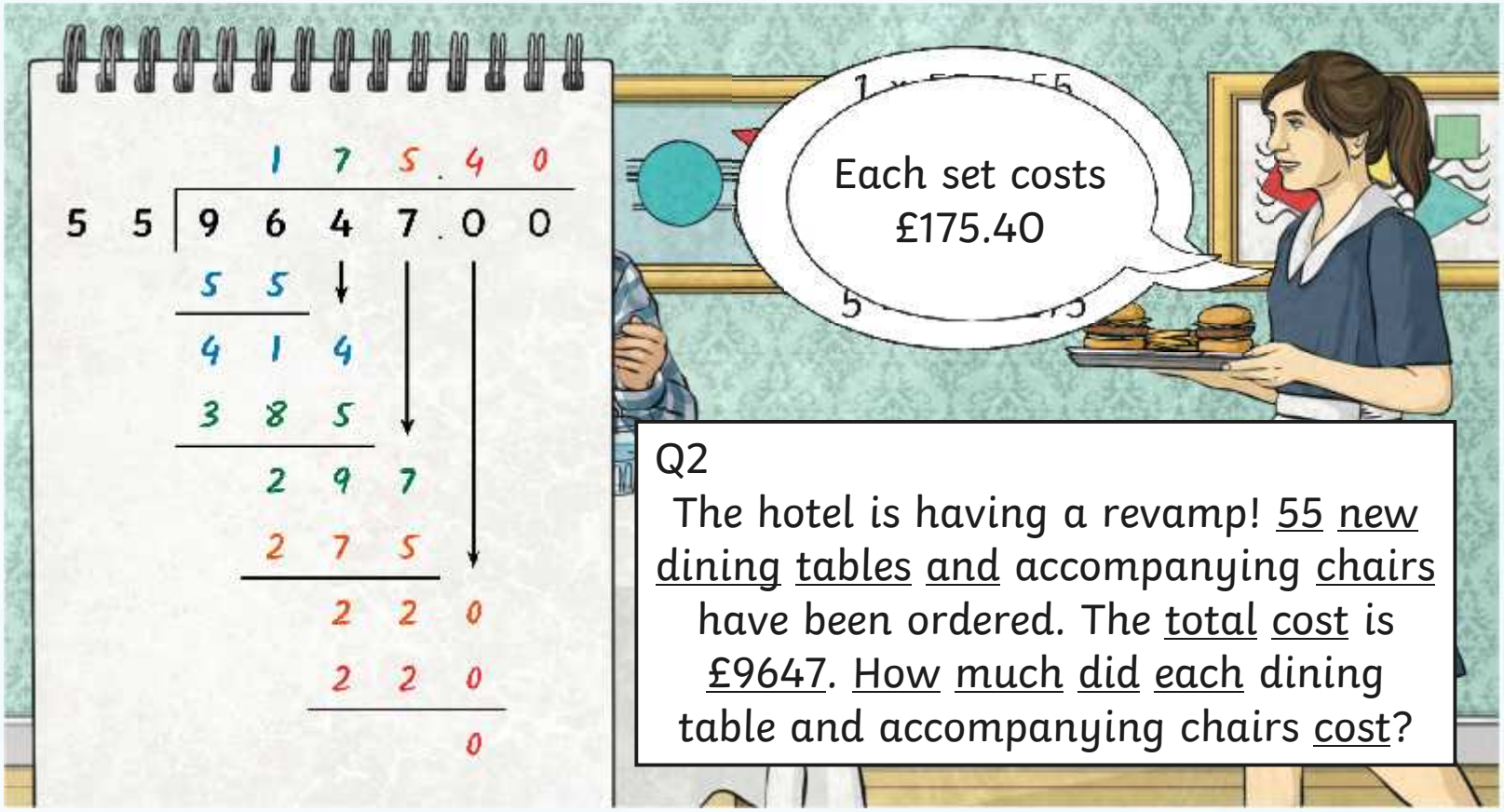



Q2

The hotel is having a revamp! 55 new dining tables and accompanying chairs have been ordered. The total cost is £9647. How much did each dining table and accompanying chairs cost?

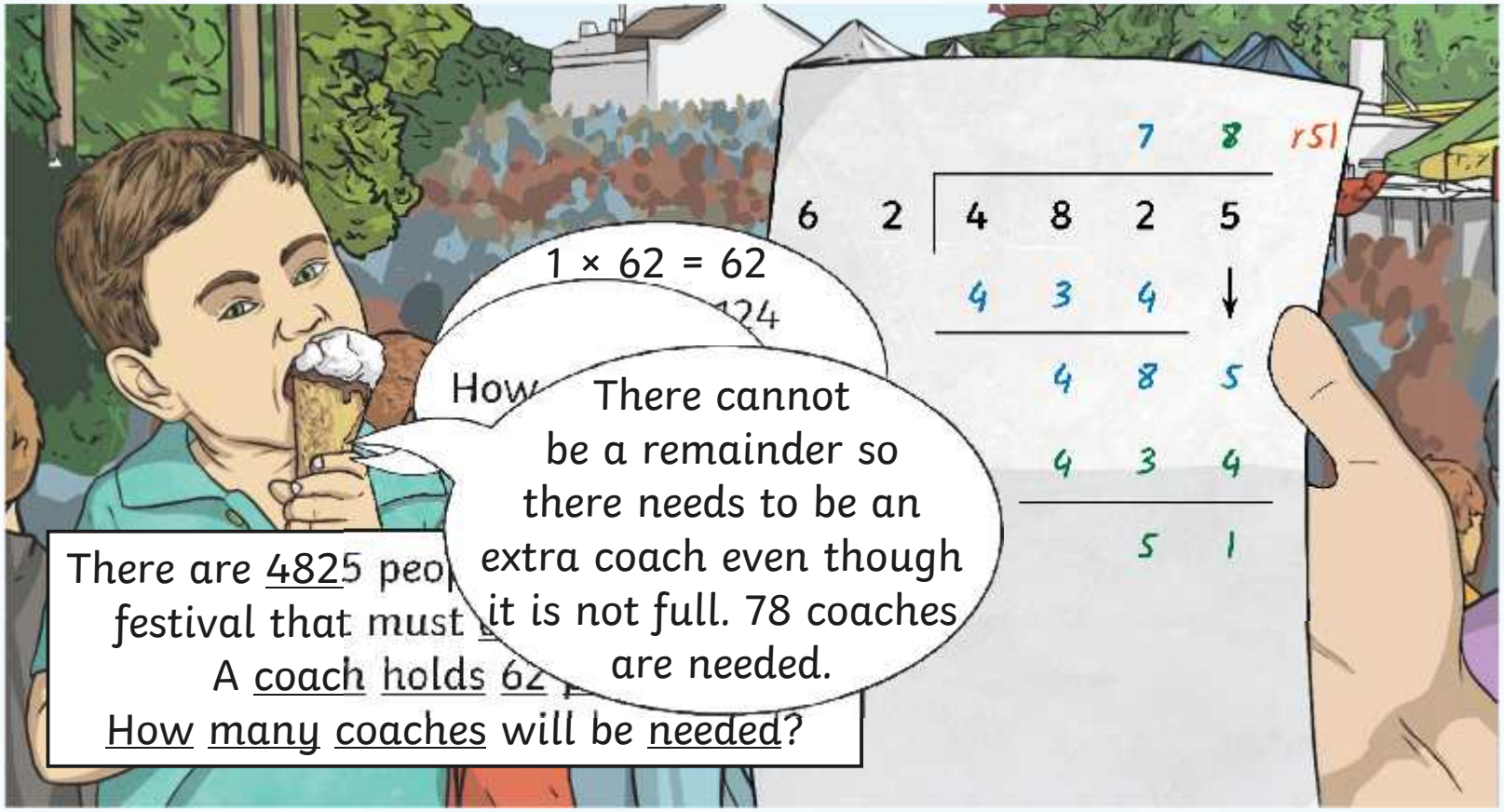
# Long Division Reasoning 3a

Read this reasoning question carefully.

# Long Division Reasoning 3a

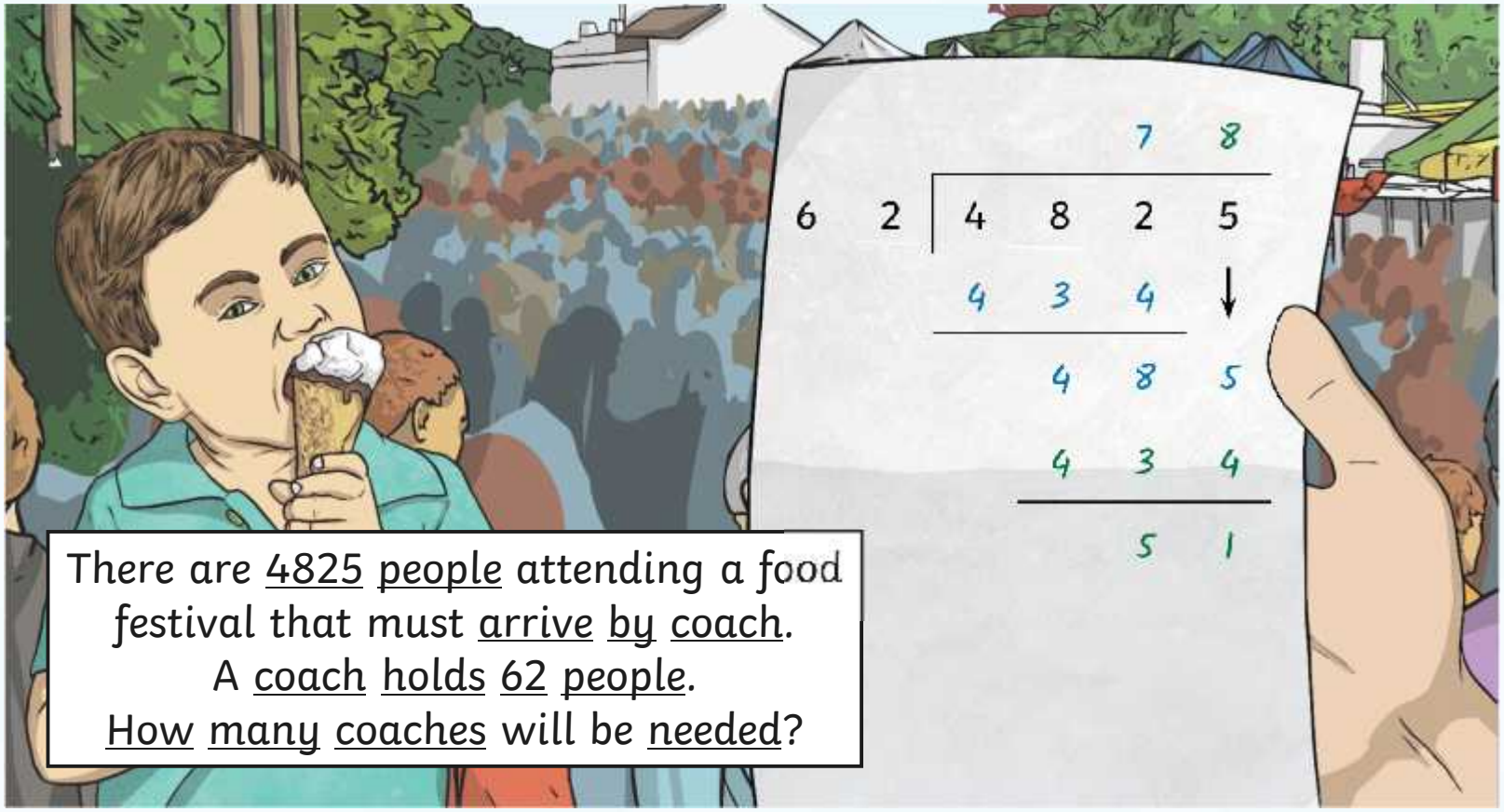
There are 4825 people attending a food festival that must arrive by coach.
A coach holds 62 people.
How many coaches will be needed?

# Long Division Reasoning 3a



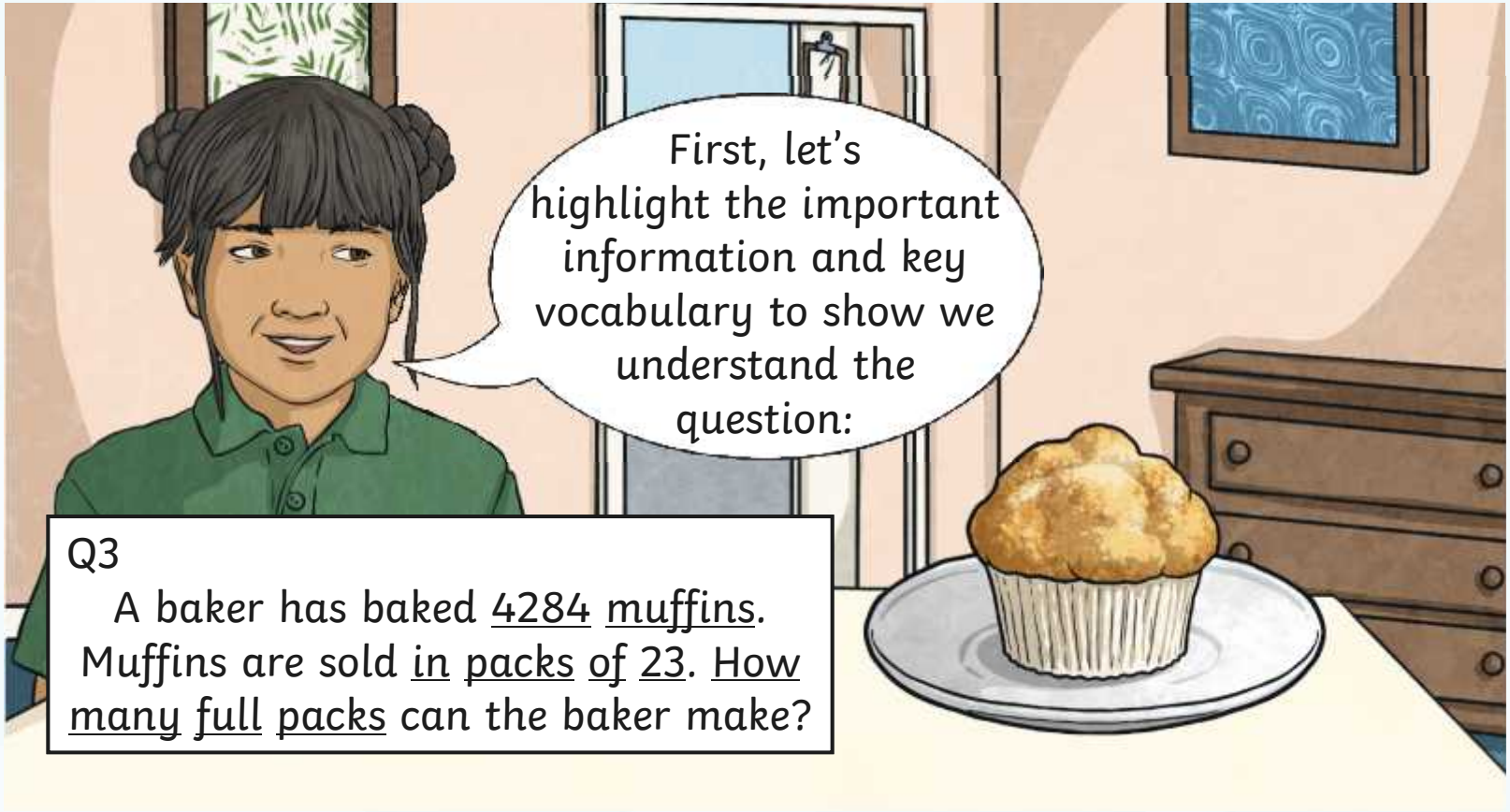
# Long Division Reasoning 3a

Finally, let's check our answer with the information and key vocabulary in the question to make sure we have answered the question fully.



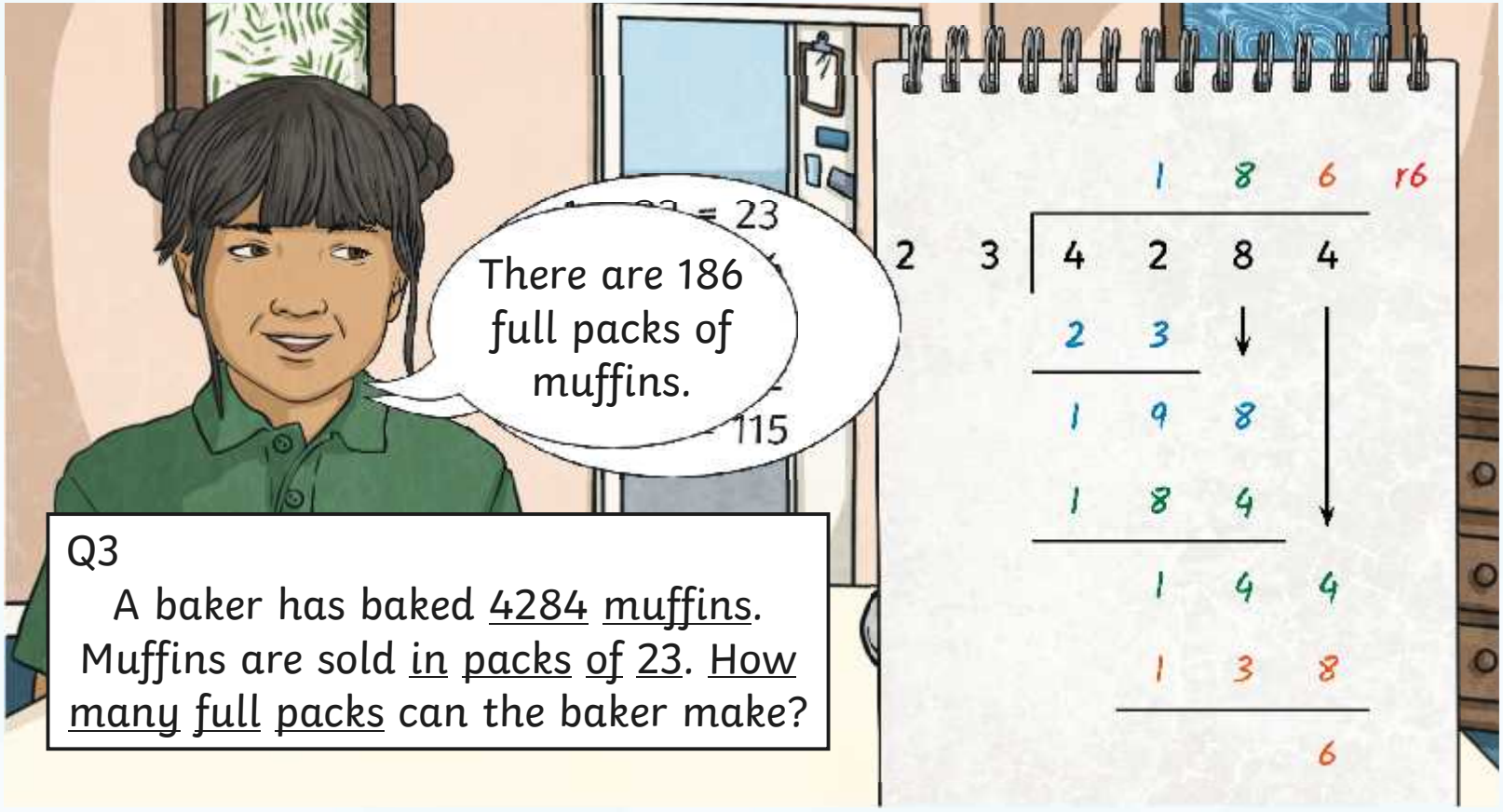
# Long Division Reasoning 3b

Working with a partner, use your reasoning skills to solve the third question on your Long Division Talk Partner Activity Sheet.



# Long Division Reasoning 3b

Working with a partner, use your reasoning skills to solve the third question on your Long Division Talk Partner Activity Sheet.

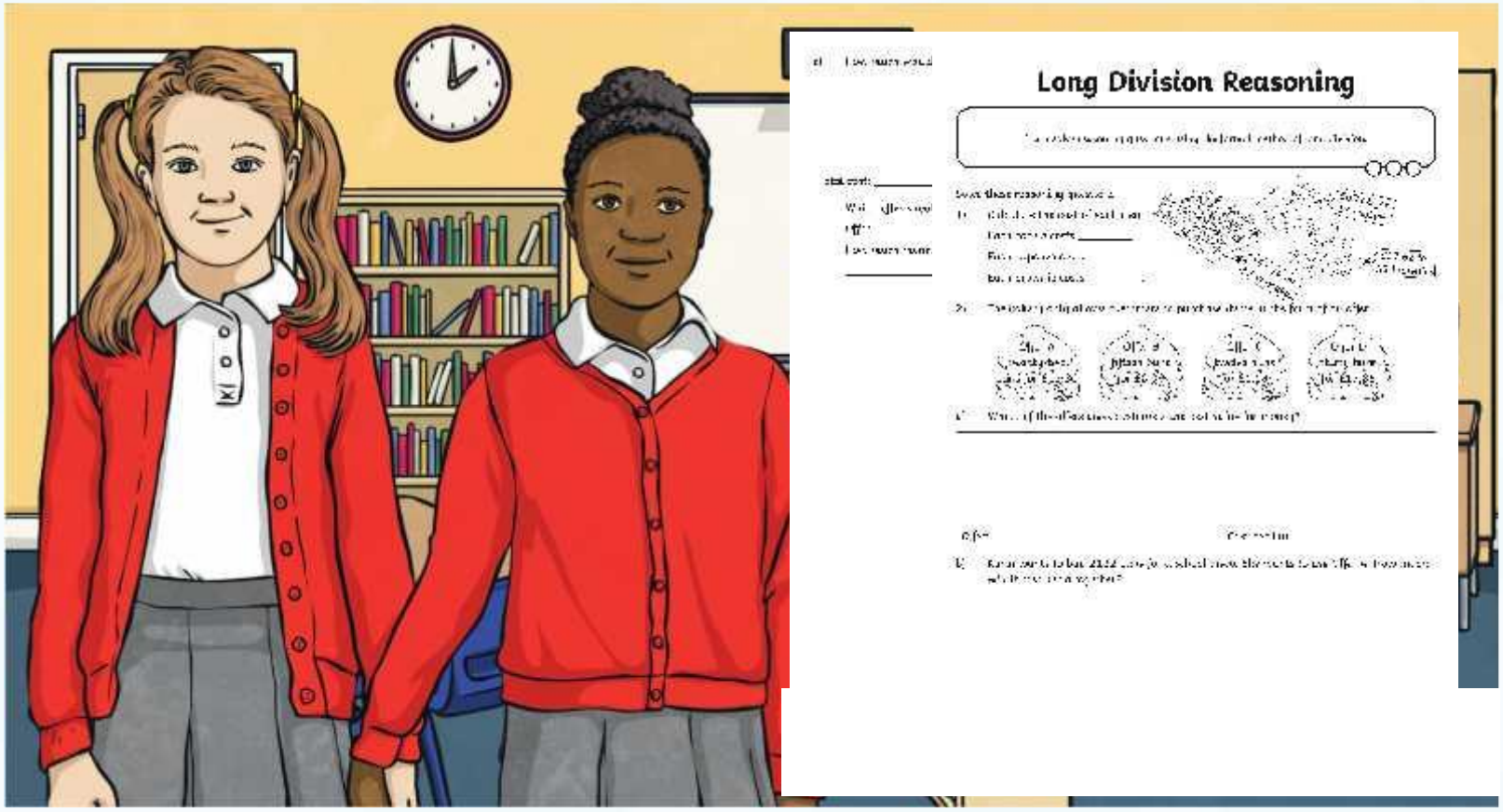



Q3

A baker has baked 4284 muffins. Muffins are sold in packs of 23. How many full packs can the baker make?

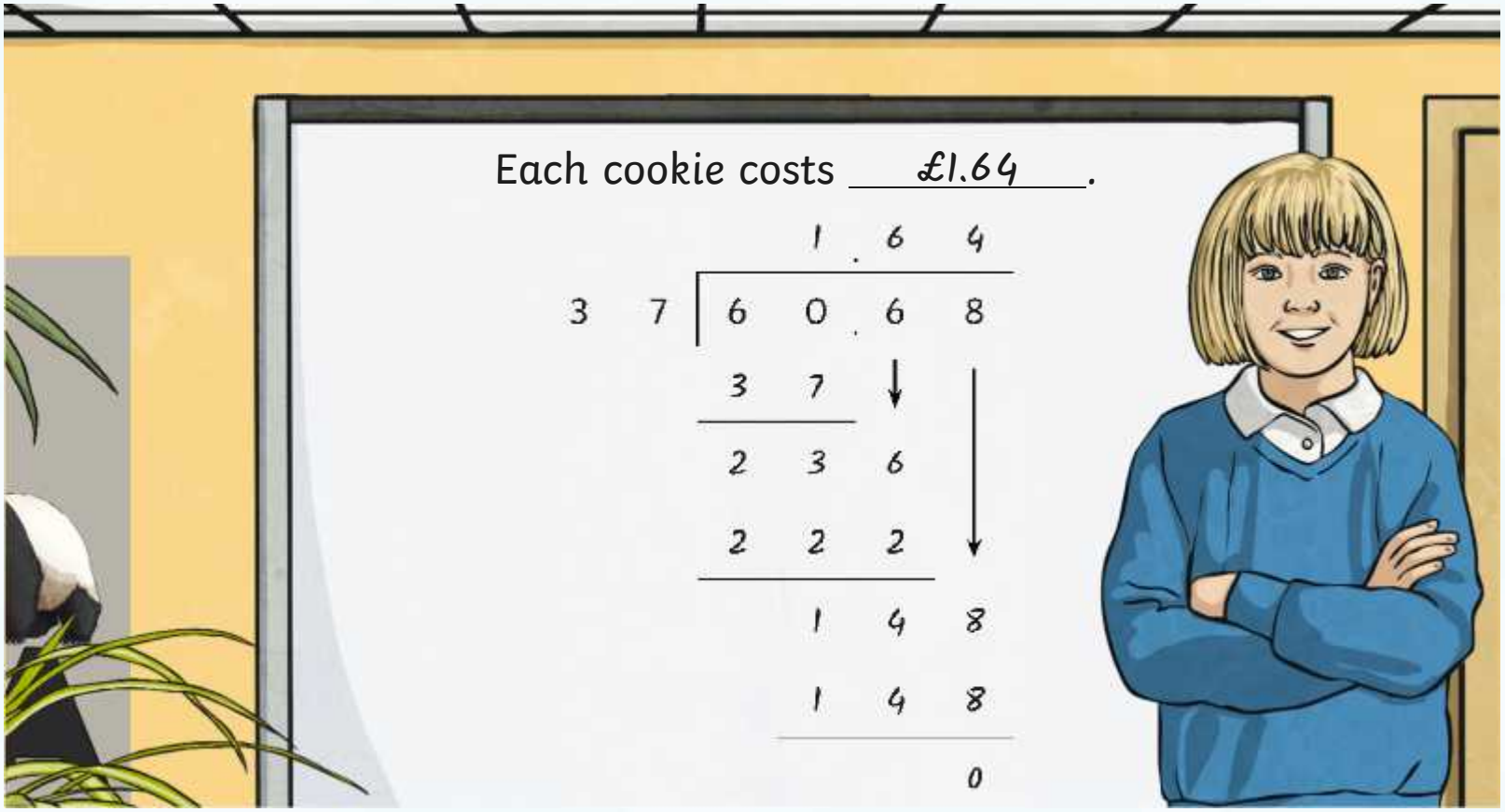
# Reasoning Practice

In pairs, have a go at solving the reasoning questions on your Long Division Reasoning Activity Sheet.



# Reasoning Answers

Calculate the cost of each item.



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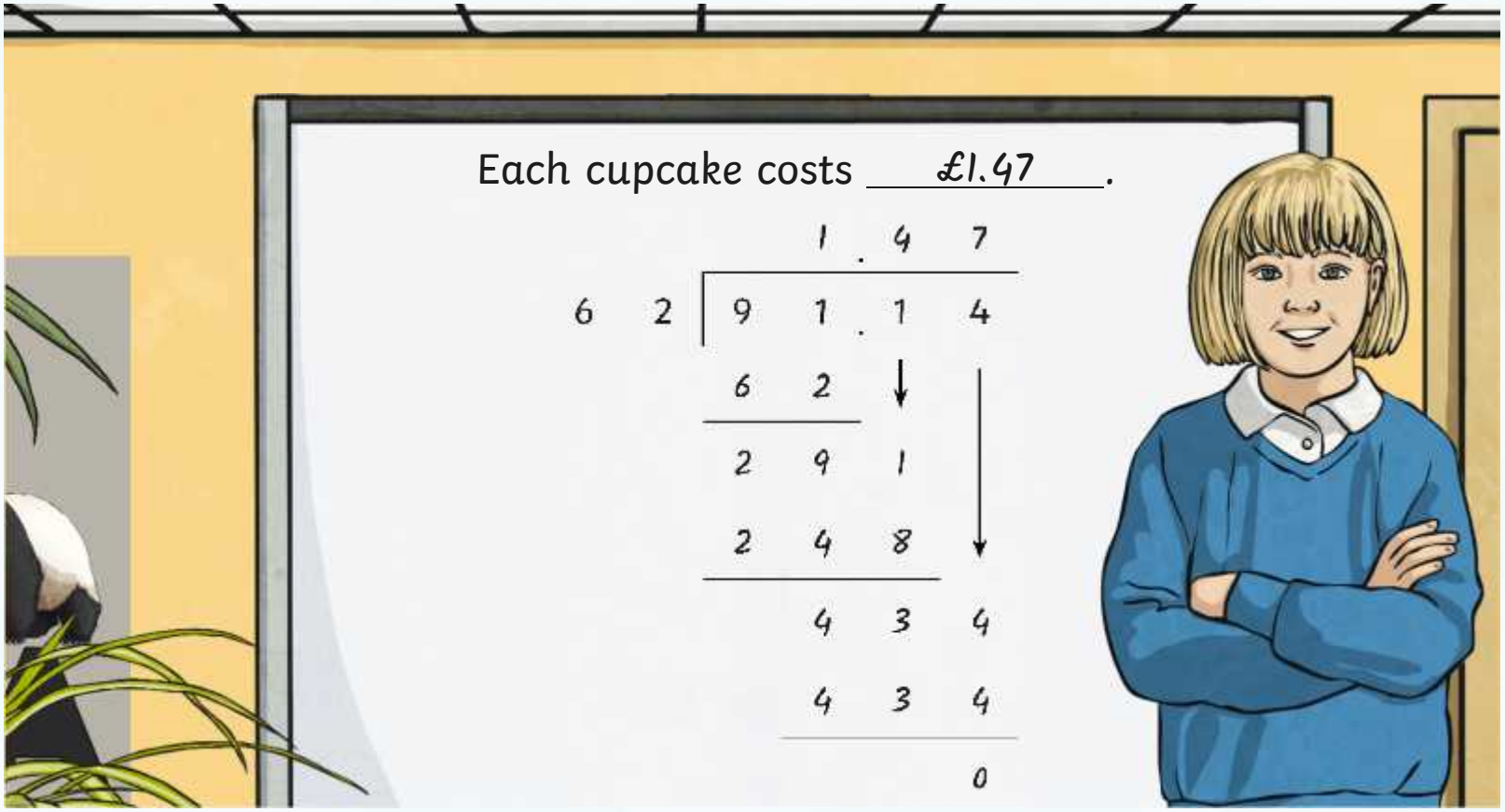

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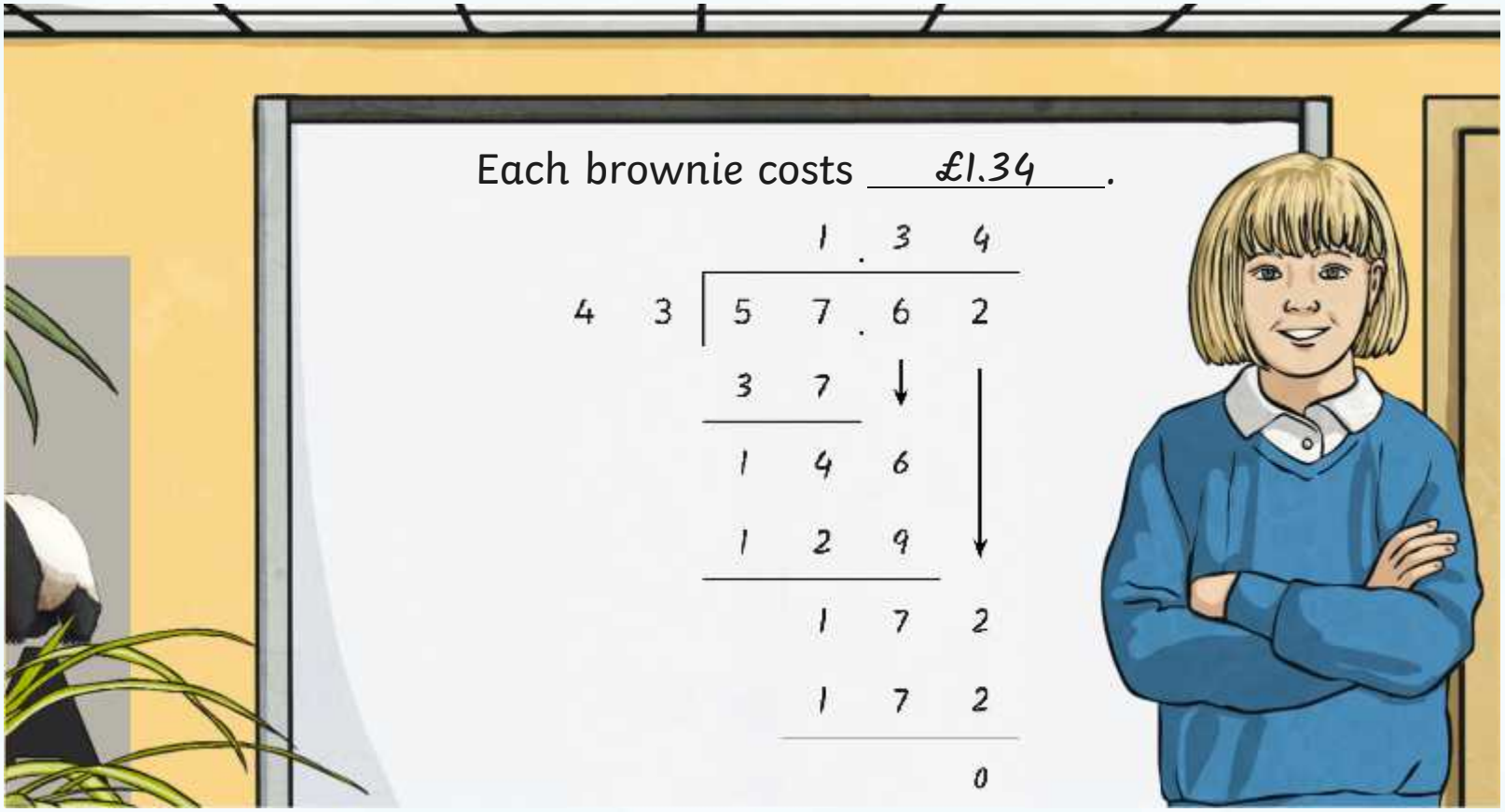
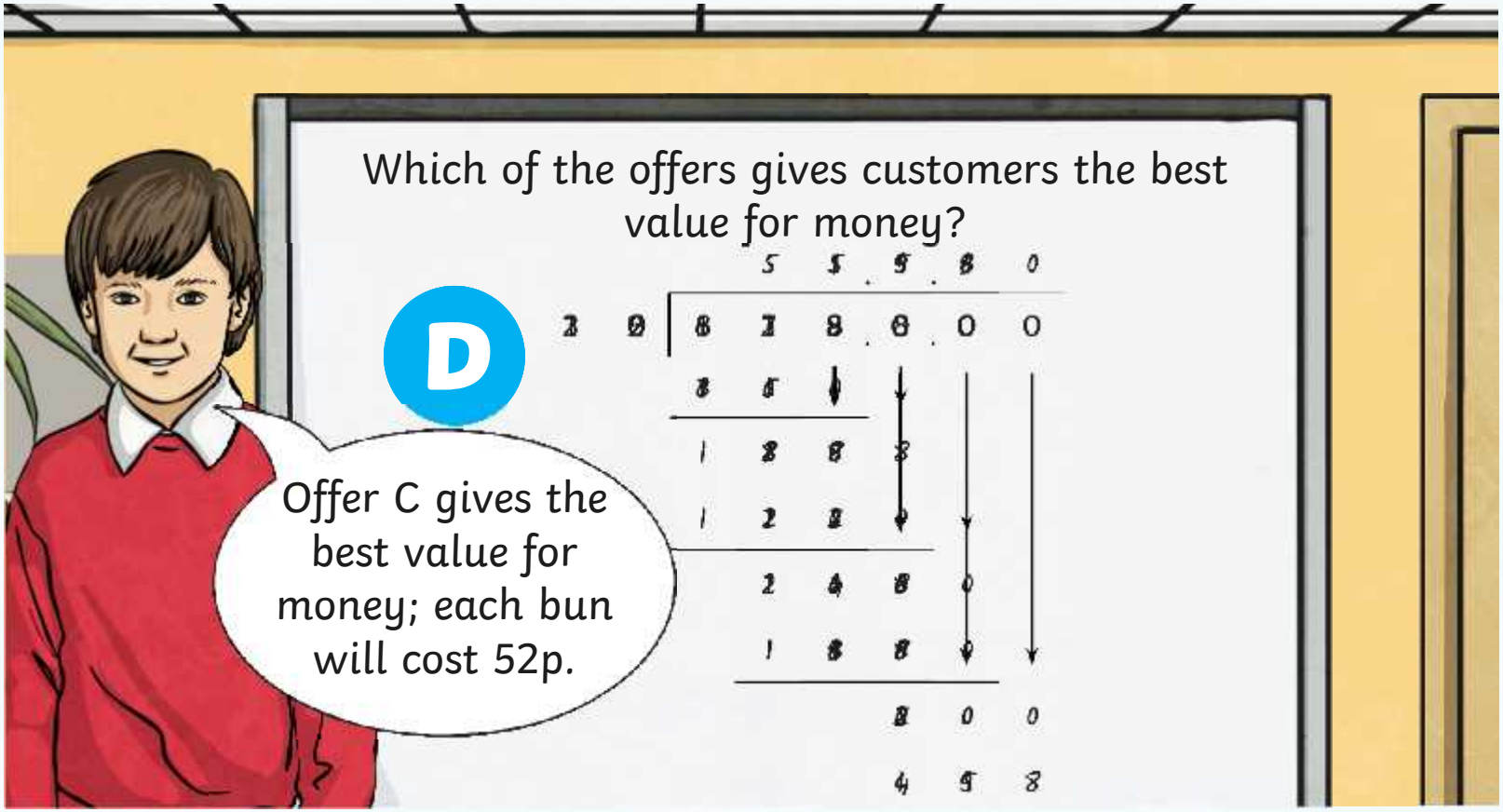


# Reasoning Answers

The bakery only allows customers to purchase items in the form of an offer.



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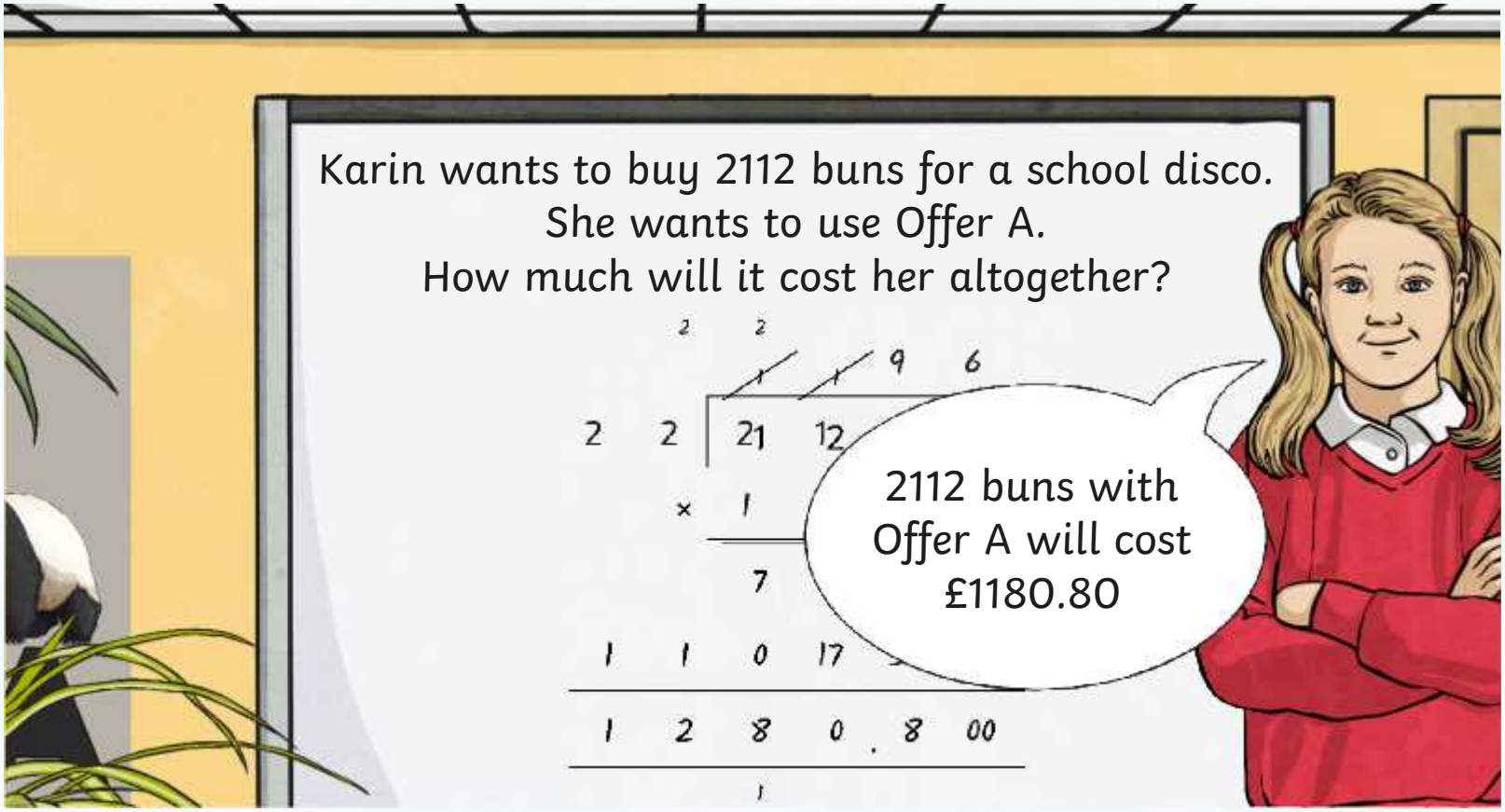

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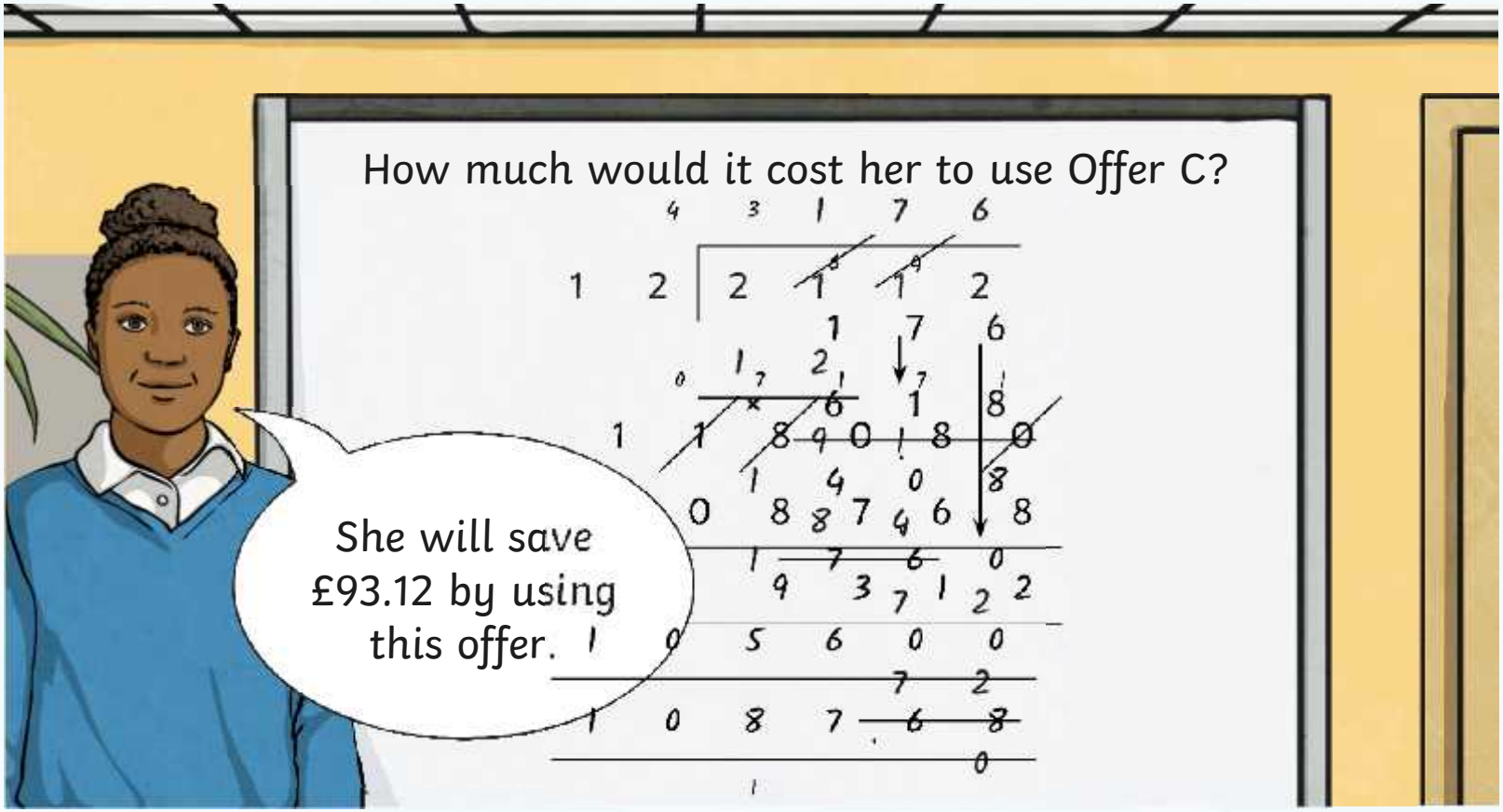
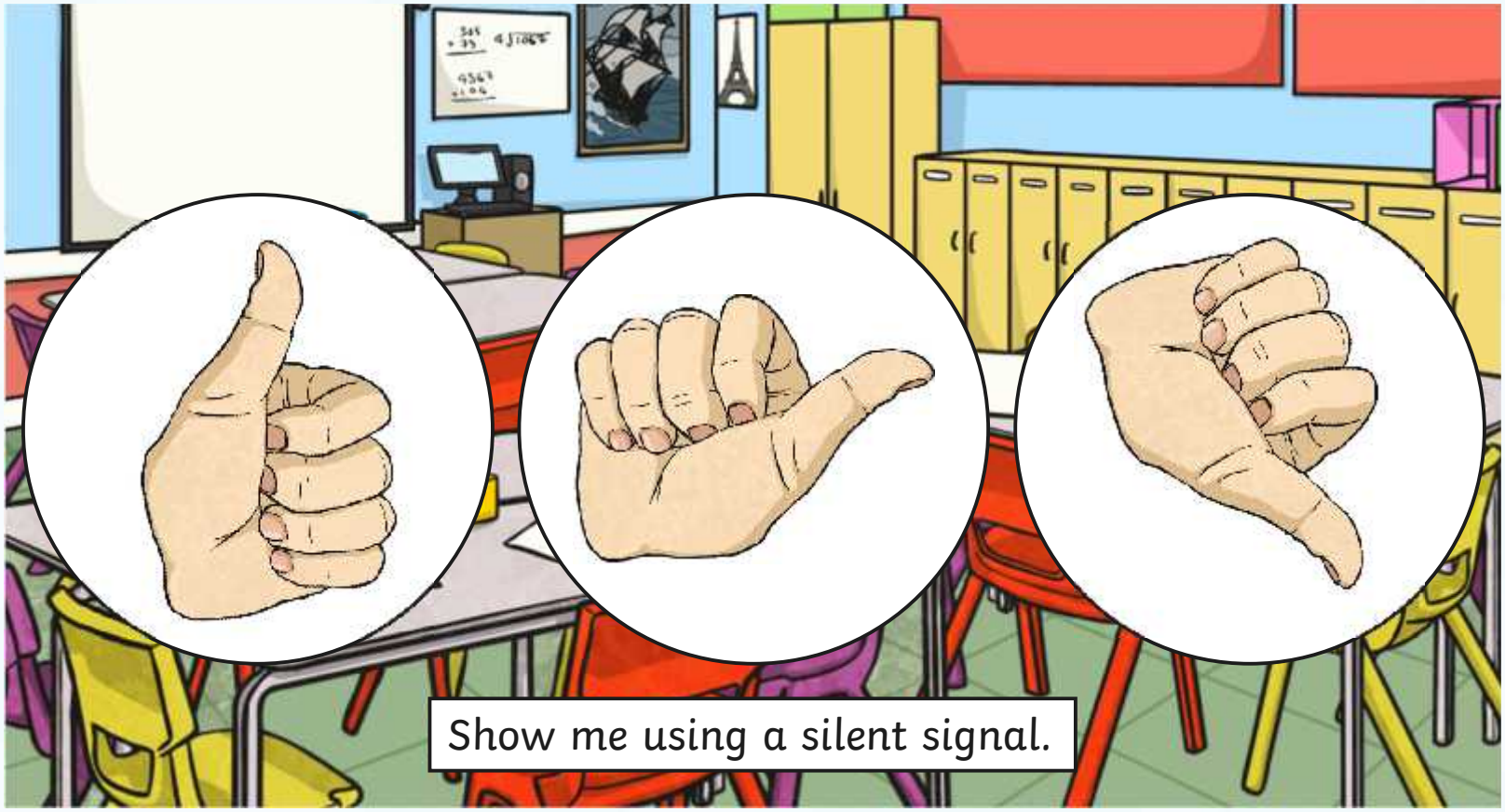


# Reasoning Answers

How confident do you feel about using long division in reasoning questions?



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Addition, Subtraction, Multiplication and Division | Long Division Reasoning

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