

Addition, Subtraction, Multiplication and Division

Maths | Year 6 | Steps to Progression Overview

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 [National Curriculum Overview](#): '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 of 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.

Independent Mental Calculations

I can solve reasoning questions involving addition, subtraction, multiplication and division.



Solve these reasoning questions. Choose the challenge best for you. Use the space provided to jot down significant numbers.

★	★★	★★★
<p>A box contains 36 soft toys. How many soft toys are there in 19 boxes?</p> <div></div> <p>_____ soft toys.</p>	<p>Each cake weighs 2957 grams. What would be the total weight of 43 cakes?</p> <div></div> <p>They weighed _____</p>	<p>Grandma shared ninety-one pounds between her seven grandchildren. Then they each received £7.75 from their uncle. How much did they each have?</p> <div></div> <p>_____</p>



Rufus raised money for two different charities. For charity one, he raised £10 956 and for charity two, he raised £26 946. How much money did he raise altogether?



Emily bought some items from a shop: a hat cost £9.85, a scarf cost £15.15 and a pair of gloves cost £14.92. How much did she spend altogether?

Emily spent _____ altogether.



Tarquin had five bags, each containing £51.10. He spent £125. How much did he have remaining?

Tarquin has _____ remaining.





Kendal had 810 trading cards. He shared them between nine people. How many trading cards did they each receive?

_____ cards each.



Kamil raised £118 for his chosen charities. He shared the money raised between eight different charities. How much did each charity receive?

Each charity received _____



Alicia says, 'If you divide 800 by 400, divide the answer by 1 and the multiply it by 20, the answer is 400'. Is she correct? Explain your answer.

Alicia is _____ because



Independent Mental Calculations **Answers**

Question	Answer
A box contains 36 soft toys. How many soft toys are there in 19 boxes?	
★	684 soft toys.
Each cake weighed 6.35kg. How much did eight cakes weigh?	
★★	They weigh 50.8kg .
Grandma shared ninety-one pounds between her seven grandchildren. Then they each received £7.75 from their uncle. How much did they each have?	
★★★	They each had £20.75 .
Rufus raised money for two different charities. For charity one, he raised £10 956 and for charity two, he raised £26 946. How much money did he raise altogether?	
★	£37 902
Emily bought some items from a shop: a hat cost £9.85, a scarf cost £15.15 and a pair of gloves cost £14.92. How much did she spend altogether?	
★★	Emily spent £39.92 altogether.

Tarquin had five bags, each containing £51.10. He spent £125. How much did he have remaining?	
★★★	Tarquin has £130.50 remaining.
Kendal had 810 trading cards. He shared them between nine people. How many trading cards did they each receive?	
★	90 cards each.
Kamil raised £118 for his chosen charities. He shared the money raised between eight different charities. How much did each charity receive?	
★★	Each charity received £14.75 .
Alicia says, 'If you divide 800 by 400, divide the answer by 1 and the multiply it by 20, the answer is 400'. Is she correct? Explain your answer.	
★★★	Alicia is incorrect. The answer is 40. Children's own explanation given.

Talk Partner Mental Calculations

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



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

In a section of an arena, there are 36 000 seats. How many seats are there in three sections?

Use this space for jottings if required:

_____ seats.

Maria had £25.59. She bought a scarf that cost £9.85. How much money did she have now?

Use this space for jottings if required:

Maria had _____ now.

Grandma shared £26 between four of her grandchildren. One of her grandchildren, Sven, spent £3.75. How much money did Sven have now?

Use this space for jottings if required:

Sven had _____ now.

Talk Partner Mental Calculations **Answers**

















Question	Answer
1.	In a section of an arena, there are 36 000 seats. How many seats are there in three sections?
108 000 seats.	
2.	Maria had £25.59. She bought a scarf that cost £9.85. How much money did she have now?
Maria had £15.74 now.	
3.	Grandma shared £26 between four of her grandchildren. One of her grandchildren, Sven, spent £3.75. How much money did Sven have now?
Sven had £2.75 now.	

Addition, Subtraction, Multiplication and Division: Mental Calculations Reasoning

Aim: Perform mental calculations, including with mixed operations and large numbers. I can solve reasoning questions involving addition, subtraction, multiplication and division.	Success Criteria: I can break down complex problems into smaller steps. I can use mathematical language to explain solutions to problems.	Resources: Lesson Pack
	Key/New Words: Problem solving, solutions, predict, identify, RUCSAC, reasoning.	Preparation: Mental Calculations Talk Partner Activity Sheet - 1 per pair Mental Calculations Independent Activity Sheet - 1 per child

Prior Learning: It will be helpful if children are familiar with mental calculation methods prior to the lesson.

Learning Sequence

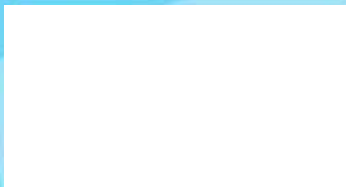
	Mental Calculation Reasoning 1a: Use the step-by-step slides from the Lesson Presentation to model how to solve one-step mental calculation problems that involve whole numbers.	
	Mental Calculation Reasoning 1b: Recording their answers on the Mental Calculations Talk Partner Activity Sheet , the children work with a partner to apply the strategy to a similar question, explaining their reasoning. Display the answers on the Lesson Presentation and discuss.	
	Mental Calculation Reasoning 2a: Use the step-by-step slides from the Lesson Presentation to model how to solve one-step mental calculations that involve decimals.	
	Mental Calculation Reasoning 2b: Recording their answers on the Mental Calculations 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.	
	Mental Calculation Reasoning 3a: Use the step-by-step slides from the Lesson Presentation to model how to solve two-step mental calculation problems.	
	Mental Calculation Reasoning 3b: Recording their answers on the Mental Calculations 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: Children complete the Mental Calculations Independent Activity Sheet to show that they can solve reasoning mental calculation questions involving addition, subtraction, multiplication and division. The questions are differentiated three ways and children are encouraged to choose the level of challenge they think is suitable for them.	
	Reasoning Answers: Using the slides from the Lesson Presentation , discuss the answers to the independent activity questions. Children self-assess how confident they feel about solving reasoning questions involving addition, subtraction, multiplication and division using a mental method.	



Maths

Addition, Subtraction,
Multiplication and Division

Mental Calculations Reasoning



Aim

- I can solve reasoning questions involving addition, subtraction, multiplication and division.

Success Criteria

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

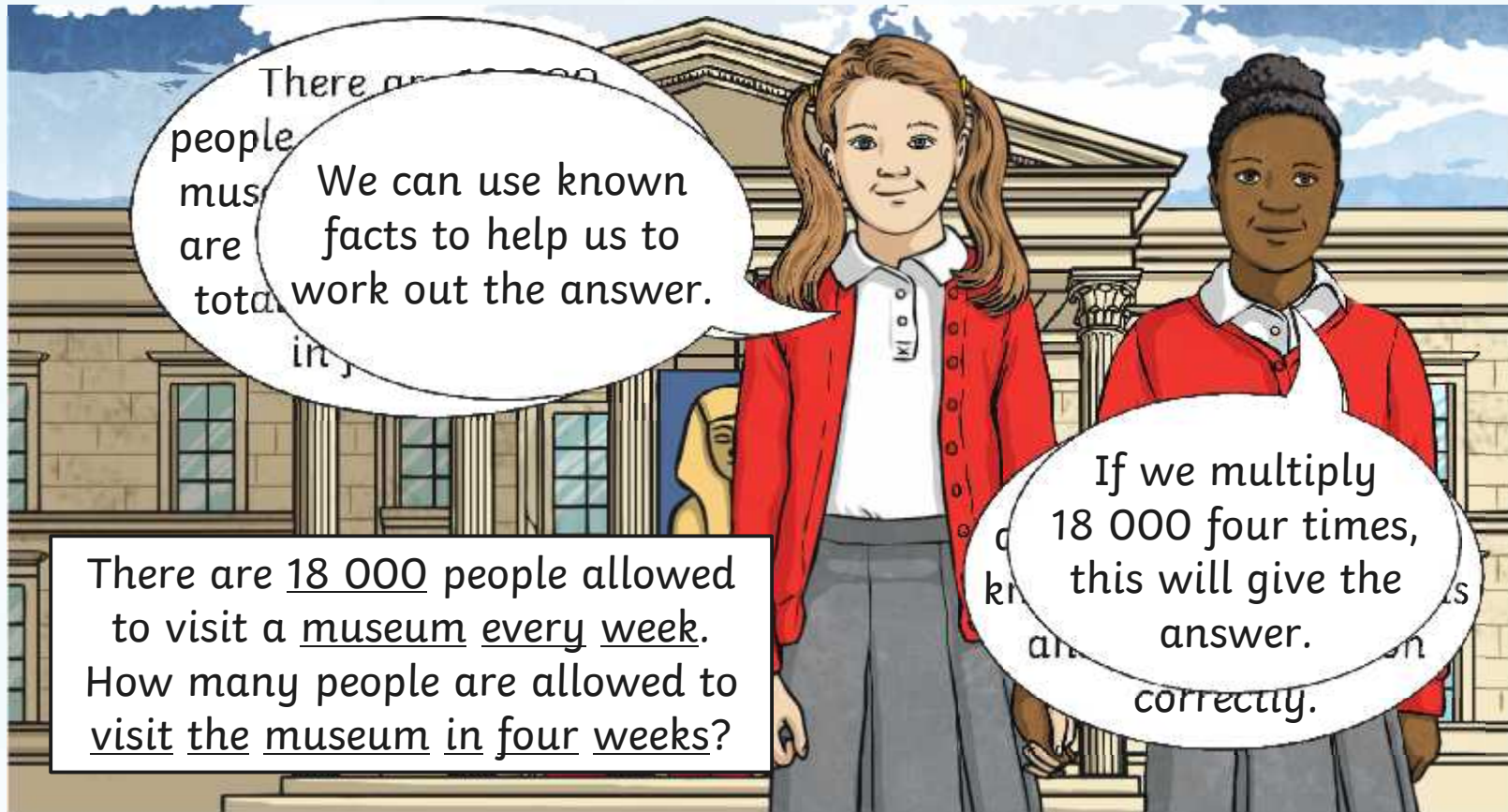
Mental Calculation Reasoning 1a

Read this reasoning question carefully.



Mental Calculation Reasoning 1a

Read this reasoning question carefully.



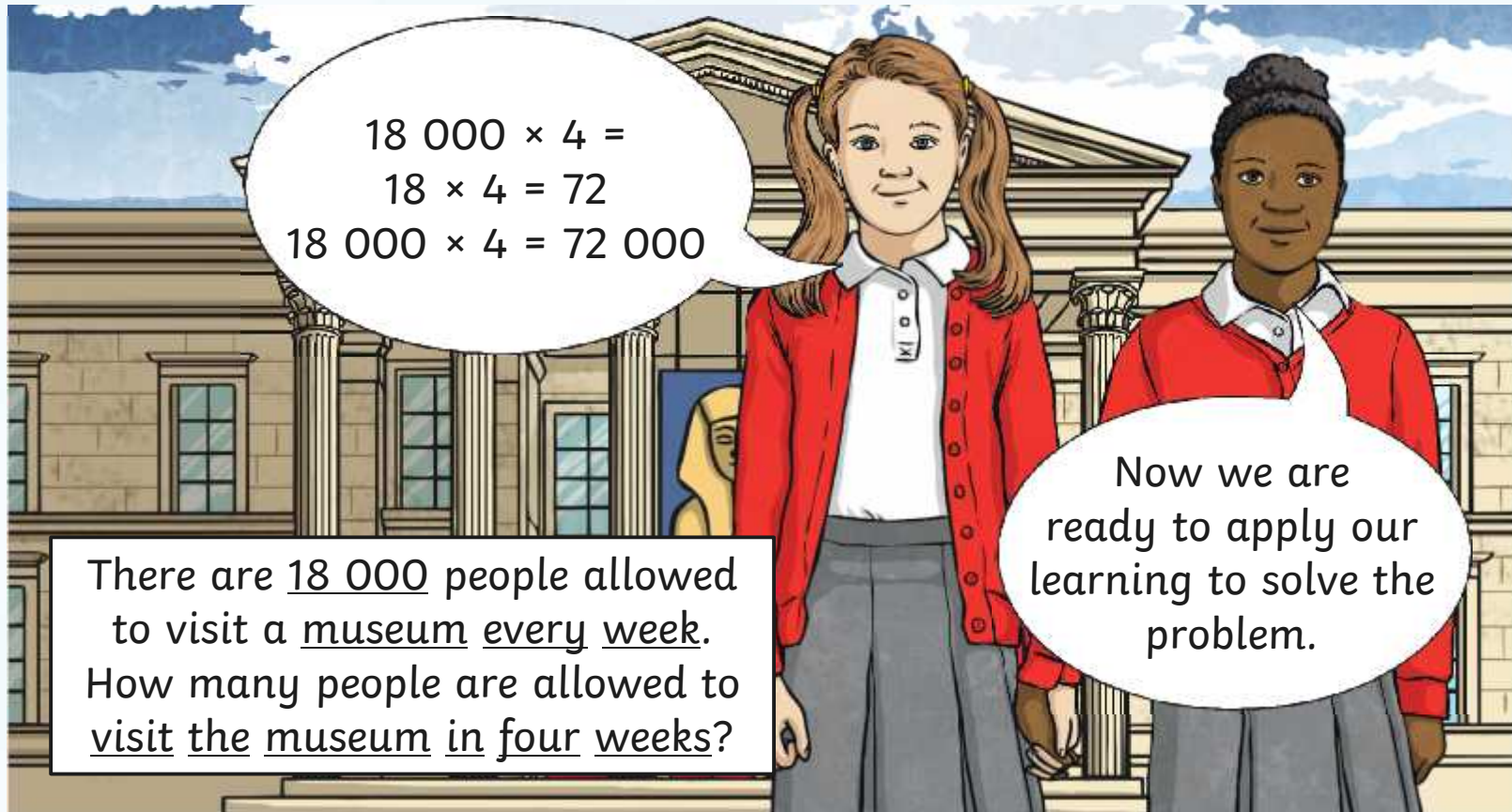
There are 18 000 people allowed to visit a museum every week. How many people are allowed to visit the museum in four weeks?

We can use known facts to help us to work out the answer.

If we multiply 18 000 four times, this will give the answer.

Mental Calculation Reasoning 1a

Read this reasoning question carefully.



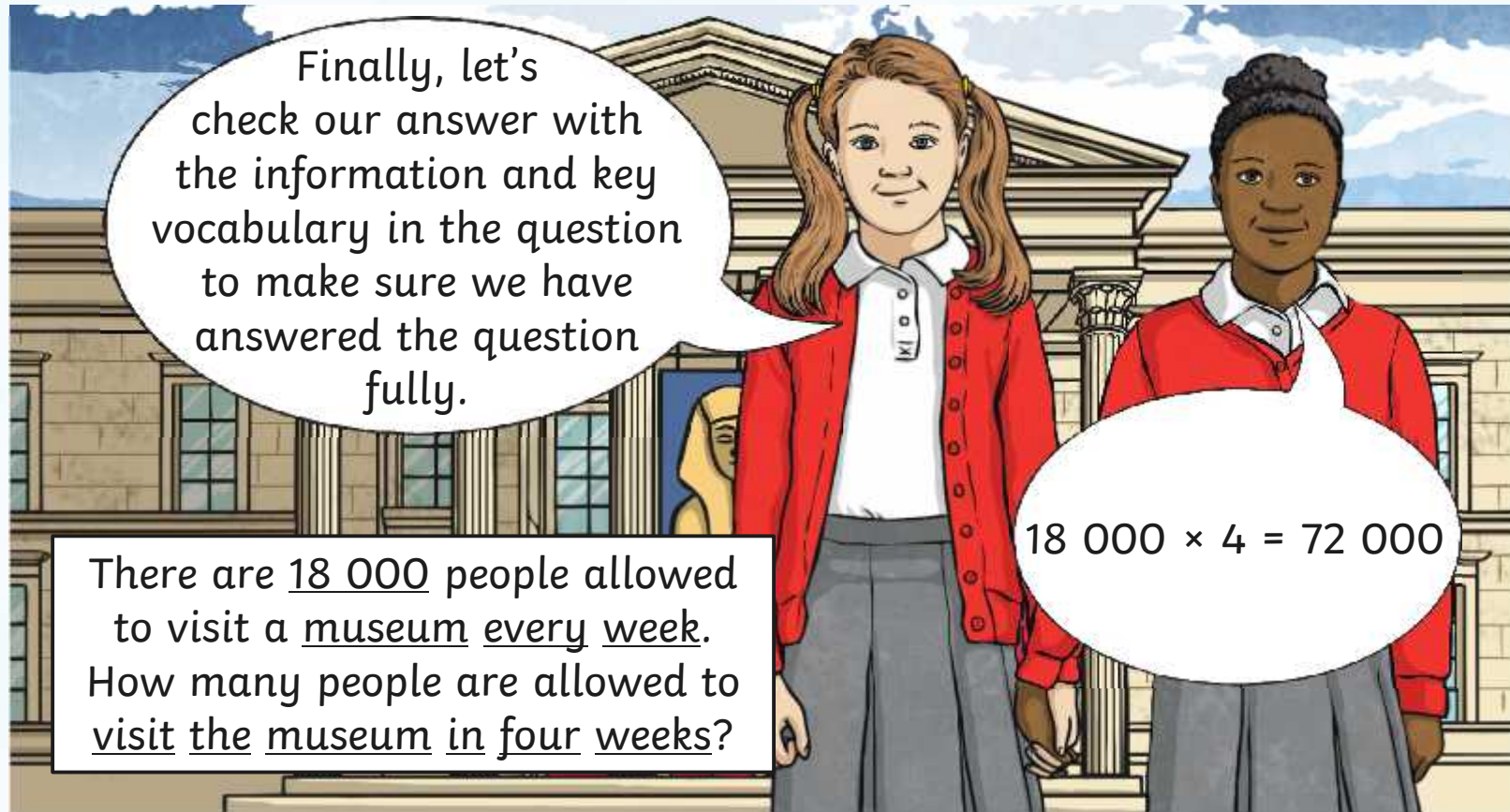
18 000 × 4 =
18 × 4 = 72
18 000 × 4 = 72 000

There are 18 000 people allowed to visit a museum every week. How many people are allowed to visit the museum in four weeks?

Now we are ready to apply our learning to solve the problem.

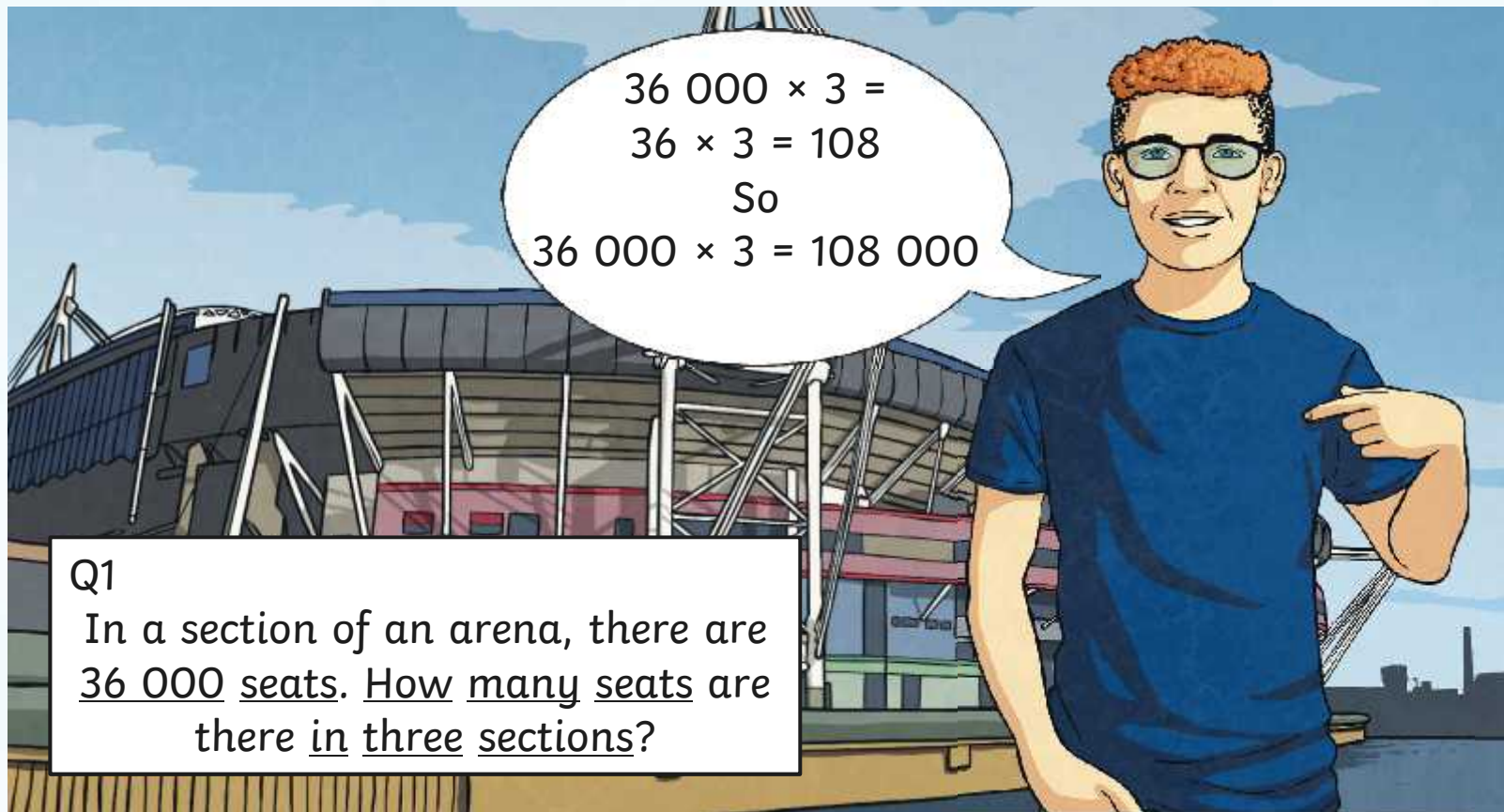
Mental Calculation Reasoning 1a

Read this reasoning question carefully.



Mental Calculations Reasoning 1b

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



36 000 × 3 =
36 × 3 = 108
So
36 000 × 3 = 108 000

Q1
In a section of an arena, there are 36 000 seats. How many seats are there in three sections?

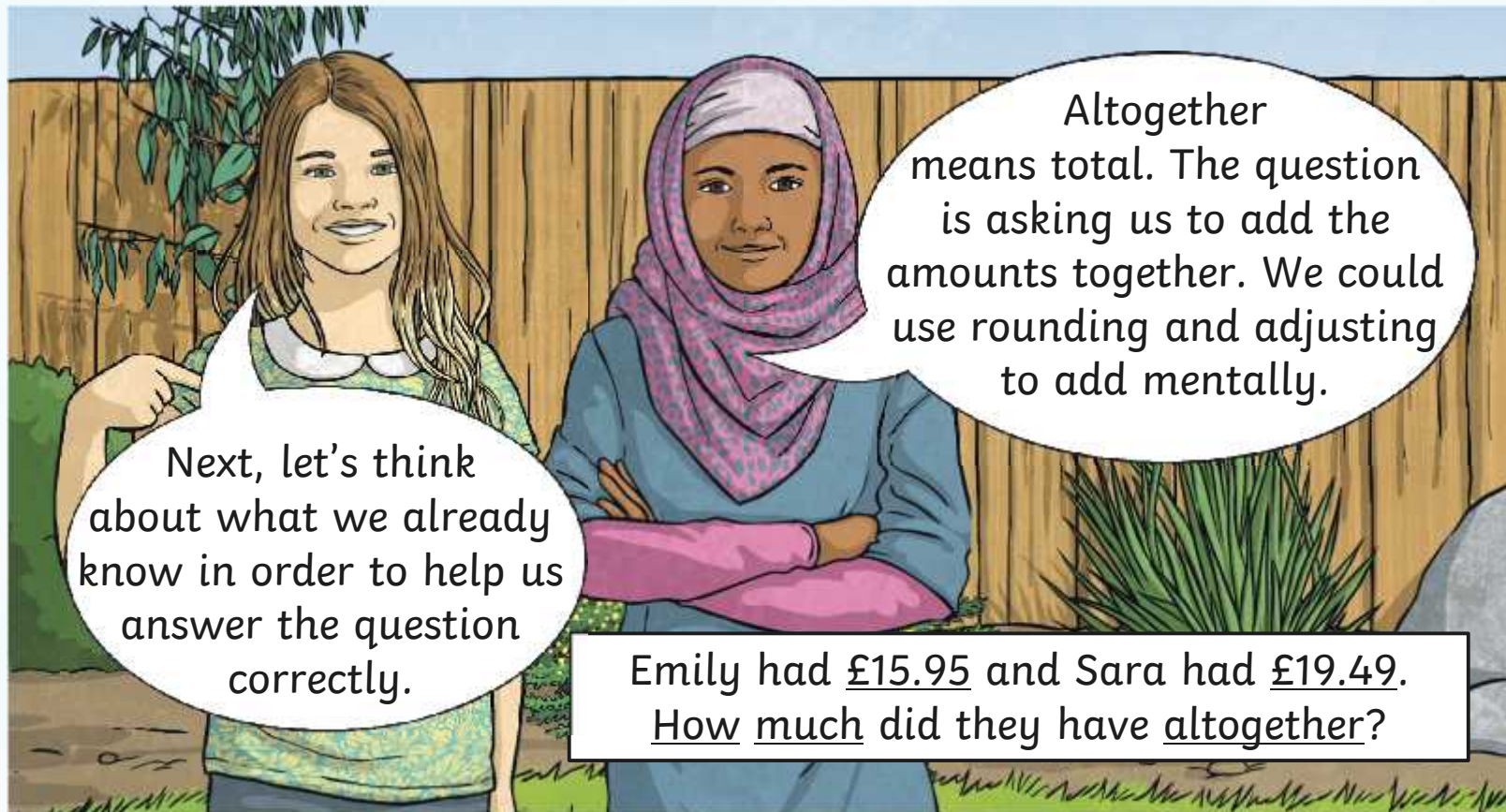
Mental Calculations Reasoning 2a

Read this reasoning question carefully.



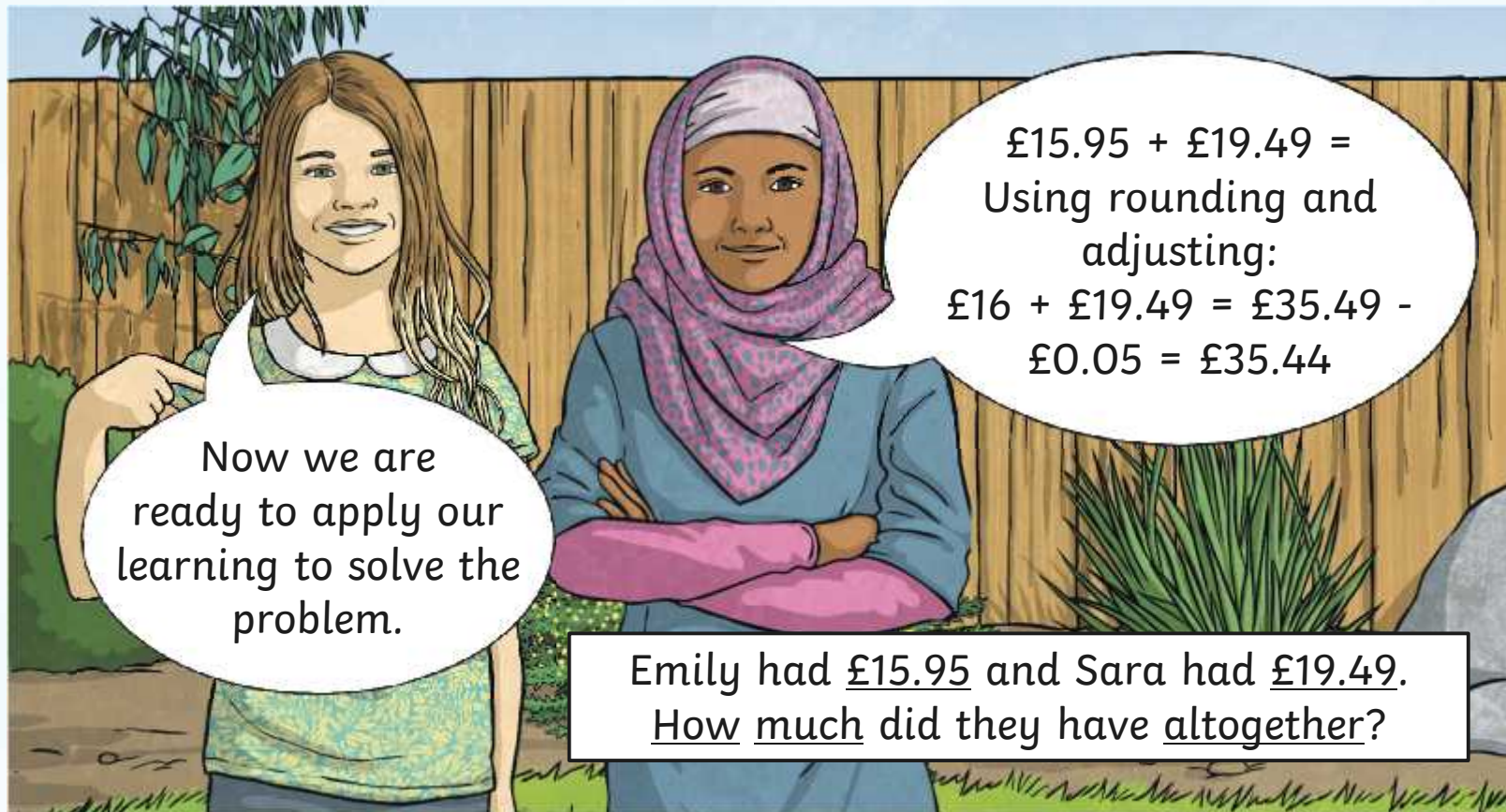
Mental Calculations Reasoning 2a

Read this reasoning question carefully.



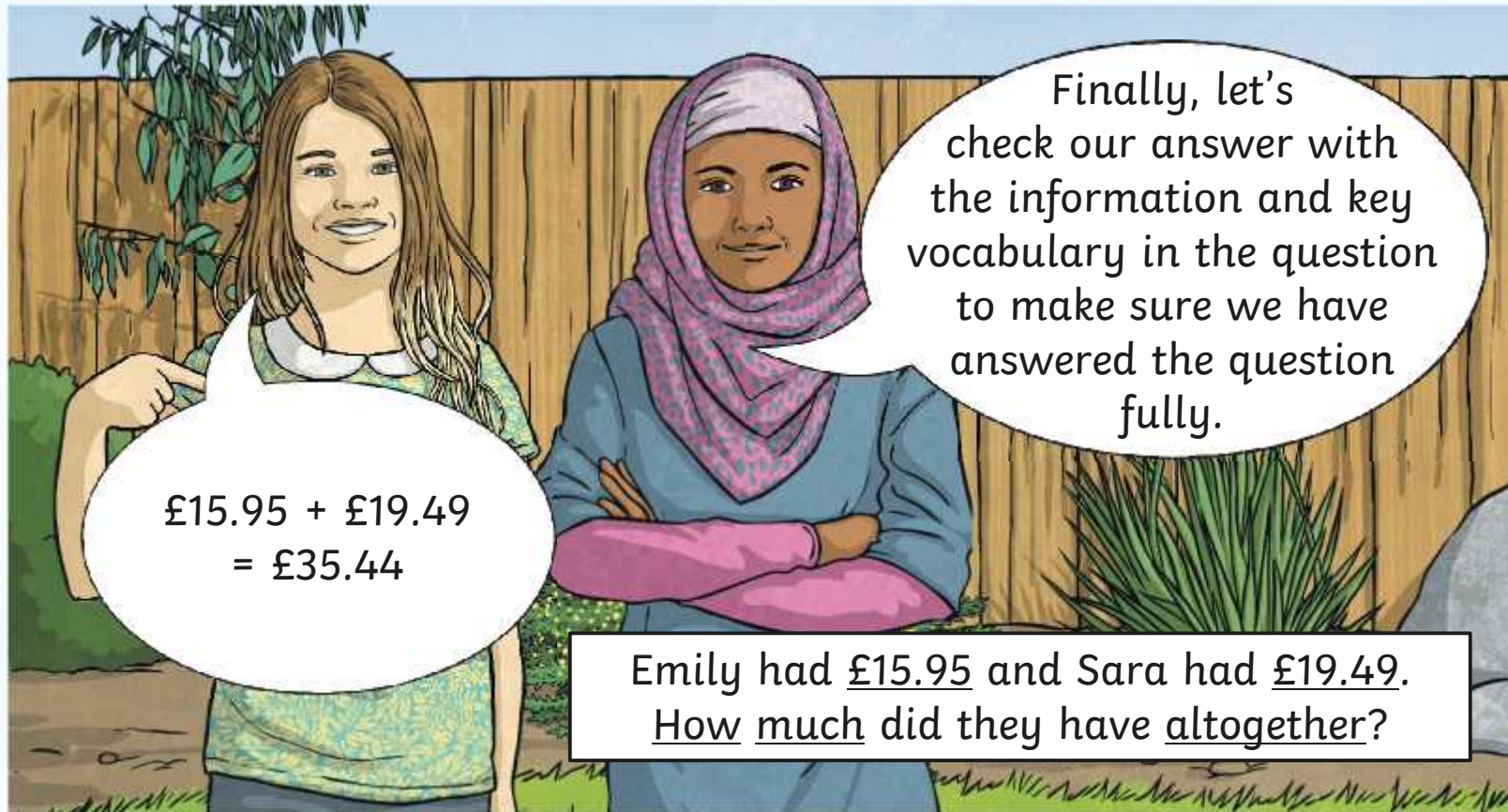
Mental Calculations Reasoning 2a

Read this reasoning question carefully.



Mental Calculations Reasoning 2a

Read this reasoning question carefully.



Mental Calculations Reasoning 2b

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



$£25.59 - £9.85 =$
Using rounding and adjusting:
 $£25.59 - £10 = £15.59 +$
 $£0.15 = £15.74$

Q2
Maria had £25.59. She bought a scarf that cost £9.85. How much money did she have now?

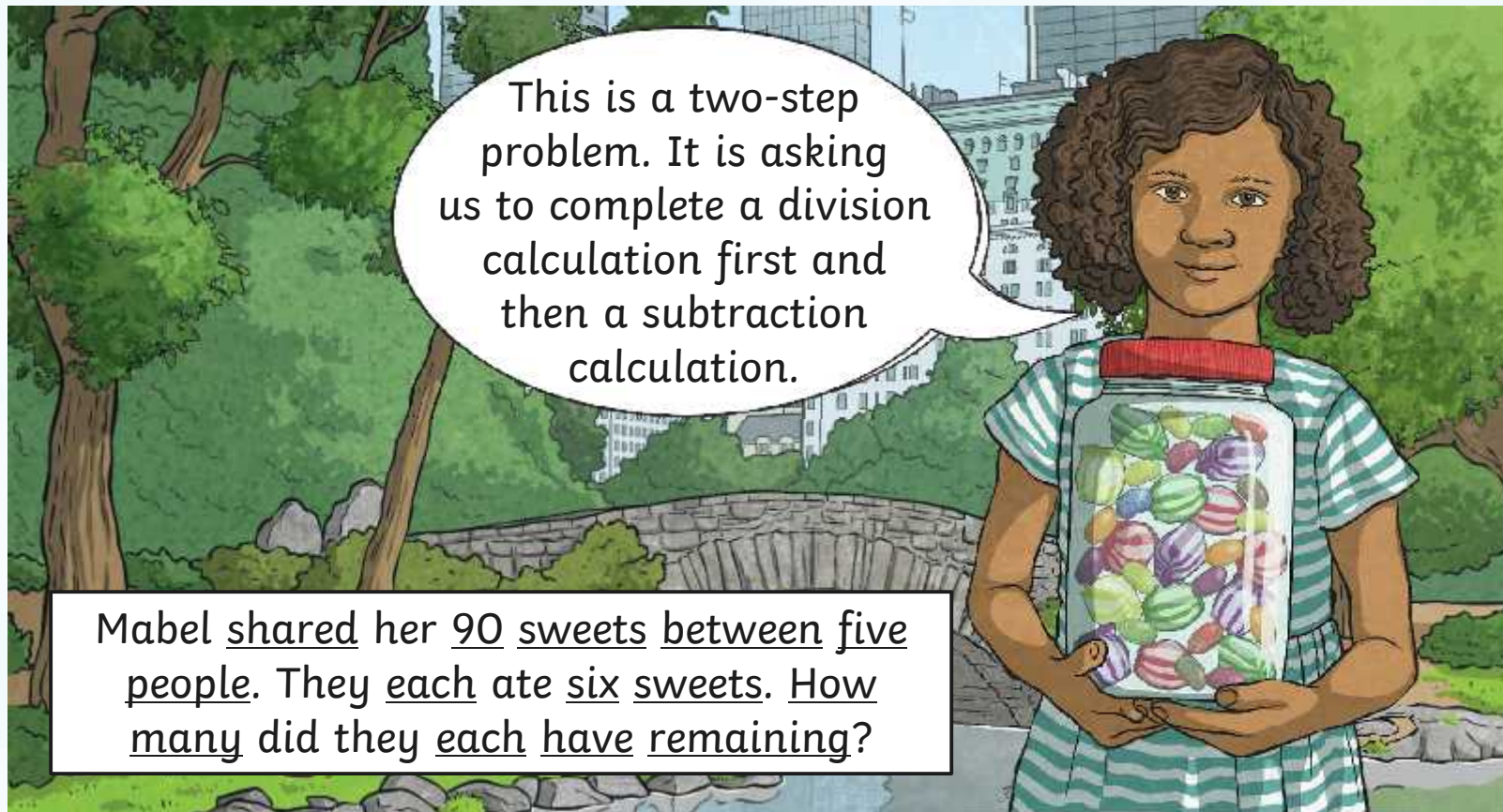
Mental Calculations Reasoning 3a

Read this reasoning question carefully.



Mental Calculations Reasoning 3a

Read this reasoning question carefully.



This is a two-step problem. It is asking us to complete a division calculation first and then a subtraction calculation.

Mabel shared her 90 sweets between five people. They each ate six sweets. How many did they each have remaining?

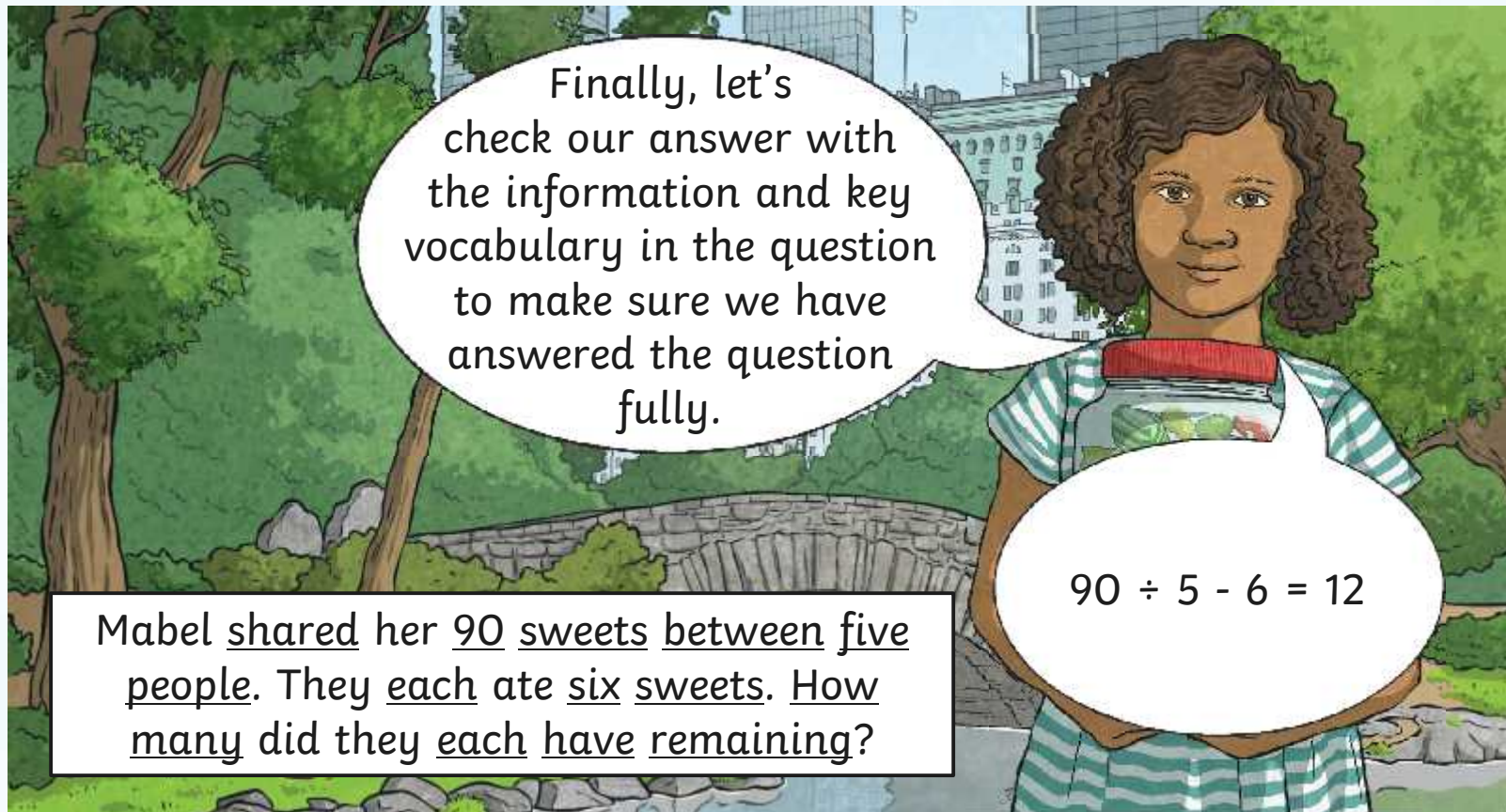
Mental Calculations Reasoning 3a

Read this reasoning question carefully.



Mental Calculations Reasoning 3a

Read this reasoning question carefully.

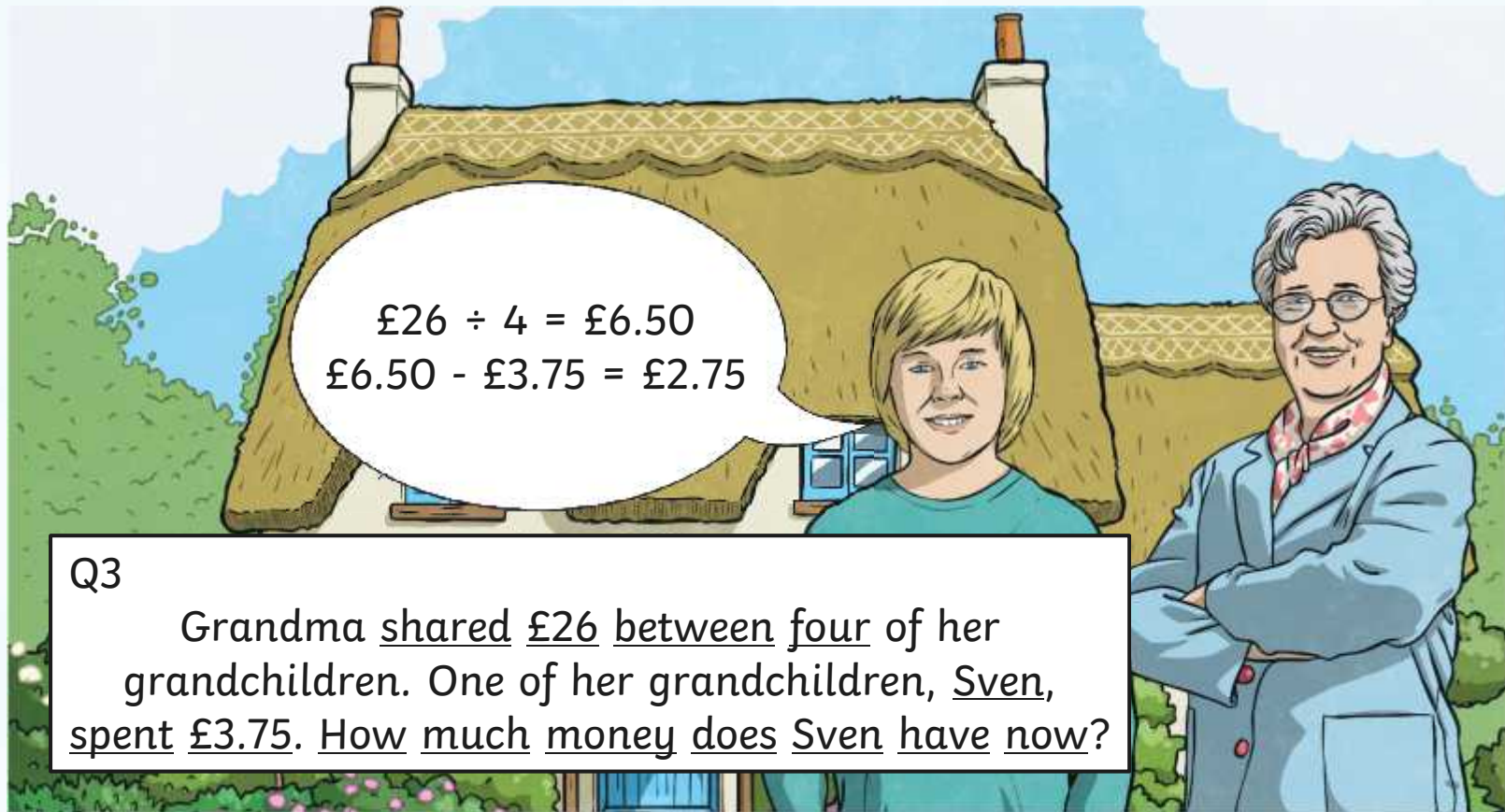


Mabel shared her 90 sweets between five people. They each ate six sweets. How many did they each have remaining?

$$90 \div 5 - 6 = 12$$

Mental Calculations Reasoning 3b

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



Reasoning Practice



Have a go at independently solving the reasoning questions on your Mental Calculations Independent Activity Sheet.

The image shows a girl working on a worksheet titled "Independent Mental Calculations". The worksheet contains several reasoning questions, each with a difficulty level indicated by stars (★, ★★, ★★★). The questions involve calculations with percentages, fractions, and decimals.

Independent Mental Calculations

1. A shop has 800 t-shirts. It sells 120 t-shirts in the first week. How many t-shirts does it have left? (★)

2. A shop has 800 t-shirts. It sells 120 t-shirts in the first week. How many t-shirts does it have left? (★★)

3. A shop has 800 t-shirts. It sells 120 t-shirts in the first week. How many t-shirts does it have left? (★★★)

4. A shop has 800 t-shirts. It sells 120 t-shirts in the first week. How many t-shirts does it have left? (★★★)

5. A shop has 800 t-shirts. It sells 120 t-shirts in the first week. How many t-shirts does it have left? (★★★)

6. A shop has 800 t-shirts. It sells 120 t-shirts in the first week. How many t-shirts does it have left? (★★★)

7. A shop has 800 t-shirts. It sells 120 t-shirts in the first week. How many t-shirts does it have left? (★★★)

8. A shop has 800 t-shirts. It sells 120 t-shirts in the first week. How many t-shirts does it have left? (★★★)

9. A shop has 800 t-shirts. It sells 120 t-shirts in the first week. How many t-shirts does it have left? (★★★)

10. A shop has 800 t-shirts. It sells 120 t-shirts in the first week. How many t-shirts does it have left? (★★★)

Reasoning Answers



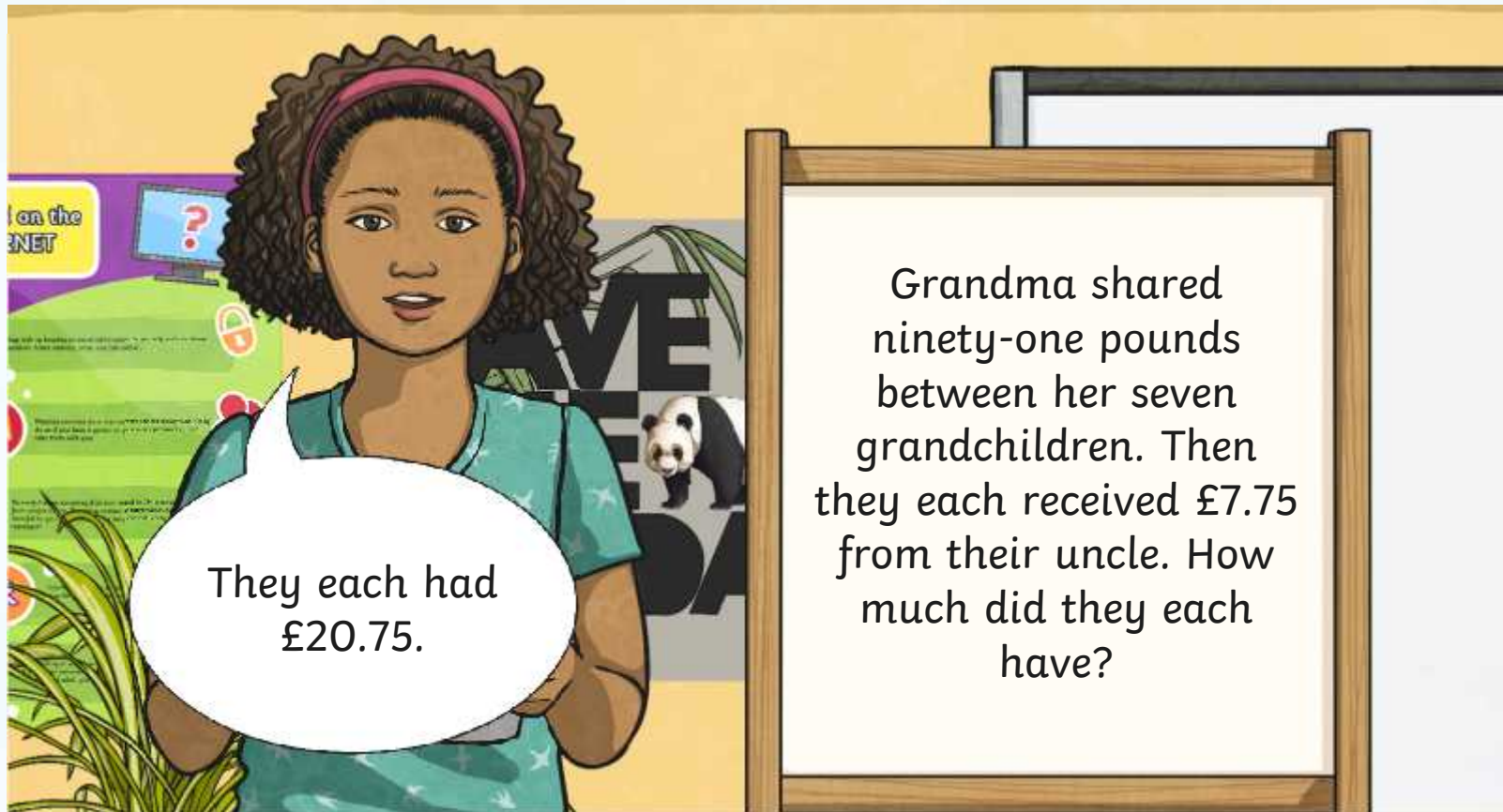
Reasoning Answers



They weighed
50.8kg.

Each cake weighed
6.35kg. How much did
eight cakes weigh?

Reasoning Answers



Reasoning Answers

An illustration of a young girl with dark curly hair and a pink headband, wearing a green shirt with white stars. She is holding a large white speech bubble that contains the number "£37 902". To her right is a wooden sign on a stand. The sign contains a math problem. In the background, there is a computer monitor with a question mark, a panda, and some text including "on the NET" and "LIVE".

£37 902

Rufus raised money for two different charities. For charity one, he raised £10 956 and for charity two, he raised £26 946. How much money did he raise altogether?

Reasoning Answers



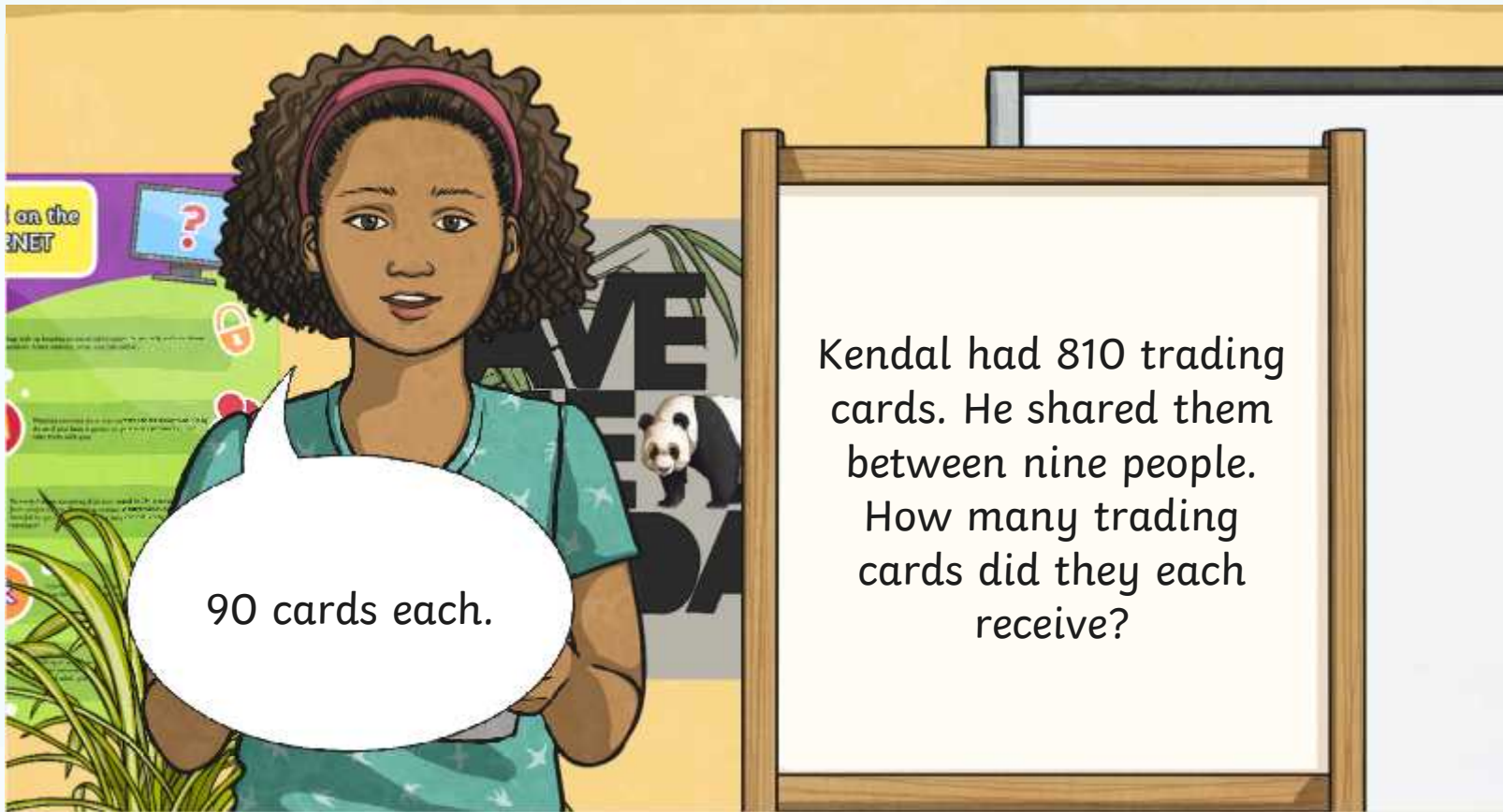
Reasoning Answers



Tarquin has £130.50 remaining.

Tarquin had five bags, each containing £51.10. He spent £125. How much did he have remaining?

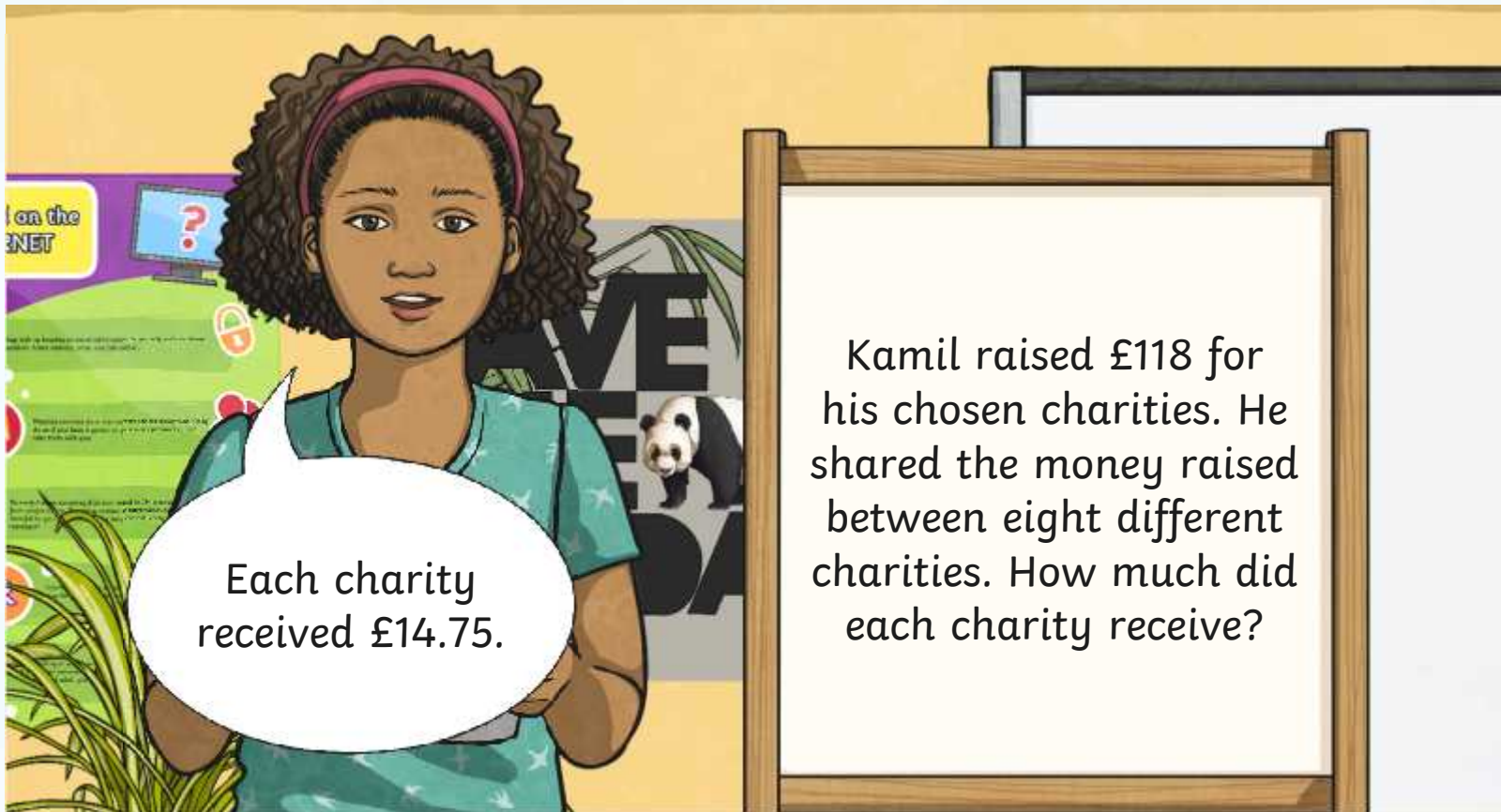
Reasoning Answers



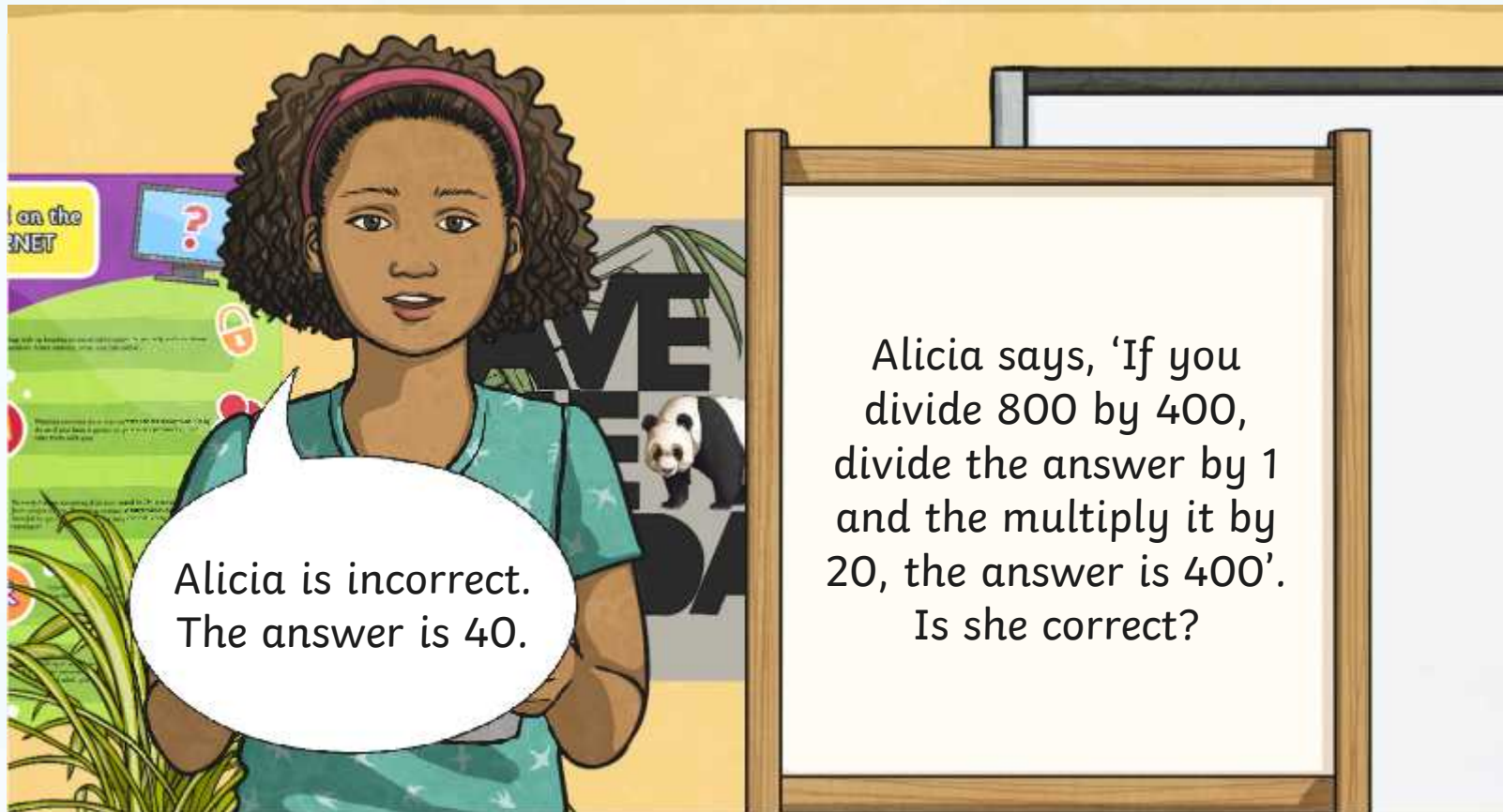
90 cards each.

Kendal had 810 trading cards. He shared them between nine people. How many trading cards did they each receive?

Reasoning Answers



Reasoning Answers



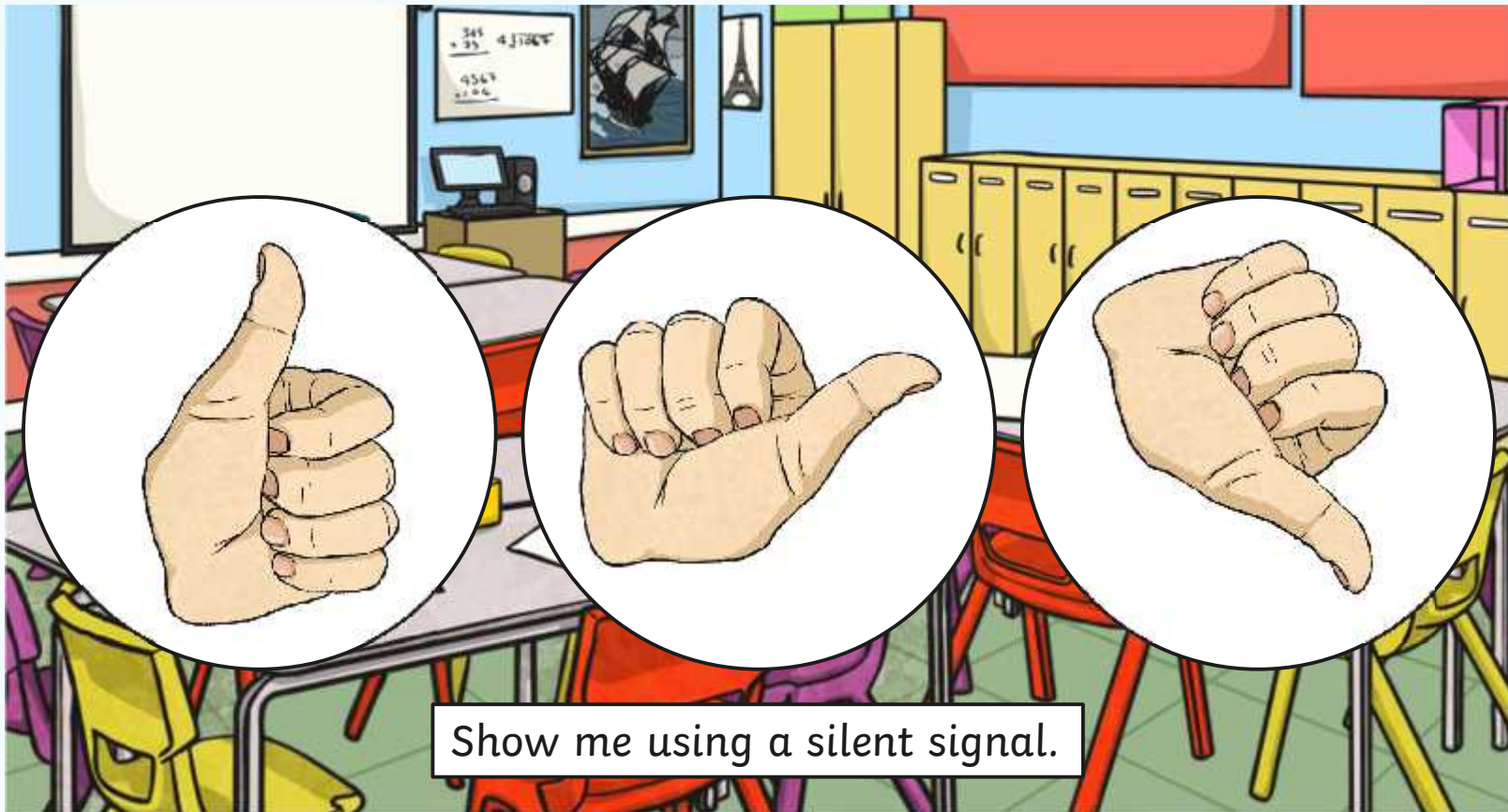
Alicia is incorrect.
The answer is 40.

Alicia says, 'If you divide 800 by 400, divide the answer by 1 and the multiply it by 20, the answer is 400'.
Is she correct?

Reasoning Answers



How confident do you feel about solving mental reasoning questions involving addition, subtraction, multiplication and division?



Show me using a silent signal.

Aim



- I can solve reasoning questions involving addition, subtraction, multiplication and division.

Success Criteria

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



Addition, Subtraction, Multiplication and Division |
Mental Calculations Reasoning

I can solve reasoning questions involving addition, subtraction, multiplication and division.		
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