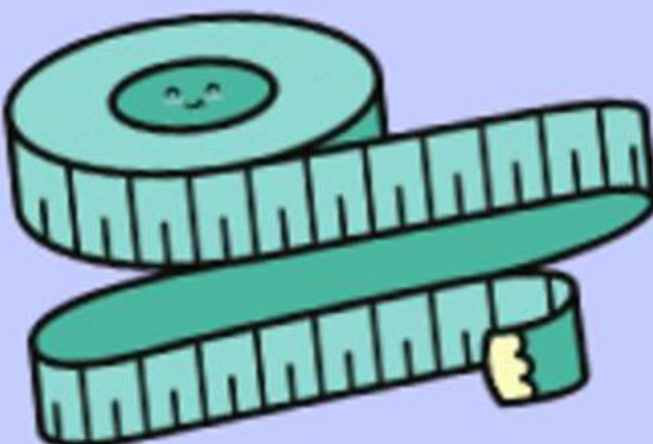




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MATHS AT AYLWARD

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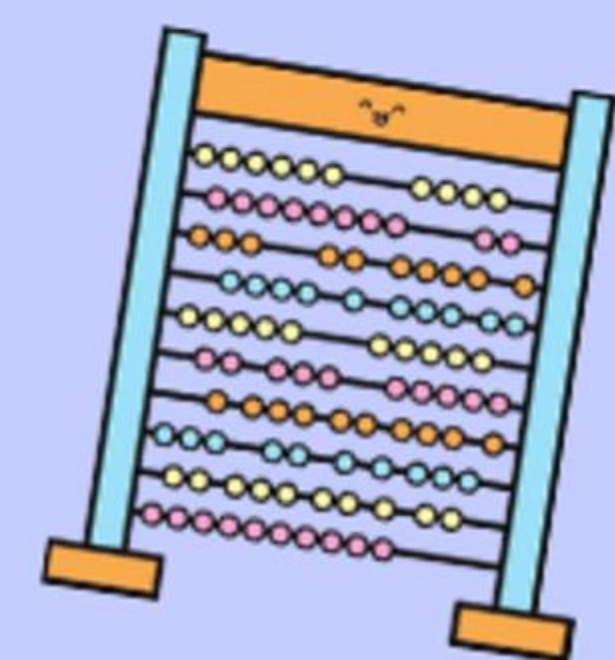
Knowledge and Skills Progression map

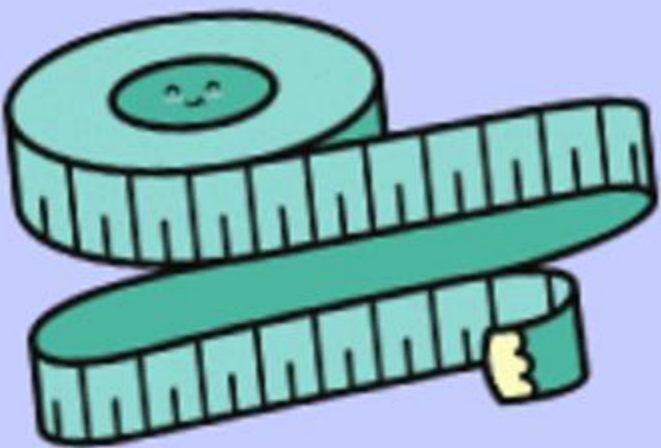


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CLICK ON EACH TAB TO
THE RELEVANT INFORMATION

Back to the
beginning

[INTENT, IMPLEMENTATION AND IMPACT](#)

[CURRICULUM MAP](#)

[KNOWLEDGE AND SKILLS PROGRESSION BY
YEAR GROUP](#)

[USEFUL WEBSITES AND LINKS](#)

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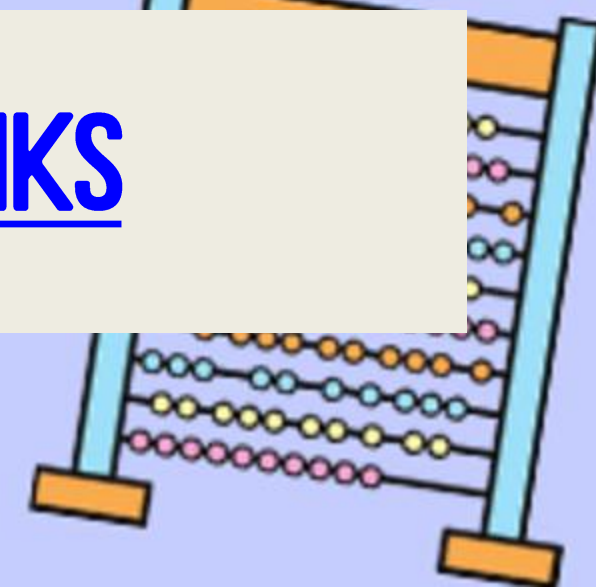
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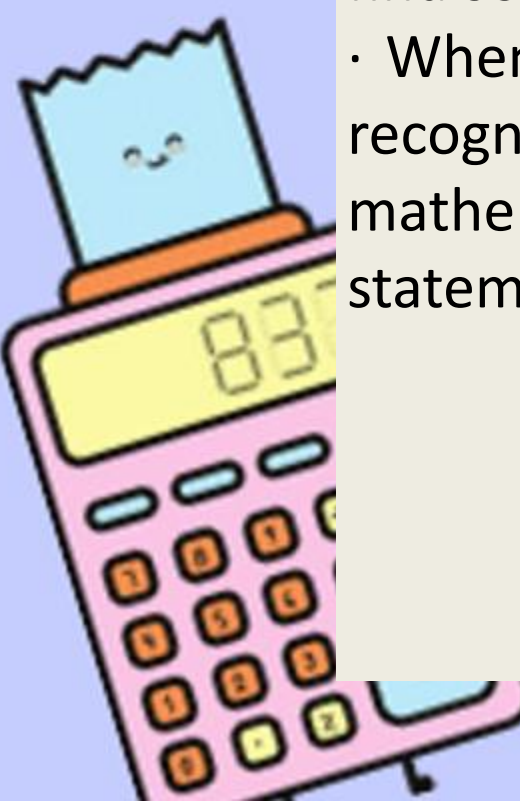
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INTENT, IMPLEMENTATION AND IMPACT

[Back to the beginning](#)

INTENT

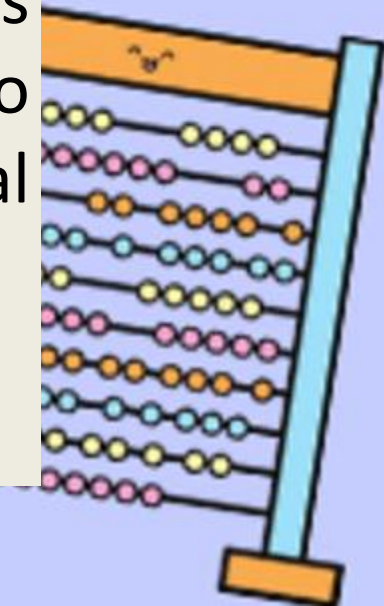
- Become fluent in the fundamentals.
- Solve problems with confidence; make links and notice patterns to find solutions.
- When solving reasoning problems, recognise and use the correct mathematical language, make statements and generalisations.

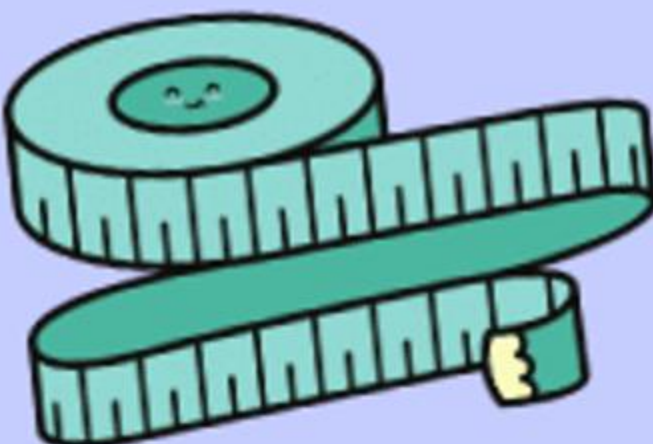
IMPLEMENTATION

The school follows the Rising Stars sequence of work, using it as a starting point and adapting it to meet the needs of each cohort and create cross-curricular links. Learning is organised through four strands - number sense, additive reasoning, multiplicative reasoning and geometric reasoning - with manipulatives used to strengthen understanding and content revisited throughout the year so pupils can consolidate previous learning and build new knowledge and skills.

IMPACT

Pupils become fluent, confident and increasingly independent mathematicians who can build upon prior learning, acquire new skills and apply their mathematical knowledge to a range of problems and real-life contexts. Through this progressive approach, pupils work towards mastery and are supported to achieve their individual potential.





CURRICULUM MAP IS BROKEN
DOWN INTO FOUR AREAS.



NUMBER SENSE

YN	YR	Y1	Y2	Y3	Y4	Y5	Y6
----	----	----	----	----	----	----	----



ADDITIVE REASONING

YN	YR	Y1	Y2	Y3	Y4	Y5	Y6
----	----	----	----	----	----	----	----

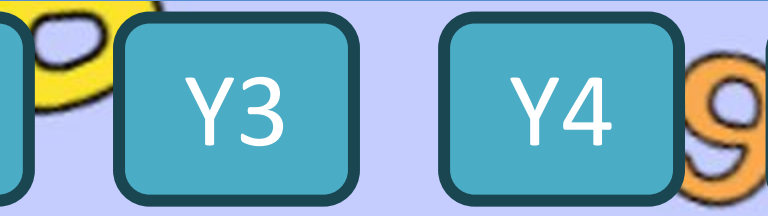
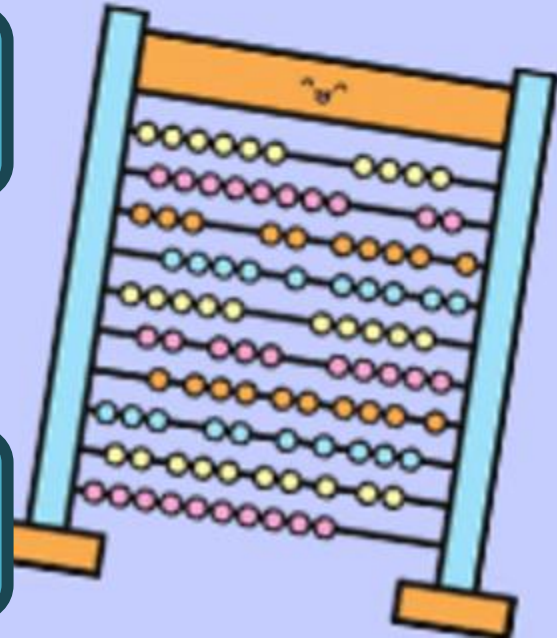


GEOMETRIC REASONING

YN	YR	Y1	Y2	Y3	Y4	Y5	Y6
----	----	----	----	----	----	----	----

MULTIPLICATIVE REASONING

YN	YR	Y1	Y2	Y3	Y4	Y5	Y6
----	----	----	----	----	----	----	----





KNOWLEDGE AND SKILLS PROGRESSION BY YEAR GROUP

[Back to the beginning](#)

Click on each year group to see which units are covered in each term.



[NURSERY](#)

[RECEPTION](#)

[YEAR 1](#)



[YEAR 2](#)

[YEAR 3](#)

[YEAR 4](#)

[YEAR 5](#)



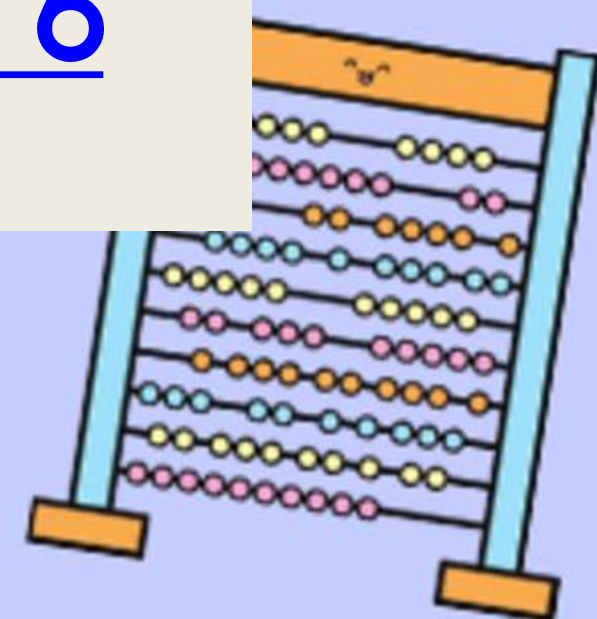
[YEAR 6](#)

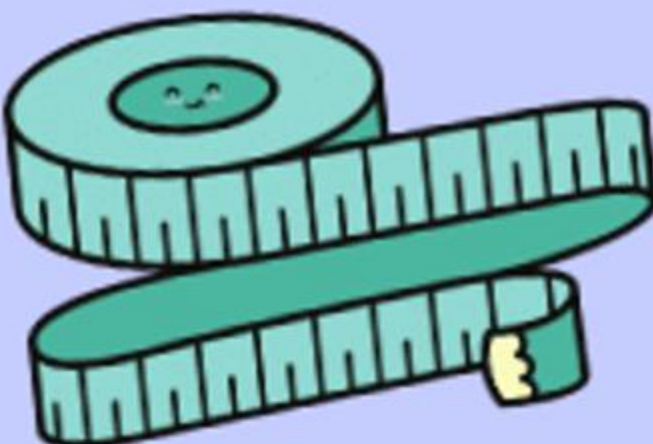


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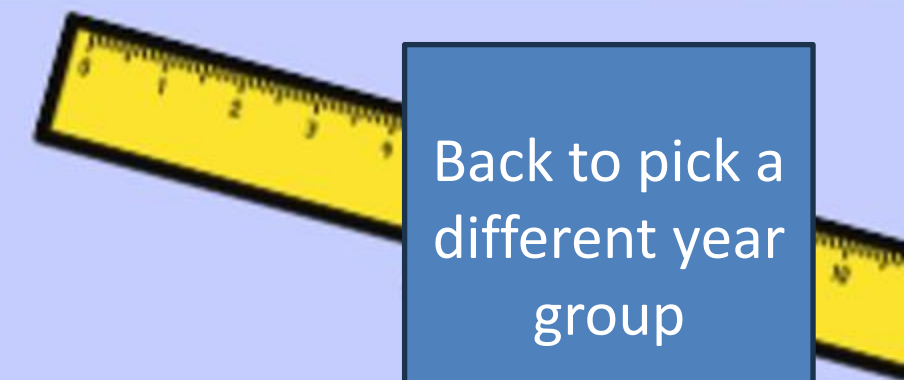




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NURSERY

6



Back to pick a
different year
group

Clicking on an area will take you to the knowledge and skills which explains the unit in more detail.

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2

[Intent and
key
vocabulary](#)

[Number
Goal](#)

[Numerical
Nursery Goal:](#)

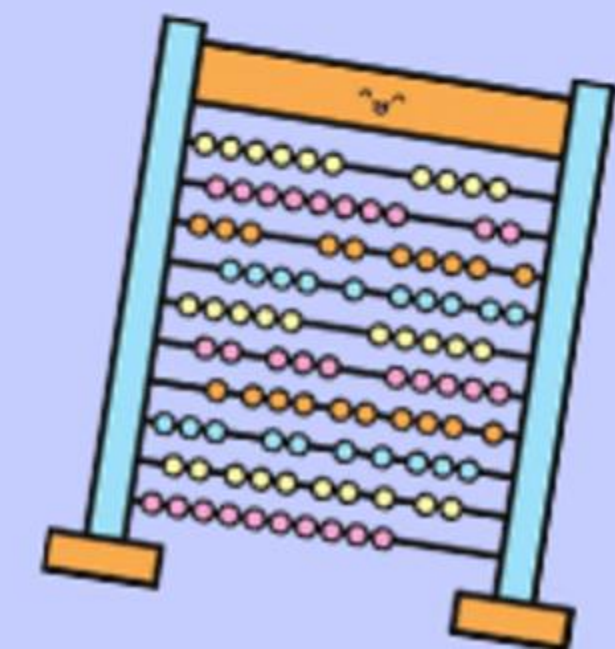
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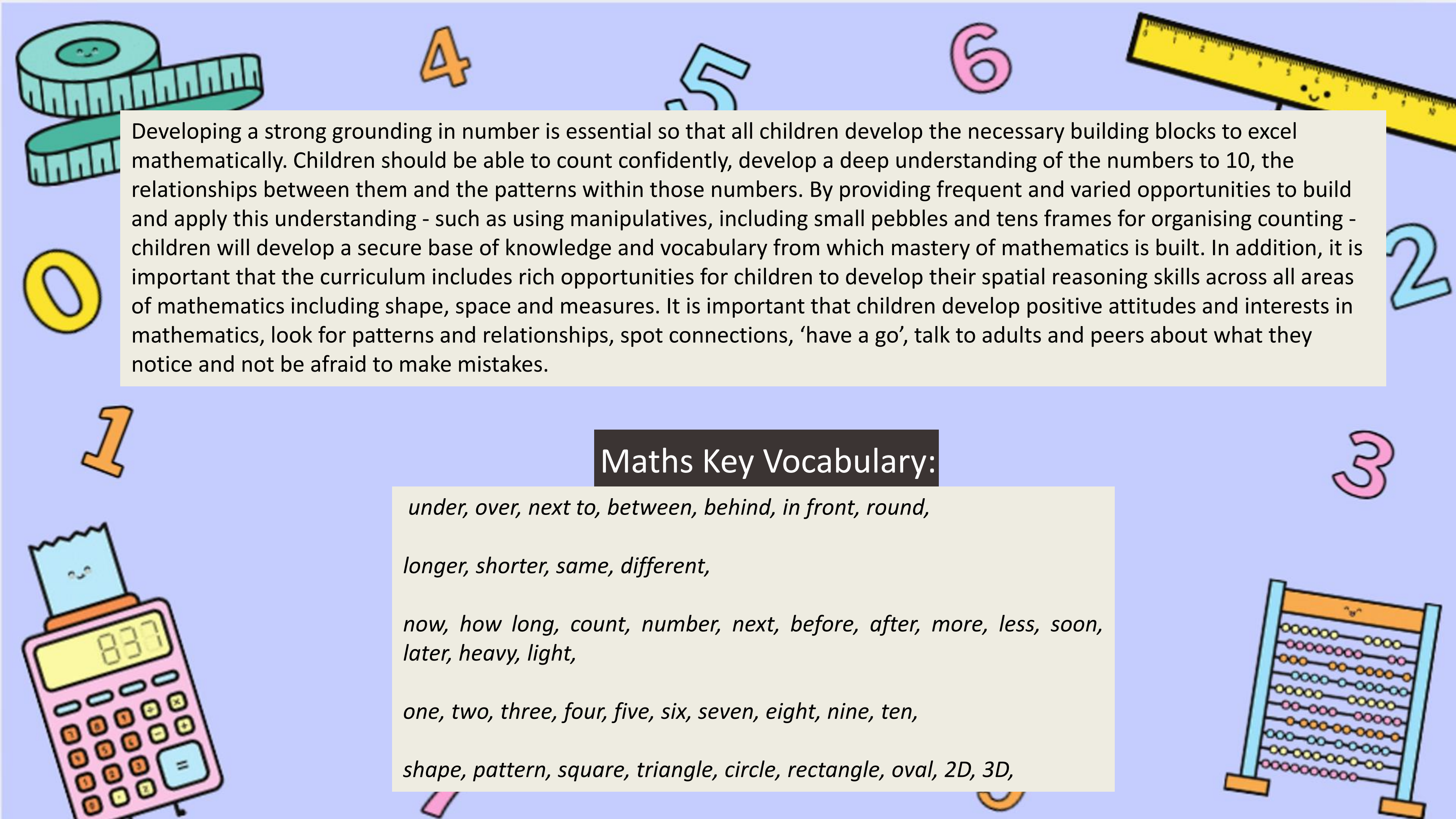


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Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

Maths Key Vocabulary:

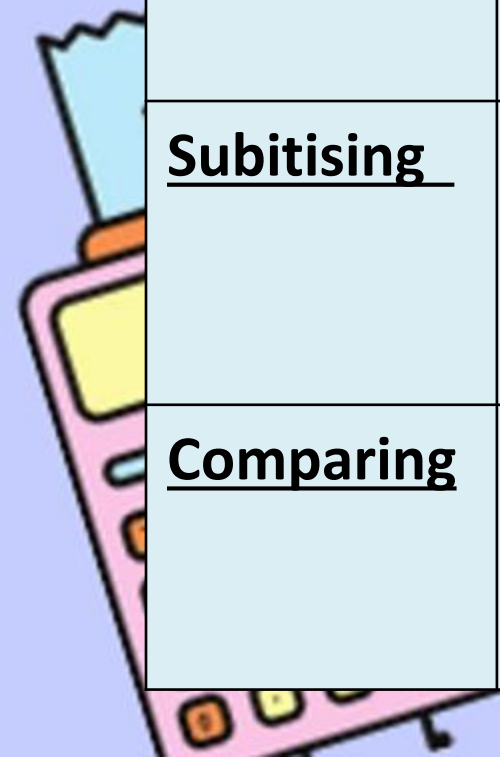
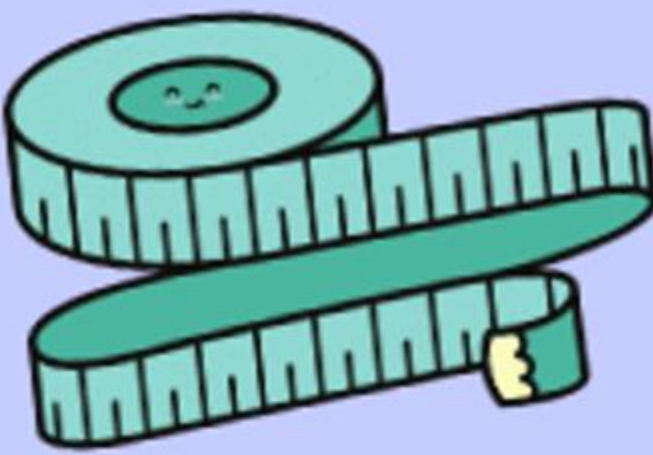
under, over, next to, between, behind, in front, round,

longer, shorter, same, different,

now, how long, count, number, next, before, after, more, less, soon, later, heavy, light,

one, two, three, four, five, six, seven, eight, nine, ten,

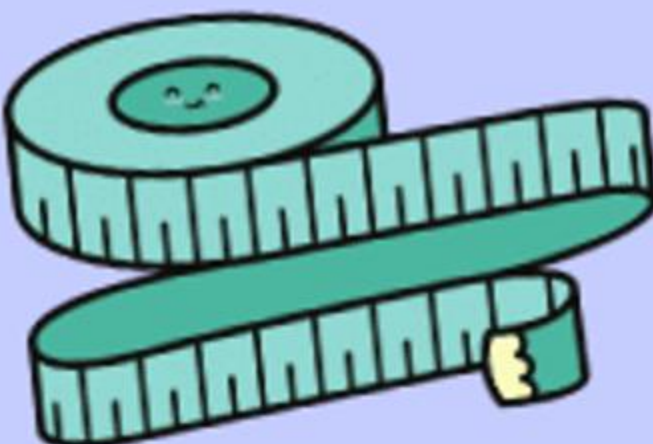
shape, pattern, square, triangle, circle, rectangle, oval, 2D, 3D,



Number Nursery Goal:

- Strong understanding of numbers to 5
- Noticing and commenting on patterns in the environment and other places e.g. books
- Notices differences in shape, size, quantities etc. and is beginning to use mathematical language to describe and compare.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<u>Numbers to 5</u>	To begin to use number words in play and routines.	To recite some number names in sequence to 5 and beyond To recognise that objects can be counted and that the last number counted represents how many there are.	To count small amounts using one-to-one correspondence. To show numbers to 3 using concrete resources.	To match objects to small groups by quantity. To show up to 5 fingers to match numerals	To count, recognise and order numbers to 5 To match quantity to numerals to 5 To solve practical problems with numbers to 5	
<u>Subitising</u>	To notice and respond to changes in quantity in everyday situations (more/less, one/many).	To subitise 1 and 2	To subitise up to 3 objects	To show three in a range of ways e.g. three fingers, three sticks etc.	To subitise up to 5	
<u>Comparing</u>	To compare sizes using words or gesture, using words such as bigger/smaller	To compare shapes using words such as 'round' and 'straight'	To recognise differences between objects- size, length, weight and capacity – use comparative language –bigger, longer, holds more, heavier etc.		To make comparisons between quantities using language 'more than' and 'fewer than'	



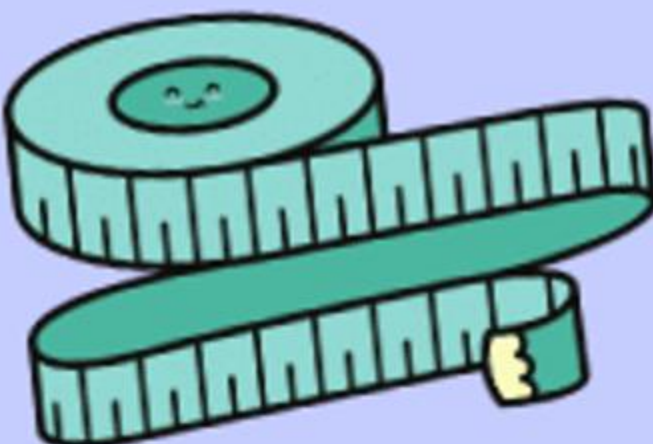
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Numerical Pattern Nursery Goal:

- Explain, continue and create patterns
- Sequencing events using time language
- Talk about and explore 2D and 3D shapes



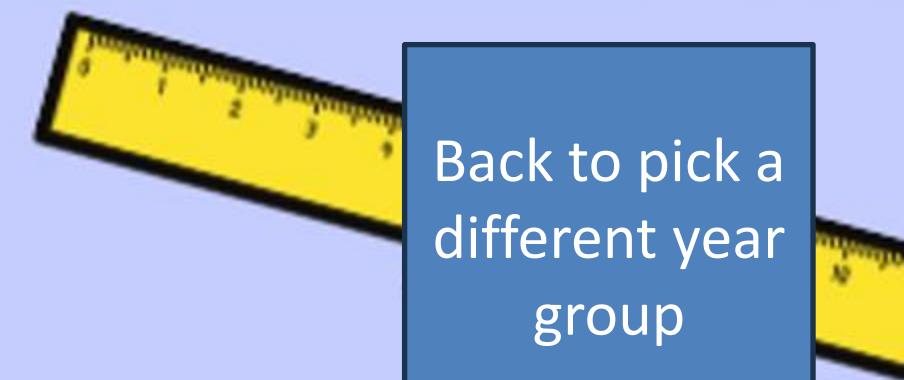
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<u>Numerical Patterns</u>	To notice patterns and arrange things in patterns	To spot patterns and talk about them e.g. stripes on a scarf	To extend a pattern that has been made	To create my own simple patterns (ABAB) To find one more or less to 3	To talk about patterns and spot errors and correct them	To continue and create patterns
<u>Sequencing and Patterns of Time</u>	To react to changes in amounts e.g. hiding and returning rhymes- two dicky birds	To start to use vocabulary to describe the time of day that things happen e.g. day, afternoon, evening, etc. To talk about what happened today and yesterday.	To start to talk about upcoming events e.g. Birthdays and then talk about what happened after the event		To sequence a pattern of events using time language e.g. first, next, then.	
<u>Shape and Space</u>	To combine shapes and objects e.g. stacking blocks/ cups	To explore shapes and create representations of objects using them	To use shapes for building thinking about their properties e.g. flat sides for stacking	To combine shapes to make new ones e.g. a bridge/ arch, bigger square, etc. To understand position language (no pointing)	To talk about 2D and 3D shapes (using informal vocab e.g. sides, straight, round, flat) To name some of the common 2D shapes	To describe a familiar route using words like 'in front of' and 'behind



4

RECEPTION

6



Back to pick a
different year
group

Clicking on an area will take you to the knowledge and skills which explains the unit in more detail.

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[Intent and
key
vocabulary](#)

[Number
Goal](#)

[Numerical
Pattern Goal:](#)

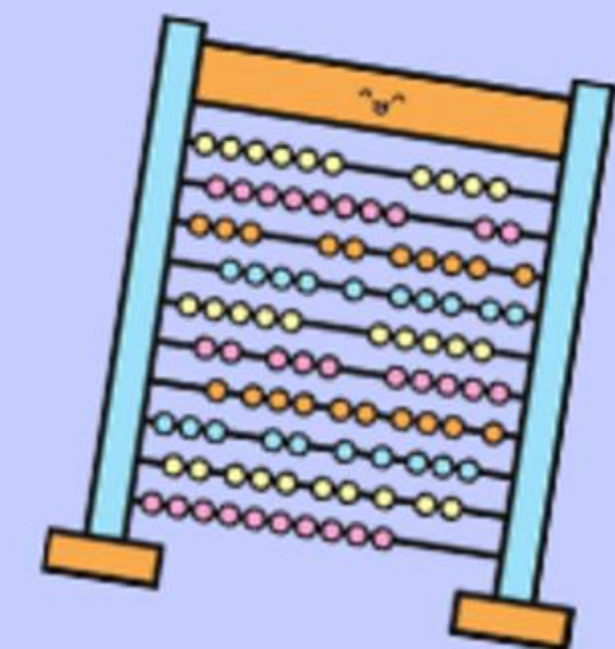
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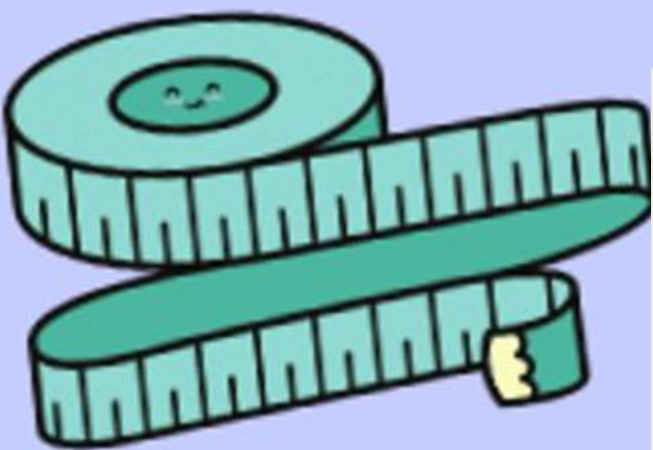




Developing a strong grounding in number is essential so that all children develop the necessary building blocks to excel mathematically. Children should be able to count confidently, develop a deep understanding of the numbers to 10, the relationships between them and the patterns within those numbers. By providing frequent and varied opportunities to build and apply this understanding - such as using manipulatives, including small pebbles and tens frames for organising counting - children will develop a secure base of knowledge and vocabulary from which mastery of mathematics is built. In addition, it is important that the curriculum includes rich opportunities for children to develop their spatial reasoning skills across all areas of mathematics including shape, space and measures. It is important that children develop positive attitudes and interests in mathematics, look for patterns and relationships, spot connections, 'have a go', talk to adults and peers about what they notice and not be afraid to make mistakes.

Key Vocabulary

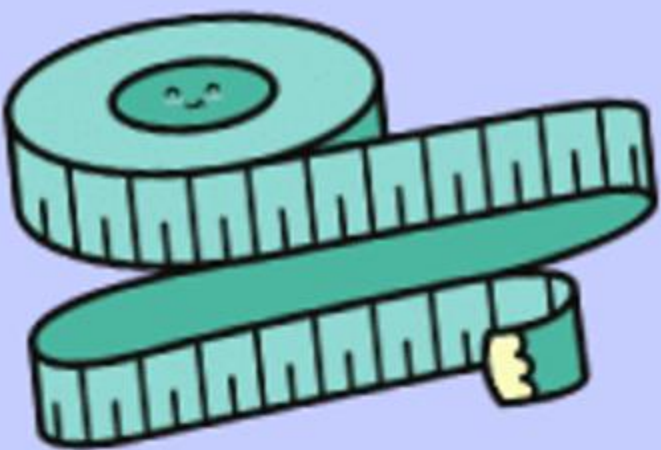
*eleven, twelve, thirteen, fourteen, fifteen, sixteen, seventeen, eighteen, nineteen, twenty,
how many altogether, total, subtraction, addition, equals, take away, count on, count back,
half, double, same as, split, group, number bond, fewer, greater than
under, over, next to, between, behind, in front, beside, inside, outside, next, before, after,
round, curved, longer, shorter, same, different, 2D, 3D, flat, solid, sides, shape, pattern, square,
triangle, circle, rectangle, oval
heavy, light, heavier, lighter
now, later, how long, count, number, order, same, different, more, less, repeated, now, soon,*



Number Early Learning Goal:

- Have a deep understanding of numbers to 10, including the composition of each number.
 - Subitise (recognise quantities without counting) up to 5.
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<u>Numbers to 10 and subitising</u>	• To show numbers to 5 using concrete resources • To match numeral and quantity • To subitise (up to 5) • To count, recognise and order numbers to 5	• To recite number names in sequence to 10 and beyond		• To count, order and sequence numerals to 10 • To subitise numbers beyond 5, sometimes noticing two groups e.g. 3 + 3 (6 dice)		• To show how numbers to 10 are made up using different models e.g. part whole, tens frame • To count, order and sequence numerals to 20
<u>Calculation</u>	• To solve some simple problems with numbers to 5	• To add two groups together • To take an amount away	• To find the composition of numbers within 5 • To partition numbers within 5 • To recall numbers bonds to 5	• To solve addition and subtraction number sentences • To find the composition of numbers within 10 • To partition numbers within 10	• To recall some double facts e.g. 1 and 1 is 2	• To recall double facts • To recall number bonds • To recall some subtraction facts within 5



Numerical Pattern Early Learning Goal:

- Verbally count beyond 20, recognising the pattern of the counting system.
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<u>The Number System</u>	• To count to 5 reliably • To count to 10 by rote	• To count to 10 with 1:1 correspondence • To order numbers to 10			• To count to 20, knowing the teen numbers	• To count beyond 20
<u>Comparison</u>	• To match, sort and compare numeral and quantity • To compare size beginning to use mathematical language e.g. saying when one tower is bigger/smaller/taller/shorter) • To use money during role play activities • To identify which group has more/less	• To find one more/ one less • To talk about shapes and their properties	• To measure and compare length, weight and capacity using correct mathematical language – longest, shortest, equal to • To name some money coins	• To compare two quantities, identifying when groups have the same amount • To share resources between groups equally	• To find half of an amount • To double an amount • To compare quantities using greater/ more than, fewer/ less than, the same/ equal	• To name 2D shapes and some common 3D shapes
<u>Pattern</u>	• To recognise patterns	• To continue and copy patterns	• To create my own patterns	• To share equally and begin to identify if a number is odd and even numbers		• To recall double facts • To recall number bonds • To recall some subtraction facts within 5

YEAR 1

[Back to pick a different year group](#)

Clicking on a strand will take you to the knowledge and skills document which explains the unit in more detail.

NUMBER SENSE

ADDITIVE REASONING

GEOMETRIC REASONING

MULTIPLICATIVE REASONING

YEAR 1- Number sense

Prior learning-

Pupils should be able to recite numbers in order, count objects reliably using one-to-one correspondence and recognise small quantities without counting.

Intent

- Lessons should cover approximately 14 weeks over the year.
- Children can develop on their knowledge of the numbers 0-20 both in writing and reading them. They can use them to compare and measure. Children also count in different multiples up to 100. Children who are shown to not make enough progress will be selected for the Numicon Intervention Program in the second half of the year.

Key Vocab

number, numeral, digit, zero, count, forwards, backwards, more, fewer, equal, greater than, less than, tens, ones, order

Tips and Tricks

ENRICHMENT OPPORTUNITIES

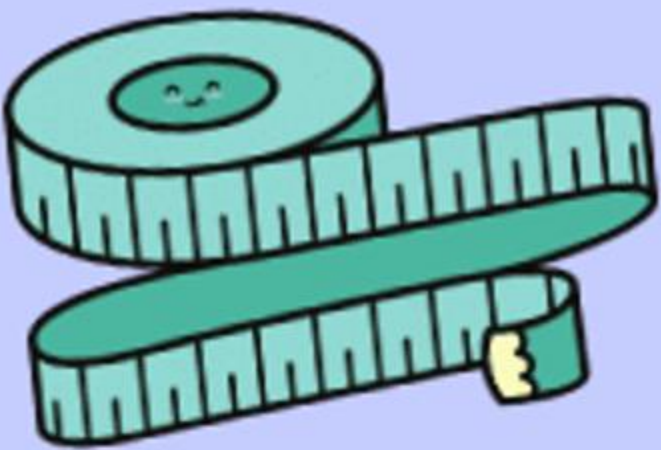
- Use to large hundred square in the playground
- Use of physical activities in the playground when looking at time.

SUGGESTED QUESTIONS TO MEASURE IMPACT

- Can you tell me one more than ____? Now continue counting on. Stop there and tell me if that number is more or less than ____
- Challenge: Change the last statement to: How does that number compare to ____

Autumn 1

- count to and across 100, forwards and backwards, beginning with 0 or 1,
- count, read and write numbers to 100 in numerals,
- given a number, identify one more and one less
- identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least
- compare, describe and solve practical problems for:
 - › lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
 - › mass or weight [for example, heavy/light, heavier than, lighter than]
 - › capacity/volume [for example, full/empty, more than, less than, half, half full, quarter]
- recognise and use language relating to dates, including days of the week, weeks, months and years



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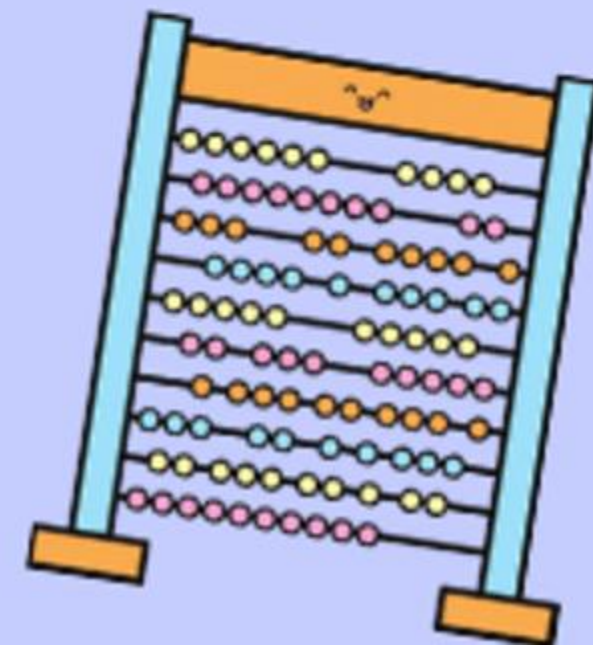
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Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number
- compare, describe and solve practical problems for:
 - › lengths and heights [for example, long/short, longer/shorter, tall/short, double/half]
 - › mass or weight [for example, heavy/light, heavier than, lighter than]
 - › capacity/volume [for example, full/empty, more than, less than, half, half full, quarter]
 - › time [for example, quicker, slower, earlier, later]

3rd time include

- recognise and know the value of different denominations of coins and notes
- count, read and write numbers to 100 in numerals, count in multiples of twos and tens

4th time include

- measure and begin to record the following:
 - › lengths and heights
 - › mass/weight
 - › capacity and volume

5th time include

- sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
- read and write numbers from 1 to 20 in numerals and words
- measure and begin to record the following:
 - › time (hours, minutes, seconds)
- count, read and write numbers to 100 in numerals, count in multiples of twos, fives and tens

CPA for representing numbers to 20

6

Back to year group main slide

Concrete:

Make a number using counters in a ten-frame and build it with cubes.

Pictorial:

Draw the counters in a ten-frame or sketch a part-whole model.

Abstract:

Read and write the numeral, such as 14, and express it as $10 + 4$.

Scaffold

- Structured counting resources: Provide counters, five-frames or ten-frames so pupils can organise objects rather than count an unstructured collection. Encourage them to move or touch each object once.
- Number-line support: Give pupils a numbered track to support counting forwards and backwards, initially allowing them to move a counter along each space.
- Stem sentences: Use prompts such as, "There are ____ altogether", "____ is one more than ____" and "I know there are ____ because..."

Development of greater depth

- Represent a number in multiple ways: Ask pupils to show 14 using objects, ten-frames, a number line, drawings and number sentences, then explain how all the representations are connected.
- Investigate missing numbers: Present a sequence such as 7, 8, __, __, 11 and ask pupils to complete it, justify their choices and create a different sequence containing 11.
- Prove comparisons: Ask, "Sam says 16 is greater than 19 because 6 is greater than 9. Is Sam correct?" Pupils use equipment or drawings to prove their answer.

YEAR 1– Additive reasoning

Prior learning–

Pupils should understand practically that groups can be combined or separated and use language such as more, fewer, altogether and left.

Intent

- Lesson should cover approximately 10 weeks over the year.
- Children can add and subtract up to the number 20 and know their number bonds. They can begin to talk about numbers and their relation to other numbers around them. Children also know key time vocabulary and vocabulary used when ordering.

Key Vocab

number, numeral, digit, zero, count, forwards, backwards, more, fewer, equal, greater than, less than, tens, ones, order

Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Use of balancing scales and cranes to help the children understand equals signs.
- Link language to events in the week and year. Children can sort themselves into what answer they fall under.

SUGGESTED QUESTIONS TO MEASURE IMPACT

- Tell me 4 different number bonds to _____
- Tell me what this question is asking? (for questions where the missing number is not in the traditional place.

Autumn 1

- given a number, identify one more and one less
- represent and use number bonds and related subtraction facts within 20
- solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as $7 = \blacksquare - 9$
- sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening]
- recognise and use language relating to dates, including days of the week, weeks, months and years

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number

3rd time include

- read, write and interpret mathematical statements involving addition (+), subtraction (−) and equals (=) signs
- add and subtract one-digit and two-digit numbers to 20, including zero

CPA for Number bonds within 10

Back to year group main slide

Concrete:

Split 8 counters between two hoops in different ways.

Pictorial:

Draw a part-whole model showing 8 partitioned into 5 and 3.

Abstract:

Write $5 + 3 = 8$, $3 + 5 = 8$ and $8 - 5 = 3$.

Scaffold

- First, then, now stories: Act out addition and subtraction with objects while pupils complete: "First there were _____. Then ____ were added/taken away. Now there are _____."
- Part-whole models: Provide two coloured sets of counters and a part-whole template to help pupils see that two parts combine to make a whole.
- Number-bond prompts: Give pupils a ten-frame with some spaces already filled and ask them to identify how many more are needed to make 10.

Development of greater depth

- Find all possibilities: Ask pupils to find every pair of whole numbers that makes 10 and explain how they know none has been missed.
- Explore related facts: Starting with $6 + 4 = 10$, pupils generate related addition and subtraction facts and explain the connections.
- Solve missing-number problems: Compare $7 + \square = 12$, $\square + 7 = 12$ and $12 - \square = 7$, asking pupils to explain why the missing number is the same.

YEAR 1– Geometric Reasoning

Prior learning-

Pupils should recognise and sort familiar shapes and describe the position of objects using everyday language such as under, next to, behind and between.

Intent

- Lesson should cover approximately 6 weeks over the year.
- Children to recognise common 2D and 3D shapes. They can use half and quarter to describe turns as well as when finding a fraction of a shape.

Key Vocab

shape, 2D, 3D, circle, triangle, square, rectangle, cube, cuboid, sphere, cylinder, position, direction, turn

Tips and Tricks

ENRICHMENT OPPORTUNITIES

- A shape hunt around the school.

SUGGESTED QUESTIONS TO MEASURE IMPACT

- Can you tell me what shape this is? How do you know it is that shape?
- I have a shape with four sides. How do I know it is not a triangle?

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

Autumn 1

- recognise and name common 2-D and 3-D shapes, including:
 - › 2-D shapes [for example, rectangles (including squares), circles and triangles]
 - › 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]
- describe position, direction and movement,

2nd time include

- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity
- describe position, direction and movement, including whole, half, quarter and three-quarter turns

CPA for recognising and describing shapes

Back to year group main slide

Concrete:

Handle and sort 2-D shapes by properties such as the number of sides and vertices.

Pictorial:

Draw or match shapes and mark their sides and vertices.

Abstract:

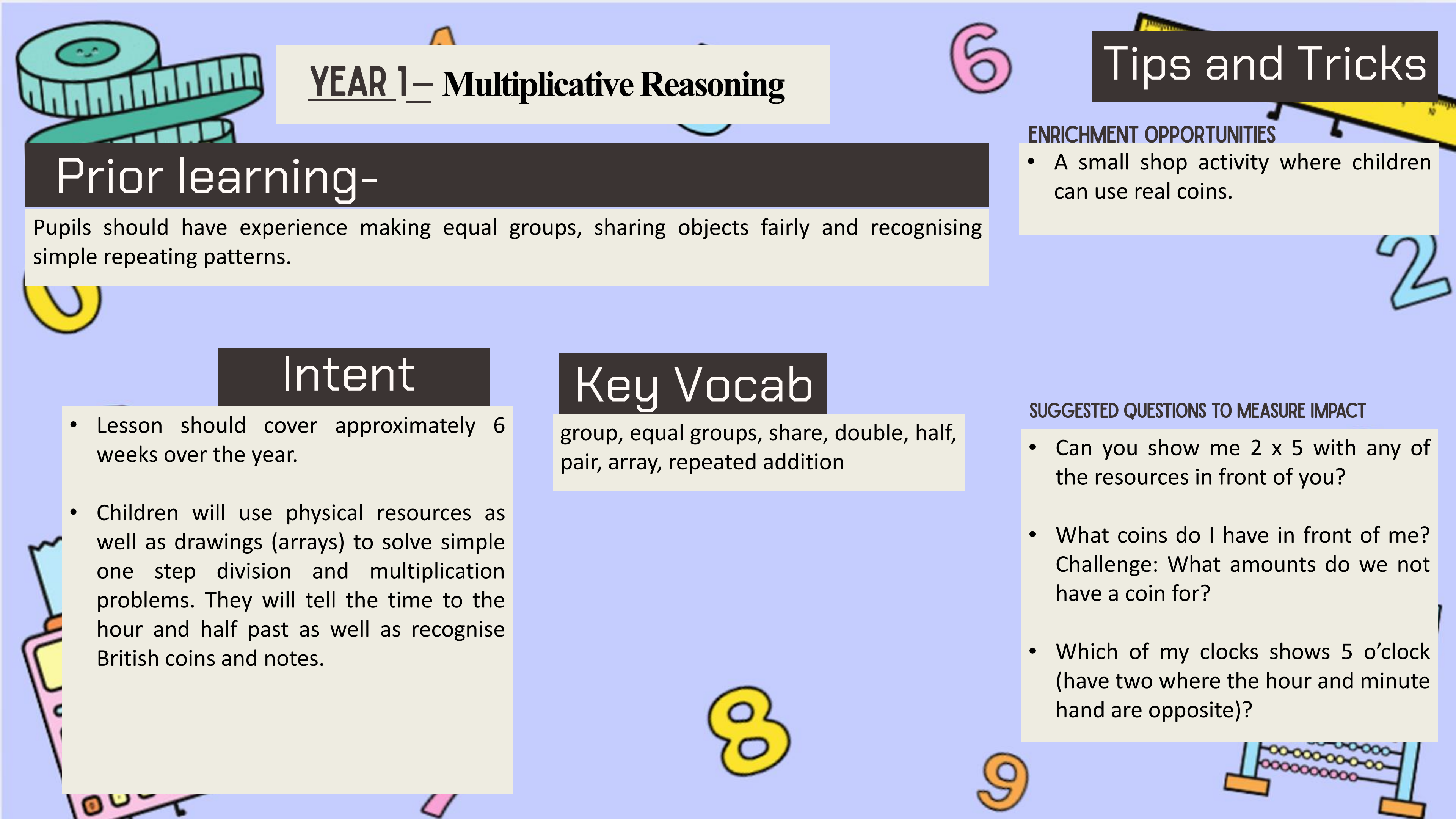
Name and describe them: "A triangle has three sides and three vertices."

Scaffold

- Physical shape sets: Allow pupils to handle, turn and compare shapes rather than identifying them only from drawings. Include shapes in different sizes, colours and orientations.
- Property prompts: Provide questions such as, "How many sides?", "How many vertices?" and "Are any sides curved?"
- Sorting frames: Use hoops or a simple sorting mat labelled with one property, such as *has a curved surface* or *has four sides*.

Development of greater depth

- Classify in different ways: Pupils sort a collection of shapes using their own criteria, explain the rule and then find a second valid way to sort them.
- Identify the odd one out: Show three shapes and ask pupils to select the odd one out. Encourage several correct answers based on different properties.
- Compose and decompose shapes: Challenge pupils to make a rectangle using two or more shapes and investigate whether it can be made in several ways.



YEAR 1— Multiplicative Reasoning

Prior learning—

Pupils should have experience making equal groups, sharing objects fairly and recognising simple repeating patterns.

Intent

- Lesson should cover approximately 6 weeks over the year.
- Children will use physical resources as well as drawings (arrays) to solve simple one step division and multiplication problems. They will tell the time to the hour and half past as well as recognise British coins and notes.

Key Vocab

group, equal groups, share, double, half, pair, array, repeated addition

Tips and Tricks

ENRICHMENT OPPORTUNITIES

- A small shop activity where children can use real coins.

SUGGESTED QUESTIONS TO MEASURE IMPACT

- Can you show me 2×5 with any of the resources in front of you?
- What coins do I have in front of me? Challenge: What amounts do we not have a coin for?
- Which of my clocks shows 5 o'clock (have two where the hour and minute hand are opposite)?

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

Autumn 1

- count, read and write numbers to 100 in numerals, count in multiples of twos, fives and tens
- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher
- recognise and know the value of different denominations of coins and notes

2nd time include

- recognise, find and name a half as one of two equal parts of an object, shape or quantity
- recognise, find and name a quarter as one of four equal parts of an object, shape or quantity
- tell the time to the hour and half past the hour and draw the hands on a clock face to show these times

CPA for making equal groups

Back to year group main slide

Concrete:

Place 6 counters into three equal groups of two.

Pictorial:

Draw three circles with two dots in each or represent the groups as an array.

Abstract:

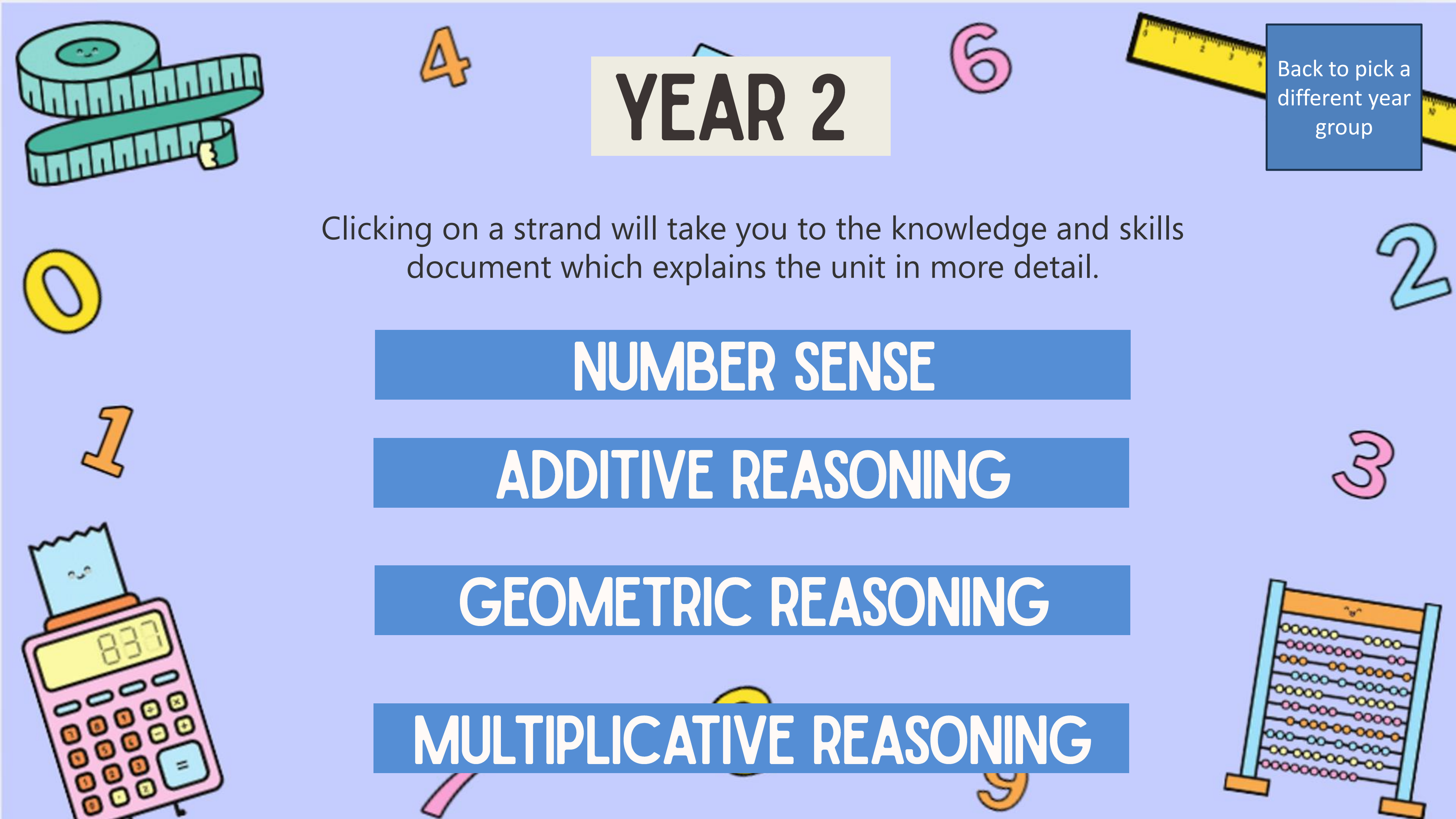
Record the repeated addition $2 + 2 + 2 = 6$, using language such as *three groups of two*.

Scaffold

- Equal-grouping mats: Provide mats with circles representing groups, into which pupils place the same number of counters.
- Sharing one at a time: Model fair sharing by distributing one object to each person or container in turn, supported by the sentence "Each group has ____."
- Pattern frames: Mark the repeating unit of a colour, shape or movement pattern before asking pupils to continue and describe it.

Development of greater depth

- Make equal groups in different ways: Give pupils 12 counters and ask them to arrange all the possible equal groupings, explaining how they know the groups are equal.
- Compare equal and unequal sharing: Ask pupils to share 10 objects between two, three or five characters and explain when the sharing is fair and whether any remain.
- Continue and explain patterns: Pupils build a repeating pattern, identify its unit of repeat and predict what the 10th object will be without constructing the whole pattern.



YEAR 2

[Back to pick a different year group](#)

Clicking on a strand will take you to the knowledge and skills document which explains the unit in more detail.

NUMBER SENSE

ADDITIVE REASONING

GEOMETRIC REASONING

MULTIPLICATIVE REASONING

YEAR 2- Number sense

Prior learning-

Pupils should be able to count, read, write, compare and order numbers to 100, understanding that two-digit numbers are composed of tens and ones.

Intent

- Lessons should cover approximately 14 weeks over the year.
- Children will be able to understand numbers up to 100. They understand their value and many ways in which they are represented. Children can then use this understanding to solve problems. Children will also develop their knowledge of units of time.
- All children should make at least expected progress. The Numicon Intervention Program is used to help ensure children do.

Key Vocab

place value, tens, ones, two-digit number, compare, represent, estimate, ascending, descending, odd, even

Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Use of games and a carousel of activities to develop existing knowledge or assess learnt skills.
- Use of thermometers around the school for the children to compare.

SUGGESTED QUESTIONS TO MEASURE IMPACT

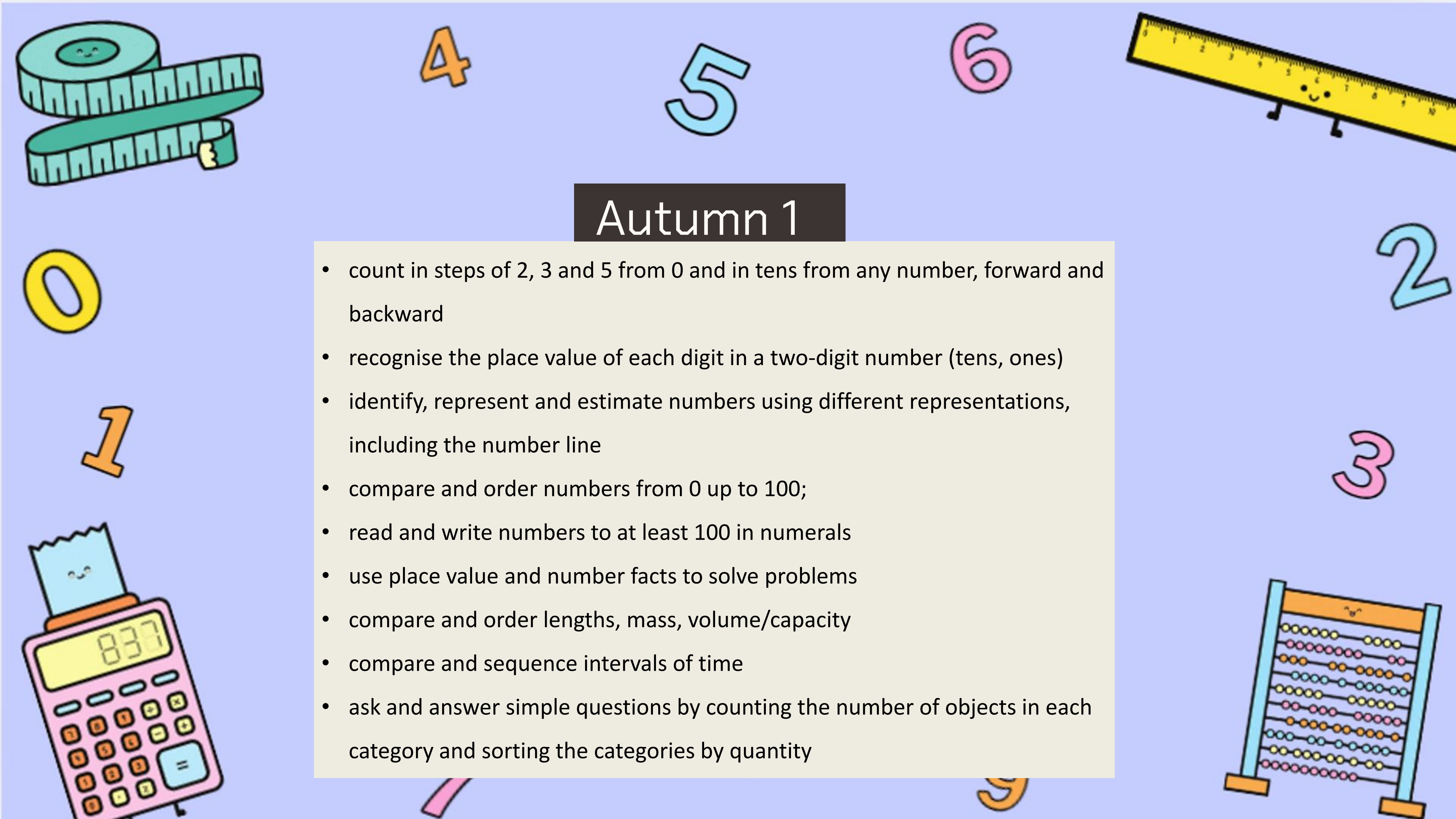
Which of these numbers is greater? (numbers where the ones is bigger but the tens smaller)

Describe or draw what happens when I add ten to a number.

Give 5 possible answers for $13 + 9 =$

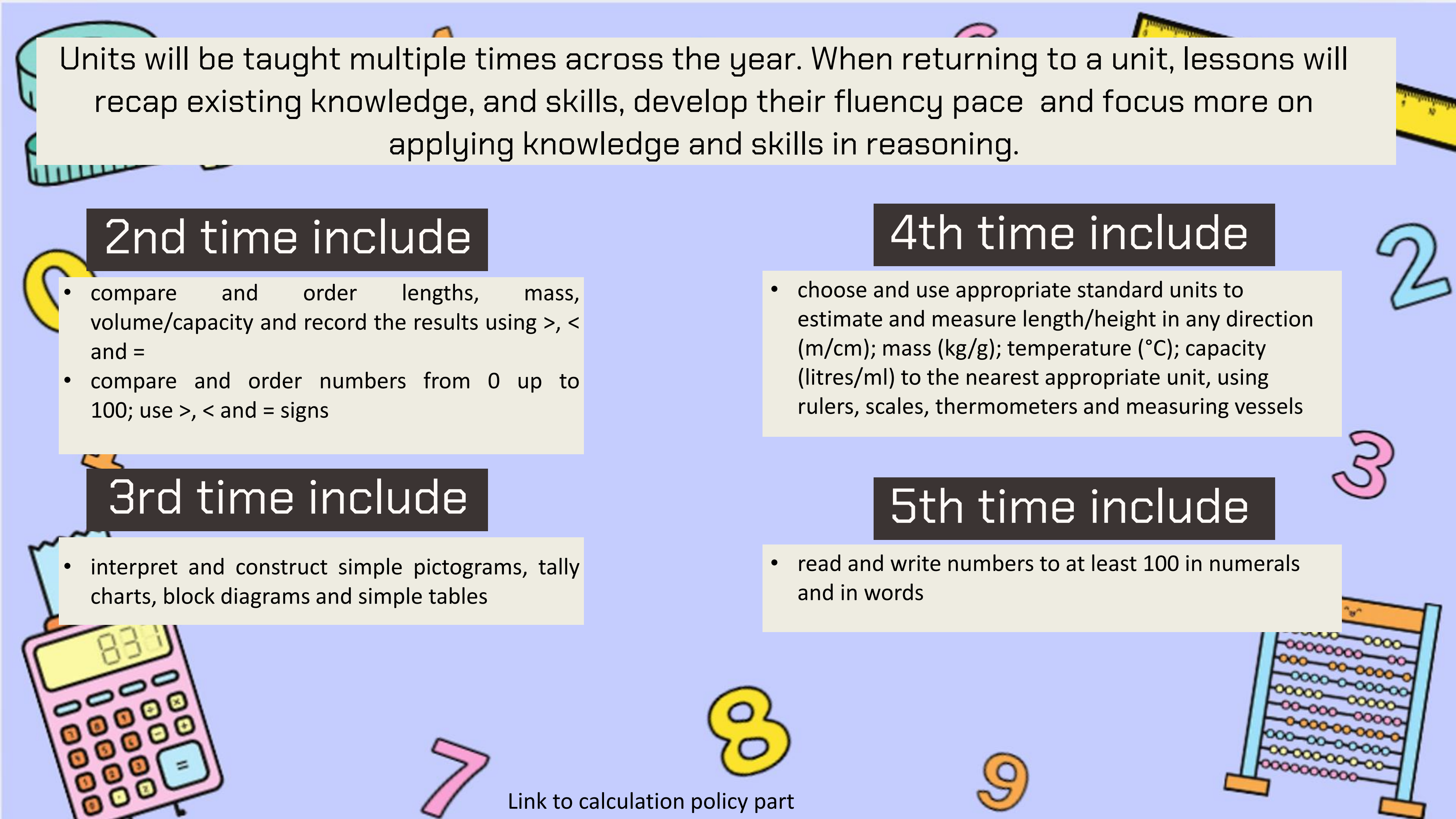
Why would I not measure how long I sleep for in years?

I have the digits 3, 7 and 4. What two-digit numbers can I make?



Autumn 1

- count in steps of 2, 3 and 5 from 0 and in tens from any number, forward and backward
- recognise the place value of each digit in a two-digit number (tens, ones)
- identify, represent and estimate numbers using different representations, including the number line
- compare and order numbers from 0 up to 100;
- read and write numbers to at least 100 in numerals
- use place value and number facts to solve problems
- compare and order lengths, mass, volume/capacity
- compare and sequence intervals of time
- ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity



Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- compare and order lengths, mass, volume/capacity and record the results using $>$, $<$ and $=$
- compare and order numbers from 0 up to 100; use $>$, $<$ and $=$ signs

3rd time include

- interpret and construct simple pictograms, tally charts, block diagrams and simple tables

4th time include

- choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature ($^{\circ}\text{C}$); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels

5th time include

- read and write numbers to at least 100 in numerals and in words

CPA for understanding tens and ones

Back to year group main slide

Concrete:

Build 47 using four tens rods and seven ones.

Pictorial:

Draw a place-value chart or represent the number with lines and dots.

Abstract:

Write $47 = 40 + 7$ and compare it with another number using $<$, $>$ or $=$.

Scaffold

- Base-ten equipment: Use tens rods and ones to construct two-digit numbers before drawing and recording them in a place-value chart.
- Partially completed number lines: Include labelled multiples of 10, allowing pupils to estimate and place numbers between these reference points.
- Place-value sentence frames: Use "___ has ___ tens and ___ ones" and "___ is greater because it has more ___."

Development of greater depth

- Partition flexibly: Pupils represent 63 as $60 + 3$, $50 + 13$, $40 + 23$ and in other ways, explaining why each partition still represents 63.
- Reason about place value: Ask, "Which numbers have 7 tens and fewer than 5 ones?" Pupils find every possibility and explain how they organised them.
- Investigate changes: Starting with 46, pupils predict and explain what happens when 10, 20, 1 or 2 is added or subtracted.

YEAR 2– Additive reasoning

Prior learning-

Pupils should know number bonds within 10 and use addition and subtraction to represent combining, separating, finding a difference and comparing quantities.

Intent

- Lesson should cover approximately 10 weeks over the year.
- Children can apply their number knowledge to solving two-digit problems with physical resources, through drawings and with an abstract method. Children can also apply this knowledge to money and real-life problems.

Key Vocab

addition, subtraction, inverse, commutative, fact family, missing number, exchange, partition, calculate

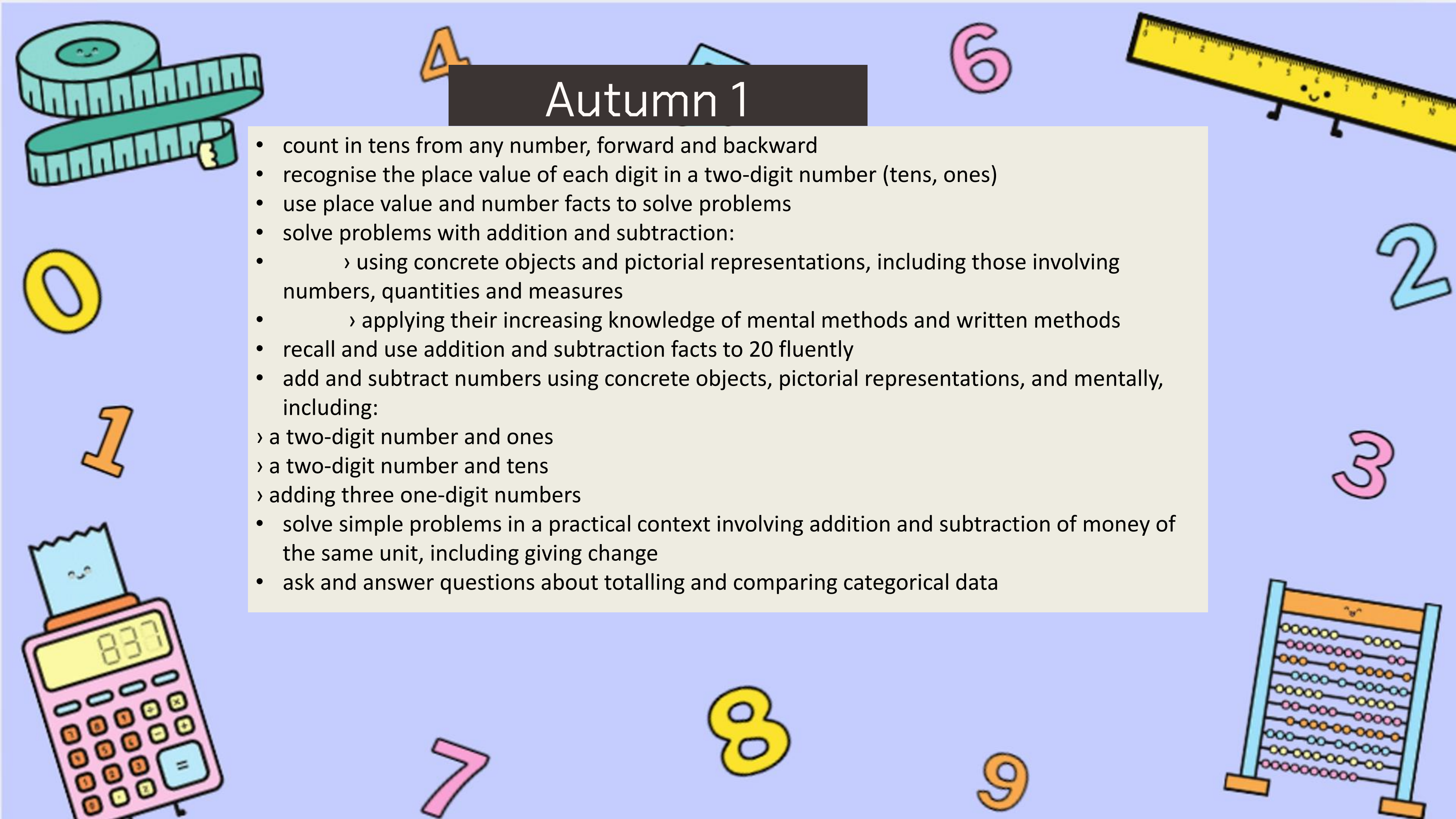
Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Strong links to the holiday seasons and buying items for presents (prices rounded to £1s)
- Children to make human bar charts in the playground.

SUGGESTED QUESTIONS TO MEASURE IMPACT

- What number do I have here _____. Can you count on in 1s / 10s from that number
- How do I use $7 + 2 = 9$ to help me solve $70 + 20 =$
- What do I do if I am subtracting and there are not enough ones?



Autumn 1

- count in tens from any number, forward and backward
- recognise the place value of each digit in a two-digit number (tens, ones)
- use place value and number facts to solve problems
- solve problems with addition and subtraction:
 - › using concrete objects and pictorial representations, including those involving numbers, quantities and measures
 - › applying their increasing knowledge of mental methods and written methods
- recall and use addition and subtraction facts to 20 fluently
- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
 - › a two-digit number and ones
 - › a two-digit number and tens
 - › adding three one-digit numbers
- solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change
- ask and answer questions about totalling and comparing categorical data

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
- find different combinations of coins to equal the same amounts of money
- recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and missing number problems

3rd time include

- add and subtract numbers using concrete objects, pictorial representations, and mentally, including:
 - › a two-digit number and ones
 - › a two-digit number and tens
 - › two two-digit numbers
 - › adding three one-digit numbers

CPA for adding across a ten

Back to year
group main
slide

Concrete:

Use counters in ten-frames to calculate $8 + 5$, filling the first frame to make 10.

Pictorial:

Draw ten-frames or a number line showing $8 + 2 + 3$.

Abstract:

Write $8 + 5 = 13$ and explain the partitioning strategy.

Scaffold

- Bridging-through-10 frames: Use two ten-frames to show how part of an addend can fill the first frame, for example decomposing 5 into 2 and 3 when calculating $8 + 5$.
- Strategy prompts: Give a choice of *make 10*, *partition*, *count on* or *use a known fact*, with a worked example of each.
- Bar-model templates: Provide labelled or partially completed models to identify the whole, known part and unknown part before pupils calculate.

Development of greater depth

- Compare strategies: Solve $38 + 27$ using two different methods, such as bridging through 10 and partitioning, then decide which is more efficient and why.
- Find and correct errors: Present an incorrect argument, such as $45 - 18 = 37$, and ask pupils to locate the error, correct it and prove the answer.
- Solve open-ended problems: Ask pupils to complete $\square + \square = 50$ in as many ways as possible, subject to conditions such as both numbers being odd.

YEAR 2— Geometric Reasoning

Prior learning-

Pupils should recognise and name common 2-D and 3-D shapes, describe simple properties and use positional, directional and turning language.

Intent

- Lesson should cover approximately 7 weeks over the year.
- Children to continue to develop their knowledge of shape through their properties and looking at sequences involving them. Children will develop their understanding of fractions by looking at fractions of a number on top of fractions of an amount.

Key Vocab

side, vertex, vertices, edge, face, surface, straight, curved, vertical, horizontal, clockwise, anticlockwise, quarter turn, half turn

Tips and Tricks

ENRICHMENT OPPORTUNITIES

- A shape hunt looking for 3D shapes.
- Use of the playground area to have children moving for rotation and movement.

SUGGESTED QUESTIONS TO MEASURE IMPACT

- My shape has four sides. Tell me at least three shapes name I could use for it?
- Tell me how you know this shape is a pentagon.
- Why will the next shape in the sequence not be a _____

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

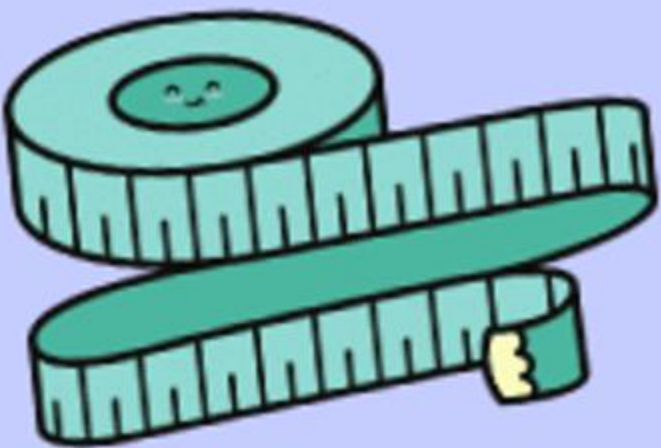
Autumn 1

- identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line
- identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces
- identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid]
- compare and sort common 2-D and 3-D shapes and everyday objects
- order and arrange combinations of mathematical objects in patterns and sequences
- use mathematical vocabulary to describe position, direction and movement

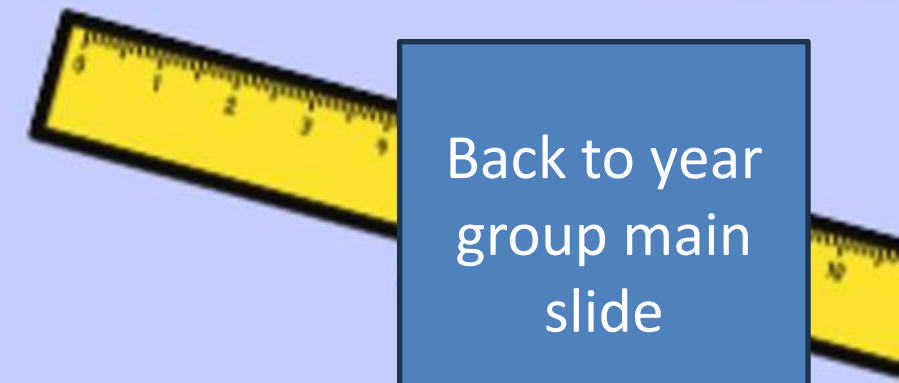
Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)
- recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$



CPA for describing 2-D and 3-D shapes



Back to year
group main
slide



Concrete:

Sort physical shapes according to sides, vertices, edges and faces.

Pictorial:

Draw the shapes or complete a property table.

Abstract:

Use precise statements such as "A cuboid has 6 faces, 12 edges and 8 vertices."

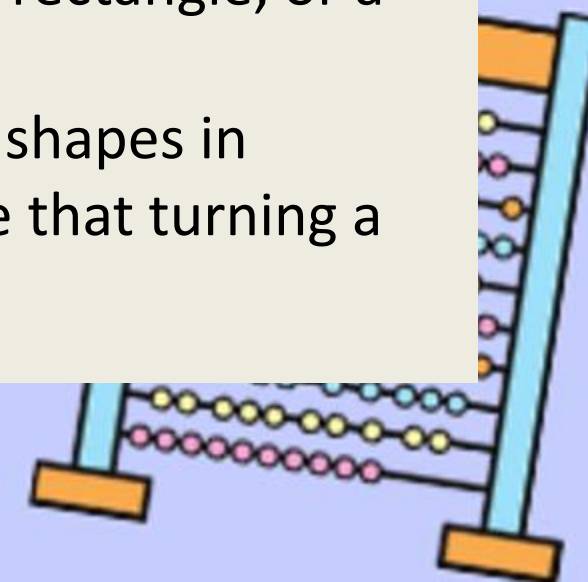


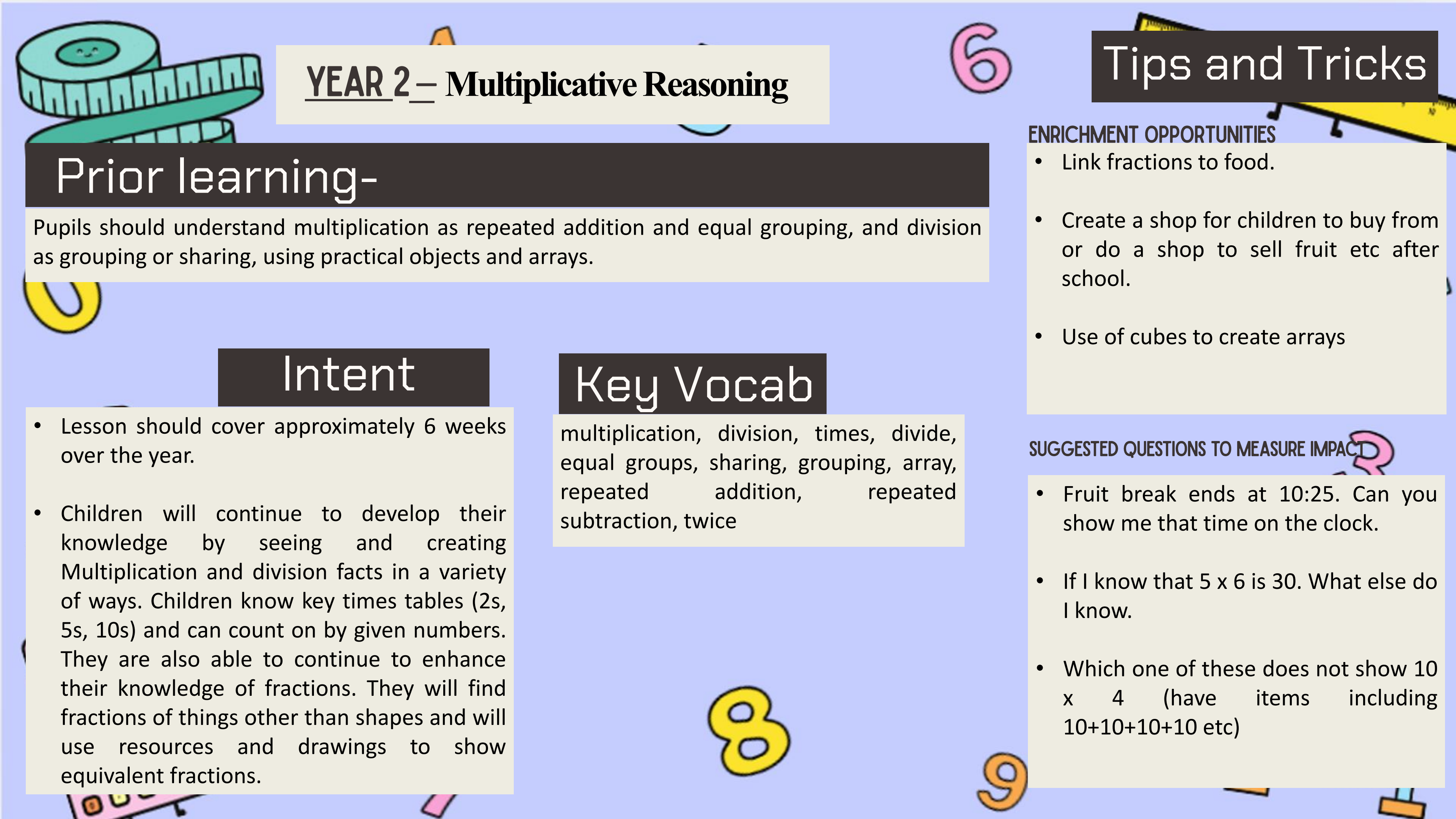
Scaffold

- Property vocabulary bank: Provide words such as *side*, *vertex*, *edge*, *face*, *curved* and *straight*, accompanied by small visual examples.
- Shape-sorting tables: Give headings such as *number of sides* or *number of vertices*, with one example already completed.
- Orientation support: Allow pupils to rotate physical shapes or transparent overlays to check that a shape's properties remain unchanged when it is turned.

Development of greater depth

- Use clues to identify shapes: Give clues such as "I have more than three sides and no right angles." Pupils identify possible shapes and explain why more than one answer may work.
- Compare properties: Ask pupils to explain what is the same and different about a square and a rectangle, or a cube and a cuboid.
- Reason about orientation: Show familiar shapes in unusual positions and ask pupils to prove that turning a shape does not change its properties.





YEAR 2 – Multiplicative Reasoning

Prior learning-

Pupils should understand multiplication as repeated addition and equal grouping, and division as grouping or sharing, using practical objects and arrays.

Intent

- Lesson should cover approximately 6 weeks over the year.
- Children will continue to develop their knowledge by seeing and creating Multiplication and division facts in a variety of ways. Children know key times tables (2s, 5s, 10s) and can count on by given numbers. They are also able to continue to enhance their knowledge of fractions. They will find fractions of things other than shapes and will use resources and drawings to show equivalent fractions.

Key Vocab

multiplication, division, times, divide, equal groups, sharing, grouping, array, repeated addition, repeated subtraction, twice

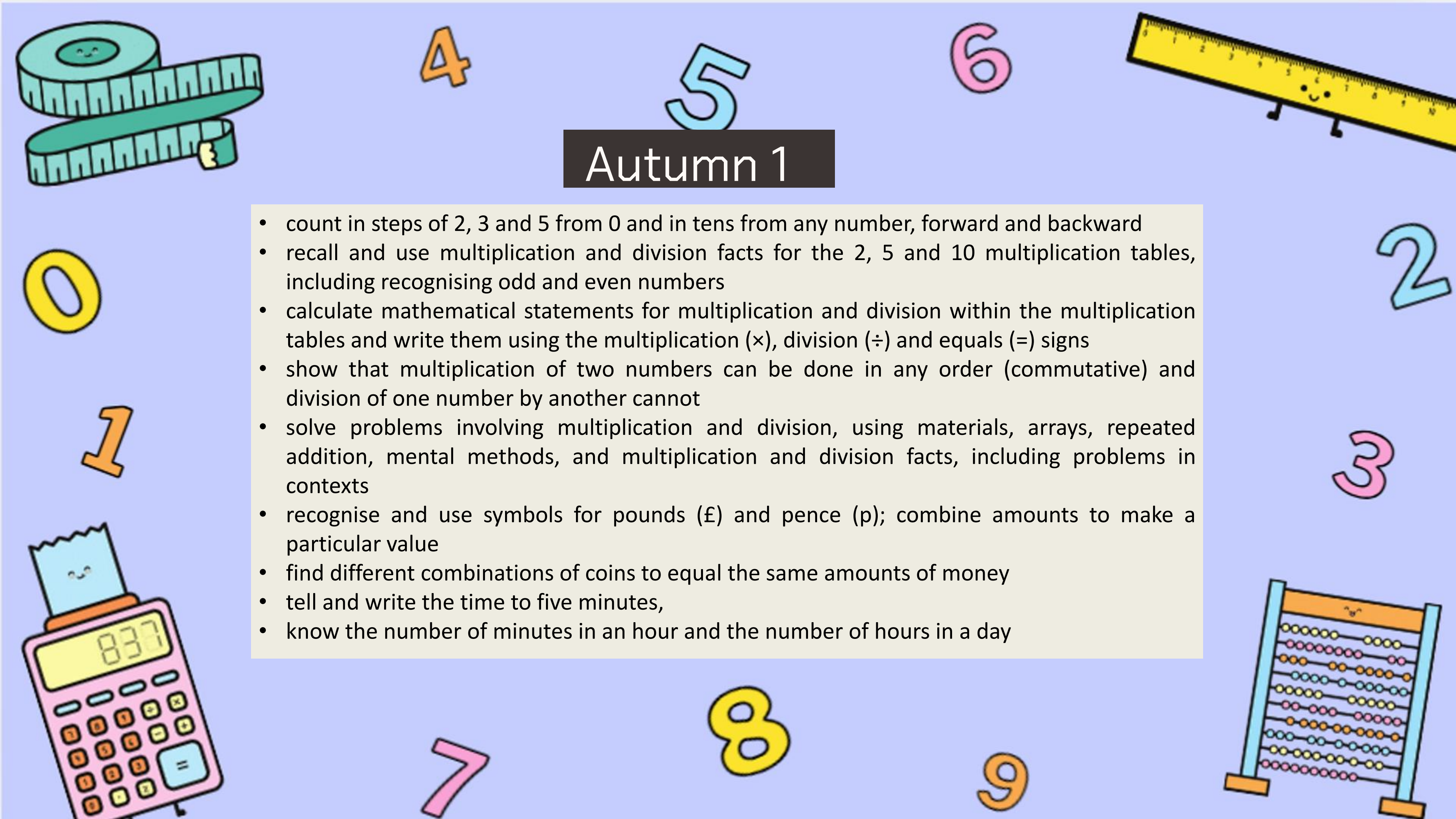
Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Link fractions to food.
- Create a shop for children to buy from or do a shop to sell fruit etc after school.
- Use of cubes to create arrays

SUGGESTED QUESTIONS TO MEASURE IMPACT

- Fruit break ends at 10:25. Can you show me that time on the clock.
- If I know that 5×6 is 30. What else do I know.
- Which one of these does not show 10×4 (have items including $10+10+10+10$ etc)



Autumn 1

- count in steps of 2, 3 and 5 from 0 and in tens from any number, forward and backward
- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication ($\times$), division ($\div$) and equals ($=$) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts
- recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value
- find different combinations of coins to equal the same amounts of money
- tell and write the time to five minutes,
- know the number of minutes in an hour and the number of hours in a day

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$
- tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times

CPA for multiplication through arrays

Back to year group main slide

Concrete:

Arrange 12 counters into three rows of four and four rows of three.

Pictorial:

Draw the arrays and identify the rows and columns.

Abstract:

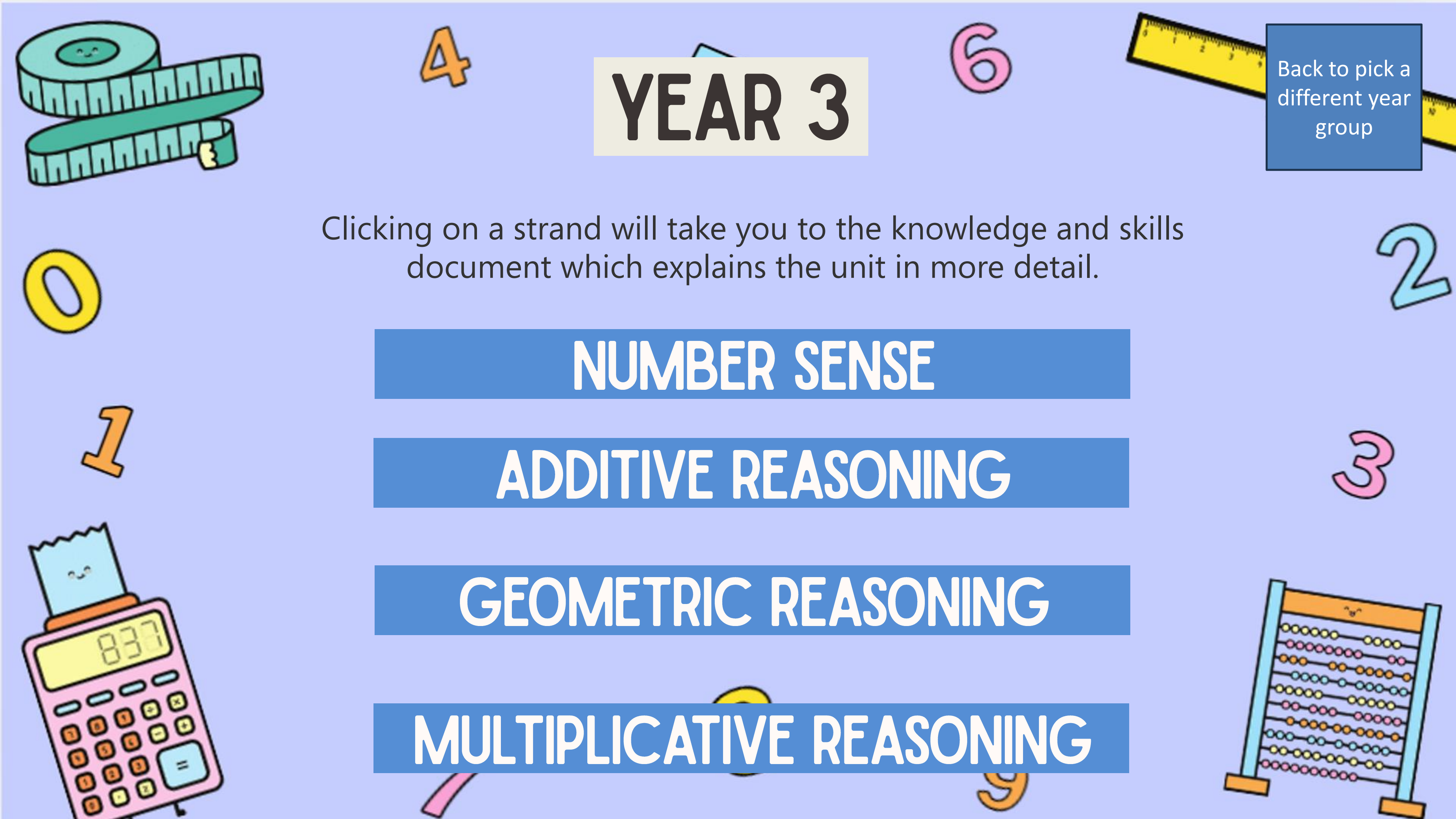
Write $3 \times 4 = 12$ and $4 \times 3 = 12$, connecting these to repeated addition.

Scaffold

- Array templates: Supply grids on which pupils can place counters in equal rows and columns before drawing and writing multiplication facts.
- Linked sentence stems: Use "There are ___ groups of ___", "There are ___ altogether" and "___ divided into groups of ___ makes ___ groups."
- Multiplication-table patterns: Provide highlighted number tracks for multiples of 2, 5 and 10 so pupils can connect skip-counting with equal groups.

Development of greater depth

- Connect arrays and equations: Pupils draw every rectangular array possible for 12 and record the corresponding multiplication and division facts.
- Solve grouping problems with constraints: Ask, "There are fewer than 30 socks. They can be put into pairs with none left. What could the total be?"
- Explain commutativity: Pupils use arrays to explain why 3×5 and 5×3 have the same product, while the groups are described differently.



YEAR 3

[Back to pick a different year group](#)

Clicking on a strand will take you to the knowledge and skills document which explains the unit in more detail.

NUMBER SENSE

ADDITIVE REASONING

GEOMETRIC REASONING

MULTIPLICATIVE REASONING

YEAR 3- Number sense

Prior learning-

Pupils should understand place value in three-digit numbers, compare and order numbers to 1,000 and recognise halves, quarters and thirds as equal parts of shapes, quantities and numbers.

Intent

- Lessons should cover approximately 12 weeks over the year.
- Children will continue to develop their number knowledge with a focus on using it to better understand fractions and time. They will also apply their knowledge of place value to solving addition and subtraction problems
- All children should make at least expected progress. The Numicon Intervention Program is used in the Autumn term to help ensure children who are just behind ARE at the end of Y2 make rapid progress to help them achieve ARE by the end of the year.

Key Vocab

hundreds, tens, ones, three-digit number, partition, interval, number line, nearest ten, nearest hundred, round, fraction, numerator, denominator

Tips and Tricks

ENRICHMENT OPPORTUNITIES

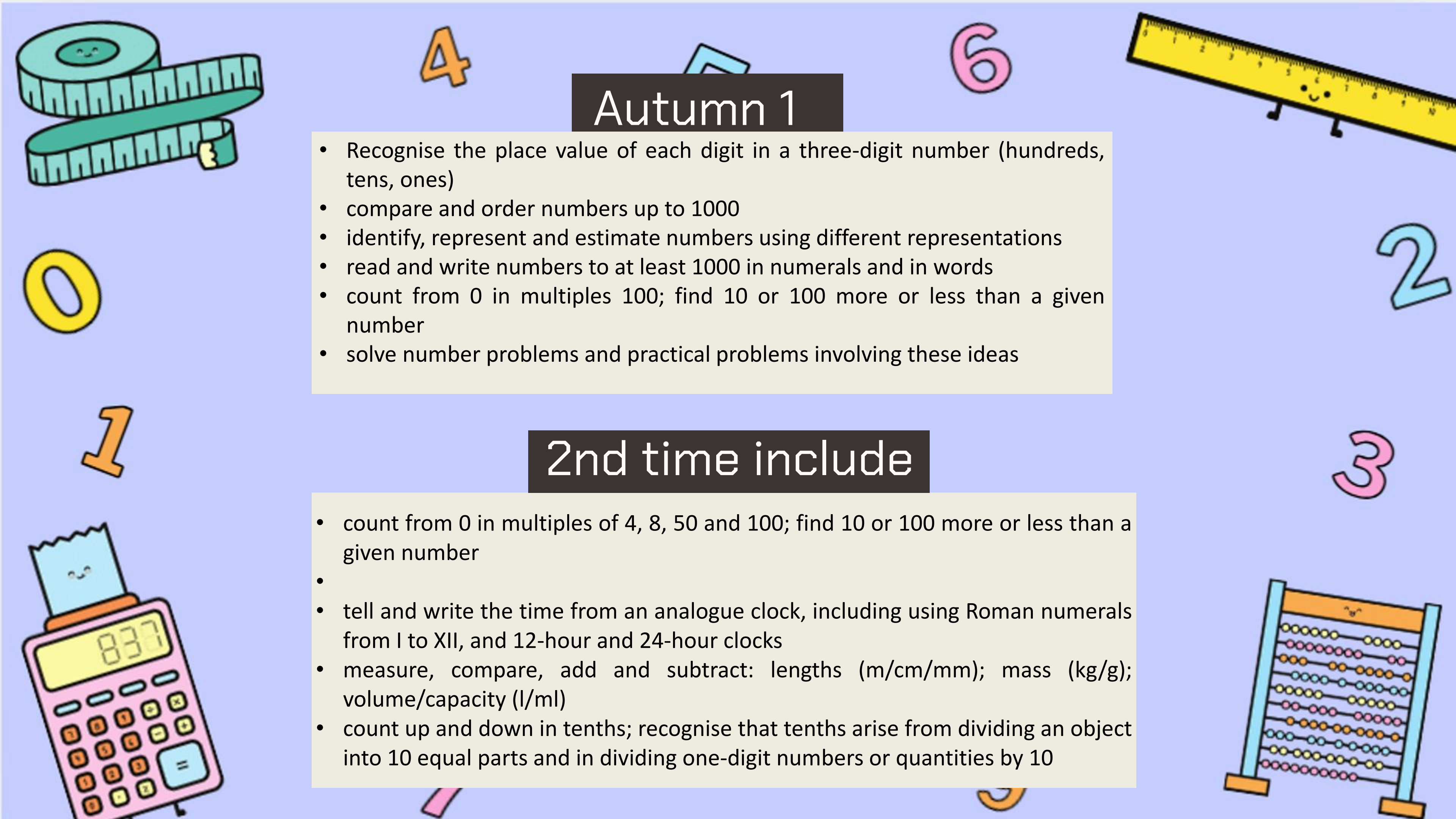
- Trip to Pizza express – linking to making pizzas and then fractions of a pizza.
- Cooking to develop measurement skills. Can also link in time when looking at cooking times.

SUGGESTED QUESTIONS TO MEASURE IMPACT

Use these digits to make the largest number possible. What is the closest number to 400 you can make? What would 100 more than that number be.

What time is shown here (nearest minute)? What will the time be in 3 minutes time? Is 3 minutes longer than 150 seconds? Why? What is the different between the most popular and least popular in this chart?

What fraction could I add to $\frac{2}{6}$ th to give $\frac{5}{6}$ ths?

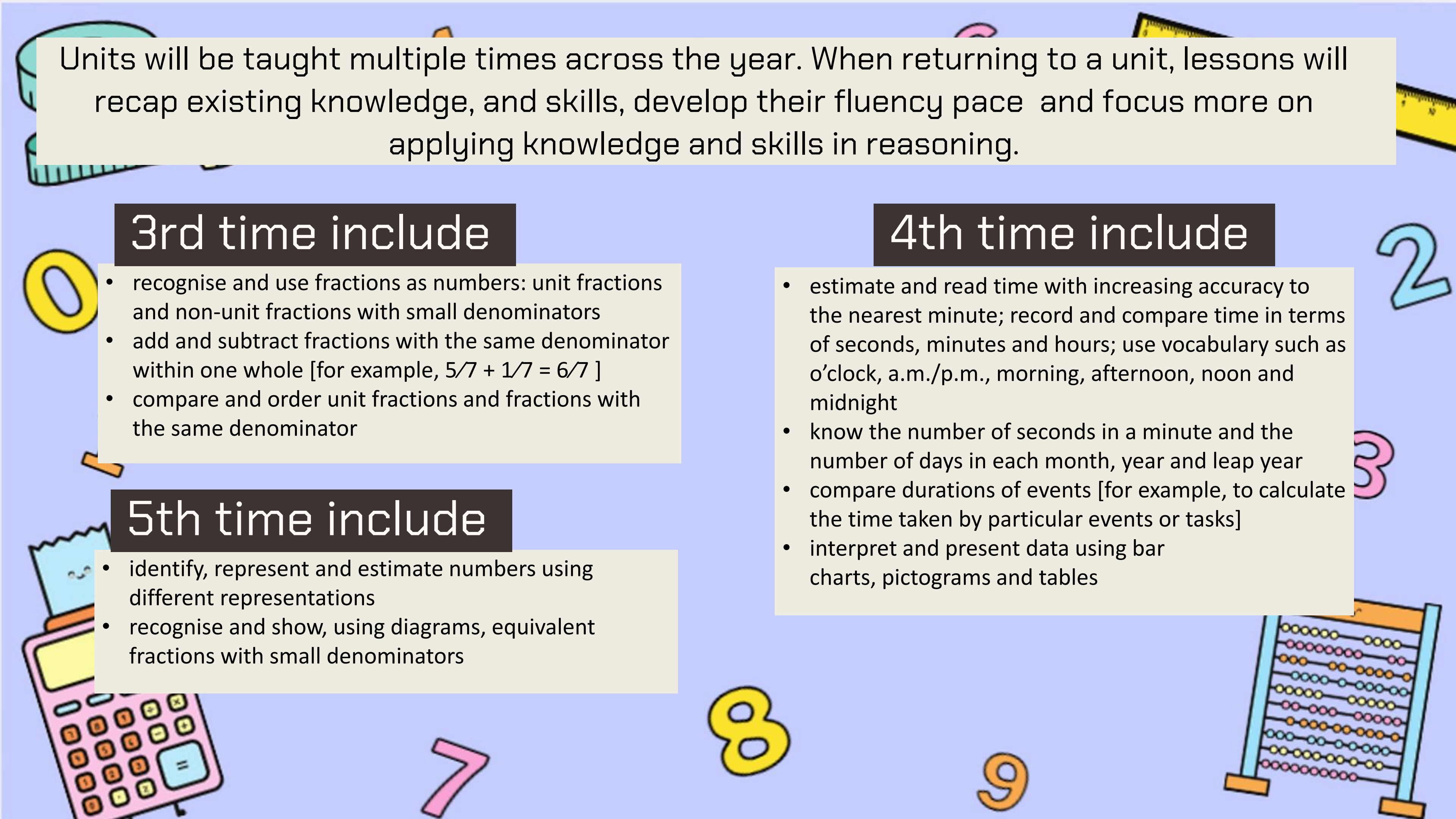


Autumn 1

- Recognise the place value of each digit in a three-digit number (hundreds, tens, ones)
- compare and order numbers up to 1000
- identify, represent and estimate numbers using different representations
- read and write numbers to at least 1000 in numerals and in words
- count from 0 in multiples 100; find 10 or 100 more or less than a given number
- solve number problems and practical problems involving these ideas

2nd time include

- count from 0 in multiples of 4, 8, 50 and 100; find 10 or 100 more or less than a given number
-
- tell and write the time from an analogue clock, including using Roman numerals from I to XII, and 12-hour and 24-hour clocks
- measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10



Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

3rd time include

- recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- add and subtract fractions with the same denominator within one whole [for example, $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$]
- compare and order unit fractions and fractions with the same denominator

5th time include

- identify, represent and estimate numbers using different representations
- recognise and show, using diagrams, equivalent fractions with small denominators

4th time include

- estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- know the number of seconds in a minute and the number of days in each month, year and leap year
- compare durations of events [for example, to calculate the time taken by particular events or tasks]
- interpret and present data using bar charts, pictograms and tables

CPA for place value in three-digit numbers

Back to year group main slide

Concrete:

Build 326 using hundreds flats, tens rods and ones.

Pictorial:

Draw a place-value chart or represent the base-ten equipment.

Abstract:

Write $326 = 300 + 20 + 6$ and identify the value of each digit.

Scaffold

- Place-value counters and charts: Let pupils build a three-digit number in hundreds, tens and ones before drawing or writing its expanded form.
- Number-line landmarks: Provide number lines with hundreds and selected multiples of 10 labelled to support comparison, ordering and rounding.
- Fraction overlays: Use equal-part strips placed over one another to compare fractions and identify equivalent fractions physically.

Development of greater depth

- Partition flexibly: Pupils express 347 in several ways, including $300 + 40 + 7$, $200 + 140 + 7$ and 34 tens + 7 ones, explaining the equivalence.
- Place numbers precisely: Give pupils an unmarked number line from 200 to 300 and ask them to position 237, 250 and 289, justifying their relative locations.
- Investigate fractions: Ask pupils to find several fractions equivalent to one-half using strips, shapes or number lines and explain the pattern they notice.

YEAR 3– Additive reasoning

Prior learning–

Pupils should recall addition and subtraction facts to 20 and add or subtract two-digit numbers using secure mental strategies and developing written methods.

Intent

- Lesson should cover approximately 9 weeks over the year.
- Children work on solving problems with a focus on deciding what methods or existing knowledge to use to solve the problem. They will develop mental methods as well as written ones. Children will develop their ability to explain what they have done and justify their solution.

Key Vocab

column addition, column subtraction, exchange, regroup, mental strategy, estimate, check, inverse operation

Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Looking outside school. Could record data of cars travelling along the main road to look at the most popular colour etc.
- Playing games placing digits rolled on a die into boxes. Can we make the smallest number etc

SUGGESTED QUESTIONS TO MEASURE IMPACT

- Give the children an addition and subtraction problem with missing digits in all three numbers. Can they use the remaining information to work out what they should be?
- Buying items for a special occasion. What could you buy them? How much change will you receive? Show me three ways that change could be given.
- What ____ received X number of votes more than ____?
- What unit of measurement would you use to measure ____? Measure it for me now.

Autumn 1

- add and subtract numbers mentally, including:
 - › a three-digit number and ones
 - › a three-digit number and tens
 - › a three-digit number and hundreds
- add and subtract numbers with up to three digits
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction
- measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml)
- add and subtract amounts of money to give change, using both £ and p in practical contexts
- interpret and present data using bar charts, pictograms and tables
- solve one-step and two-step questions [for example, 'How many more?' and 'How many fewer?'] using information presented in scaled bar charts and pictograms and tables

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- add and subtract numbers with up to three digits using formal written methods of columnar addition and subtraction
- record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight
- know the number of seconds in a minute and the number of days in each month, year and leap year
- compare durations of events [for example, to calculate the time taken by particular events or tasks]

CPA for addition with regrouping

Back to year
group main
slide

Concrete:

Model $247 + 136$ using place-value counters, exchanging ten ones for one ten and ten tens for one hundred.

Pictorial:

Draw counters in columns and show each exchange..

Abstract:

Use the formal column method to calculate $247 + 136 = 383$.

Scaffold

- Exchange mats: Use labelled columns and place-value counters so pupils can exchange 10 ones for 1 ten or 10 tens for 1 hundred before recording the written method.
- Worked-example annotations: Colour-code the hundreds, tens and ones and annotate where an exchange occurs. Gradually remove the colours and notes.
- Calculation checklists: Provide: estimate, choose a method, calculate, check using the inverse and decide whether the answer is reasonable.

Development of greater depth

- Compare written and mental methods: Pupils solve $398 + 247$ mentally and formally, then explain why adjusting 398 to 400 is efficient.
- Reason from known facts: Starting with $46 + 27 = 73$, ask pupils to calculate $460 + 270$, $73 - 27$ and $146 + 27$ without starting again.
- Solve missing-digit problems: Complete a calculation such as $2\square7 + 145 = 392$ and explain how each unknown digit was determined.

YEAR 3 – Geometric Reasoning

Prior learning-

Pupils should identify common 2-D and 3-D shapes, describe their sides, vertices, edges and faces, and recognise turns and right angles.

Intent

- Lesson should cover approximately 6 weeks over the year.
- Children to develop their understanding of shapes by their properties with a focus on the use of angles. Children will also enhance their vocabulary using terms including perpendicular and parallel when describing shapes.

Key Vocab

angle, right angle, acute, obtuse, parallel, perpendicular, horizontal, vertical, compass point, clockwise, anticlockwise

Tips and Tricks

ENRICHMENT OPPORTUNITIES

Look at perimeter of the ground markings in the playground.

Have the children search the school and photograph examples of perpendicular and parallel lines.

SUGGESTED QUESTIONS TO MEASURE IMPACT

Which is the odd one out? (looking at one oblong and three squares but at different orientations)

What can you tell me about this shape? (looking for angles and parallel lines)

How are these angles different?

What does perimeter mean?

Autumn 1

- draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them
- recognise that angles are a property of shape or a description of a turn
- identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle



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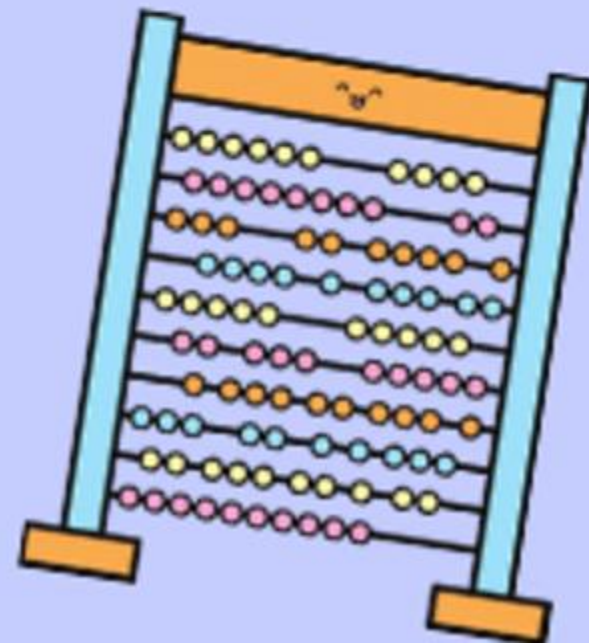


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Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- identify horizontal and vertical lines and pairs of perpendicular and parallel lines

3rd time include

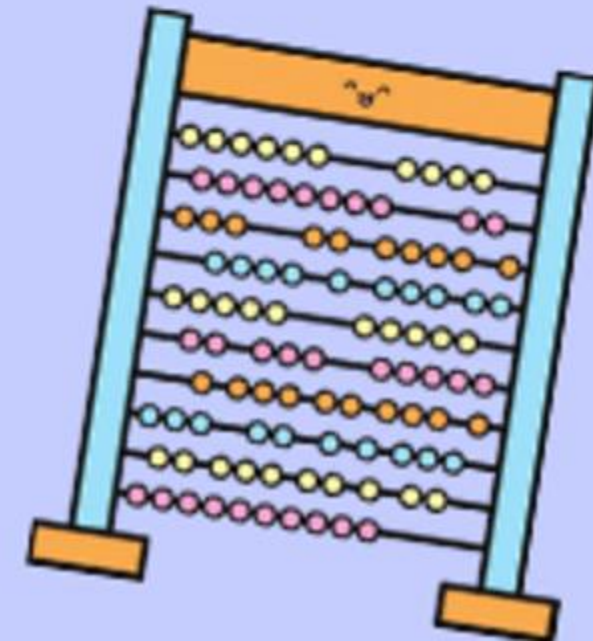
- measure the perimeter of simple 2-D shapes



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CPA for understanding right angles

Back to year group main slide

Concrete:

Make turns and test classroom objects using a right-angle checker.

Pictorial:

Mark right angles on drawings of shapes and compare other angles with a right angle.

Abstract:

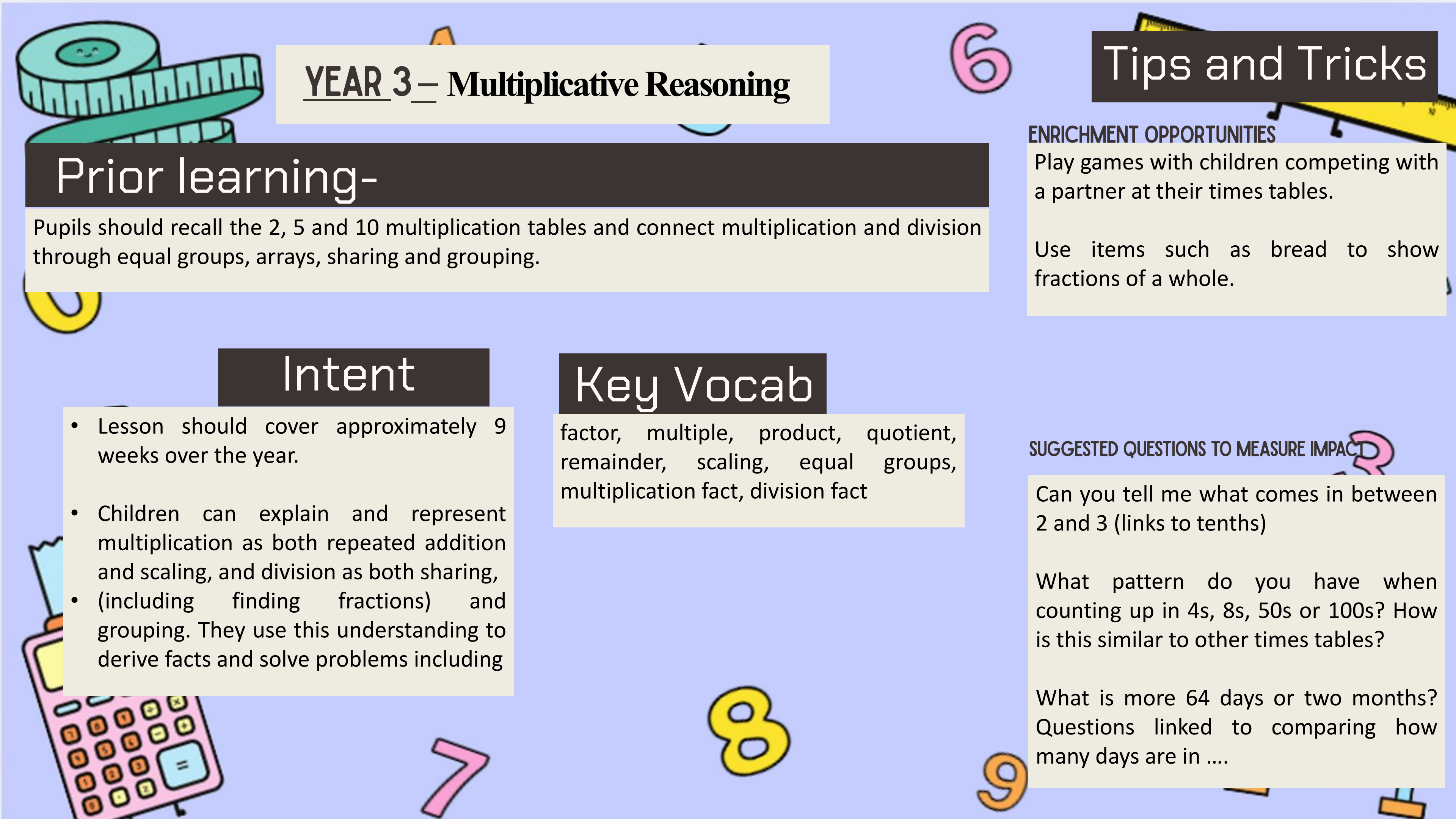
State the number of right angles in a shape and describe angles as less than or greater than a right angle.

Scaffold

- Right-angle checkers: Give pupils a card corner to identify and compare right angles in shapes and around the classroom.
- Turn mats: Use arrows and labelled quarter-, half- and three-quarter turns before pupils visualise turns without moving an object.
- Property tables: Provide columns for *sides*, *vertices*, *right angles*, *parallel sides* and *symmetry*, completing the first shape together.

Development of greater depth

- Classify using necessary properties: Ask pupils whether a shape with four right angles must be a square, encouraging them to construct counterexamples.
- Reason about turns: Pupils predict the direction an object will face after combinations of quarter, half and three-quarter turns, then justify without physically turning it.
- Investigate shape construction: Pupils create as many different quadrilaterals as possible on a geoboard and classify them according to their properties.



YEAR 3 – Multiplicative Reasoning

Prior learning-

Pupils should recall the 2, 5 and 10 multiplication tables and connect multiplication and division through equal groups, arrays, sharing and grouping.

Intent

- Lesson should cover approximately 9 weeks over the year.
- Children can explain and represent multiplication as both repeated addition and scaling, and division as both sharing, (including finding fractions) and grouping. They use this understanding to derive facts and solve problems including

Key Vocab

factor, multiple, product, quotient, remainder, scaling, equal groups, multiplication fact, division fact

Tips and Tricks

ENRICHMENT OPPORTUNITIES

Play games with children competing with a partner at their times tables.

Use items such as bread to show fractions of a whole.

SUGGESTED QUESTIONS TO MEASURE IMPACT

Can you tell me what comes in between 2 and 3 (links to tenths)

What pattern do you have when counting up in 4s, 8s, 50s or 100s? How is this similar to other times tables?

What is more 64 days or two months? Questions linked to comparing how many days are in

Autumn 1

- count from 0 in multiples of 4, 8, 50 and 100
- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know,
- solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects



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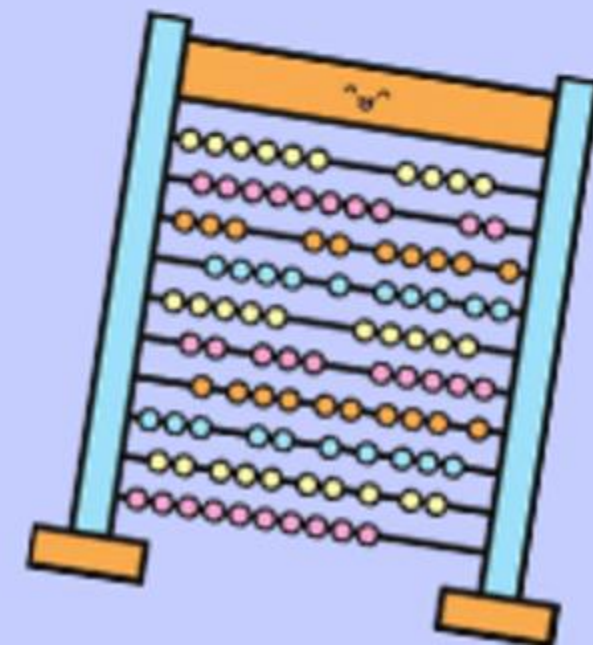
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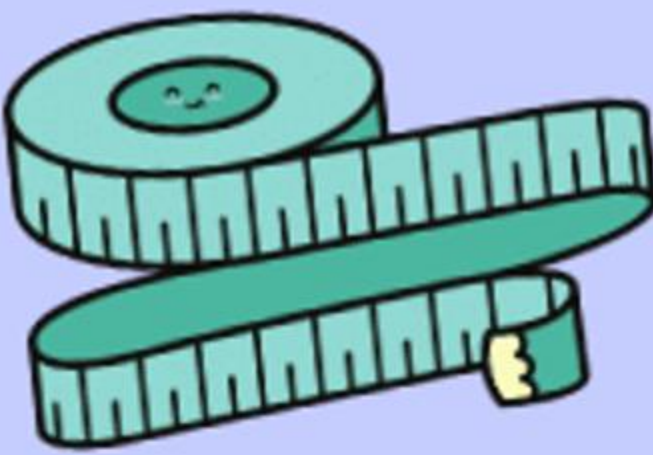
Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers,
- count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- solve problems that involve all of the above

3rd time include

- know the number of seconds in a minute and the number of days in each month, year and leap year
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods



CPA for linking multiplication and division



Back to year group main slide



Concrete:

Make an array of 4 rows of 3 counters, then divide the 12 counters into equal groups.

Pictorial:

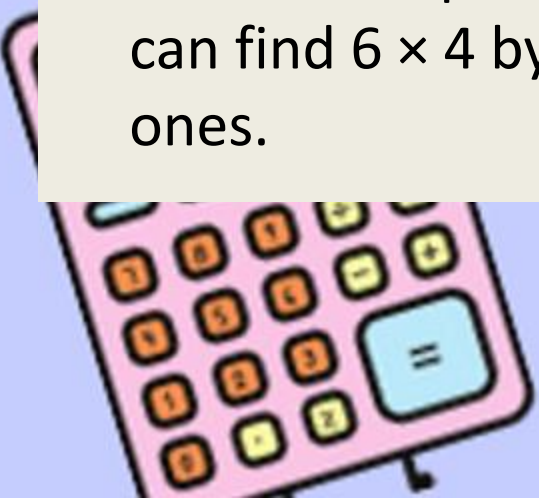
Draw an array or bar model representing the whole and equal groups.

Abstract:

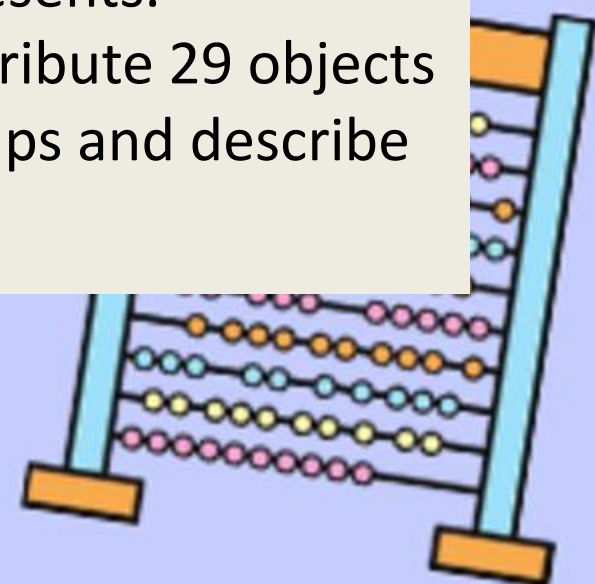
Write the fact family: $4 \times 3 = 12$, $3 \times 4 = 12$, $12 \div 3 = 4$ and $12 \div 4 = 3$.

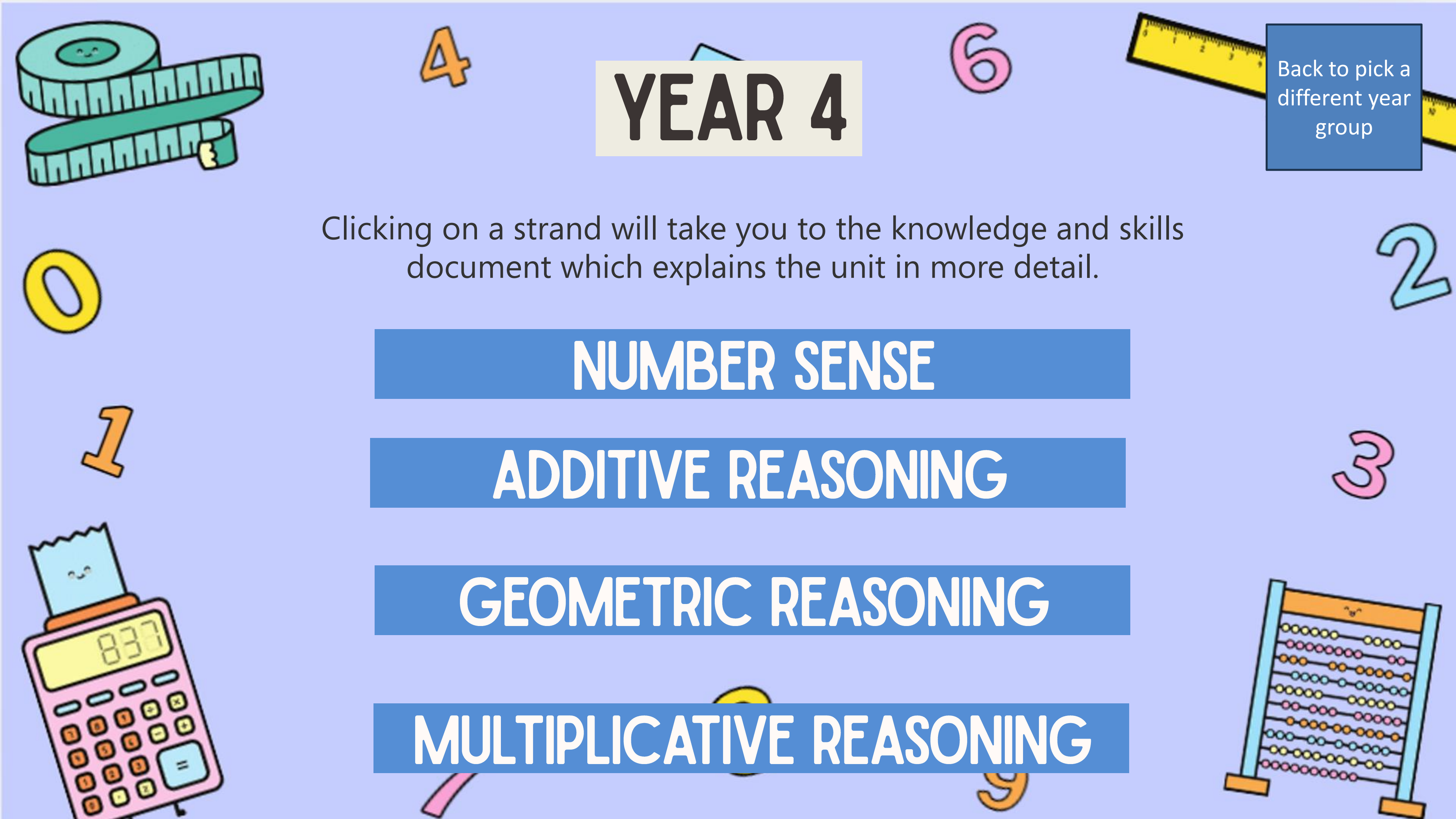


Scaffold

- Representation sequence: Move from counters in equal groups to arrays, bar models and equations, keeping the same calculation visible in each representation.
 - Fact-family frames: Provide four linked spaces for two multiplication and two division equations arising from the same array.
 - Known-fact prompts: Use prompts such as "I know 5×4 , so I can find 6×4 by..." to connect unfamiliar facts to secure ones.
- 

Development of greater depth

- Use fact families deeply: From $6 \times 4 = 24$, pupils generate multiplication and division facts involving 24, 240 and related missing-number equations.
 - Compare representations: Pupils represent 8×4 using equal groups, an array, a bar model and repeated addition, explaining what each part represents.
 - Investigate remainders: Ask pupils to distribute 29 objects equally among different numbers of groups and describe how the remainder changes.
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YEAR 4

[Back to pick a different year group](#)

Clicking on a strand will take you to the knowledge and skills document which explains the unit in more detail.

NUMBER SENSE

ADDITIVE REASONING

GEOMETRIC REASONING

MULTIPLICATIVE REASONING

YEAR 4- Number sense

Prior learning-

Pupils should understand place value in numbers to 1,000, compare and order these numbers, and recognise tenths and simple equivalent fractions.

Intent

- Lesson should cover approximately 12 weeks over the year.
- Children continue to develop their number knowledge to include the use of decimals and understand how they link to a whole. They will be able to link this with different forms of measurement and create links to fractions.
- Children will also round numbers when solving problems and use both 12- and 24-hour clocks in a variety of problems.

Key Vocab

thousand, place holder, negative number, Roman numeral, decimal, decimal place, tenth, hundredth, equivalent fraction, improper fraction, mixed number

Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Use of shopping and the need to round when estimating costs.
- A TV show lasts for 100 minutes. How long is that in hours and minutes?

SUGGESTED QUESTIONS TO MEASURE IMPACT

- 3.743 what number comes next if I was counting in thousandths. What whole number does this round to?
- Compare the goals scored by _____ in both bar charts. what day did _____ score more goals? (have one out of 6 so shows a bigger section and one out of 30 which has more goals but a smaller sections)
- Start at 5 and count back for me. Do they know how to cross 0.

Autumn 1

- count in multiples of 1000
- find 1000 more or less than a given number
- recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)
- order and compare numbers beyond 1000
- identify, represent and estimate numbers using different representations
- round any number to the nearest 10, 100 or 1000
- solve number and practical problems that involve all of the above and with increasingly large positive numbers



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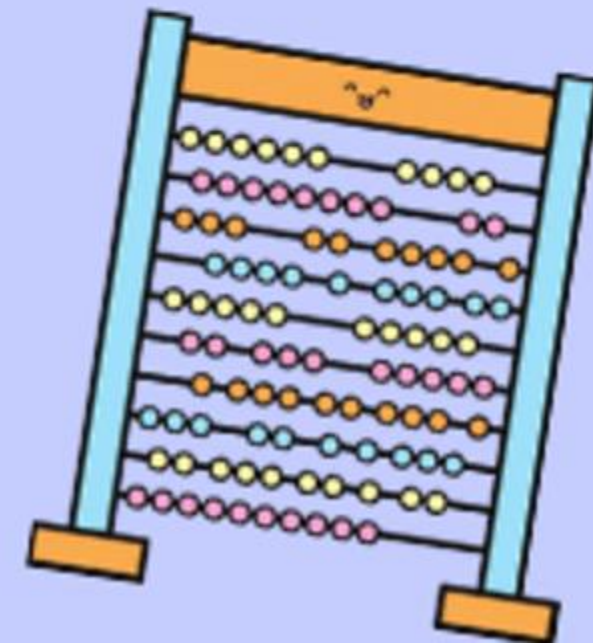
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Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- read Roman numerals to 100 (I to C) and know that, over time, the numeral system changed to include the concept of zero and place value
- count backwards through zero to include negative numbers

4th time include

- read, write and convert time between analogue and digital 12- and 24-hour clocks
- solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days
- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs

3rd time include

- count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten
- recognise and show, using diagrams, families of common equivalent fractions
- add and subtract fractions with the same denominator
- recognise and write decimal equivalents of any number of tenths or hundredths
- recognise and write decimal equivalents to $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$
- find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths
- round decimals with one decimal place to the nearest whole number
- compare numbers with the same number of decimal places up to two decimal places
- convert between different units of measure [for example, kilometre to meter; hour to minute]

CPA for tenths as fractions and decimals

Back to year group main slide

Concrete:

Divide a metre strip or ten-frame into ten equal parts and identify selected tenths.

Pictorial:

Shade, for example, 7 of 10 equal sections on a bar or hundred square.

Abstract:

Connect $7/10$, 0.7 and *seven tenths*.

Scaffold

- Place-value slider: Use a chart or slider to show how a digit's value changes when numbers are multiplied or divided by 10.
- Fraction walls: Provide a fraction wall to support comparison and equivalence before pupils reason using numerator and denominator relationships.
- Rounding number lines: Mark the lower multiple, midpoint and upper multiple before asking pupils to place and round a number.

Development of greater depth

- Generalise place-value changes: Ask pupils to explain what always, sometimes or never happens to each digit when 10, 100 or 1,000 is added to a four-digit number.
- Reason about rounding: Find all whole numbers that round to 3,500 to the nearest hundred, explaining the boundary values.
- Explore equivalence: Pupils find several fractions equivalent to $\frac{3}{4}$ and explain the multiplicative relationship between their numerators and denominators.

YEAR 4– Additive reasoning

Prior learning–

Pupils should add and subtract numbers with up to three digits using mental and formal written methods, estimating and using inverse operations to check answers.

Intent

- Lesson should cover approximately 12 weeks over the year.
- Children will continue to develop their skills to be able to explain their method and justify their solution. Children broaden the contexts in which they add and subtract. They apply number facts as well as their understanding of place value, counting, and mental and written methods.

Key Vocab

multi-step, operation, efficient strategy, approximation,, difference, formal written method

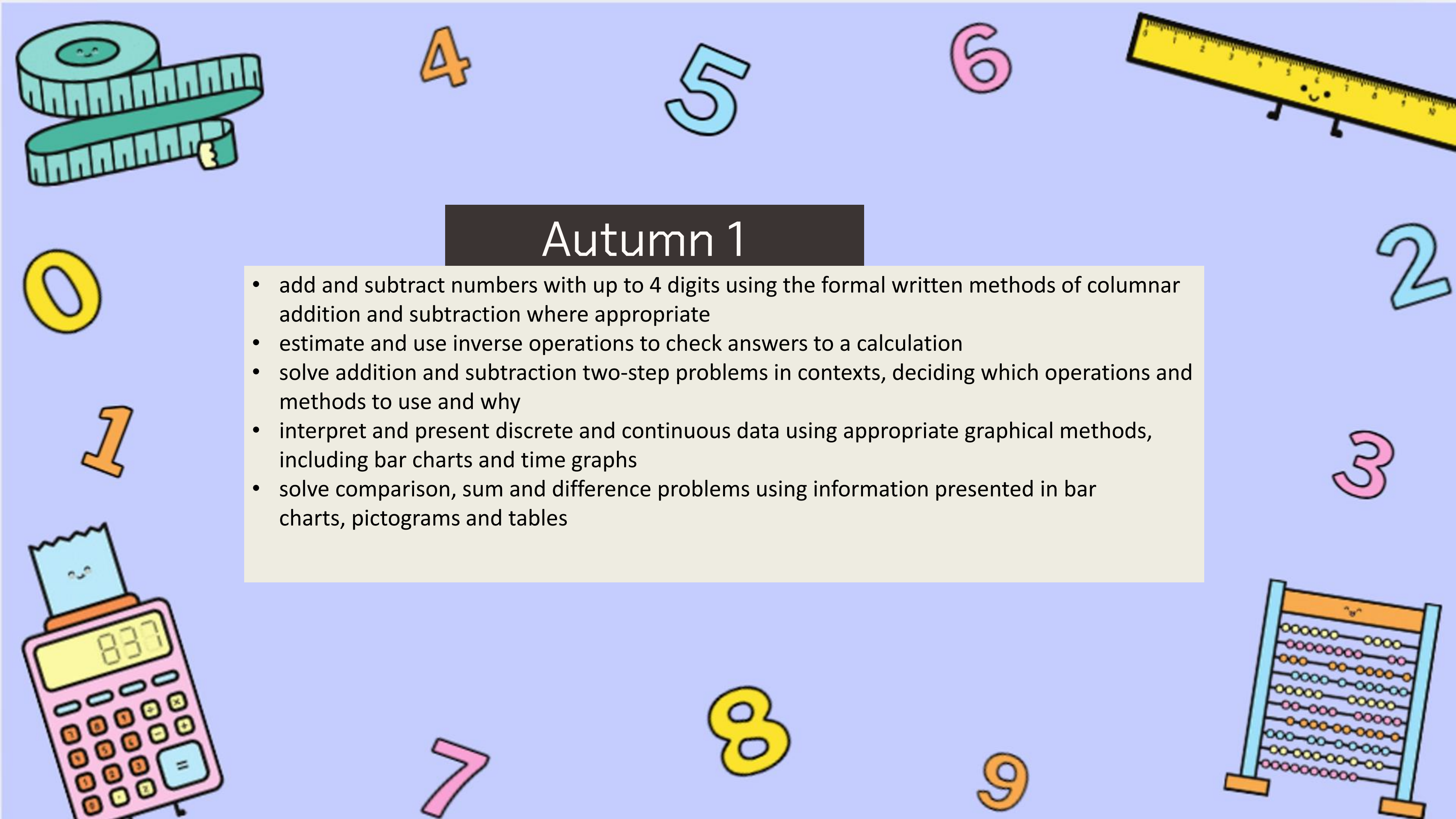
Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Ordering items, they have brought in from home, by their value with some in £ and some in p

SUGGESTED QUESTIONS TO MEASURE IMPACT

- Which Item sold the most and how many more than _____, did it sell?
- Would you rather receive £3 or 280p in pocket money? Why?
- Can you find the missing digits in this column addition problem? Remove parts of the question not the answer.



Autumn 1

- add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why
- interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs
- solve comparison, sum and difference problems using information presented in bar charts, pictograms and tables

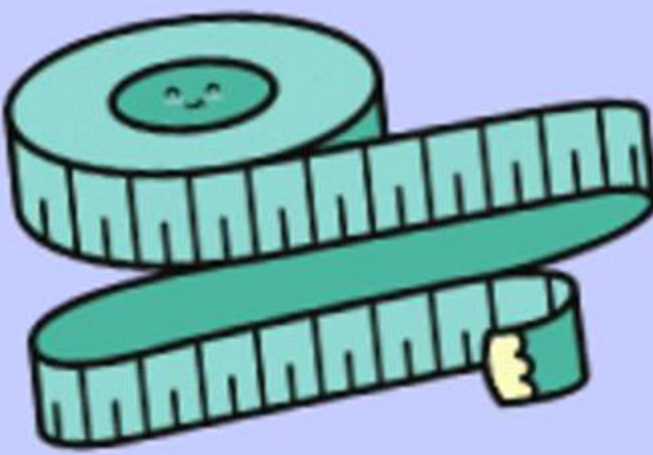
Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- estimate, compare and calculate different measures, including money in pounds and pence

3rd time include

- solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and simple line graphs
- solve simple measure and money problems involving fractions and decimals to two decimal places



CPA for subtraction with exchanges



Back to year group main slide



Concrete:

Use place-value counters to calculate $402 - 178$, exchanging across a zero.

Pictorial:

Draw the place-value columns and record each exchange.

Abstract:

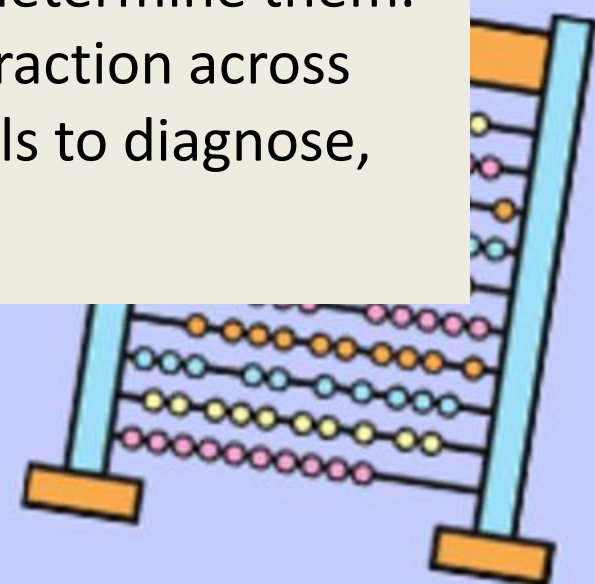
Apply the formal column method to find $402 - 178 = 224$.



Scaffold

- Place-value counters across zeros: Model exchanges step by step when subtracting from numbers containing zeros, recording each exchange alongside the equipment.
 - Method-selection prompts: Provide questions such as, "Are the numbers close together?", "Is one number close to a multiple of 10 or 100?" and "Would a written method be efficient?"
 - Error-analysis frames: Use "The mistake occurred when...", "The correct step is..." and "I can prove this by..." to structure explanations.
- 

Development of greater depth

- Choose efficient methods: Compare calculations such as $2,999 + 1,756$ and $4,003 - 1,998$, asking pupils to select and justify mental or written methods.
 - Solve missing-digit calculations: Complete a column calculation containing several missing digits and explain how exchanging and inverse operations determine them.
 - Analyse errors: Present an incorrect subtraction across zeros, such as $4,002 - 786$, and ask pupils to diagnose, correct and explain the misconception.
- 

YEAR 4 – Geometric Reasoning

Prior learning-

Pupils should identify right angles and compare other angles with them, recognise horizontal, vertical, parallel and perpendicular lines, and interpret simple coordinates.

Intent

- Lesson should cover approximately 6 weeks over the year.
- Children develop their ability to explain with a focus on how different area and perimeters of a shape can be calculated. They will improve their knowledge of symmetry and coordinates. They will use their understanding to complete patterns and solve problems. Children will enhance knowledge of angles taught in previous years to explain properties of shapes.

Key Vocab

quadrilateral, polygon, rhombus, parallelogram, trapezium, isosceles, equilateral, scalene, regular, irregular, symmetry, coordinate, translation

Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Using large pieces so the area is always the same, the children create different rectilinear shapes. How many can they make with the same area?
- Children can use the 100 square in the playground and mark coordinates on it. They then can be the vertices of a shape themselves.

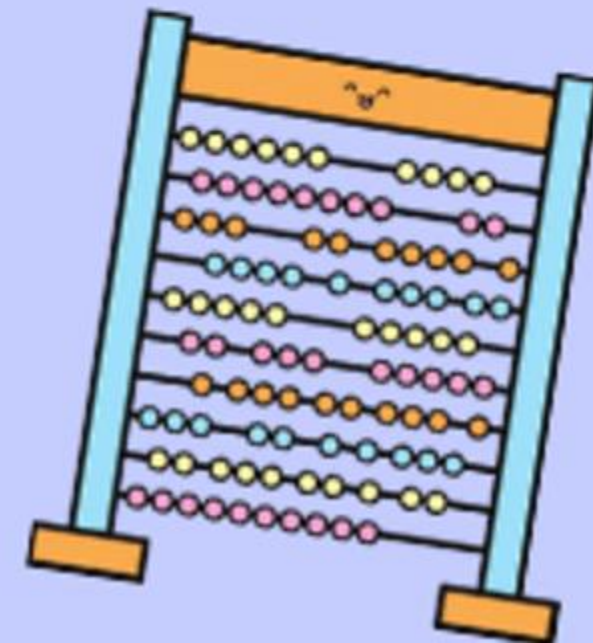
SUGGESTED QUESTIONS TO MEASURE IMPACT

- How are these shapes the same? How are they different?
- Record the coordinates of the square. What will they be if it moves two left and three up?
- Which rectilinear shape has the greater area?

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

Autumn 1

- compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes
- identify acute and obtuse angles and compare and order angles up to two right angles by size
- identify lines of symmetry in 2-D shapes presented in different orientations



Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- describe positions on a 2-D grid as coordinates in the first quadrant
- describe movements between positions as translations of a given unit to the left/right and up/down
- plot specified points and draw sides to complete a given polygon

3rd time include

- measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres
- find the area of rectilinear shapes by counting squares
- complete a simple symmetric figure with respect to a specific line of symmetry

CPA for classifying quadrilaterals

[Back to year group main slide](#)

Concrete:

Construct quadrilaterals using sticks or geoboards and compare their properties.

Pictorial:

Draw and sort the shapes using a diagram based on parallel sides, equal sides or right angles.

Abstract:

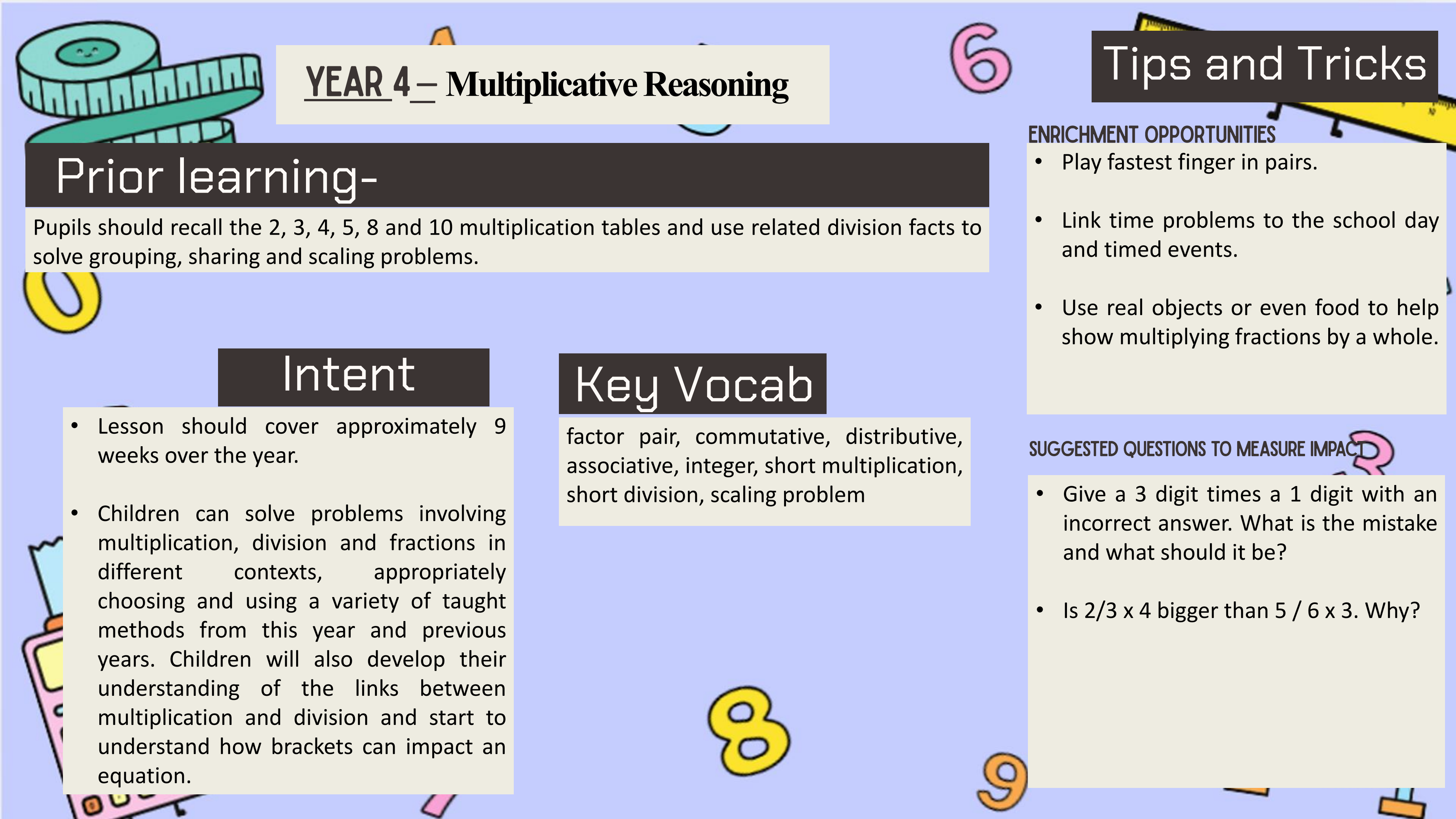
Classify each shape using precise properties, such as "A square is a quadrilateral with four equal sides and four right angles."

Scaffold

- Geoboards or sticks: Let pupils construct quadrilaterals and alter one property at a time, such as changing an angle while keeping opposite sides parallel.
- Hierarchical sorting diagram: Provide overlapping sets for quadrilaterals, parallelograms, rectangles and squares, with some shapes already positioned.
- Coordinate grids: Begin with fully numbered axes and a tracing or sliding overlay; then gradually remove intermediate labels.

Development of greater depth

- Develop hierarchical classification: Explore whether every square is a rectangle and whether every rectangle is a square, using properties to justify the conclusions.
- Reason from partial information: Give one or two properties, such as "two pairs of parallel sides", and ask pupils what the shape could or could not be.
- Investigate symmetry: Pupils find all lines of symmetry in regular and irregular shapes and explain why no additional lines are possible.



YEAR 4 – Multiplicative Reasoning

Prior learning-

Pupils should recall the 2, 3, 4, 5, 8 and 10 multiplication tables and use related division facts to solve grouping, sharing and scaling problems.

Intent

- Lesson should cover approximately 9 weeks over the year.
- Children can solve problems involving multiplication, division and fractions in different contexts, appropriately choosing and using a variety of taught methods from this year and previous years. Children will also develop their understanding of the links between multiplication and division and start to understand how brackets can impact an equation.

Key Vocab

factor pair, commutative, distributive, associative, integer, short multiplication, short division, scaling problem

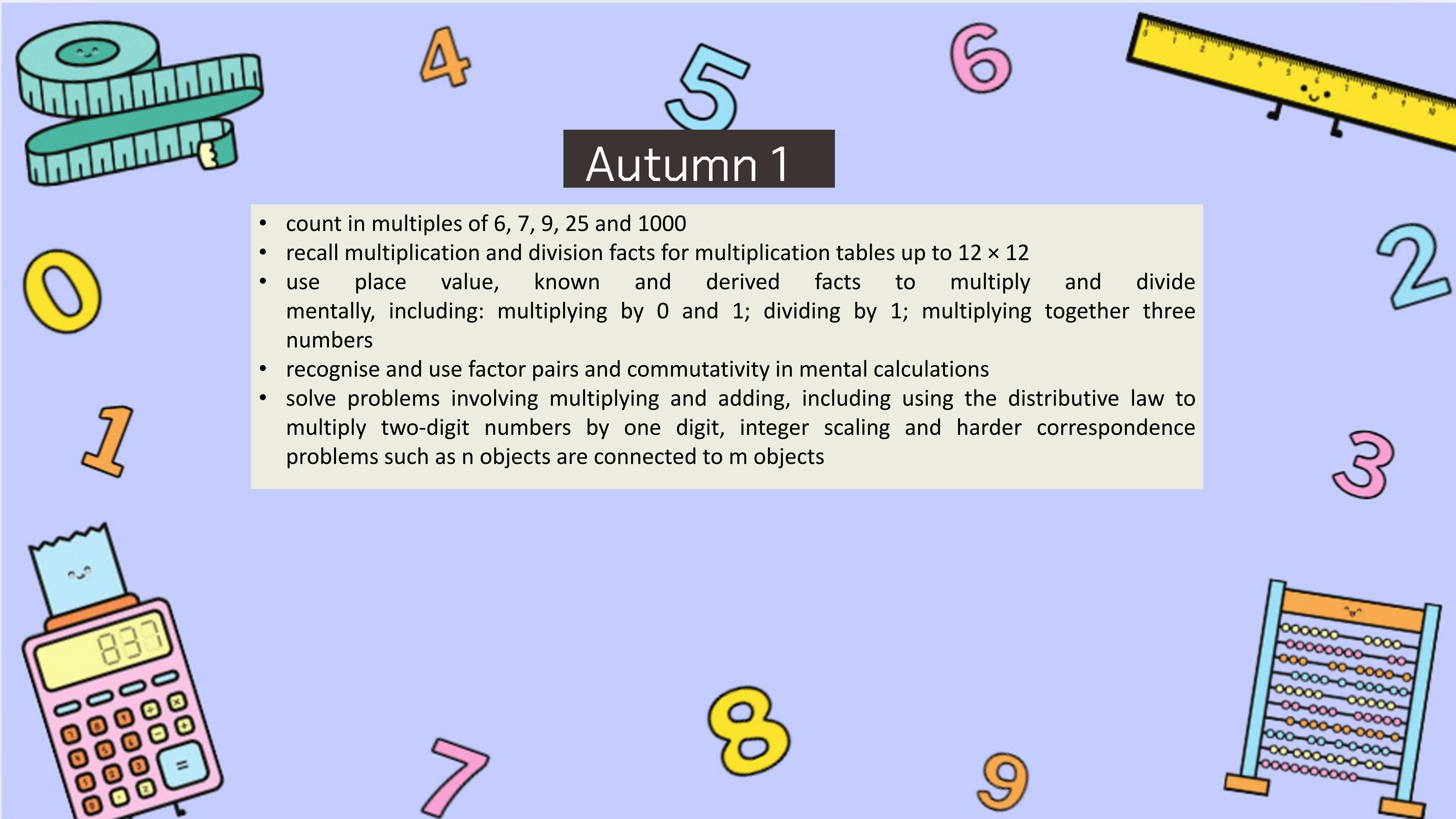
Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Play fastest finger in pairs.
- Link time problems to the school day and timed events.
- Use real objects or even food to help show multiplying fractions by a whole.

SUGGESTED QUESTIONS TO MEASURE IMPACT

- Give a 3 digit times a 1 digit with an incorrect answer. What is the mistake and what should it be?
- Is $\frac{2}{3} \times 4$ bigger than $\frac{5}{6} \times 3$. Why?



Autumn 1

- count in multiples of 6, 7, 9, 25 and 1000
- recall multiplication and division facts for multiplication tables up to 12×12
- use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by one digit, integer scaling and harder correspondence problems such as n objects are connected to m objects

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number

solve problems involving converting from hours to minutes; minutes to seconds; years to months; weeks to days

3rd time include

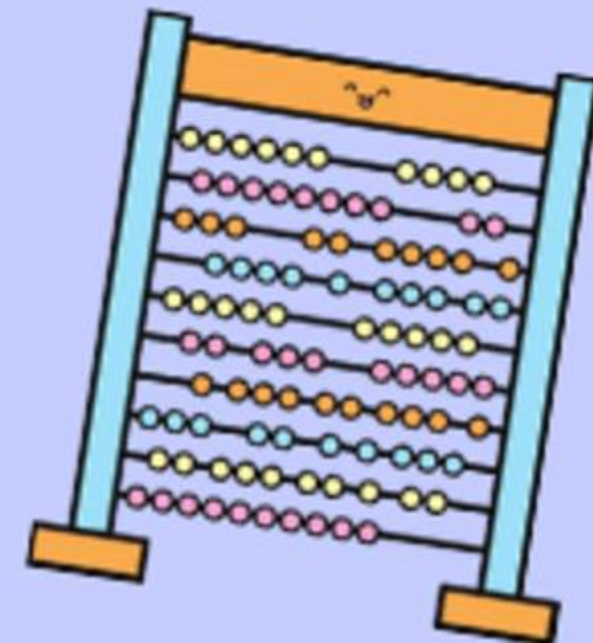
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout



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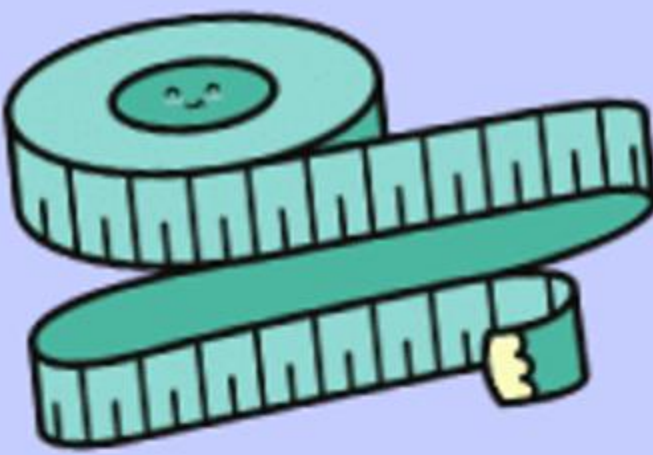
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CPA for multiplying a two-digit number by one digit



Back to year group main slide



Concrete:

Use base-ten equipment or counters to model three groups of 24, regrouping when necessary.

Pictorial:

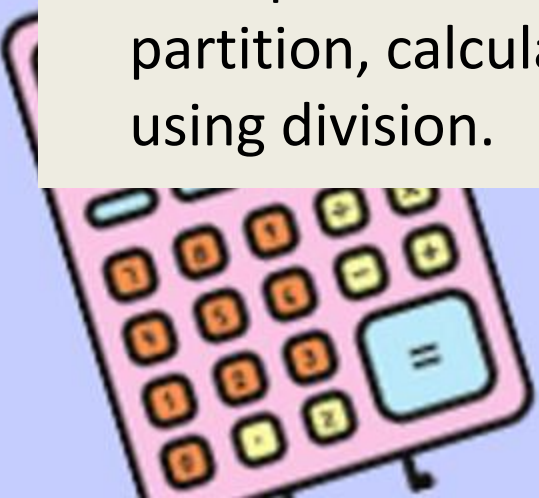
Draw a partitioning model or an area model showing $(20 \times 3) + (4 \times 3)$.

Abstract:

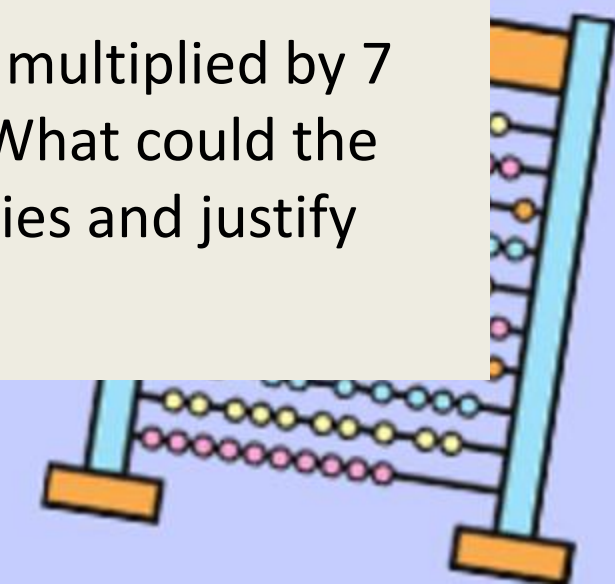
Calculate $24 \times 3 = 72$ using partitioning or a formal written method.

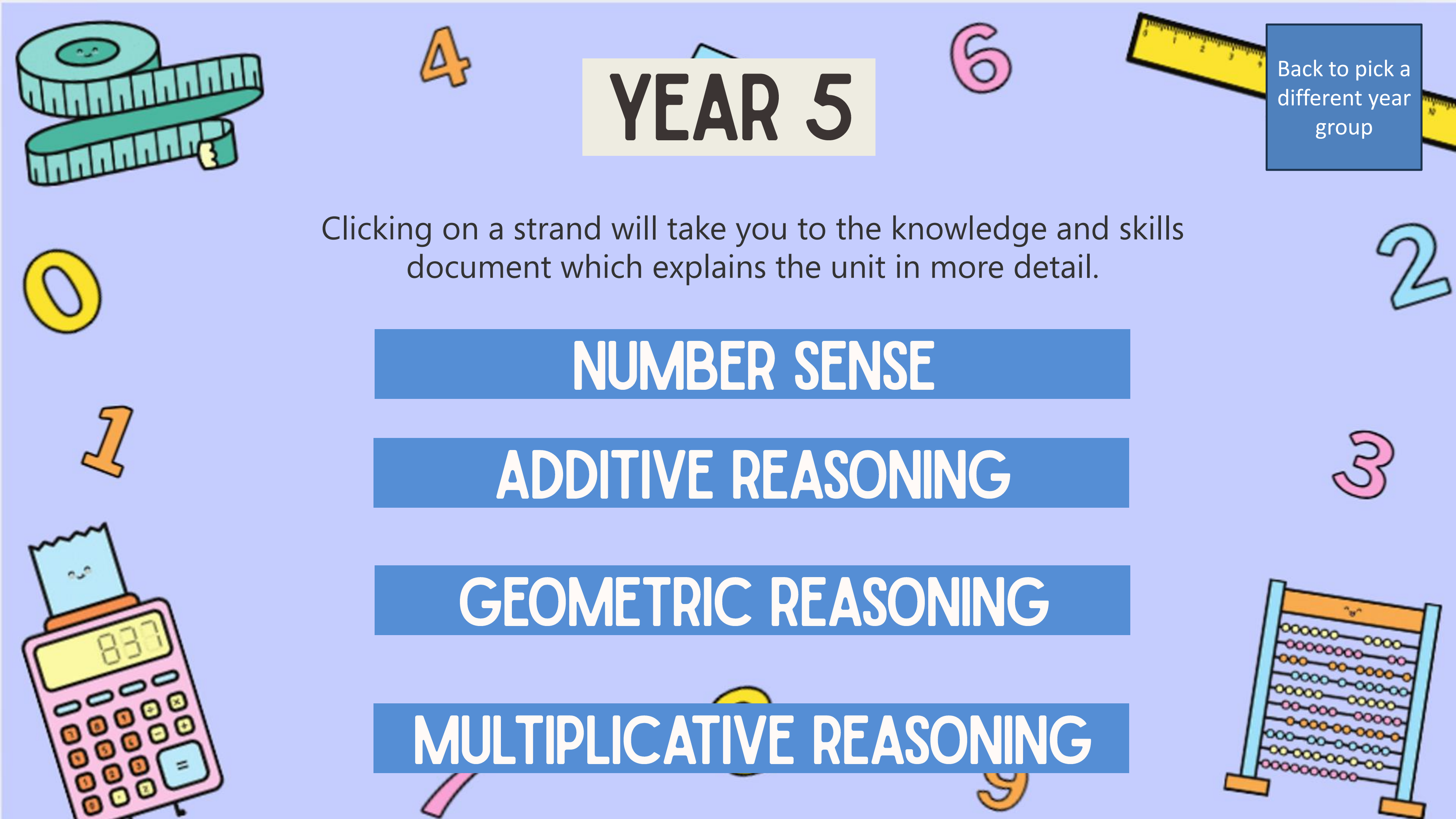


Scaffold

- Partitioned area models: Provide a partly completed model for calculations such as 24×6 , with 24 partitioned into 20 and 4.
 - Factor-pair grids: Give an organised table with one factor listed so pupils can find its partner and avoid missing or repeating pairs.
 - Multiplication checklists: Prompt pupils to estimate, partition, calculate partial products, combine and check using division.
- 

Development of greater depth

- Use factor relationships: Pupils find all factor pairs of 36, organise them systematically and explain why the search can stop after 6×6 .
 - Compare calculation strategies: Solve 24×6 using partitioning, doubling and halving, and a formal method; compare their efficiency.
 - Solve inverse problems: Ask, "A number multiplied by 7 gives an answer between 200 and 250. What could the number be?" Pupils identify all possibilities and justify completeness.
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YEAR 5

[Back to pick a different year group](#)

Clicking on a strand will take you to the knowledge and skills document which explains the unit in more detail.

NUMBER SENSE

ADDITIVE REASONING

GEOMETRIC REASONING

MULTIPLICATIVE REASONING

YEAR 5 - Number sense

Prior learning-

Pupils should understand place value in four-digit numbers, round to appropriate powers of 10, work with negative numbers and recognise connections between fractions and decimals.

Intent

Lesson should cover approximately 12 weeks over the year. Children use number knowledge to continue to develop their decimal, fraction and percentages knowledge. They show different representations of them and can explain the links between them. Children are also able to them in relation to who numbers. Children will continue to enhance their understanding on measurement, often using multiplicative reasoning skill to support converting between units.

Key Vocab

ten thousand, hundred thousand, million, negative integer, decimal fraction, thousandth, percentage, proper fraction, improper fraction, mixed number

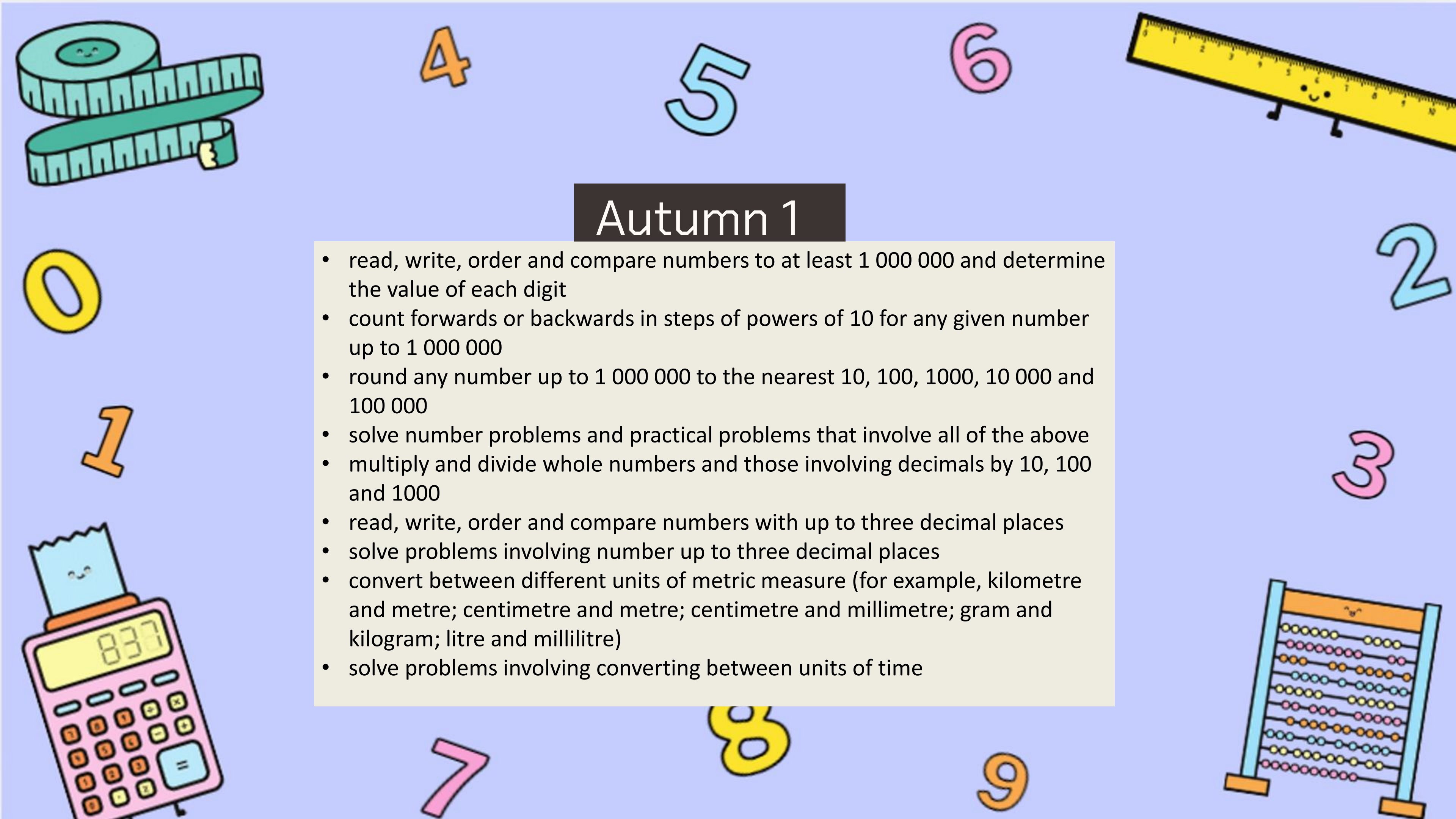
Tips and Tricks

ENRICHMENT OPPORTUNITIES

A treasure hunt with all clues and numbers in roman numerals.

SUGGESTED QUESTIONS TO MEASURE IMPACT

What do these two number (_____, _____) round to. Why are the answers different/ the same?
Tell me five ways you could write this? (show an item with 5 parts and 3 moved to the side)
What two fractions give an answer of 1 and $\frac{1}{3}$?
What date have I written? XX . IX . MCMXCV



Autumn 1

- read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit
- count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000
- round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000
- solve number problems and practical problems that involve all of the above
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- read, write, order and compare numbers with up to three decimal places
- solve problems involving number up to three decimal places
- convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre)
- solve problems involving converting between units of time

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero
- read Roman numerals to 1000 (M) and recognise years written in Roman numerals
- read and write decimal numbers as fractions [for example, $0.71 = 71/100$]
- recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents
- round decimals with two decimal places to the nearest whole number and to one decimal place

3rd time include

- compare and order fractions whose denominators are all multiples of the same number
- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number [for example, $2/5 + 4/5 = 6/5 = 11/5$]
- recognise the per cent symbol (%) and understand that per cent relates to “number of parts per hundred”, and write percentages as a fraction with denominator 100, and as a decimal
- identify, name and write equivalent fractions of a given fraction, represented visually including tenths and hundredths

CPA for connecting fractions and decimals

Back to year group main slide

Concrete:

Use fraction strips, place-value counters or a hundred grid to represent hundredths.

Pictorial:

Shade 35 squares on a hundred square or mark the value on a number line.

Abstract:

Connect $35/100$, 0.35 and, after simplifying, $7/20$.

Scaffold

- Aligned representations: Present a fraction strip, hundred square, decimal number line and place-value chart together so pupils can connect fractions and decimals.
- Place-value charts for decimals: Use columns from thousands to hundredths and counters that can be exchanged between adjacent columns.
- Comparison scaffold: Prompt pupils to convert to a common representation, compare equal place values and justify using $<$, $>$ or $=$.

Development of greater depth

- Reason across representations: Pupils order a mixed set such as 0.6 , $\frac{5}{8}$, 61% and 0.59 , selecting suitable conversions and justifying the order.
- Investigate rounding intervals: Find all numbers with two decimal places that round to 4.6 to the nearest tenth and explain the endpoints.
- Generalise place value: Pupils explain the effect of multiplying and dividing whole and decimal numbers by 10 , 100 and $1,000$ without relying on "moving the decimal point".

YEAR 5– Additive reasoning

Prior learning–

Pupils should add and subtract numbers with up to four digits using efficient mental and formal methods, selecting operations to solve multi-step problems.

Intent

- Lesson should cover approximately 9 weeks over the year.
- Children can use skills taught this year and before to solve multistep problems by deciding on what a problem is asking and apply techniques they have learned. They will develop their understanding of place value and be able to work both mentally and in writing to solve problems with information in different units of measurement.

Key Vocab

multi-step problem, context, operation, estimate, approximate, mental calculation, formal method, justify

Tips and Tricks

ENRICHMENT OPPORTUNITIES

Link charts and graphs to latest things of interest – this could be that season's football results or something from the summer's Olympics.

Use physical items to help show fractions and adding fractions.

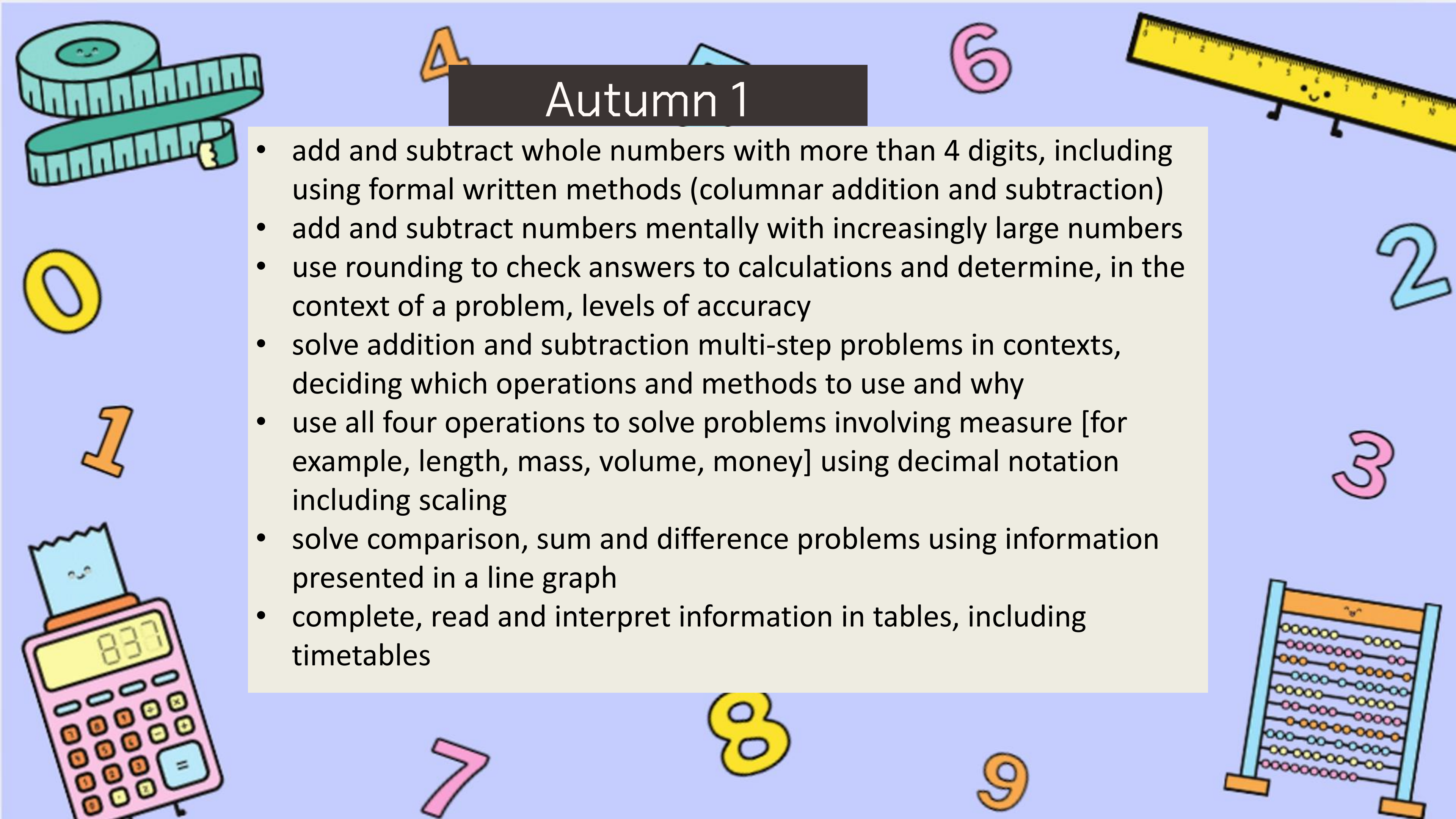
SUGGESTED QUESTIONS TO MEASURE IMPACT

I buy three apples and 2 bananas, and I am given £7.35 change from £10. How much could the banana and apple cost individually?

How many more did _____ receive that _____ in the graph?

Explain your answer.

$902 + 1896$. Estimate what the answer is and tell me why you think that.

The background is a light blue gradient. It is decorated with various math-related illustrations: a green measuring tape in the top left, a yellow ruler in the top right, a pink calculator in the bottom left, and an abacus in the bottom right. Scattered throughout are large, colorful numbers: 4 (orange), 6 (pink), 2 (light blue), 3 (pink), 8 (yellow), 9 (orange), 7 (pink), 1 (orange), and 0 (yellow).

Autumn 1

- add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
- add and subtract numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation including scaling
- solve comparison, sum and difference problems using information presented in a line graph
- complete, read and interpret information in tables, including timetables

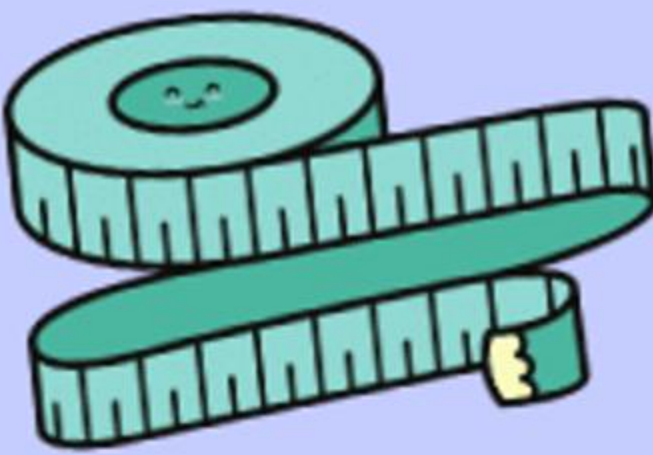
Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- solve problems involving number up to three decimal places
- measure and calculate the perimeter

3rd time include

- recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number [for example, $2/5 + 4/5 = 6/5 = 11/5$]
- add and subtract fractions with the same denominator and denominators that are multiples of the same number
- solve problems involving converting between units of time



CPA for adding and subtracting decimals



Back to year
group main
slide



Concrete:

Represent $2.35 + 1.40$ with place-value counters, aligning ones, tenths and hundredths.

Pictorial:

Draw the counters in a place-value chart or use a bar model.

Abstract:

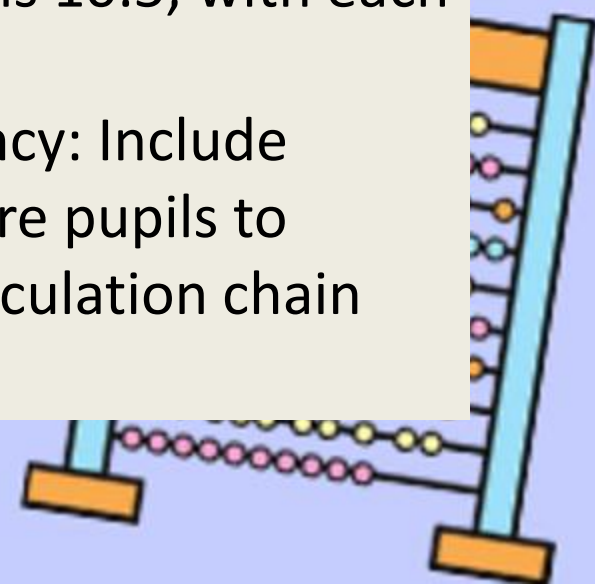
Use a formal method, keeping decimal points aligned: $2.35 + 1.40 = 3.75$.



Scaffold

- Decimal place-value grids: Align ones, tenths and hundredths on a place-value mat before translating the arrangement into a written calculation.
- Bar models for multi-step problems: Provide an unlabelled or partially labelled bar, followed by prompts to identify the known quantities, unknown quantity and order of operations.
- Faded worked examples: Begin with a complete model calculation, then remove selected steps until pupils independently set out and solve the calculation.

Development of greater depth

- Select efficient methods: Pupils compare mental adjustment, partitioning and formal methods for calculations such as $7.98 + 4.67$ and explain which is most efficient.
 - Work backwards from constraints: Ask pupils to create two different calculations whose answer is 10.5, with each number containing two decimal places.
 - Solve multi-step problems with redundancy: Include information that is not needed and require pupils to identify the relevant data, construct a calculation chain and justify each operation.
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YEAR 5 – Geometric Reasoning

Prior learning-

Pupils should classify triangles and quadrilaterals, compare acute and obtuse angles, identify lines of symmetry and plot coordinates in the first quadrant.

Intent

- Lesson should cover approximately 6 weeks over the year.
- Children will be able to measure, draw and describe a range of angles as well as angles within a shape. Children will use knowledge of area and shape to solve problems. They will also enhance their understanding of reflecting and translating shapes on the first quadrant.

Key Vocab

degree, reflex angle, protractor, exterior angle, interior angle, coordinate grid, quadrant, reflection, translation, perpendicular, parallel

Tips and Tricks

ENRICHMENT OPPORTUNITIES

Children to create large examples of symmetry out in the playground with chalk. Find different angles around the school – Sort them by acute, obtuse and reflex. Measure some of them.

SUGGESTED QUESTIONS TO MEASURE IMPACT

Sort these angles with your own headings. Now sort them in a different way. Measure the given angle. Now draw an angle double its size. Explain what you would do to measure the perimeter of this compound shape. Explain why this reflection is not correct.

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

Autumn 1

- identify 3-D shapes, including cubes and other cuboids, from 2-D representations
- know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles
- draw given angles, and measure them in degrees ($^{\circ}$)
- identify:
 - › angles at a point and one whole turn (total 360°)
 - › angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°)
 - › other multiples of 90°
- use the properties of rectangles to deduce related facts and find missing lengths and angles
- distinguish between regular and irregular polygons based on reasoning about equal sides and angles

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed

3rd time include

- measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres
- calculate and compare the area of rectangles (including squares), including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes
- estimate volume [for example, using 1 cm³ blocks to build cuboids (including cubes)] and capacity [for example, using water]

CPA for measuring and calculating angles

Back to year group main slide

Concrete:

Make and compare angles using hinged strips, then measure them with a protractor.

Pictorial:

Draw and label angles on a straight line or around a point.

Abstract:

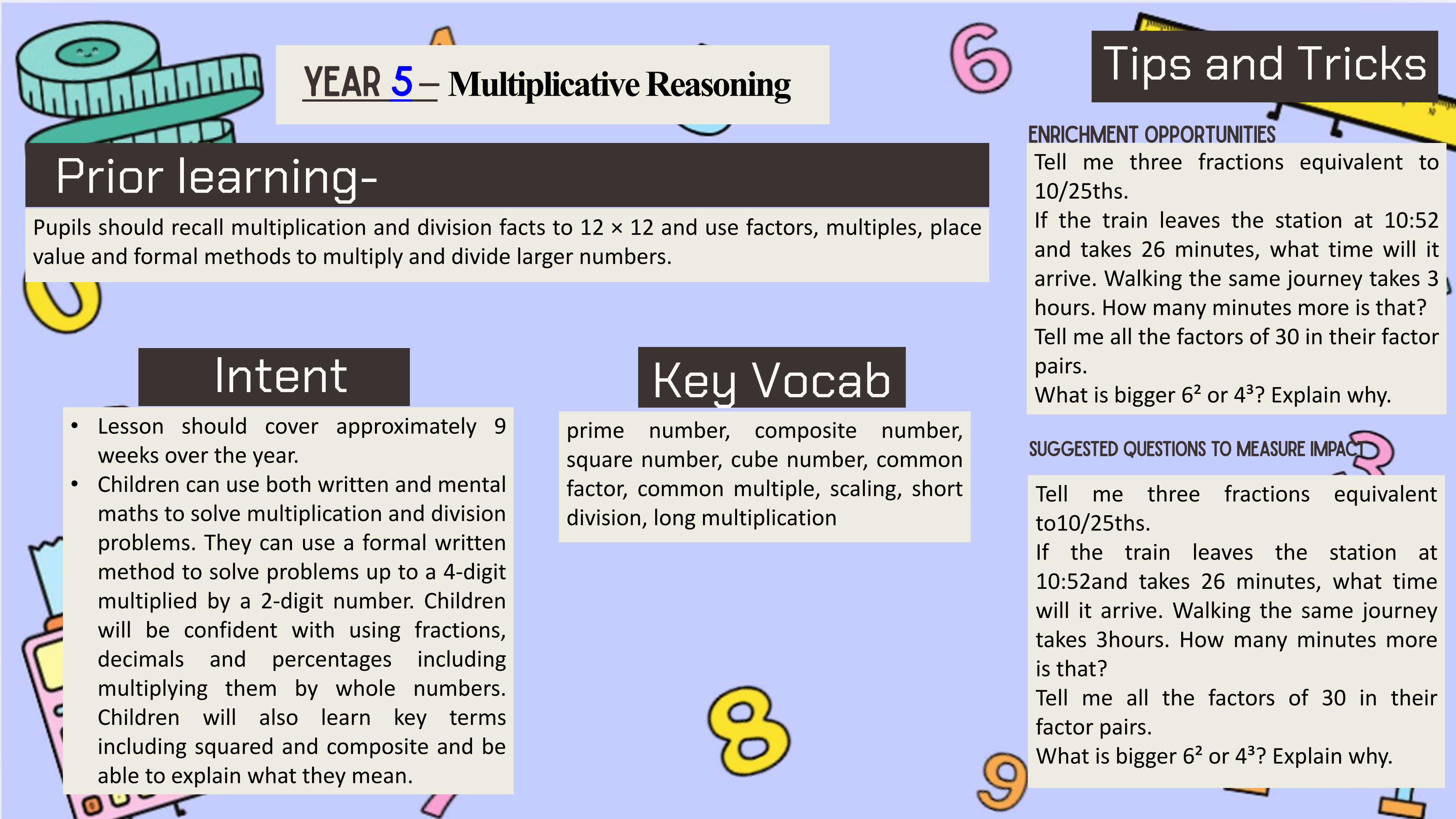
Use angle facts, such as $180^\circ - 125^\circ = 55^\circ$, to calculate an unknown angle.

Scaffold

- Angle-fact cards: Provide cards stating *angles on a straight line total 180° , angles around a point total 360° and a right angle is 90°* .
- Colour-coded diagrams: Mark equal angles, parallel lines and known angles in different colours before pupils write the corresponding equations.
- Coordinate and translation frames: Use the sentence "Each point moves ___ units right/left and ___ units up/down", supported initially by tracing paper.

Development of greater depth

- Deduce unknown angles: Pupils calculate several missing angles in a diagram using facts about straight lines, around a point and properties of rectangles.
- Classify hierarchically: Pupils create a classification diagram for quadrilaterals and explain how one shape can belong to more than one category.
- Reason about transformations: Give the start and end coordinates of a vertex after a translation and ask pupils to determine and justify the movement of the whole shape.



YEAR 5 – Multiplicative Reasoning

Prior learning-

Pupils should recall multiplication and division facts to 12×12 and use factors, multiples, place value and formal methods to multiply and divide larger numbers.

Intent

- Lesson should cover approximately 9 weeks over the year.
- Children can use both written and mental maths to solve multiplication and division problems. They can use a formal written method to solve problems up to a 4-digit multiplied by a 2-digit number. Children will be confident with using fractions, decimals and percentages including multiplying them by whole numbers. Children will also learn key terms including squared and composite and be able to explain what they mean.

Key Vocab

prime number, composite number, square number, cube number, common factor, common multiple, scaling, short division, long multiplication

Tips and Tricks

ENRICHMENT OPPORTUNITIES

Tell me three fractions equivalent to $10/25$ ths.

If the train leaves the station at 10:52 and takes 26 minutes, what time will it arrive. Walking the same journey takes 3 hours. How many minutes more is that?

Tell me all the factors of 30 in their factor pairs.

What is bigger 6^2 or 4^3 ? Explain why.

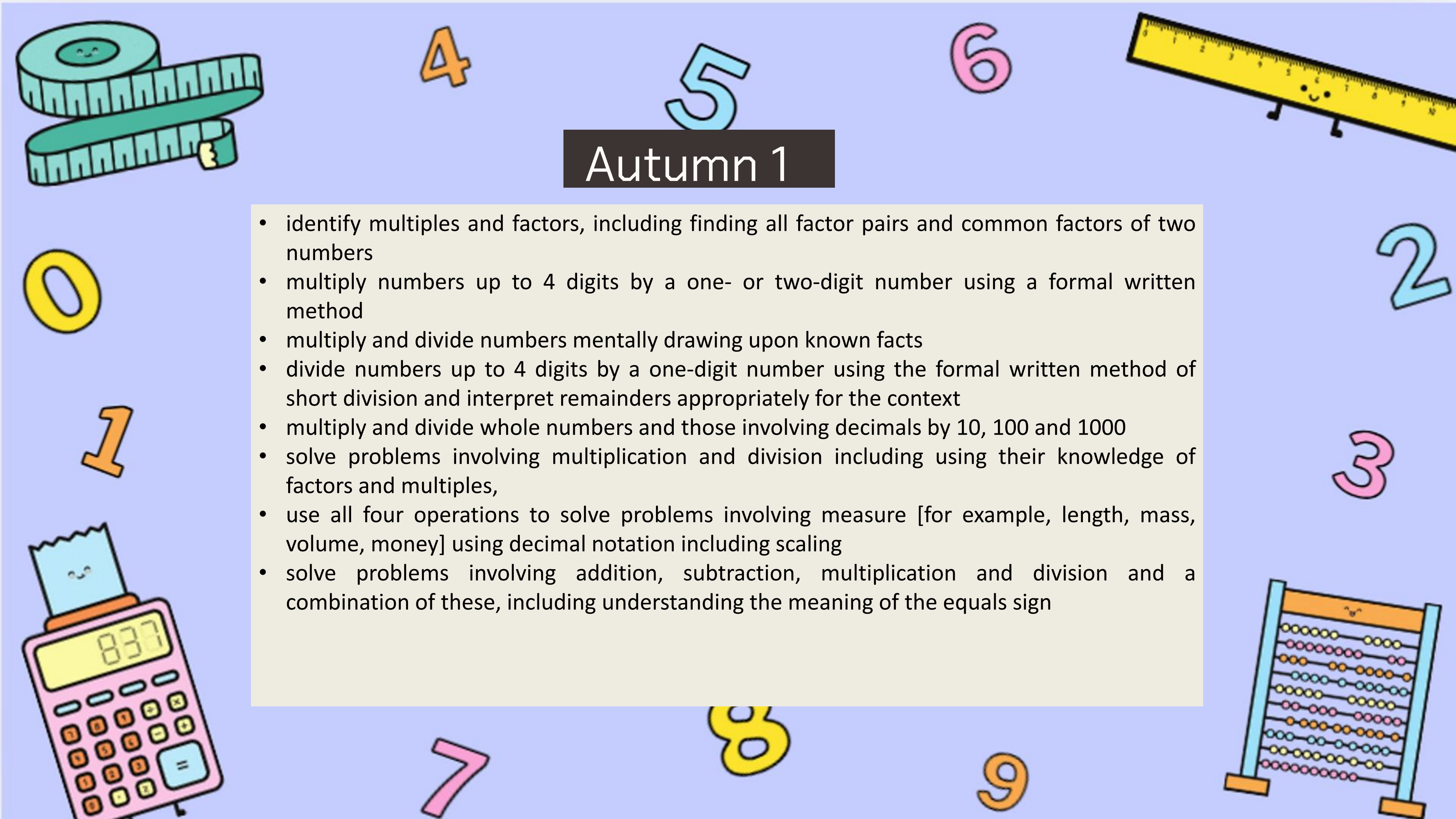
SUGGESTED QUESTIONS TO MEASURE IMPACT

Tell me three fractions equivalent to $10/25$ ths.

If the train leaves the station at 10:52 and takes 26 minutes, what time will it arrive. Walking the same journey takes 3 hours. How many minutes more is that?

Tell me all the factors of 30 in their factor pairs.

What is bigger 6^2 or 4^3 ? Explain why.



Autumn 1

- identify multiples and factors, including finding all factor pairs and common factors of two numbers
- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method
- multiply and divide numbers mentally drawing upon known facts
- divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context
- multiply and divide whole numbers and those involving decimals by 10, 100 and 1000
- solve problems involving multiplication and division including using their knowledge of factors and multiples,
- use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation including scaling
- solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers
- establish whether a number up to 100 is prime and recall prime numbers up to 19
- recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)
- squares and cubes
- solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates
- solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those with a denominator of a multiple of 10 or 25

3rd time include

- identify, name and write equivalent fractions of a given fraction, represented visually including tenths and hundredths
- multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams
- understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints
- solve problems involving converting between units of time

4th time include

- multiply numbers up to 4 digits by a one- or two-digit number using a formal written method including long multiplication for two-digit numbers

CPA for multiplying using an area model

Back to year group main slide

Concrete:

Build a rectangle representing 23×14 using place-value equipment..

Pictorial:

Partition the area into 20×10 , 20×4 , 3×10 and 3×4 .

Abstract:

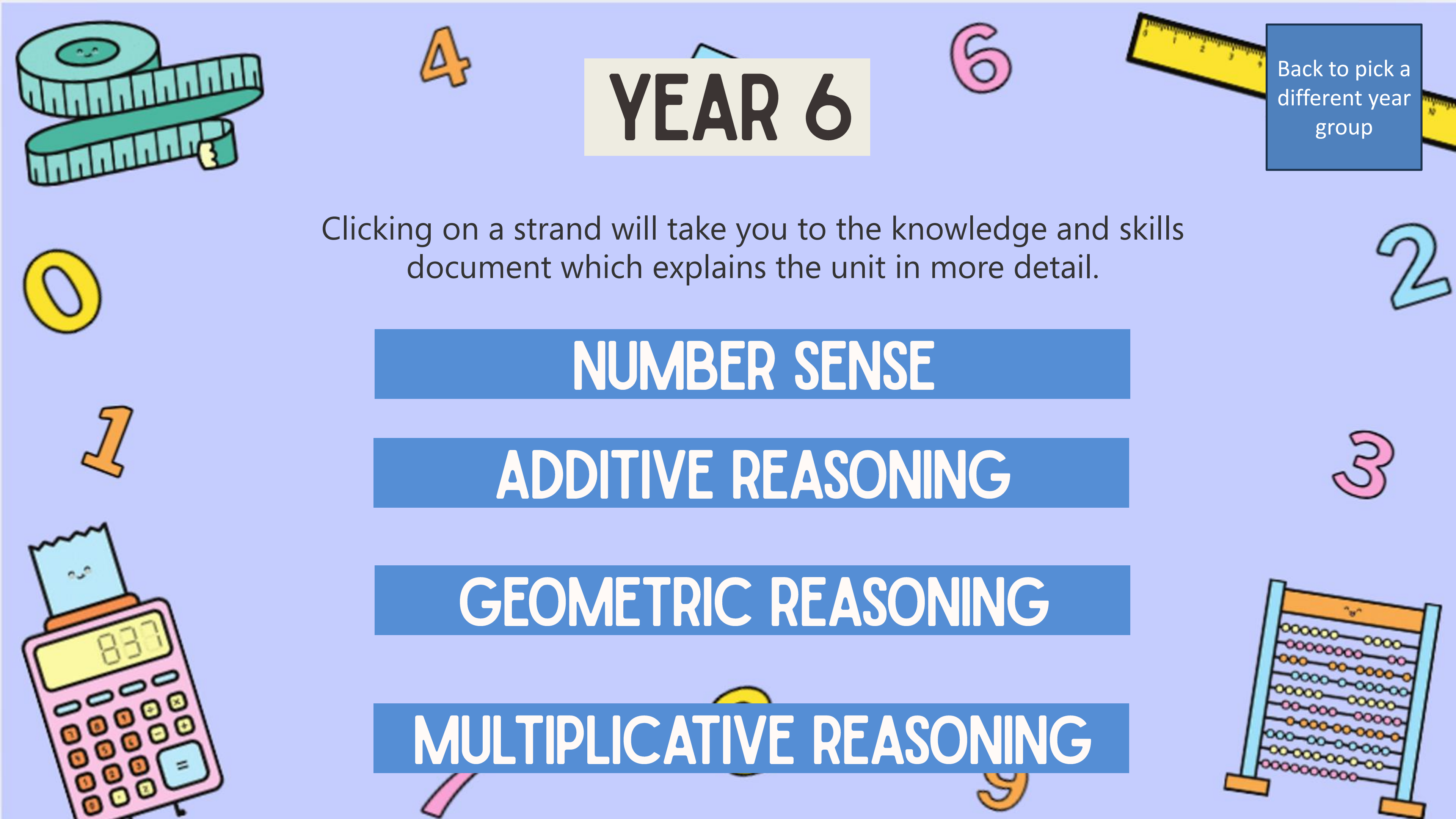
Use long multiplication to obtain $23 \times 14 = 322$.

Scaffold

- Area-model templates: Partition each factor into tens and ones, with separate boxes for partial products, before connecting the model to formal multiplication.
- Factor and multiple lists: Provide multiplication grids or divisibility prompts while pupils identify common factors, multiples and prime numbers.
- Scaling tables: Organise recipe or measure problems in a table showing the amount for 1 unit before scaling to the required number of units.

Development of greater depth

- Compare multiplication methods: Pupils solve 34×26 using an area model and formal multiplication, explaining how the partial products correspond.
- Investigate factors and multiples: Ask pupils to find a number below 100 that has an odd number of factors, identify other examples and explain the connection with square numbers.
- Solve scaling problems: Pupils adapt a recipe for four people to serve six, ten or another number, explaining the multiplicative relationships rather than adding repeatedly.



YEAR 6

[Back to pick a different year group](#)

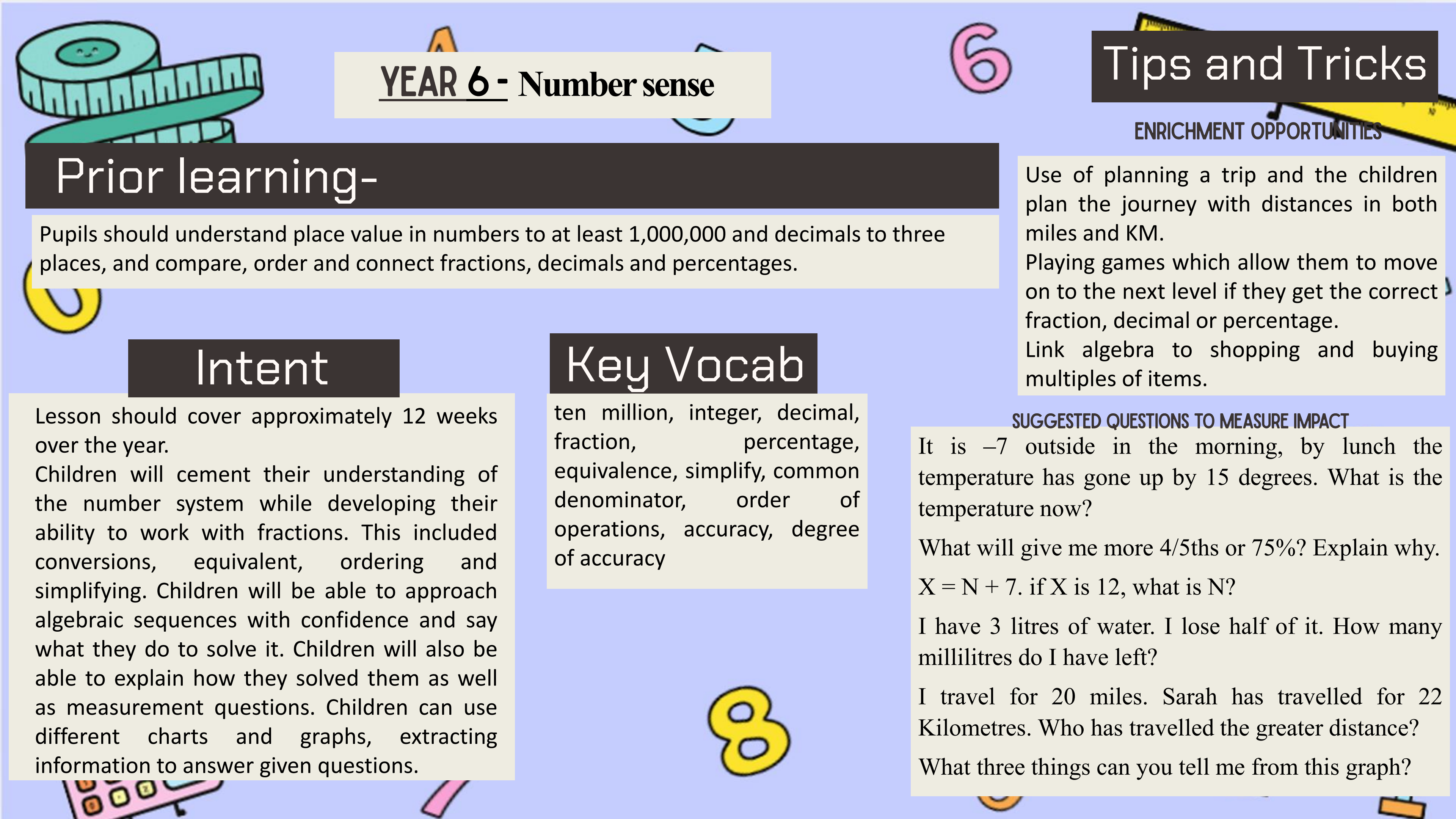
Clicking on a strand will take you to the knowledge and skills document which explains the unit in more detail.

NUMBER SENSE

ADDITIVE REASONING

GEOMETRIC REASONING

MULTIPLICATIVE REASONING



YEAR 6 - Number sense

Prior learning-

Pupils should understand place value in numbers to at least 1,000,000 and decimals to three places, and compare, order and connect fractions, decimals and percentages.

Intent

Lesson should cover approximately 12 weeks over the year.

Children will cement their understanding of the number system while developing their ability to work with fractions. This included conversions, equivalent, ordering and simplifying. Children will be able to approach algebraic sequences with confidence and say what they do to solve it. Children will also be able to explain how they solved them as well as measurement questions. Children can use different charts and graphs, extracting information to answer given questions.

Key Vocab

ten million, integer, decimal, fraction, percentage, equivalence, simplify, common denominator, order of operations, accuracy, degree of accuracy

Tips and Tricks

ENRICHMENT OPPORTUNITIES

Use of planning a trip and the children plan the journey with distances in both miles and KM.

Playing games which allow them to move on to the next level if they get the correct fraction, decimal or percentage.

Link algebra to shopping and buying multiples of items.

SUGGESTED QUESTIONS TO MEASURE IMPACT

It is -7 outside in the morning, by lunch the temperature has gone up by 15 degrees. What is the temperature now?

What will give me more $\frac{4}{5}$ ths or 75%? Explain why.

$X = N + 7$. if X is 12, what is N?

I have 3 litres of water. I lose half of it. How many millilitres do I have left?

I travel for 20 miles. Sarah has travelled for 22 Kilometres. Who has travelled the greater distance?

What three things can you tell me from this graph?

Autumn 1

- Read, write, order and compare numbers up to
- 10 000 000 and determine the value of each digit.
- Round any whole number to a required degree of accuracy.
- Solve number and practical problems that involve all of the above.
- Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.
- Use, read, write and convert between standard units, converting measurements of length, mass and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to three decimal places.
- Convert between miles and kilometres.



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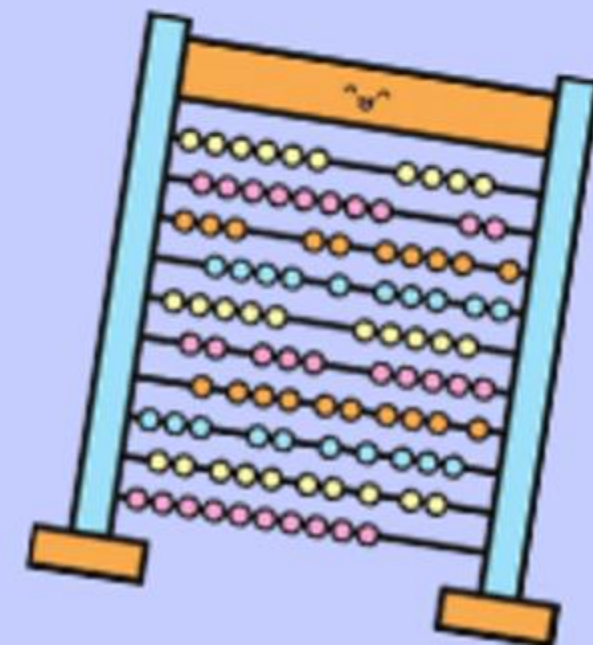
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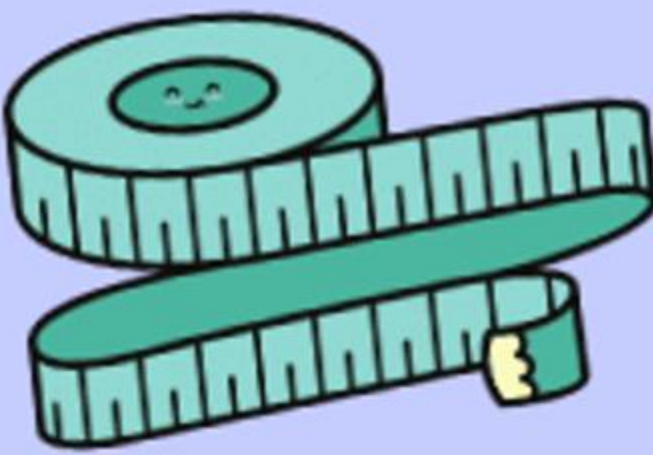
Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- Use negative numbers in context and calculate intervals across zero.

3rd time include

- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.
- Compare and order fractions, including fractions >1 .
- Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example $\frac{3}{8}$].
- Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
- Use simple formulae.
- Generate and describe linear number sequences.
- Express missing number problems algebraically.
- Find pairs of numbers that satisfy an equation with two unknowns.
- Solve problems involving the calculation and conversion of units of measure, using decimal notation to three decimal places where appropriate.
- Interpret and construct pie charts and line graphs and use these to solve problems.



CPA for equivalence among fractions, decimals and percentages



Back to year group main slide



Concrete:

Use a hundred grid or counters to represent 75 out of 100.

Pictorial:

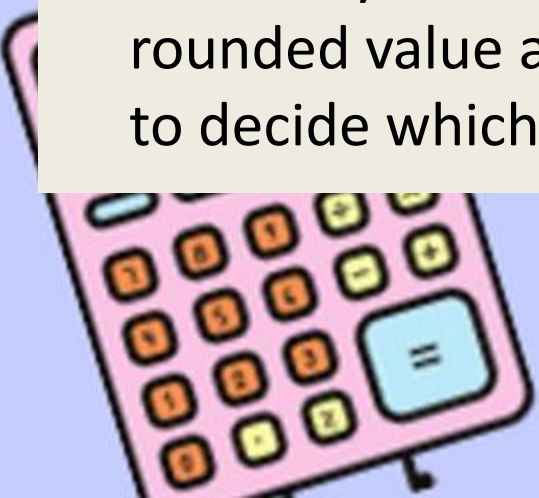
Shade three quarters of a bar and the corresponding 75 squares on a hundred grid.

Abstract:

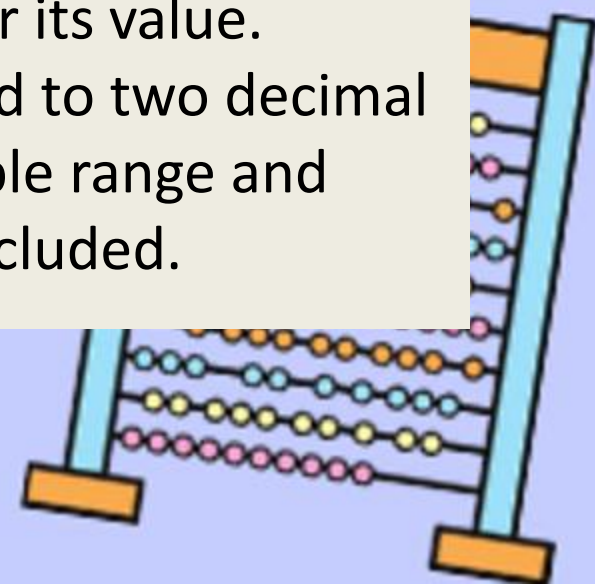
Connect $\frac{3}{4} = 0.75 = 75\%$ and use the equivalence in problems.

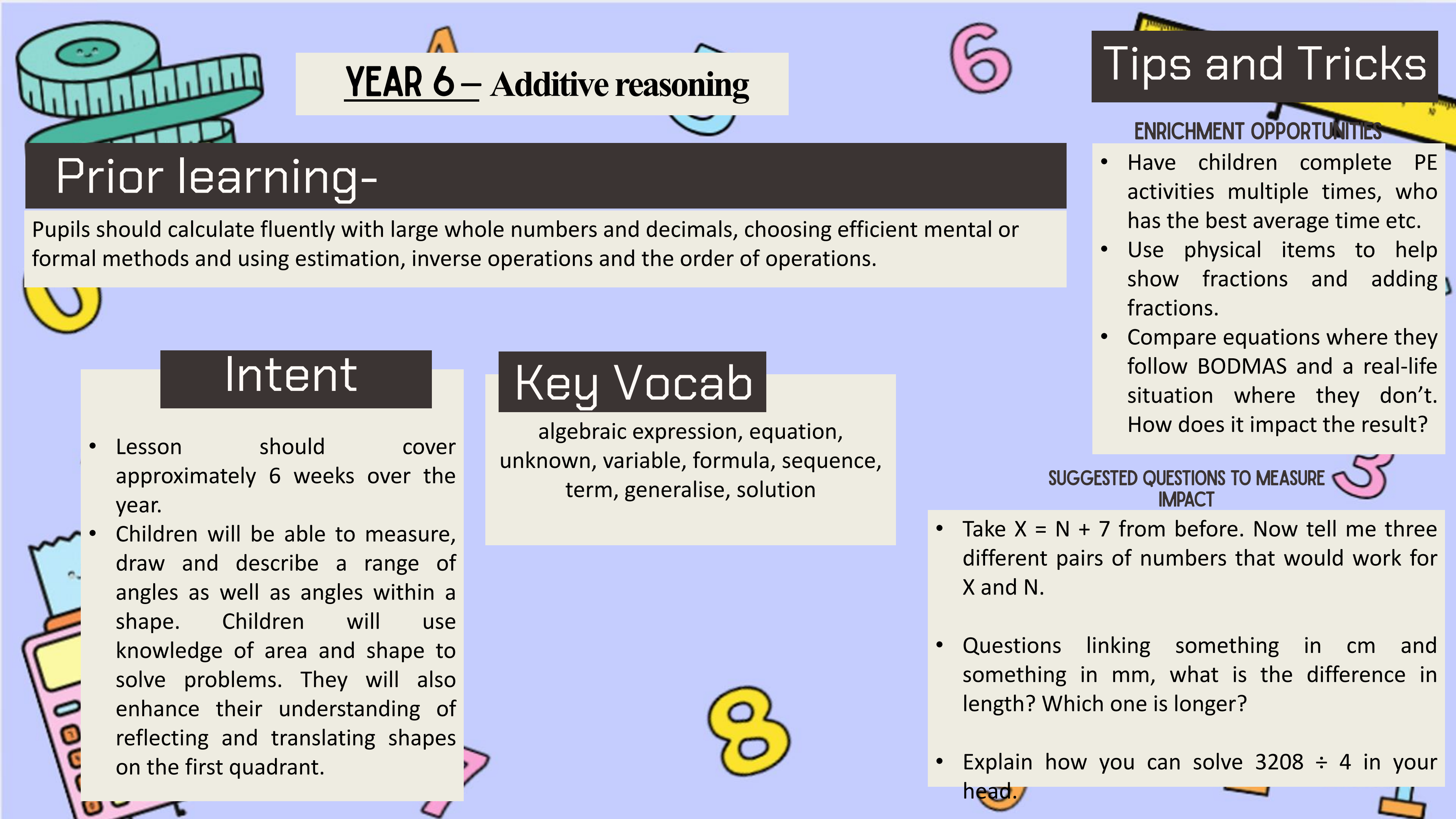


Scaffold

- Conversion grids: Provide aligned columns for *fraction*, *equivalent fraction with denominator 100*, *decimal* and *percentage*, completing one representation first.
 - Common-denominator scaffold: Use fraction strips or multiplication lists to help pupils identify a common denominator before comparing or calculating with fractions.
 - Boundary number lines: For rounding problems, mark the rounded value and half-unit boundaries, then prompt pupils to decide which endpoint is included.
- 

Development of greater depth

- Connect fractions, decimals and percentages: Pupils order values such as $\frac{7}{8}$, 0.87 and 86%, explaining which representation they converted and why.
 - Generalise fraction equivalence: Ask pupils to explain why multiplying a fraction's numerator and denominator by the same non-zero number does not alter its value.
 - Reason about bounds: A number rounded to two decimal places is 3.47. Pupils determine its possible range and explain which boundary is included or excluded.
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YEAR 6 – Additive reasoning

Prior learning-

Pupils should calculate fluently with large whole numbers and decimals, choosing efficient mental or formal methods and using estimation, inverse operations and the order of operations.

Intent

- Lesson should cover approximately 6 weeks over the year.
- Children will be able to measure, draw and describe a range of angles as well as angles within a shape. Children will use knowledge of area and shape to solve problems. They will also enhance their understanding of reflecting and translating shapes on the first quadrant.

Key Vocab

algebraic expression, equation, unknown, variable, formula, sequence, term, generalise, solution

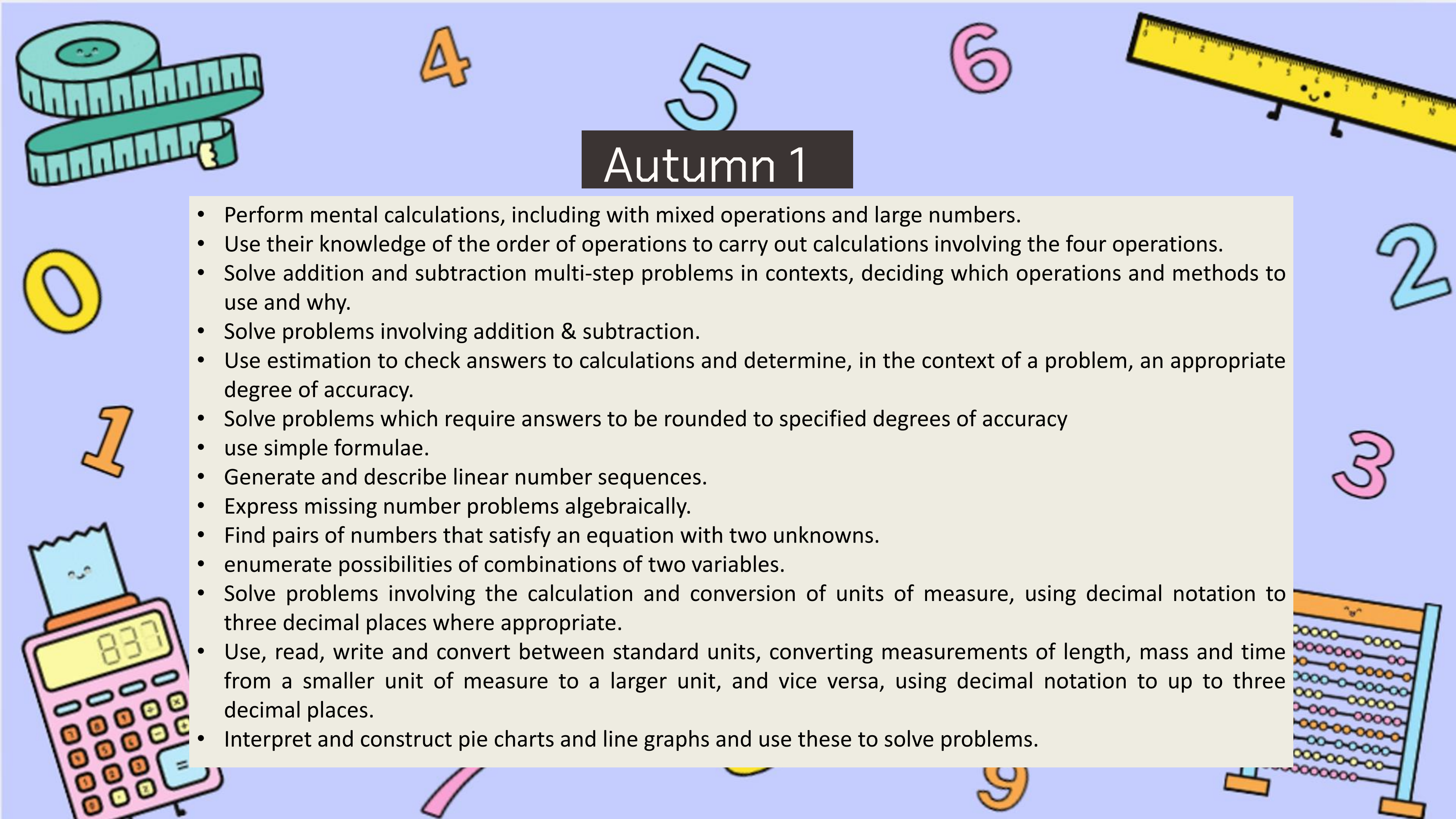
Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Have children complete PE activities multiple times, who has the best average time etc.
- Use physical items to help show fractions and adding fractions.
- Compare equations where they follow BODMAS and a real-life situation where they don't. How does it impact the result?

SUGGESTED QUESTIONS TO MEASURE IMPACT

- Take $X = N + 7$ from before. Now tell me three different pairs of numbers that would work for X and N.
- Questions linking something in cm and something in mm, what is the difference in length? Which one is longer?
- Explain how you can solve $3208 \div 4$ in your head.



Autumn 1

- Perform mental calculations, including with mixed operations and large numbers.
- Use their knowledge of the order of operations to carry out calculations involving the four operations.
- Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.
- Solve problems involving addition & subtraction.
- Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.
- Solve problems which require answers to be rounded to specified degrees of accuracy
- use simple formulae.
- Generate and describe linear number sequences.
- Express missing number problems algebraically.
- Find pairs of numbers that satisfy an equation with two unknowns.
- enumerate possibilities of combinations of two variables.
- Solve problems involving the calculation and conversion of units of measure, using decimal notation to three decimal places where appropriate.
- Use, read, write and convert between standard units, converting measurements of length, mass and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places.
- Interpret and construct pie charts and line graphs and use these to solve problems.

Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

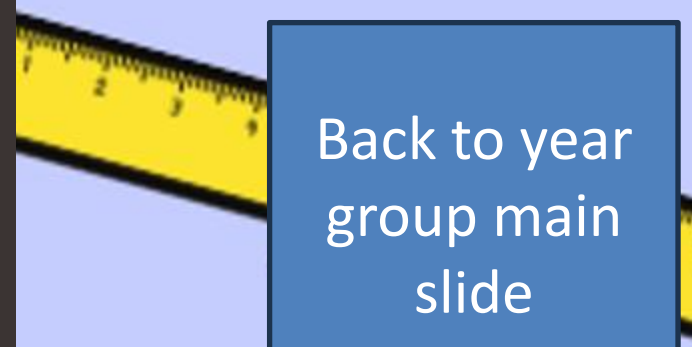
- Use negative numbers in context and calculate intervals across zero.

3rd time include

- solve problems involving addition, subtraction, multiplication and division
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- calculate and interpret the mean as an average



CPA for adding fractions with different denominators



Back to year group main slide



Concrete:

Use fraction tiles to combine $\frac{1}{2}$ and $\frac{1}{3}$, replacing both with sixths.

Pictorial:

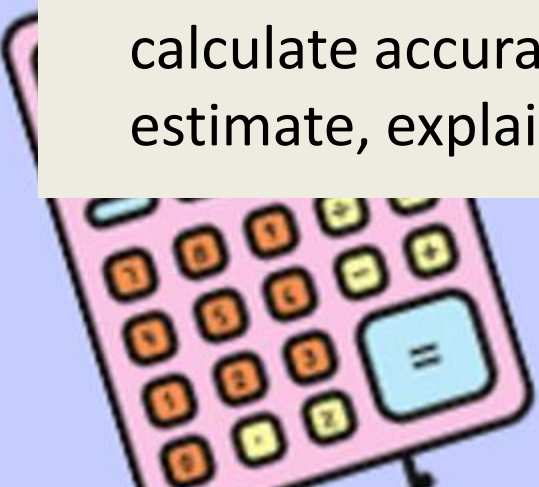
Draw aligned fraction bars showing $\frac{3}{6} + \frac{2}{6}$.

Abstract:

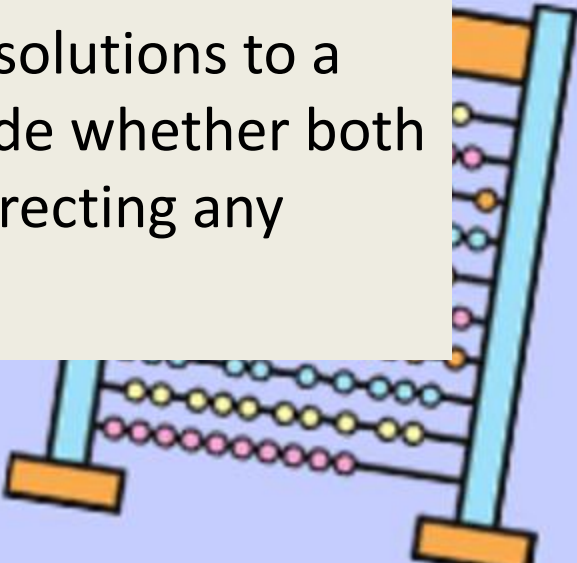
Calculate $\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$.

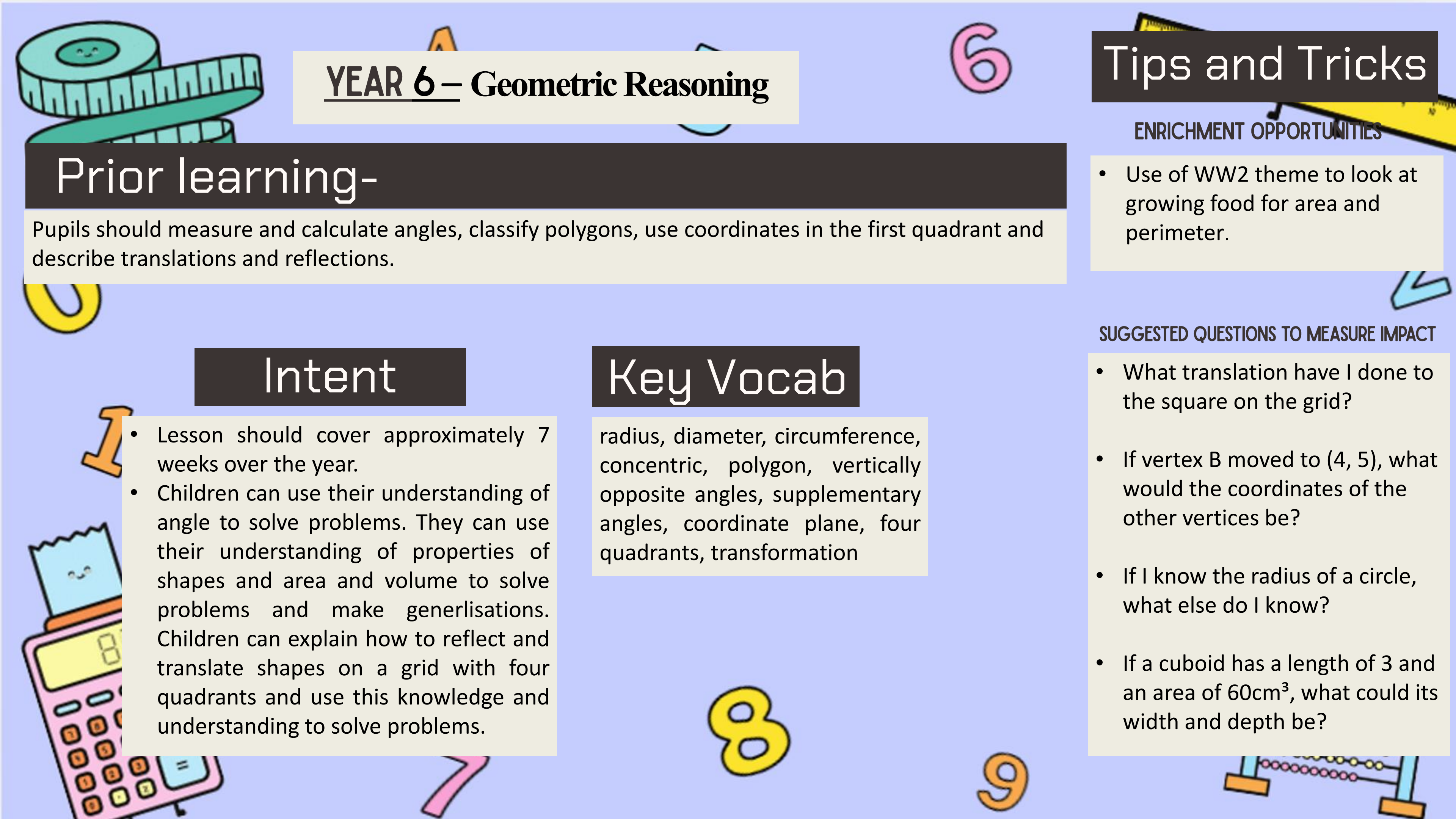


Scaffold

- Operation-planning frames: Before calculating, pupils record: what is known, what must be found, which operation is needed and why.
 - Annotated order-of-operations support: Provide a checklist that separates brackets, powers, multiplication or division, and addition or subtraction, with one worked example.
 - Reasonableness checks: Prompt pupils to estimate first, calculate accurately and compare the answer with the estimate, explaining any significant difference.
- 

Development of greater depth

- Evaluate competing strategies: Pupils compare formal calculation with compensation for $20,003 - 9,997$ and justify which approach is more efficient.
 - Solve missing-number equations: Explore equations such as $3.75 + \square = 10 - \square$, finding possible solutions and explaining the relationships.
 - Critique reasoning: Present two different solutions to a multi-step problem and ask pupils to decide whether both are valid, identifying assumptions and correcting any errors.
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YEAR 6 – Geometric Reasoning

Prior learning-

Pupils should measure and calculate angles, classify polygons, use coordinates in the first quadrant and describe translations and reflections.

Intent

- Lesson should cover approximately 7 weeks over the year.
- Children can use their understanding of angle to solve problems. They can use their understanding of properties of shapes and area and volume to solve problems and make generalisations. Children can explain how to reflect and translate shapes on a grid with four quadrants and use this knowledge and understanding to solve problems.

Key Vocab

radius, diameter, circumference, concentric, polygon, vertically opposite angles, supplementary angles, coordinate plane, four quadrants, transformation

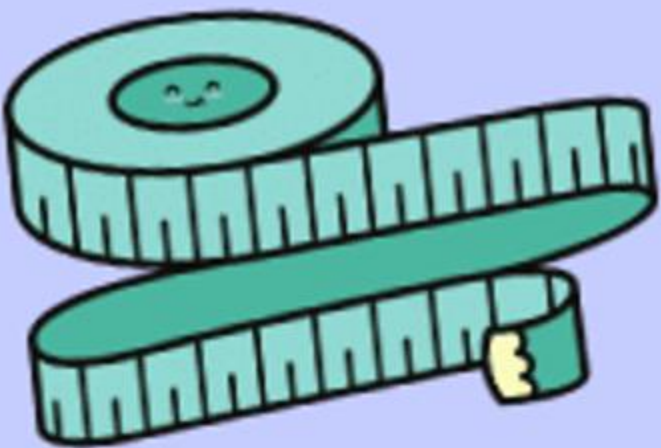
Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Use of WW2 theme to look at growing food for area and perimeter.

SUGGESTED QUESTIONS TO MEASURE IMPACT

- What translation have I done to the square on the grid?
- If vertex B moved to (4, 5), what would the coordinates of the other vertices be?
- If I know the radius of a circle, what else do I know?
- If a cuboid has a length of 3 and an area of 60cm^3 , what could its width and depth be?



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Autumn 1

- draw 2-D shapes using given dimensions and angles
- recognise, describe and build simple 3-D shapes, including making nets
- compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius
- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles
- recognise that shapes with the same areas can have different perimeters and vice versa
- calculate the area of parallelograms and triangles
- recognise when it is possible to use the formulae for area and volume of shapes
- use simple formulae
- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with two unknowns
- enumerate possibilities of combinations of two variables

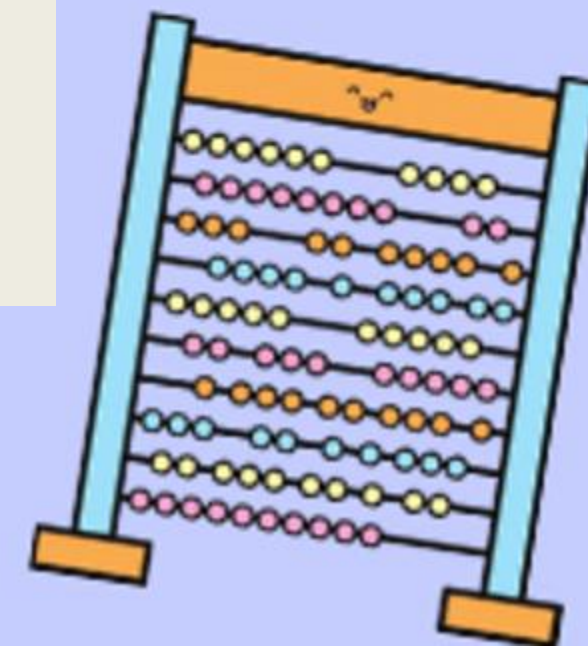
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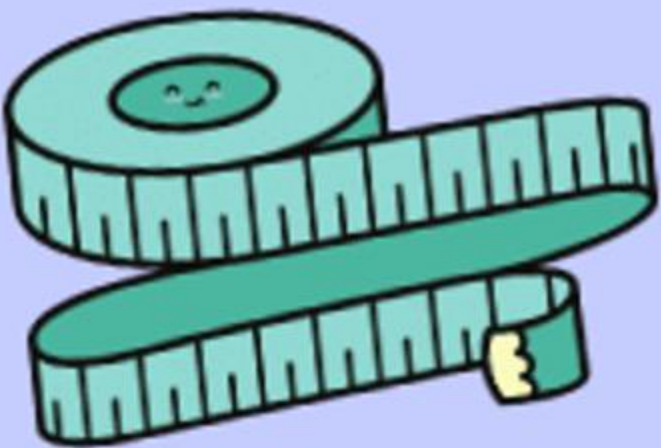
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Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

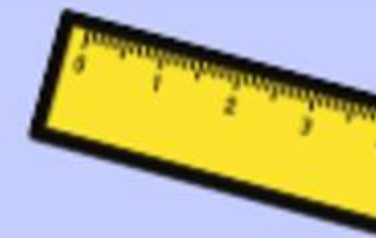
- calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3) and extending to other units [for example, mm^3 and km^3]
- describe positions on the full coordinate grid (all four quadrants)
- draw and translate simple shapes on the coordinate plane, and reflect them in the axes
- solve problems involving similar shapes where the scale factor is known or can be found



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Back to year
group main
slide

CPA for angles in triangles

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Concrete:

Construct a triangle, tear off its three corners and arrange them along a straight line..

Pictorial:

Draw a triangle, label two known angles and represent the total as 180° .

Abstract:

Calculate a missing angle, for example $180^\circ - 65^\circ - 45^\circ = 70^\circ$.

2

Scaffold

- Angle-reasoning chains: Provide a two-column frame headed *calculation* and *geometric fact*, requiring pupils to justify every step.
- Diagram annotation: Encourage pupils to mark equal angles, right angles, parallel lines and known totals before writing any calculation.
- Transformation overlays: Use tracing paper or transparent coordinate grids to perform reflections and translations before pupils describe them numerically.

Development of greater depth

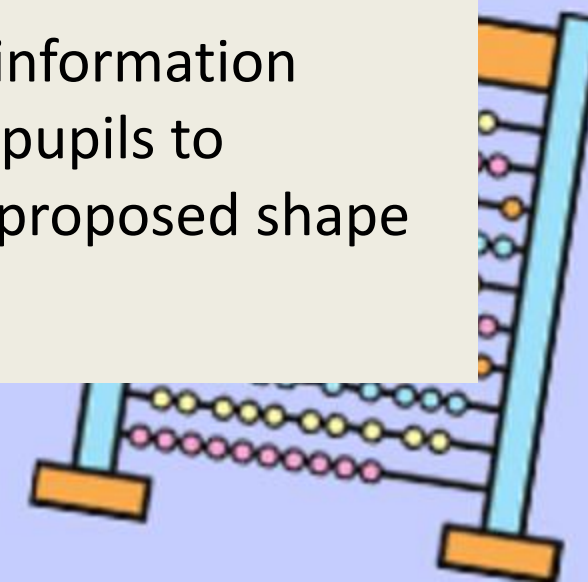
- Construct chains of deduction: Pupils calculate missing angles in composite diagrams and annotate every step with the geometric fact used.
- Explore invariant properties: Pupils translate or reflect a polygon and explain which properties change and which remain unchanged.
- Investigate possible shapes: Give partial information about a triangle or quadrilateral and ask pupils to construct all possibilities or prove that a proposed shape is impossible.

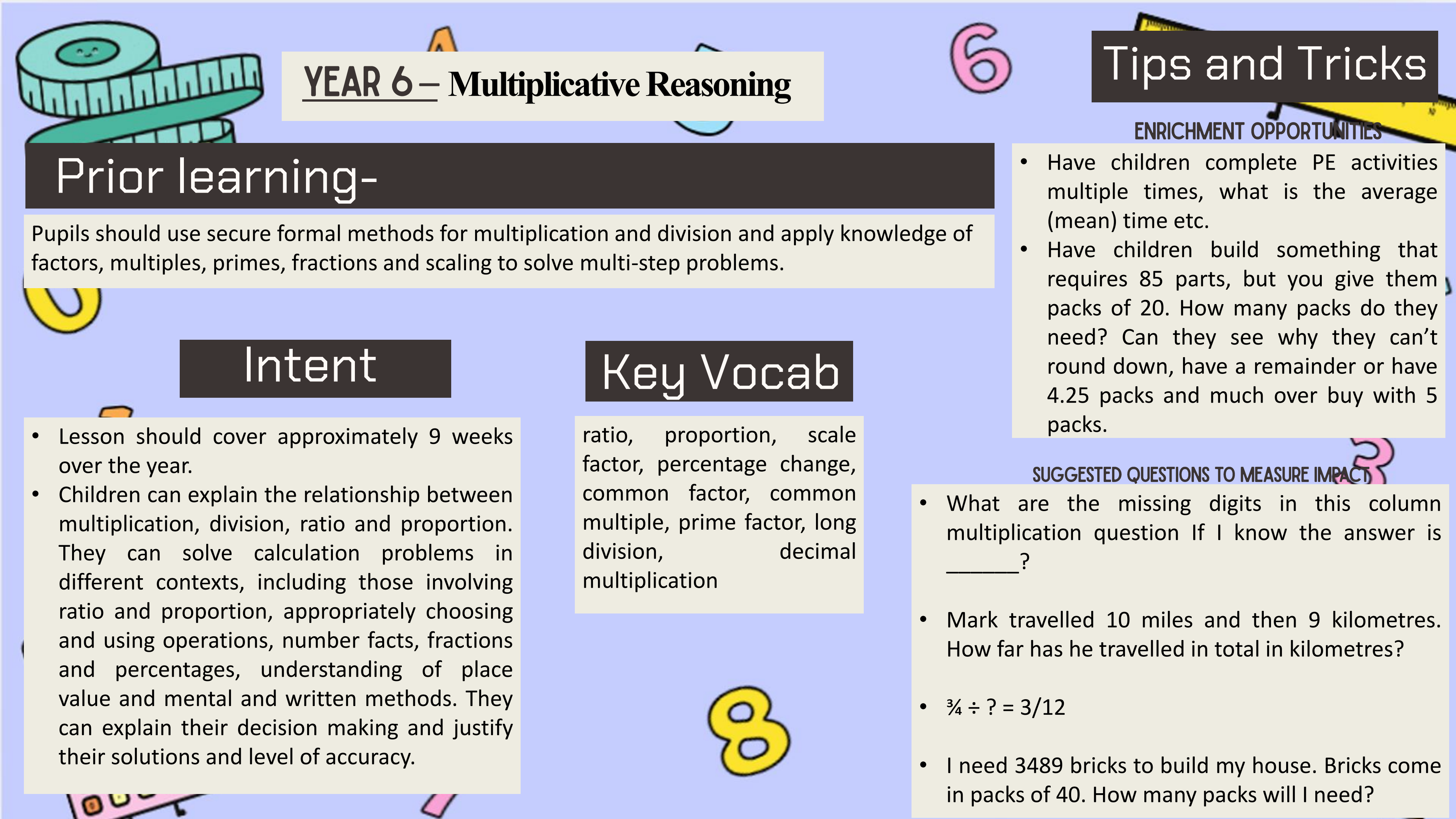


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YEAR 6 – Multiplicative Reasoning

Prior learning-

Pupils should use secure formal methods for multiplication and division and apply knowledge of factors, multiples, primes, fractions and scaling to solve multi-step problems.

Intent

- Lesson should cover approximately 9 weeks over the year.
- Children can explain the relationship between multiplication, division, ratio and proportion. They can solve calculation problems in different contexts, including those involving ratio and proportion, appropriately choosing and using operations, number facts, fractions and percentages, understanding of place value and mental and written methods. They can explain their decision making and justify their solutions and level of accuracy.

Key Vocab

ratio, proportion, scale factor, percentage change, common factor, common multiple, prime factor, long division, decimal multiplication

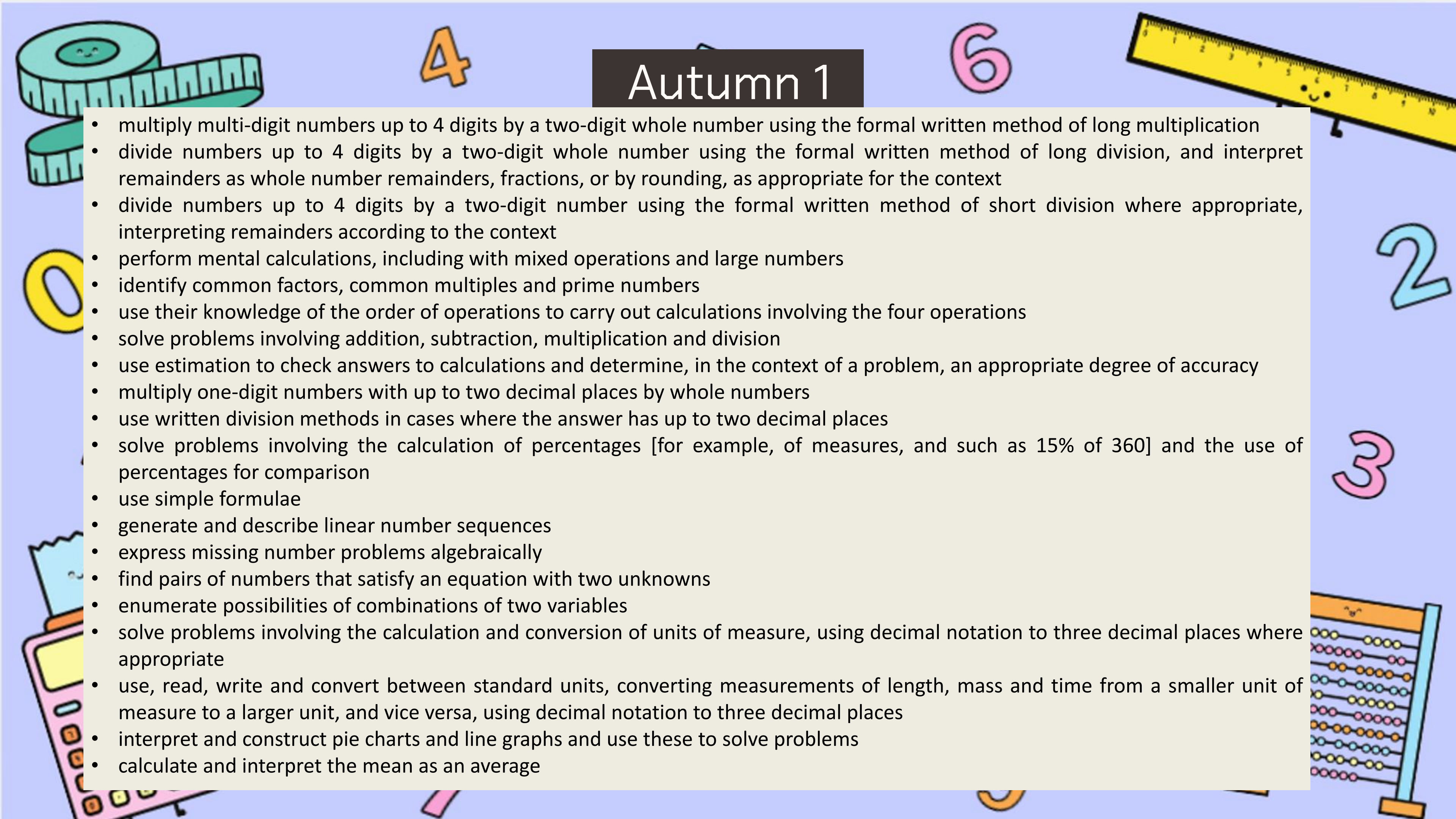
Tips and Tricks

ENRICHMENT OPPORTUNITIES

- Have children complete PE activities multiple times, what is the average (mean) time etc.
- Have children build something that requires 85 parts, but you give them packs of 20. How many packs do they need? Can they see why they can't round down, have a remainder or have 4.25 packs and much over buy with 5 packs.

SUGGESTED QUESTIONS TO MEASURE IMPACT

- What are the missing digits in this column multiplication question If I know the answer is _____?
- Mark travelled 10 miles and then 9 kilometres. How far has he travelled in total in kilometres?
- $\frac{3}{4} \div ? = \frac{3}{12}$
- I need 3489 bricks to build my house. Bricks come in packs of 40. How many packs will I need?



Autumn 1

- multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
- 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
- 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
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve problems involving addition, subtraction, multiplication and division
- use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
- multiply one-digit numbers with up to two decimal places by whole numbers
- use written division methods in cases where the answer has up to two decimal places
- solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
- use simple formulae
- generate and describe linear number sequences
- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with two unknowns
- enumerate possibilities of combinations of two variables
- solve problems involving the calculation and conversion of units of measure, using decimal notation to three decimal places where appropriate
- use, read, write and convert between standard units, converting measurements of length, mass and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to three decimal places
- interpret and construct pie charts and line graphs and use these to solve problems
- calculate and interpret the mean as an average

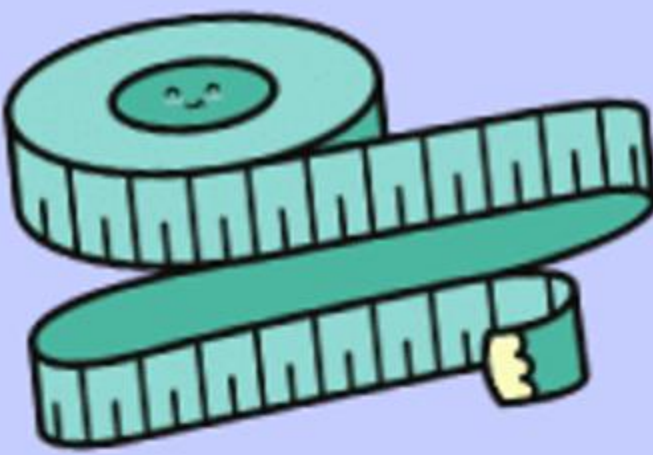
Units will be taught multiple times across the year. When returning to a unit, lessons will recap existing knowledge, and skills, develop their fluency pace and focus more on applying knowledge and skills in reasoning.

2nd time include

- solve problems involving the relative sizes of two quantities, where missing values can be found by using multiplication and division facts
- solve problems involving unequal sharing and grouping using knowledge of fractions and multiples
- convert between miles and kilometres

3rd time include

- multiply simple pairs of proper fractions, writing the answer in its simplest form [for example $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$]
- divide proper fractions by whole numbers [for example, $\frac{1}{3} \div 2 = \frac{1}{6}$]



CPA for ratio and proportional scaling



[Back to year group main slide](#)



Concrete:

Make two-colour groups in a ratio of 2:3 using counters and enlarge the groups proportionally.

Pictorial:

Draw a ratio table, double number line or bar model showing equivalent ratios.

Abstract:

Calculate a missing angle, for example $180^\circ - 65^\circ - 45^\circ = 70^\circ$.



Scaffold

- Ratio bar models: Divide a bar into the total number of ratio parts, label the known value and find the value of one part before scaling.
 - Double number lines: Align corresponding values to support direct proportion, percentage change and scale-factor problems.
 - Reverse-calculation frames: Use the sequence "identify the multiplier, represent the relationship, apply the inverse and check by rebuilding the original result."
- 

Development of greater depth

- Generalise ratio structures: Given a ratio of 2:3 and a total of 40, pupils solve the problem, represent it in multiple ways and explain why dividing the total into five parts works.
 - Compare multiplicative relationships: Pupils distinguish between additive and multiplicative comparisons, explaining why increasing 20 by 50% is not reversed by decreasing the result by 50%.
 - Solve reverse problems: Give the final price after a percentage reduction or the result after scaling and ask pupils to reconstruct the original value and justify the inverse operation.
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USEFUL WEBSITES AND LINKS

SATs boot camp

Children in Year 5 and 6 are given logins to continue their learning at home.

[SATs Boot Camp - Year 6 SATs Revision, Practice Papers & SATs Questions Online](#)

Times tables Rockstars

Children in Year 2, 3 and 4 are given logins to continue their learning at home.

<https://ttrockstars.com/>

Numbots

Children in Reception & Year 1 are given logins to continue their learning at home.

<https://numbots.com/>