Maths at Alder Grove
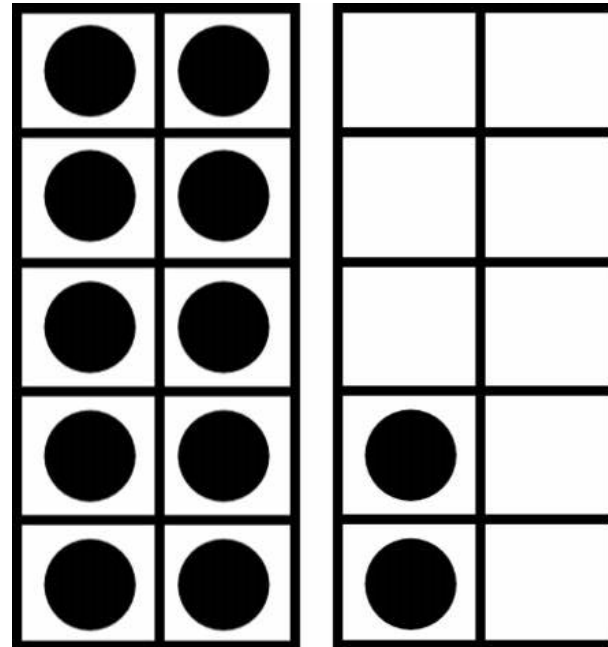
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Whilst you're waiting, see if you can make these numbers using the ten frames and counters...

7

18

20

For example:
12

Maths at Alder Grove

DATE: 14.06.22

Kindness   Service   Truthfulness   Forgiveness   Courage   Perseverance

'They are like trees planted along the riverbank, bearing fruit each season' Psalm 1:3
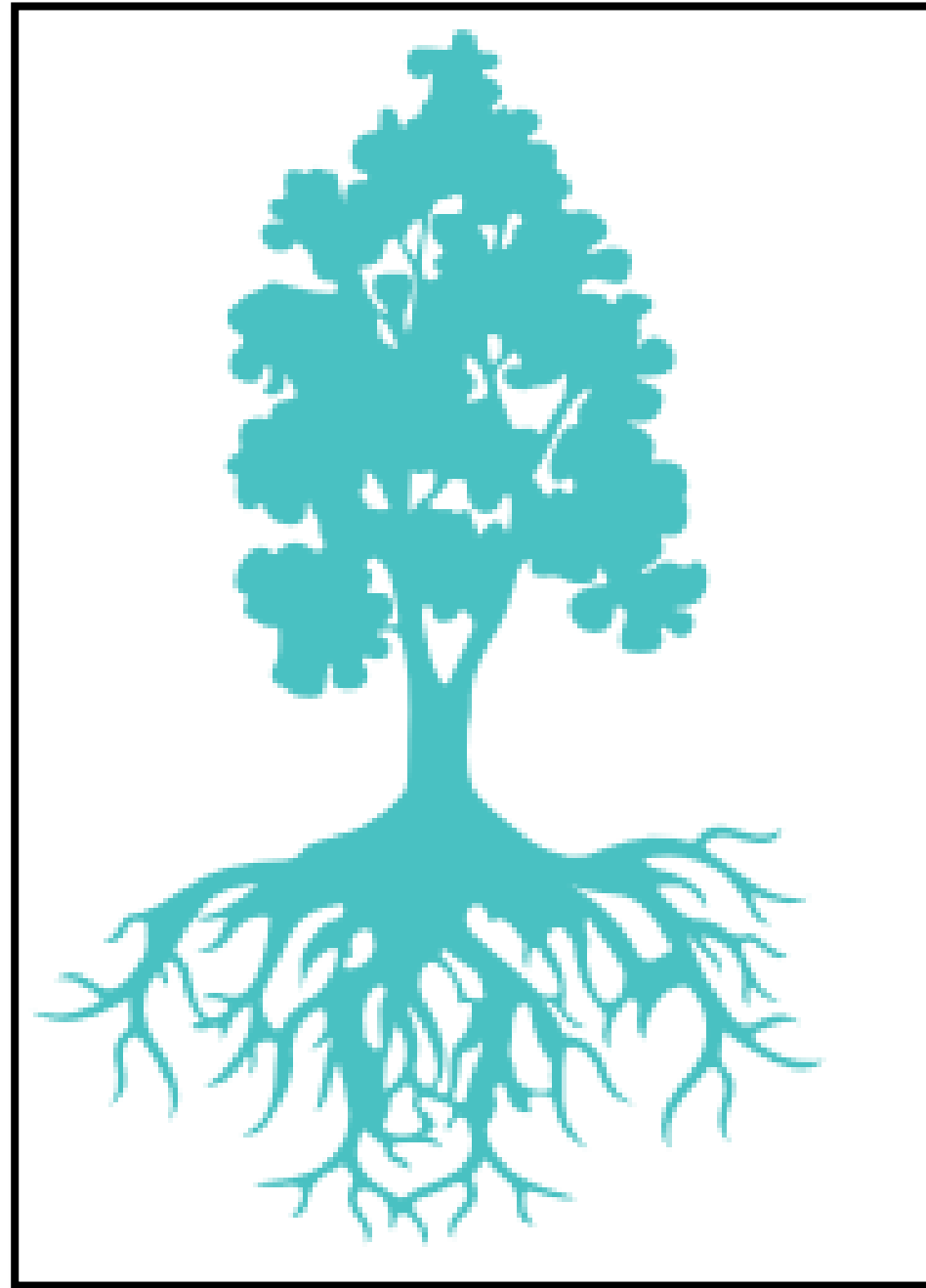
Challenge

Work out the answer:

Each root represents 10

Each branch represents 5

What is the total value represented by the tree?

1:00

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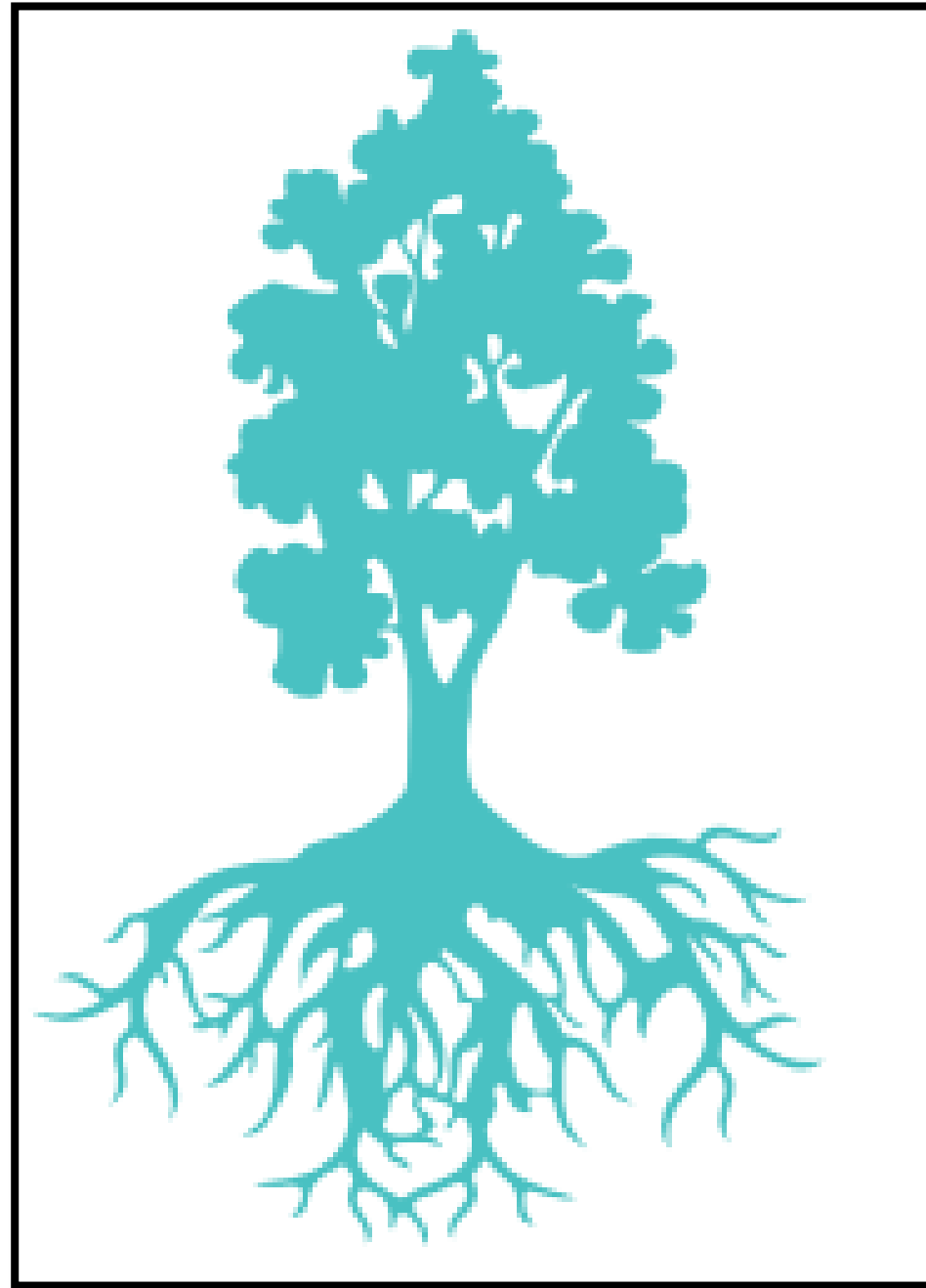
Challenge

Who found this difficult to even comprehend?

Now let's try it a different way...

The tree represents 100

What do the branches and roots represent?
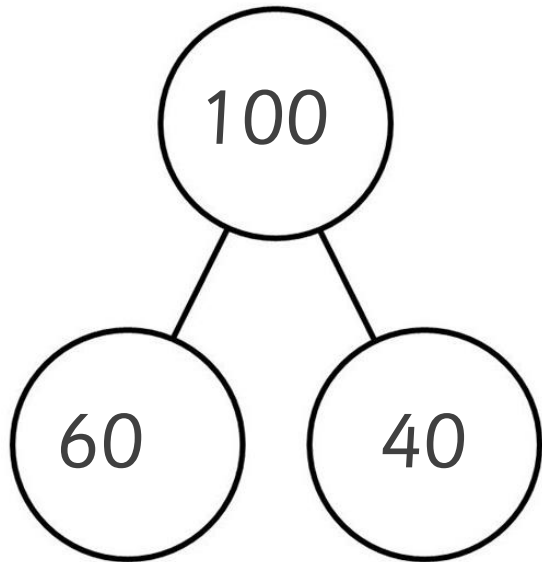
Explain your answer.

1:00

Challenge

$100 = 50 + 50$

If there are 20 branches and roots together, that would be 100 divide by 20 which equals 5

Alder Grove
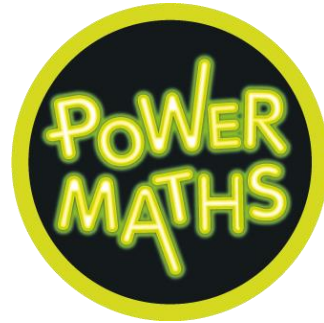Church of England Primary School

I know half of 10 is 5 so half of 100 is 50

100

60   40

$75 + 25 = 100$

I know ¼ of 100 is 25, so ¾ must be 75

Introduction to Power Maths

At Alder Grove CofE School, we use a Maths scheme called Power Maths.

Power Maths is a whole-class mastery approach (from Reception to Year 6) that aims to work for every child.

What is Mastery?

'Mastering Maths means acquiring a deep, long-term, secure and adaptable understanding of the subject.' – NCETM
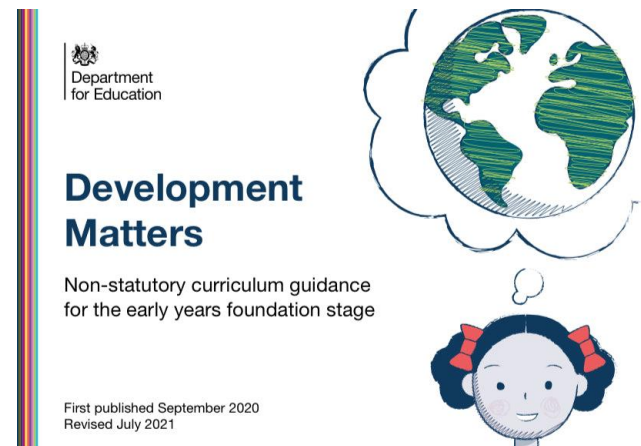
Power Maths Pedagogy

At the heart of maths in Alder Grove it is the belief that <u>all</u> children can achieve.

It is an interactive whole class teaching model, encouraging precise mathematical language, allowing children to deepen their understanding as far as they can.

The national curriculum in England

Key stages 1 and 2 framework document

Department for Education

Development Matters

Non-statutory curriculum guidance for the early years foundation stage

First published September 2020
Revised July 2021

Power Maths Pedagogy

It is a whole class mastery approach that is based upon the concrete, pictorial and abstract approach.

Concrete + Pictorial + Abstract

$2 + 1 = 3$

Non-linear stages

Concrete

Replacing the traditional approach of a teacher working through a problem in front of the class, the concrete stage introduces real objects that children can use to 'do' the maths – any familiar object that a child can manipulate and move to help bring the maths to life. It is important to appreciate, however, that children must always understand the link between models and the objects they represent. For example, children need to first understand that three cakes could be represented by three pretend cakes, and then by three counters or bricks. Frequent practice helps consolidate this essential insight. Although they can be used at any time, good concrete models are an essential first step in understanding.

Pictorial

This stage uses pictorial representations of objects to let children 'see' what particular maths problems look like. It helps them make connections between the concrete and pictorial representations and the abstract maths concept. Children can also create or view a pictorial representation together, enabling discussion and comparisons. The *Power Maths* teaching tools are fantastic for this learning stage, and bar modelling is invaluable for problem solving throughout the primary curriculum.

Abstract

Our ultimate goal is for children to understand abstract mathematical concepts, signs and notation and, of course, some children will reach this stage far more quickly than others. To work with abstract concepts, a child needs to be comfortable with the meaning of, and relationships between, concrete, pictorial and abstract models and representations. The C-P-A approach is not linear, and children may need different types of models at different times. However, when a child demonstrates with concrete models and pictorial representations that they have grasped a concept, we can be confident that they are ready to explore or model it with abstract signs such as numbers and notation.

Use at any time and with any age to support understanding.

Growth Mindset
Power Maths Characters

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Ash
Ash is curious and inquistive. He loves to explore new concepts.

Flo
Flo is flexible and creative. She often comes up with new methods.

Astrid
Astrid is brave and confident. She is not afraid to make mistakes.

Sparks
Sparks is helpful and supportive. He will remind you of things that may help you.

Dexter
Dexter is determined. When he makes a mistake, he learns from it and tries again.

Power Maths Lesson Structure

Power Maths uses a unique lesson sequence designed to empower children to understand core concepts and grow in confidence.

POWER UP! ▶ DISCOVER & SHARE ▶ THINK TOGETHER ▶ PRACTICE ▶ REFLECT

Same Day Intervention
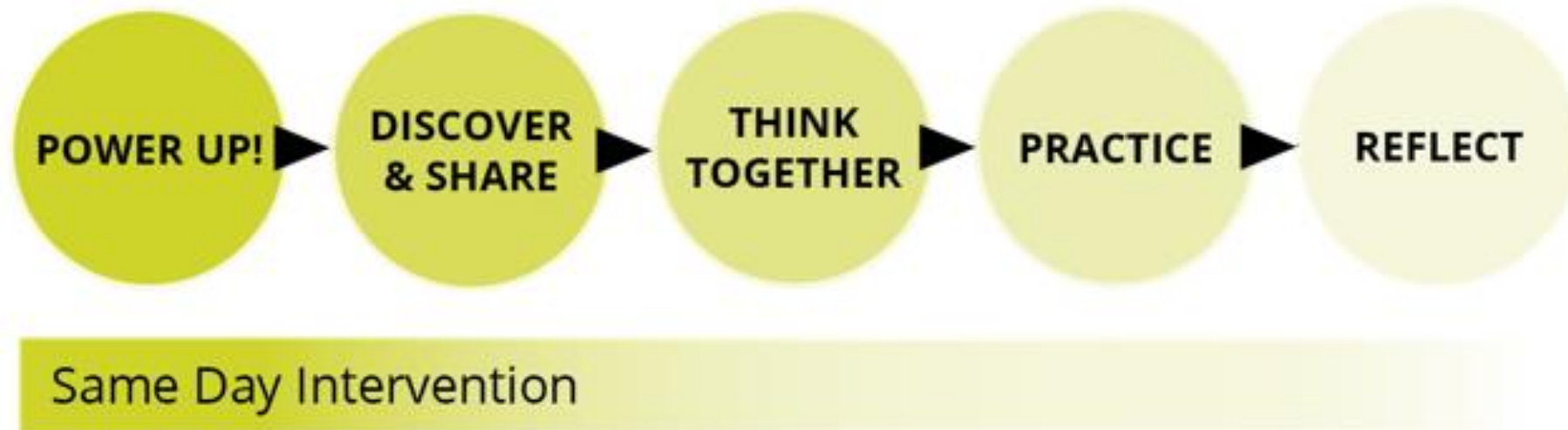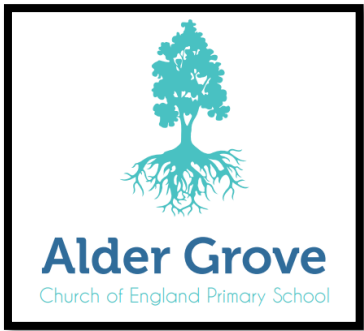
Maths in Reception

In Reception we use the principles and structure of Power Maths but we also add in a Mastery Approach for practical maths through the NCEMT and Department for Education (DfE).
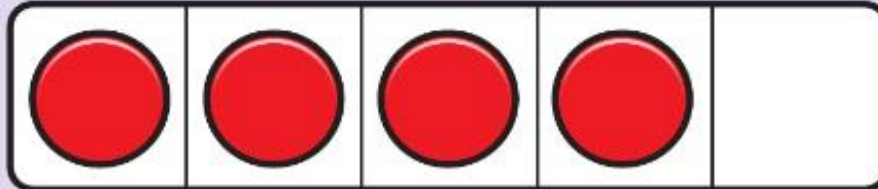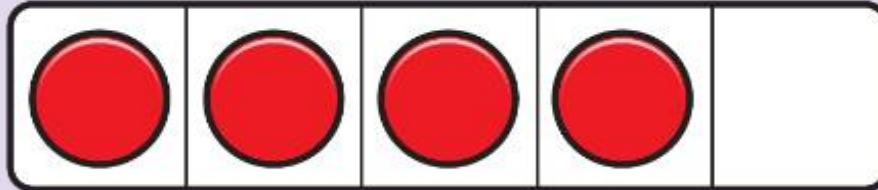
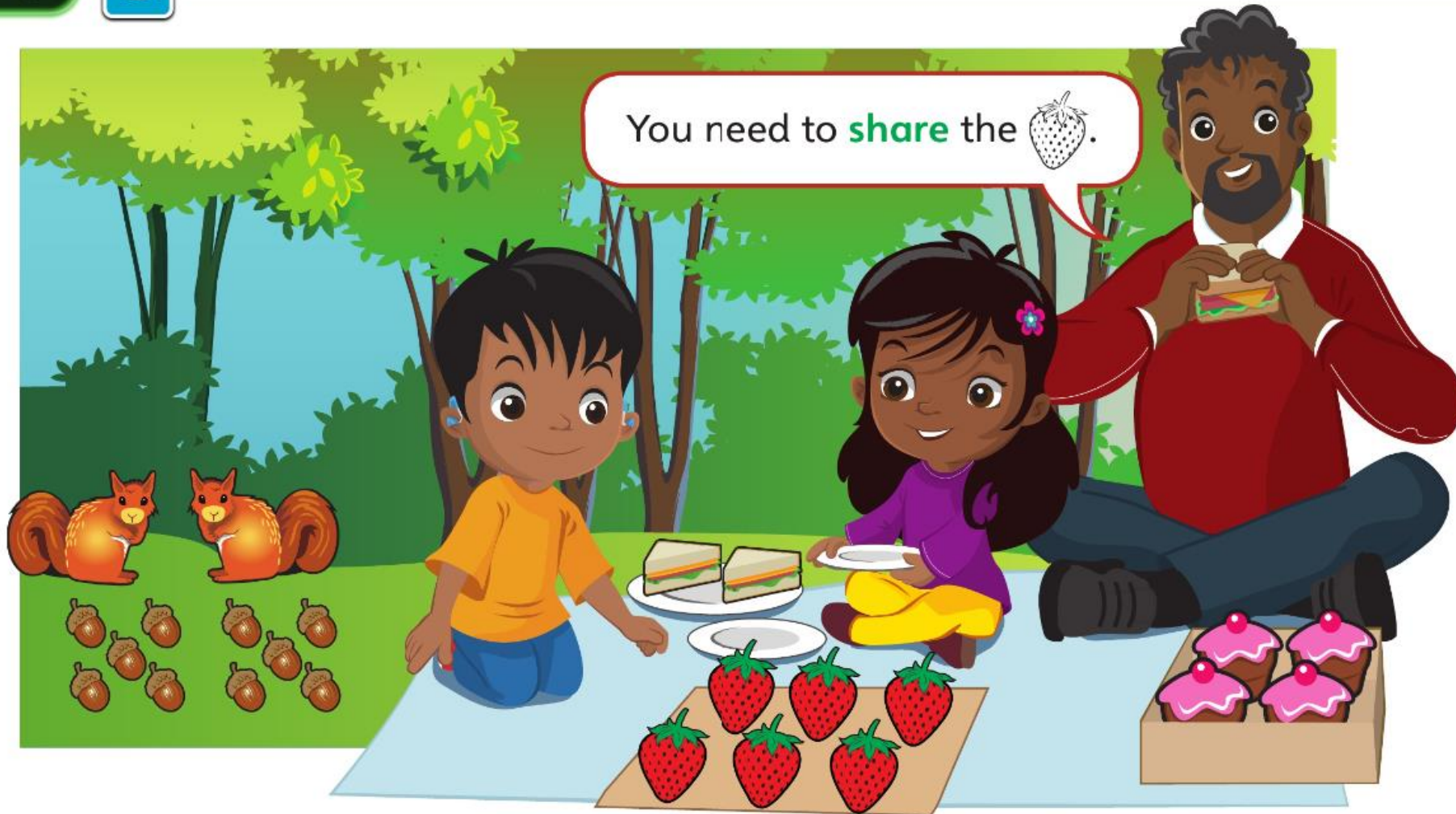This year in Reception we have really focused on practical maths. Let's look at a typical week.

POWER UP! ▶ DISCOVER & SHARE ▶ THINK TOGETHER ▶ PRACTICE ▶ REFLECT

Same Day Intervention

Power Up

What can you see?

Discover

Discover

How many 🍓 will each child get?
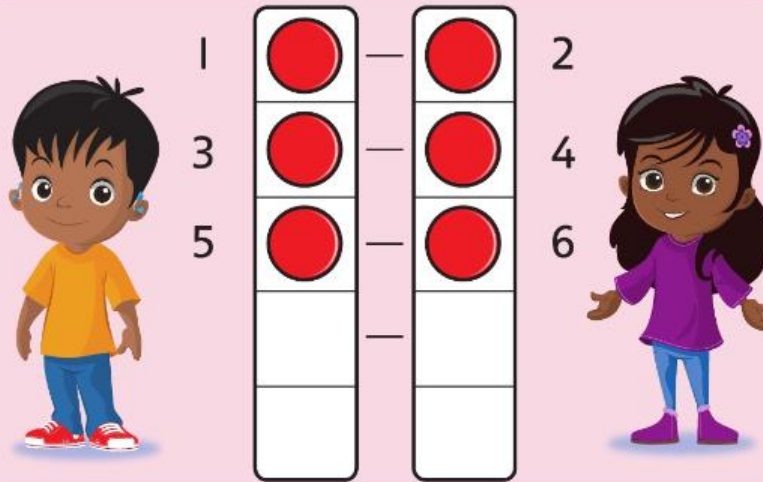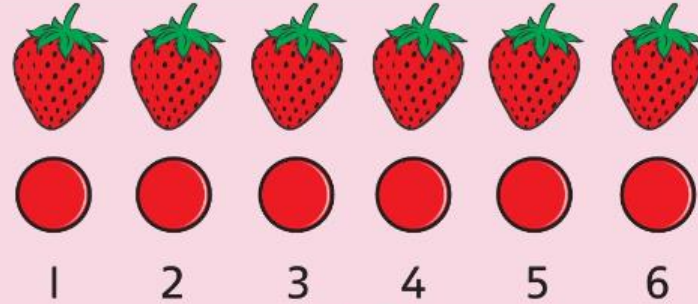
Share

Think together

1 Share the 🍓.
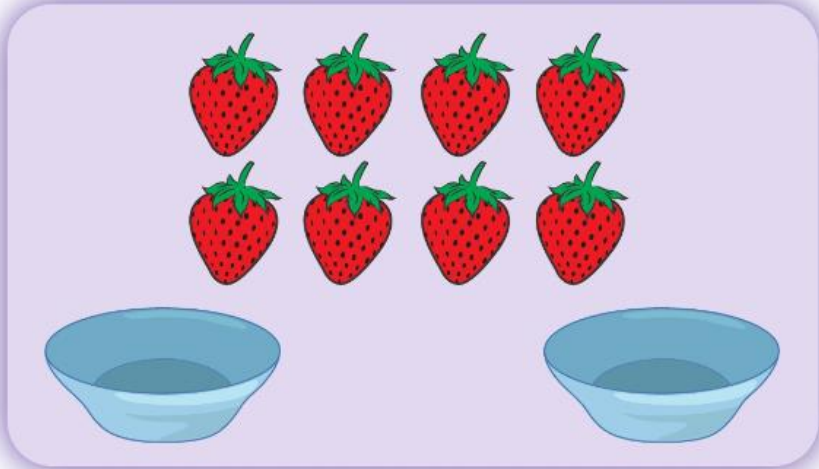
2 Find **half** of the 🍓.
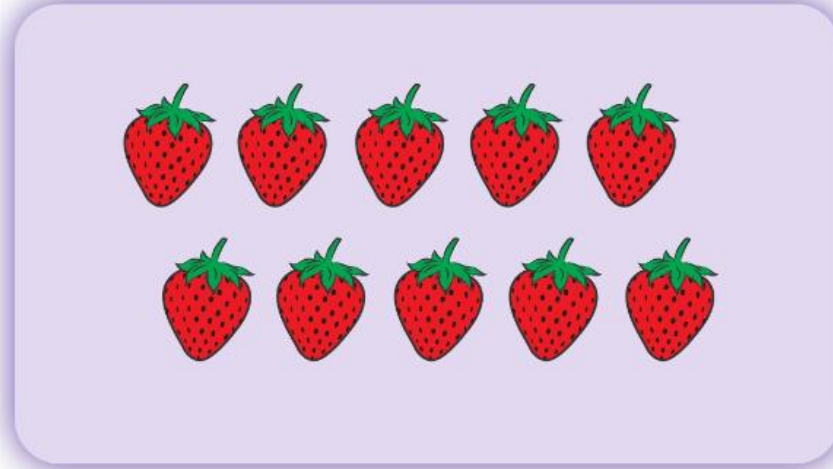
Use ⭕ and ▭▭ to help you.

I will share the 🍓 to find half.

Think together

TTYP:
How many strawberries are there altogether?

How can you share them into two groups?

Can each child have the same amount?

How many strawberries will each child get?

What does half mean?

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Challenge & Practice

Share the picnic so each child gets half.

I think I see a pattern!

Use double facts to help you!

Reflect

If double 2 is 4
What is half of 4?

If double 4 is 8
What is half of 8?

If double 5 is 10
What is half of 10?

If double 50 is 100
What is half of 100?

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Maths in KS1

Power Maths in KS1 then uses this structure in each lesson.
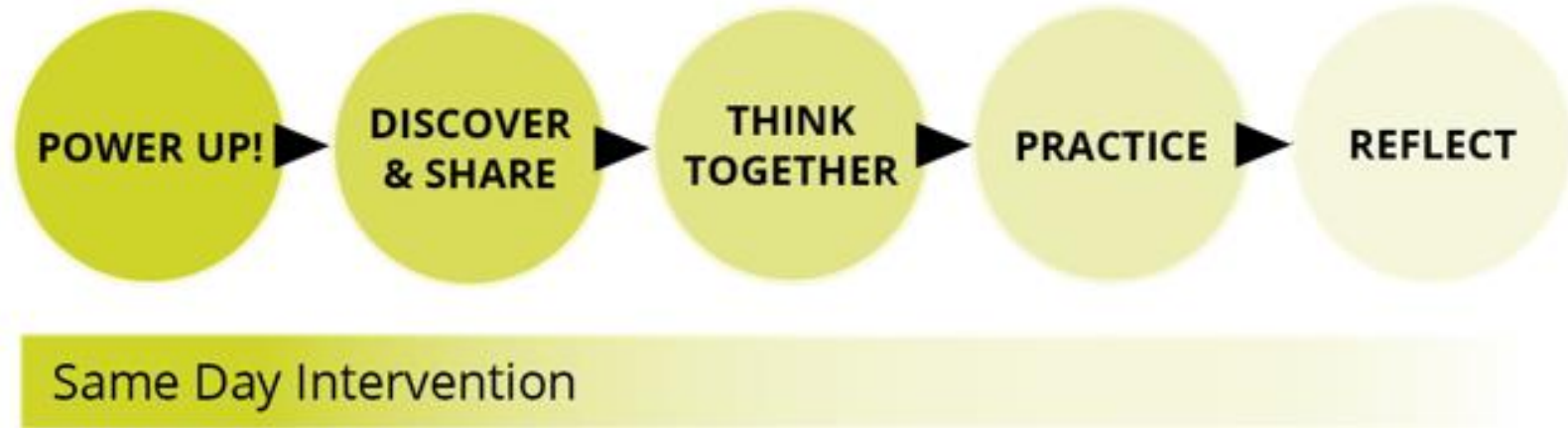Year 1:

- Autumn Term - practical maths.
- Spring Term - combination of practical maths and workbooks
- Summer Term - workbooks with practical resources to support.

Let's look at a typical lesson:

POWER UP! ▶ DISCOVER & SHARE ▶ THINK TOGETHER ▶ PRACTICE ▶ REFLECT

Same Day Intervention

Power Up

Unit 14
Halves and quarters

In this unit we will ...
- ⚡ Find half of a shape or object
- ⚡ Share equally
- ⚡ Find a quarter of a shape or object
- ⚡ Solve word problems about halves and quarters

We will be using these maths words. Can you read them out loud?

half   **halves**   **quarter**

We can find half of a shape. Which shape has been cut in half?

We will also do some sharing. Share the jam tarts equally. How many does each child get?

58   59

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Discover & Share

Finding halves ❶

Discover

a) How can the two gardeners share the flower bed equally?
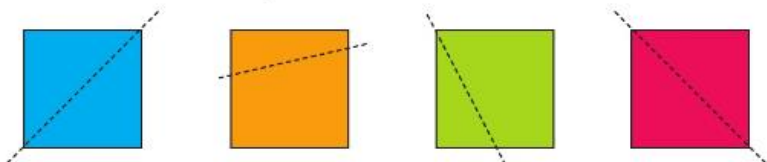
b) Here are four squares.

Which squares are split into **halves**?

Share

When you split a **whole** into two equal parts, each **part** is a **half**.

a) The flower bed is a square shape.

The gardeners can split the flower bed into two equal parts.
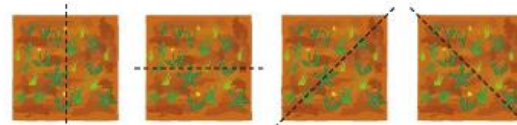
The two parts of the flower bed are equal, so it is split into two halves.

I wonder if **halves** always look the same.

I can check by folding or cutting a square piece of paper.
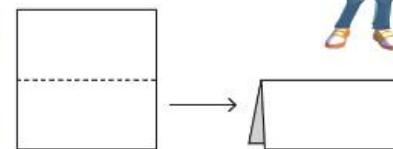
b) The two parts are not equal in these squares.
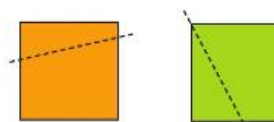
The two parts are equal in these squares. They are split into halves.
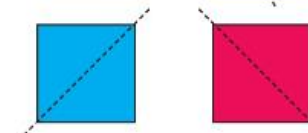
Think together

1. Here are six rectangles.

   Which rectangles are split into two halves?

   A   C   E

   B   D   F
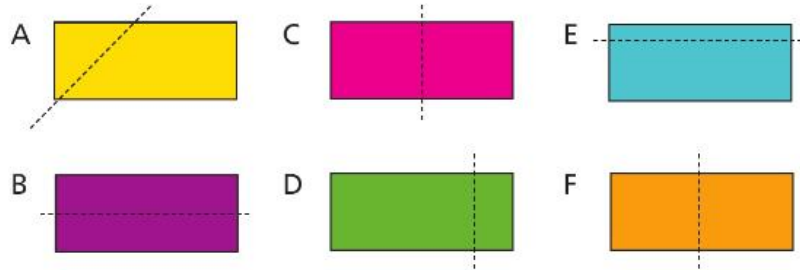
2. a) Which shapes are half shaded?

   b) Which shapes are more than half shaded?

   c) Which shapes are less than half shaded?

   A   C   E

   B   D   F

3. CHALLENGE
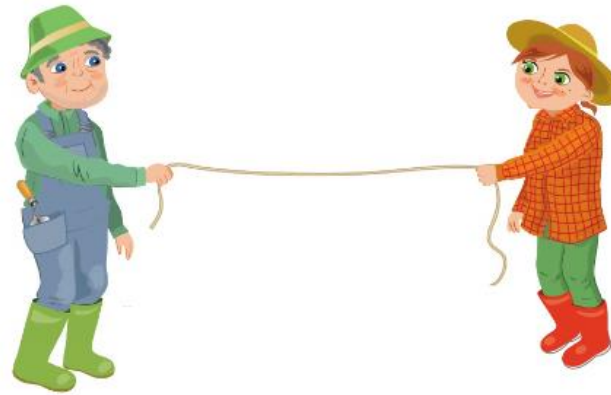
   The gardeners have a piece of string.

   How can they split the string into two halves?

   Can you find half of any line?

Practice

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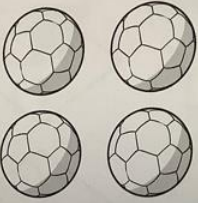
Finding quarters ②

1 Split each group into quarters.

a)

c)

A quarter of 4 is ☐.

A quarter of 20 is ☐

b)

d)
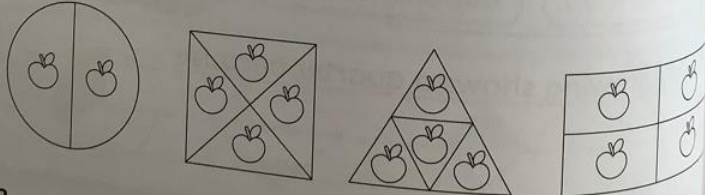
A quarter of ☐ is ☐.   A quarter of ☐ is ☐

2 Circle the shapes that show quarters.

52

3 Use the correct words to complete each sentence.

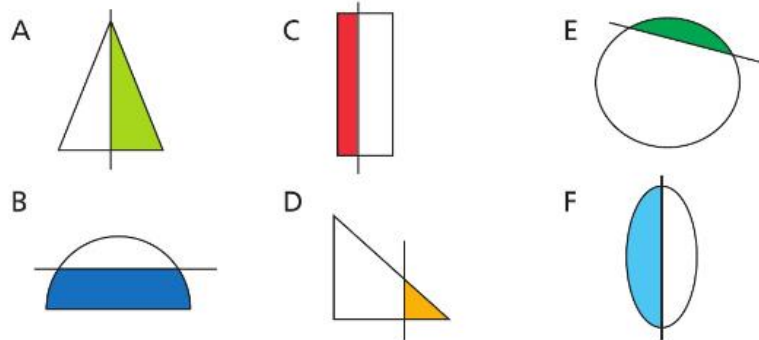| more than | less than | exactly |

a) This is _____ a quarter full.

b) This is _____ a quarter full.

c) This is _____ a quarter full.

4 Complete the sentences.

a) A quarter of 4 is ☐.

I will draw dots to help me.

b) A quarter of 8 is ☐.

c) A quarter of ☐ is 4.

d) A quarter of ☐ is 1.

53

5

I will eat 4 sweets. That will be a quarter.   Ben

Meg   No, that will not be a quarter.

Who is right? Explain your answer.

_____ is right because _____

_____

6 What are the values of ⭐ and ♥ ?   CHALLENGE

⭐ + ♥ = 10   ⭐ = ☐

♥ is a quarter of 16.   ♥ = ☐

Reflect

Reflect

I can find a quarter of 12 by _____

_____

_____

_____

54
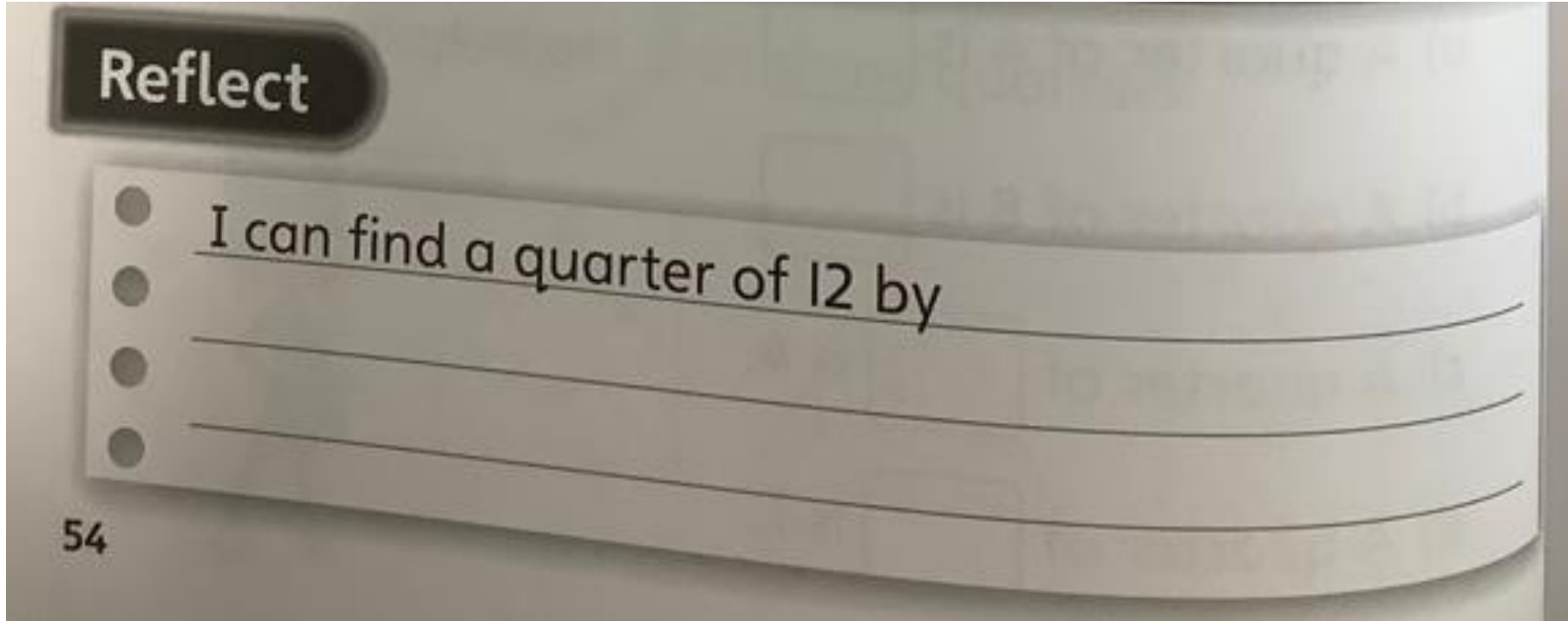
Power Maths Lesson Structure
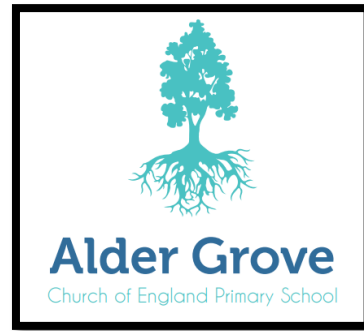
Flexibility is built into the our Power Maths units so there is no one-to-one mapping of lessons and concepts, meaning we can pace our teaching according to our class.

While some children will need to spend longer on a particular concept (through interventions or additional lessons), others will reach deeper levels of understanding. However, it is important that the class moves forward together through the termly schedules.

Power Maths Reception, yearly overview

Autumn term

Strand		Unit	Week	Week title	Early Learning Goal
Number – number and place value	Unit 1	Numbers to 5	1	Counting to 1, 2 and 3	Have a deep understanding of number to 10, including the composition of each number.
			2	Counting to 4	Subitise (recognise quantities without counting) up to 5.
			3	Counting to 5	Recognise the pattern of the counting system.
Number – number and place value	Unit 2	Comparing groups within 5	4	Comparing quantities of identical objects	Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
			5	Comparing quantities of non-identical objects	Subitise (recognise quantities without counting) up to 5.
Geometry – properties of shape	Unit 3	Shape	6	3D shapes	There is no specific ELG related to this unit. This unit supports the Development Matters statement Select, rotate and manipulate shapes in order to develop spatial reasoning.
			7	2D shapes	
Number – addition and subtraction	Unit 4	Change within 5	8	One more	Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
			9	One less	
Number – addition and subtraction	Unit 5	Number bonds within 5	10	Introducing the part-whole model	Have a deep understanding of number to 10, including the composition of each number. Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 and some number bonds to 10, including double facts.
Geometry – properties of shape	Unit 6	Space	11	Spatial awareness	There is no specific ELG related to this unit. This unit supports the Development Matters statement Select, rotate and manipulate shapes in order to develop spatial reasoning skills.

Spring term

Strand		Unit	Week	Week title	Early Learning Goal
Number – number and place value	Unit 7	Numbers to 10	1	Counting to 6, 7 and 8	Have a deep understanding of number to 10, including the composition of each number.
			2	Counting to 9 and 10	Subitise (recognise quantities without counting) up to 5. Verbally count, (recognising the pattern of the counting system).
Number – number and place value	Unit 8	Comparing numbers within 10	3	Comparing groups up to 10	Have a deep understanding of number to 10, including the composition of each number. Subitise (recognise quantities without counting) up to 5. Compare quantities up to 10 in different contexts, (recognising when one quantity is greater than, less than or the same as the other quantity).
Number – addition and subtraction	Unit 9	Addition to 10	4	Combining 2 groups to find the whole	Have a deep understanding of number 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. Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.

Spring term continued

Strand		Unit	Week	Week title	Early Learning Goal
Number – number and place value	Unit 10	Measure	5	Length, height and distance	Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
			6	Weight	
Number – addition and subtraction	Unit 11	Number bonds to 10	7	Using a ten frame	Have a deep understanding of number 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.
			8	The part-whole model to 10	
Number – addition and subtraction	Unit 12	Subtraction	9	Subtraction	Have a deep understanding of number to 10, including the composition of each number.
Geometry – properties of shape	Unit 13	Exploring patterns	10	Making simple patterns	There is no specific ELG related to this unit. This unit supports the Development Matters statement Continue, copy and create repeating patterns.
			11	Exploring more complex patterns	

Summer term

Strand		Unit	Week	Week title	Early Learning Goal
Number – addition and subtraction	Unit 14	Counting on and counting back	1	Adding by counting on	Have a deep understanding of number to 10, including the composition of each number.
			2	Taking away by counting back	
Number – number and place value	Unit 15	Numbers to 20	3	Counting to and from 20	Verbally count beyond 20, recognising the pattern of the counting system.
Number – multiplication and division	Unit 16	Numerical patterns	4	Doubling	Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.
			5	Halving and sharing	
			6	Odds and evens	
Geometry – properties of shape	Unit 17	Shape	7	Composing and decomposing shapes	There is no specific ELG related to this unit. This unit supports the Development Matters statement Select, rotate and manipulate shapes in order to develop spatial reasoning.
Number – number and place value	Unit 18	Measure	8	Volume and capacity	Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
Number – addition and subtraction	Unit 19 (Optional)	Sorting	9	Sorting into 2 groups	This unit is optional because sorting is not covered in the EYFS Framework or Development Matters guidance for Reception. It does provide an introduction to the concept of sorting, which will be useful in Year 1.
Measurement	Unit 20 (Optional)	Time	10	My day	This unit is optional because time is not covered in the EYFS Framework or Development Matters guidance for Reception. It does provide a useful introduction to time, which will be covered in Year 1.

Power Maths Year 1, yearly overview

Textbook	Strand	Unit	Number of Lessons	
Textbook A / Practice Pupil Book A (Term 1)	Number – number and place value	1	Numbers to 10	12
	Number – number and place value	2	Part-whole within 10	5
	Number – addition and subtraction	3	Addition and subtraction within 10 (1)	6
	Number – addition and subtraction	4	Addition and subtraction within 10 (2)	12
	Geometry – properties of shape	5	2D and 3D shapes	5
	Number – number and place value	6	Numbers to 20	7
Textbook B / Practice Pupil Book B (Term 2)	Number – addition and subtraction	7	Addition within 20	6
	Number – addition and subtraction	8	Subtraction within 20	8
	Number – number and place value	9	Numbers to 50	11
	Measurement	10	Introducing length and height	5
	Measurement	11	Introducing weight and volume	7
Textbook C / Practice Pupil Book C (Term 3)	Number – multiplication and division	12	Multiplication	6
	Number – multiplication and division	13	Division	5
	Number – fractions	14	Halves and quarters	5
	Geometry – position and direction	15	Position and direction	3
	Number – number and place value	16	Numbers to 100	9
	Measurement	17	Time	7
	Measurement	18	Money	3

Power Maths Year 2, yearly overview

Textbook	Strand	Unit	Number of Lessons	
Textbook A / Practice Workbook A (Term 1)	Number – number and place value	1	Numbers to 100	10
	Number – addition and subtraction	2	Addition and subtraction (1)	12
	Number – addition and subtraction	3	Addition and subtraction (2)	9
	Measurement	4	Money	9
	Number – multiplication and division	5	Multiplication and division (1)	9
Textbook B / Practice Workbook B (Term 2)	Number – multiplication and division	6	Multiplication and division (2)	9
	Statistics	7	Statistics	7
	Measurement	8	Length and height	5
	Geometry – properties of shape	9	Properties of shapes	12
	Number – fractions	10	Fractions	14
Textbook C / Practice Workbook C (Term 3)	Geometry – position and direction	11	Position and direction	4
	Number – addition and subtraction	12	Problem solving and efficient methods	12
	Measurement	13	Time	9
	Measurement	14	Weight, volume and temperature	10

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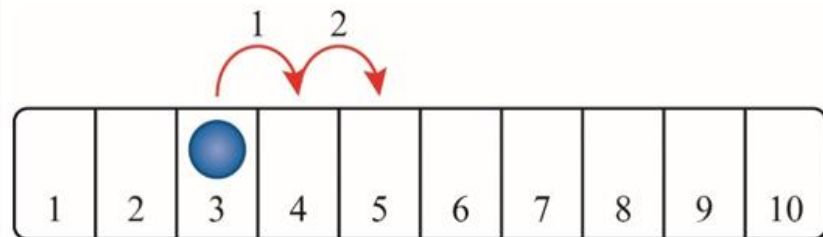
Reception Maths Calculation Policy

Adding by counting on (number track)

Children jump along a physical number track. They start at the larger number and count on the smaller number to find the total.
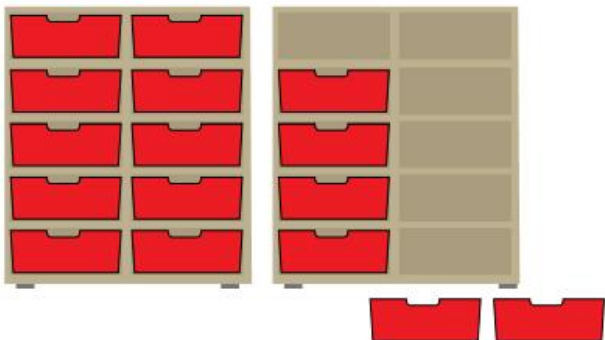
Adding by counting on (number track)

Children use a number track and a counter. They start at the larger number and count on the smaller number to find the total.
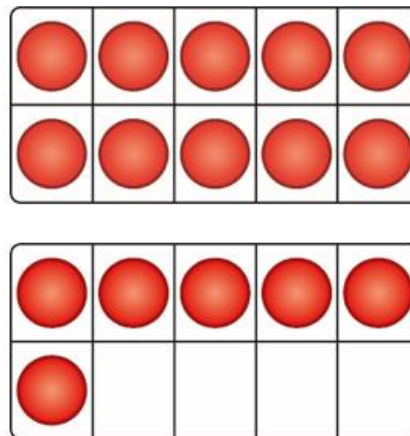
Adding by counting on (ten frames)
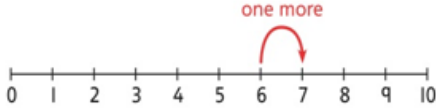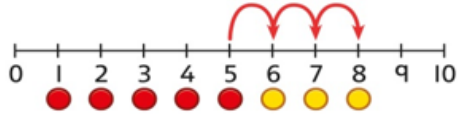
Children find the total number by counting on from the larger number.
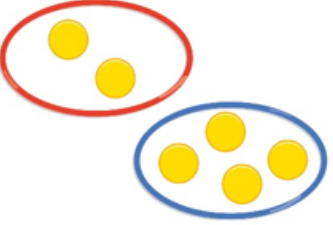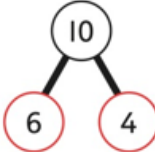
Adding by counting on (ten frames)

Children make the larger number on the ten frames and then make the smaller number, counting on to find the total. They can use counters, cubes or other objects on the ten frames.
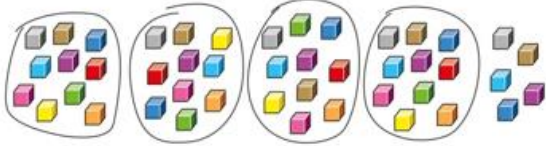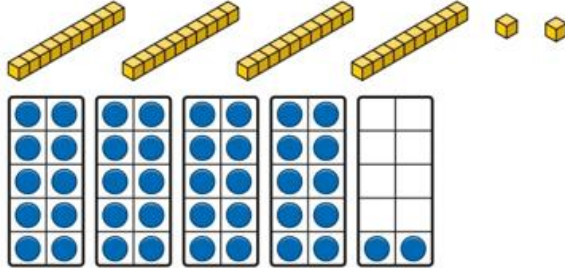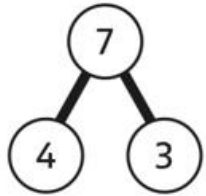
KS1 Maths Calculation Policy

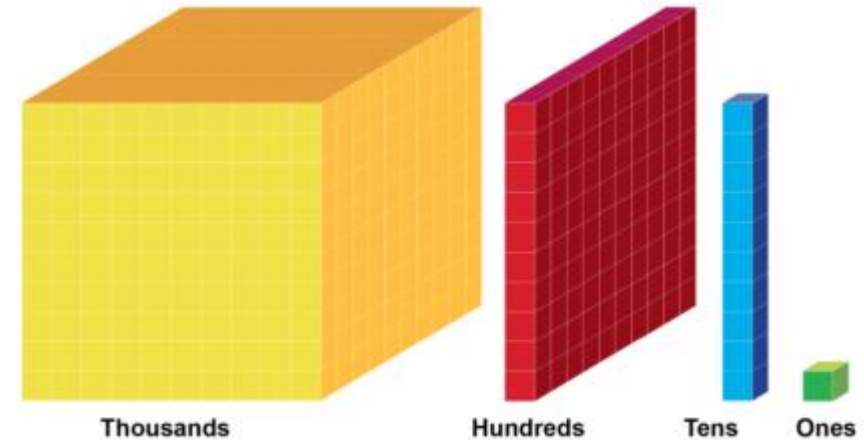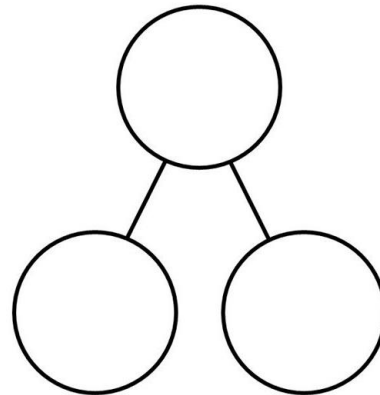| Year 1			
	Concrete	**Pictorial**	**Abstract**
Year 1 Addition	**Counting and adding more** Children add one more person or object to a group to find one more.	**Counting and adding more** Children add one more cube or counter to a group to represent one more. *One more than 4 is 5.*	**Counting and adding more** Use a number line to understand how to link counting on with finding one more. *One more than 6 is 7.* *7 is one more than 6.* Learn to link counting on with adding more than one. *5 + 3 = 8*
	Understanding part-part-whole relationship Sort people and objects into parts and understand the relationship with the whole. *The parts are 2 and 4. The whole is 6.*	**Understanding part-part-whole relationship** Children draw to represent the parts and understand the relationship with the whole. *The parts are 1 and 5. The whole is 6.*	**Understanding part-part-whole relationship** Use a part-whole model to represent the numbers. 10 6 4 6 + 4 = 10 *6 + 4 = 10*

KS1 Maths Calculation Policy

	Concrete	Pictorial	Abstract
Year 2 Addition			
Understanding 10s and 1s	Group objects into 10s and 1s. Bundle straws to understand unitising of 10s.	Understand 10s and 1s equipment, and link with visual representations on ten frames.	Represent numbers on a place value grid, using equipment or numerals. Tens: 3, Ones: 2 Tens: 4, Ones: 3
Adding 10s	Use known bonds and unitising to add 10s. I know that 4 + 3 = 7. So, I know that 4 tens add 3 tens is 7 tens.	Use known bonds and unitising to add 10s. I know that 4 + 3 = 7. So, I know that 4 tens add 3 tens is 7 tens.	Use known bonds and unitising to add 10s. 4 + 3 = ☐ 4 + 3 = 7 4 tens + 3 tens = 7 tens 40 + 30 = 70

<table>
<tr><td colspan="4">Year 2</td></tr>
</table>

Resources we use at School

What can you do to help your child?

Alder Grove
Church of England Primary School

Give your child a number, see if they can think of as many ways using numbers facts to make the number as possible

10

Baking and Cooking
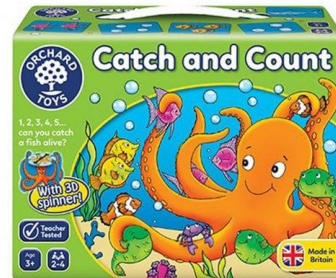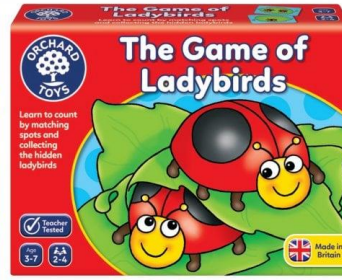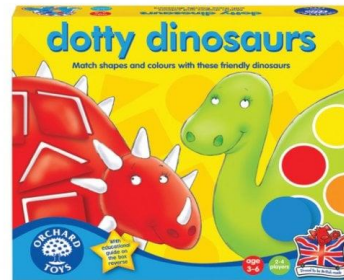
Counting every day objects

Practising number formation

Website:
- www.TopMarks.co.uk

Topmarks

App:
- One minute maths (White Rose Maths)

SCHOOL JAM

Dominoes & Maths games

1-minute MATHS
No login or internet access needed. Just download and play.

Subitising
1 1 to 5 (Dice)
2 1 to 5 (Common)
3 1 to 5 (Random)
4 1 to 5 (Two colours)
5 Five frame
6 1 to 5 (Objects)
7 Ten frame
8 5 to 9 (Common)
9 1 to 9 (Common)

Thank you for listening!