

Power Maths Parent/Carer Workshop

Wednesday 14th October 2020



Aims of this session

- ▶ Understand the pedagogy behind Power Maths
- ▶ Explore a typical week of Power Maths in Reception
- ▶ Understand the impact for Year 1 and beyond



What is Power Maths?

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

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.




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What is Power Maths?

Every lesson is divided into sections that involve and encourage discovery, sharing, collaboration, practice and reflection. Children are encouraged to solve problems each day through the use of concrete resources, pictorial representations and abstract thinking.


Discover

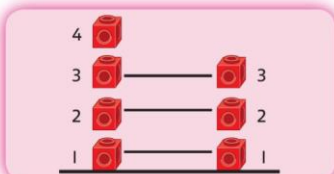
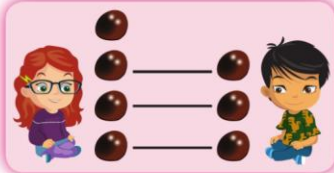


Who has **more** conkers?


Share

Who has more conkers?

I used a  for each conker.

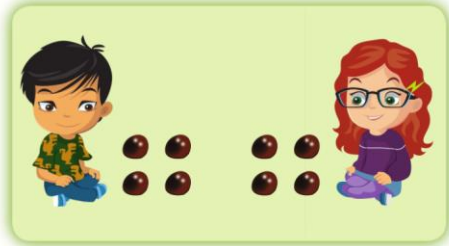


Ella has more conkers.

I counted the .


CHALLENGE

Who has more conkers?



I will line them up.

Can you always use 'more' or 'fewer'?



Think together

1 Who has fewer conkers?



2 Who has fewer conkers?



I can use  to help me.

I can see without counting.

What is Power Maths?

At the heart of this programme is the principle that all children can achieve and be successful mathematicians with the right growth mindset. It promotes five child friendly characters, each with their own positive skillset, to inspire and motivate children. These characters are:



What is Power Maths?

To develop mastery in maths, children need to be enabled to acquire a deep understanding of maths concepts, structures and procedures, step by step. Complex mathematical concepts are built on simpler conceptual components and when children understand every step in the learning sequence, maths becomes transparent and makes logical sense. Interactive lessons establish deep understanding in small steps, as well as fluency in key facts such as tables and number bonds. The whole class works on the same content and no child is left behind.

Power Maths:

- ▶ Builds every concept in small, progressive steps.
- ▶ Is built with interactive, whole-class teaching in mind.
- ▶ Provides the tools you need to develop growth mindsets.
- ▶ Helps your child's teacher check understanding and ensure that every child is keeping up.
- ▶ Establishes core elements such as practice and reflection.



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What does Power Maths look like in Reception class?

Unit 2 - Sorting Monday - Check

Unit 2 Sorting

Sorting into 2 groups



Can you **describe** the object?



Let's look.



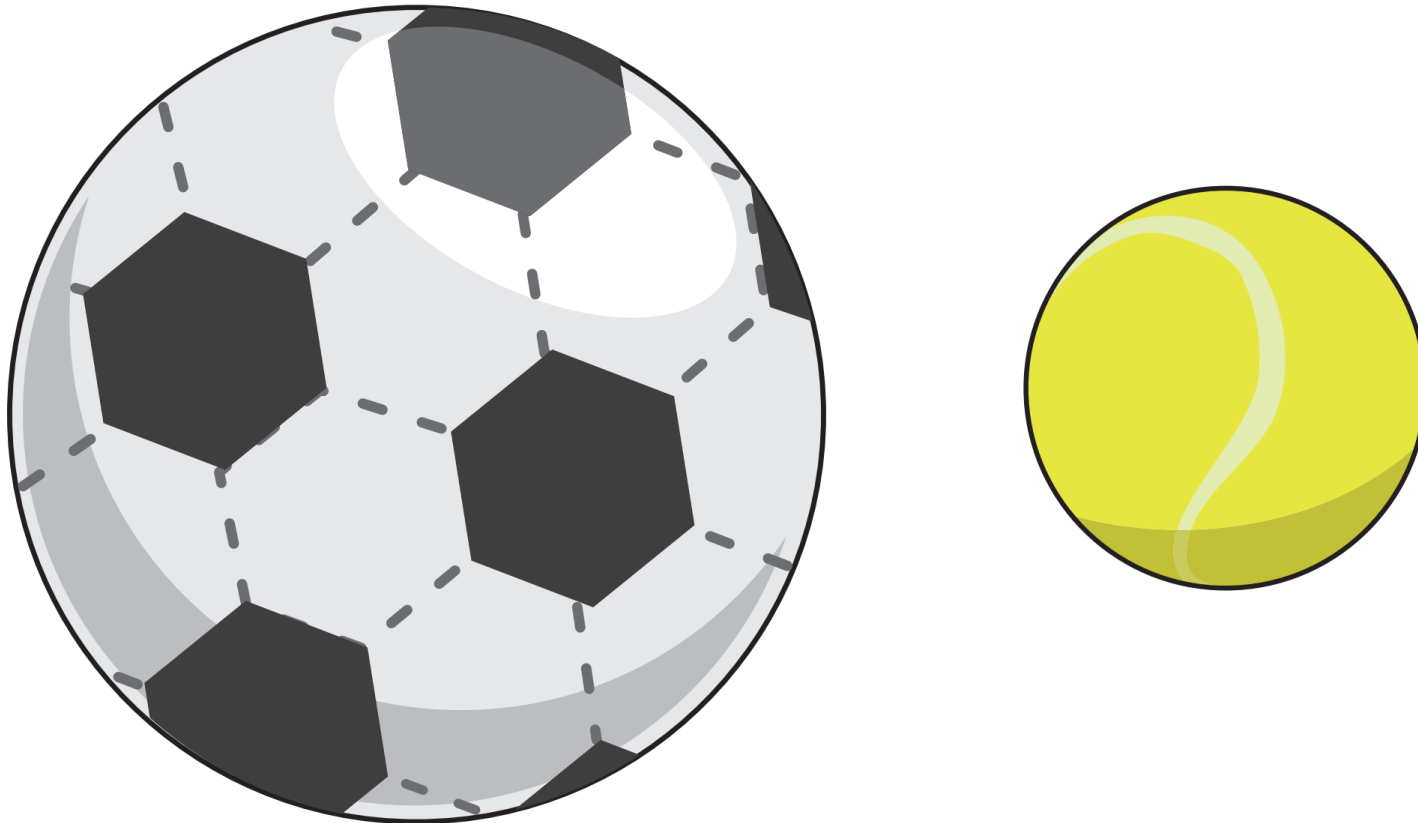
Before you teach

- What objects will you provide for children to support their learning in this lesson?
- Can children describe the characteristics of a familiar object in terms of colour, pattern, shape and size?
- Are children familiar with the language 'same' and 'different'?

What does Power Maths look like in Reception class?

Monday - Check

Unit 2: Sorting, Week 4: Sorting into 2 groups



STIMULUS Picture to prompt discussion

The picture of two different balls is intended to spark discussion about similarities and differences.

WAYS OF WORKING Whole class or in pairs

Encourage children to describe the physical characteristics of the football and the tennis ball and compare them in terms of what is the same and what is different. Prompt children to think about size, shape and colour.

IN FOCUS The focus is on practising the language of description and observing the properties of an object, using these observations to describe the similarities and differences between objects. This is an important foundation for being able to accurately sort a set of objects into groups.

ASK

- *What is the same about these two objects?*
- *What is different about these two objects?*
What else is different about these two objects?

GET ACTIVE Ask children to find an interesting object in the classroom to share with a partner. Encourage children to describe what is the same and what is different about their objects. Encourage them to describe the shape, colour, pattern or size. Ask: *Are there any other similarities or differences?* Ask pairs of children to describe to the class what is the same and what is different about their two objects. Ask: *Who else has an object the same as X's? How is it the same? How is it different?* Children may struggle to notice that two very different objects can be 'the same' by virtue of their colour, shape or size. If appropriate, continue with identifying pairs of objects that have something the same and something different about them (large and yellow, small and yellow; used for art or one white, one red).

What does Power Maths look like in Reception class?

Tuesday - Discover & Share

Discover






How can you **sort** the  and  ?

What does Power Maths look like in Reception class?

Tuesday - Discover & Share



Share

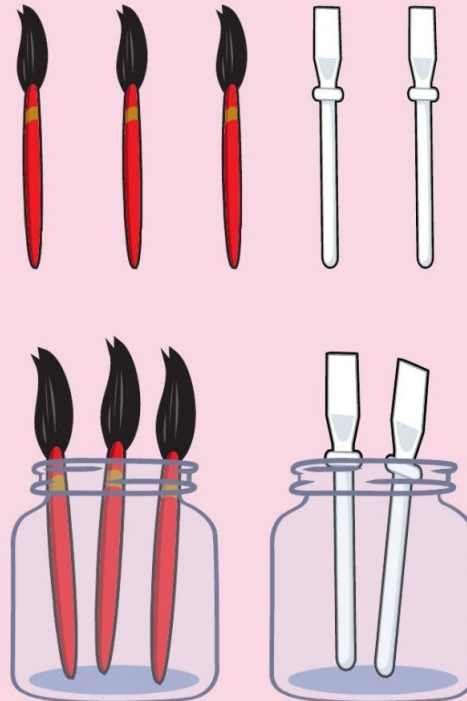
How can you sort the  and  ? 



I used real  and  .



I put the  in one jar and the  in another jar.




I sorted the  and  into 2 **groups**.



What does Power Maths look like in Reception class?

Wednesday - Think Together

Think together

- 1 Sort the animals into 2 groups. 
- 2 Is there **more than** one way to sort them?



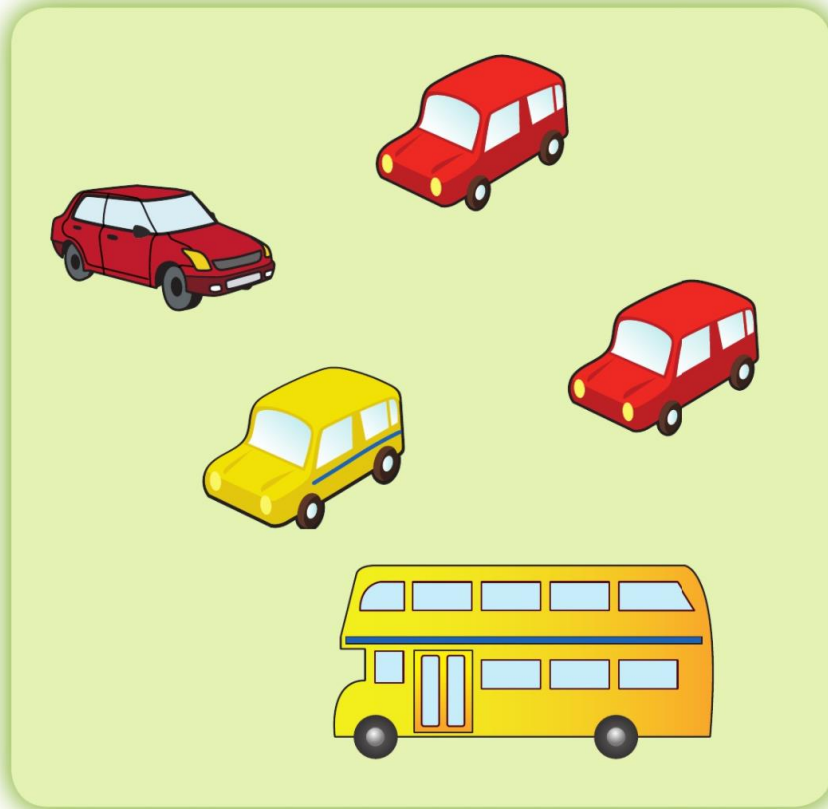
I can see a
different way!

What does Power Maths look like in Reception class?

Thursday - Challenge



Sort the toys into 2 groups.



Can you sort them in more than one way?



I can sort them into 3 groups.



What does Power Maths look like in Reception class?



Friday - Practical Activities

Learning focus

Sorting collections of objects

Practical activities

WAYS OF WORKING Whole class at start, then in pairs

IN FOCUS The focus of the activity is to give children confidence in sorting groups by asking them to collect their own group of objects (up to 5 objects in total) and then use the skills of description they have developed and practised in this unit to sort their objects.

GET ACTIVE **Sorting collections**

If possible, use the outside area to give children access to a variety of objects from nature that they can choose from to form their own 'collections'. Ask children to make a collection of 5 natural objects, such as leaves, stones, petals, shells. Working with a partner, can they sort their collections into two groups? Discussion is vital here: how have they sorted, why did they choose to sort their collections that way, is there a different way to sort their collections?

If children need a starting point, prompt them to look at the colour, pattern, shape and size of their objects. Give lots of positive feedback as they sort and then encourage one pair of children to share how they have sorted their collection with another pair of children. To finish off, move children inside and ask them to record how they have sorted their collections by drawing them in their groups.

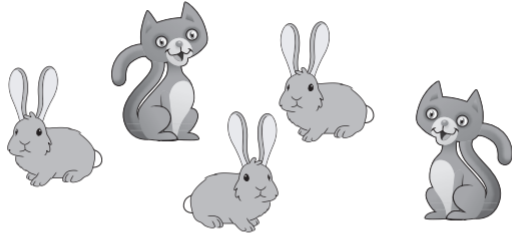
What does Power Maths look like in Reception class?



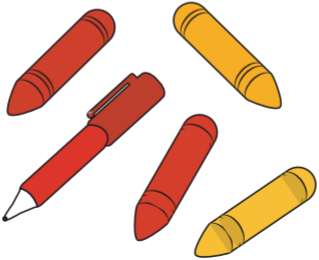
Throughout Week Journal - Independent Work

Unit 2: Sorting, Week 4: Sorting into 2 groups Practice

Circle each group.



Spot the **odd one out**.



Unit 2: Sorting, Week 4: Sorting into 2 groups Reflect

Sort some toys into 2 groups.



I can sort my toys in more than 1 way.



Power Maths Overview



Autumn term

| Strand | Unit | | Week | Weekly title | Early Learning Goal 2020 |
|-----------------------------------|--------|---------------------------|------|--|--|
| 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 | |
| | | | 3 | Counting to 5 | Recognise the pattern of the counting system. |
| Number – addition and subtraction | Unit 2 | Sorting | 4 | Sorting into 2 groups | Compare quantities up to 10 in different context |
| Number – number and place value | Unit 3 | Comparing groups within 5 | 5 | Comparing quantities of identical objects | Compare quantities up to 10 in different context |
| | | | 6 | Comparing quantities of non- identical objects | Subitise (recognise quantities without counting) up to 5. |

| Strand | Unit | | Week | Weekly title | Early Learning Goal 2020 |
|-----------------------------------|--------|-----------------|------|--------------|--|
| Number – addition and subtraction | Unit 4 | Change within 5 | 7 | One more | Have a deep understanding of number to 10, including the composition of each number. |
| | | | 8 | One less | |
| | Unit 5 | Time | 9 | My day | |

Power Maths Overview

Spring term



| Strand | Unit | | Week | Weekly title | Early Learning Goal 2020 |
|--------|--------|-----------------------------|------|----------------------------------|---|
| | Unit 6 | Number bonds within 5 | 1 | Introducing the part-whole model | Have a deep understanding of number to 10, including the composition of each number. Automatically recall number bonds up to 5. |
| | Unit 7 | Numbers to 10 | 2 | Counting to 6, 7 and 8 | Have a deep understanding of number to 10, including the composition of each number. Subitise (recognise quantities without counting) up to 5. |
| | | | 3 | Counting to 9 and 10 | Verbally count, recognising the pattern of the counting system. |
| | Unit 8 | Comparing numbers within 10 | 4 | 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. |

| Strand | Unit | | Week | Weekly title | Early Learning Goal 2020 |
|--------|--------|----------------|------|--|--|
| | | | | | Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. |
| | Unit 9 | Addition to 10 | 5 | Combining two 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 numbers bonds up to 5 and some number bonds to 10, including double facts. Compare different contexts, recognising when one quantity is greater than, less than or the same as the other quantity quantities up to 10 in. |

Power Maths Overview



| Strand | Unit | | Week | Weekly title | Early Learning Goal 2020 |
|--------|---------|--------------------|------|----------------------------|---|
| | | | | | Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity. |
| | Unit 10 | Number bonds to 10 | 6 | Using a ten frame | Have a deep understanding of number to 10, including the composition of each number. |
| | | | 7 | The part-whole model to 10 | Subitise (recognise quantities without counting) up to 5. Automatically recall number bonds up to 5 and some number bonds to 10, including double facts. |
| | Unit 11 | Shape and space | 8 | Spatial awareness | |
| | | | 9 | 3D shapes | |
| | | | 10 | 2D shapes | |

Power Maths Overview



Summer term

| Strand | Unit | | Week | Weekly title | Early Learning Goal 2020 |
|--------|---------|----------------------|------|---------------------------------|---|
| | Unit 12 | Exploring patterns | 1 | Making simple patterns | |
| | | | 2 | Exploring more complex patterns | |
| | Unit 13 | Counting on and back | 3 | Add by counting on | Have a deep understanding of number to 10, including the composition of each number. |
| | | | 4 | Taking away by counting back | Verbally count, recognising the pattern of the counting system. |
| | Unit 14 | Numbers to 20 | 5 | Counting to 20 | Verbally count beyond 20, recognising the pattern of the counting system. |
| | Unit 15 | Numerical patterns | 6 | Doubling | Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally. |
| | | | 7 | Halving and sharing | |
| | | | 8 | Odds and evens | |
| | Unit 16 | Measure | 9 | Length, height and distance | |
| | | | 10 | Weight | |
| | | | 11 | Volume and capacity | |

Power Maths across the school

Discover

Share

Think together



Unit 1: Place value within 10,000,000, Lesson 1

Numbers to 1,000,000

Discover

I have made a 6-digit number using the cards. It has 4 hundreds. My number has 2 ten thousands. It is less than 800,000 and odd.

10,000 more than the number I have made is 106,287.



- What numbers could Richard have made using the digit cards shown? How many different answers can you find?
 - What number has Lexi made?

Unit 1: Place value within 10,000,000, Lesson 1

Share



a) I have made a 6-digit number using the cards. It has 4 hundreds.

| HTh | TTh | Th | H | T | O |
|-----|-----|----|---|---|---|
| | | | 4 | | |

Put the 4 in the hundreds column.
My number has 2 ten thousands.

| HTh | TTh | Th | H | T | O |
|-----|-----|----|---|---|---|
| | 2 | | 4 | | |

Put the 2 in the ten thousands column.
It is less than 800,000 and odd.

| HTh | TTh | Th | H | T | O |
|-----|-----|----|---|---|---|
| 6 | 2 | | 4 | | 9 |

The digit in the hundred thousands column must be less than 8.
The 7 or the 9 must go in the ones column to make the number odd.

The digits that are left can be placed in either the thousands or the tens column. So Richard could have made:

- 627,489 726,489 629,487
628,479 728,469 628,497

I made 726,489 and 728,469 when I used 7 instead of 6 as the first digit.
I made 629,487 and 628,497 when I used 7 instead of 9 in the ones column.



Unit 1: Place value within 10,000,000, Lesson 1

Think together



- To find the number Lexi has made we need to work out what is 10,000 less than 106,287.

I represented 106,287 with counters on a place value grid, and then subtracted 10,000.

| HTh | TTh | Th | H | T | O |
|-----|-----|----|---|---|---|
| | 10 | 6 | 2 | 8 | 7 |

Lexi has made the number 96,287.

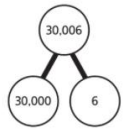
Think together

- Richard has made some numbers using different representations. Say each number out loud. Then write each number in words.

3 2 5 6 7

| HTh | TTh | Th | H | T | O |
|-----|-----|----|---|---|---|
| 4 | 9 | 1 | 0 | 6 | 2 |

| HTh | TTh | Th | H | T | O |
|-----|------|------|---|---|---|
| ● | ●●●● | ●●●● | | | |



Unit 1: Place value within 10,000,000, Lesson 1

- What is the value of the digit 5 in each of these numbers?

| TTh | Th | H | T | O |
|-----|----|---|---|---|
| 5 | 2 | 1 | 8 | 0 |

| HTh | TTh | Th | H | T | O |
|-----|-----|----|---|---|---|
| 4 | 1 | 2 | 1 | 0 | 5 |

- 26,515
- 519,822

Saying the numbers out loud helps me to understand the place value of each number.



- Lexi makes a new number using these digit cards.

0 1 2 4 8 9

She draws an arrow where her number is on the number line.



What number do you think Lexi has made?

I can see the number line is split into 10 equal parts. This will help me to work out what the missing values are.



Thank you!



Any questions?

