

Potley Hill's Journey to Mastery

July 2021

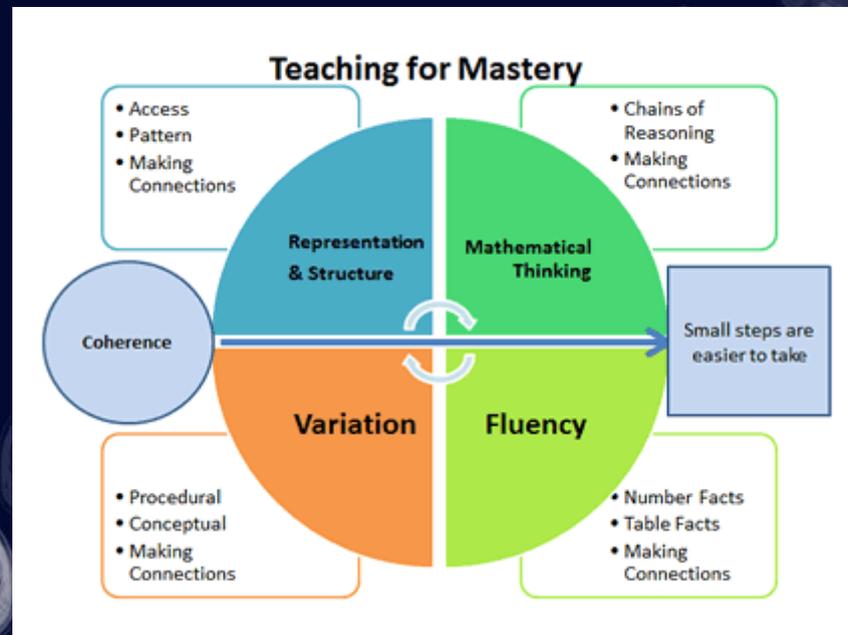


Mastering maths means pupils of all ages acquiring a deep, long-term, secure and adaptable understanding of the subject.

The phrase 'teaching for mastery' describes the elements of classroom practice and school organisation that combine to give pupils the best chances of mastering maths.

Achieving mastery means acquiring a solid enough understanding of the maths that's been taught to enable pupils to move on to more advanced material.

NCETM



Areas of Development

Ensuring Clear Progression through units of work

Use of models and images

Wider range of quick activities to get all children involved and “doing more maths”

Removing the “ceiling” by grouping and children having access to greater depth challenges

White Rose Planning Overviews

Year 3 – Yearly Overview

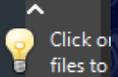
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number – Place Value			Number – Addition and Subtraction				Number – Multiplication and Division				Consolidation
Spring	Number - Multiplication and Division			Measurement: Money	Statistics		Measurement: length and perimeter			Number - Fractions		Consolidation
Summer	Number – fractions			Measurement: Time			Geometry – Properties of Shapes		Measurement: Mass and Capacity			Consolidation

<https://whiterosemaths.com/resources/primary-resources/>

Progression within Units of Work

Year 3 | Spring Term | Teaching Guidance

Week 4 – Measurement: Money



Overview

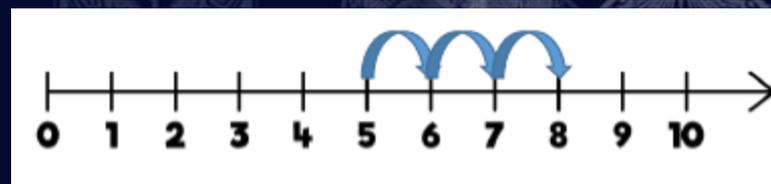
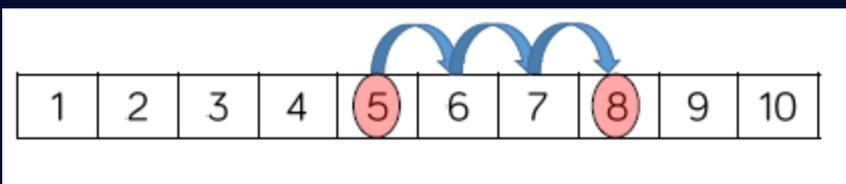
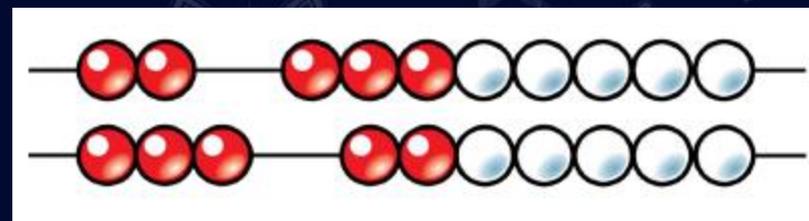
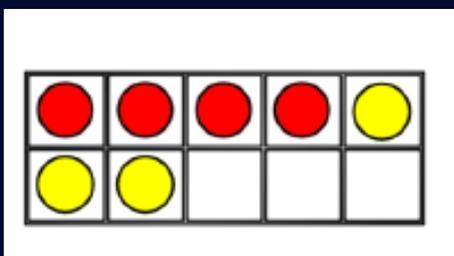
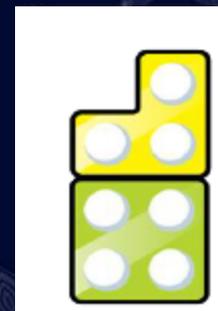
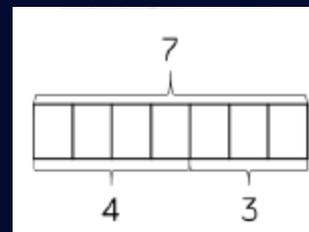
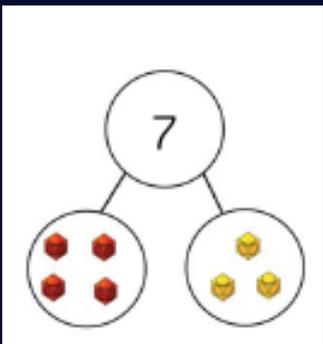
Small Steps

- ▶ Pounds and pence
- ▶ Converting pounds and pence
- ▶ Adding money
- ▶ Subtracting money
- ▶ Giving change

NC Objectives

Add and subtract amounts of money to give change, using both £ and p in practical contexts.

Visual Images



Tens	Ones

38
+ 23

61

1

Hundreds	Tens	Ones

--	--

Pounds and Pence

Notes and Guidance

Children develop their understanding of pounds and pence. This is the first time they are introduced to decimal notation for money. Once children are confident with this, they can move on to convert between different units of money.

Children can use models, such as the part-whole model, to recognise the total of an amount being partitioned in pounds and pence.

Mathematical Talk

How many pence make a pound?

Why do we write a decimal point between the pounds and pence?

How would we write 343 p using a pound sign?

How can the amounts be partitioned in to pounds and pence?

Is there only one way to complete the part-whole model?

How can these amounts be converted into pounds and pence?

Varied Fluency

How much money is in each purse?



There is ___ pence.
There is ___ pounds.
There is £___ and ___ p
There is £_____



There is ___ pence.
There is ___ pounds.
There is £___ and ___ p
There is £_____

Complete the part-whole models to show how many pounds and pence there are.



Convert these amounts to

357 p

307 p

Pounds and Pence

Reasoning and Problem Solving

Some children are converting 1206 p into pounds.

Who is correct?



1206 p = £12.6

Whitney

1206 p = £12.06



Rosie



1206 p = £120.6

Teddy

What have the others done wrong?

Rosie is correct. Whitney has not written the 6 p in the correct column. Teddy has not understood how many pence there are in a pound, therefore his place value is incorrect.

Eva has these coins:



She picks three coins at a time. Decide whether the statements will be always, sometimes or never true.

- She can make a total which ends in 2
- She can make an odd amount.
- She can make an amount greater than £6
- She can make a total which is a multiple of 5 pence

Can you think of your own always, sometimes, never statements?

- Never
- Sometimes e.g. £3.05
- Never – she can only choose three coins so the largest amount she can make is £5
- Always, because every coin is a multiple of 5 pence

Year 2 Maths Addition and Subtraction planning (Change this as relevant to your year group)



KPIs	National Curriculum Statements
Include the KPIs relevant to the unit you are doing.	<ul style="list-style-type: none"> Include the NC statements relevant to the unit you are doing

Learning Journey

Small steps that will be followed throughout the unit

Lesson Aims	Mental Starter	Lesson Structure		
Lesson 1 Aim: What do you want the children to be able to do at the end that they can't do at the beginning/or be more fluent with at the end?	Developing mental calculation fluency Developing times table fluency (As best as possible link this with what will be them in main part of lesson)	Input/Key Learning How will the whole class input go? What examples will you complete as a class? Will everyone have the same examples or will there be different levels of examples. What modelling will need to be done by the teacher? What questions can children try before modelling? Will everyone be part of this or will some children have started on the secure/developing fluency or deepening task independently ready for you to work with them and develop them further once others have been set off?		
		Scaffolded fluency Some children may need some extra support to help them reach fluency level. What support would be put into place for them eg. Resources, slightly different questioning, adult support, visual aids. *The aim would be to move children quickly from this section into completing the secure/developing fluency tasks	Secure/developing fluency What tasks should children complete to develop their fluency within the aim for today? *Once children are showing a good level of fluency then move the quickly onto the application/deepening tasks. It may be that they only complete 2 or 3 of the questions in this section but show a good level of fluency so move them on quickly.	Deepening/Application How can children go deeper with the aim for today? How can they show their understanding within problem solving, reasoning style questions *It is important to know which children are capable of going deeper and ensuring they always have access to these tasks. It may mean they spend less time on secure/developing fluency tasks.
		Plenary How will the lesson be summed up? Will there be an application question for the whole class to try? Will you drip in the next step to get them ready for tomorrow? Will you use some self-assessment for the children to reflect on what they have learnt? Could you use class marking and editing?		
Extra notes: Eg. Use of adults, groupings of children, any children who need particular support/challenge following yesterday, any observations from yesterday that will be relevant to ensure children make progress today.				

Lesson 2

Aim:
To be able to represent numbers up to 100 (Revision)

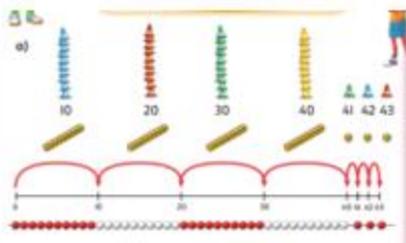
TT Rockstars Week 1 Session 2

Input/Key Learning

Look at the following image. What do you wonder and what do you notice? Allow children chance to discuss what they see.

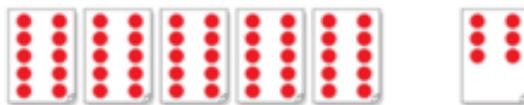


If no one comments then ask them how many cones they think there are. Talk about the fact that they are towers of 10 and see if that helps them count quickly. (There are 43) Show this using a place value chart and place value counters and using dianes equipment/beads similar to below (Show 4 tens and 3 ones to show 43)

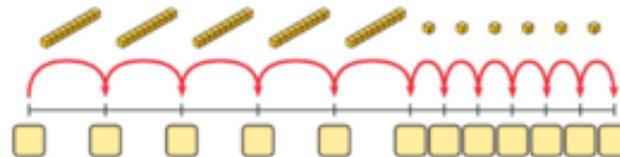


The teacher finds 4 more cones. How many cones would there be now?

How many red stickers are there:

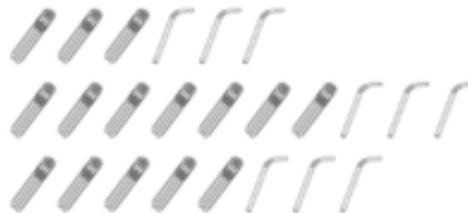


Use the following image to help show this using dianes equipment and a numberline. Can also show this using a place value chart and place value counters.



There are red stickers.

There are 10 straws in a bundle. Can you match the numbers (33, 53, 73) to their representations of straws:



Discuss ways of doing this was there a quick way? Did you use your knowledge of the larger amounts and smaller amounts of 10s?

When ready send children off to work through the challenges.

Scaffolded fluency

Have lots of resources like bead strings, diennes, place value counters, bundles of straws, numicon, ten frames

Teacher to layout out an amount on the table and support children with seeing how much is there.

Make sure they understand the concept of the place value chart to show tens and 1s.

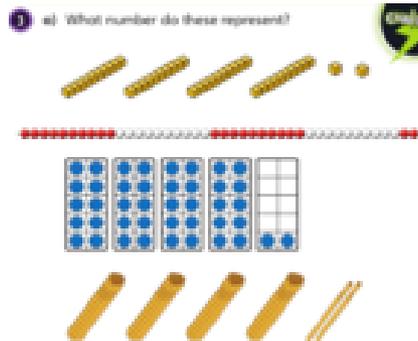
Look at some 2 digit numbers and ensure they recognise the tens digit and the 1s digit.

When ready get them to work on challenge 1

Secure/developing fluency

Challenge 1

1 a) What number do these represent?



Challenge 2

Match the number to the correct representation.



One ten and five ones

Thirty-five

25

Challenge 3

Show the number 32 using pictures and equipment.



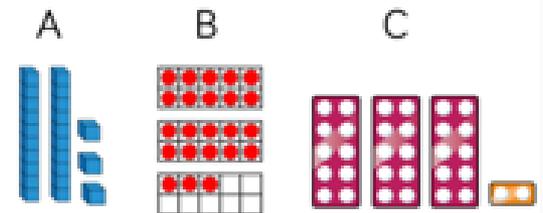
Represent 67 in three different ways.

Deepening/Application

Challenge 4

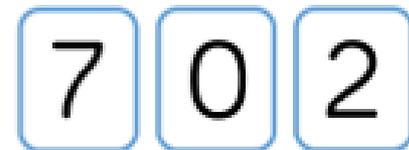
One of these images does not show 23
Can you explain the mistake?

A B C



Challenge 5

How many two-digit numbers can you make using the digit cards?



What is the largest number?
Prove it by using concrete resources.

What is the smallest number?
Prove it by using concrete resources.

Why can't the 0 be used as a tens number?

Impact at the first stage

- Buzz in the Classrooms
- Children enjoying maths and motivated by the challenges
- More evidence of children “doing maths”
- Teacher’s became more confident with their delivery of Maths lessons – small steps
- So many more visuals being used

Ch6:

A number with one decimal place rounded to the nearest whole number is

45

What could the number be?

Is there more than one answer?

45.1 ✓ 45.4 ✓ 44.7 ✓
 45.2 ✓ 44.5 ✓ 44.8 ✓
 45.3 ✓ 44.6 ✓ 44.9 ✓

7521

Aim: To explore pounds and pence

Challenge 1



a) Complete the statements.

There is pounds.

There is pence.

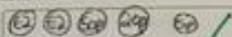
There is £ and p.

There is £ .

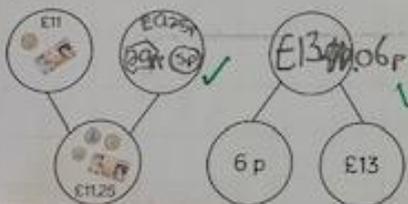
£4.75 ✓

Ch2:

Using the coins in challenge 1, answer:
Draw money so that there are fewer coins but the same total amount.



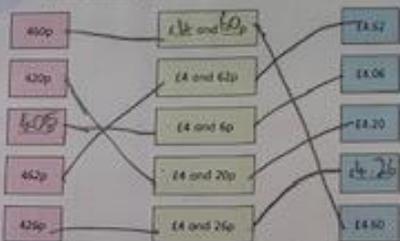
Challenge 3



Challenge 4 For the missing example, create your own, but all 3 have to match as equal!

3 Match the amounts that are equal

Put in the missing digits.



Challenge 5

Convert these amounts to pounds and pence:

p p p p

£3.57 ✓ £3.07 ✓ £0.57 ✓
 £3.70 ✓



Eva has these coins:
 She picks three coins at a time.
 Decide whether the statements will be always, sometimes or never true.

- She can make a total which ends in 2
- She can make an odd amount.
- She can make an amount greater than 5p
- She can make a total which is a multiple of 5 pence

Challenge 6
 Can you think of your own always, sometimes, never statements?

never ✓
 sometimes ✓
 never ✓
 always ✓

She can make a total less than £1.00. *some times*

She can make precisely £2.00. *never*

*can you explain your answers using facts?

- 1 never because there is no 2p coins.
- 2 sometimes because there is a 5p coin.
- 3 never because there are only 2 £2 coins.
- 4 always because 10 is a multiple of 5 5 is a multiple of 5 200 is a multiple of 5 100 is a multiple of 5.

Aim: To be able to order amounts of money.

Challenge 1
 Two classes save their pennies for a year.
 Class A saves 3,589 pennies.
 Class B saves 3,859 pennies.
 Which class saves the most money?
 class B ✓

Challenge 2
 What is the value of the digit 2 in these amounts?
 a) 524p 20p ✓
 b) £24 and 50p £20 ✓
 c) £54.02 2p ✓
 d) 5,240p £2 ✓
 e) £42.54 £2 ✓
 f) 2,544p £20 ✓

Challenge 3
 Write <, > or = to compare the amounts.
 a) 743p > 734p ✓
 b) £37.40 > £37.04 ✓
 c) £3.74 < 734p ✓
 d) £40.07 > 4,003p ✓
 e) 4,037p > £40.37 ✓
 f) 7,304p < £73.40 ✓

Challenge 4
 Order the amounts in ascending order. £1.30
 130 p £0.32 132 p £13.20
 Order the amounts in descending order.
 257 p £2.50 2,057 p £25.07
£25.07 £20.57

7304 = 4p
 £73.04

£0.32, £1.30, £1.32, £13.20
 £2.50, £2.57, £20.57, £25.07 ✓

Teddy, Dora and Jack are buying toys.

I have £5.43



Teddy

I have 534p



Dora

I have more money than Dora but less than Teddy.



Jack

How much money could Jack have?
Is there only one answer?

Challenge 5

£5.35 ✓
£5.36
£5.37
£5.38
£5.39
£5.40
£5.41
£5.42

challenge 6

4 6 3 2

He uses them to fill the frame below.

£ 4 . 6 2

He makes a total that is more than three pounds but less than six pounds.

How many amounts can he make?

Order your amounts in ascending order.

£3.24, £3.26 ✓
~~£3.26~~, £3.42 ✓
£3.46, £3.62 ✓
£3.44, £4.23 ✓
£4.26, £4.32 ✓
£4.36, £4.62 ✓
£4.63 ✓

£4.26 x, £3.62 x
£4.36 x, £3.64
£4.23 x, £3.46 x
£4.32 x, £3.26 x
£4.63, £3.24 x
£3.42

1 1 5 2 +
Aim: to estimate money. 2 MC
42 15 67 £5 = 500p ✓
x 6 x 8 x 9 A £5.18, £6.78, 4242p, 4468p,
252 ✓ 20 ✓ 603 ✓ 7918p.
21 x 4 68 D 7918p, 4468p, 4242p, £6.78,
£5.18p.

Challenge 1

Here are some amounts of money.

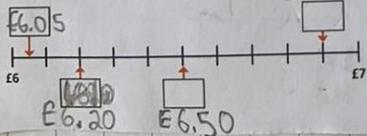
£6.90

£6.20

£6.50

£6.05

a) Use the amounts to label the number line.



b) 2:

Place these amounts in the correct side of the table:

£12.06 £12.49 £12.78 £12.51 £11.57
£13.01

Rounds to £12	Rounds to £13
£12.06	£13.01
£11.57 ✓	£12.51
£12.49 ✓	£12.78 ✓

Adapting WRM to suit us

Year 3 – Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
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Deeper and Longer



Year 3
Week 2 - Day 1

A. $9 \times$



Year 3
Week 2 - Day 1

C. $8 +$

KEY

▲ Try mentally first

■ Try a written method

▲ A. $9 \times$



▲ C. $8 +$

Fluent in Five
Questions and Answers

Year 3

Week 2

Flashback 4

Year 3 | Week 10 | Day 2

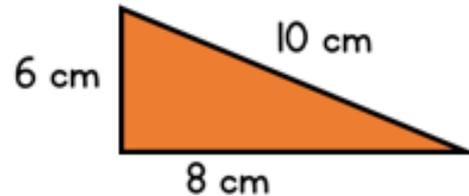
1) What fraction of the shape is shaded?



$\frac{2}{5}$



2) Work out the perimeter of the triangle.



24 cm

3) Complete: 70 millimetres = 7 centimetres

4) What is 28 divided by 4? 7

Yesterday

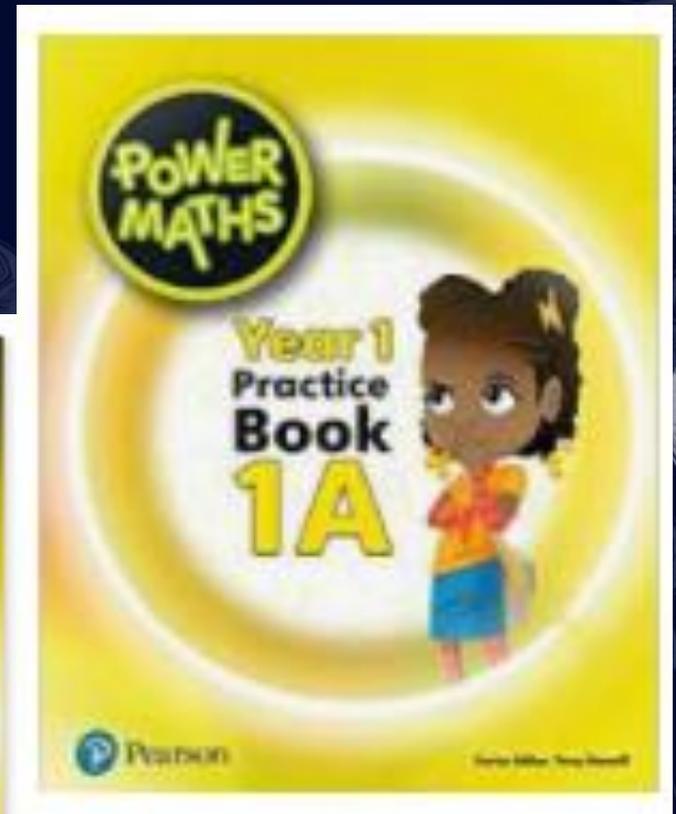
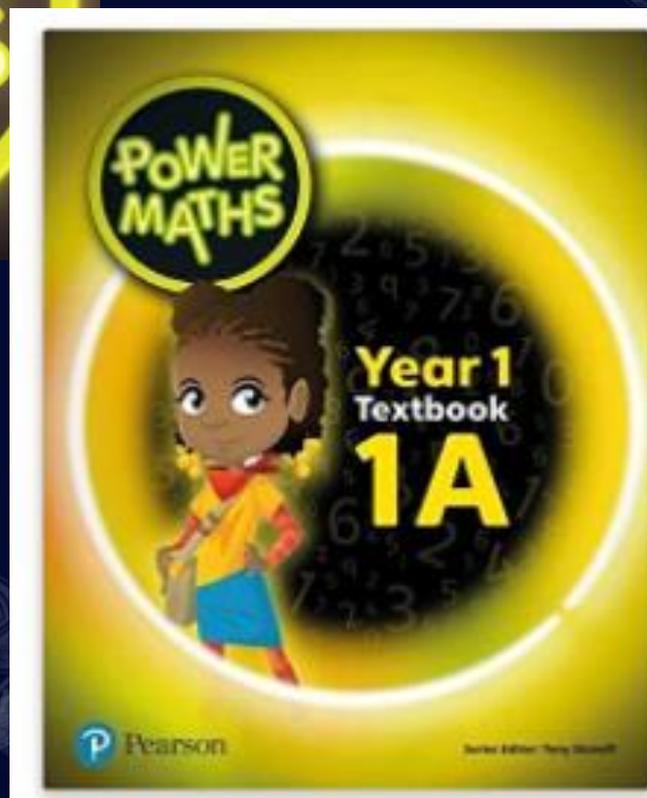
Last Week

Last Term

Last Year



Continuing on the Journey



Related multiplication calculations

Discover



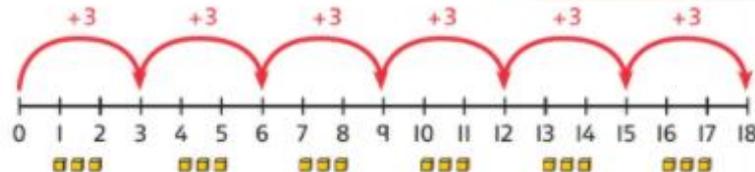
- 1 a) How many balloons are there on all the cakes in total?
 - b) How many candles are there on all the cakes in total?
- What do you notice about your answers?

Share



Remember to use your times-tables facts if you know them.

- a) There are 3 balloons on each cake.



There are 6 cakes in total.

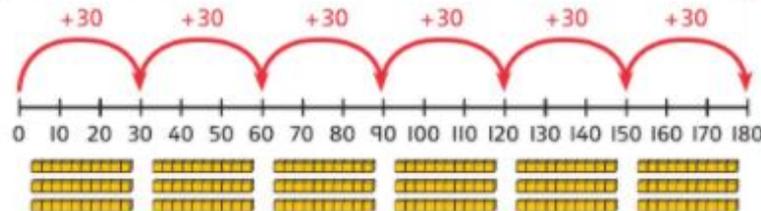
$$6 \times 3 = 18$$

There are 18 balloons in total.

I used a number line and counted up in 3s.



- b) There are 6 cakes.



There are 30 candles on each cake.

$$6 \times 30 = 180$$

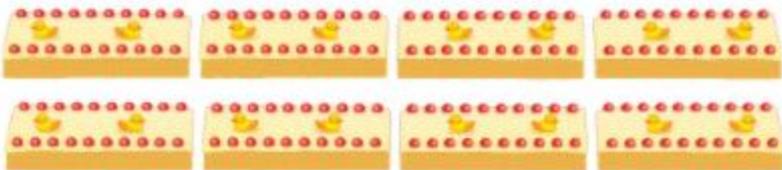
There are 180 candles in total.

This answer is 10 times bigger because there are 10 times more candles than balloons.

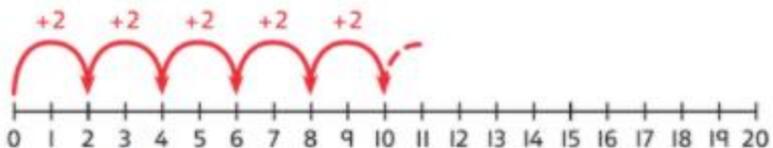


Think together

1 A baker bakes 8 cakes.



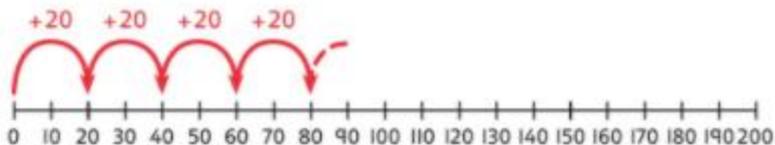
a) How many ducks are there on the cakes in total?



$$8 \times 2 = \square$$

There are \square ducks in total.

b) How many cherries are there on the cakes in total?



$$8 \times 20 = \square$$

There are \square cherries in total.

2 How many chocolate circles are there in total?



$$\square \times \square = \square$$

There are \square chocolate circles in total.

3 a) Use base 10 equipment to work out these calculations.



$$4 \times 3 = \square$$



$$4 \times 30 = \square$$

b) Work out these calculations.

i) $7 \times 5 = \square$

iv) $6 \times 4 = \square$

ii) $7 \times 50 = \square$

v) $6 \times 40 = \square$

iii) $70 \times 5 = \square$

vi) $60 \times 4 = \square$

CHALLENGE

I can see a pattern in the answers.



Pounds and Pence

Notes and Guidance

Children develop their understanding of pounds and pence. This is the first time they are introduced to decimal notation for money. Once children are confident with this, they can move on to convert between different units of money.

Children can use models, such as the part-whole model, to recognise the total of an amount being partitioned in pounds and pence.

Mathematical Talk

How many pence make a pound?

Why do we write a decimal point between the pounds and pence?

How would we write 343 p using a pound sign?

How can the amounts be partitioned in to pounds and pence?

Is there only one way to complete the part-whole model?

How can these amounts be converted into pounds and pence?

Varied Fluency

How much money is in each purse?



There is ___ pence.
There is ___ pounds.
There is £___ and ___ p
There is £___



There is ___ pence.
There is ___ pounds.
There is £___ and ___ p
There is £___

Complete the part-whole models to show how many pence there are.



Convert these amounts to pounds and pence:

357 p

307 p

57 p

370 p

Share

a) $184 + 10$ can be solved like last lesson but $184 + 20$ is different.

$8 \text{ tens} + 1 \text{ ten} = 9 \text{ tens}$

$184 + 10 = 194$

The birch tree is 194 years old.

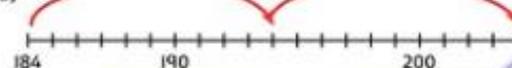
H	T	O
100	80	4
	10	

H	T	O
200		4

$184 + 20 = 204$

The horse chestnut tree is 204 years old.

b)

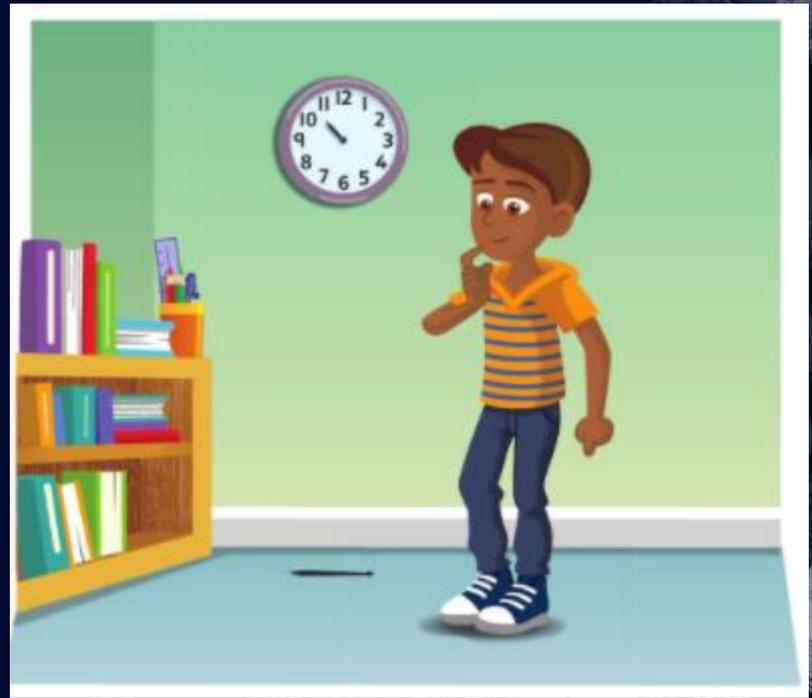


I wonder if I could add 16 and then add 4?
But that wouldn't be as clear as adding 2 tens.

$184 + 10 = ?$
I can add the 10s.

$184 + 20 = ?$
I will add the 10s.
 $8 \text{ tens} + 2 \text{ tens} = 10 \text{ tens}$
There are 10 tens. I don't think 1,104 is correct.

Exchange 10 tens for 1 hundred.



Impact since 2018

- Takes a long time to embed
- We have been working on this since 2018
- Current Year 5s – part of the mastery approach since Year 2
- Teachers in Year 5 commenting on how much more confident children are with maths understanding

What our teachers say about how their own teaching has changed.....

“I use a wider range of visuals to help unpick the maths for the children - this has been especially useful in fractions”

“I'm much more confident using bar models!”

“I find it easier to think of open ended extensions and challenges for higher ability learners.”

What our teachers say about WRM and Power Maths resources.....

“The journey and steps the children need to go on are really clear.”

Much easier to plan using these documents: I know where to start (power maths image etc.) and where to then take the questions for the lesson from

“I prefer the White Rose layout to questions but I like having both as you can choose questions from each to create your own challenge sheet which is differentiated to support and challenge all the children - the children are really good now at choosing their level of challenge and engaging with these questions”

What our Y5 teachers says about how the children have changed.....

“They are far more willing to try problem solving and have more of an understanding that skills you already know are just being applied in these questions”

“They understand part-whole models, number lines, bar models, counters etc. This has been the first year I haven't had to explain what all of those are which makes using them a lot more accessible!”

“They are better at breaking down number facts and applying them to questions”

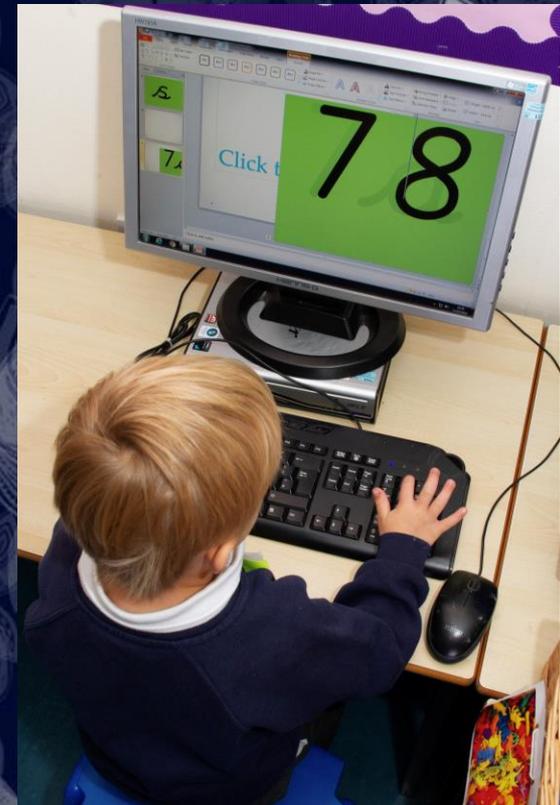
“Able to explain their thinking with more clarity”

“Much higher quality of mathematical discussion”



93% of our KS2 children rated them selves as 3 and above for their maths enjoyment (on a scale of 1-5)

100% of our KS2 children rated them selves as 3 and above for their confidence in Maths (on a scale of 1-5)



They particularly enjoy.....

Discussing the pictures at the start of the lessons



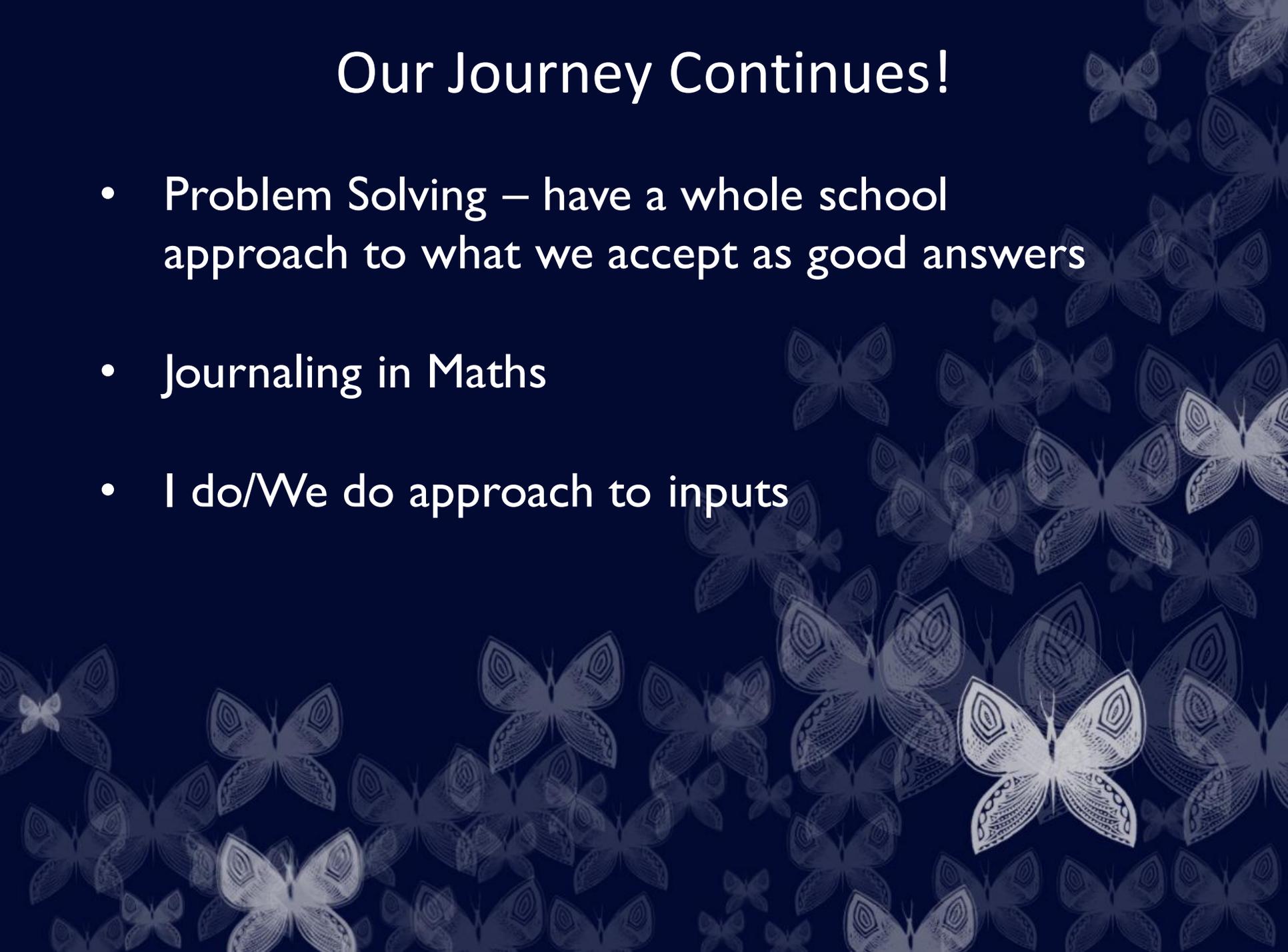
Having the answers to self mark

Flash back 4s/Practice makes perfect



Our Journey Continues!

- Problem Solving – have a whole school approach to what we accept as good answers
- Journaling in Maths
- I do/We do approach to inputs



Step 1
SLT on board
Whole School Shared Vision for Mastery

Step 2
Finding where we were at
Areas for development

Step 3
Implementation
Adapting Organisation
Trying out new structures/organisations

Step 4
Dissemination/Whole school Roll out
Scaffolding for teachers
Team Teaching/Planning/Coaching

Step 5
Reviewing where we were at
Adapting to suit the setting
Seeking up to date resources

Tips

- Start small!
- Try out things in your own lessons first
- Get a few teachers to buy in
- Team Teach lessons – people need to see it's value
- Start with changing just one thing – for us it was the planning and the way we wanted our lessons to look
- Use the wealth of resources out there – WRM and Power Maths