Year 6 Maths Workshop

Tuesday 5th October, 2021

POPE PAUL CATHOLIC PRIMARY SCHOOL

Learning in the light of Christ
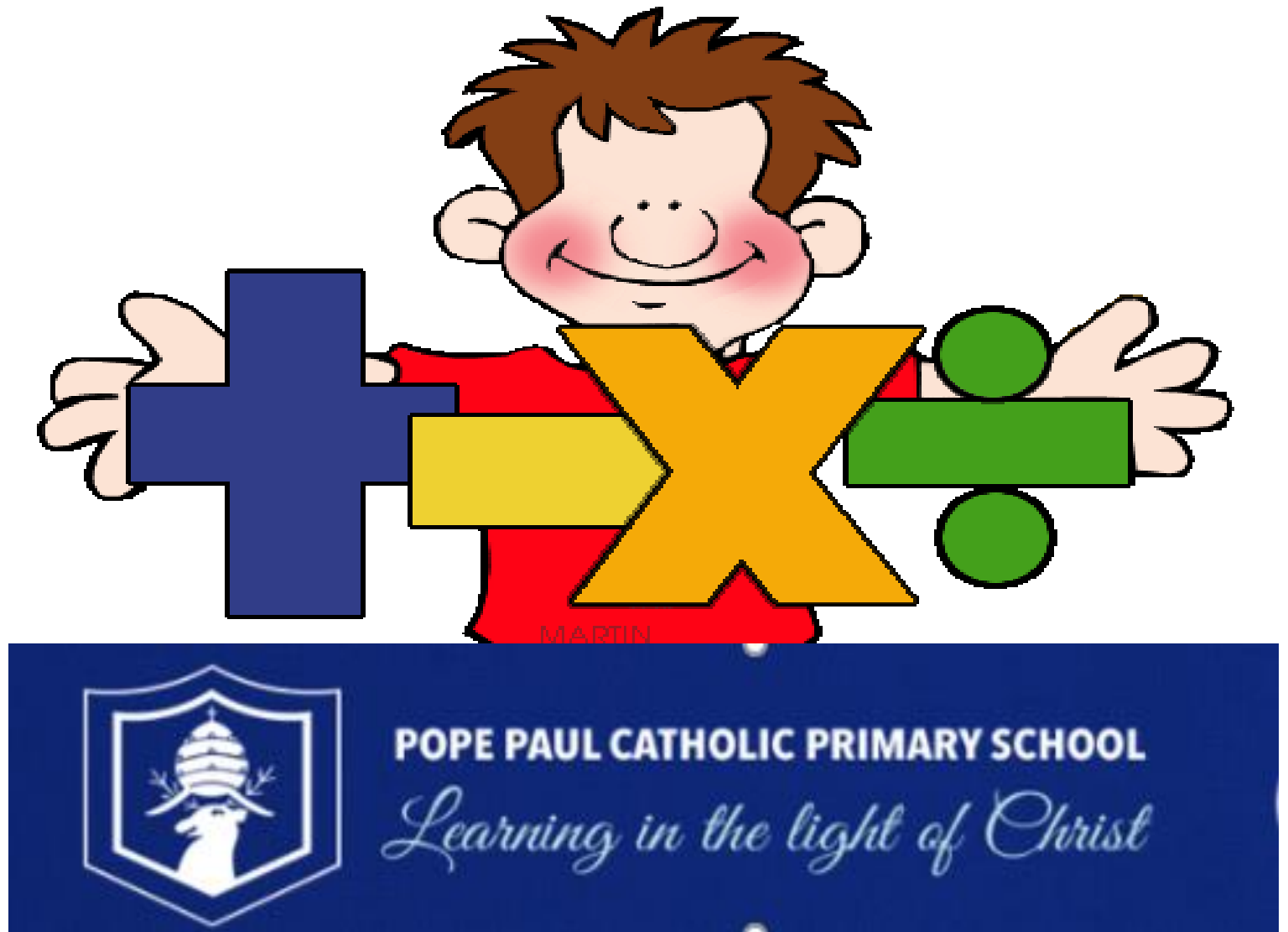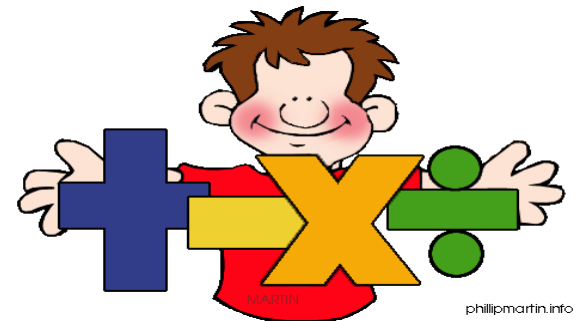
Maths at Pope Paul
Aims of this afternoon session

- To gain an insight into how Maths is taught at Pope Paul.

- To take away some ideas to support your child(ren) at home.

National Curriculum

- The national curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics,

- **reason mathematically**

- can **solve problems**

phillipmartin.info

- At Pope Paul School, the mathematical learning that children are presented with enables them to respond to mathematics in many forms. Being a **'mathematician'** is not, simply, completing mathematical tasks: it is the ability to formulate and choose an appropriate, efficient response which utilises a true understanding of the problem or situation.

- Using **Essential Maths** as a key driver for our planning of mathematics at Pope Paul School, we aim to provide children with deeper knowledge and understanding of mathematical procedures and related concepts.

- As such teachers identify the key learning for each class and plan to secure these. The Learning sequences in Essential Maths are developmental and, depending on the concept, a good proportion of time will be spent securing key learning.

  Teachers will use their judgement about when it is the right time to move on.

What does this look like at in our school?

Whole class **direct teaching** with clear and progressive modelling of concepts and procedures with sequences of varied examples.

The **consistent use** of core manipulatives and representations to support ability to access learning and to deepen children's understanding.

Rich **mathematical talk** is given high status and supported by the learning environment and teachers' questioning.

Emphasis placed on 'learning' through reasoning, developing multiple strategies and concepts towards understanding.

Pupils 'grappling' with learning mathematical concepts

Challenge for pupils grasping concepts quickly is provided through depth and breadth of experience.

CPA

CONCRETE   **PICTORIAL**   **ABSTRACT**
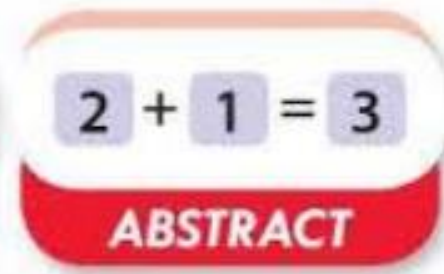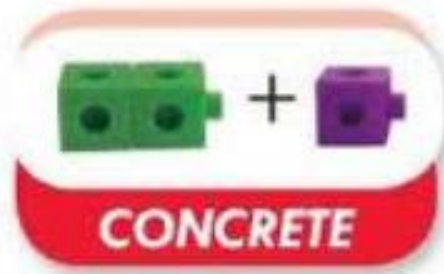
Moving freely between concrete materials, pictorial representations and abstract symbols.

1. The children are first introduced to an idea or skill using **objects**.

2. When the hands on experience is understood we relate them to representations such as a **diagram** or a **picture**.

3. The children represent their learning using **numbers** and **symbols**

The Year 6 Learner

Working mathematically

By the end of year 6, children will structure their own investigations and solve a wide variety of increasingly complex problems. They will independently develop their own lines of enquiry and be expected to prove their solutions in a variety of ways including algebra, negative proof (use a counter example to prove the rule) and be able to communicate their results using accurate mathematical language. Children will demonstrate secure knowledge and confidence to talk in depth about mathematical concepts and explain their solutions, decisions and reasoning.

Number

- **Counting and understanding numbers**

Children extend and apply their knowledge of place value for numbers up to and beyond one million (including decimals and negative numbers) in a variety of situations. Special numbers are extended to include common factors, common multiples and a deeper understanding of prime numbers. Children will be able to round numbers and identify what degree of accuracy is appropriate.

- **Calculating**

Children will be fluent in a wide range of mental and formal written calculation strategies for all operations, extending to long division (four-digit numbers by two digit numbers) by the end of the year. They will apply estimation in a range of ways. Through investigations, they explore the effect of the order of operations including the use of brackets.

6LS1	Place Value	
6LS2	Multiply and Divide by 10, 100 and 1,000	
6LS3	Choosing Effective Mental Calculation Strategies	
6LS4	Problem Solving with Four Operations	
6LS5	Application of Factors, Multiples and Primes	
6LS6	Equivalent Fractions	
6LS7	Comparing and Ordering Fractions	
6LS8	Adding and Subtracting Fractions	
6LS9	Fraction and Decimal Equivalents	
6LS10	Fractions, Decimals and Percentages	
6LS11	Calculating Percentages	
6LS12	Formal Written Method of Multiplication	
6LS13	Area of Parallelograms and Triangles	
6LS14	Formal Written Method of Short Division	
6LS15	Properties of Shape	

Place Value

Key NC Statement
Solve number problems and practical problems that involve place value

Related NC Statements
• 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 • use negative numbers in context, and calculate intervals across zero • identify the value of each digit to three decimal places • solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate • use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places

Steps within the Learning Sequence

Step 1: Read and write large numbers

Step 2: Counting and regrouping large numbers

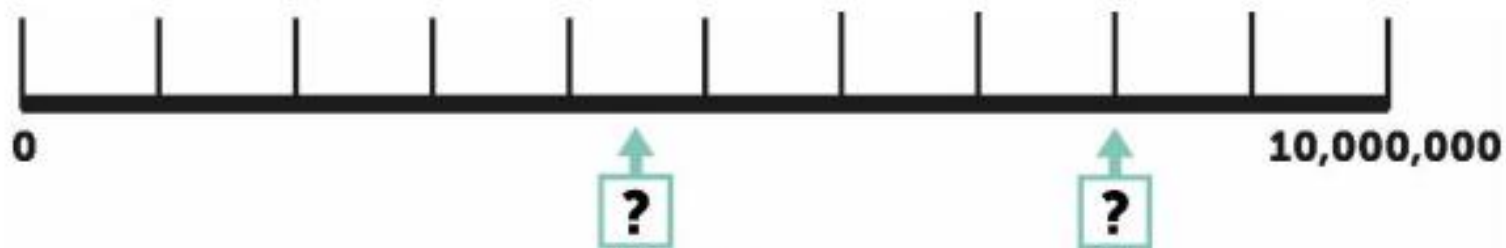Step 3: Comparing and ordering numbers

Step 4: Comparing numbers including to 3 decimal places

Step 5: Negative numbers

Step 6: Rounding numbers

Herts
for Learning

Destination Questions

1

0   10,000,000

?   ?

What could these numbers be?

2

Write the number that is one hundred less than 3 million in numerals and in words.

3

What is the third largest number in this set?

12,324.5   12,567   12,604   1,458.69

4 🏁 What digit could be inserted to make this statement true? 23,763.☐12 > 23,763.829	5 🏁 What is the largest whole number which, when rounded to the nearest 10,000, gives 80,000?	6 🏁 20 hundreds = ☐ thousands 600,000 = ☐ hundreds twenty thousand = ☐ tens
7 🏁 Round 4,782.50 • to the nearest 100 • to the nearest 1,000 • to the nearest whole number	8 🏁 Circle 2 numbers with a difference of 4. -0.5 1.5 4.5 -2.5 -3.5	9 🏁 Day temperature = 12°C Night temperature = -5.5°C What is the difference between the temperature at night and during the day?

Learning Sequences, Speaking Frames, Destination Questions

Speaking Frame - Mental Strategy Reasoning

For the calculation ... I would use ... strategy because ...
... strategy is efficient for this calculation because ...
I know ... so I can apply it to ... because ...
... strategy would be inefficient for this calculation because ...

Calculation strategies:
Place value - digit position, place value - use known facts, equal sum/difference, regrouping, one/zero effect, doubling/halving

Remember to talk about the individual digits within calculations when considering the efficiency of strategy.

$0.135 + \square = 1.06$	160×35
$1.7 + 0.05$	$0.4 \div 10$
$475 \div 1$	320×0

$460 = \square - 35$	$640 \div \square = 8$
$532,525 - 9,997$	$9,999 + 397$
22×8	$46.8 - 23.566$

Can you solve these?

Place Value – Digit position (addition and subtraction)

Using this knowledge will help pupils with simple addition and subtraction calculations either with or without the aid of a place value chart. This strategy is most effective for calculations such as:

- 0.008 + 1.23
- 12.56 – 0.03
- 10,001 + 530

Place Value – Use known facts (applying multiplication and division of 10, 100 and 1,000)

Applying place value understanding alongside known facts, pupils will be able to derive new facts. Pupils may need to apply regrouping and recombining depending on the calculation. Calculations appropriate for this strategy might include:

- 0.3 x 10 (using base fact 3 x10)
- 0.7 x 6 (using base fact 7 x 6)
- 150 ÷ 3 (using base fact 15 ÷ 3)
- 140 ÷ 7 (using base fact 14 ÷ 7)

Place value – digit position

$$0.135 + \square = 1.06$$

Place value – digit position

$$1.7 + 0.05$$

Doubling and halving/Place value – use known facts

$$160 \times 35$$

(becomes 80 x 70)

Place value

$$0.4 \div 10$$

Place value – digit position

$$460 = \square - 35$$

Place value – use known facts

$$640 \div \square = 8$$

Doubling and Halving (multiplication and division)

This strategy can be used to multiply and divide by 4 and 8, or alternatively alongside knowledge of operations. Pupils can use this within multiplication by doubling one side and halving the other to change a calculation to be within the range of their known facts. They might also use place value to support finding the solution alongside this strategy. The following examples suit this strategy:

- 22 x 4 (knowing this is the same as 22 x 2 x 2)
- 88 ÷ 4 (knowing this is the same as 88 ÷ 2 ÷ 2)
- 18 x 3 (knowing this is the same as 9 x 6)
- 160 x 35 (knowing this is the same as 80 x 70 and then using base fact 8 x 7)

Doubling/halving

22 x 4

Doubling and halving/Place value - use known facts

160 x 35

(becomes 80 x 70)

Equal Sum and Equal difference (addition and subtraction)

Both strategies are similar in the way that pupils recognise how they can adjust the calculation to make it more manageable to work out using a mental strategy, yet how they adjust will be different. Again, pupils have explored this in previous year groups.

Equal sum will ask pupils to look for a more manageable number and readjust the calculation by taking from one side and adding to another (either number).

For example:

- 1999 + 457 (adjusting to 2,000 + 456)
- 267 + 398 (adjusting to 265 + 400)

Equal difference will expect pupils to see if they can make the same adjustment to both sides to make the calculation easier to work out. The adjustment can be up or down, but must be the same on each side to keep the difference equal.

For example:

- 3,000,001 − 34 (adjusting to 3,000,000 − 33)
- 1,943 − 998 (adjusting to 1,945 − 1,000)

Equal difference	Equal sum
532,525 - 9,997	**9,999 + 397**
(adjust to 532,528 - 10,000)	(adjust to 1,000 + 396)

Regrouping (Partitioning)

By using this strategy in a range of ways, pupils can deconstruct numbers flexibly to help them make the calculation easier to solve. This might be by regrouping a number to cross a boundary, by doing the calculation in two stages, or it might be to help them use known facts more easily to solve it. If pupils are less confident with equal sum or difference this is an alternative strategy.

Examples could include:

- 14 − 7.01 (regroup the 7.01 into 7 and 0.1 to back 7 and then 0.1)
- 536 − 9 (regroup the 9 into 6 and 3 to go back 6 and then 3)
- 34 x 6 (regroup 30 and 4 and then multiply (30 x 6 and 4 x 6) and recombine)
- 346 + 55 (regroup 55 into 54 and 1 to cross the hundreds boundary)

1 🏁 $750.2 \div 10 = \square$	2 🏁 $\frac{1}{2} + \frac{1}{4} + \frac{1}{10} = \frac{\square}{\square}$	3 🏁 $1{,}000{,}000 - 2 = \square$
4 🏁 $\square = 3600 + 700$	5 🏁 $207 \div 1 = \square$	6 🏁 $7 \times \square = (2 \times 7) + (2 \times 7)$

1 🏁	2 🏁	3 🏁
$750.2 \div 10 = \square$ Place value	$\frac{1}{2} + \frac{1}{4} + \frac{1}{10} = \dfrac{\square}{\square}$	$1,000,000 - 2 = \square$

4 🏁	5 🏁	6 🏁
$\square = 3600 + 700$ **Equal sum**	$207 \div 1 = \square$ One/zero effect | One/zero effect $475 \div 1$ | 320×0	$7 \times \square = (2 \times 7) + (2 \times 7)$ Regrouping

Mathletics

Pupil Engagement

Mathletics gives each student their very own personal learning space. Filled with targeted curriculum content, interactive tutorials and support, alongside engaging games and rewards – the Student Console is a powerful hub of learning.

➡ Curriculum content can be assigned and controlled by the teacher.

➡ Self-directed learning is the focus, with searchable access to activities, interactive content, eBooks and video.

➡ Targeted and adaptive practice activities for differentiated learning.

1 Encourage your child to play maths puzzles and games. Puzzles and games – anything with a dice really – will help kids enjoy maths, and develop number sense, which is critically important.

2 Always be encouraging and never tell your child they are wrong when they are working on a maths problem. Instead find the logic in their thinking – there is always some logic to what they say. For example if your child multiplies 3 by 4 and gets 7, say – Oh I see what you are thinking, you are using what you know about addition to add 3 and 4, when we multiply we have 4 groups of 3…

3 Encourage your child to take time to understand the logic…speed comes later.

4 Encourage number sense. What separates high and low achievers is number sense – having an idea of the size of numbers and being able to separate and combine numbers flexibly should be encouraged.
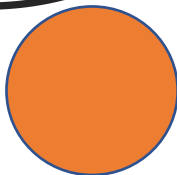
5 Encourage them to do their home learning and use the online resources.
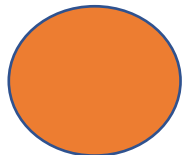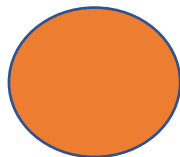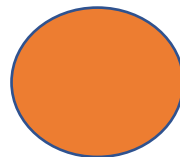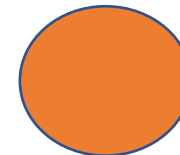
How to assist your child

Helpful Websites:

Maths games

Fun games and activities to help develop maths skills.
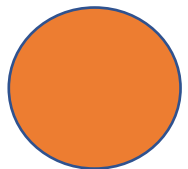
Maths games

NRich

Maths Zone

Multiplication

Oxford Owl

Times table check

Maths for mums and dads

Questions?