

Mathematics: how to support your child at home.

Mrs Brayne
Maths Co-ordinator



The DfE: National Curriculum

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

- **Become fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- **Reason mathematically** by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- Can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.



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Maths robots vs. mathematicians

Children need to be able to reason and apply the mathematical knowledge they have – this is what makes them mathematicians, rather than maths robots!



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Examiners love problem solving and reasoning!


Seb bought 2 apples and 3 pears.

Tara has 4 books.

j and k stand for two numbers that make 504

Double j .


Three whole numbers add up to 50



Seb says,

'All three numbers must be even numbers.'

Is Seb correct?
Circle **Yes** or **No**.

 Yes / No

Explain how you know.



What does it mean to master something?



Maths Mastery

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Mastery of Mathematics is...



- **Deep** and sustainable learning
- The ability to build on something that has already been sufficiently mastered
- The ability to reason about a concept and make connections
- Conceptual and procedural fluency



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What is conceptual and procedural fluency?

Knowing the concepts behind the procedures and facts so pupils can use them more readily and flexibly.

Write the missing number to make this calculation correct.

$$754 \times 6 + 754 \times 3 = 754 \times$$

What mistakes will children make?



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754

754

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What is conceptual and procedural fluency?

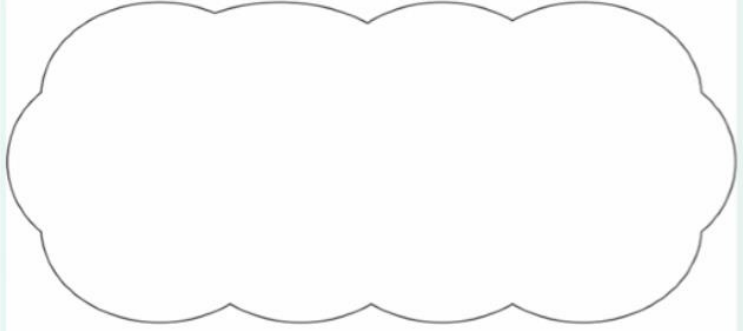
Knowing the concepts behind the procedures and facts so pupils can use them more readily and flexibly.

Jack says,




I multiplied a whole number by 3
My answer was 32

Explain why Jack is **not** correct.



What knowledge do children need in order to answer this question?

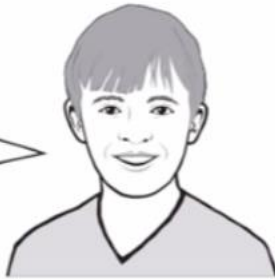


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Jack says,

I multiplied a whole number by 3
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What knowledge do children need in order to answer this question?

9

Award **ONE** mark for an explanation that recognises that 32 is not a multiple of 3, e.g.

- 32 is not in the $3\times$ table
- $32 \div 3 = 10 \text{ r}2$ or 10.66 (which are not whole numbers)
- if you count in multiples of 3 from 0, you won't get 32
- $3 + 2 = 5$, 5 is not a multiple of 3 so he is wrong.

OR

For a description that includes one or both of the multiples of 3 either side of 32, e.g.

- if you do $10 \times 3 = 30$ and $11 \times 3 = 33$ there is no 32
- $10 \times 3 = 30$ and 32 is 2 away.

1m

Do not accept responses that restate the question, e.g. Jack is not correct because if you multiply 3 by any whole number you will not get 32.

Do not accept vague or incomplete explanations, e.g.

- If you multiply by 3 you will get 30, not 32
- 3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33
- 32 is not a factor of 3

Do not accept explanations which include incorrect mathematics or incorrect information relevant to the explanation.



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Teaching for depth of understanding

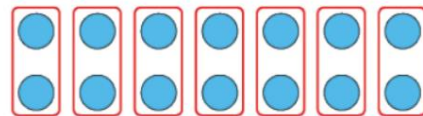


- Longer time on topics
- Intelligent practice (procedural variation)
- Detail in exploring the concept – all aspects exposed and linked) (conceptual variation)
- Small steps
- Questioning and activities develop reasoning and make connections

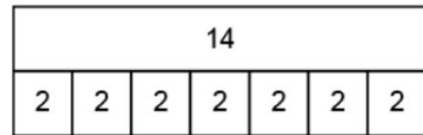


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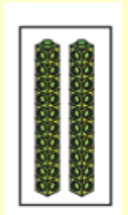
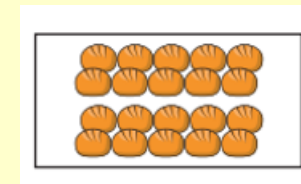
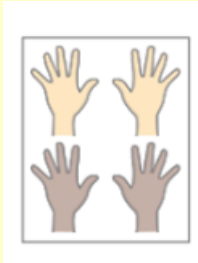
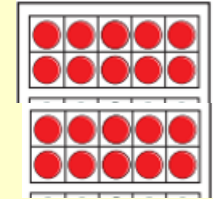
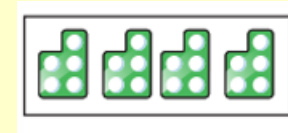
$2 \times 3 =$	$6 \times 7 =$	$9 \times 8 =$
$2 \times 30 =$	$6 \times 70 =$	$9 \times 80 =$
$2 \times 300 =$	$6 \times 700 =$	$9 \times 800 =$
$20 \times 3 =$	$60 \times 7 =$	$90 \times 8 =$
$200 \times 3 =$	$600 \times 7 =$	$900 \times 8 =$



$$14 \div 2 = 7$$



Conceptual variation:
Showing learners different representations of the same subject



Procedural variation: Keeping some aspects the same and only varying the important concept and idea.



1. We ALL
start the
journey
TOGETHER

2. Some children
will need a little
additional
support along
the way

3. Some children, who feel confident, will be let loose. They'll be able to explore deeper into the woods, before returning to the group to continue on with the journey.



5. Children will
not be left
behind alone
and isolated.

4. Children will not
be racing off ahead
on a different
journey.

We're Going on a **Maths Hunt**

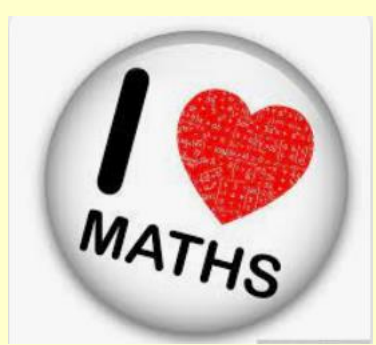
Martin Adsett
Mastery Specialist

What does
Mastery look
like?



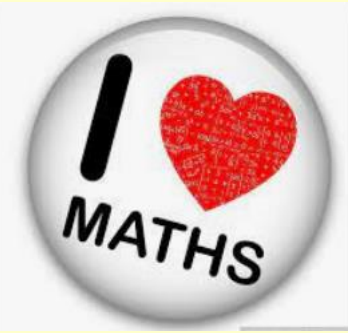
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How can you help at home?



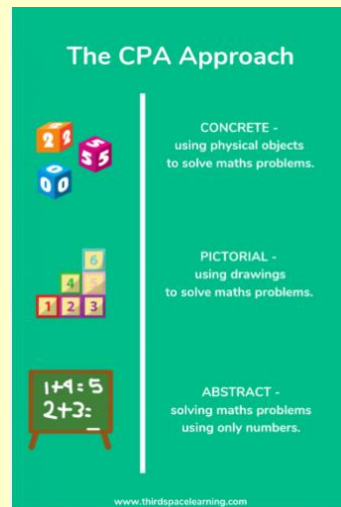
- ✓ Talk positively about Maths at home. Children are influenced by those around them - if they hear people talk about disliking Maths, 'I wasn't good at Maths' or Maths in a negative way this will influence and help them develop a negative attitude towards the subject. Growth mindset to be encouraged.
- ✓ Take a look at the methods that are being used. Its important not to confuse children with the methods that we were taught at school. See our calculation policies, which can be found on the school website, under curriculum, mathematics, addition and subtraction policy, multiplication and division policy.
- ✓ If you're not sure how to complete a calculation, please ask the teacher for some help.
- ✓ Maths is all around you, especially when shopping, cooking and out and about. Encourage your children to help measure in the kitchen or help plan an event. Lots of tasks involve sharing and fractions.

How can you help at home?

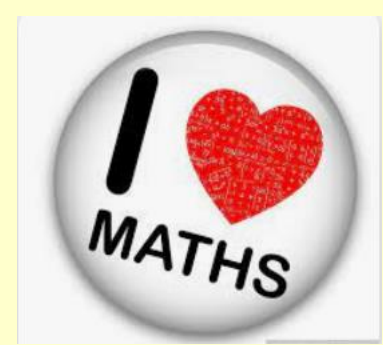


- ✓ In Early years and Key Stage One say rhymes, sing songs and read books about maths!
- ✓ In Years 1 and 2, learning number bonds to ten and twenty and a hundred off by heart. In order and out of order. E.g $1 + 9 = 10$. We want this knowledge to become part of pupils long term memory!
- ✓ In Years 2, 3 and 4 working hard to learn your times tables off by heart. In order and out of order. Also, division facts. We want this knowledge to become part of pupils long term memory!

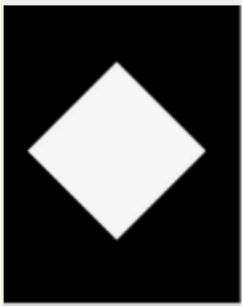
- ✓ Teach the CPA approach.



How can you help at home?



- ✓ Play online games using Purple Mash and TT Rock Stars.
- ✓ It's difficult but give thinking time.
- ✓ Consider when completing problem solving questions should you work systematically: use a table to organise the work, complete the calculation using trial and improvement, pattern spot, work backwards, visualise or draw a diagram.
- ✓ Use the sentence stems handout that accompanies this talk. See below for example.



Is the white shape a square?

What do I already know? A square has four sides of equal length and four vertices.

I noticed that this shape has four sides of equal length and four vertices. It must be a square in a different orientation.



How can you help at home?




- ✓ Complete weekly homework. It is revision of learning that has been completed in class.
- ✓ When answering reasoning questions use APE:

A: Answer the question

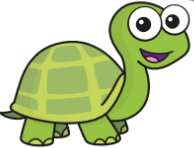
P: Prove that their answer is correct using another mathematical strategy

E: Explain their reasoning and thinking in written form using our mathematical sentence stems

Tiny has worked out $4 \times \frac{3}{14}$



From the bar model, I can see that $4 \times \frac{3}{14} = \frac{12}{56}$

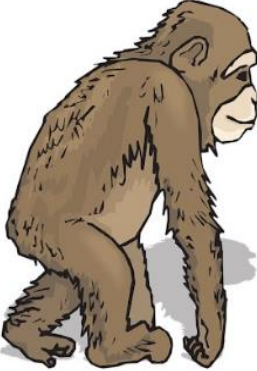


Do you agree with Tiny?
Explain your answer.

A: No I do not agree with Tiny.

P: $\frac{3}{14} + \frac{3}{14} + \frac{3}{14} + \frac{3}{14} = \frac{12}{14}$.

E: Tiny has multiplied both the numerator and the denominator by 4. He should only have multiplied the numerator by 4 because the bar model shows 4 lots of $\frac{3}{14}$.



A.P.E. **Answer it**
What is the answer to the question you've been asked?

Prove it
Show how you know that is the answer with pictures, diagrams, calculations or in another way.

Explain it
Write some sentences which make it clear why you came to your answer.

@MRSPTeach

Now its over to you?

- Time for you to experience an investigation lesson.
- Use the sentence stems and get involved, supporting pupils with their learning.
- Timings at 9:45 – 9:50 please visit siblings and 10:15 make your way to the school office.
- Have fun and become mathematicians!

