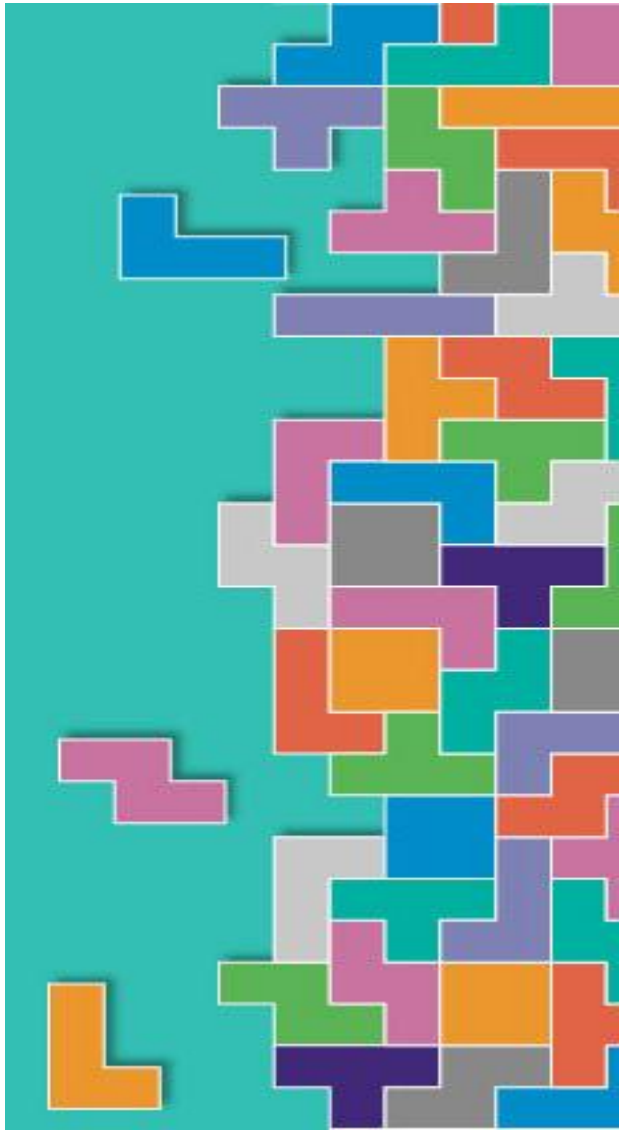
Maths Mastery Curriculum

What is Maths Mastery?

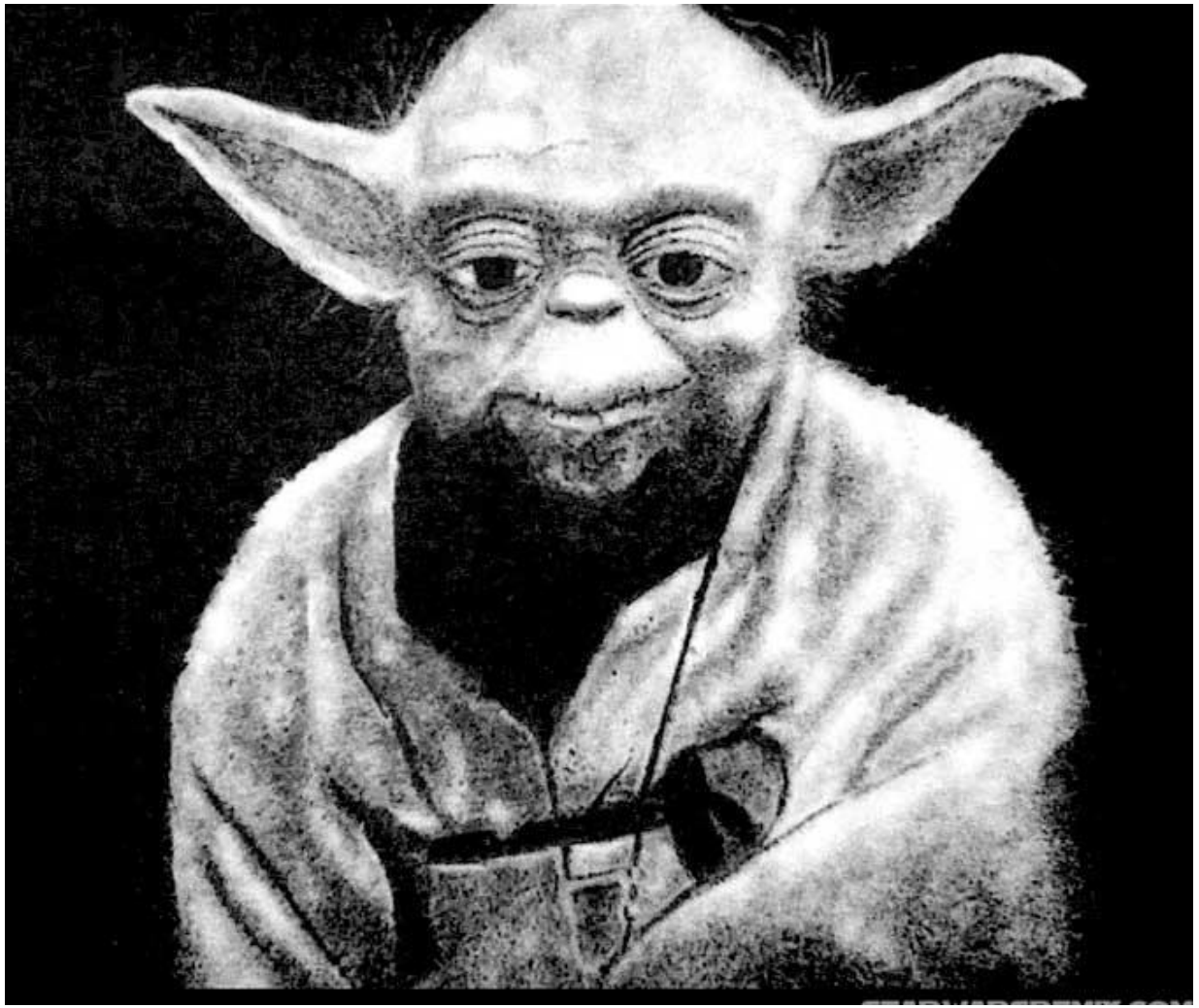


National Curriculum Aims

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.

What does it mean to master something?



Gok Wan?

Mastery of Maths is more…

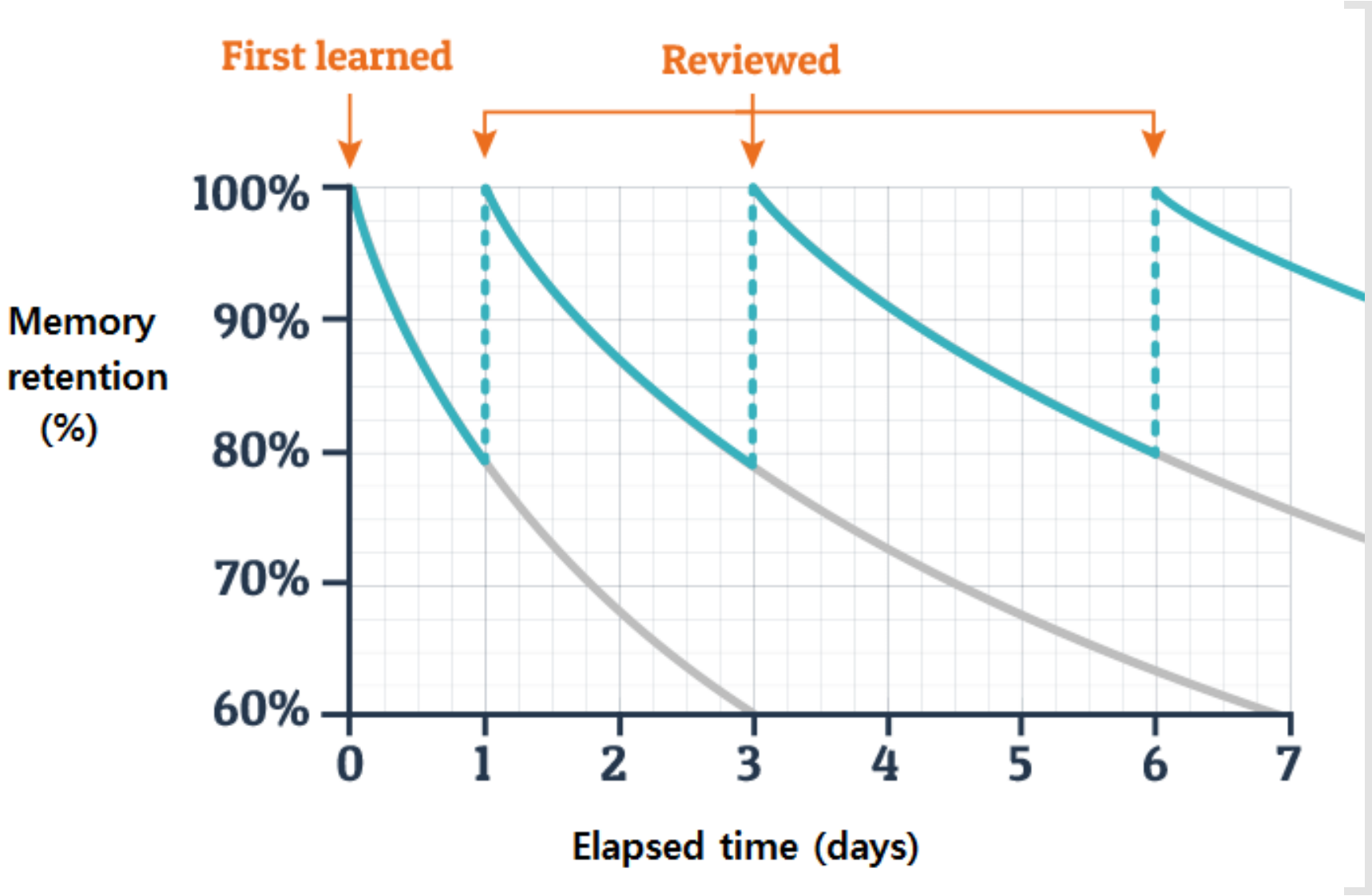
- Achievable for all
- **Deep** and sustainable learning
- The ability to build on something that has already been sufficiently mastered
- The ability to reason about a concept and make connections
- Conceptual and procedural fluency

Teaching for Mastery

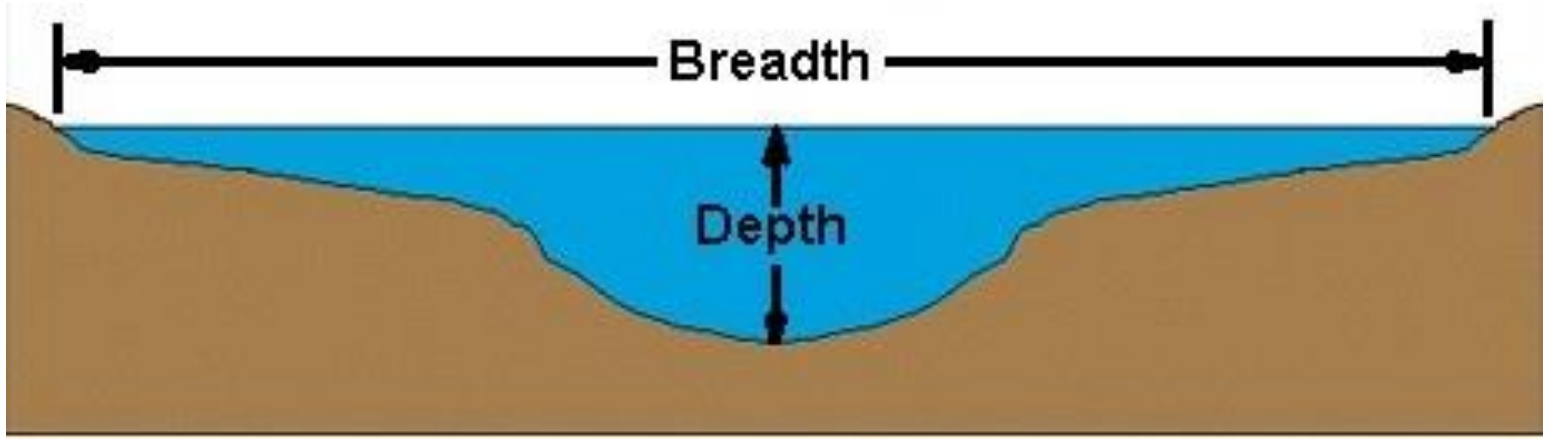
- The belief that all pupils can achieve
- Keeping the class working together so that all can access and master mathematics
- Development **of deep** mathematical understanding
- Development of both factual/procedural and conceptual fluency
- Longer time on key topics, providing time to go deeper and embed learning

They did this last year!

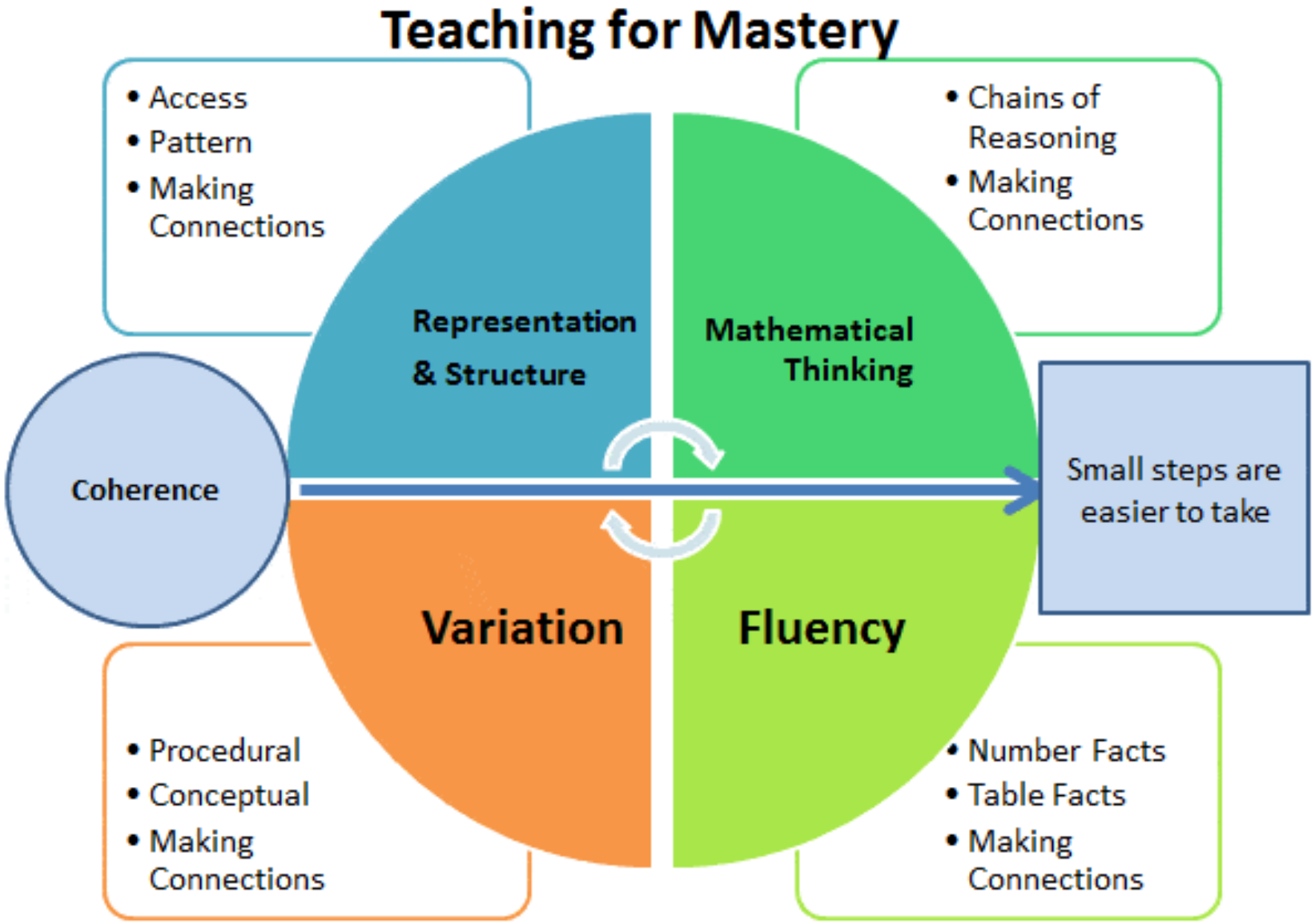
Understanding VS Performing

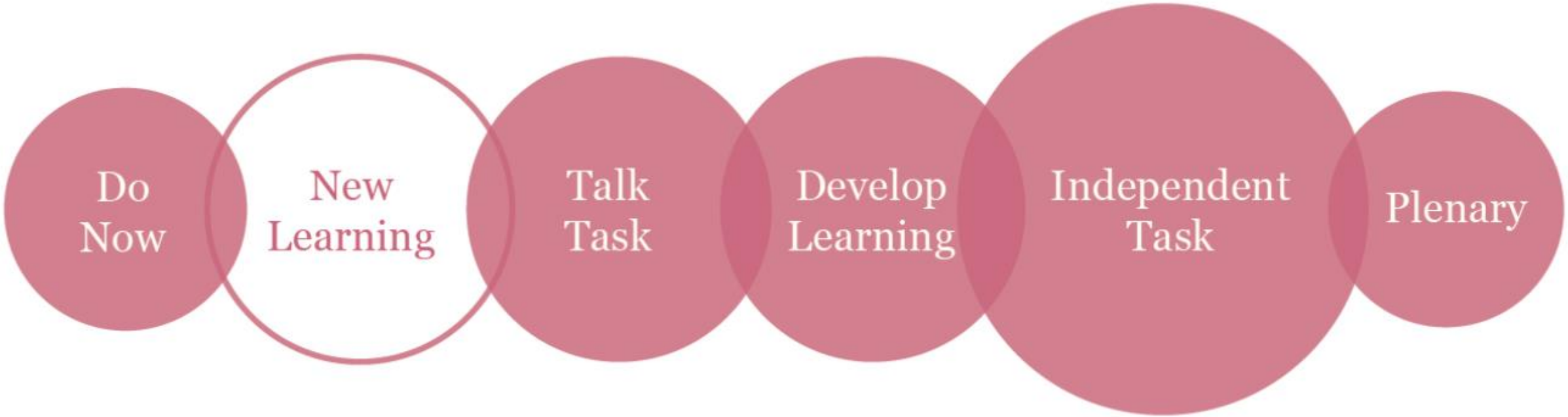


What is depth?



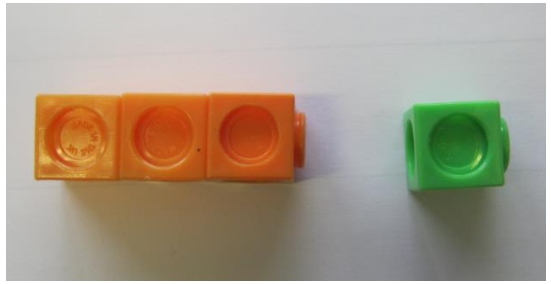
The mastery model



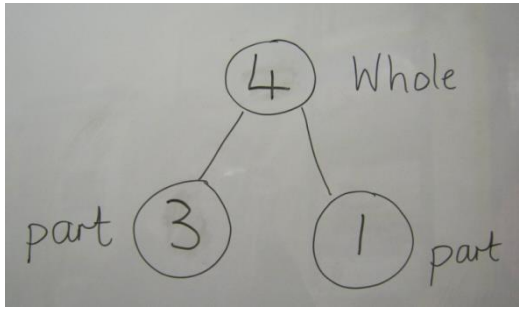

Do Now
New Learning
Talk Task
Develop Learning
Independent Task
Plenary

Concrete, Pictorial, Abstract.

Concrete



Pictorial

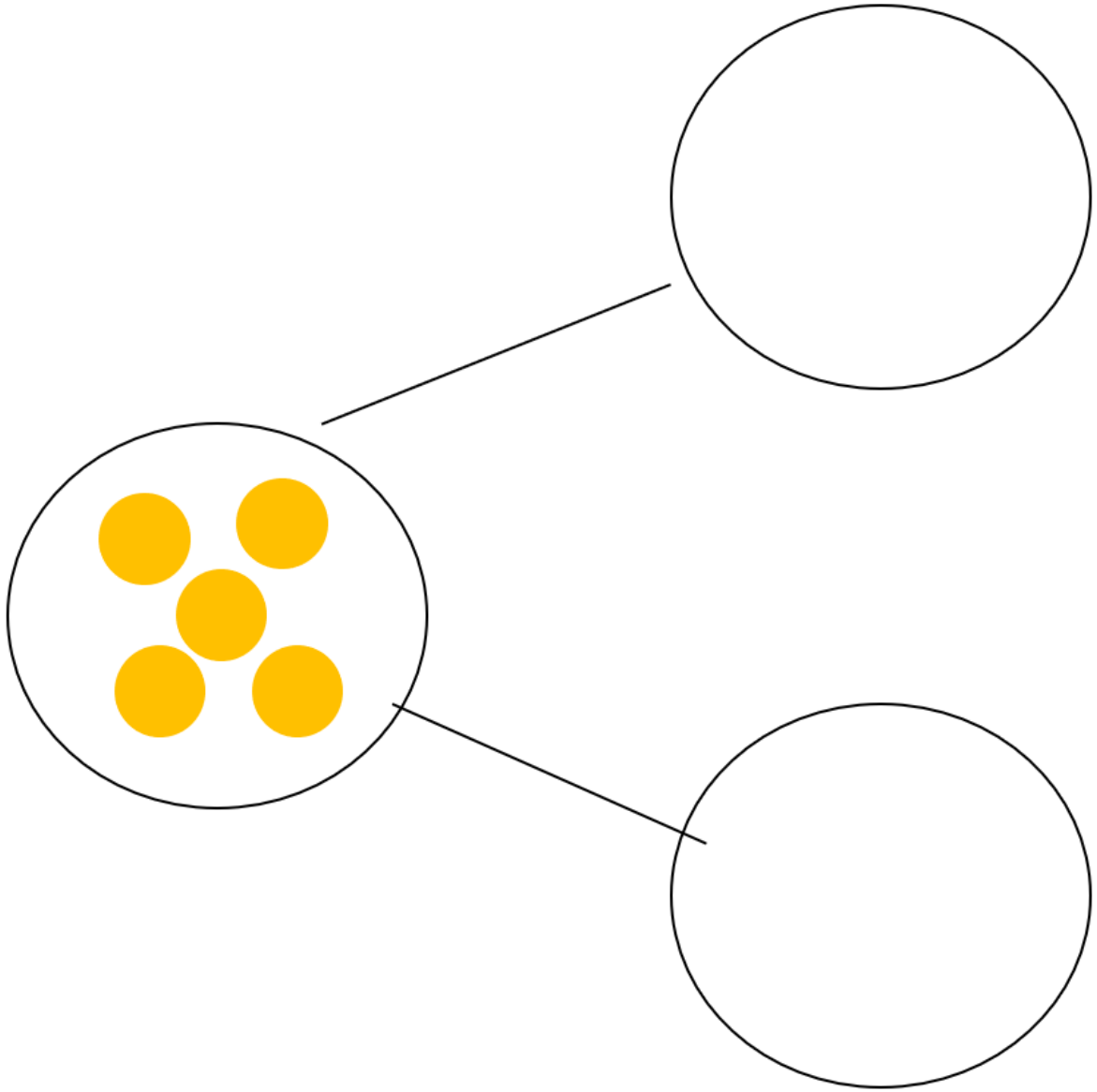


Abstract

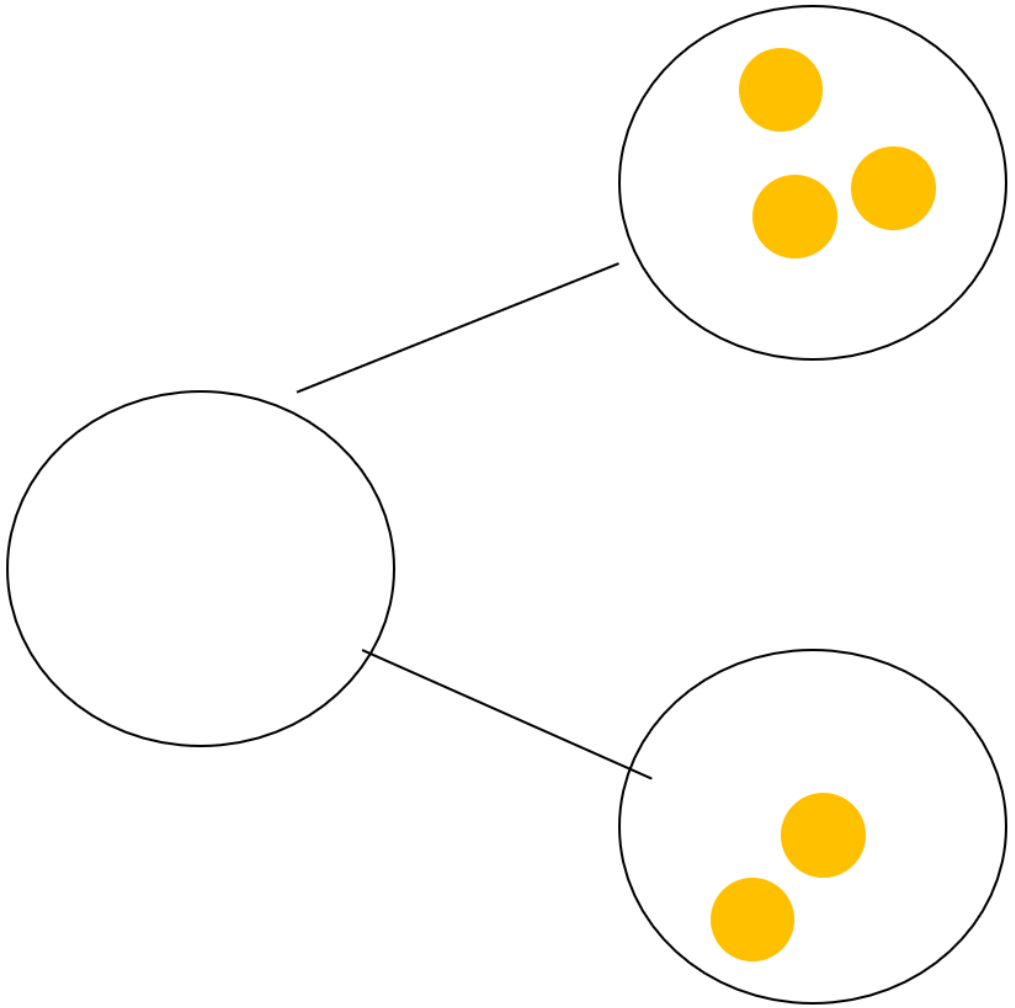
$3 + 1 = 4$

Concrete or pictorial representations support students to understand abstract concepts

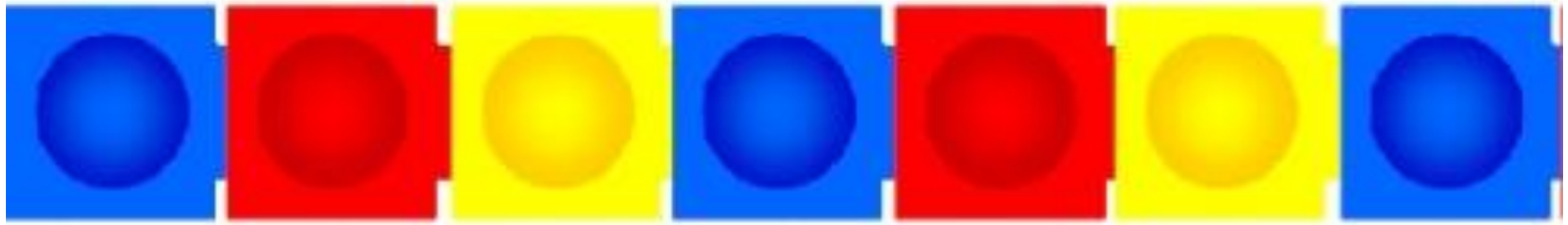
Partitioning and Combining



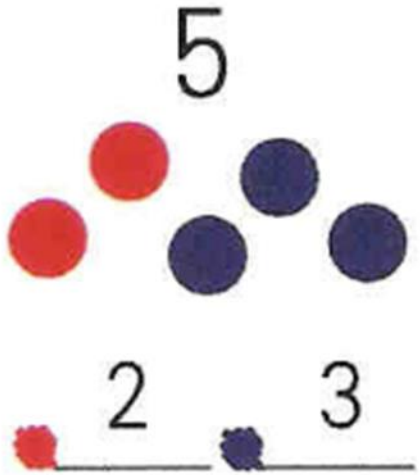
Partitioning and Combining

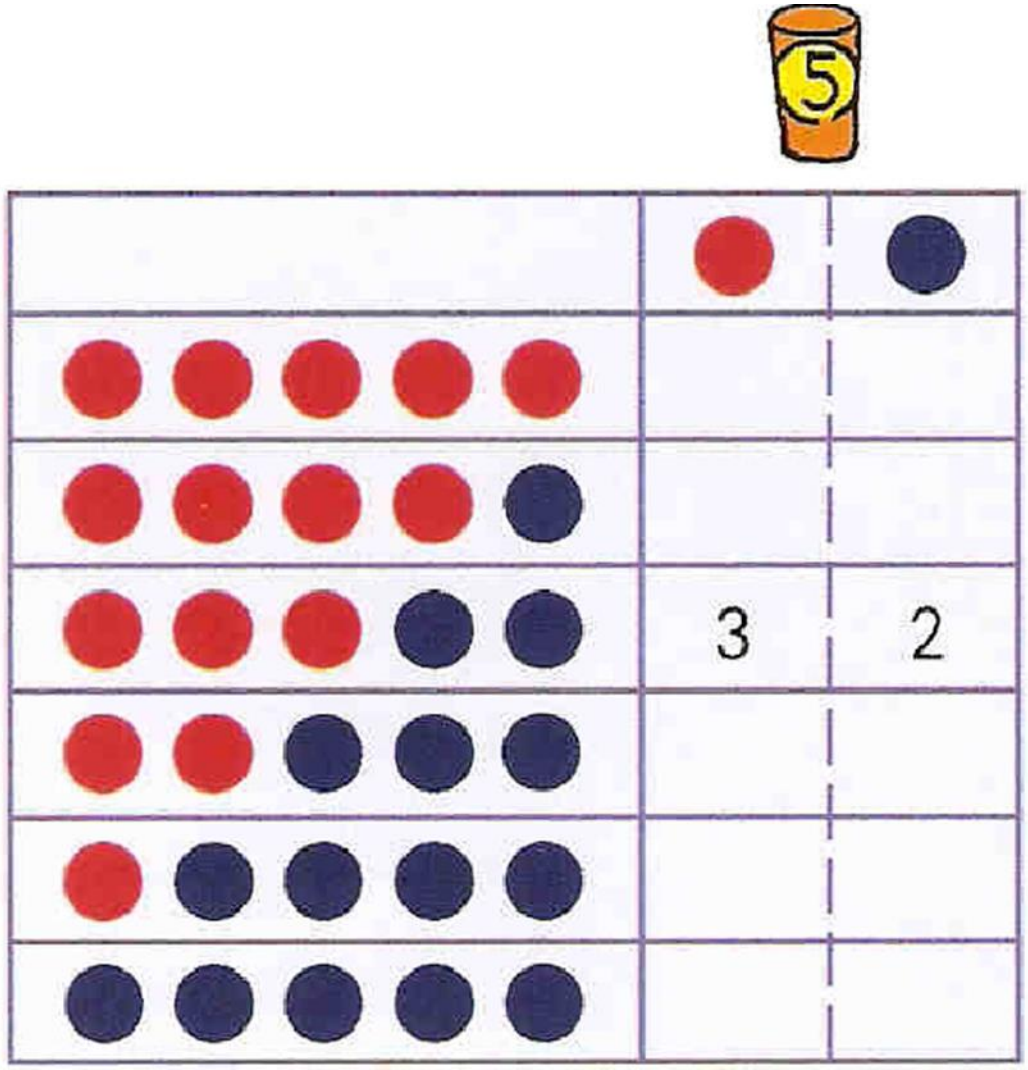


Part, Part, Whole Relationships

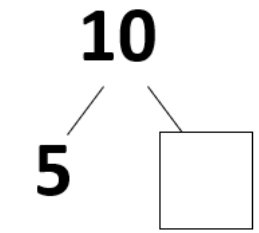


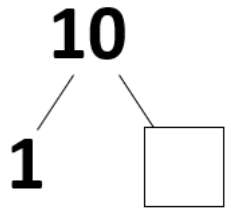
Representing the Part, Part, Whole

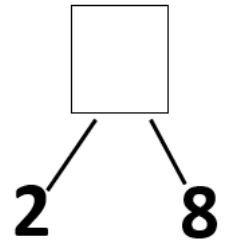


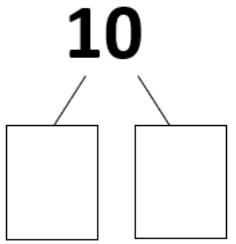


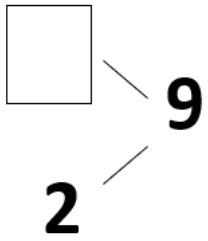
Have a go…

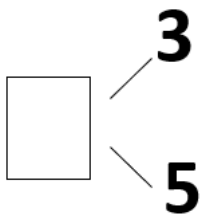


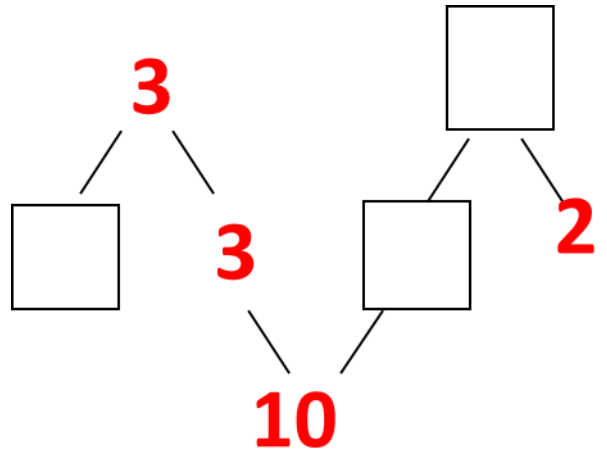


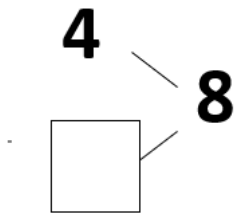




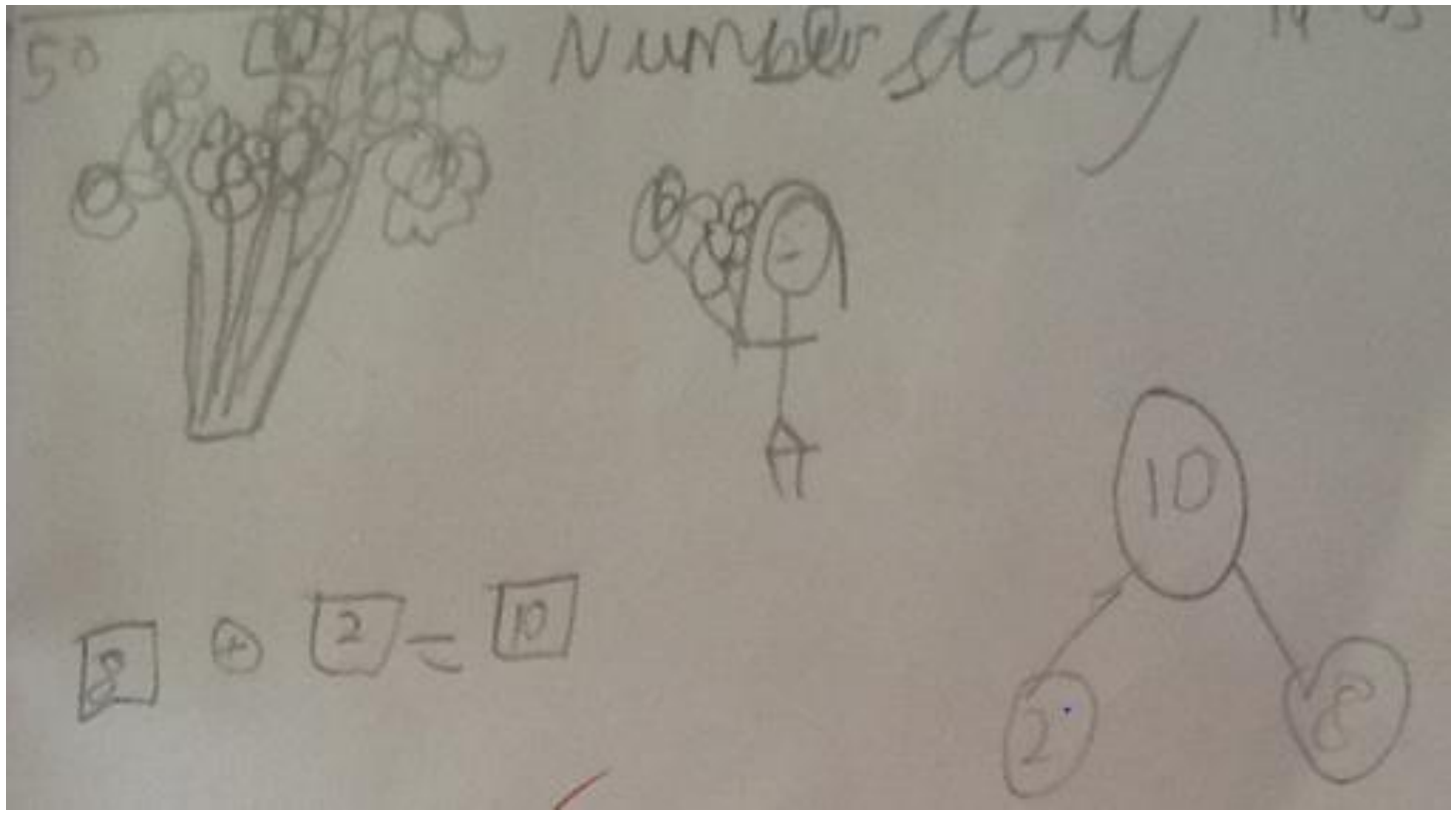




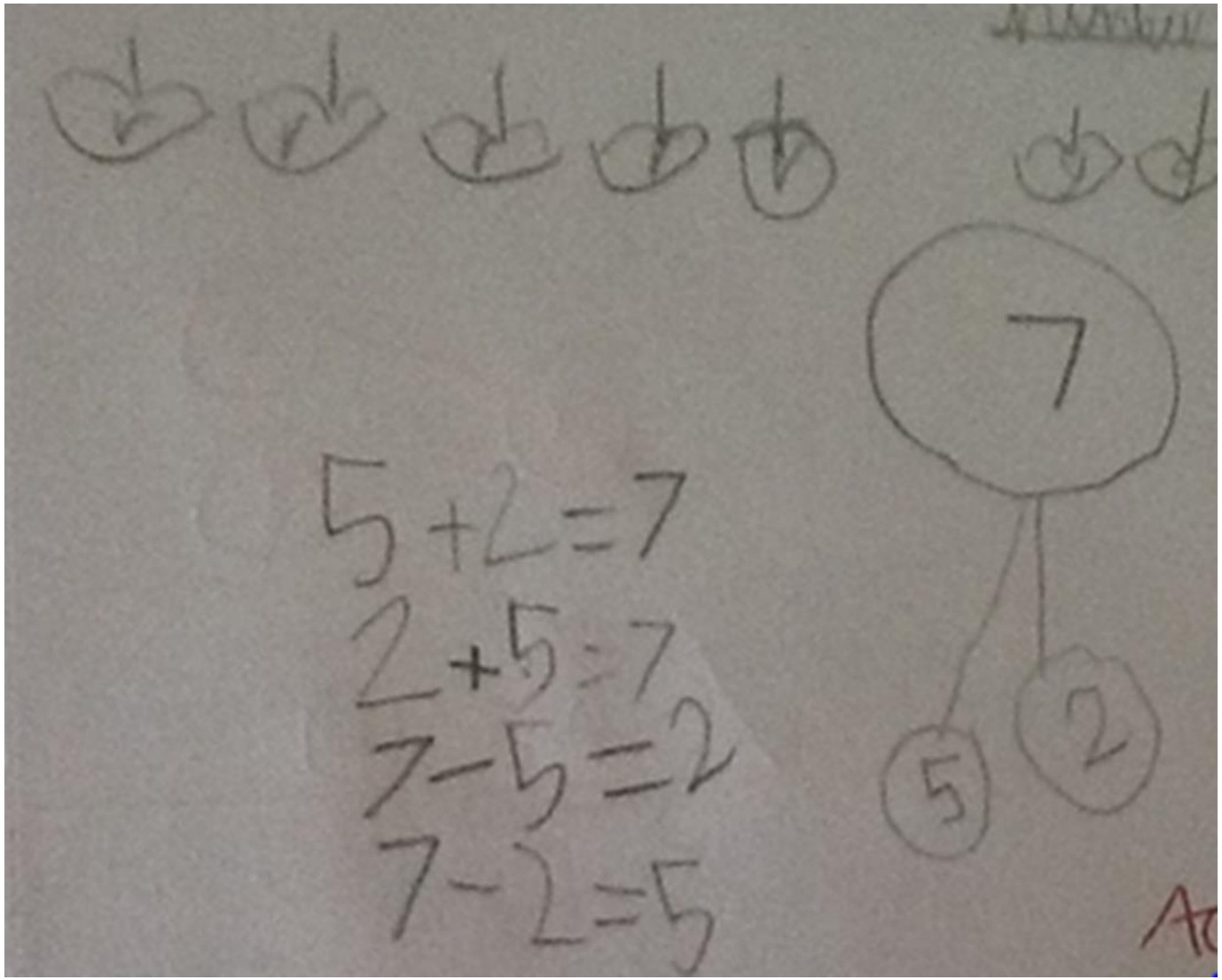




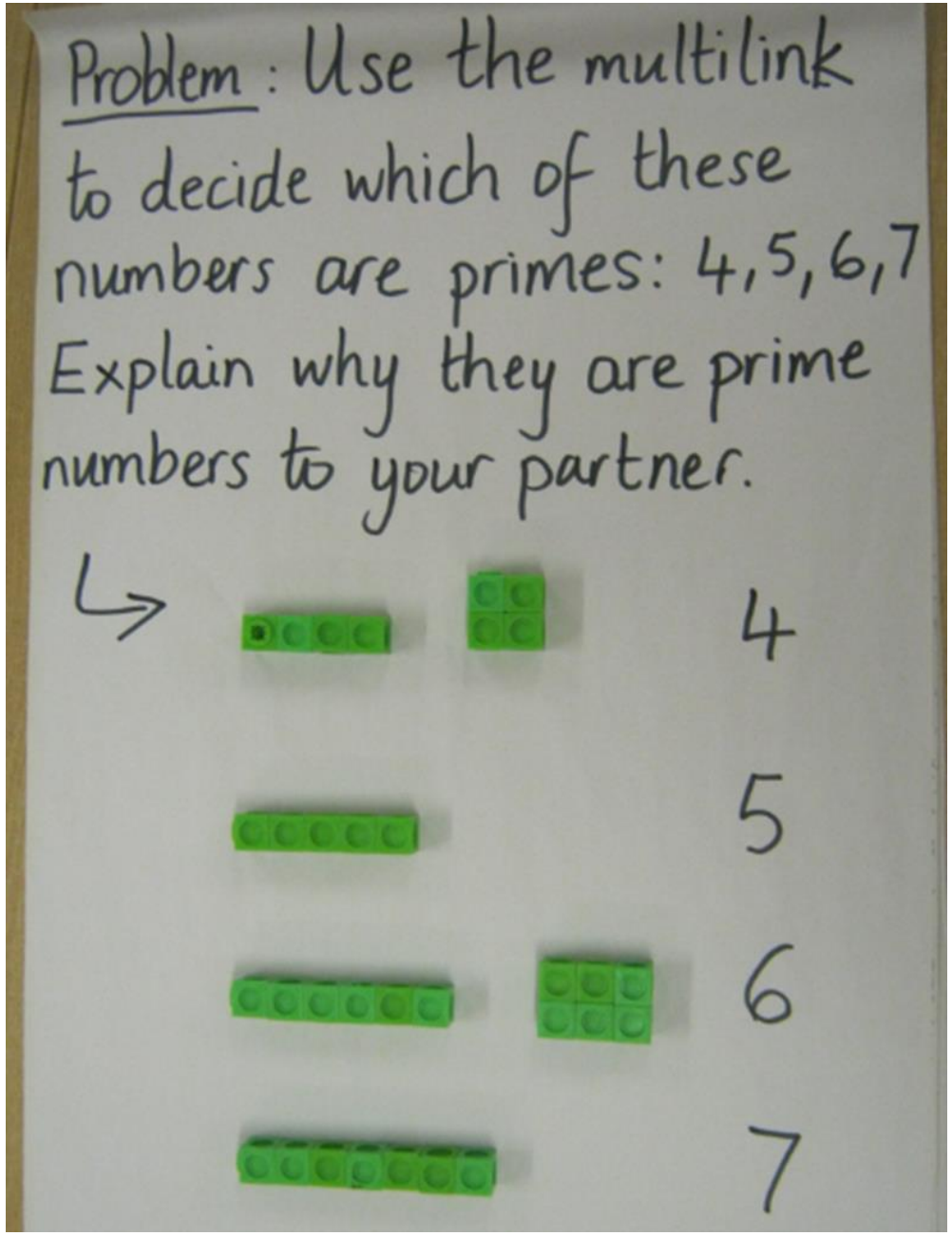
8 flowers and 2 flowers



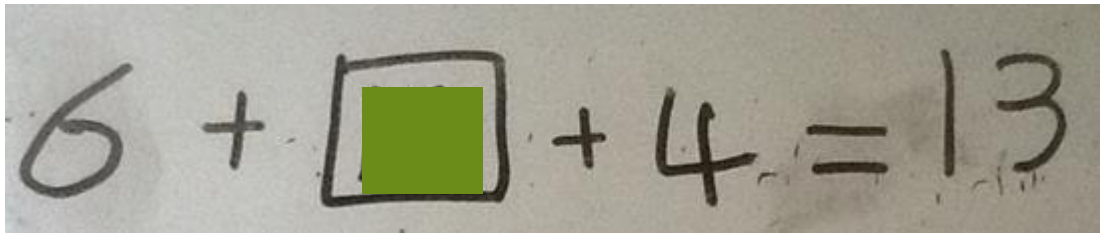
5 apples and 2 apples

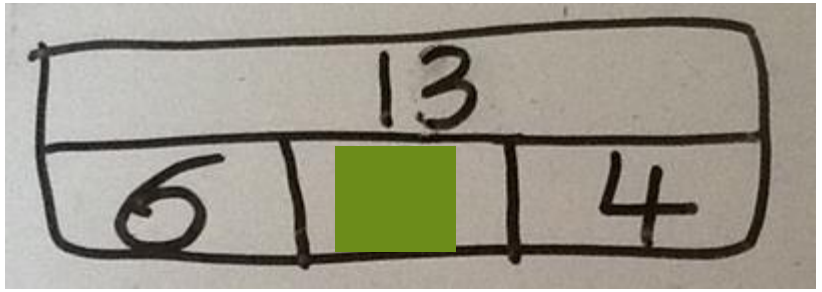


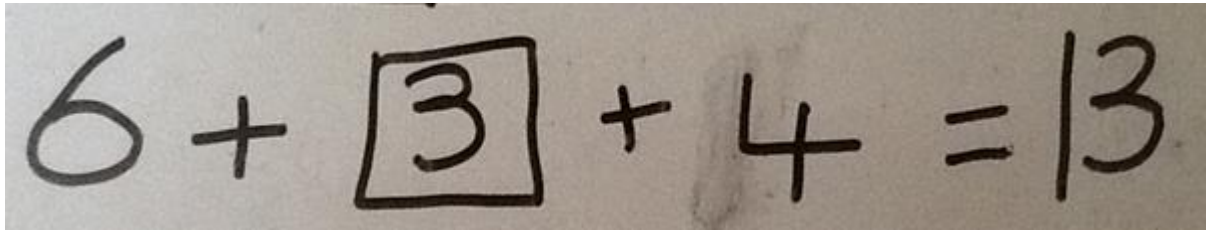
Proving prime numbers



Examples of depth







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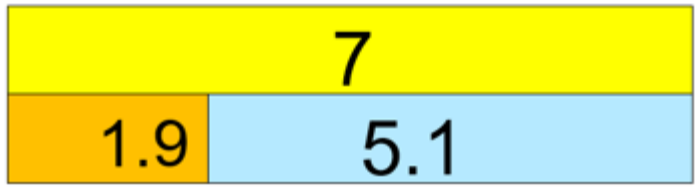
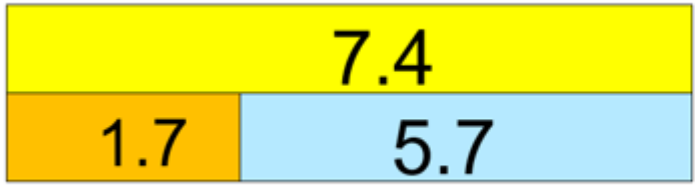
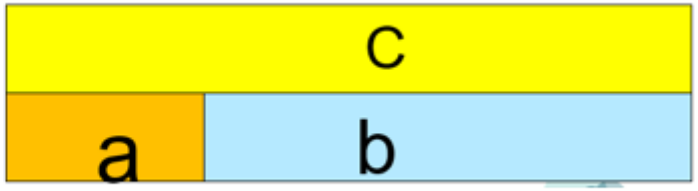






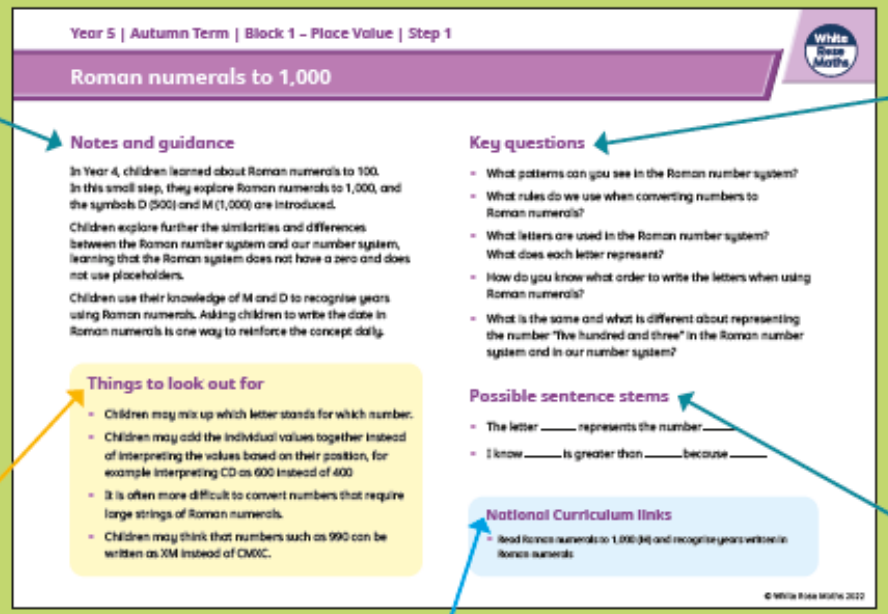
WRM Guidance Block 1

Teacher guidance

Every block in our schemes of learning is broken down into manageable small steps, and we provide comprehensive teacher guidance for each one. Here are the features included in each step.

Notes and guidance that provide an overview of the content of the step and ideas for teaching, along with advice on progression and where a topic fits within the curriculum.

Things to look out for, which highlights common mistakes, misconceptions and areas that may require additional support.



National Curriculum links to indicate the objective(s) being addressed by the step.

Key questions that can be posed to children to develop their mathematical vocabulary and reasoning skills, digging deeper into the content.

Possible sentence stems to further support children's mathematical language and to develop their reasoning skills.

WRM Guidance Block 1

Sort objects

Notes and guidance

In this small step, children learn that collections of objects can be sorted into sets based on attributes such as colour, size or shape. Sorting enables children to consider what is the same about all the objects in one set and how they differ from the objects in other sets.

Children need to understand that the same collection of objects can be sorted in different ways and should be encouraged to come up with their own criteria for sorting objects into sets.

Practical activities should be used to support the learning in this step and ideas are suggested in Key learning. The concept of sorting can also be reinforced during daily activities such as lining up. Children could be asked to line up based on certain criteria, for example whether they have a sister.

Things to look out for

- Children may think that a group of objects can only be sorted in one way.
- Children may not focus on a single similarity, but instead on different attributes, leading to incorrect placement of objects in some sets.

Key questions

- What is the same about all the objects in the set?
- What is different about the sets?
- Can you find an object that belongs to this set?
- Can you find an object that does not belong to this set? Why does it not belong?
- Can you think of a different way to sort the objects?

Possible sentence stems

- This set of objects has been sorted by _____
- I could also sort the objects by _____
- _____ does belong in the set because ...
- _____ does not belong in the set because ...

National Curriculum links

- Identify and represent numbers using objects and pictorial representations including the number line, and use the language of: equal to, more than, less than (fewer), most, least

WRM Guidance Block 1

Sort objects

Key learning

Find some seeds and leaves to represent Autumn.

Ask children to sort the objects in three different ways and then compare their answers with a partner.

Read *The Button Box* by M Reid.

Give children a selection of buttons and ask them to sort the buttons in as many different ways as they can.

Encourage them to think about size, shape, colour and number of holes.

Give children a selection of 3-D shapes.

Ask children to sort the objects into two groups and then challenge a partner to say how the objects have been sorted.

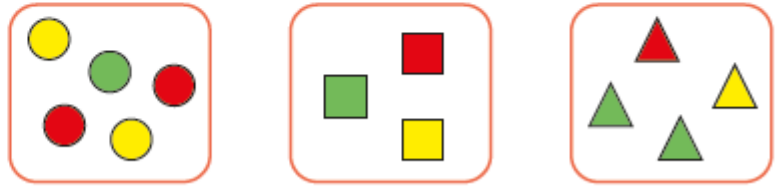
- Sort the fruit into groups.

Explain how you have sorted them.

- Look at the pictures of Alex.

How many different ways can you find to sort them?

- How have the shapes been sorted?



How else could you sort them?

WRM Guidance Block 1

Sort objects

Reasoning and problem solving

Begin with a large pile of objects such as buttons.

Tell the children you have a sorting rule, and they need to work out what it is.

One at a time, place an object into your set that fits the rule.

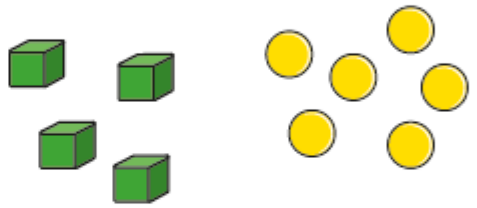
What do children notice first? How long does it take them to work out the sorting rule?

When they think they know your sorting rule, ask the children to choose an object that belongs in your set. Tell them if they are correct or incorrect.

Challenge the children to create their own sorting rule for you to work out.

Answers will vary depending on the rule chosen.

Kim and Mo are trying to find the sorting rule.



The objects are sorted into cubes and counters.

Kim

The objects are sorted into green and yellow.

Mo

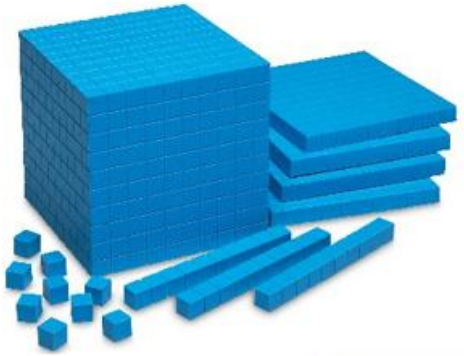
Who is correct? How do you know?

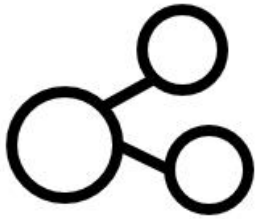
Kim and Mo could both be correct, as all the cubes are green and all the counters are yellow.

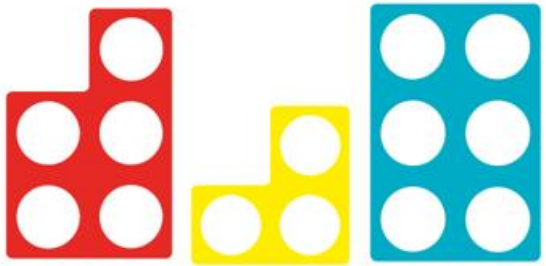
Remember… Teaching for Mastery is…

- The belief that all pupils can achieve
- Keeping the class working together so that all can access and master mathematics, moving together
- Development **of deep** mathematical understanding
- Development of both factual/procedural and conceptual fluency, making connections
- Longer time on key topics, providing time to go deeper and embed learning

Thank you and any questions?







1000	2000	3000	4000	5000	6000	7000	8000	9000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009