



Subject Knowledge for Mathematics Teaching

KS1

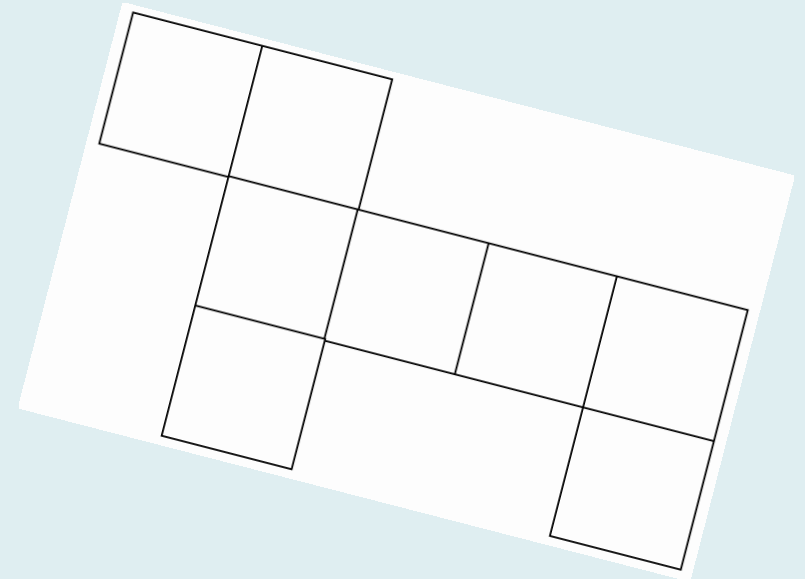


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Spotty Dogs

Use the template and the dominos.
Make a dog with 10 spots.

How many ways can you do this?
You can only use dominos from one
box/packet.
Have you found all the possibilities?
Which dominos can't you use?



Evidence of deeper thinking/reasoning

Spotty Dogs

Why might you give this task to your pupils?

What would they learn?

Where does this learning fit in the curriculum?

How does this task fit with your idea of maths in the classroom?



What are the intended outcomes for SKTM

To develop specialist subject knowledge, pedagogic knowledge and confidence in teaching specific aspects of mathematics:

- Number sense and place value
- Addition and subtraction – models and representations
- Multiplication and division – models and representations
- Fractions

Have a go – adapted from NRICH sealed solution

A set of ten cards, each showing one of the digits from 0 to 9, is divided up between five envelopes so that there are two cards in each envelope.

The sum of the two numbers inside it is written on each envelope.



Have you found all of the solutions?

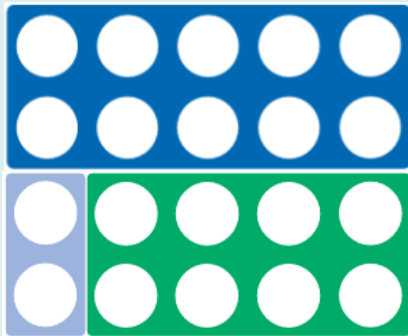
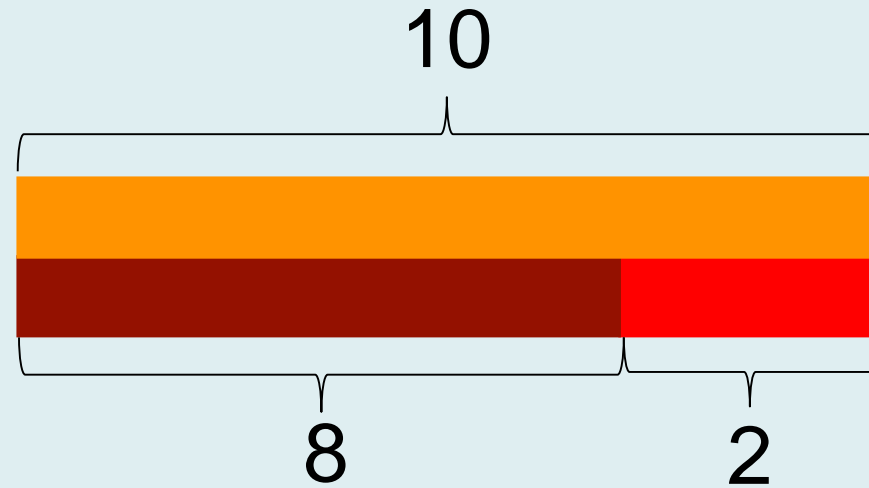
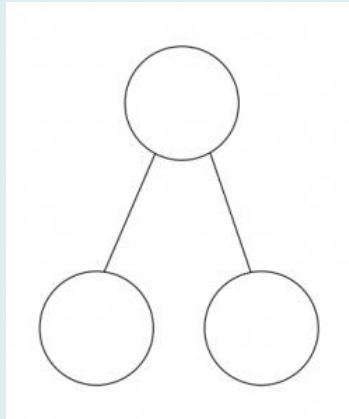
How might pupils approach the problem?

How can we support them to complete the task?

What would pupils learn from Sealed Solution?

- Key National curriculum aims
 - Fluency
 - Varied and frequent practice
 - Reasoning
 - Follow a line of enquiry
 - Problem solving
 - Persevering
- Key programmes of study practiced?
 - represent and use number bonds within 20
 - add and subtract one-digit and two-digit numbers to 20, including 0

Part-whole model: how many calculations can be shown?



$$8 + 2 = 10$$

$$2 + 8 = 10$$

$$10 - 2 = 8$$

$$10 - 8 = 2$$

$$10 = 2 + 8$$

$$10 = 8 + 2$$

$$2 = 10 - 8$$

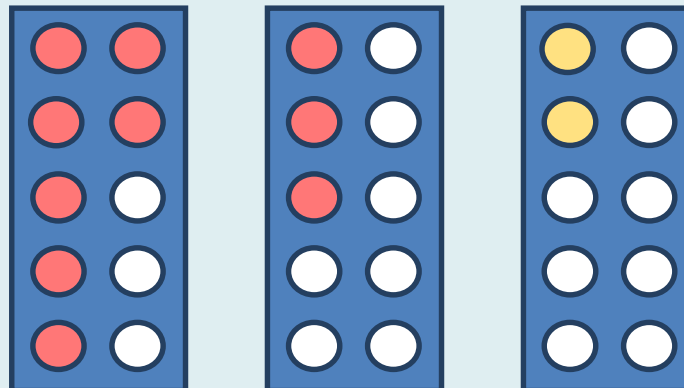
$$8 = 10 - 2$$

What can pupils learn from the 10, 8 and 2 activity

- Builds knowledge of the inverse relationship between addition and subtraction.
- Pupils develop fluency in addition and subtraction.
- Pupils develop the knowledge of equivalence rather than thinking of the equals sign as the answer.

Add three numbers

Use the ten frames and counters.
Show the calculation and find the total.



The answer is...

... what's the question?

52

What does posing problems like this one do to enhance understanding of number?

Make the number 52

- With a bead string
- Show it on the Place Value Chart
- With Base Ten blocks (Dienes)
- With the coins
- With Numicon
- Where does it sit on the number line?
 - How else could you explore 52?

Number sense and place value

- A good understanding of number is needed before children can operate numerically, i.e. the numbers have to make sense in terms of order and size.

$$\begin{array}{r} 26 \\ +35 \\ \hline 511 \end{array}$$

This is a genuine error made by a pupil, who when questioned thought that 511 was a perfectly feasible answer.

- What the pupil has done and why?
- How would number sense have helped?
- How can we support this learner?

Number sense and place value

- Model the calculation with the Dienes (base ten) blocks

$$\begin{array}{r} 26 \\ +35 \\ \hline 511 \end{array}$$

- How do the blocks support number sense?
- What other resources would help?
- Have a go with another resource – which is most effective?

The Ofsted bit...

- On pages 88 and 89 of the report, specific guidance is given regarding applying the EIF to the teaching of Mathematics. Ofsted state that inspectors will consider what steps the school has taken to ensure that:

"all teachers of mathematics, including non-specialist teachers of mathematics, have sufficient mathematical and teaching content knowledge to deliver topics effectively".

Between each day, a gap task is set, such as:

- Bring either photographs, pupil work or notes to share and discuss next time
 - Find an example of a misconception; how did you resolve it?

OR

- Try out one of the tasks that we have used today.

Discuss with school colleagues