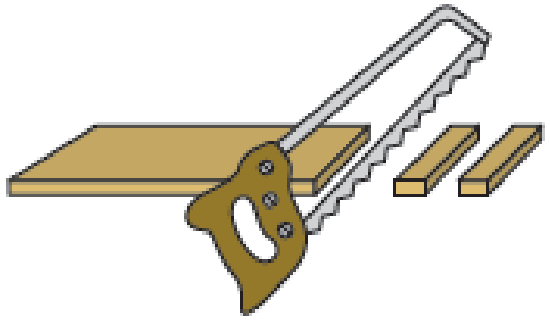
Year 5 multiplication and division mastery task

A 50 cm length of wood is cut into 4 cm pieces.

How many 4 cm pieces are cut and how much wood is left over?



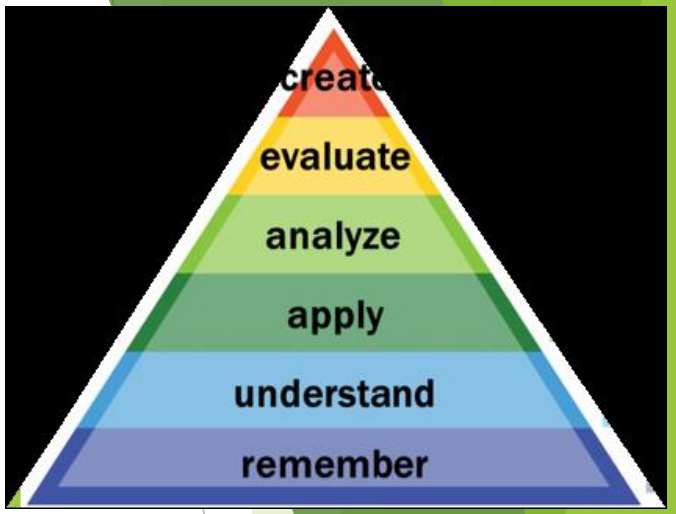
Fill in the blanks to represent the problem as division:

☐ ÷ ☐ = ☐ remainder ☐

Fill in the blanks to represent the problem as multiplication:

☐ × ☐ + ☐ = 50

A 50 cm length of wood



- What does 50cm look like? Show me with your arms. What about 4cm?
- How else could you write this length? How could it be written in mm or m?
- How much more wood would you need to make a metre?

Some of these questions could form a pre-assessment

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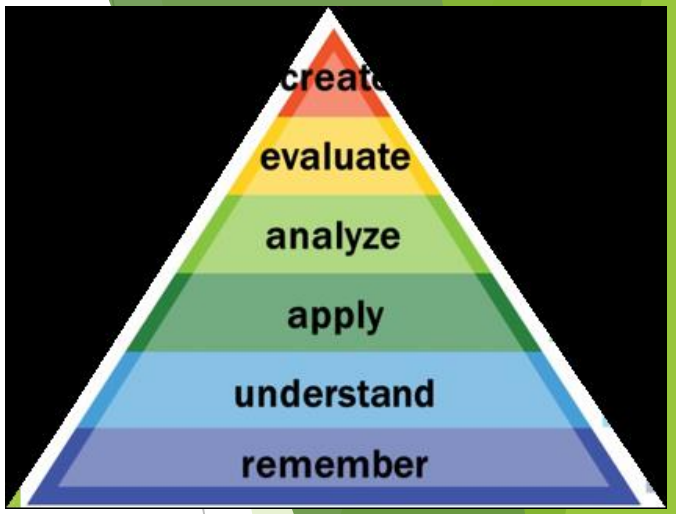

- Create what this could this look like as a picture? How else could it look?
- Share the different pictures from around the classroom, which one makes most sense to you? Which makes the least sense to you – why?
- This is how one child represented the wood and thinks there will be none left over, is he right? Why, why not?

1	2	3	4

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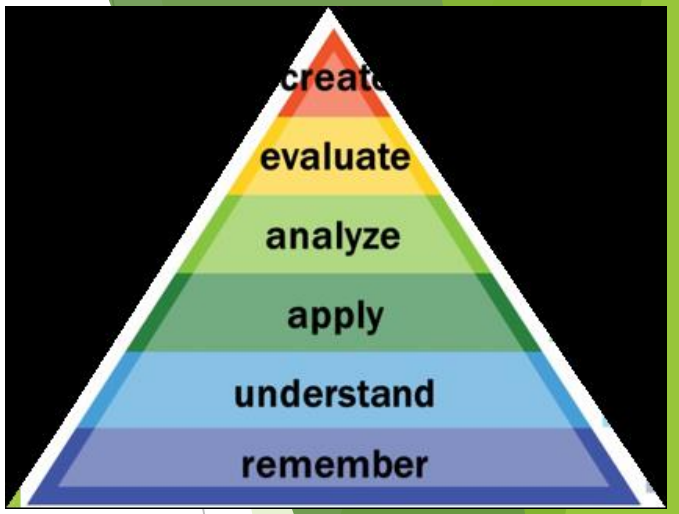

- Without calculating the answer, what do you know about the extra bit?
- Is it odd or even? How do you know?
- Will there be any left over? How do you know?
- Is 50 in the 4x times table? Can you divide 50 by 4?
- Which multiple of 4 is before 50, and which is after 50?

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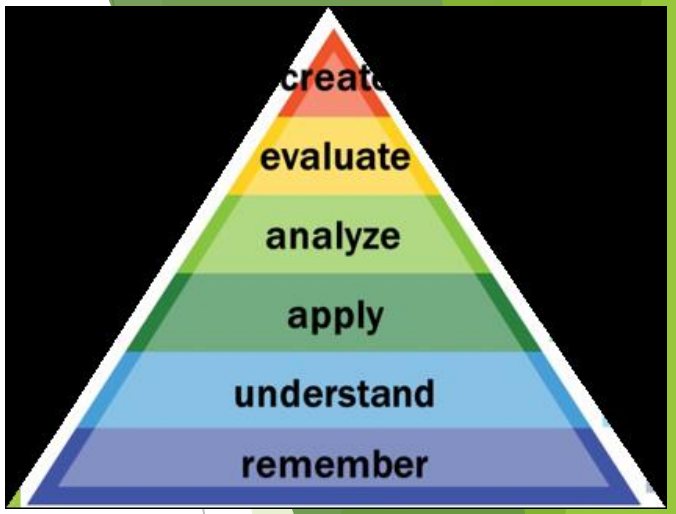

- Can you calculate the answer to the problem?
- On your picture, which part is showing the answer?

- How could you represent your thought-process as a division calculation?

- Could you represent it as a multiplication calculation?

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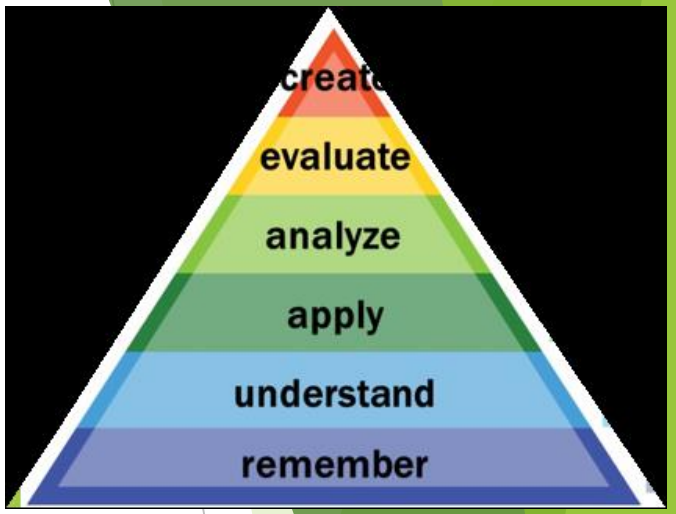


- Have a look at this video of another child working out the same problem, why do you think they have made these mistakes? (Stop video at 2.13 and 3.15)

- Can you create an array to represent these calculations?

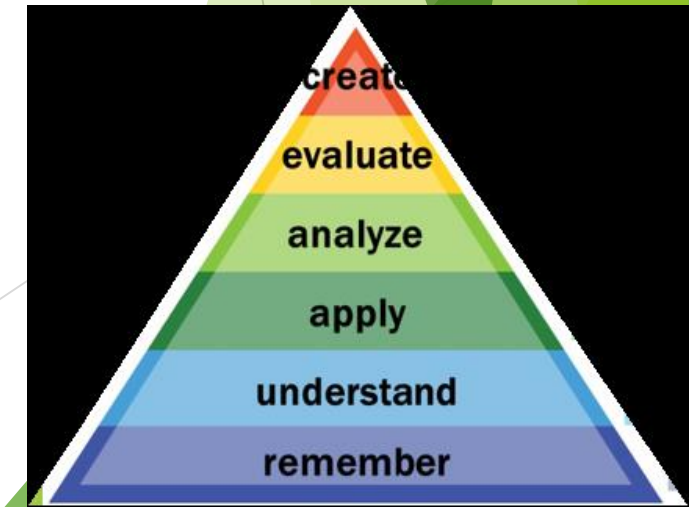
Extending the problem:

- Which numbers would be more difficult to cut into equal pieces? Why are they more difficult?
- Which numbers could be cut into a number of different lengths? Why are these numbers so useful/flexible?

- If you wanted to have no wood left over, which type of number would you need to choose? What about 1cm left over, 2cm left over 3cm left over? Can you think of a rule to support these? Do these rules always work?
- What about 4cm left over?

- Without calculating the answer, can you think of a length of wood, that is longer that 100cm, that would also have 2cm left over if it was cut into 4cm pieces? How do you know it would have 2cm left over?

- Now investigate cutting the wood into 7cm pieces, can you create rules about which numbers would have the following lengths left over:
  - 0cm
  - 2cm
  - 6cm



Linking the domains

Year	Number and place value	Addition and subtraction	Multiplication and division	Fractions	Measurement	Geometry Properties of shape	Geometry Position and direction	Statistics
YEAR 5	Pupils should be taught to: ▪ read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit ▪ count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000 ▪ interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers through zero ▪ round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000 ▪ solve number problems and practical problems that involve all of the above ▪ read Roman numerals to 1000 (M) and recognise years written in Roman numerals.	Pupils should be taught to: ▪ add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) ▪ add and subtract numbers mentally with increasingly large numbers ▪ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy ▪ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.	Pupils should be taught to: ▪ identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. ▪ know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers ▪ establish whether a number up to 100 is prime and recall prime numbers up to 19 ▪ multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers ▪ multiply and divide numbers mentally drawing upon known facts ▪ divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context ▪ multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 ▪ recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3}) ▪ Solve problems involving addition, subtraction, multiplication and division including using their knowledge of factors and multiples, squares and cubes ▪ solve problems involving addition, subtraction, multiplication and division and a combination of these, including understanding the meaning of the equals sign ▪ solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.	Pupils should be taught to: ▪ compare and order fractions whose denominators are all multiples of the same number ▪ identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths ▪ recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number (e.g. $^2/_5 + {}^4/_5 = {}^6/_5 = 1\,{}^1/_5$) ▪ add and subtract fractions with the same denominator and multiples of the same number ▪ multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams ▪ read and write decimal numbers as fractions (e.g. $0.71 = {}^{71}/_{100}$) ▪ recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents ▪ round decimals with two decimal places to the nearest whole number and to one decimal place ▪ read, write, order and compare numbers with up to three decimal places ▪ solve problems involving number up to three decimal places ▪ recognise the per cent symbol (%) and understand that per cent relates to "number of parts per hundred", and write percentages as a fraction with denominator hundred, and as a decimal fraction ▪ solve problems which require knowing percentage and decimal equivalents of $^1/_2$, $^1/_4$, $^1/_5$, $^2/_5$, $^4/_5$ and those with a denominator of a multiple of 10 or 25.	Pupils should be taught to: ▪ convert between different units of metric measure (e.g. kilometre and metre; centimetre and metre; centimetre and millimetre; gram and kilogram; litre and millilitre) ▪ understand and use equivalences between metric units and common imperial units such as inches, pounds and pints ▪ measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres ▪ calculate and compare the area of rectangles (including squares) and including using standard units, square centimetres (cm^2) and square metres (m^2) and estimate the area of irregular shapes ▪ estimate volume (e.g. using 1 cm^3 blocks to build cubes and cuboids) and capacity (e.g. using water) ▪ solve problems involving converting between units of time ▪ use all four operations to solve problems involving measure (e.g. length, mass, volume, money) using decimal notation including scaling.	Pupils should be taught to: ▪ identify 3-D shapes, including cubes and other cuboids, from 2-D representations ▪ know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles ▪ draw given angles, and measure them in degrees ($^\circ$) ▪ identify: ▪ angles at a point and one whole turn (total 360°) ▪ angles at a point on a straight line and ½ a turn (total 180°) ▪ other multiples of 90° ▪ use the properties of rectangles to deduce related facts and find missing lengths and angles ▪ distinguish between regular and irregular polygons based on reasoning about equal sides and angles.	Pupils should be taught to: ▪ identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed.	Pupils should be taught to: ▪ solve comparison, sum and difference problems using information presented in a line graph ▪ complete, read and interpret information in tables, including timetables.

What previous knowledge/skills will the children need to have to be able to tackle this challenge?

What will the pre-task look like to assess whether they are ready to tackle the challenge?

Which concrete/visual resources will be needed to support the understanding?

Which vocabulary will they need to understand/ will you need to unpick and model?

Sophie has five coins in her pocket. How much money might she have?
What is the greatest amount she can have?
What is the least amount she can have?

If all the coins are different:
What is the greatest amount she can have?
What is the least amount she can have?

Which objectives will it cover?

How will it be adapted/extended?

Probing questions…

Possible misconceptions…