Maths Workshop
Y2 and Y3

Thursday 9th March 2023

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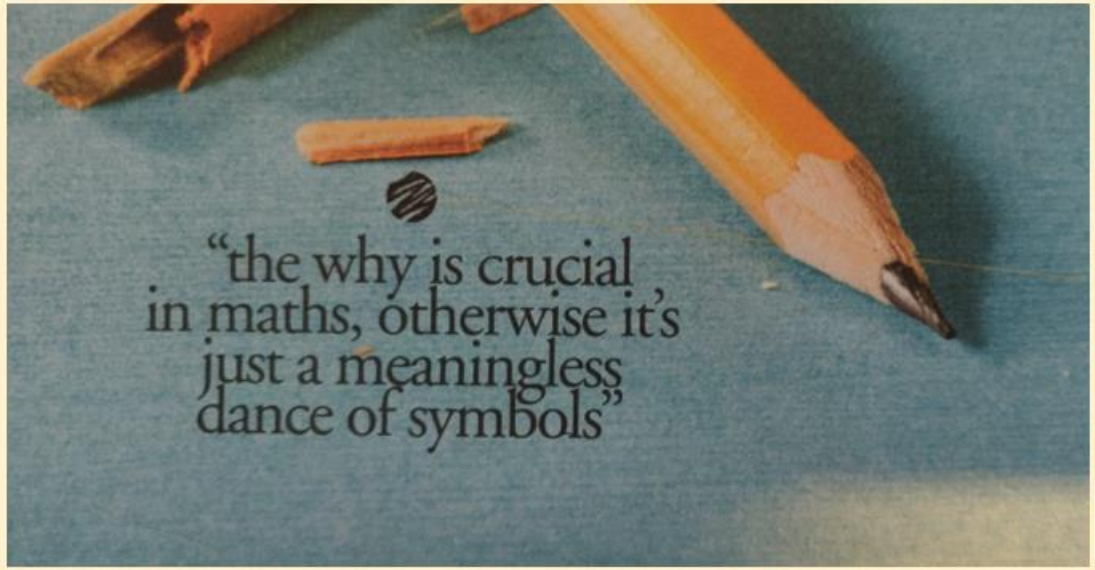
KILMORIE
PRIMARY SCHOOL

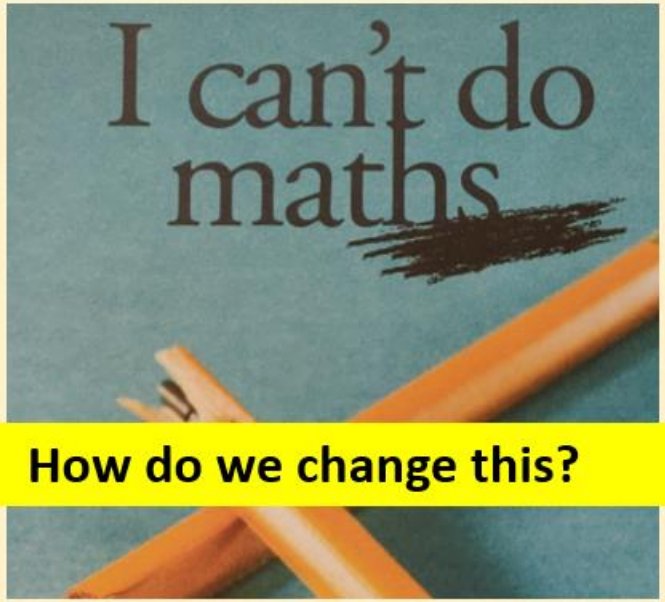
Aims

- To understand what your child needs to be able to do mathematically as they move through the phase
- How we approach the teaching of mathematics
- What are the common areas of concern / misconceptions
- Things that you can do to support your child to build the key skills

Your child's mathematical learning journey

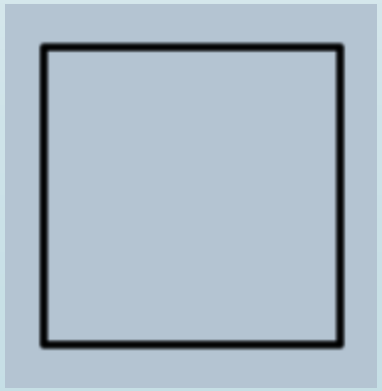
- Children begin their journey as mathematicians in Early Years. They use inside the classroom and the outside areas to explore what numbers mean using the counting principles. They listen to stories based around numbers and engage with the Numberblocks characters as they investigate numbers up to 5. They are encouraged to start reasoning and problem solving using mathematical talk.
- As they progress through the school, they continue to gain a deeper understanding of number and how different operations link to each other. They use a Concrete (objects) – Pictorial (drawings) – Abstract (formal methods) approach to learning new concepts which allows everyone to succeed and boosts confidence in explaining methods. Children are encouraged to use technical mathematical vocabulary from the start of their journey and to share what we have learnt with others.
- Classes mostly all work on the same objectives, with support for those who need it, and extra challenges for those who grasp something more quickly. Our hands on and practical approach aims to support children to get a love of maths and become life-long learners.
- It is best when Maths is seen as a building project. Each new thing that we learn builds upon something we have learnt before. As we learn more, our foundations become stronger and our building grows taller.





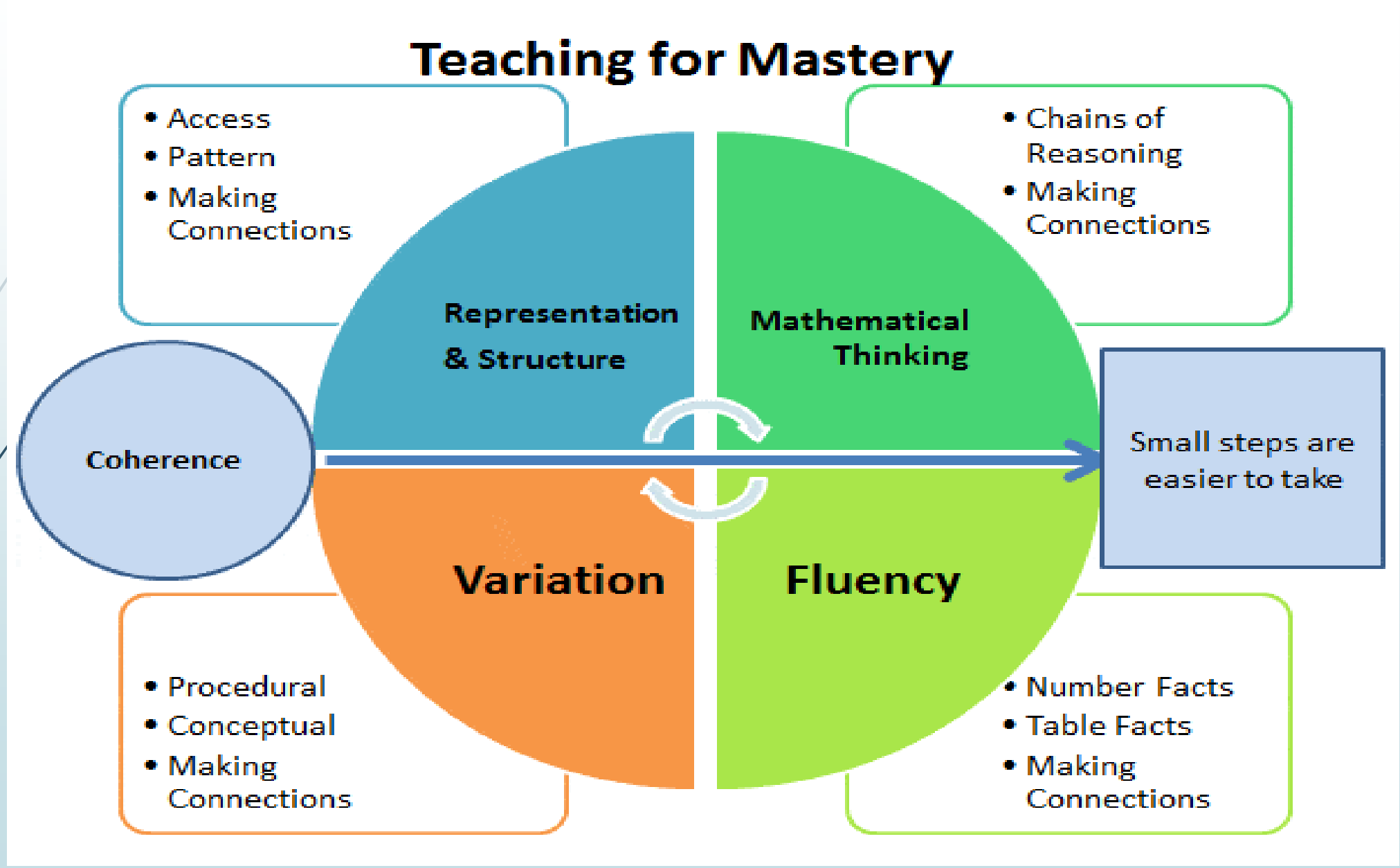
How do we change this?

Why is this not a triangle?



Play games and give the children opportunities to investigate and invent:
Invent the next Dienes Piece: 10000 … 1000000
How big is a million with Dienes?
Start from an early stage to form habits for inverse and commutative:
4 + 2 = 6 2 + 4 = 6 6 – 2 = 4
40 + 20 = 60 20+ 40 = 60 60 – 20 = 40

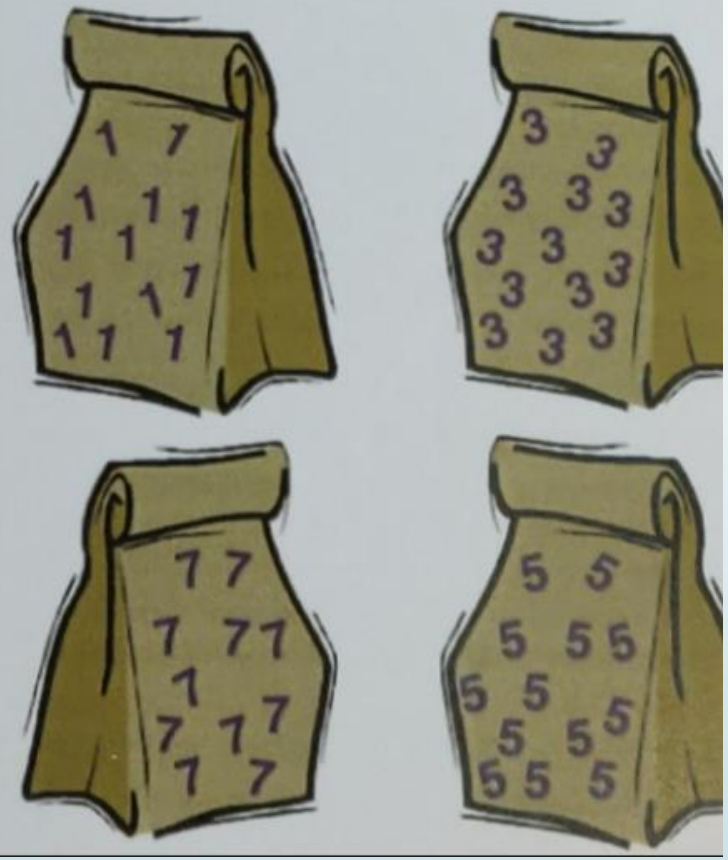
How do we teach mathematics?



Make 37

Four bags contain a large number of 1s, 3s, 5s and 7s.

Can you pick ten numbers from the bags that add up to 37?



Problem solving to show understanding of number facts and reasoning skills.

Building skills to read and understand the problem before solving it:

What do I know?

What do I need to find out?

When you add 2 odd numbers the answer is even. If you add 10 odd numbers the answer will be even. So it cannot be 37!

Basic skills focus on developing mathematical fluency of key knowledge for each unit of maths. These key skills are taught through short, repetitive sequences of *counting* in different forms, *learning* by spotting patterns and making connections to known facts, and finally *applying* the skills in different contexts. By mastering this skills, children are then equipped with the freedom to explore more complex mathematical concepts confidently.

Problem solving skills are taught with the aim of not only preparing children to apply their mathematical skills in different contexts, but to also prepare them for challenges in their everyday life. By working creatively and collaboratively, trying different strategies and methods, our children develop the perseverance and resilience necessary for increasingly complex problem-solving. Through emphasising speaking and listening skills, we also encourage our children to focus on the process rather than the answer and to use precise and sophisticated mathematical language to explain and justify their solutions.

Curriculum Progression: At the beginning of the year, each year group teacher is given a long-term overview of the mathematics units for the year. This ensures all concepts are built on previous knowledge so that foundations are fully secure. Children spend longer on key mathematical concepts, most noticeably number. Significant time is spent developing deep knowledge of the key ideas that are needed to underpin future learning

Practical Pictorial Abstract

Fluency Reasoning Problem Solving

KEY OBJECTIVES

CURRICULUM OVERVIEW- learning letter

Key Ideas and Structures

- Make time: Investigate Patterns 100 – 60 = 100 – 61=
- True or False ?
- How many ways?
- Fluency – missing number problems
- Stem Sentences
- Inverse Relationships: 735 – 128 = 128 + ___ = 735

- Make up stories to match calculations

Less confident pupils – What is their challenge? Identify steps for their learning journey.

Common misconceptions / problems

- You ask your Year 3s to list pairs with a total of 100, and one child's pairs of numbers are all 10 too big. What is s/he doing?! The child has probably thought of numbers where both the 10s digits and the 1s digits add to 10, e.g. 68 + 42.
- CONFIDENCE: The children are reluctant to explore different strategies not to make mistakes. Our say: mistakes help us to learn.
- Taking part in active collaboration to develop learning and deepen thinking, not only with the teacher but with each other.

How can you help?

- ❑ Be familiar with the curriculum
- ❑ Use Kilmorie's calculation policy to support with methods
- ❑ Get your child to tell you what they already know / understand (give examples)

Short clip video with activity at home for
Year 2
Year 3

- **The array game:**
  ttps://www.youtube.com/watch?v=ltsaefDzMEk&list=PLn0hWIiHk5d54CyBLoC281QJwNViWBrGu

  You can have your own square and at the end compare how many squares you didn't fill in!

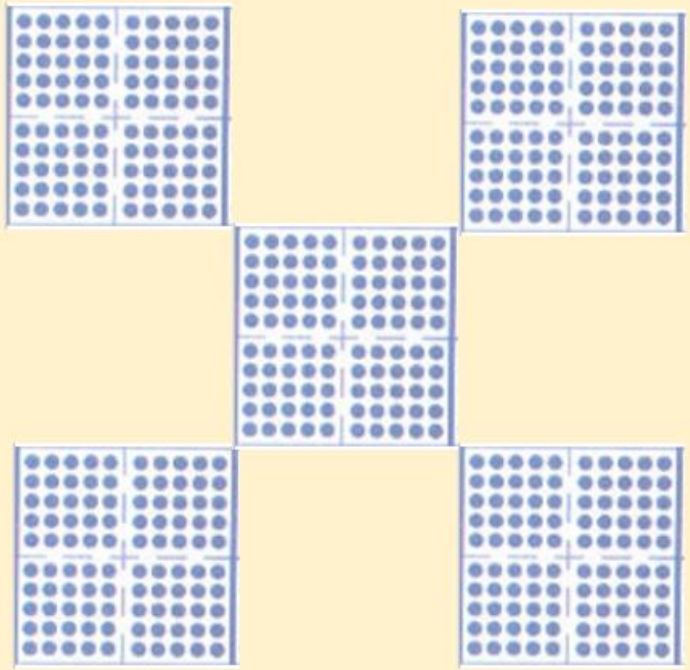
  Play the game with addition or subtraction.

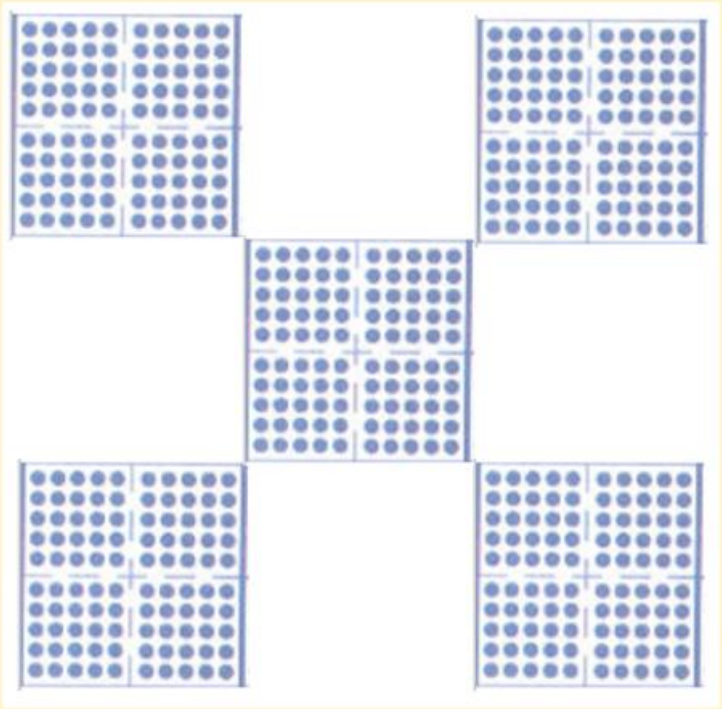
  For division: Can you divide the generated number by 2,3,4,5? Or miss a turn.
  To generate the numbers, roll the dice and turn the smallest number into tens: for example,
  2 and 5 I can make 25.

Examples of strategies used to solve calculations in Y2 and Y3

Not a TEST – Have fun!

How many ways can you make 1000?



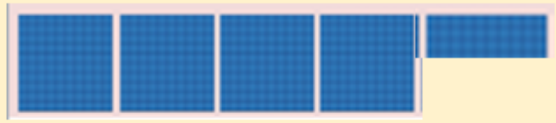


Who can see 450? How many 250? 25 x 4 x 10 25 x 40 50 x 20 How many 125? 125 x 8 ....

Challenge:

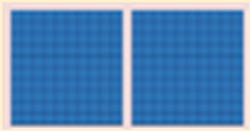
How many ways can you make 1000?

- Additive



420 + ? =1000

- Multiplicative including powers of ten



200 x ?=1000

The answer is 30.

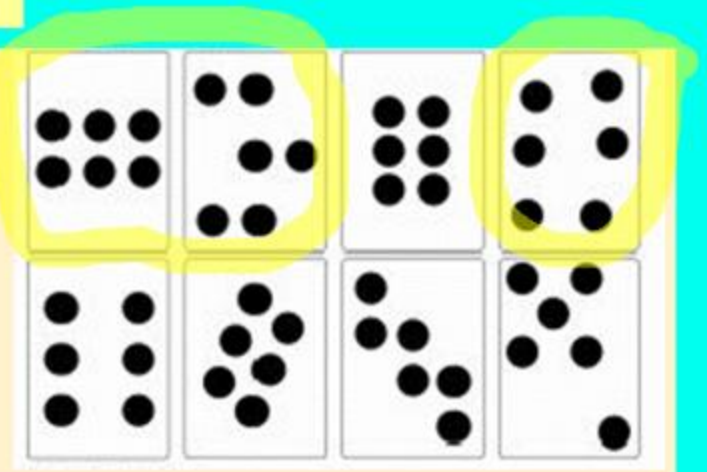
Write the calculations.

What is the difference between 6 and 12?
12 - 6 = 6

Activities to build confidence:

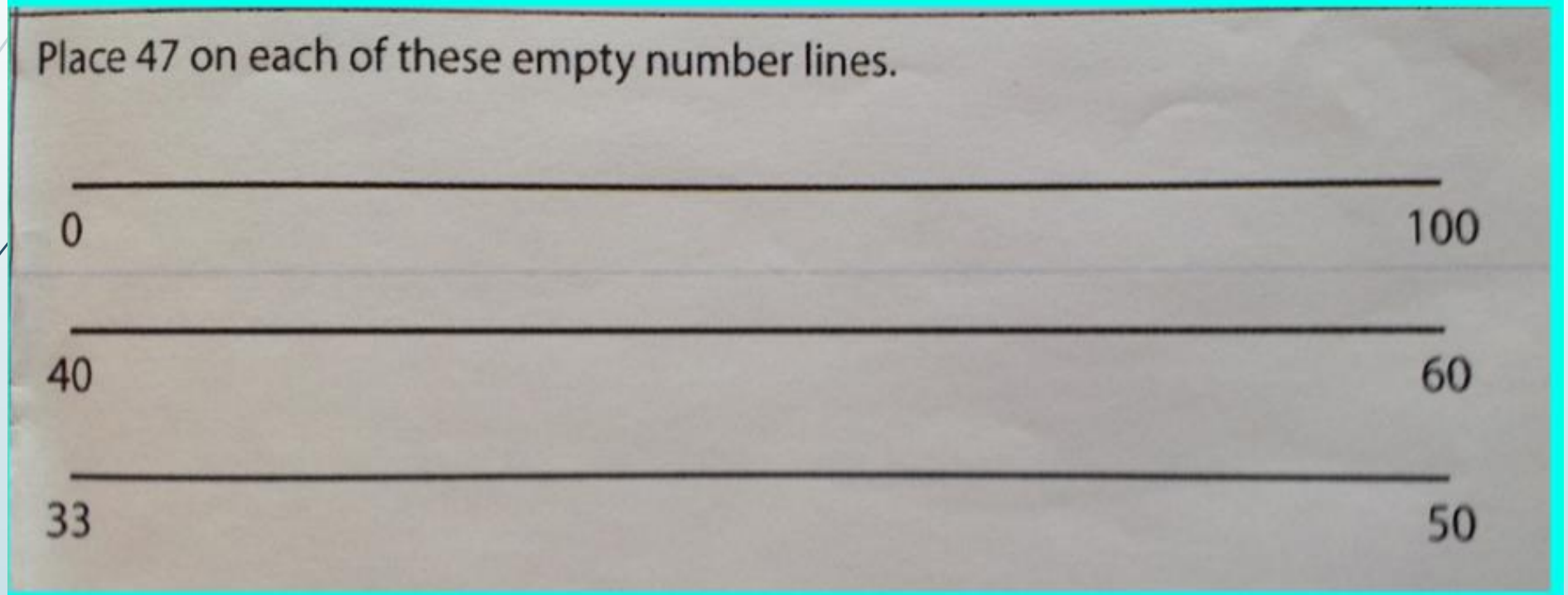
Activities: using dot cards

- Matching amounts
- Finding totals
- Finding the difference



Place value - Fluency

Place 47 on each of these empty number lines.



Y 2

Fluency
Addition and subtraction

Using number bonds
Using dienes

23 + 17 =

20 + 10 + 10 =

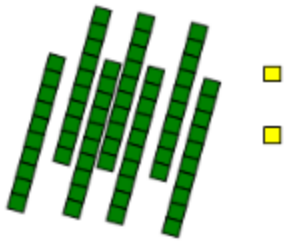
230 + 170

200 + 100 + 100

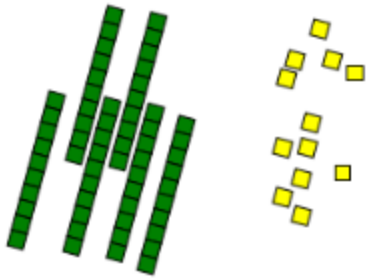
More than single digits?

National Centre for Excellence in the Teaching of Mathematics

72 - 47



72 - 47



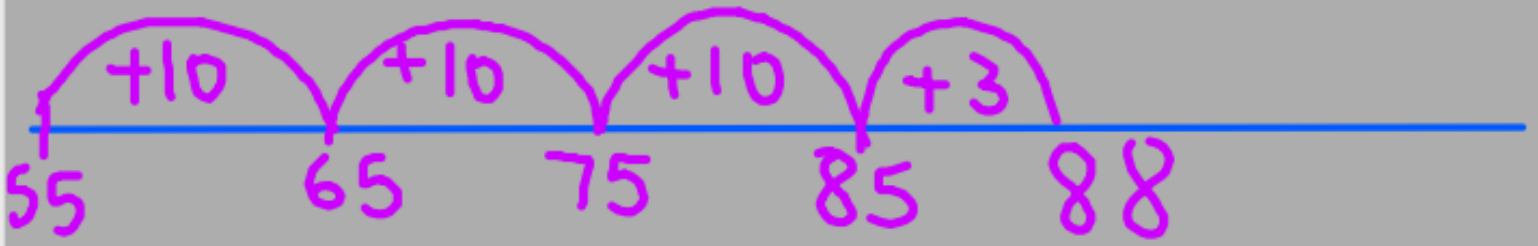
Counting or calculating?

38

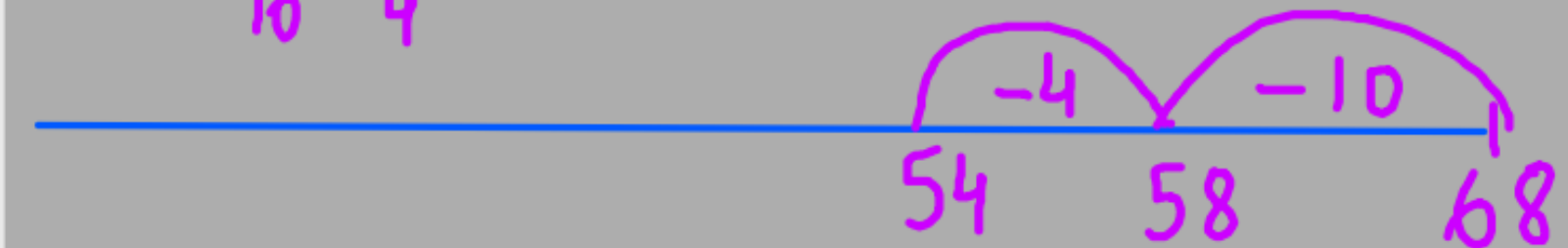
+ and -
Using empty number lines

Partitioning

$55 + 33$ (30, 3)



$68 - 14$ (10, 4)



Estimate the answers

What can it not be?

What do you already know?

I can partition 9 into 4 and 5

34 - 9 =

34 - 4 = 30 - 5 = 25

Estimate: 34 - 10 = 24 so it is close to 24

It cannot be more than 34 or less than 20!

234 - 9 =

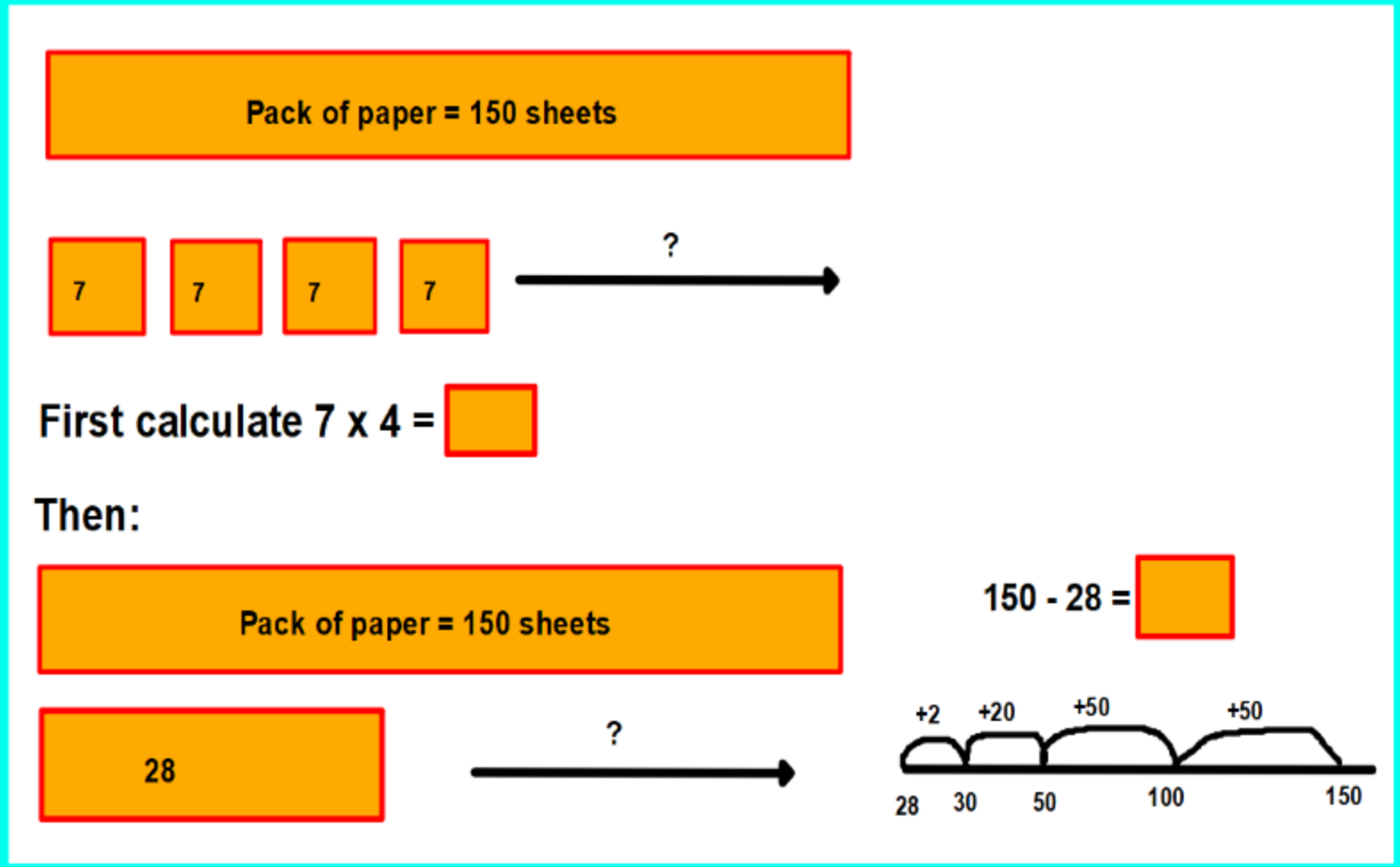
234 - 19 =

What strategy?

Calculate or count?

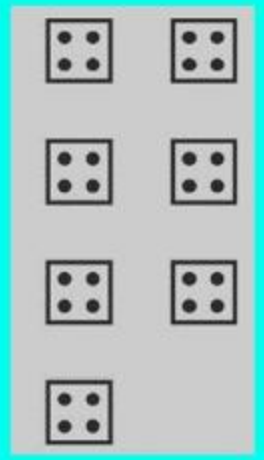
Problem solving Y 3

A pack of paper has 150 sheets. 4 children each take 7 sheets. How many sheets of paper are left?



Counting on to check the answers!

Multiplication and Division



Vocabulary: equal groups, groups of… rows, columns, repeated addition, repeated subtraction

Which picture am I describing?

4	8	12	16	20	24	28	32	36	40	44	48

X 4

	8		16		24		32		40		48
			56		64		72		80	88	96

X8

Multiplication and Division

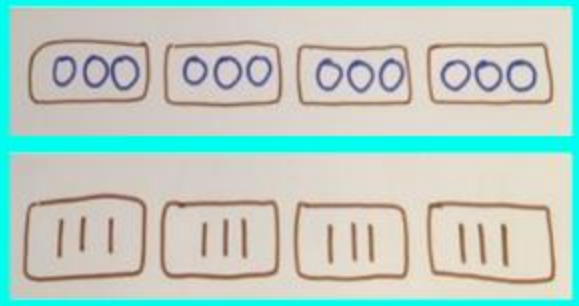
PROGRESSION TOWARDS ABSTRACT

Y 2

groups of 3

4 groups of 3 equals

12 counters



$3 + 3 + 3 + 3 =$ $3 \times 4 = 12$

What is the inverse calculation?

Y 3 Investigate the link between 3 and 6 timetables.

$6 \times 2 = 12$

Context, Language to Abstract Mathematics

- Ten 2p makes 20p
- ↓
- 2+2+2+2+2+2+2+2+2+2

- ↓
- 2,4,6,8,10,12,14,16,18,20
- ↓
- Ten groups of 2 make 20
- Ten 2s make 20
- 10 x 2 =20

Stem sentences:
practise using the correct vocabulary

Write a calculation that makes the same total as the opposite side.

2 x 5 = 20 ÷ 2

2 x 6 = [ ]

[ ] = 15 ÷ 3

Y 3

42 x 4 =

Partitioning

42

x4 | 40 | 2

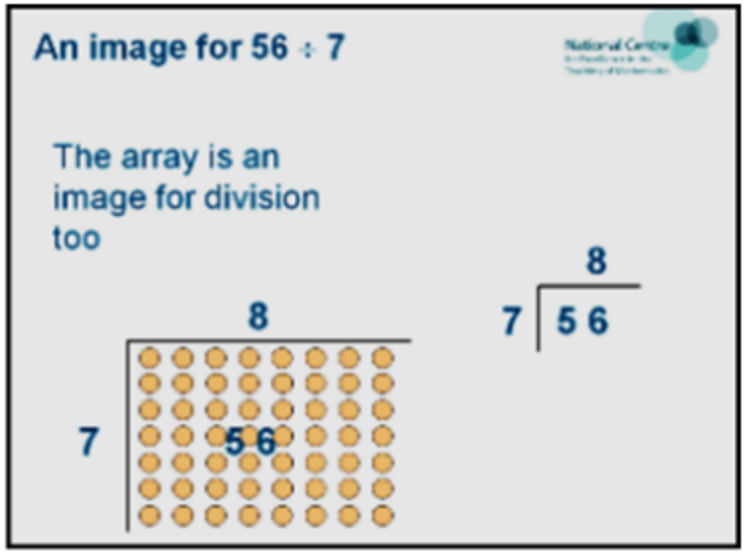
40 + 2 =

Grid method

x	40	2	42
4			

Compact method

	T	O	
	4	2	
x		4	



Phases of basic fact mastery (Baroody 2006)

Phase 1: Modeling and/or counting to find the answer

- Solving 6 × 4 by drawing 6 groups of 4 dots and skip counting the dots

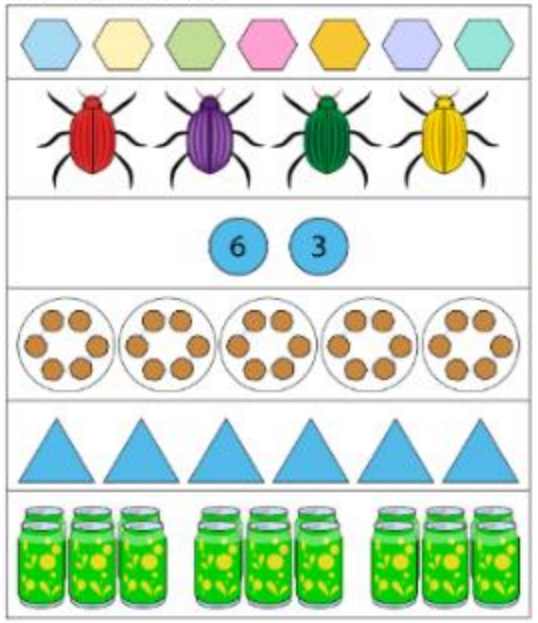
Phase 2: Deriving answers using reasoning strategies based on known facts

- Solving 6 × 4 by thinking 5 × 4 = 20 and adding one more group of 4

Phase 3: Mastery (efficient production of answers)

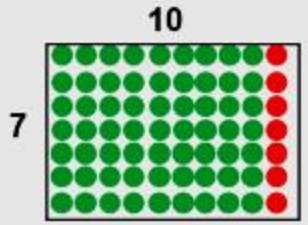
- Knowing that 6 × 4 = 24

'Which of these pictures could represent groups of six? Write two multiplication equations for each picture that represents groups of six.'



Practical, pictorial practice as needed.

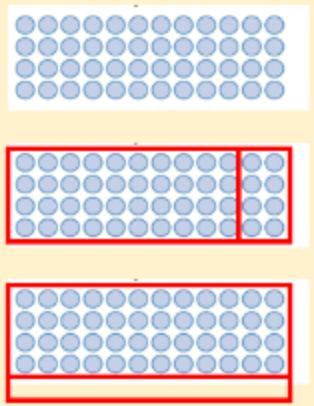
How can 7 x 10 = 70 help me work out what 9 x 7 is?



10 x 7 = 70

"If I know 7 x 10 = 70, I know that…"

Distributive law of multiplication



12 x 4

(10x4) + (2x4)

(5x12) – (1x12)

Y 3

The pupils will be confident with 1, 2, 10, 5 times tables.

	10	8
10	100	80
3	30	24

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When?

What calculation is represented here?

How?

		1	8	
	×	1	3	
	1	8	0	
		5	4	
	2	3	4	

Multiplication and Division investigation

Show X 4 and X 8 with shapes

What properties of shapes will help you to decide?

Sia's clue: the number of sides

How can we use matchsticks to make the shapes?

Henry's clue: 1 matchstick is one side

Challenge:

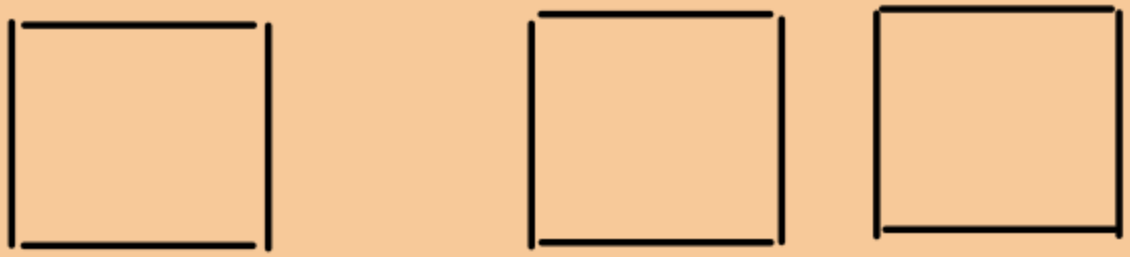
What other properties of shapes can you use?

Represent 4 and 8 times tables with the matchsticks and write the multiplication and division calculations.

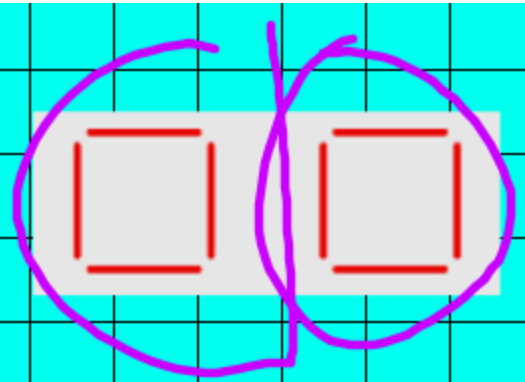
Do you agrree or desagree with Wren's representstion?

4 X 3 =

What does 4 represent?
What does 3 represent?

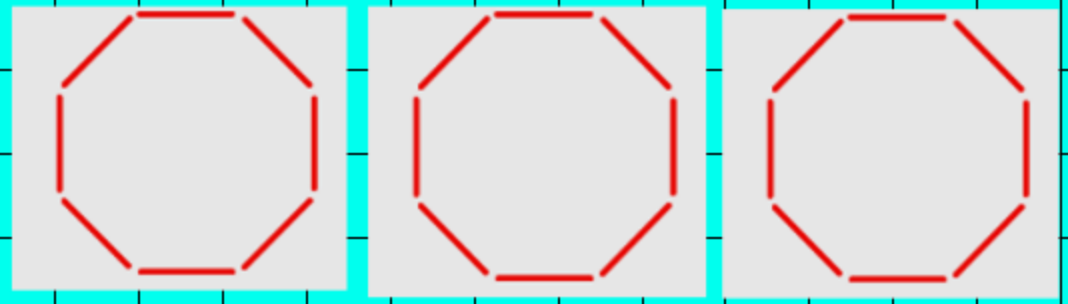


3 X 4



$4 \times 2 = 8$

$8 \div 4 = 2$



$8 \times 3 = 24$

$3 \times 8 = 24$

$24 \div 8 = 3$

$24 \div 3 = 8$

Childrens' questions:

How can we represent 4 divided by 4?

Multiplication and Division Reasoning

Do you agree or disagree? Prove it!

$$24 \div 4 < 24 \div 8$$

4 X ___ = 24

8 x ___ = 24

$$4 \times 6 = 8 \times 3$$

Fractions

Find 2/3 of 9

Y 2

First find 1/3, this is 9 divided by 3

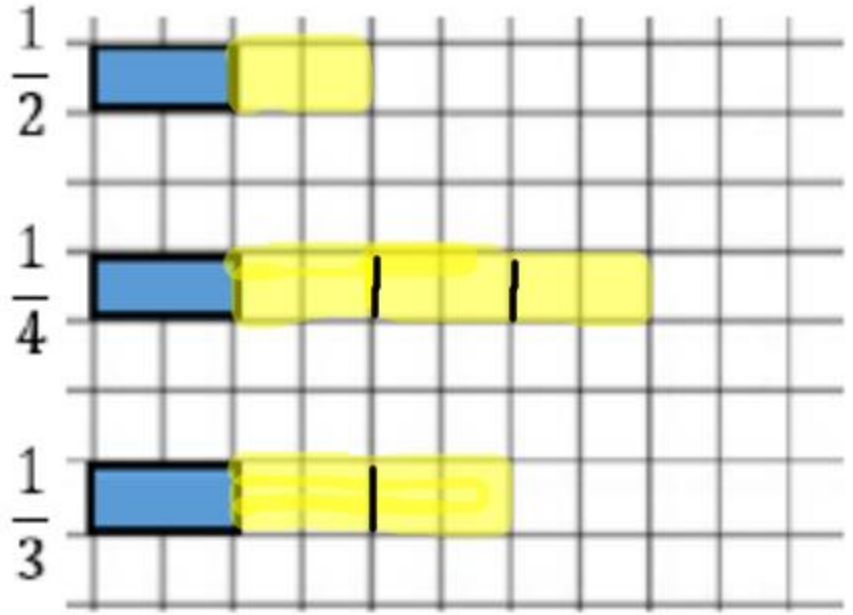
Use your division learning to solve fraction statements.

1/3 is 3 so 2/3 is 6

Y2 Fractions: Reasoning

Here are four fractions of four different bars.

Can you draw the whole bar for each?



Activities at home

- Use playing cards to practise adding numbers. Turn over two cards and add them together or subtract the smaller number from the larger one.
- Use a clock, watch or phone showing analogue and digital time
- Make your own clock using card and butterfly clips
- Look at variety of jugs that show ml/l – make cakes/smoothies, etc. to practise measuring
- Look at scales that show kg/g – make cakes to practise measuring
- Measure the length of objects with a ruler or measuring tape. Build awareness of the distance travelled by car – How many miles? How long does it take?
- Go shopping – work out totals, change, if one pack costs X how much do 2/ 4 /3 cost?

Useful maths websites

These sites have an excellent range of activities and games for most topics.

- **Top Marks Age 7-11**

  https://www.topmarks.co.uk/maths-games/7-11-years/ordering-and-sequencing-numbers

- **Cool Maths 4 Kids** – also includes lessons/explanations/brain teasers

  http://www.coolmath4kids.com/

- **Maths is fun -** Range of explanations and online activities

  https://www.mathsisfun.com/numbers/index.html

- **SUMS Maths -** Games sorted into: Number, Data Handling, Calculations, Shape and Space.

  http://www.sums.co.uk/original/

- **Arcademics Skill Builders –** games to play against the computer or a friend

  http://www.arcademics.com/

- **NRICH - SUMS Maths -** Games sorted into: Number, Data Handling, Calculations, Shape and Space.

  http://www.sums.co.uk/original/

  https://nrich.maths.org/8937

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