Fleet Infant School

Reasoning in Maths

November 2024

Maths Curriculum Meeting for Parents

What does reasoning look like?

Its quite hard to pinpoint...

Good **'because'** statements

Requires children to make use of **all the mathematical skills** they have acquired so far.

Helps maths to make **more sense**

It's in the National Curriculum

"The second aim of the new mathematics National Curriculum in England (DfE, 2013) is that all pupils will: Reason mathematically by following a line of enquiry, conjecturing relationships and generalisations and developing an argument, justification or proof using mathematical language"

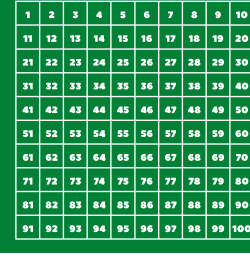
What do we encourage the children to use?

NUMICON

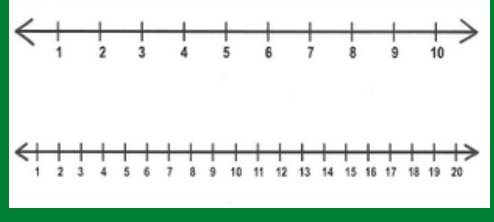
DIENNES

BEAD STRINGS

100 SQUARE

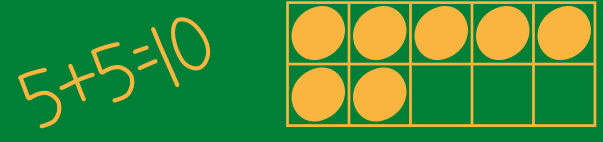


NUMBER LINE



MULTI LINK

DRAWINGS & JOTTINGS



Progession in reasoning

1 STEP ONE
DESCRIBING

Simply tells what they did.

2 STEP TWO
EXPLAINING

Offers some reasons for what they did. These may or may not be correct. The argument may yet not hang together coherently. This is the beginning of inductive reasoning.

3 STEP THREE
CONVINCING

Confident that their chain of reasoning is right and may use words such as 'I reckon' or 'without doubt'. The underlying mathematical argument may or may not be accurate yet is likely to have more coherence and completness that the explaining stage. This is call inductive reasoning.

4 STEP FOUR
JUSTIFYING

A correct logical argument has a complete chain of reasoning to it and it uses words such as 'because', 'therefore', 'and so', 'that leads to'...

5 STEP FIVE
PROVING

A watertight argument that is matematically sound, often based on generalisations and underlying structure. This is also called deductive reasoning.

Working towards the expected standard

Working towards the expected standard
The pupil can: • read and write numbers in numerals up to 100 • partition a two-digit number into tens and ones to demonstrate an understanding of place value, though they may use structured resources[1] to support them • add and subtract two-digit numbers and ones, and two-digit numbers and tens, where no regrouping is required, explaining their method verbally, in pictures or using apparatus (e.g. 23 + 5; 46 + 20; 16 – 5; 88 – 30) • recall at least four of the six[2] number bonds for 10 and reason about associated facts (e.g. 6 + 4 = 10 , therefore 4 + 6 = 10 and 10 – 6 = 4) • count in twos, fives and tens from 0 and use this to solve problems • know the value of different coins

Reason about Addition and subtraction -1

"I know that 4 + 6 = 10 so 6 + 4 = 10."

Reason about Addition and subtraction -2

"I know that 4 + 6 = 10 so 6 + 4 = 10 because addition can be done in any order."

Working at the expected standard

Working at the expected standard
The pupil can: • read scales* in divisions of ones, twos, fives and tens • partition any two-digit number into different combinations of tens and ones, explaining their thinking verbally, in pictures or using apparatus • add and subtract any 2 two-digit numbers using an efficient strategy, explaining their method verbally, in pictures or using apparatus (e.g. 48 + 35; 72 – 17) • recall all number bonds to and within 10 and use these to reason with and calculate bonds to and within 20, recognising other associated additive relationships (e.g. If 7 + 3 = 10, then 17 + 3 = 20; if 7 – 3 = 4, then 17 – 3 = 14; leading to if 14 + 3 = 17, then 3 + 14 = 17, 17 – 14 = 3 and 17 – 3 = 14)

Reason about Addition and subtraction – 1

"26 could be 20 and 6 or 10 and 16."

Reason about Addition and subtraction – 2

"26 could be 20 and 6 or 10 and 16. I know this because I moved a ten"

Example

Choose some different sized objects. Is the largest object always the heaviest? Why? Why not?

I think the biggest object will/will not always be the heaviest because It mite not hogeey But it mit not. ✓

I think the biggest object will/will not always be the heaviest because If it was a balloon than the big and that it mite

Super reasoning

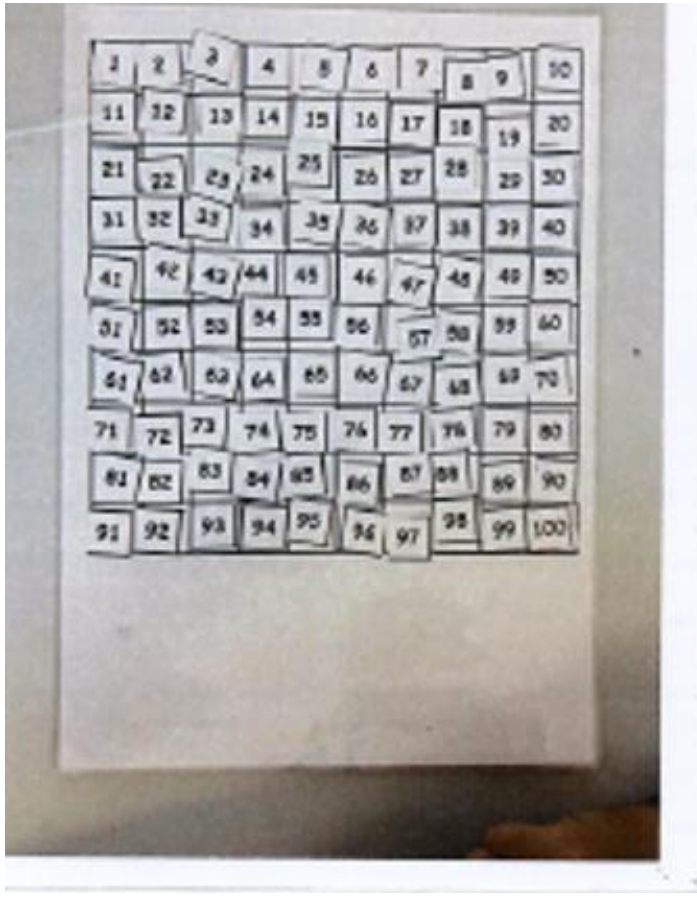
I think the biggest object will/will not always be the heaviest because a smol stone in my garden is nice hevo. ✓ Great reasoning

small

garden

Example

06.09.18 LO: To complete the jigsaw of the 100



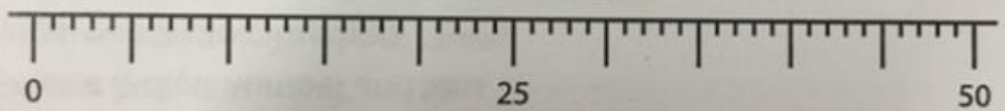
Explain your thinking:

I placed the numbers by using my mental maths. "16 is under 6 as it is 1 more 10"

Place value

Place these numbers on the number line:

10, 48, 30



Here is part of a number square.

What is the largest number on the whole square?

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16		
19	20	21			
25	26				
31	32				

Example

LO: to use place value and number knowledge to solve a problem.

47 is 3 tens and 17 ones.

No. You have to have 4 tens. So 47 is 4 tens and 17 ones.

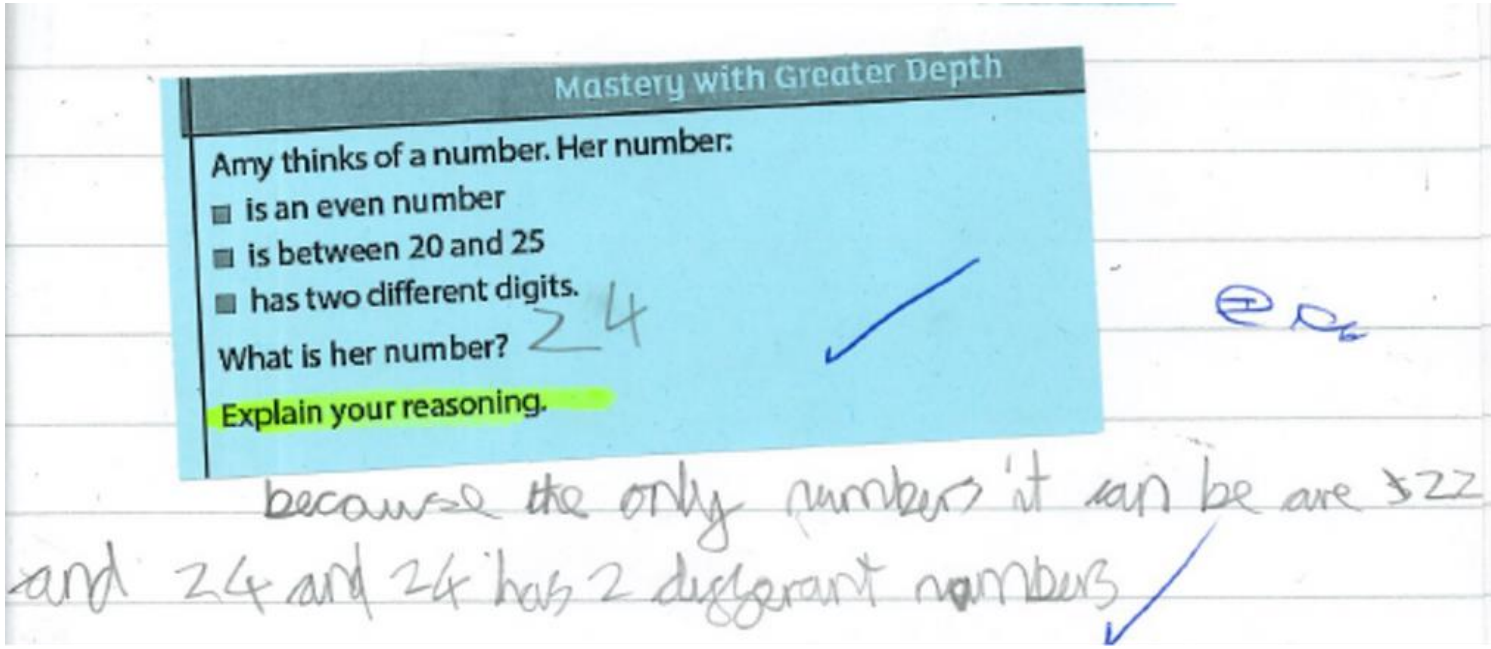
Ben and Holly

Who is right? Ben ✓

How do you know? Write below in your book.

because if you have 4 tens and 17 ones. you will end up with 57. ✓

Example



Mastery with Greater Depth

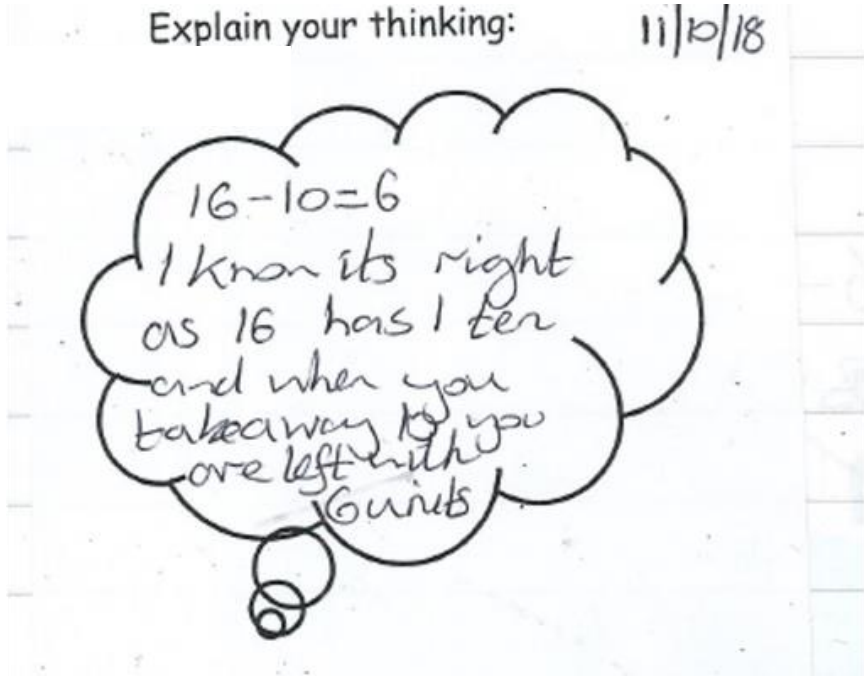
Amy thinks of a number. Her number:

- is an even number
- is between 20 and 25
- has two different digits.

What is her number? 24

Explain your reasoning.

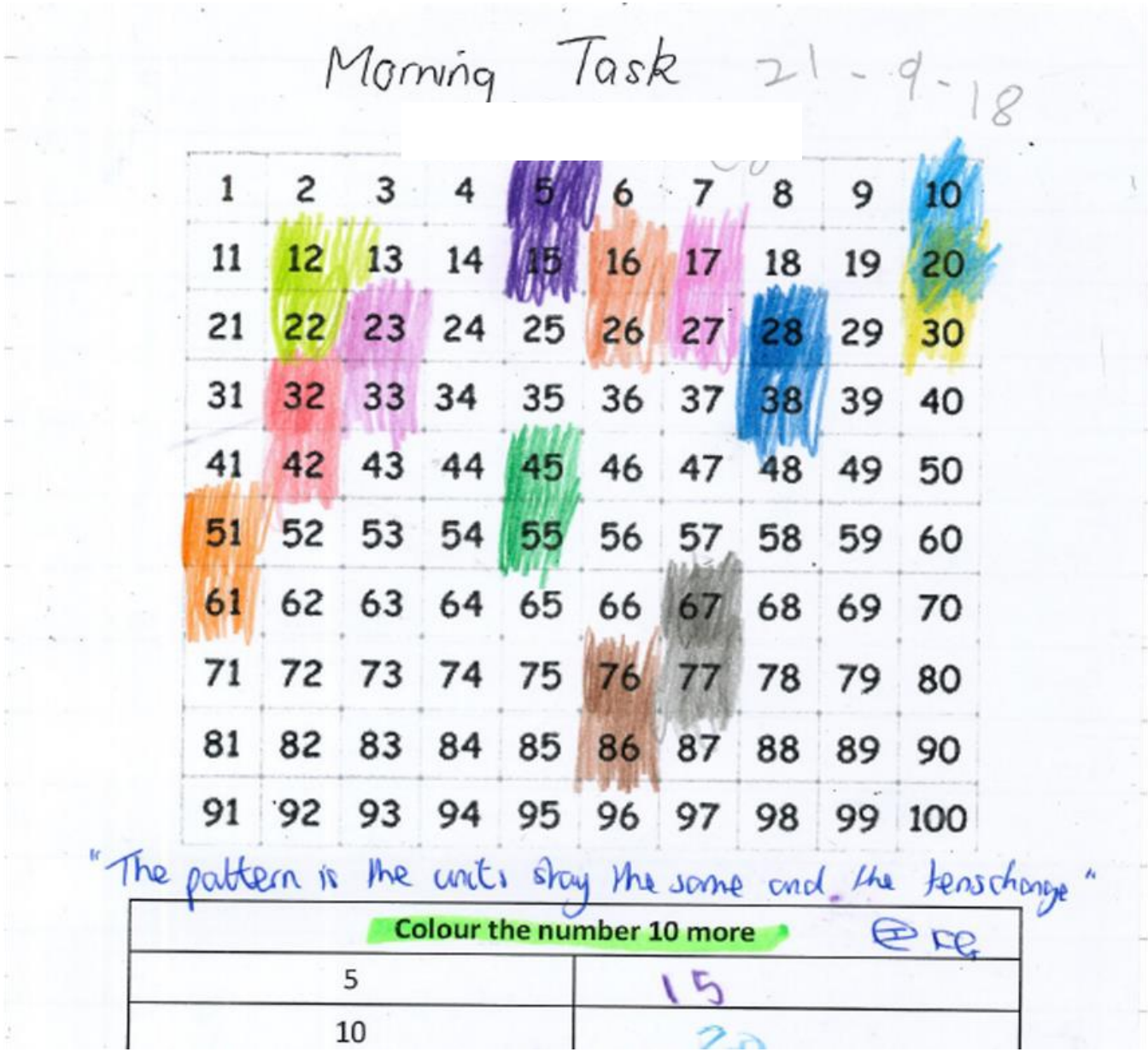
because the only numbers it can be are 22 and 24 and 24 has 2 different numbers



Explain your thinking: 11/10/18

16-10=6
I know its right as 16 has 1 ten and when you takeaway 10 you are left with 6 units

Example



Morning Task 21-9-18

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

"The pattern is the units stay the same and the tens change"

Colour the number 10 more	
5	15
10	20

Whats the next number in the sequence?

50,45,40,35,30,_?

Why?

500,450,400,350,300,_?

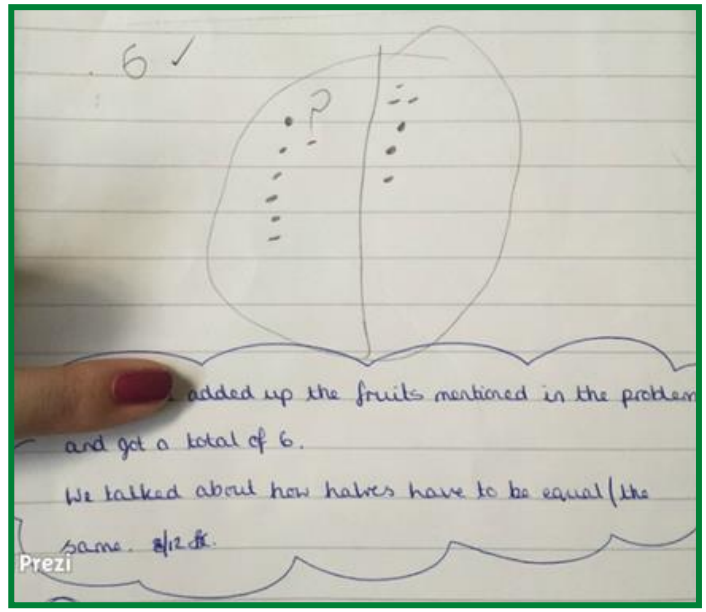
Reasoning about fractions

Here is a bowl of fruit.
Half of the pieces of fruit in the bowl are apples. There are also 3 oranges, 2 pears and a banana

How many apples are there in the bowl?

If, instead, one quarter were apples, and one quarter were orange and there were also 4 bananas, 3 pears and 3 plums

How many would be apples?



16	15
5	10

Thank You

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