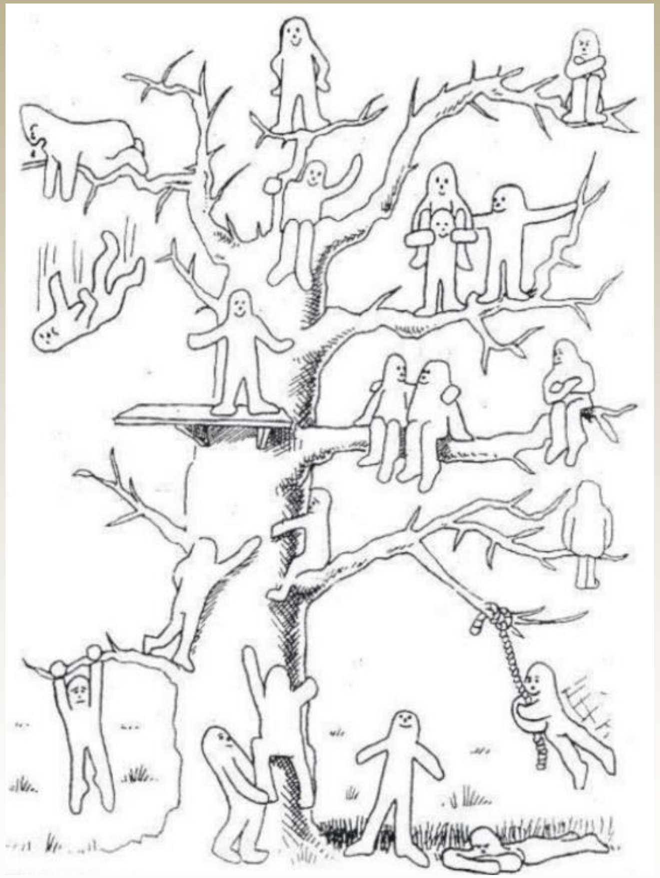
KS2 Maths

Tuesday 3rd December 2024

Look at the picture of the Blob Tree.

When it comes to maths, which Blob represents you the best and why?

Which Blob do you think represents your child?



Agenda

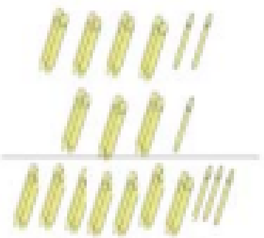
1. Calculation policy
2. Mathematical language
3. Practical resources and visual representations

Calculation policy

Representations to support mental and written calculations.

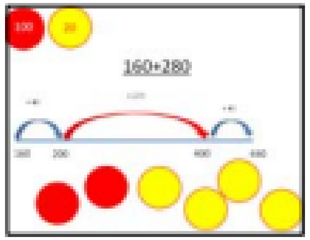
Use a range of concrete, pictorial and abstract representations, including those below

Bundles of straws



42 + 31 = 73

0 + 50 + 3
10 + 40 + 3
20 + 30 + 3
30 + 20 + 3
40 + 10 + 3
50 + 0 + 3

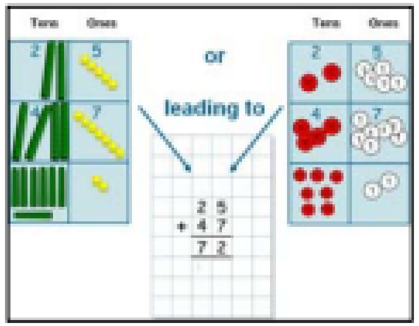


I can explain my method using representations

76 + 21
= 70 + 6 + 20 + 1
= 90 + 7 = 97

Partitioning and recombining

What is the same and what is different about all these methods?



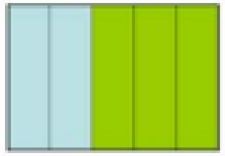
Dienes and place value counters

Fractions

Addition of fractions with the same denominator within one whole.

Addition of fractions with the same denominator

$\frac{2}{5} + \frac{3}{5} = \frac{5}{5}$



Calculation policy

Written Calculations

Add numbers with up to three digits, using formal written (columnar) methods

Add to three digit numbers using physical and abstract representations (e.g. straws, dienes, place value counters, empty number lines)

- Straws, dienes, place value counters, empty number lines

30 + 4	34
20 + 5	+25
50 + 9	59

200 + 30 + 4	234
500 + 20 + 7	+ 527
700 + 60 + 1	761
10	1

Revert to concrete representations if children find expanded/column methods difficult

Calculation policy

Written Calculations

Add whole numbers with more than four digits, using the formal written (columnar) method

Add three digit numbers using columnar method and then move onto 4 digits.
Include decimal addition for money

```
  24172m
+  5929m
  30101m
  1 111
```

```
  £563.14
+ £207.88
  £771.02
   1 1  1
```

Revert to expanded methods if children find formal calculation method difficult (see Y3)

Represent-ations to support mental and written calculations.

Use physical/pictorial representations alongside columnar methods where needed.

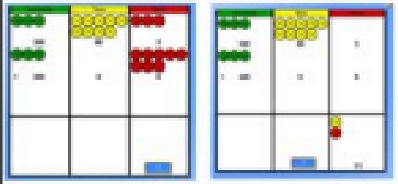
12 462 + 2300
= 12 462 + 2000 + 300
= 14 462 + 300
= 14 762

Partitioning and recombining

Ask **what is the same** and **what is different** about all these methods?

Jottings to support mental calculation

Place Value counters to support column addition



```
  393
+ 308
    1
    1
```

Calculation policy

Written Calculations	**Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).** ***(Pupils) practise adding and subtracting decimals.*** Begin with three-digit numbers using formal, columnar method; then move into four-digit numbers.

As in Year 4, compare physical and / or pictorial representations and expanded algorithms alongside columnar methods. Ask: *What is the same? What's different?*
Compare and discuss the suitability of different methods, (mental or written), in context.
Revert to expanded methods whenever difficulties arise

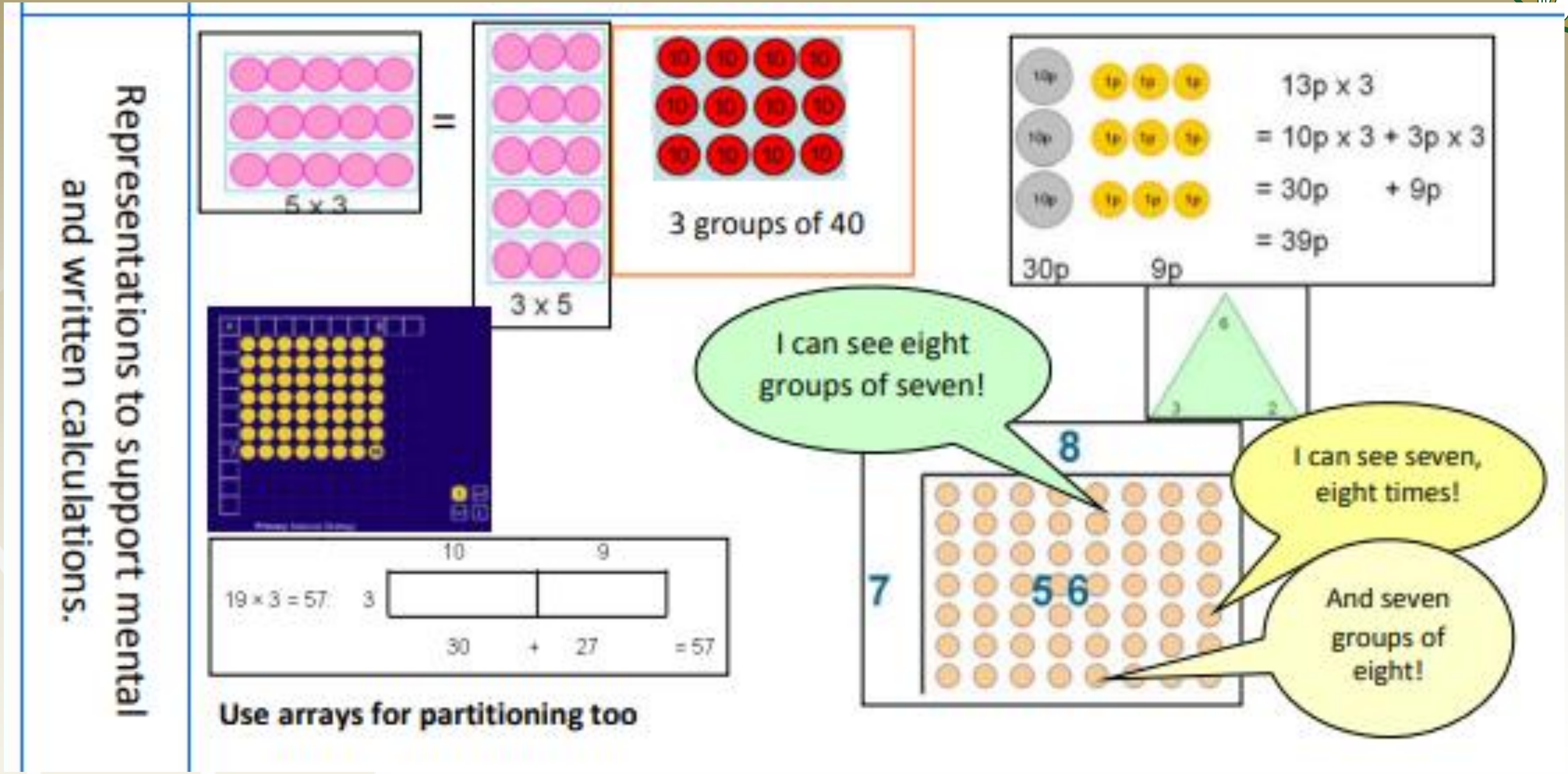
£17.34—£12.16

What is the same about these models? What's different?

```
 1000+700+20+14p          2                 £  2
- 1000+200+10+ 6p  →    1734p    →        17.34
      500+10+ 8p      - 1216p            - 12.16
                        518p                5.18
```

Relate place value of decimals with that of whole numbers using representations. See below.

Calculation policy



Calculation policy

Written Calculations

- **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**

24 × 16 becomes

```
     2
   2 4
 × 1 6
 2 4 0
 1 4 4
 3 8 4
```

Ans…

124 × 26 becomes

```
  1 2
  1 2 4
×   2 6
2 4 8 0
  7 4 4
3 2 2 4
1 1
```

Answer: 3224

124 × 26 becomes

```
  1 2
  1 2 4
×   2 6
  7 4 4
2 4 8 0
3 2 2 4
1 1
```

Answer: 3224

2741 × 6 becomes

```
  2 7 4 1
×       6
1 6 4 4 6
  4 2
```

Answer: 16 446

Compact methods for multiplication are efficient but often do not make the value of each digit explicit. When introducing multiplication of decimals, it is sensible to take children back to an expanded form such as the grid method where the value of each digit is clear, to ensure that children understand the process.

Does your answer seem reasonable?

Revert to expanded methods if children find formal calculation method difficult (see Y3/Y4)

Calculation policy

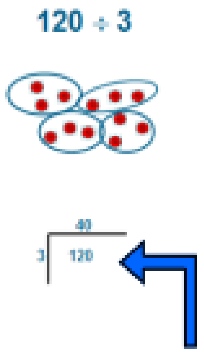
Written Calculations

Pupils should be taught to:

•write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.

•solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects, (see Links from other strands, below.)

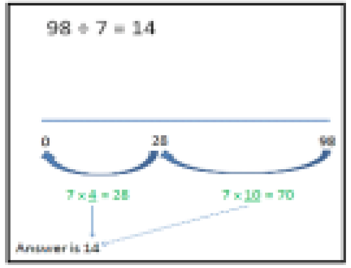
"I know 6÷3=2, so 60÷3=20."
"I know 12÷3=4, so 120÷3=40."



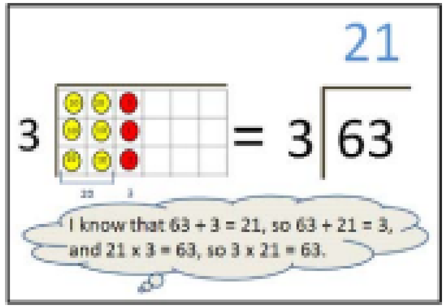
New written methods can be modelled alongside mental or informal methods to ensure understanding.

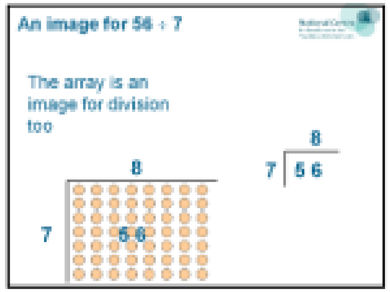
Representations to suppor[t] written calculatio[ns]

Use a range of concrete and pictorial resources, including:



63 ÷ 3 equals three groups of 2 tens and a one.





How could I calculate 72÷3 ?

Informal exploration with manipulatives supports the progression to formal written methods—which is continued in Year 4.

Calculation policy

Written Calculations

Pupils practise and extend their use of the formal written methods of short multiplication and short division.

- 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.

98 ÷ 7 becomes

```
   1 4
7 | 9 ²8
```

Answer: 14

432 ÷ 5 becomes

```
    8 6 r2
5 | 4 ³3 2
```

Answer: 86 remainder 2

496 ÷ 11 becomes

```
       4 5 r1
1 1 | 4 9 ⁵6
```

Answer: $45\frac{1}{11}$

- Pupils interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding. (See Representations below.)

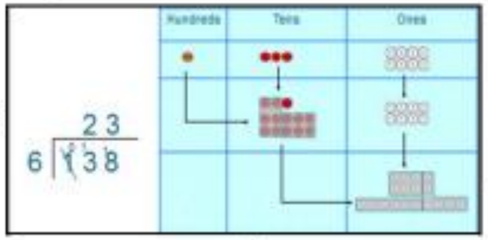
Revert to expanded methods if children find formal calculation method difficult

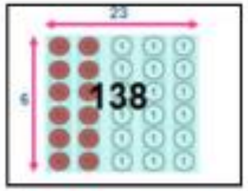
Representations to support mental and written calculations.

Can we divide this (100) token into 6 equal groups?, then we must exchange it for ten (10) tokens. Can we divide into 6 groups now?

Short division with exchange.

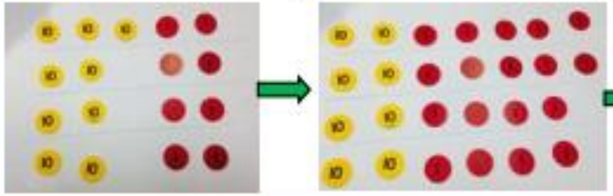
```
   2 3
6 | 1³3 ¹8
```

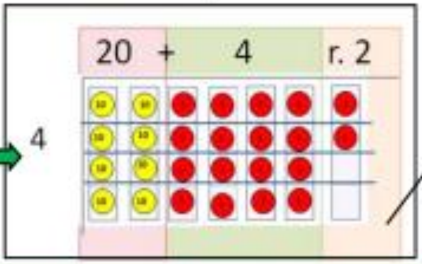




Practical experience with manipulatives is vital for children to talk through the language of division e.g. *exchange*, *remainder*; and to embed conceptual understanding.

Understanding remainders.



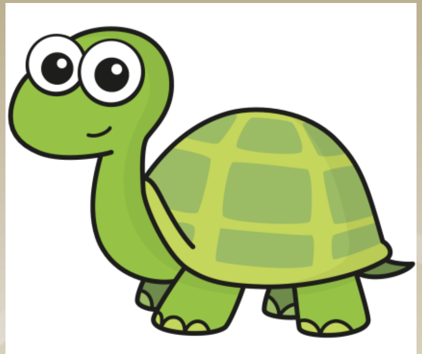


2 out of a whole group of 4 = $\frac{2}{4} = \frac{1}{2} = 0.5$

$98 \div 4 = \frac{98}{4} = 24 \text{ r } 2 = 24\frac{1}{2} = 24.5$

What is the same? What's different about the ways that these remainders are expressed?

Why is using precise mathematical language so important?



"Use of precise mathematical language enables all pupils to communicate their reasoning and thinking effectively. If a pupil fails to grasp a concept or procedure, this is identified quickly, and gaps in understanding are addressed systematically to prevent them falling behind."

NCETM

I think Tiny is correct/incorrect because...

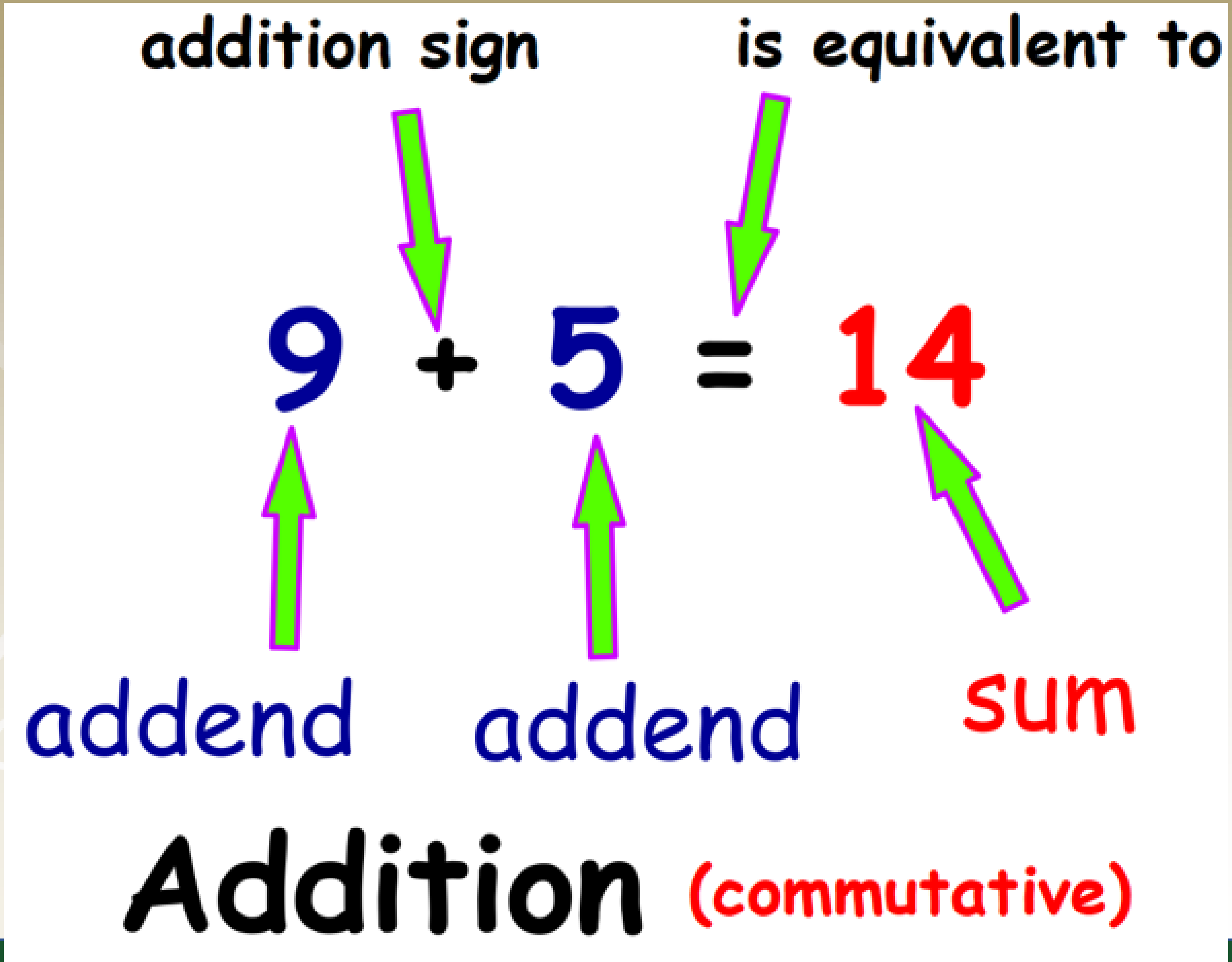
If I know... then I know...

I agree/disagree because...

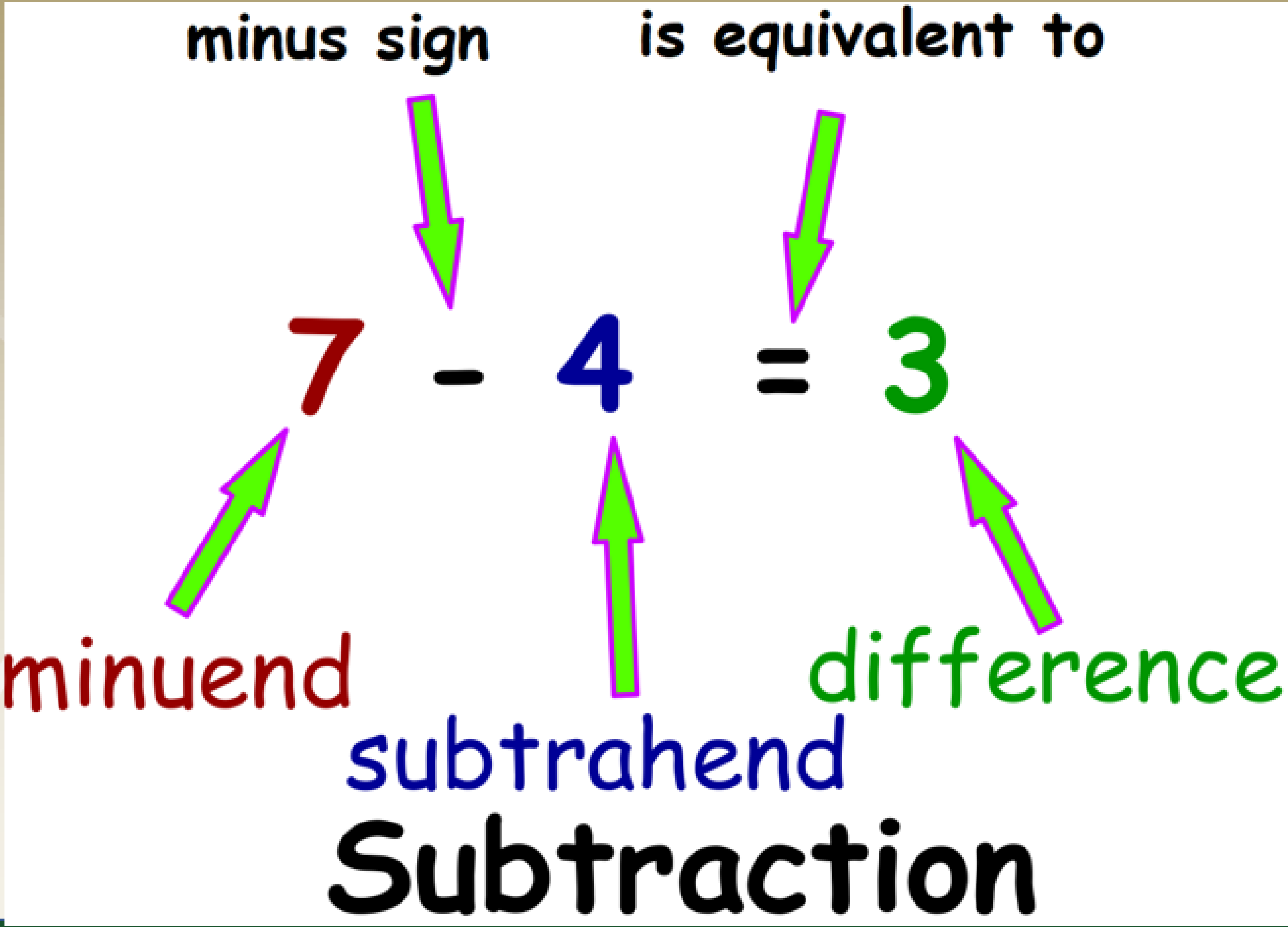
I think this is always/sometimes/never true because...

I noticed that...

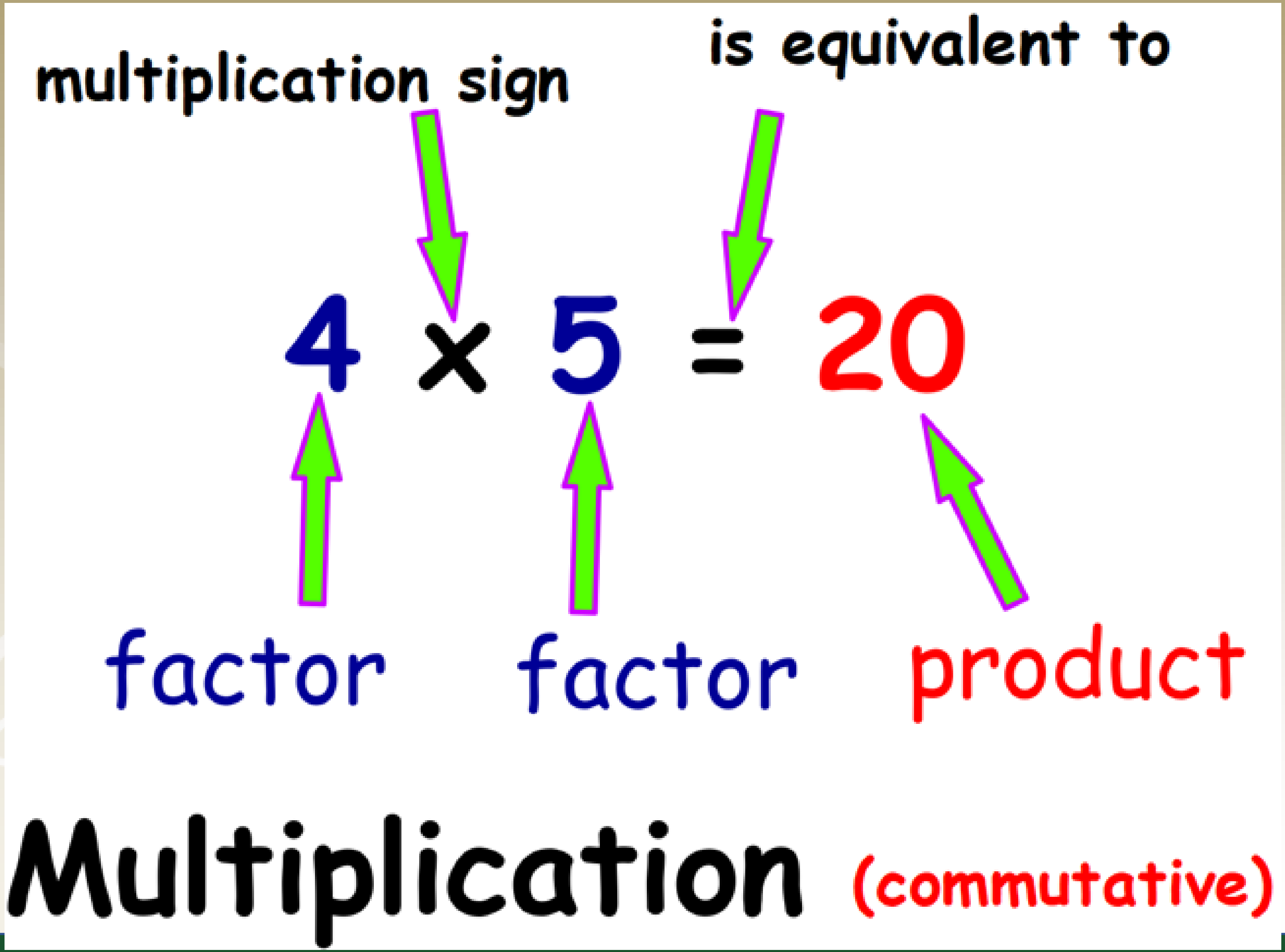
Mathematical language



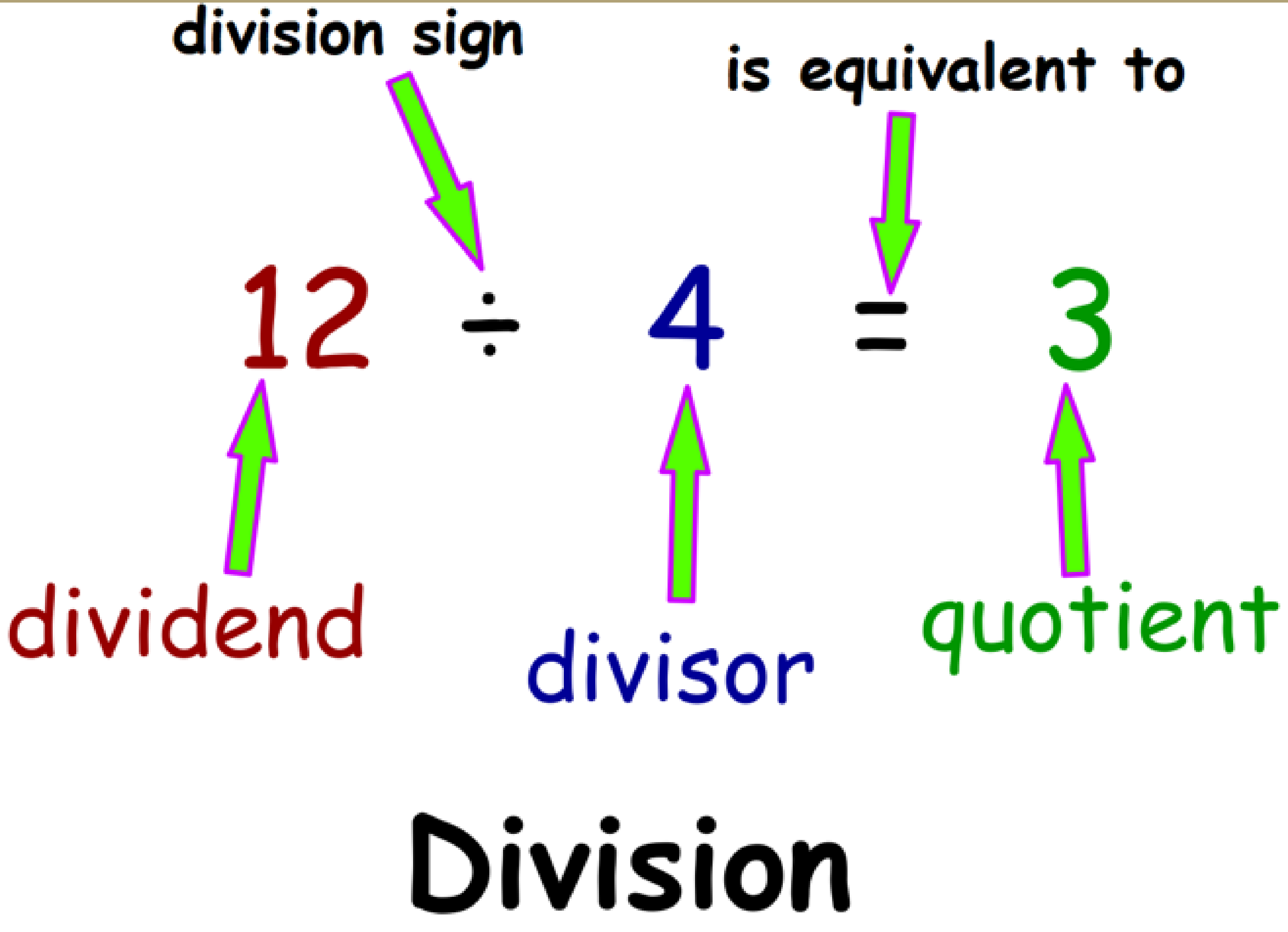
Mathematical language



Mathematical language



Mathematical language



Practical resources and visual representations

"Unlike traditional maths teaching methods where teachers demonstrate how to solve a problem, the CPA approach brings concepts to life by allowing children to experience and handle physical (concrete) objects." Maths, No Problem!

place value counters dienes numicon