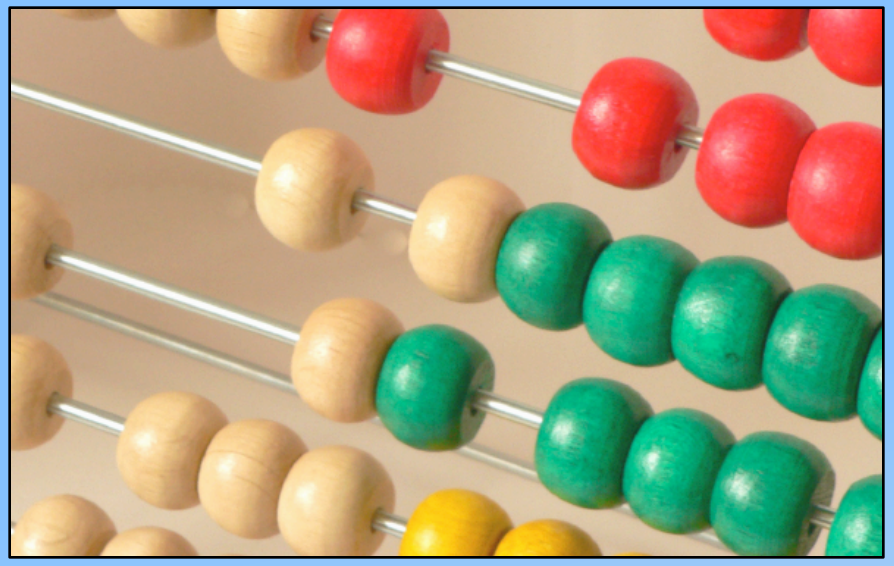
PRIMARY ADVANTAGE MATHEMATICS PROGRAMME

A MODEL OF BEST PRACTICE

4260



What to Expect in Lower KS2 Mathematics

Catherine Thomas

PA

The Fundamentals – Year 3

Counting

Count from zero in multiples of four, eight, fifty and one hundred

0	4			16	20	
0		100	150	200		
0	8		24	32		

Complete the number patterns.

Count on and back in tens and hundreds from any given number

Sally is counting backwards in hundreds. She starts at 526, then counts back 3 more hundreds. What does she count back to?

Place Value

Recognise the place value of each digit in a three digit number

Write the number in the box.

559 = 500 + 50 + ☐

559 = 500 + ☐ + 19

559 = 200 + ☐ + 9

Read, write, compare and order numbers to one thousand (in numerals and words)

Write these numbers in words:

637 703 350 599

Addition and Subtraction

Mentally add and subtract one, ten and a hundred to any three digit number

Complete these using a mental method.

42 + 37 = ☐ 29 + 67 = ☐

69 - 27 = ☐ 170 - 19 = ☐

Add and subtract numbers up to three digits with regrouping using the column method

Use a written method of column addition to complete the following.

487 + 16 + 83 =

Multiplication and Division

Identify factor pairs using two, three, four, five, eight and ten times table (deriving division facts)

What are the factor pairs for 16:

4 x 4 ☐ ☐

Multiply and divide two digit by one digit using short method for division and multiplication.

Use a written method of multiplication to complete the following.

63 x 8 = 38 x 4 =

The Fundamentals – Year 4

Counting

Count in sixes, sevens, nines, twenty fives and thousands both forwards and backwards (including negative numbers)

Complete these sequences:

9 0 -9 -18 ☐ ☐

4000 3000 ☐ 1000 ☐ -1000

Count in hundredths and recognise that hundredths arise when dividing 1 digit numbers by 100

Continue counting in hundredths:

1.57 1.58 ☐ ☐

Place Value

Read, write, compare and order numbers up to ten thousand (knowing value of each digit)

Order these numbers

1423 1234 1324 1342

☐ ☐ ☐ ☐

smallest largest

Round to nearest ten, hundred, thousand and decimals (1 decimal place) to nearest whole.

Dwayne weighed out 2067 grams of sand on his weighing scales.

To the nearest thousand, how many grams was this?

Addition and Subtraction

Add and subtract up to ten thousand with regrouping (using the column method)

Artek collected 3056 leaves into a recycling bin in the playground. The wind blew 178 leaves out of the bin. Artek then collected another 264 leaves into the bin.

How many leaves were in the bin then?

Add and subtract nearest multiple of ten, one hundred or one thousand and adjust

Mr Print, the newsagent, has 56 newspapers to sell. He sells 37 newspapers to customers. Another 48 newspapers are delivered to the shop.

How many newspapers are in the shop now?

Multiplication and Division

Rapid recall of multiplication and division facts to 12 x 12

Complete these:

11 x 11 = ☐ 120 ÷ 12 = ☐

132 ÷ 11 = ☐ 9 x 12 = ☐

Use short multiplication and division methods

Use a written method to complete the following.

616 x 8 = 85 ÷ 7 =

Key Vocabulary

+	-
Get some more, real story, maths story, same value different appearance, tens, units, hundreds, thousands, place value, digit, value, combine, sum, total, add, addition, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make…?, equals, sign, regroup, tens boundary, hundreds boundary, units boundary, tenths boundary, inverse, fair swap	Get ready to take away, real story, maths story subtract, take away, minus, decrease, leave, how many are left/left over? difference between, half, halve, how many more/fewer is.. than…?, how much more/less is…?, equals, sign, tens boundary, hundreds boundary, units boundary, tenths boundary, inverse, regroup, fair swap
x	**÷**
Lots of, groups of, I love that number- how many times? times, product, multiply, multiplied by, multiple of, once, twice, three times, four times, five times,… ten times, repeated addition, array, row, column, double, regroup, fair swap, inverse	Halve, share, share equally, one each, two each, three each…, group in pairs, threes… tens, equal groups of, divide, divided by, divided into, divisible by, remainder, factor, quotient, inverse, regroup, fair swap, inverse

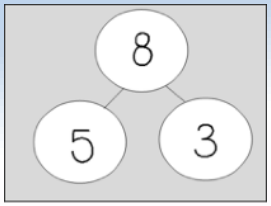
Addition and Subtraction

Number bonds

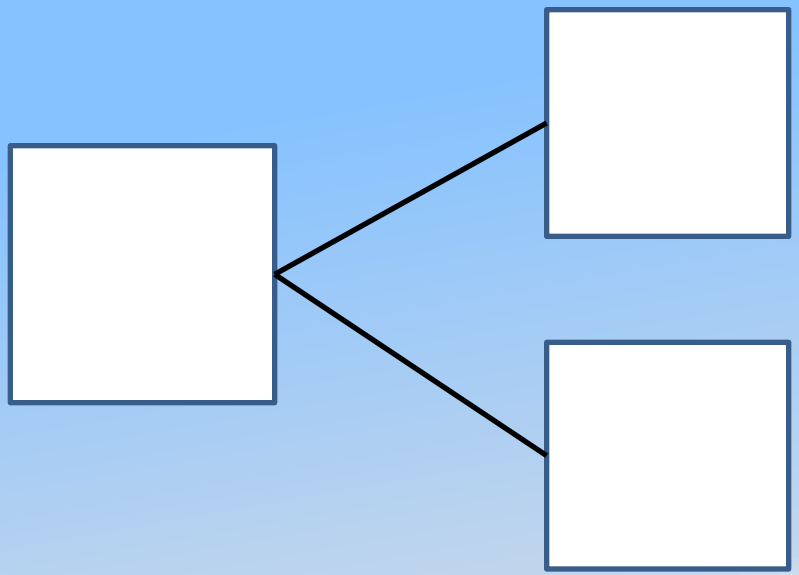
Number bonds

Part- Part whole relationship

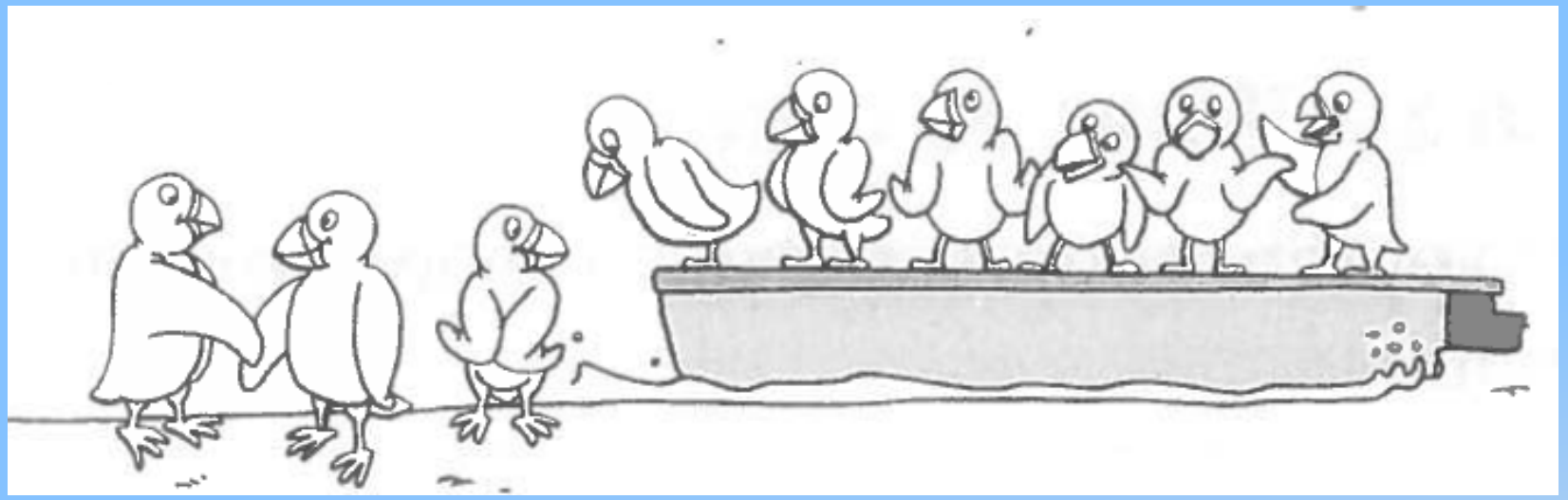
Missing parts

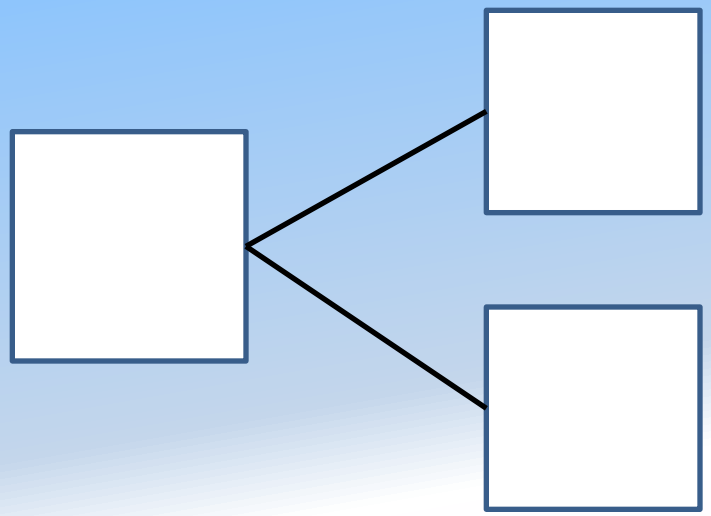


Number Bonds- Part-Part-Whole Relationships



Number Bonds- Part-Part-Whole Relationships





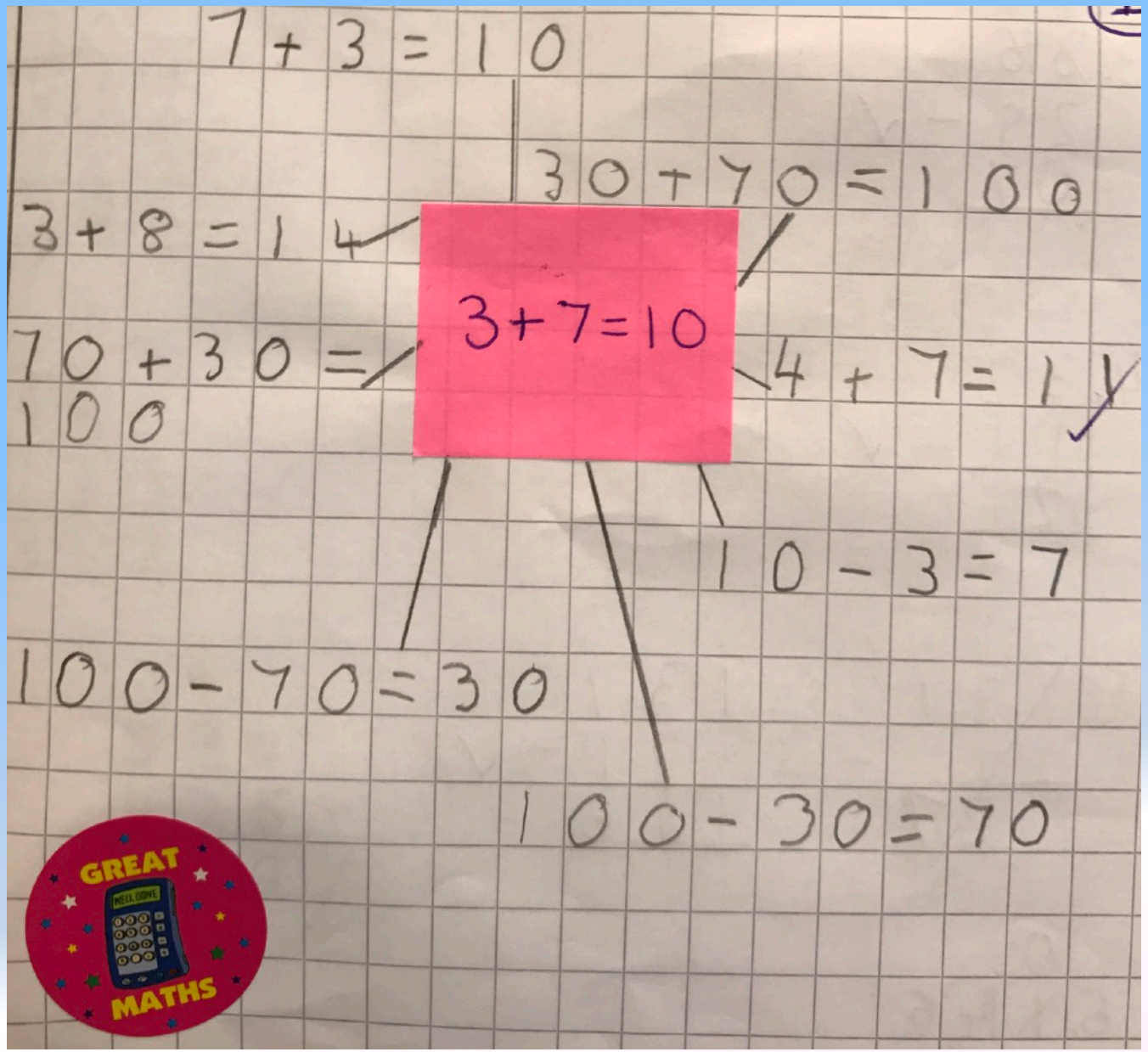
How many puffins are swimming?
3 puffins swimming

How many puffins in the boat?
6 puffins in the boat

How many puffins altogether?
9 puffins altogether.

3 is a part
6 is a part
9 is the whole amount

Play - 'If I know… game'



Represents and uses number bonds and related subtraction facts within 20.

Knowledge of Fact Families and more.

3 + 7 = 10

7 + 3 = 10

10 - 3 = 7

10 - 7 = 3

30 + 70 = 100

PA

Written Methods for Addition

Expanded Method

20	+	3
10	+	4
30	+	7

+

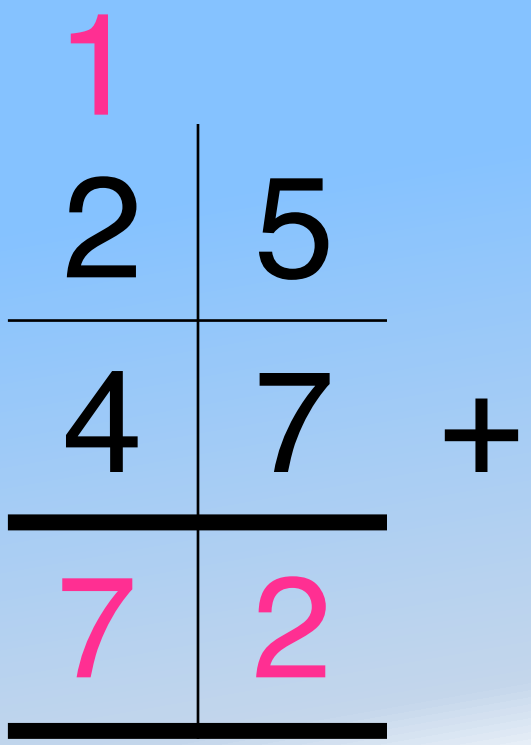
20	+	5
40	+	7
70	+	2

+

regrouped and renamed → 10

Written Methods for Addition

Column Addition - Formal Written Method



***sometimes known as column addition**

Your turn:

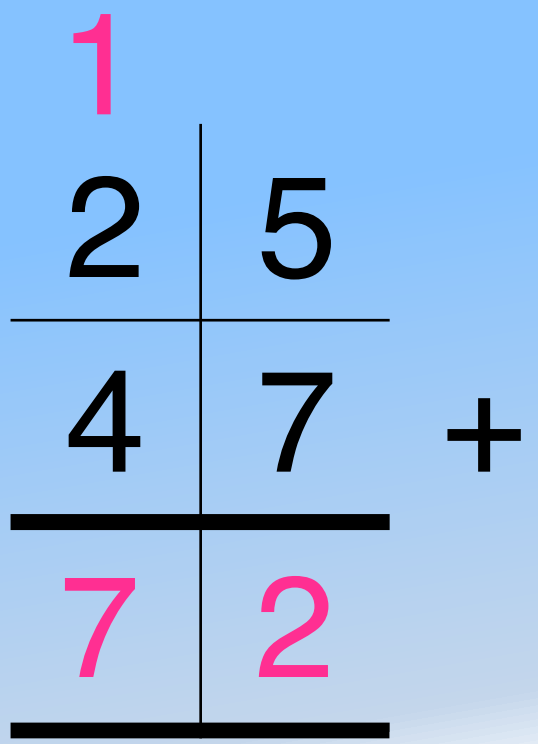
Use both the pictorial and expanded written methods to complete these sums:

a) 17 + 14

b) 22 + 17

c) 16 + 16

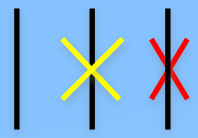
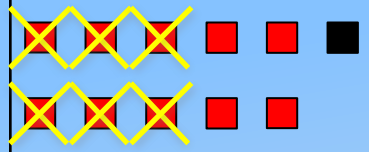
d) 13 + 50



Remember to use the terms **regroup** and **rename**.

Concrete Method for Subtraction:

$31 - 16 = 15$

T	O
	
1	5

Again we use the terms **regroup** and **rename**.

Thinking Column

$1 - 6 = X$

$11 - 6 = 5$

$20 - 10 = 10$

Written Methods for Subtraction

Expanded Method

25 – 14 = 15

20	+	5
10	+	4
10	+	1

-

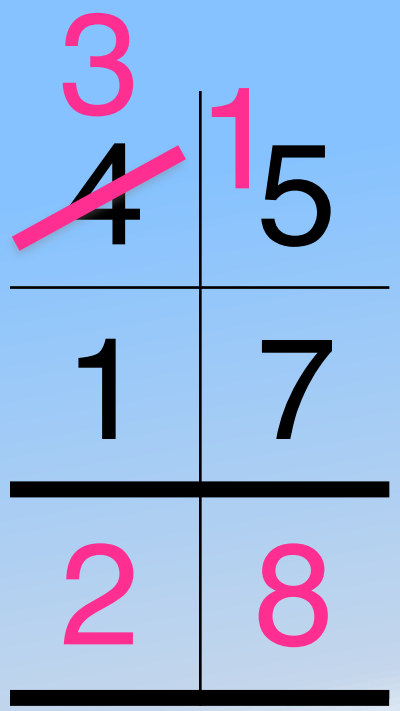
33 – 15 = 18

		10
~~30~~	+	3
10	+	5
10	+	8

-

Written Methods for Subtraction

Column Subtraction - Formal Written Method



***sometimes known as column subtraction**

Your turn:

Use both the pictorial and expanded written methods to complete these sums:

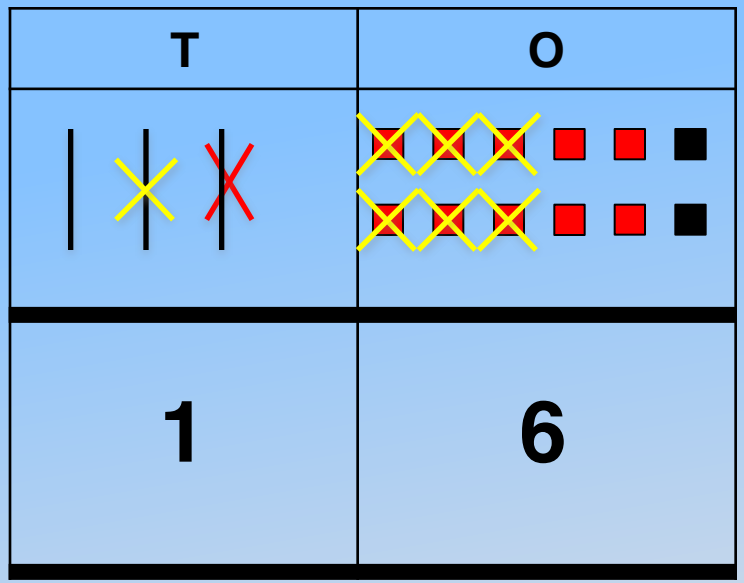
a) 17 - 14

b) 22 - 9

c) 32 - 16

d) 72 - 61

32 – 16 = 16



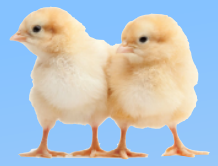
Remember to use the terms **regroup** and **rename**.

Addition and Subtraction

Word Problems

When Sarah left school on Thursday 2 chicks had hatched. By Friday there were 8 more. How many chicks hatched all together?

Thursday



2

Friday

8

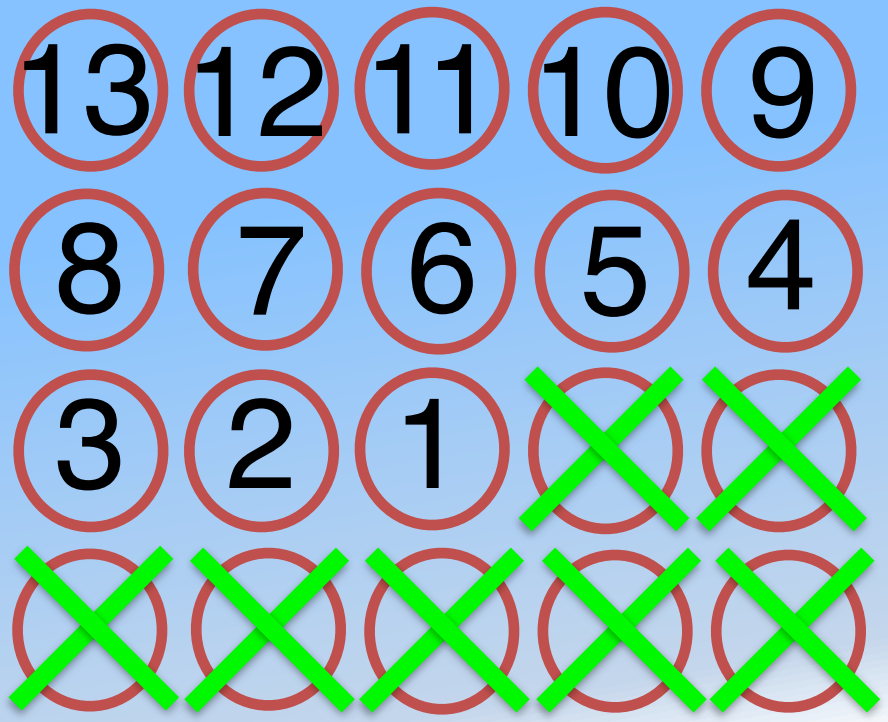
10 chicks hatched altogether.

Thinking column

2 + 8 = 10

Word Problems

Edward had 20 apples. He gave 7 to his friends. How many does he have now?



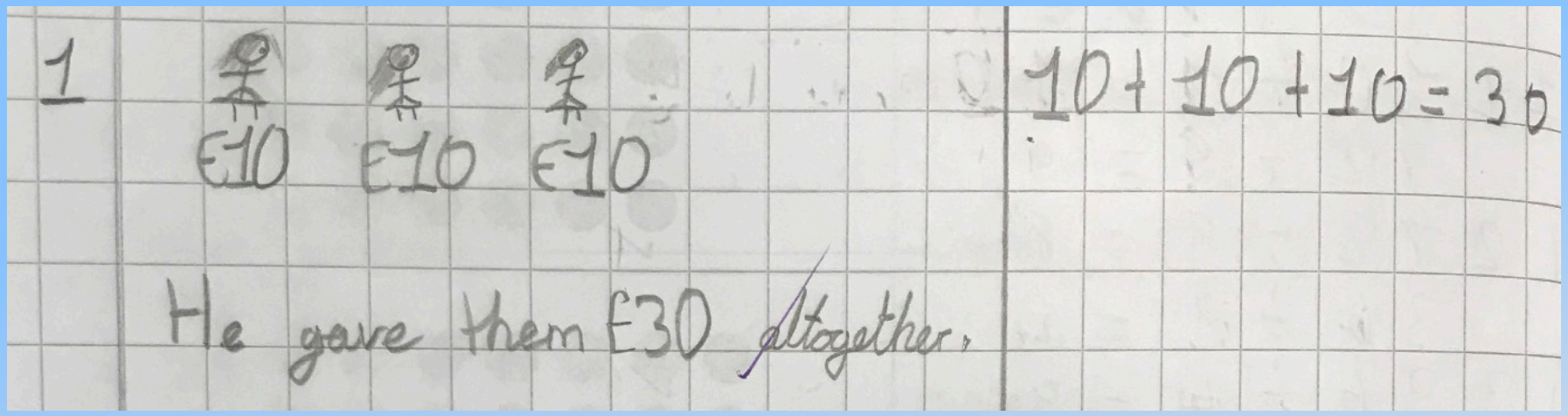
He has 13 apples left.

Thinking column

20 - 7 = 13

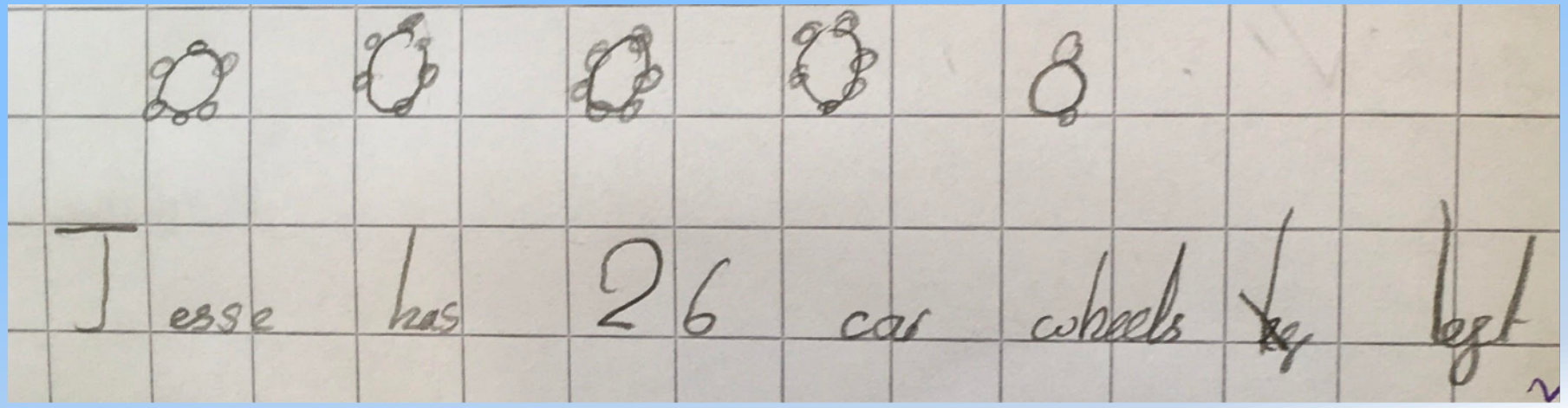
Word Problems - Your turn:

Mr Barley gives his 3 children £10 each. How much does he give his children altogether?

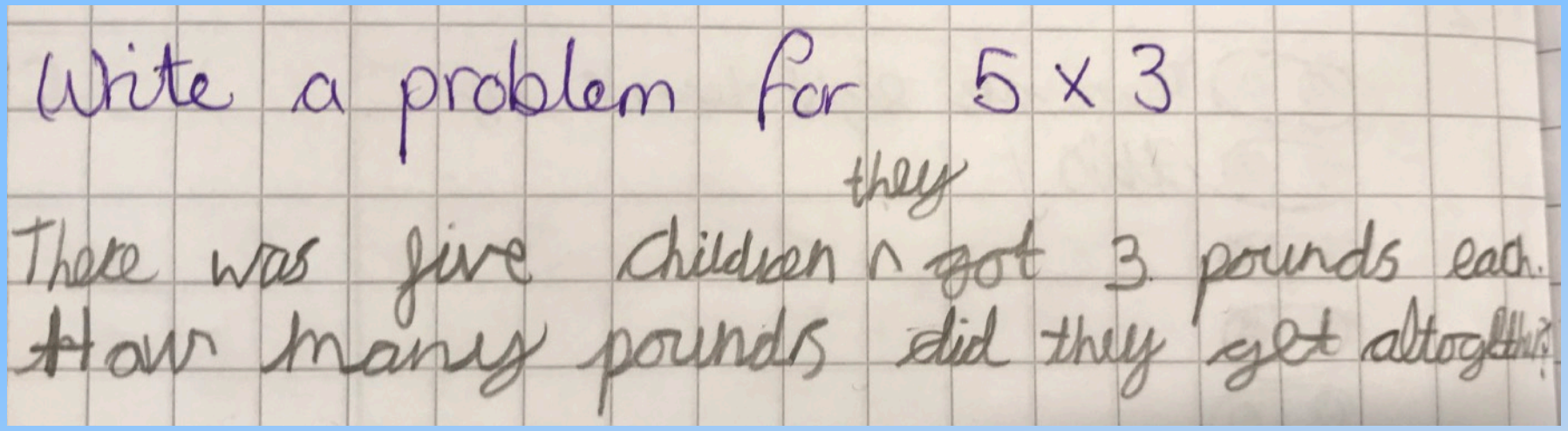


Word Problems

Jesse has 5 toy cars and each car has 6 wheels. One of the cars loses 4 wheels. How many wheels are there in total left on the cars?



A deeper understanding…

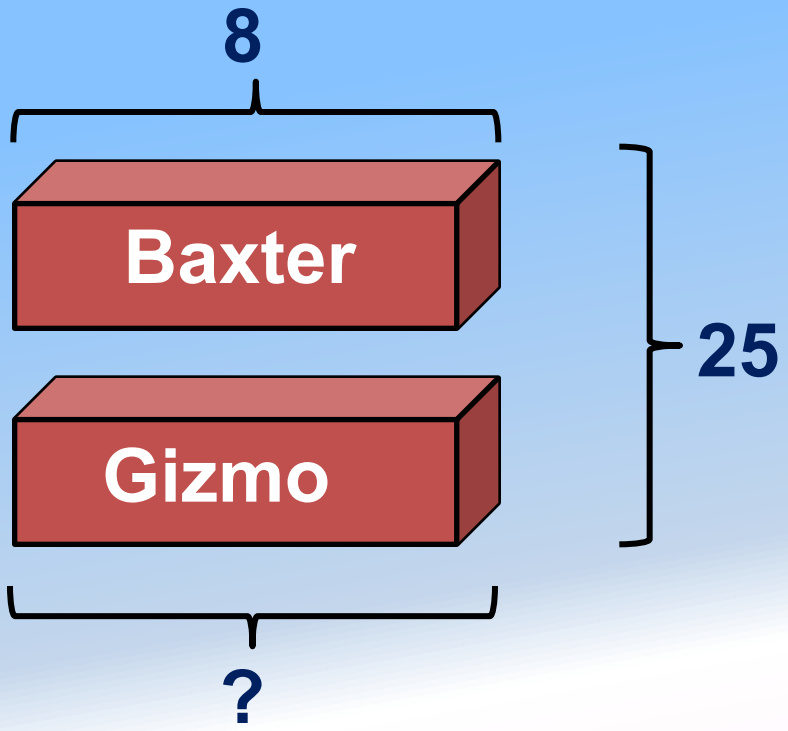


Addition and Subtraction

Addition & Subtraction Word Problems

When Baxter and Gizmo stand on a scale together, the scale reads 25 pounds. Baxter weighs 8 pounds. How much does Gizmo weigh?

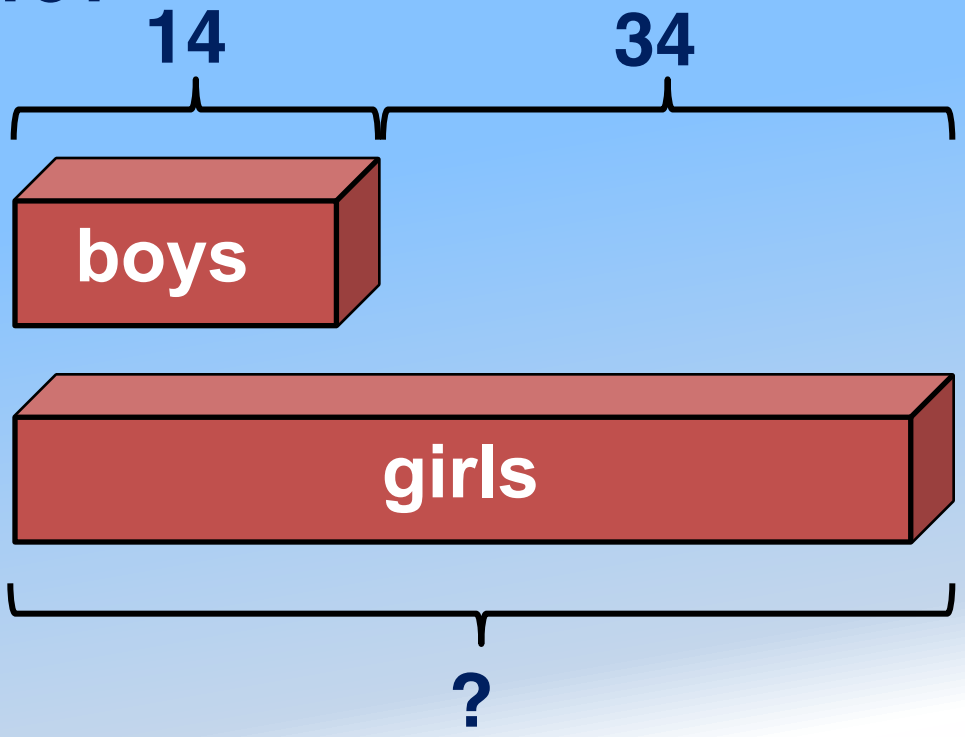
25 – 8 = 17



Gizmo weighs 17 pounds.

Addition & Subtraction Word Problems

There are 34 fewer boys than girls at the soccer game. If there are 14 boys, how many girls are there?



34 + 14 = 48

What else does this model tell us?

There are 48 girls at the match.

Addition & Subtraction Word Problems – Your turn:

1. **The sum of two numbers is 44. The bigger number is 36. What is the difference between the two numbers?**

2. **Sarah has 45 fewer stickers than Mayar. If Mayar has 105 stickers. How many stickers does Sarah have?**

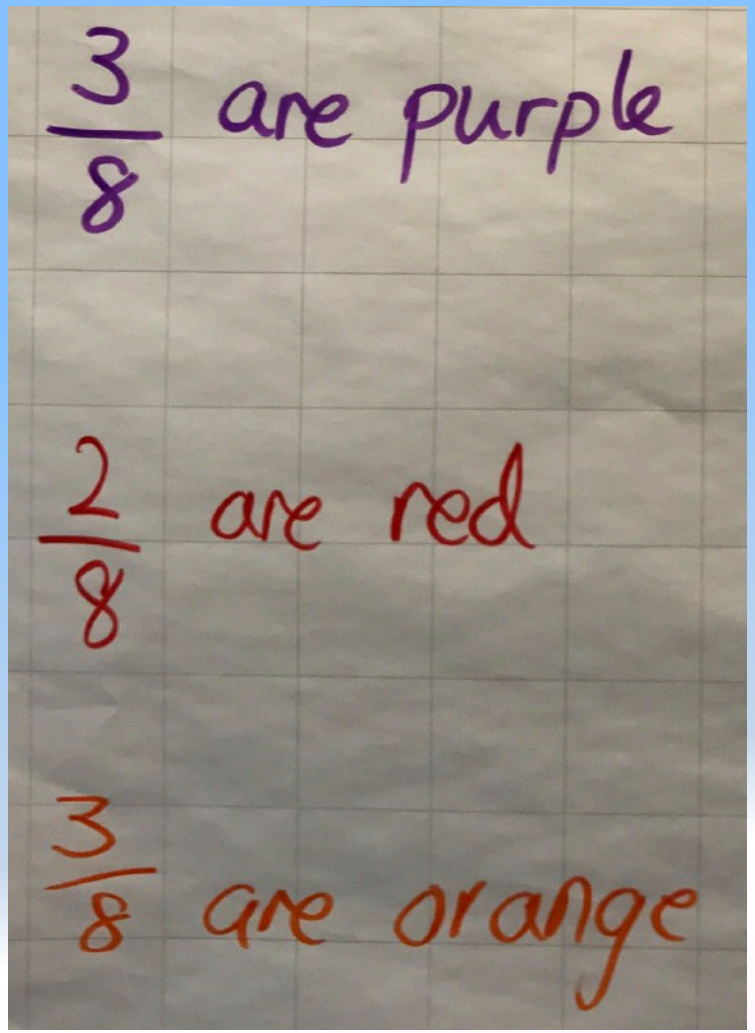
3. **Zaid has completed 12 fewer sums than Dior. If Zaid has completed 44 sums. How many sums have they completed altogether?**

4. **Princess counted her Halloween treats. She counted 34 gobstoppers, 21 chocolate bars and 18 lollipops. How many did she have altogether?**

Fractions

Fractions - Making real life links

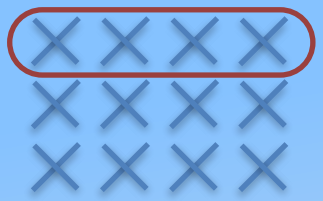
When do children come across fractions in real life situations?

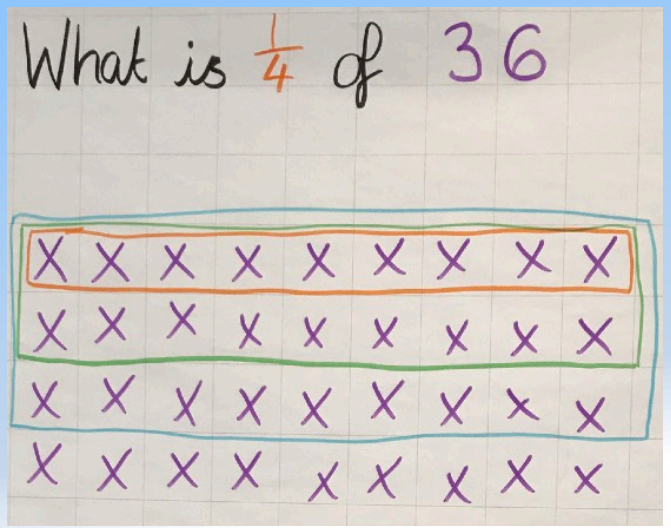


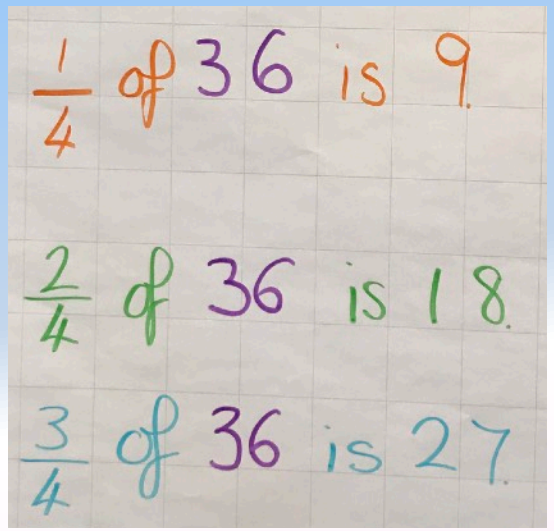
Models for Fractions

Identify 1/2, 1/3, 1/4, 2/4 and 3/4 of quantity.

What is 1/3 of 12?

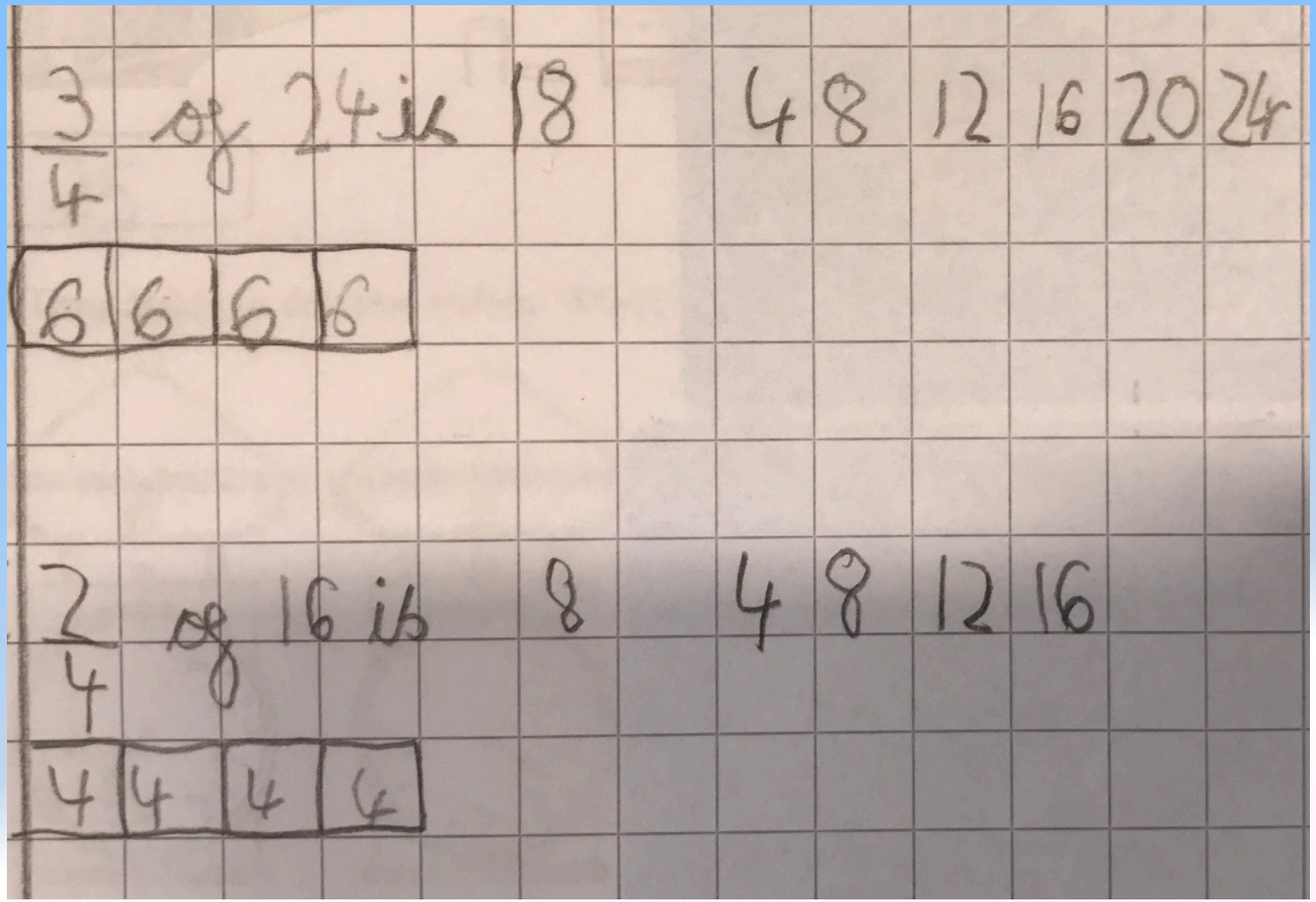






Models for Fractions

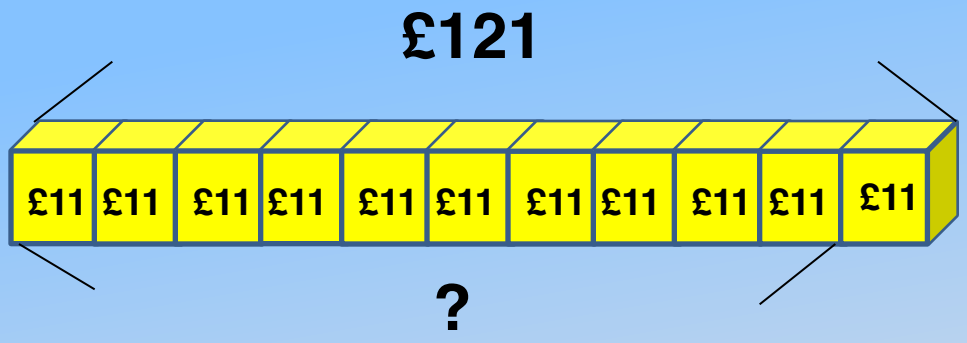
As children become more confident with the link between fractions and multiplication their workings move onto this:



Fractions

Problem Solving – Finding a fraction of a number

Jamie's lawn care business made £121 yesterday. She decided to save 10/11 of her earnings and spend the rest on supplies. How much money did Jamie save?



121 ÷ 11 = 11

10 x 11 = 110

Jamie saved £110.

Finding a fraction of a number – your turn:

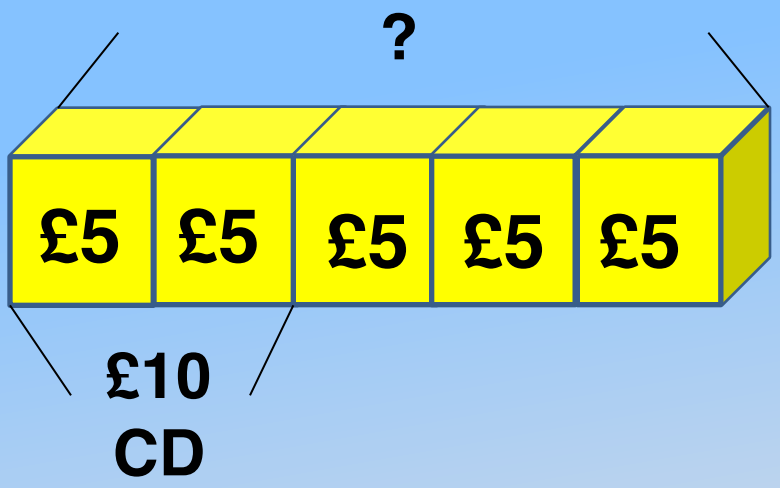
1. **The year 4 class decorated the school gym with 60 orange and green balloons. 6/10 of the balloons were orange. How many balloons were green?**

2. **Kiara had 15 books to sell. She sold 3/5 of the books on Sunday and the rest on Wednesday. How many books did Kiara sell on Wednesday?**

3. **Precision Auto had 42 customers today. 1/7 of the customers came in for a change of oil. The rest came in for a tune-up. How many customers came to the shop for a tune-up?**

Problem Solving – Finding the total or a part

Ben spent 2/5 of his money on a CD. The CD cost £10. How much money did he have at first?



$10 \div 2 = 5$

$5 \times 5 = 25$

Ben started with £25.

Finding the total or a part – your turn:

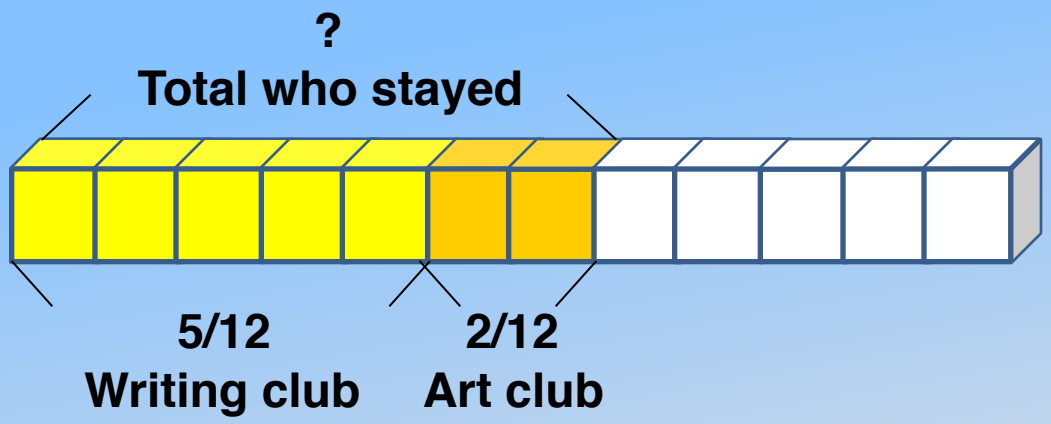
1. **Vicky went to the store and spent 4/7 of her money on a kite. The kite cost £20. How much money did Vicky have at first?**

2. **I'm thinking of a number. 5/6 of my number is 35. What is my number?**

3. **Kayla is playing a game of Galaxy Goo. She located 1/4 of the zorgs she needs to find in order to win the game. There were 15 zorgs remaining. How many zorgs had Kayla found?**

Problem Solving – Add fractions with like denominators

5/12 of the students stayed for the writing club meeting and 2/12 stayed for the art club meeting. The rest of the students went home. What fraction of the students stayed?



5/12 + 2/12 = 7/12

7/12 of the students stayed

Problem Solving – Add fractions with like denominators

1. **Marco and Riley played their favourite game, Lotsa Money. Marco won 5/11 of the games and Riley won 3/11 of the games. The rest of the games ended in a tie. What fraction of the games that were played had a winner?**

2. **Amber rode in a bike-a-thon. She completed 2/6 of the distance before lunch. She continued riding and by the end of the day Amber had completed 5/6 of the distance. What fraction of the distance did Amber complete after lunch?**

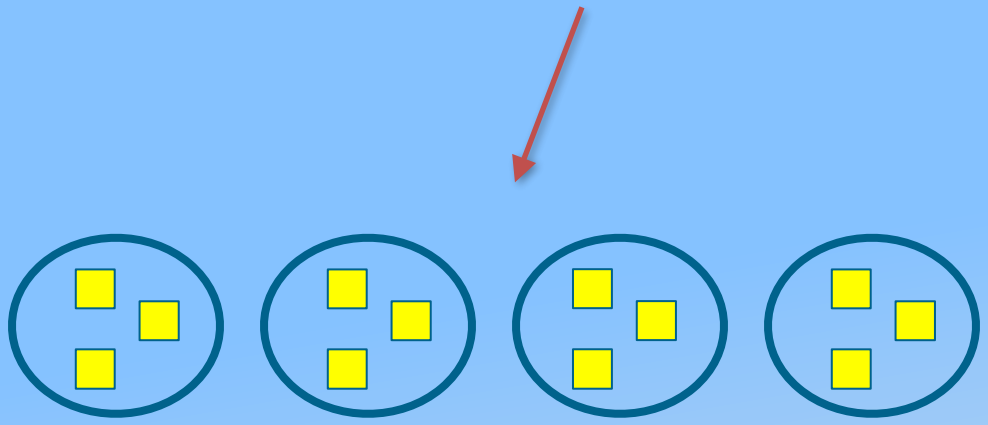
3. **5/7 of the students stayed for the computer club meeting and 1/7 stayed for the art club meeting. The rest of the students went home. What fraction of the students stayed?**

Division

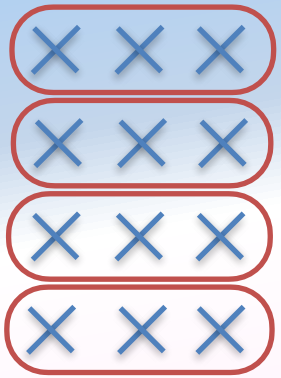
Models for Division

'shared between'

12 ÷ 4 = 3

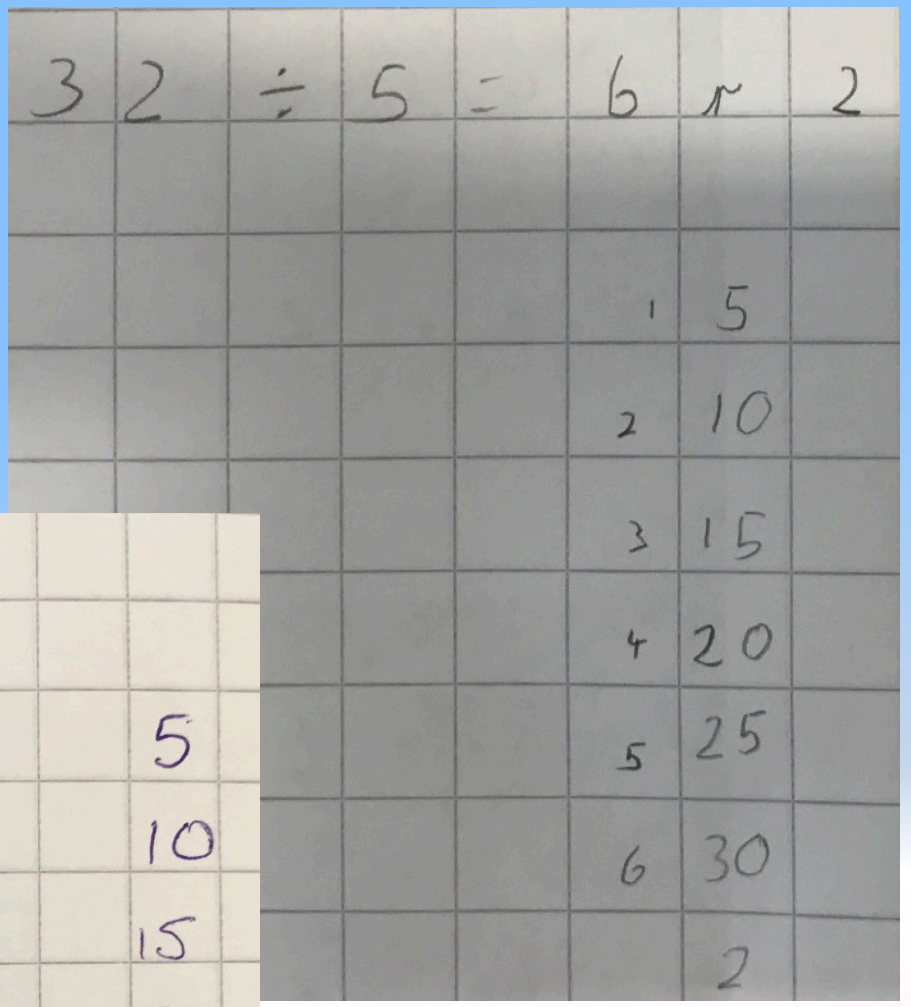


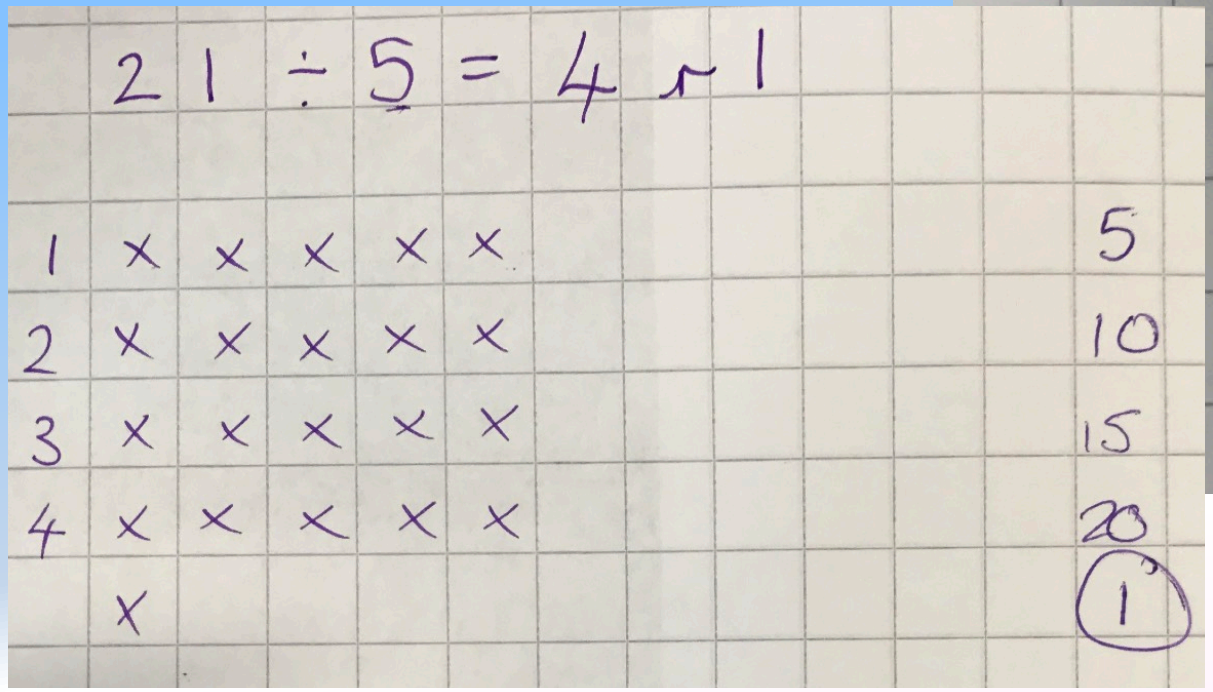
Which becomes arrays:



Models for Division

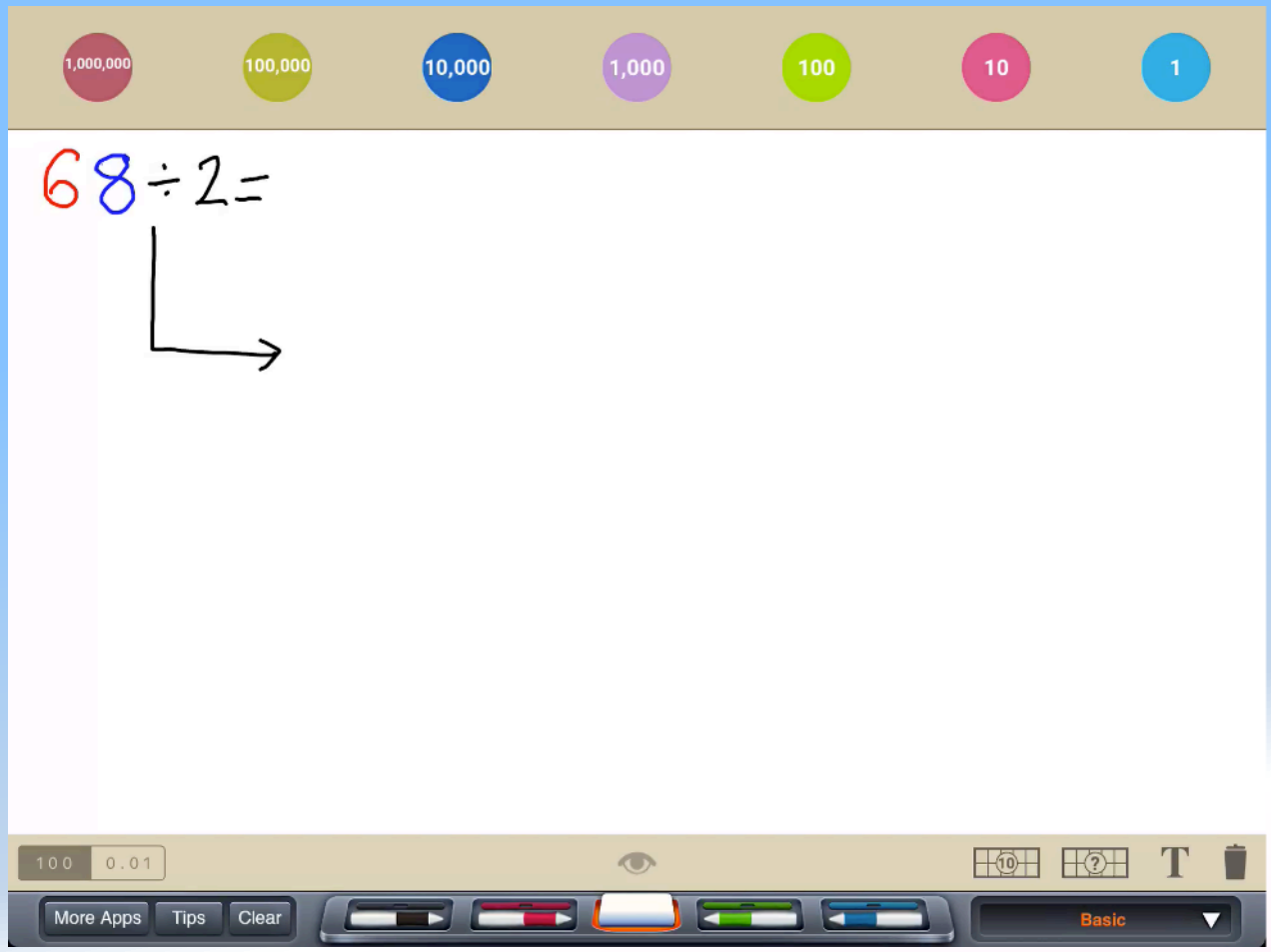
Arrays become multiples:





Formal Written for Division

How they learn the formal written method:



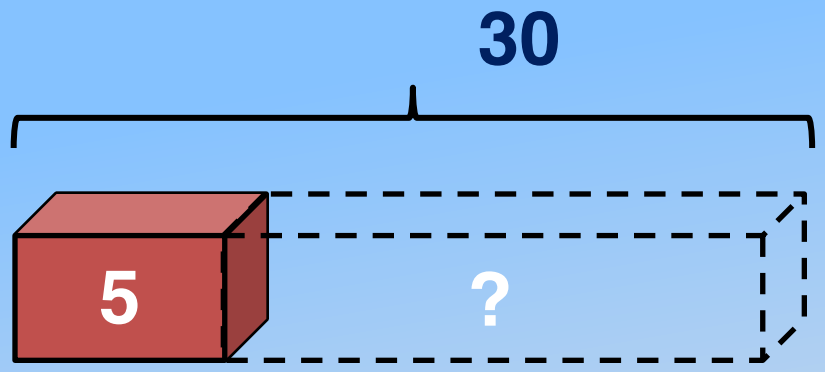
*sometimes known as the bus stop method

Problem Solving - Bar Modelling

Division

Division Word Problems

30 Year 3 children are going on a trip to the history museum. There needs to be 1 adult with every 5 children. How many adults are needed?



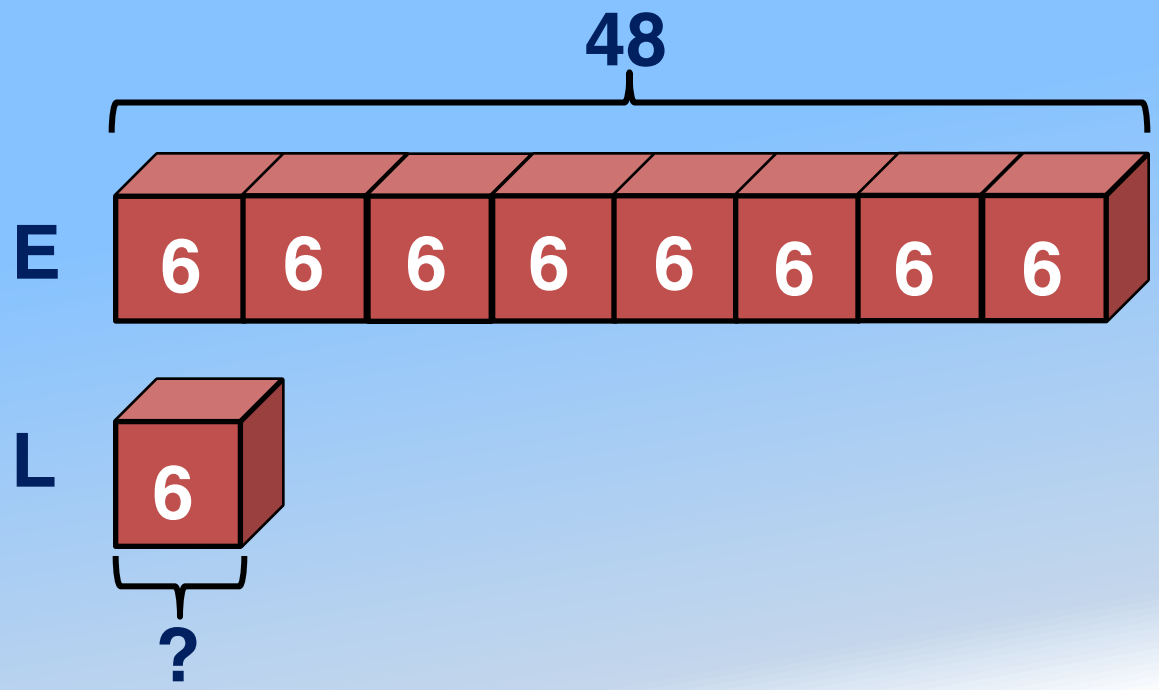
$30 \div ___ = 5$

$30 \div 5 = 6$

There needs to be 6 adults altogether.

Division Word Problems

Ellie has 8 times more loom band bracelets than Lily. If Ellie has 48 loom band bracelets, how many does Lily have?



$$48 \div 8 = 6$$

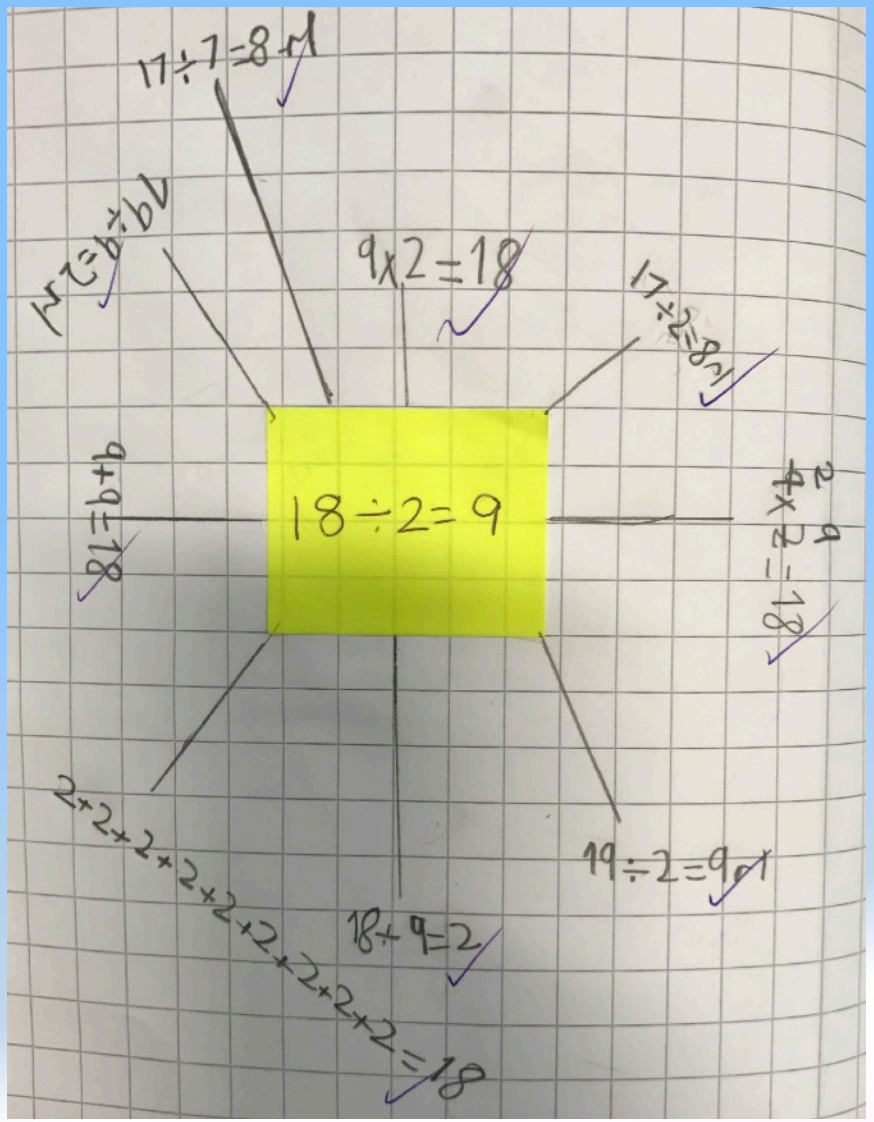
Lily has 6 loom band bracelets.

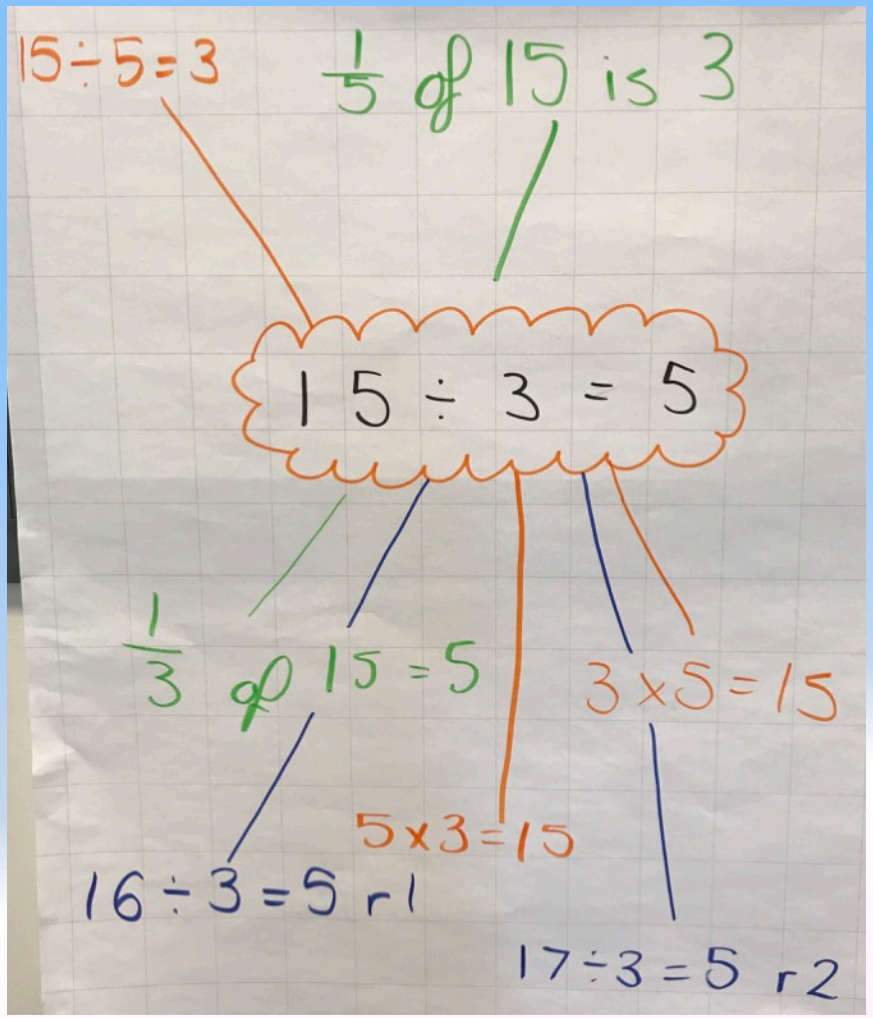
Division Word Problems – Your turn:

1. Alexa loves to read science fiction books. Her new book is 24 pages long. Alexa plans to read 4 pages per day. How long will it take her to read the whole book? (Half the book?)

2. Ashley has £45. She wants to buy Science kits that cost £5 each. How many science kits can Ashley buy?

Play - ‘If I know…’ game



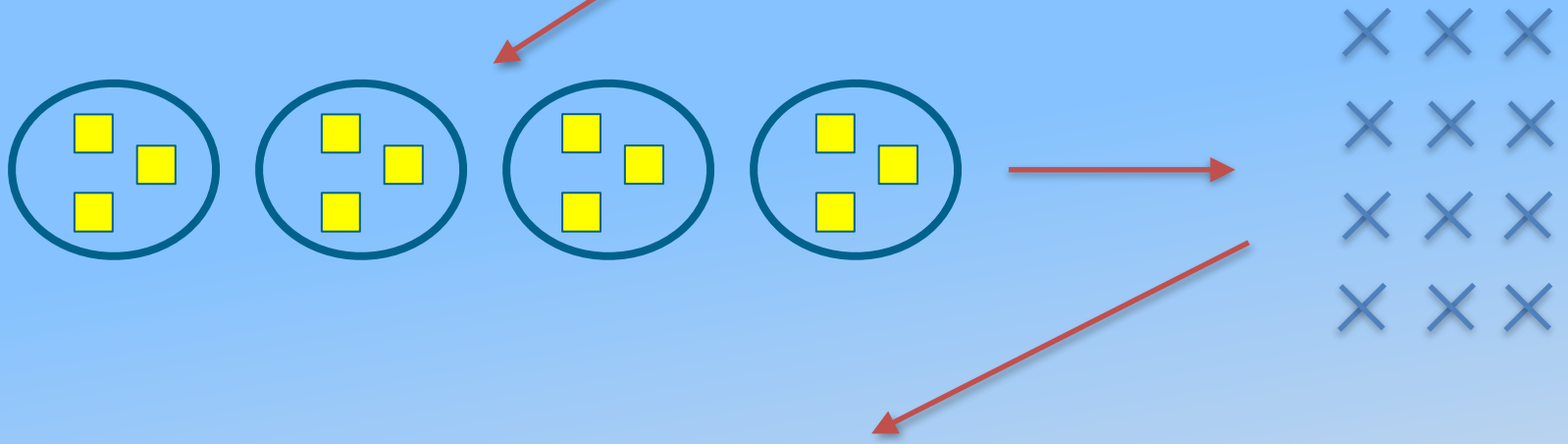


Multiplication

Models for Multiplication

Lots of the 'same thing'

4 x 3 = 12

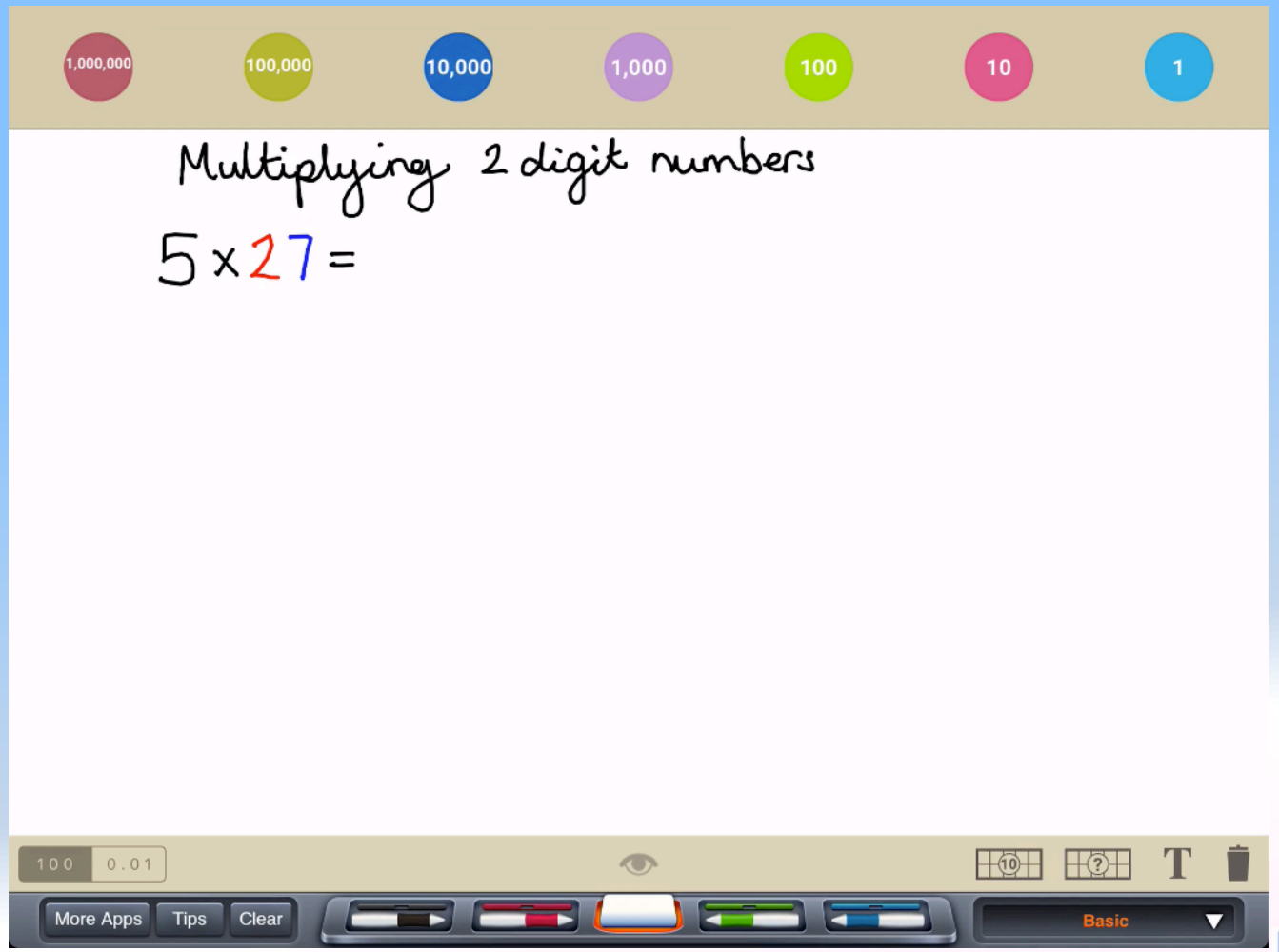


Multiplication is commutative

3 x 4 = 12

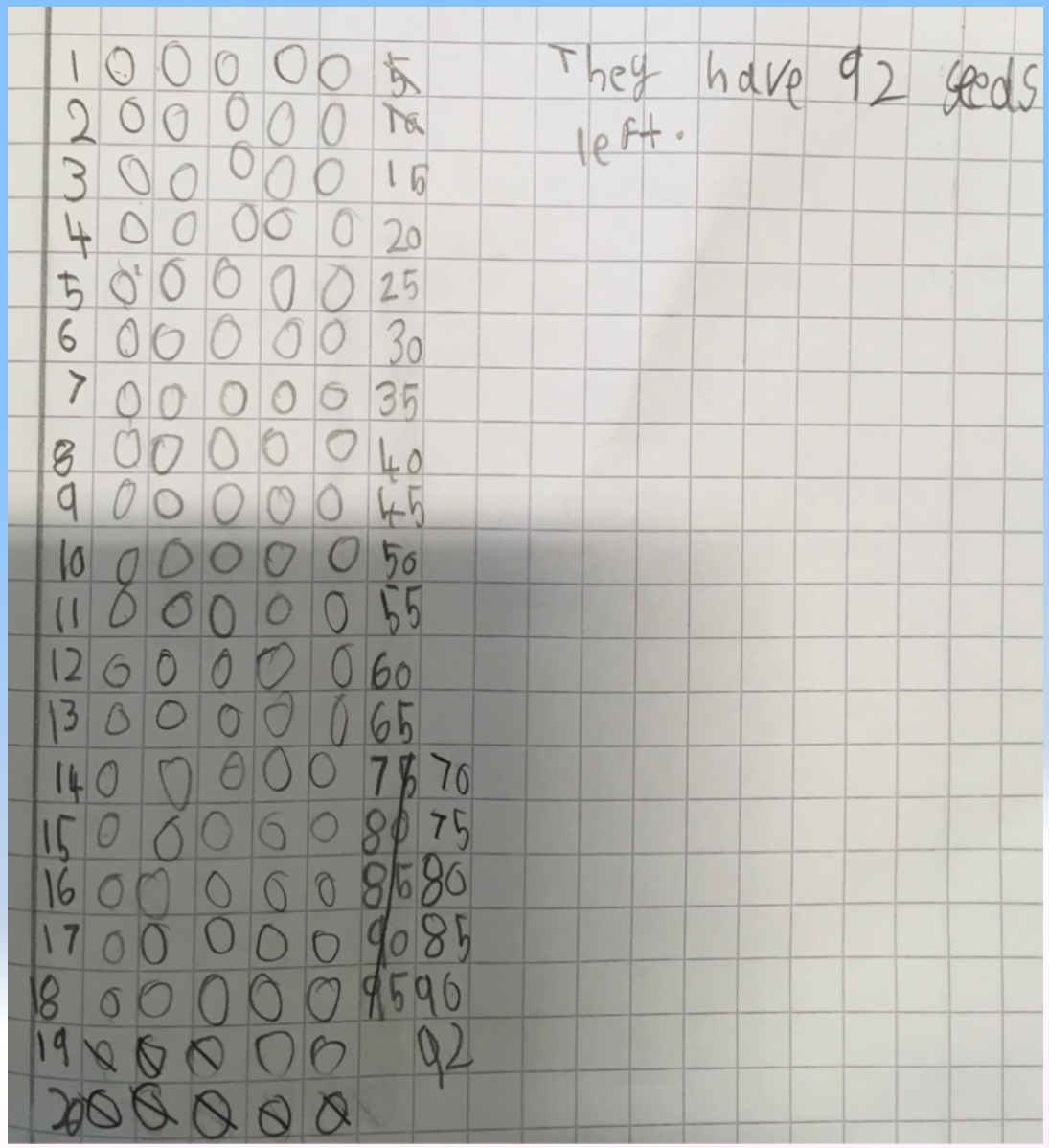
Formal Written for Multiplication

How they learn the formal written method:



Word Problems

There is a group of children who are planting seeds for their topic about growth. There are 20 children in the group and they each plant 5 seeds. Unfortunately during the night 2 squirrels come along and eat up 8 of the seeds. How many seeds are left?



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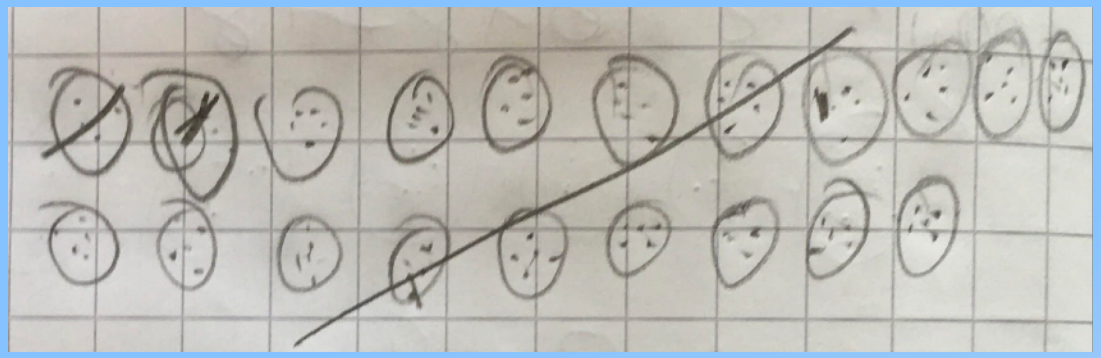
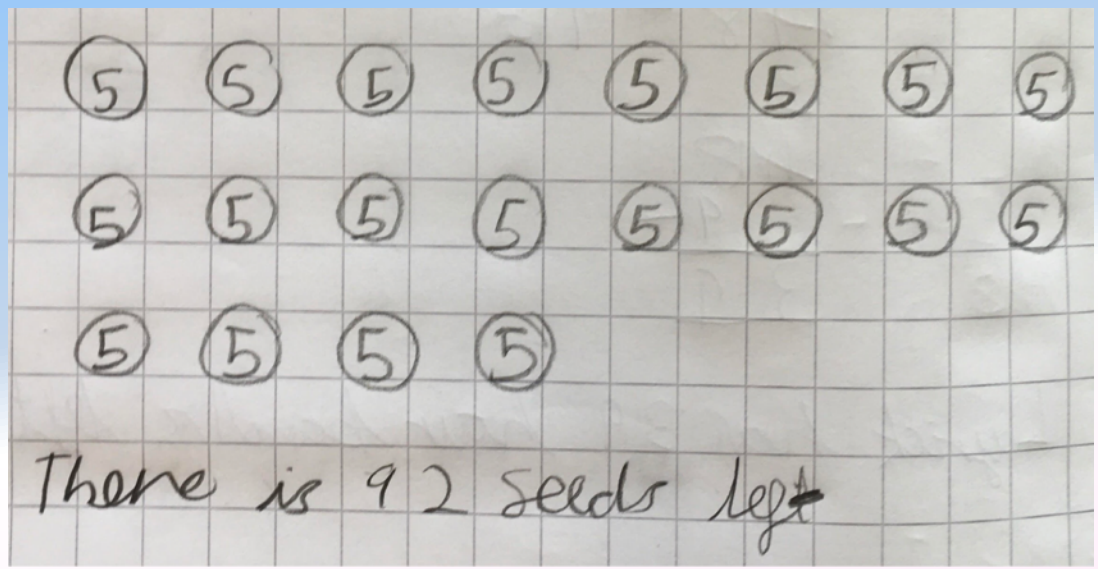
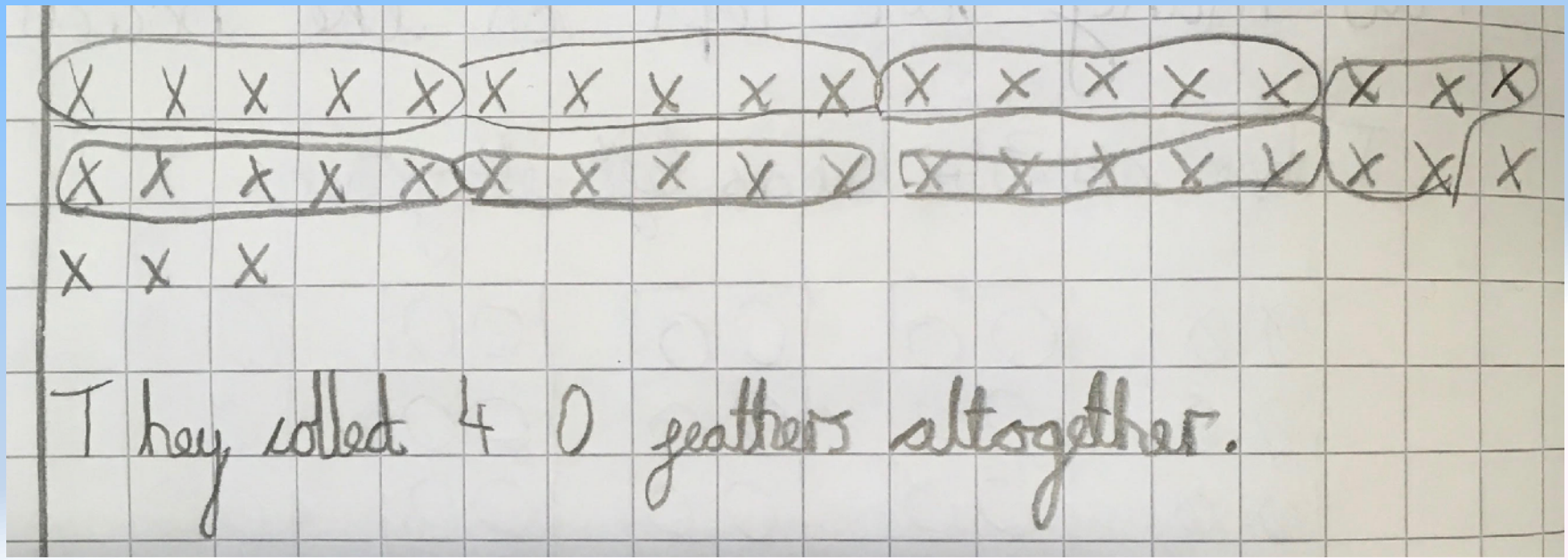




Word Problems

Alice and Lyrick have both been helping Miss Adal with the ducks. It is their job to collect up the feathers. They both collect 18 feathers and put them in the bin. As they go to close the gate Alice notices 4 feathers on the floor so she pops them in the bin too. How many feathers went in the bin altogether?

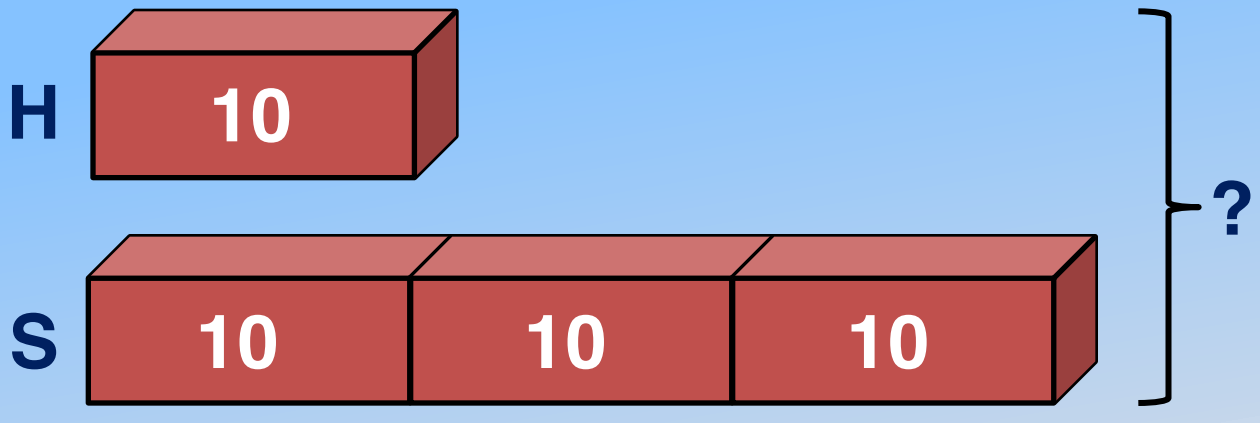


Multiplication

Multiplication Word Problems

Henry ate 10 meatballs at the Christmas party.
Shane ate 3 times as many meatballs as Henry.
How many meatballs did they eat altogether?

10 x 4 = 40

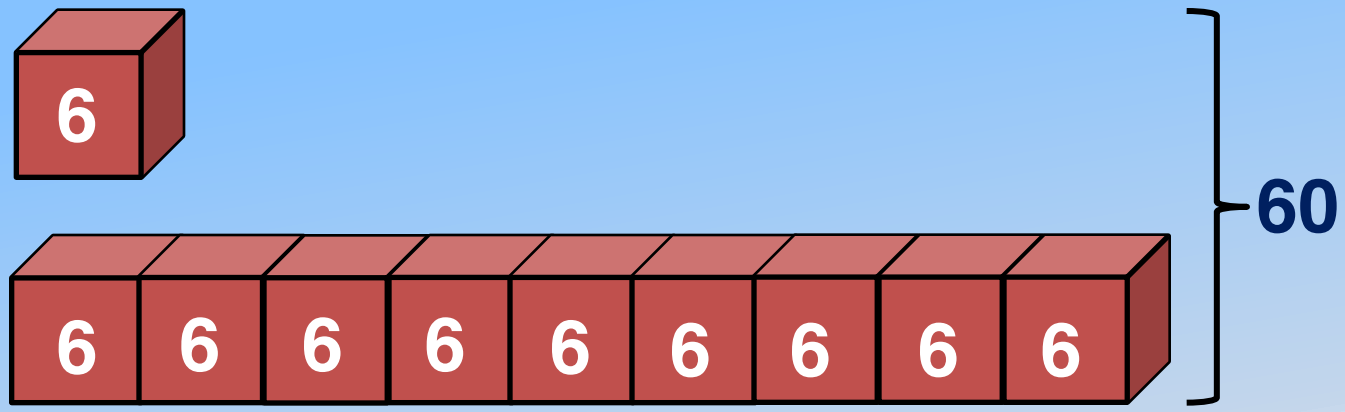


Altogether they ate 40 meatballs.

Multiplication Word Problems

The sum of 2 numbers is 60. One number is 9 times as big as the other. What is the bigger number?

$$60 \div 10 = 6$$



The bigger number is 54.

Multiplication Word Problems – Your turn:

1. Billy ate 15 sausage rolls at the Christmas party. Eddie ate 5 times as many sausage rolls as Billy. How many sausage rolls did they eat altogether?

2. The sum of 2 numbers is 60. One number is 5 times as big as the other. What is the bigger number?

3. Helen has 9 times as many football cards as Sam. Together they have 150 cards. How many more cards does Helen have than Sam?

4. The sum of 2 numbers is 64. One number is 7 times as big as the other. What is the smaller number?