Talking REAL Maths

A resource to engage children in discussion based on common errors and misconceptions in mathematics.

ALGEBRA

Discussion mat	**Suggested year group/KS**	**APP link**
Simple Sequence	Lower KS2	L3 Alg 1 – Recognise a wider range of sequences
Balance Scale 1	Y2/Lower KS2	L3 Alg 2 –Begin to understand the role of '=' (the 'equals' sign)
Balance Scale 2	Y2/Lower KS2	L3 Alg 2 –Begin to understand the role of '=' (the 'equals' sign) L3 Calc 5 – Use mental recall of addition and subtraction facts to 20 in solving problems involving larger numbers
Coordinates	Upper KS2	L4 Alg 2 – Use and interpret coordinates in the first quadrant L4 SSM 3 – Reflect simple shapes in a mirror line, translate shapes horizontally or vertically and begin to rotate a simple shape or object about its centre or vertex

Two people are correct:

I think one of the missing numbers is 23.

I don't have enough information to work out the missing numbers.

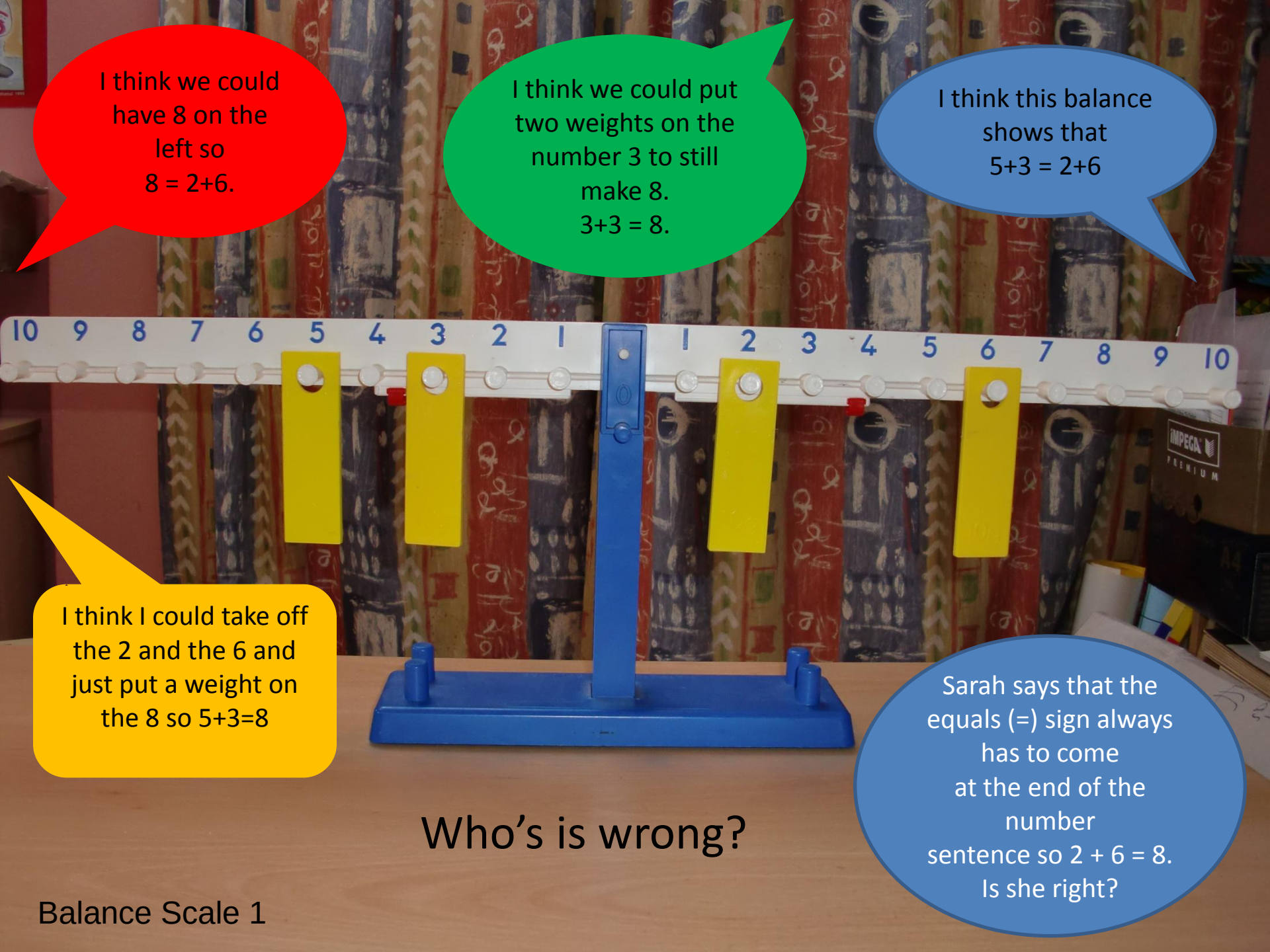
...38, 33, __, __, 18...

18 and 33 are both in the 3 times table, so it must be jumping in 3's.

I think the last number will be zero.

I think the sequence is about subtraction.

Simple Sequence


I think we could have 8 on the left so 8 = 2+6.
I think we could put two weights on the number 3 to still make 8. 3+3 = 8.
I think this balance shows that 5+3 = 2+6
10 9 8 7 6 5 4 3 2 1 1 2 3 4 5 6 7 8 9 10
I think I could take off the 2 and the 6 and just put a weight on the 8 so 5+3=8
Sarah says that the equals (=) sign always has to come at the end of the number sentence so 2 + 6 = 8. Is she right?
Who's is wrong?
Balance Scale 1

Balancing Scales

100 = 23 + 87

Which answer would you choose to evenly balance these scales?

111 110 90

The answer is 100 because I know that
20 + 80 = 100.

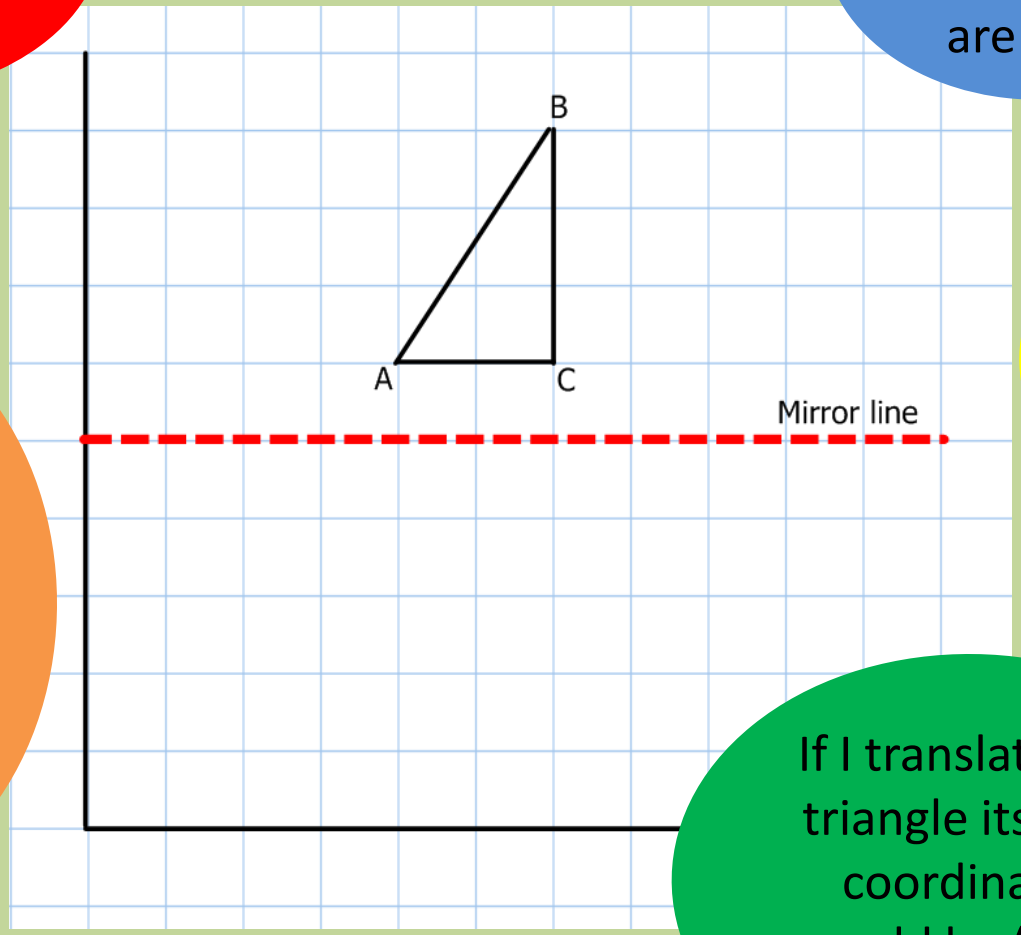
The answer is 111 because I know that
20 + 80 = 100
And 3 + 8 = 11

Balance Scale 2

Which two are correct?

The coordinates of point A are (6,4)

The coordinates of point B are (6,6)



The mirror line is y=5

If I reflect the triangle in the mirror line the new coordinates will be (4,1), (6,1) and (6,4)

If I translate the triangle its new coordinates could be (4,1), (6,1) and (6,4)

NUMBERS AND THE NUMBER SYSTEM

Discussion mat	Suggested year group/KS	APP link
Cake Fractions 1	KS1	L1 NNS 4 – begin to use the fraction one-half L2 NNS 3 – Begin to use halves and quarters and relate the concept of half of a small quantity to the concept of half of a shape
Playground Balls 1	KS1	L1 NNS 4 – begin to use the fraction one-half L2 NNS 3 – Begin to use halves and quarters and relate the concept of half of a small quantity to the concept of half of a shape
Playground Balls 2	Y2/Lower KS2	L2 NNS 3 – Begin to use halves and quarters and relate the concept of half of a small quantity to the concept of half of a shape
Place Value	Y2/Lower KS2	L3 NNS 1 – understand place value in numbers to 1000
Pizza Fractions 1	Lower KS2	L3 NNS 4 – Use simple fractions that are several parts of a whole and recognise when two simple fractions are equivalent.
Chocolate Fractions	Lower KS2	L3 NNS 4 – Use simple fractions that are several parts of a whole and recognise when two simple fractions are equivalent.
Cake Fractions 2	Lower KS2	L3 NNS 4 – Use simple fractions that are several parts of a whole and recognise when two simple fractions are equivalent.
Smarties Fractions	Lower KS2	L3 NNS 4 – Use simple fractions that are several parts of a whole and recognise when two simple fractions are equivalent.
Tricky Sequence	Upper KS2	L4 NNS 1 – recognise and describe number patterns
Pizza Fractions 2	Upper KS2	L4 NNS 4 – Recognise approximate proportions of a whole and use simple fractions and percentages to describe these

Cake Fractions 1

Which of the thought bubbles show the cake being shared in half?

Mr Newman has asked us to put $\frac{1}{2}$ of the balls into the skipping circle.

I'm going to put one ball in the circle because 1 is the top number

I don't think I can do this because if I cut a ball in half then the next group can't use it

I think he wants 6 balls because if you put the balls into two groups there will be 6 in each group.

I will put 3 balls in because ½ means 1 + 2

Playground Balls 1

Mr Newman has asked us to put ¼ of the balls into the skipping circle for the next group.

I'm going to put one ball in the circle because 1 is the top number

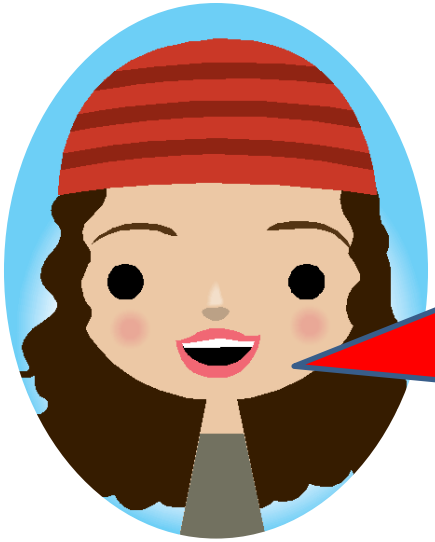
I think he means 5 because ¼ is 1 + 4

I think he wants 6 balls because if you put the balls into two groups there will be 6 in each group.

I will put 3 balls in because if I put the balls into 4 equal groups there will be 3 balls in each group and 3 lots of 4 is 12

Playground Balls 2

Daisy, Kyle and Luke have been learning about adding tens to three-digit numbers

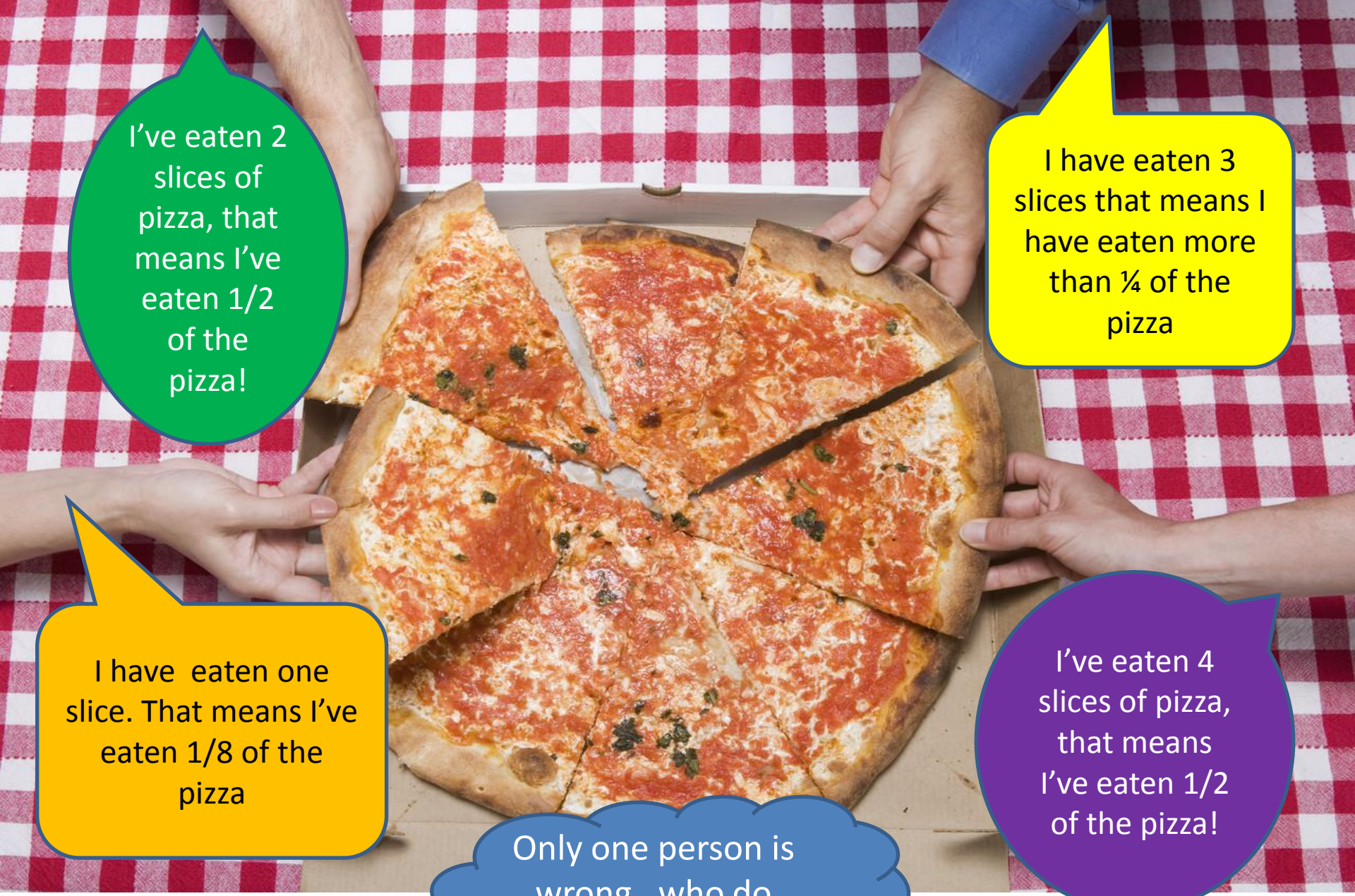


I think when you add 10 the units digit always stays the same.

When you add 10 to a three-digit number the hundreds digit always stays the same!

354
364
374
384

I'm not too sure…what do you think?



Only one person is wrong…who do you think it is?

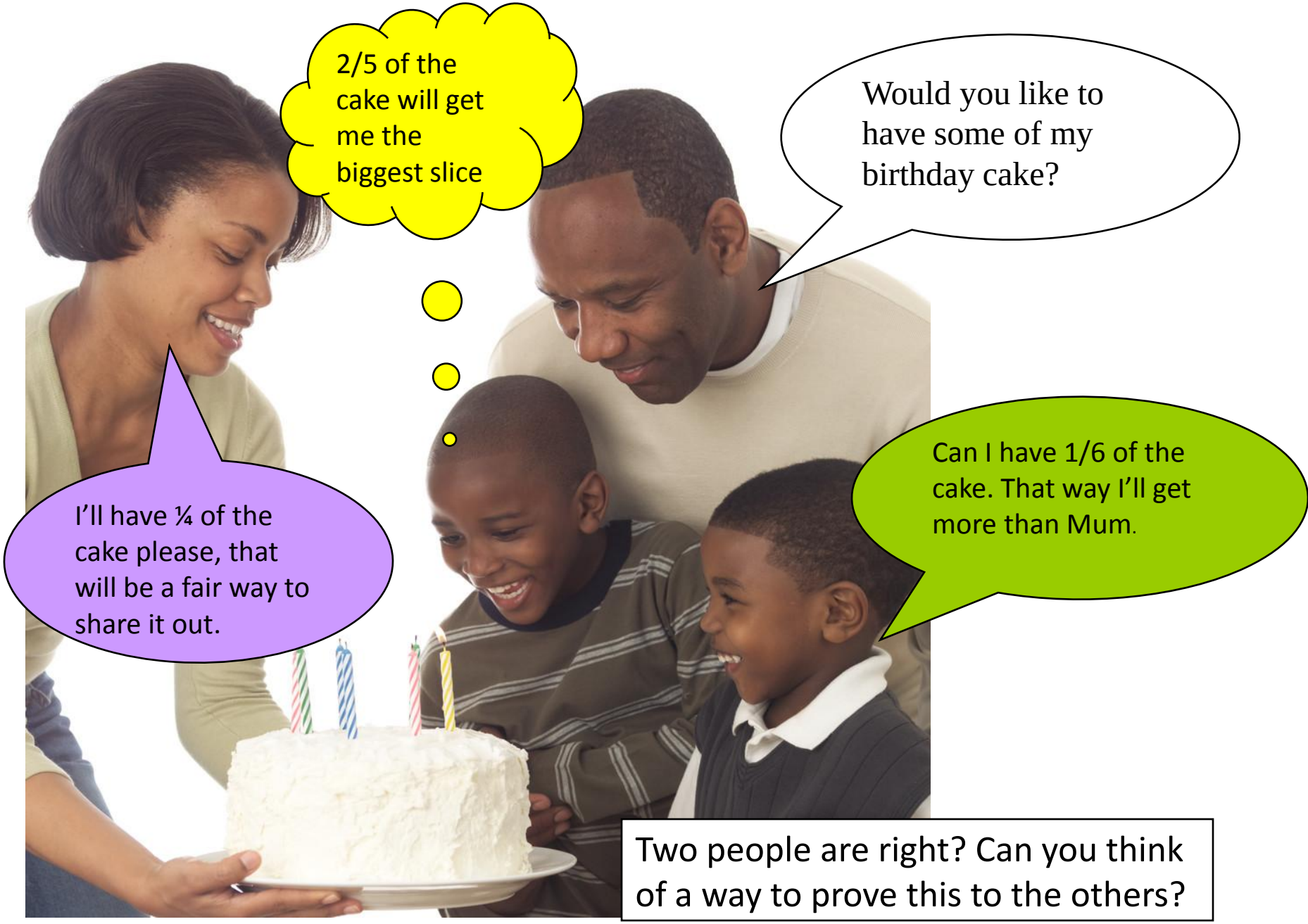
Pizza Fractions 1

CHOCOLATE CHALLENGE

- How many pieces would half be?
- Write a fraction for this chocolate bar that is an equivalent to ¼
- What fraction of the bar would 2 squares be?
- Describe a quarter of this bar?
- Describe a third of this bar?

Even harder!!

What is the maximum number of people I could share this bar with?



Two people are right? Can you think of a way to prove this to the others?

Cake Fractions 2

Convince me that this child is wrong:

6 Smarties are blue so that means: $\frac{6}{15}$

is the fraction of blue Smarties here.

There are 21 Smarties

What fraction of the Smarties are green?

Draw a diagram to convince me that the fraction of green Smarties is bigger than the fraction of red Smarties.

What is this child doing wrong?

Fraction of red Smarties $\frac{21}{4}$

Explain what you would do to help.

Smarties Fractions

Only one person is correct.

I think 88 will be in the sequence

I think the missing number after 33 is 25 ½

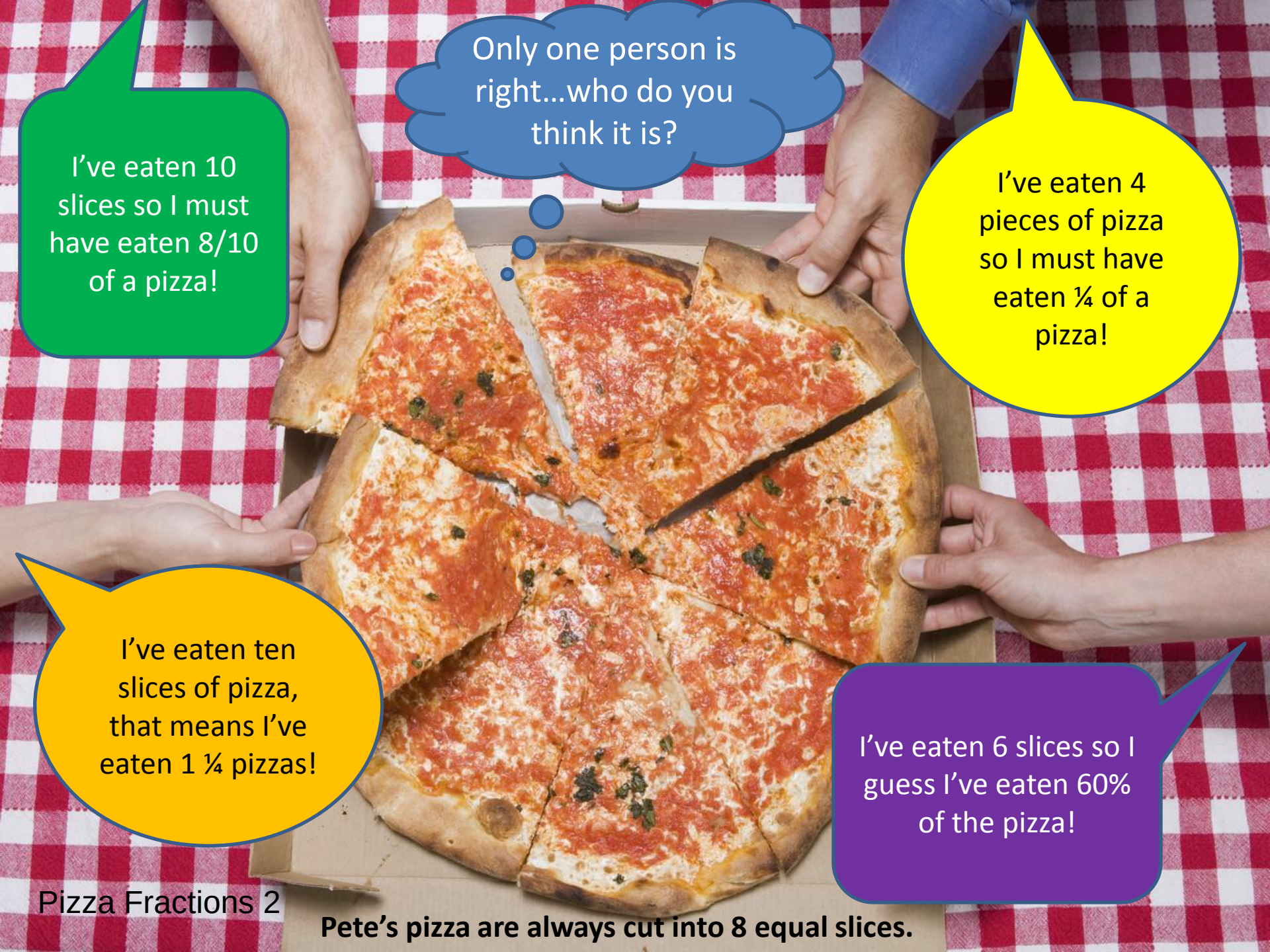
... 33, _ , _, 18 ...

The difference between 33 and 18 is 15 so it must be counting in steps of 7 ½

The first negative number in the sequence will be -3

What do you think the two missing numbers are?

Tricky Sequence



Pizza Fractions 2

Pete's pizza are always cut into 8 equal slices.

CALCULATING

Discussion mat	Suggested year group/KS	APP link
Purses	Y2/Lower KS2	L2 calc 3 – use mental calculation strategies to solve number problems including those involving money and measures
Starburst	Y2/Lower KS2	L2 calc 3 – use mental calculation strategies to solve number problems including those involving money and measures
Make 50	Y2/Lower KS2	L3 Calc 2 – add and subtract two digit numbers mentally
Toy Shop	Lower KS2	L3 Calc 5 - Use mental recall of addition and subtraction facts to 20 in solving problems involving larger numbers L3 NNS 5 – Begin to use decimal notation in contexts such as money
World Cup stickers	Lower KS2	L3 Calc 5 - Use mental recall of addition and subtraction facts to 20 in solving problems involving larger numbers L3 Calc 6 – Solve whole number problems including those involving multiplication or division that may give rise to remainders
Chocolate box	Upper KS2	L4 Calc 3 – use efficient written methods of addition and subtraction and of short multiplication and division
Cricket Scores	Upper KS2	L4 Calc 3 – use efficient written methods of addition and subtraction and of short multiplication and division
Calculator	Upper KS2	L4 Calc 5 – solve problems with or without a calculator (interpret a calculator display) L5 SSM 6 – Solve problems involving conversion of units and make sensible estimates of a range of measures in relation to everyday situations
DVDs	KS2	No specific APP link as a range of mathematical topics are covered.

Peter’s purse

Which purse shows the correct amount.

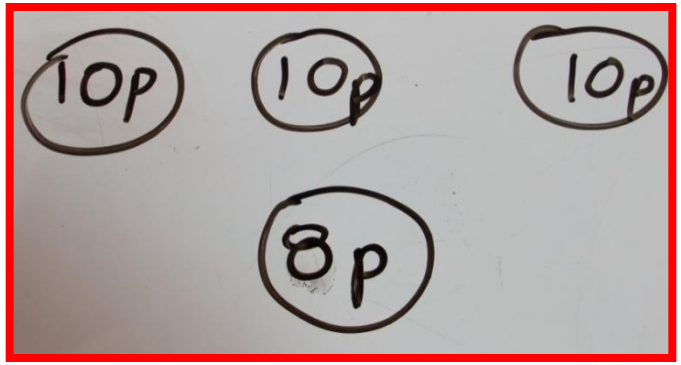
Lucy’s purse

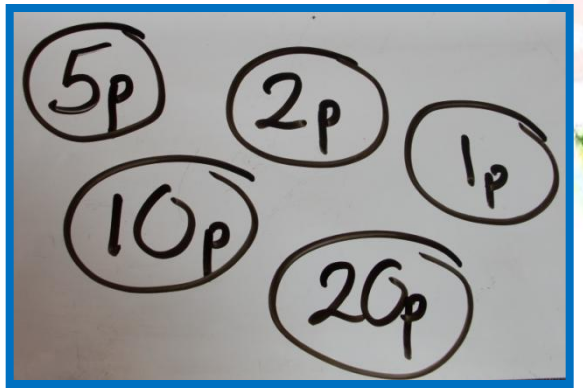
Susie’s purse

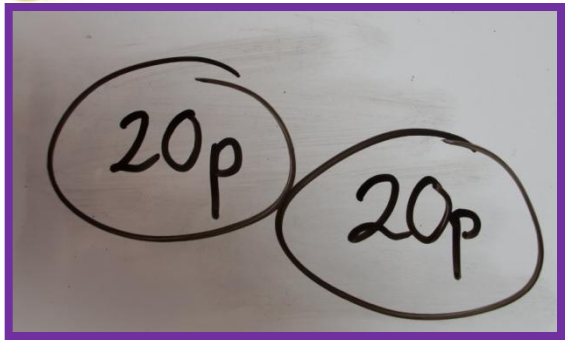
Shaman’s purse

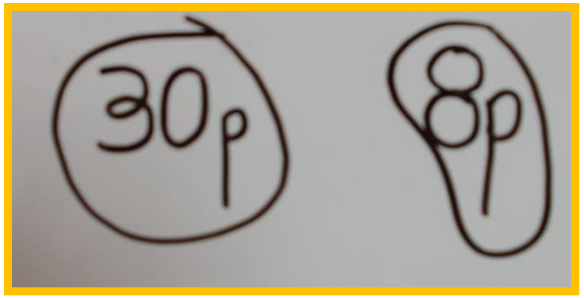
Purses

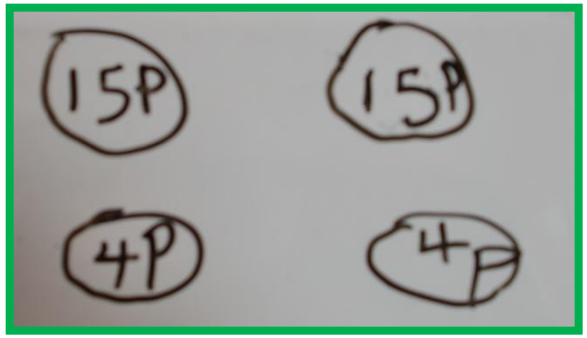
Which coins would you use to buy a packet of Starburst costing 38p?







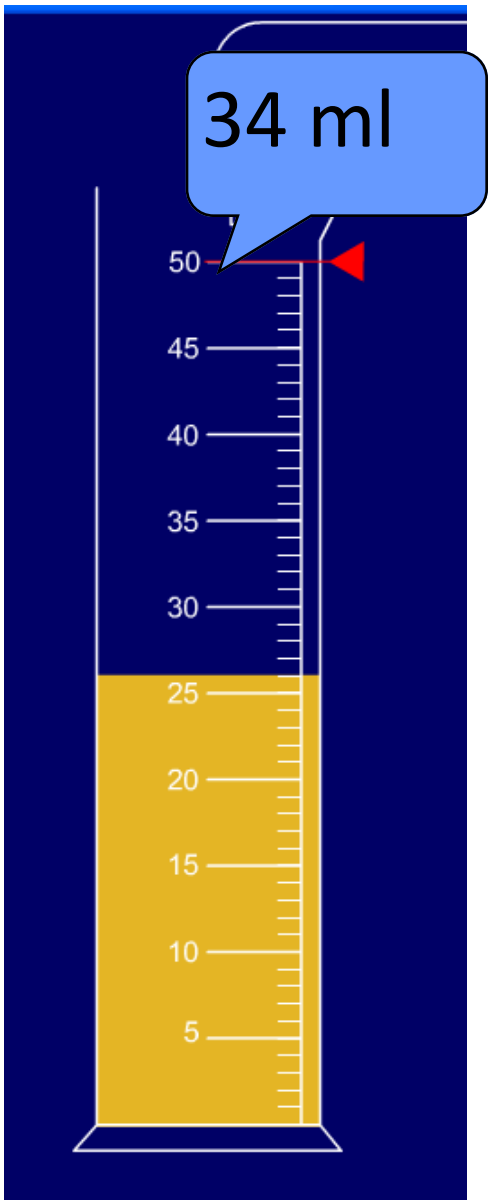


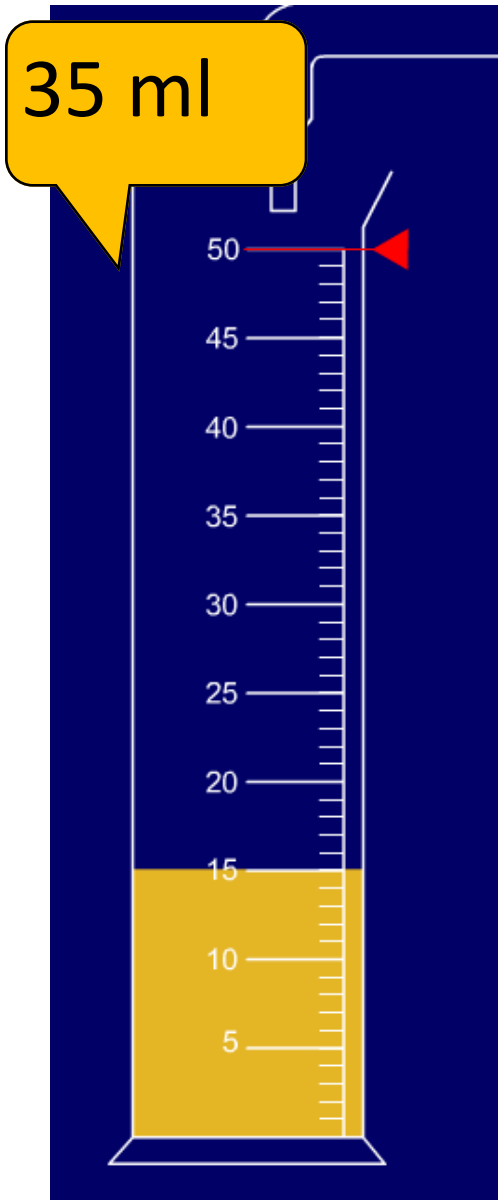


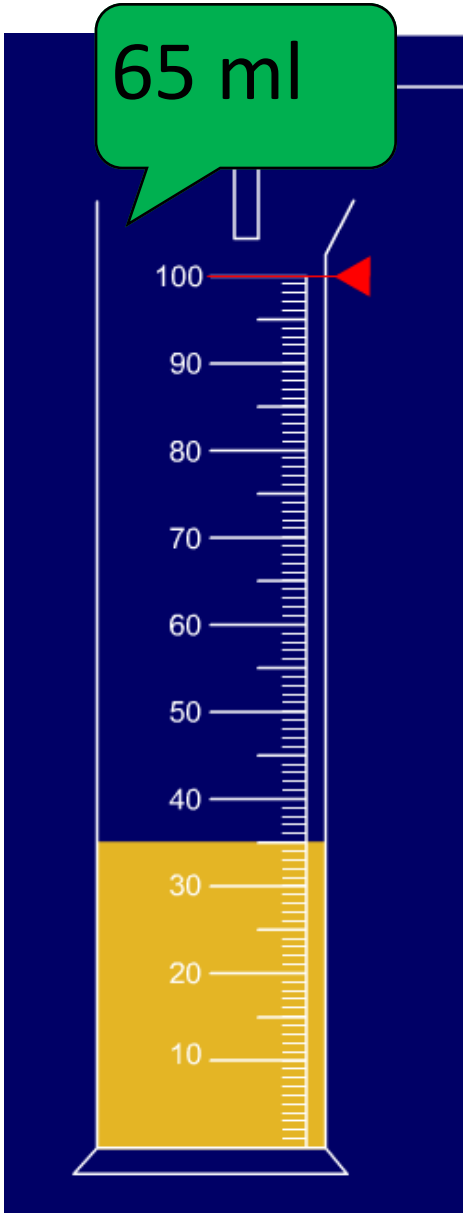
Only two are correct.
Which ones are they?

Starburst

What needs to be added to each cylinder to make 50 ml?

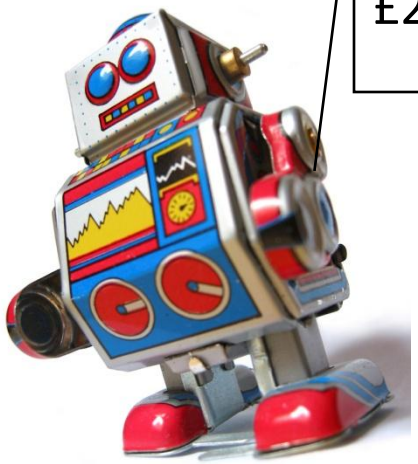




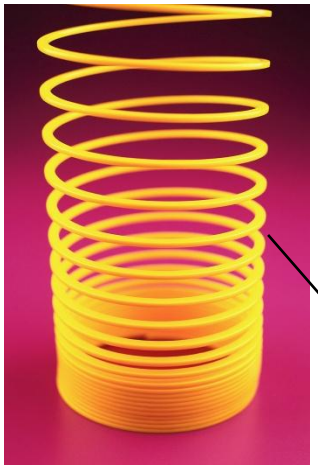


Who is correct?

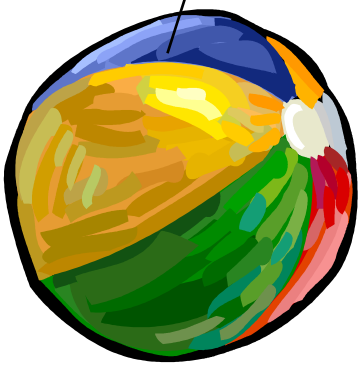
Make 50



£2.64



£1.90



£ 2.36

Can you work out if any of these children worked out their answers correctly?
If they have made mistakes how could you help them?

If I buy one of everything it will cost £7.90.

£1.90
£3.36
+ £2.64
0.10
1.80
6.00
£7.90

If I buy two slinky toys it will cost me £2.18.

£ 1.90 + £1.90 =
£1.00 + £1.00 = £2.00
9 + 9 + 18
£2.00 + 18 = £2.18

If I buy a robot and pay with £10.00 I will get £8.46 change.
I know this is right because a robot costs £ 2.64 and I used my number bonds.

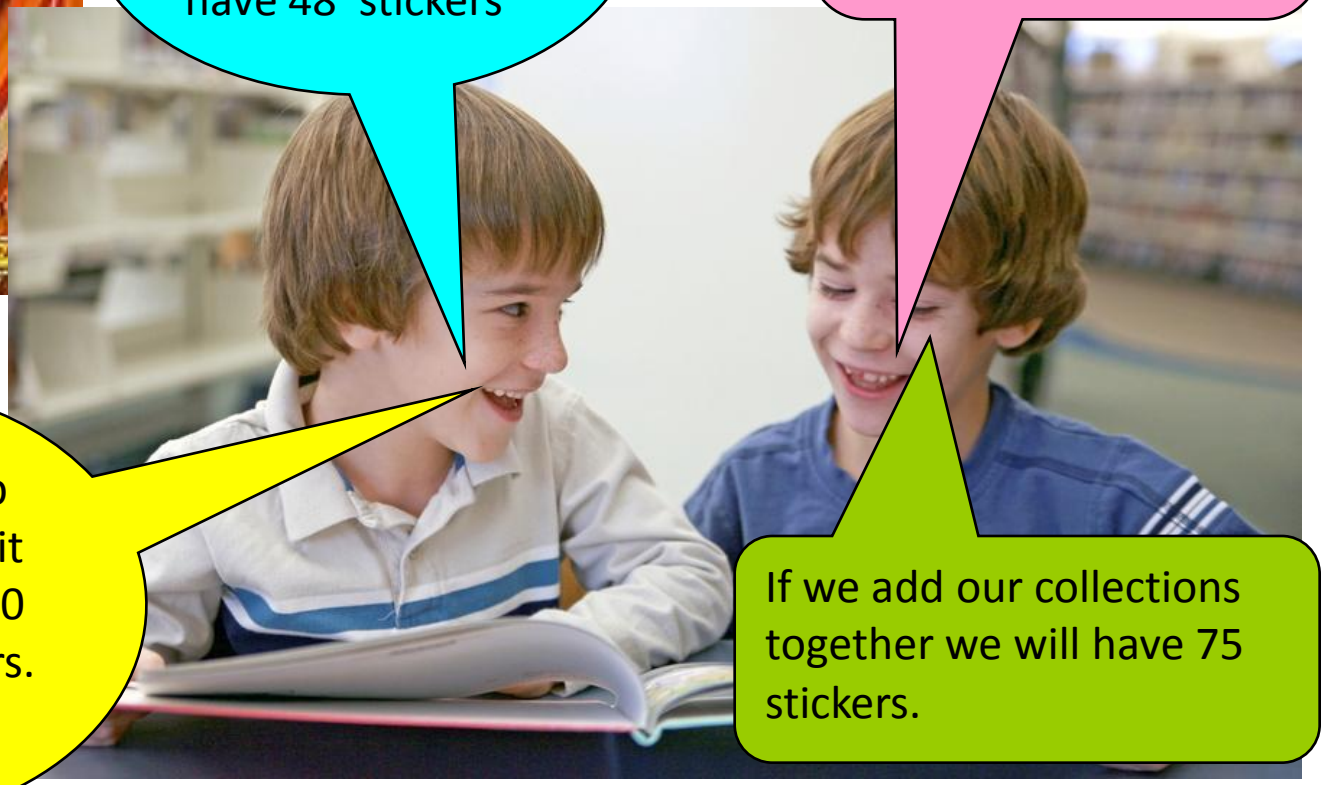
There is a half price offer on for this week only. I think that for £5.00 I can buy one of each toy.

Toy Shop

Two friends are collecting World Cup stickers

I can fill 6 pages with 8 stickers on each page so I have 48 stickers

I have 37 stickers and if I put 12 on each page I will have 3 full pages with one left over.



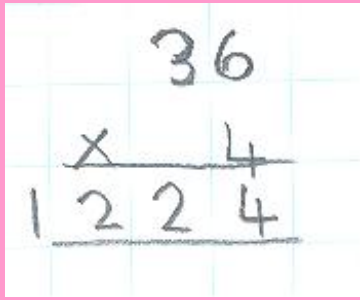
Stickers cost 50p for 6 stickers so it has cost me £4.00 to buy my stickers.

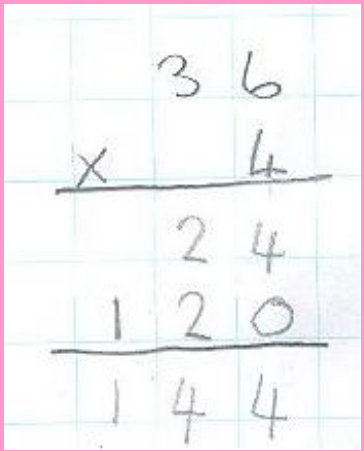
If we add our collections together we will have 75 stickers.

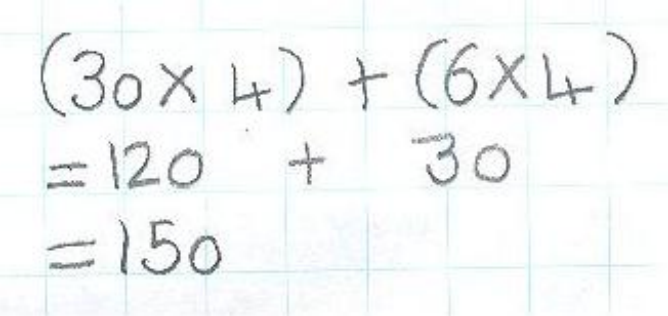
One of the statements is wrong!

World cup stickers

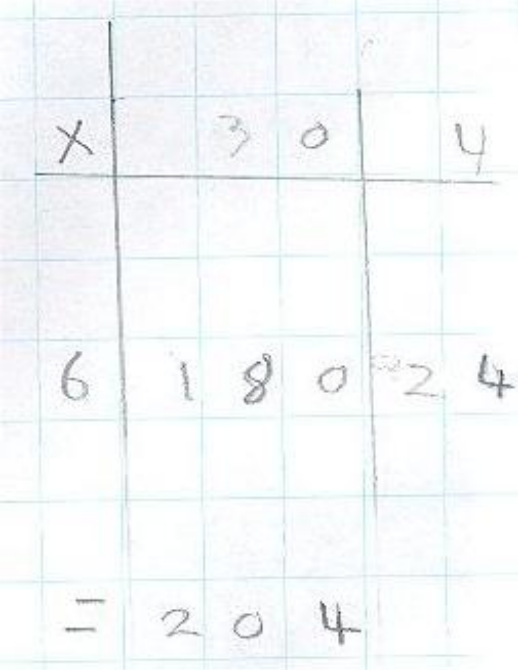
There are 36 chocolates in a layer.
How many are in the whole box?







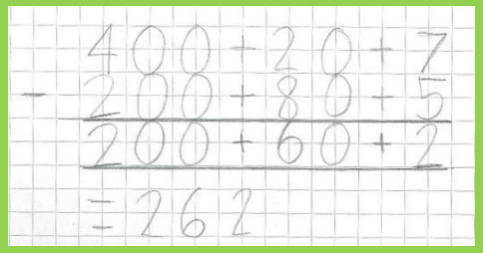
One person is correct.
Who do you agree with?

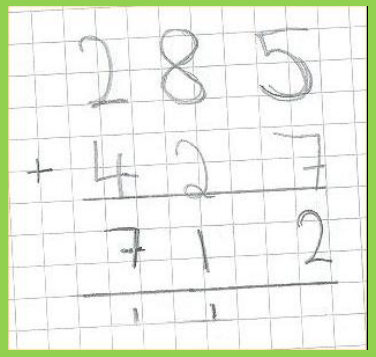


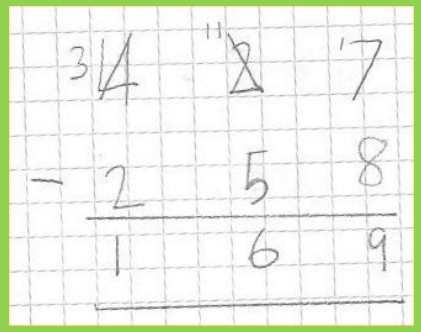
Chocolate Box

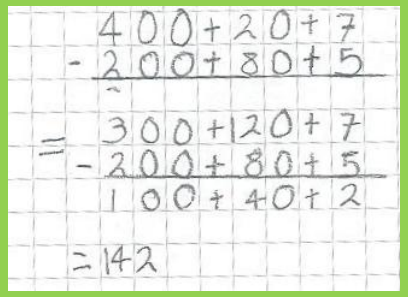
How many runs did England win by?

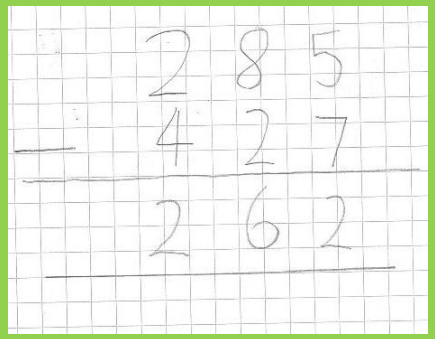
Which answer is correct?

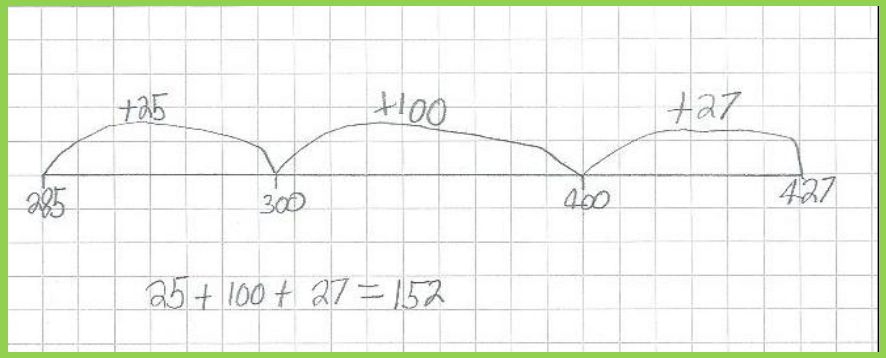












Cricket Scores

The calculator shows the answer to a question. What could this mean?

3kg and 8g

£3.08

38mm

£3.80

3 litres 80ml

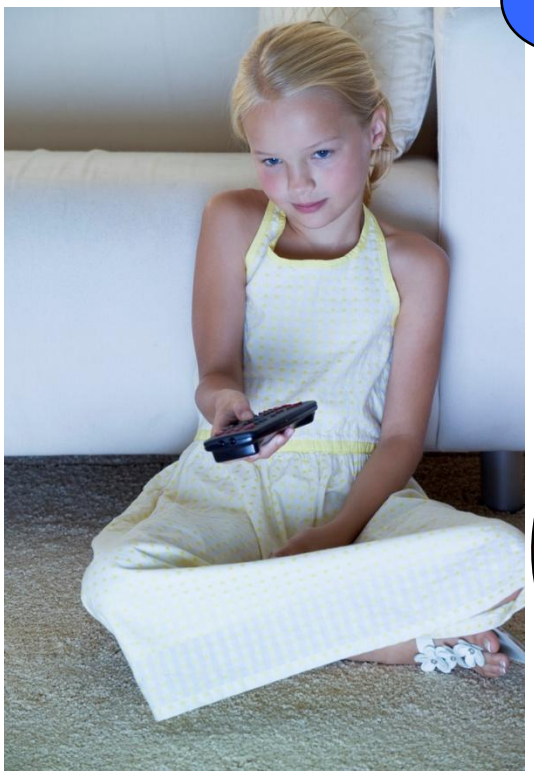
Two are correct.

Calculator

I have 24 DVDs. Which two of these statements are correct?

I have a rack that holds 100 so I need to get 86 more to fill it.

Mum said that ¾ of these are made by Disney so that is 3.



¼ of these are too young. 1/3 of them are too old. So I can only watch 10 of them.

Shrek the Third takes 90 minutes so if I start watching at 6.35pm I will finish before my bedtime at 8.15pm.

DVDs

SHAPE SPACE AND MEASURES

Discussion mat	Suggested year group/KS	APP link
Sorting Shapes	KS1/Lower KS2	L2 SSM 1 – use mathematical names for common 3-D and 2-D shapes L2 SSM 2 – Describe their properties, including number of sides and corners L2 HD 1 – Sort objects and classify them using more than one criterion
Ruler 1	KS1/Lower KS2	L2 SSM 5 – begin to use a wider range of measures including everyday non-standard and stand units to measure length and mass
Measuring Cylinders	Lower KS2	L3 SSM 5 – Use a wider range of measures including non-standard units and standard metric units of length, capacity and mass in a range of contexts L3 Calc 2 – add and subtract two digit numbers mentally
Flapjacks	Lower KS2	L3 SSM 5 – Use a wider range of measures including non-standard units and standard metric units of length, capacity and mass in a range of contexts
Cake Time	KS2	L3 SSM 6 – Use standard units of time
Ruler 2	Upper KS2	L4 SSM 5 – Interpret, with appropriate accuracy, numbers on a range of measuring instruments
Temperature	Upper KS2	L4 SSM 5 – Interpret, with appropriate accuracy, numbers on a range of measuring instruments
Playground Measures	Upper KS2	L4 SSM 5 – Interpret, with appropriate accuracy, numbers on a range of measuring instruments
Timetable	Upper KS2	No specific link to APP assessment criteria

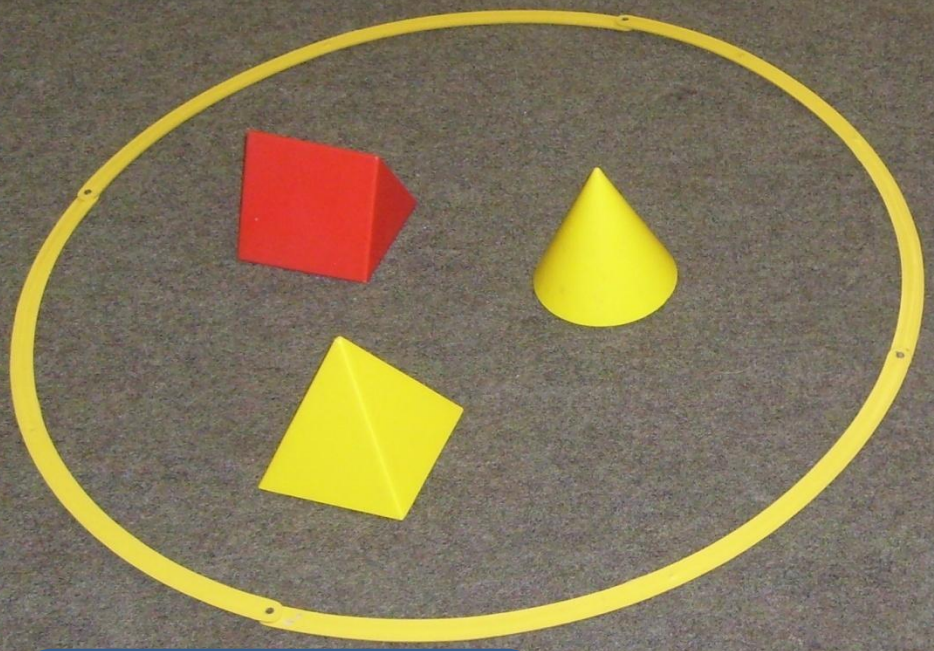
Sorting Shapes

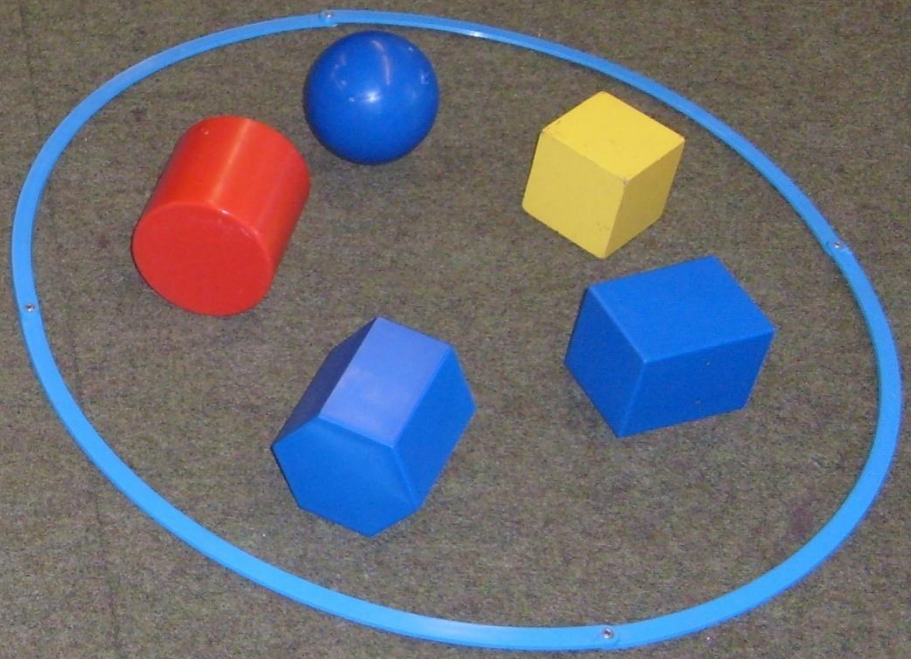
Can you find these shapes and name them?

I think shapes with more faces have more corners?

Some faces are triangles

Shapes with an even number of faces



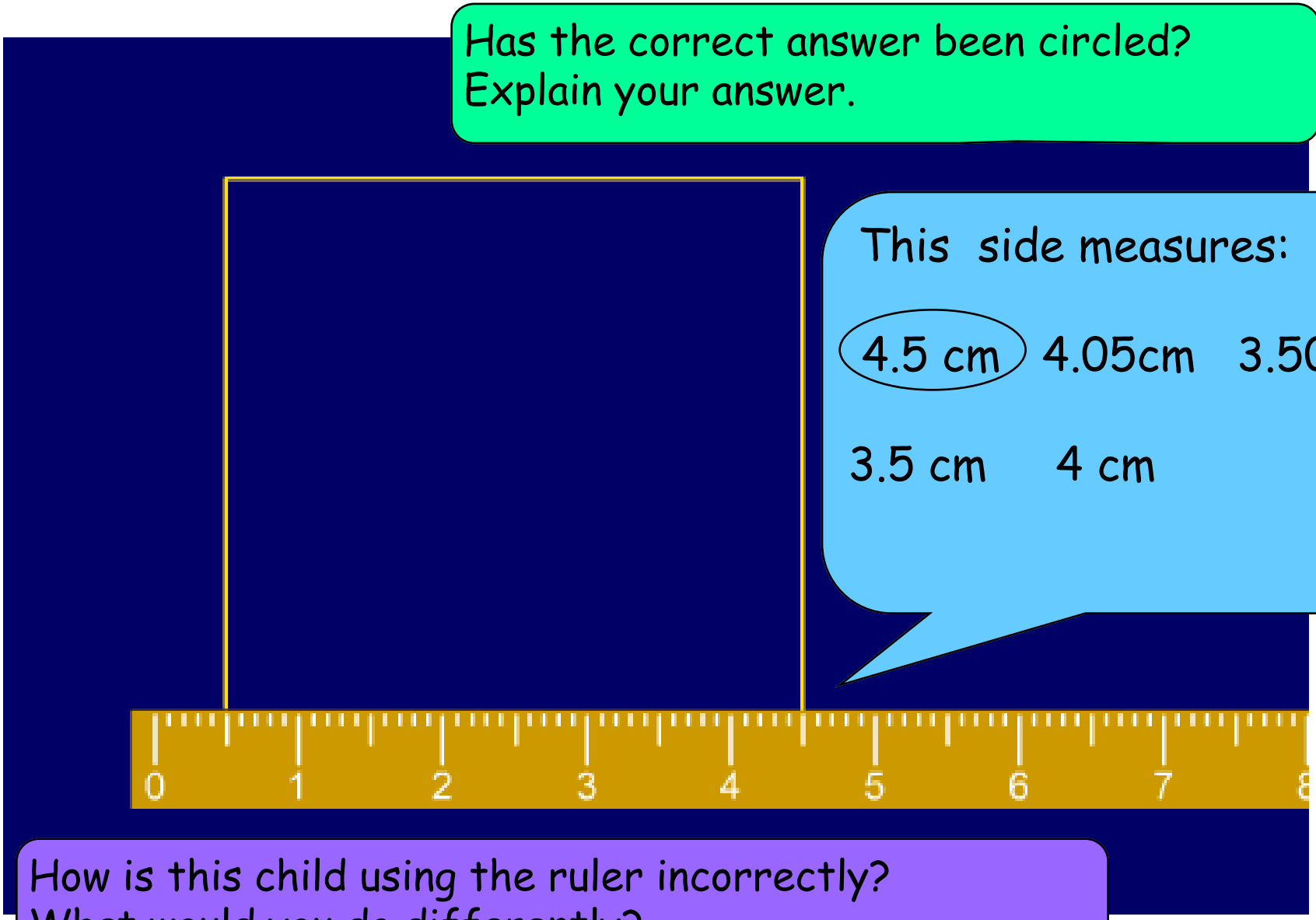


3 shapes have been sorted incorrectly. Can you find them?

Now that you've found the incorrect shapes, can you tell me something that is the same and something that is different about them?

What do you think?

Has the correct answer been circled?
Explain your answer.



This side measures:

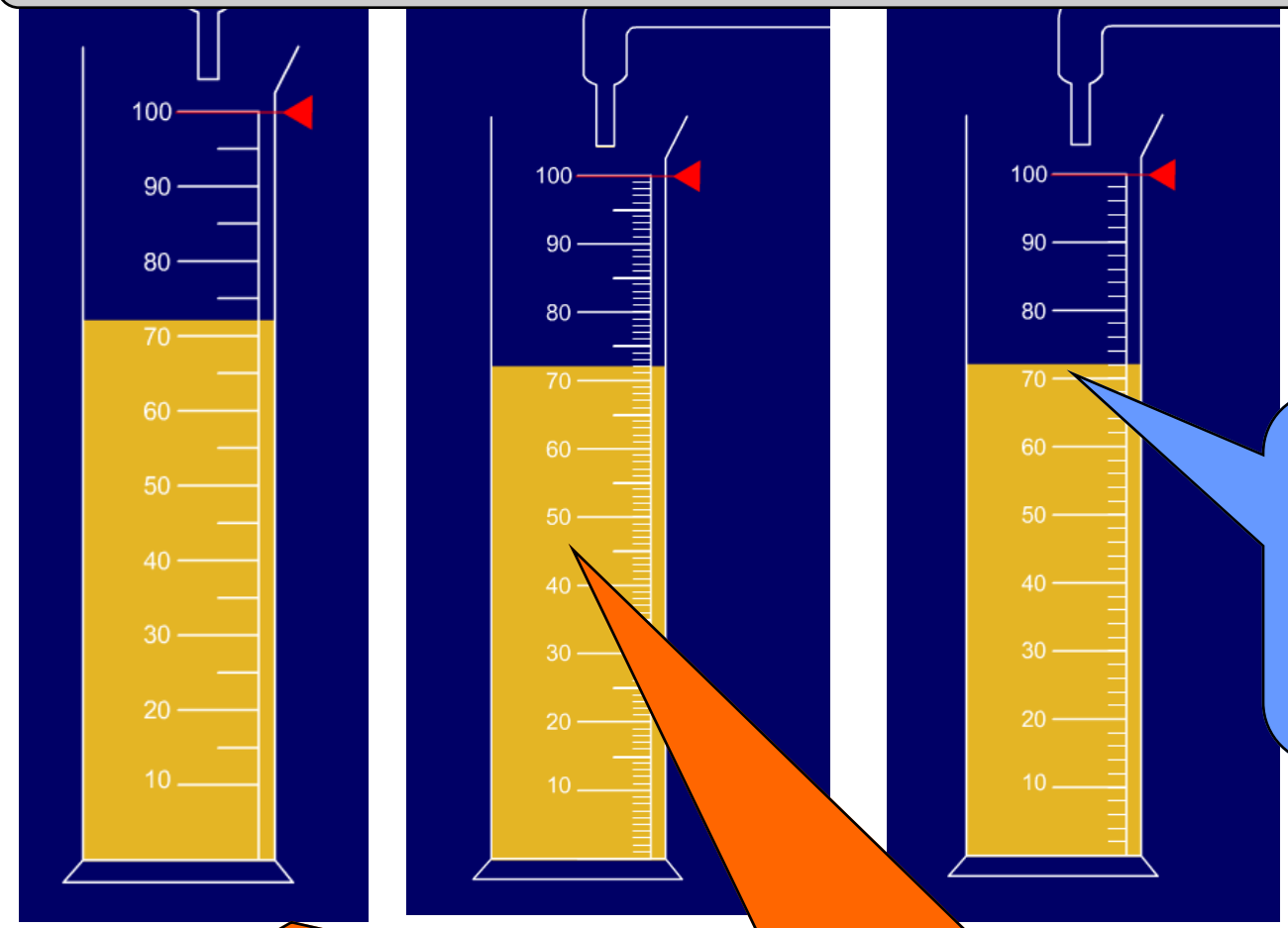
4.5 cm 4.05cm 3.50 cm

3.5 cm 4 cm

How is this child using the ruler incorrectly?
What would you do differently?

Ruler 1

Measuring Cylinders



Convince me that this does not measure 71 ml

True/ False?
All of these measuring cylinders measure the same amount.

True/false?
I need to add 38ml more to make 100 ml.

Making Flapjacks

Here is a recipe for 18 Flapjacks

I only want to make 6 flapjacks – I can't do it!

If I add the amount of butter to the porridge oats I will have ¼ kg

<u>Ingredients</u>

75 g butter

30ml golden syrup

75g light brown sugar

150g porridge oats

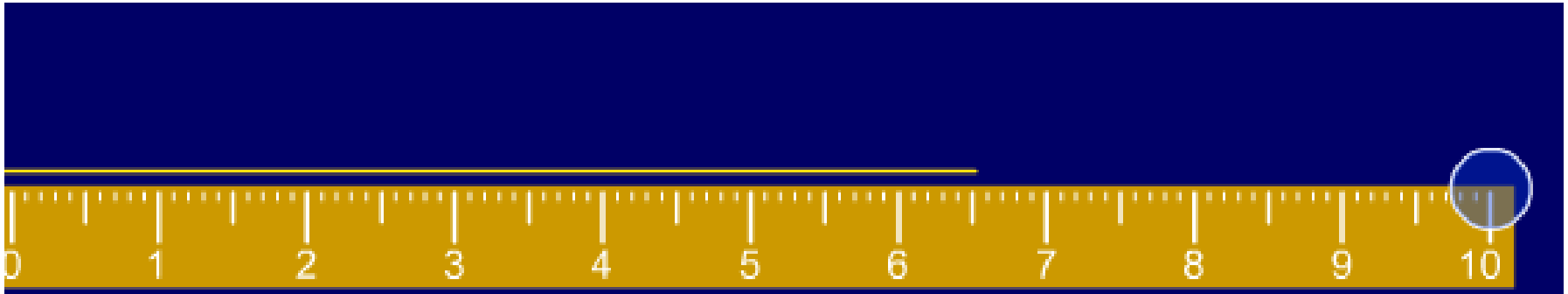
50g raisins

If I have 1 kg of raisins I can make two batches of flapjacks because there are 100g in 1kg

There is half as much sugar as porridge oats in this recipe.

What do you think?

Cake Time



Two answers are correct. Which two would you choose?
Explain your choices.

This line measures:
6.5 cm 6.05 cm 65 mm

To make it 10cm, I need to add:

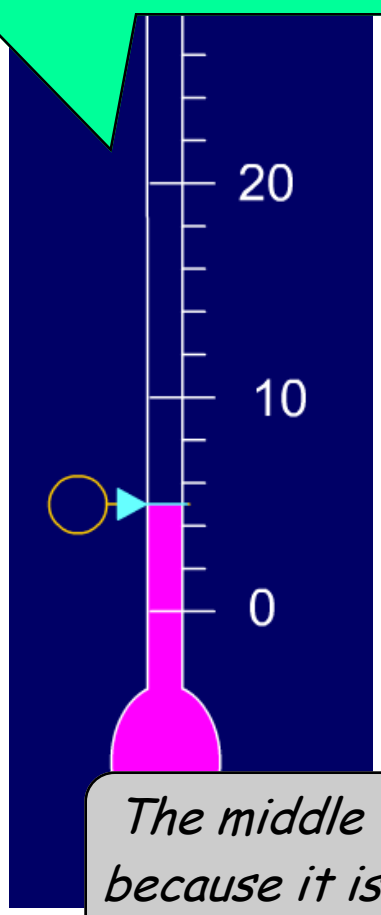
4.05cm 4 cm 4.5 cm 3.5 cm

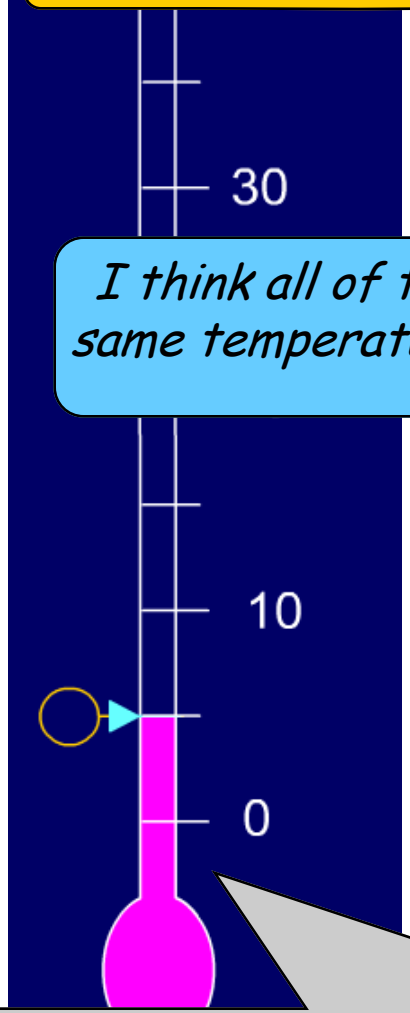
Only one answer is correct. Which would you choose?
Explain your choice.

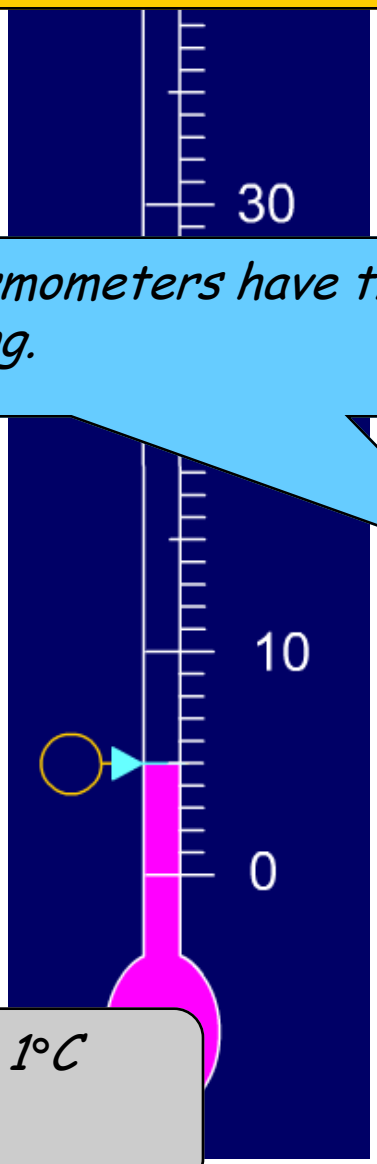
Ruler 2

Which statements do you agree with?

The first thermometer's temperature is 2.5 °C because if you count up from 0 it is 2.5 more.

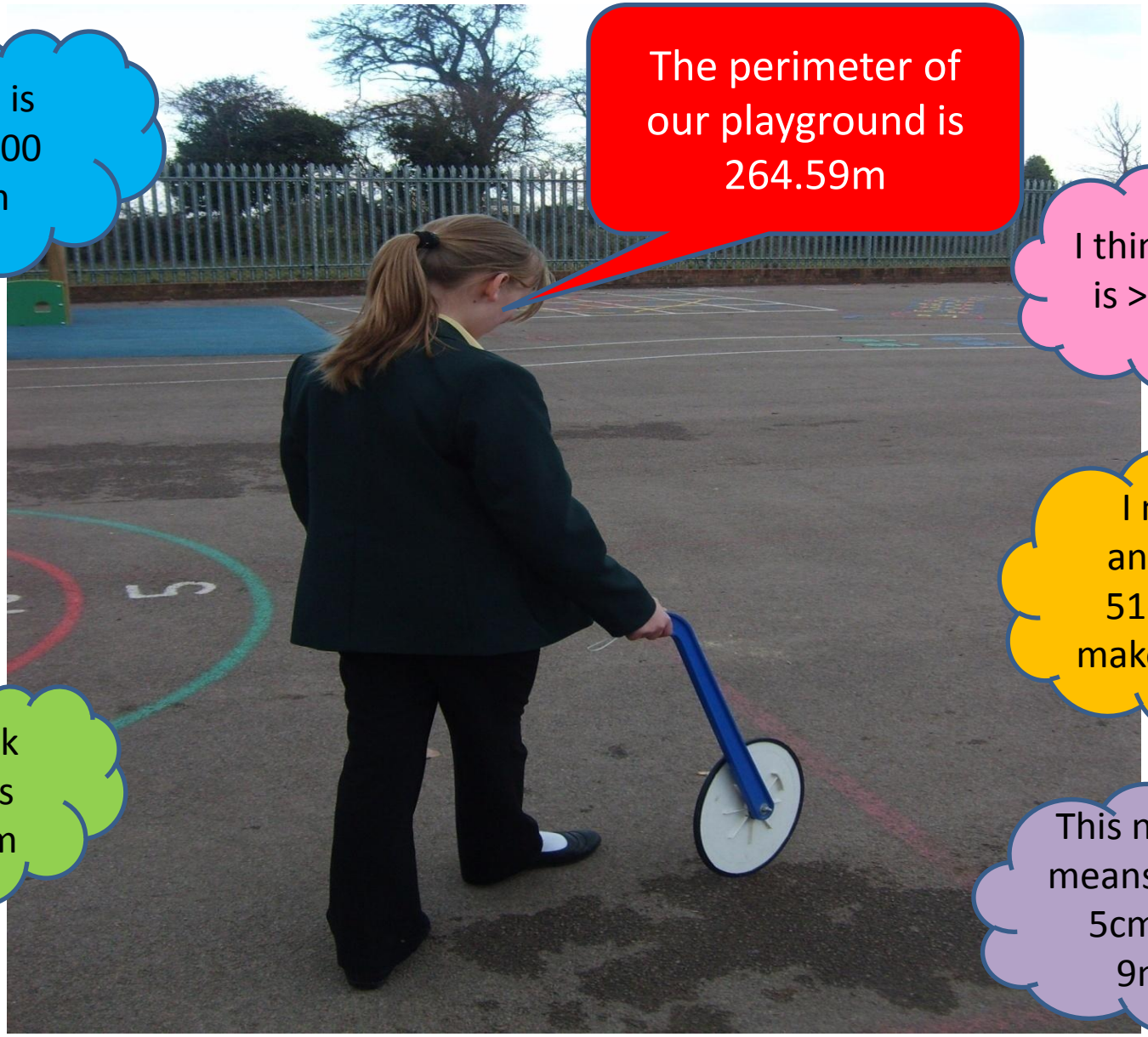






I think all of these thermometers have the same temperature reading.

The middle thermometer's temperature is only 1°C because it is 1 more above 0°C



This is 26,400 cm

The perimeter of our playground is 264.59m

I think this is > 2km

I need another 51cm to make 265m

I think this is < 1km

This number means 264m, 5cm and 9mm

1 person is correct. Who do you agree with?

Playground measures

Bristol to Gloucester, Cheltenham Spa, Worcester and Great Malvern

Mondays to Fridays

Operator		XC	GW	XC	XC	XC	LM	GW	X
Notes		H		V		H			V
Facilities		1◇⌶	◇	1◇⌶	1◇	1◇⌶		◇	1◇⌶
Weston-super-Mare	d	1240		1310		1340			1410
Bath Spa	⑦ d	1300	1319	1335		1400		1415	1435
Bristol Temple Meads	⑩ d	1330	1341	1400		1430		1441	1500
Filton Abbey Wood	d		1348	1357				1448	1457
Bristol Parkway	⑦ d	1340	1352	1410		1440		1452	1510
Yate	d		1401					1501	
Cam & Dursley	d		1413					1513	
Gloucester	⑦ a		1430					1532	
Gloucester	⑦ d				1446		1513	1537	
Cheltenham Spa	d	1412		1442	1456	1512	1525	1548	1542
Ashchurch for Tewkesbury	d						1532	1555	1555
Worcester Shrub Hill	⑦ a						1552	1622	1622
Worcester Foregate St	‡ ⑦ a							1642	1642
Malvern Link	‡ a								
Great Malvern	‡ a								
Birmingham New Street	⑫ a	1456		1526	1545	1556			1626
Train continues to		DEE		MAN	NOT	GLC			MAN

I need to get to Worcester Shrub Hill for 4.30pm. I'm not sure which is the best train to get from Gloucester!

The half past one train from Bristol Temple Meads takes 82 minutes to get to Cheltenham Spa.

What is the shortest journey time from Bath Spa to Birmingham New Street?

I don't think the 2 o'clock train from Bristol goes to Birmingham!

Can you help?

Timetable

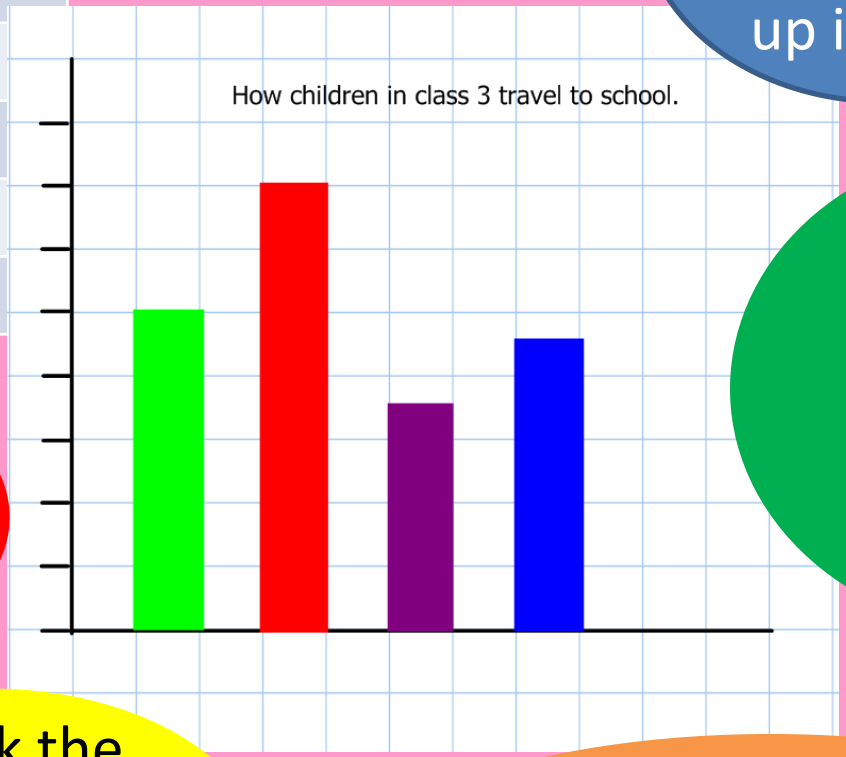
HANDLING DATA

Discussion mat	**Suggested year group/KS**	**APP link**
School Travel	Lower KS2	L3 HD 2 – Construct bar charts and pictograms, where the symbol represents a group of units
Beans	Lower KS2	L3 HD 4 – Extract and interpret information presented in simple tables, lists, bar charts and pictograms
Pictogram	Lower KS2	L3 HD 4 – Extract and interpret information presented in simple tables, lists, bar charts and pictograms

How children in class 3 travel to school	
Method of travel	Number of children
Walk	14
Bus	7
Car	10
Bike	?

Which one is correct?

I think the scale should go up in ones



I think four more people walk to school than go by bike.

I think the scale needs to start at one.

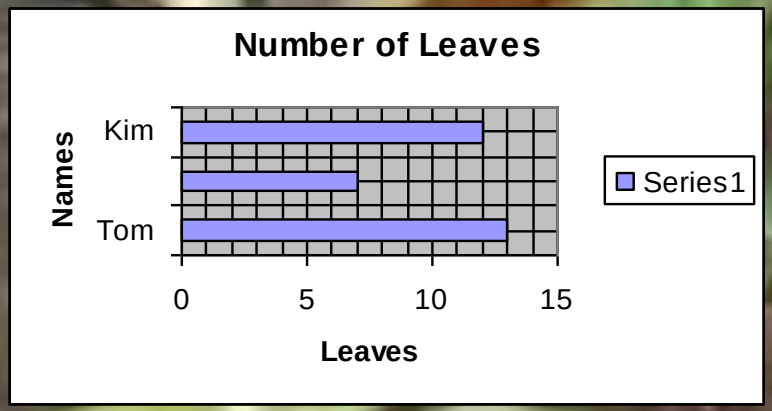
I think the total number of children is 40.

I think the horizontal axis should be labelled walk, bus, car, bike

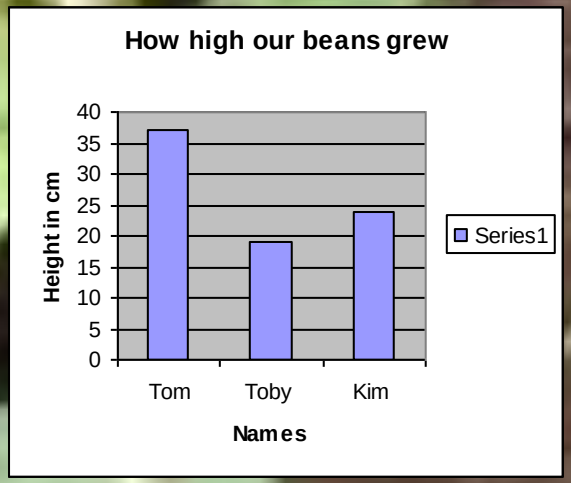
School Travel

In Class 3 we all grew beans from seeds. After 5 weeks we measured their height and counted the leaves.

Here are some ways to show the results.



Name	Height In cm	Leaves
Tom	37	13
Toby	7	19
Kim	21	12



Toby

My bean plant had 7 leaves and was 19cm high

Tom

My bean plant was 37 cm tall and had 13 leaves

Kim

Mine grew 21cm, had 3 flowers and 12 leaves

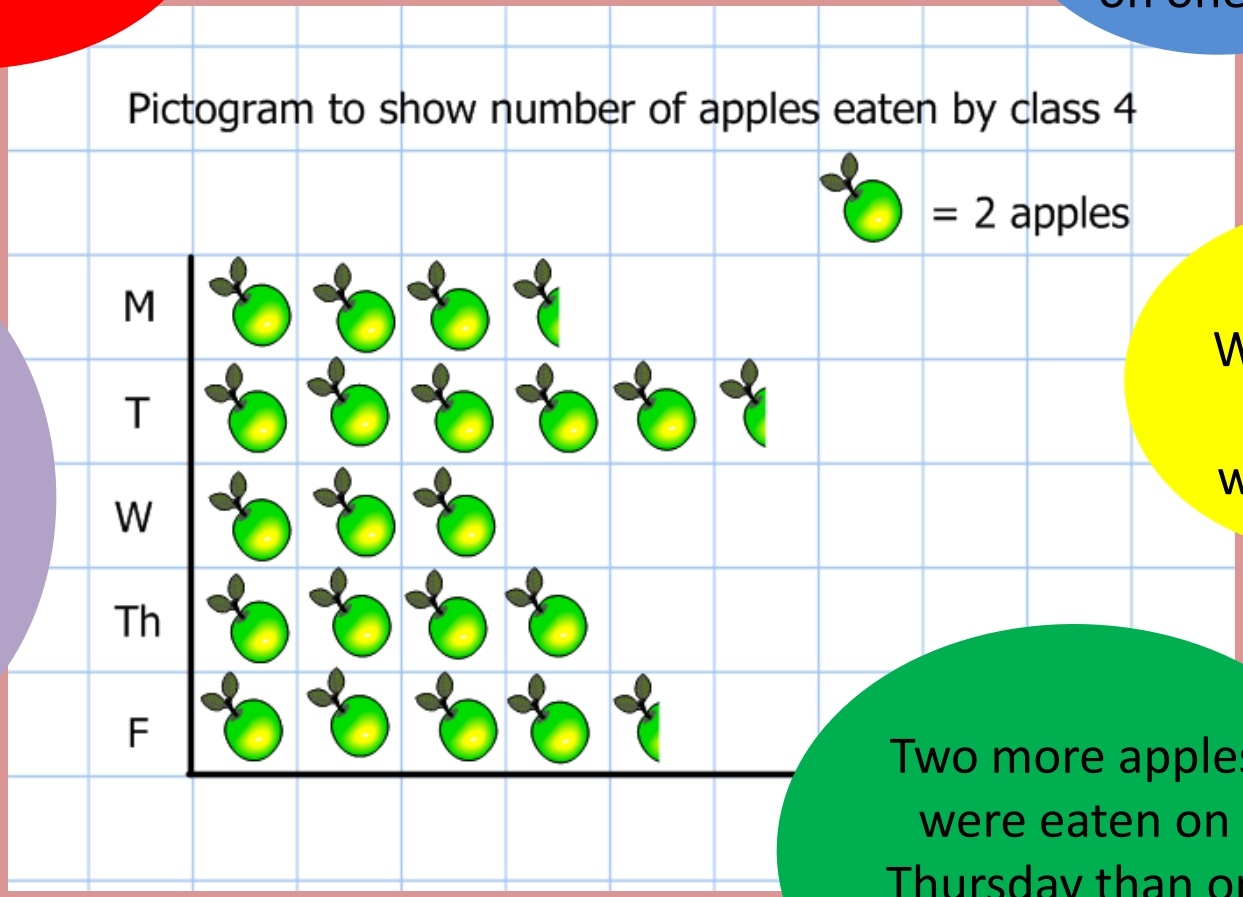
Do you think the data has been presented correctly?

Beans

Only two children are correct. Who are they?

Seven apples were eaten on Saturday

Eleven apples were eaten on one day



Twenty two apples were eaten during the week

On Wednesday 3 apples were eaten

Two more apples were eaten on Thursday than on Wednesday

Pictogram