Addition & Subtraction

Day 1

Starter

Believe it or not, a version of the joke below was one of the top 10 jokes at the Edinburgh Festival.

A cowboy asked me, "Can you help me round up 497 cattle?"

"Yeah," I said. "That's 500 cattle."

Why should the joke have won the most mathematically helpful prize this year?

Explain your response.

Starter – ANSWERS

The joke is mathematically helpful as although cowboys actually round up (herd) cattle, the comedian has demonstrated how to round 497 to the nearest 10 or 100, which is 500 (as there is a digit greater than 5 in the tens and ones places meaning rounding up needs to take place).

Date: Day 1

LO: To use estimation to give approximate results.

Success Criteria

I can use my knowledge of rounding to the nearest 10, 100 and 1000 to calculate approximate results for number-based and worded problems.

I can explain my reasoning.

Descriptive Teaching

Watch the clips on:
https://www.bbc.co.uk/bitesize/topics/zh8dmp3/articles/zpx2qty to remind yourself how to round to the nearest 10, 100 and 1000.

Descriptive Doing

Round the numbers below:

Starting number: 3,456

Nearest 10:

Nearest 100:

Nearest 1,000:

Starting number: 45,454

Nearest 10:

Nearest 100:

Nearest 1,000:

Descriptive Doing - ANSWERS

Starting number: 3,456

Nearest 10: 3460

Nearest 100: 3,500

Nearest 1,000: 3,000

Starting number: 45,454

Nearest 10: 45,450

Nearest 100: 45,500

Nearest 1,000: 45,000

Descriptive Doing

Match each calculation below to a good estimated number sentence.

33,333 + 2,772	56,000 + 25,000
33,397 + 2,843	33,300 + 2,800
56,492 + 24,947	56,000 + 24,500
55,934 + 24,494	33,400 + 2,800

Descriptive Doing - ANSWERS

33,333 + 2,772	56,000 + 25,000
33,397 + 2,843	33,300 + 2,800
56,492 + 24,947	56,000 + 24,500
55,934 + 24,494	33,400 + 2,800
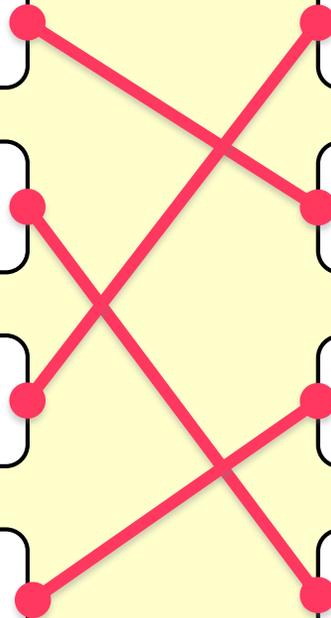
Descriptive Doing

The table below shows the monthly sales figures at a fast food restaurant.

Month	Total Sales
August	£17,935
September	£32,144
October	£29,217

a) Approximately, what were the combined sales in August and September?

b) What were the approximate combined sales in September and October?

c) What is the total approximately for August, September and October?

d) If sales totalled £60,000 approximately in October and November combined, what might sales have been in November? Can you think of multiple possibilities?

Descriptive Doing – ANSWERS

a) August and September: £18,000 + £32,000 = £50,000

b) September and October: £32,000 + £29,000 = £61,000

c) August, September and October: £18,000 + £29,000 + £32,000 = £79,000

d) November: £60,000 - £29,000 = £31,000
Any figure between £30,500 and £31,499 will round to £31,000 (nearest 1,000)

Reflective Doing

Is Gemma's statement true or false?

$$60,001 - 30,001 = 60,000 - 30,000$$

Gemma says, "I can use estimation and approximation and still arrive at the exact result."

Explain your answer.

Reflective Doing – ANSWERS

Gemma's statement is true, 60,001 – 30,001 = 30,000, which is the same as 60,000 – 30,000 = 30,000. Although both 60,001 and 30,001 round to 60,000 and 30,000 respectively as to the nearest 10, 100, 1,000 and even 10,000, the reason it works <u>exactly</u> is because the difference both numbers have between their actual numbers and estimate/approximate numbers is the same difference (which is of 1).

Reflective Doing

Sally works for a big company in London who give their staff carbon points – 1 point for every mile they travel by plane for work. At the end of the year, They then round totals to the nearest 100 and donate £1 to an environmental charity for every 100 points they have accrued over the previous 12 months.

▶ In February, Sally took return flights to Singapore, 6,747 miles each way.

▶ In June, Sally took return flights to New York, 3,473 miles each way.

▶ In October, Sally took return flights to Sydney, 10,557 miles each way.

How much money will Sally have to give to her chosen environmental charity?

Reflective Doing - ANSWERS

6,747 x 2 = 13,494;

3,473 x 2 = 6,946;

10,557 x 2 = 21,114

6,946 + 13,494 + 21,114 = 41,554 miles

41,554 to the nearest 100 = 41,600, then divided by 100 = £416 to donate to charity!

Choose your challenge

Challenges can be found on the document named 'Maths Challenges Day 1'.

Choose an appropriate challenge OR work through green, orange and red.

Answers can be found at the bottom of the document.
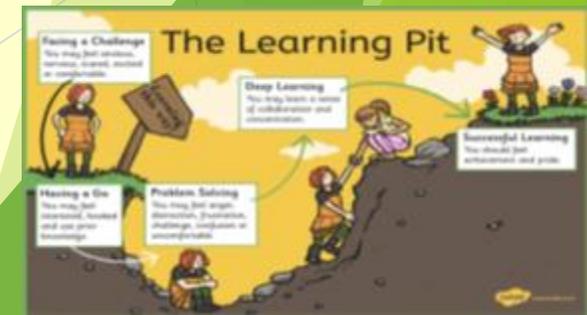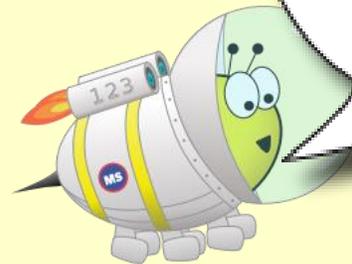
Reflection Time

If the River Amazon is 3,976 miles long,
I can say it is approximately 3,900 miles long.

Do you agree?
Explain your answer.
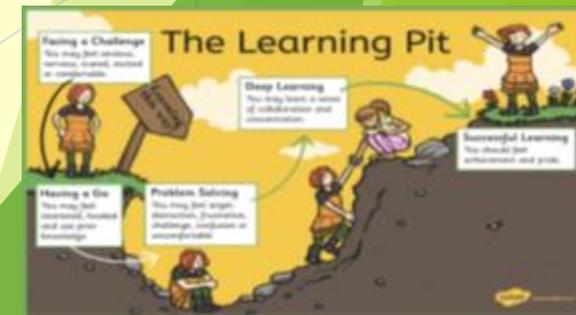
I agree/disagree because…

Reflection Time – ANSWERS

I do not agree with Astrobee. Whether Astrobee chooses to round to the nearest hundred or to the nearest thousand, the approximate value will be the same, 4,000 miles. Even if Astrobee were to choose to round to the nearest 10, the approximate value would still be 3,980 miles.

The Learning Pit
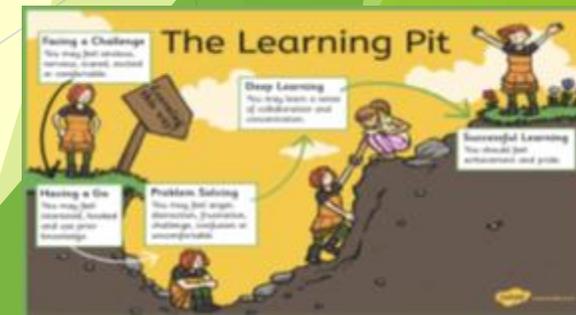
# Addition & Subtraction

Day 2

Starter

Thinking about rounding and estimation, which one doesn't belong?

22,003	9,995

| |
|---|
| 22,497 + 9,957 = |

21,996   10,001

Explain your answer.
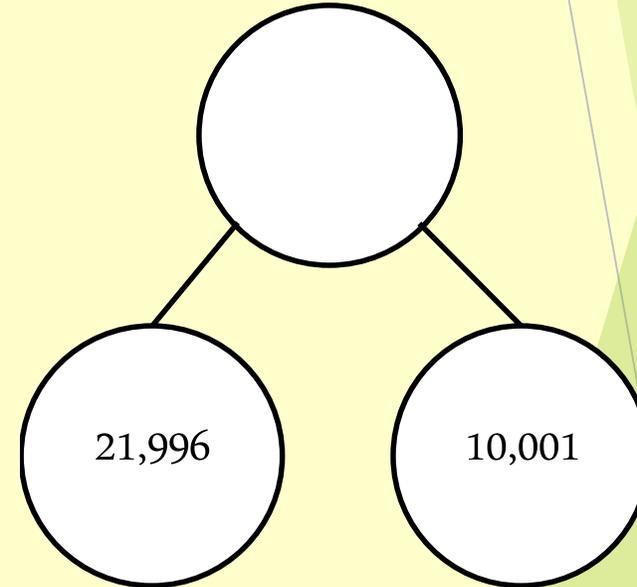
Starter - ANSWERS

The number sentence doesn't belong as it is the only example given where unless the numbers are being rounded to the nearest 1,000, the result is not 32,000. If you round instead to the nearest 100 the result will be 32,500 or to the nearest 10 when the result will be 32,560.

32,000	
22,003	9,995

22,497 + 9,957 = 32,560

32,000

21,996   10,001
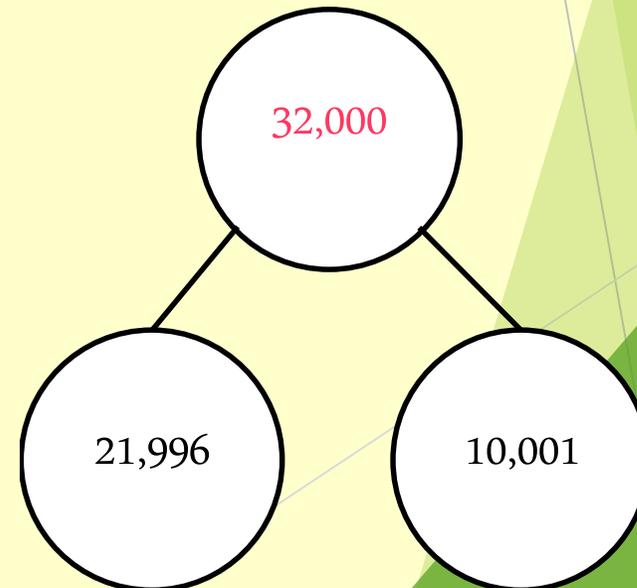
Date: Day 2

LO: To use inverse operations to check calculations.

Success Criteria

I can use my knowledge of part and whole amounts, as well as the application of the commutative law for addition, to use the inverse operation more than once to check results of a prior calculation.

I can explain my reasoning.

Descriptive Teaching

Inverse operations are opposite operations.

Addition is the inverse operation of subtraction and vice versa.

We often use inverse operations to check our answers.

Descriptive Teaching

I'm thinking of a number.
Once I've subtracted 973 and added 5,431, my number is now 12,879.

What was my number originally?

We need to use inverse operations to find the original number.
We need to work backwards...

12879 – 5431 = 7448

7448 + 973 = 8421

Descriptive Doing

1. I'm thinking of a number.
Once I've added 1,257 and subtracted 6,837, my number is now 14,753.

What was my number originally?

2. I'm thinking of a number.
Once I've subtracted 1,357 and added 6,879, my number is now 14,539.

What was my number originally?

# Descriptive Doing

1. $14,753 + 6,837 = 21,590$

$21,590 - 1,257 = \underline{20,333}$

2. $14,539 - 6,879 = 7,660$

$7,660 + 1,357 = \underline{9,017}$

Reflective Doing

Use addition and subtraction to complete the pyramid below:

Pyramid blocks:
- Top row: (empty)
- Second row: (empty), 35,810
- Third row: (empty), (empty), 18,406
- Fourth row: 6,844, 8,079, (empty), 9,081
- Bottom row: 2,307, (empty), 3,542, 5,783, (empty)

Reflective Doing - ANSWERS

		83,060		
	47,250		35,810	
14,923		17,404		18,406

6,844	8,079	9,325	9,081

2,307	4,537	3,542	5,783	3,298
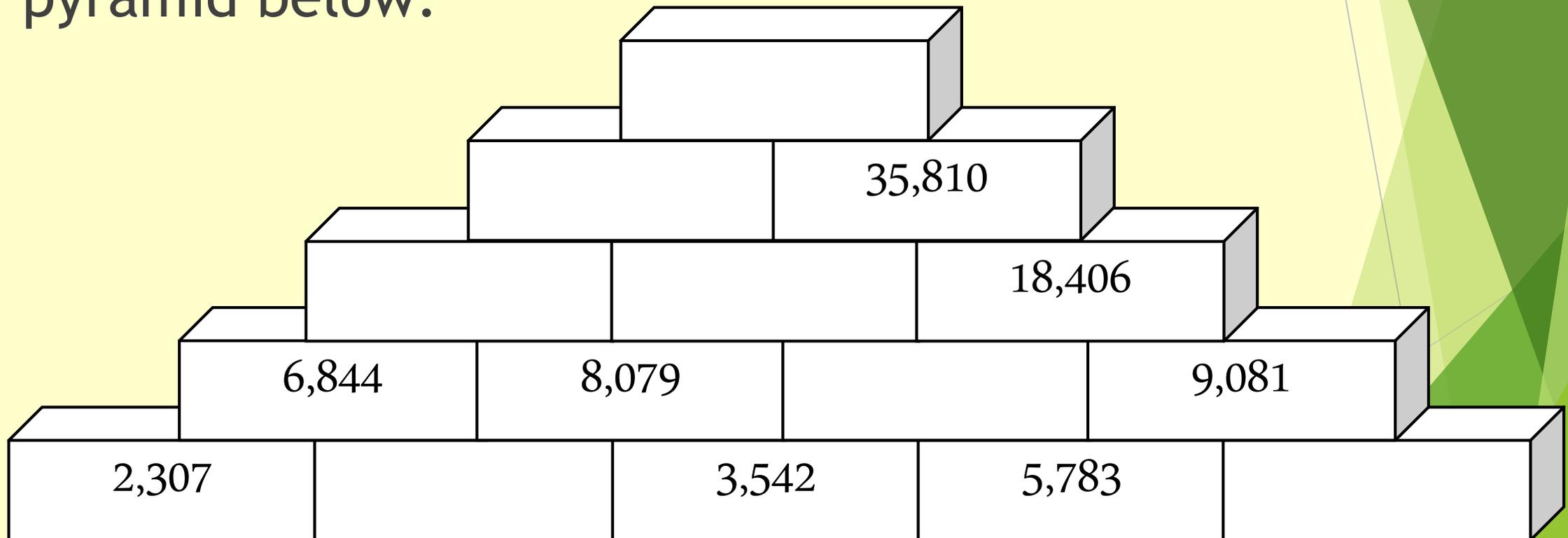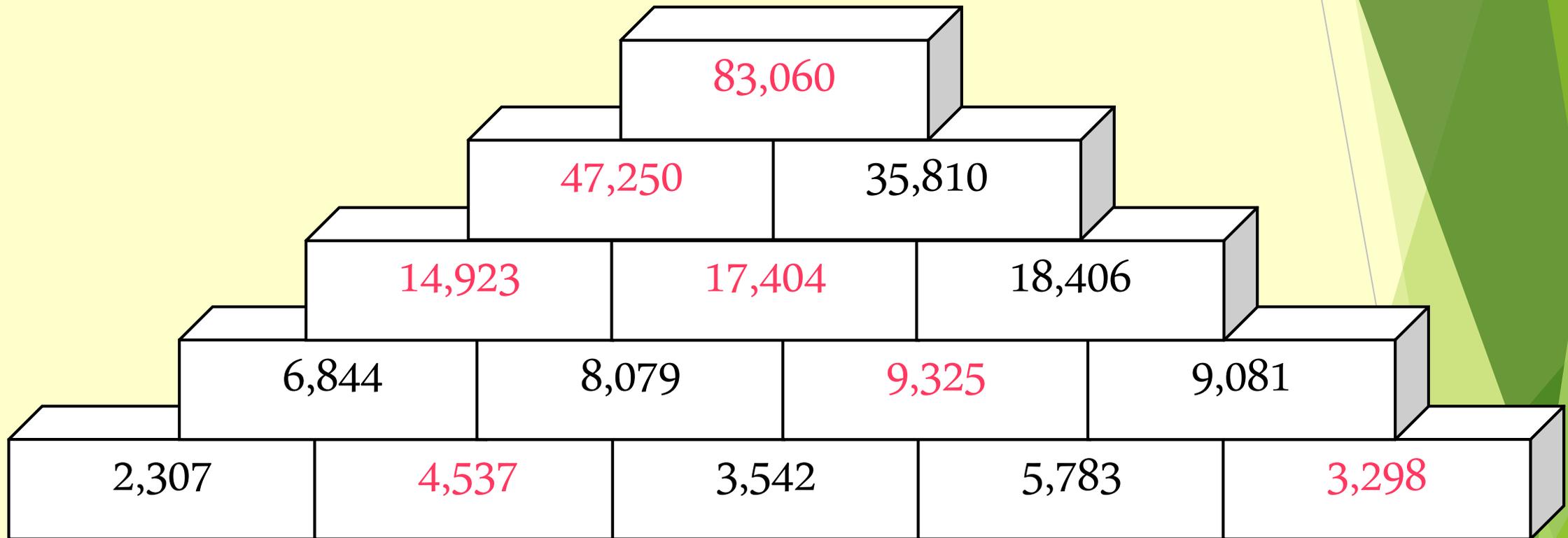
Reflective Doing

Jamal, Yasmin, Ruth and Chen are comparing lengths of rivers.

Jamal says, "The river I am think of is 1,738 miles long."

Yasmin says, "My river is exactly twice as long as Jamal's river."

Ruth says, "My river is only half as long as the one Jamal thought of."

In total, there rivers have a combined length of 9,874 miles.

How long is the river Chen has been thinking of?

Explain your answer.

Reflective Doing

Yasmin: 1,738 x 2 = 3,476 miles

Ruth: 1,738 ÷ 2 = 869 miles

Yasmin, Ruth and Jamal combined: 3,476 + 1,738 + 869 = 6,083 miles

Chen: 9,874 – 6,083 = 3,791 miles

Choose your challenge

Challenges can be found on the document named 'Maths Challenges Day 2'.

Choose an appropriate challenge OR work through green, orange and red.

Answers can be found at the bottom of the document.

The Learning Pit
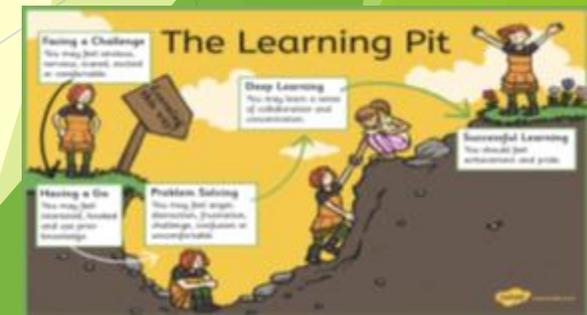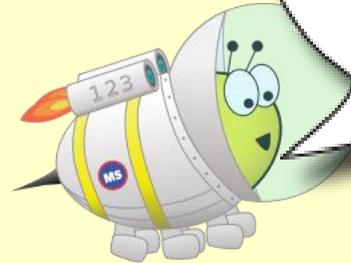
Reflection Time

If I wanted to check whether I'd calculated 12,897 + 7,543 correctly, I could subtract 7,543 from 12,897.

Do you agree?

Explain your answer.

I agree/disagree because…

The Learning Pit
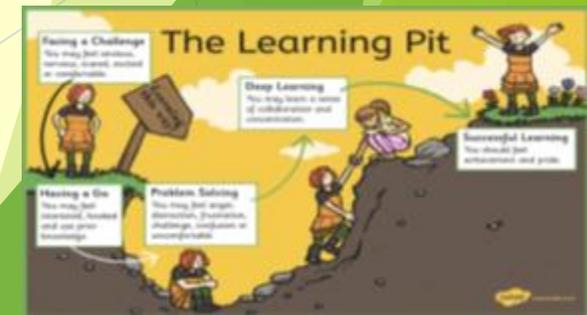
Reflection Time – ANSWERS

I do not agree with Astrobee. To check an addition calculation, you cannot subtract one part amount from the other part amount. You need to find the whole amount first by adding them together, then subtract part amounts from the whole. For example, 12,897 + 7,543 = 20,440. To check: 20,440 – 7,543 = 12,897...
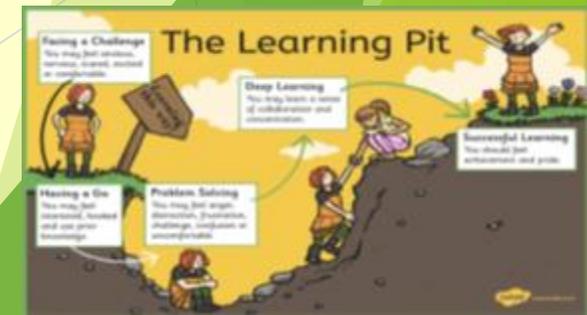
Addition & Subtraction

Day 3

Starter

Chen opens his book.

The sum total of the page numbers on the double-page he has opened is 401.
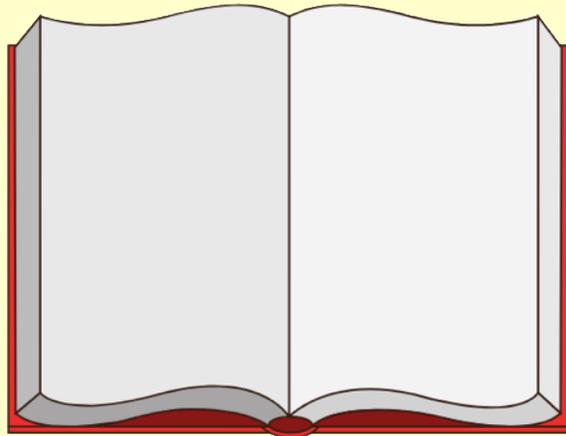
What is the sum total for the pages of the next double-page he could have opened?

Explain your answer.

Starter – ANSWERS

The pages he opened had the page numbers 200 and 201, as 200 and 201 are the two consecutive numbers that have a sum total of 401. If you turn to the next two pages, they will be 202 and 203, so the next two pages would have a sum total of 405. (If you subtract 1 from the total, then halve it, you get the first number.)

200   201
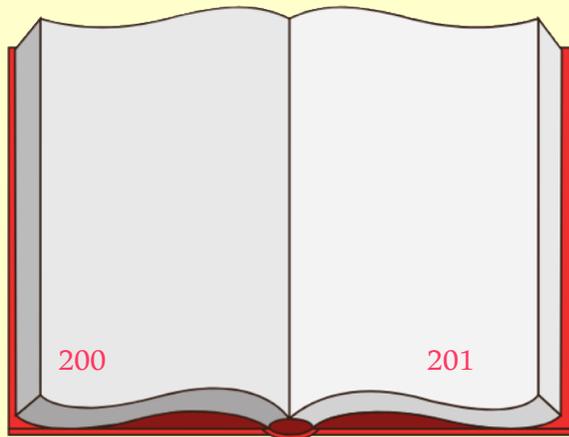
Date: Day 3

LO: To solve multi-step problems.

Success Criteria

I can use my knowledge of addition and subtraction to solve a variety of multi-step problems, including pictorially-presented and worded problems.

I can explain my reasoning.

Descriptive Doing

Daniel is cycling from Los Angeles to San Diego.

On Tuesday he cycles 41 miles.

He cycles 5 miles less on Wednesday than he did on Tuesday.

a) How many miles did Daniel cycle on Wednesday?

b) How many miles has he cycled on Tuesday and Wednesday combined?

c) If the distance between LA and San Diego is 121 miles in total, how many miles does he need to cycle on Thursday to arrive in San Diego?

Descriptive Doing – ANSWERS

a) How many miles did Daniel cycle on Wednesday?
41 – 5 = 36 miles

b) How many miles has he cycled on Tuesday and Wednesday combined?
41 + 36 = 77 miles

c) If the distance between LA and San Diego is 121 miles in total, how many miles does he need to cycle on Thursday to arrive in San Diego?
121 – 77 = 44 miles

Descriptive Doing

Yasmin has been watching a movie.

On Friday she watched 49 minutes.

She watches 8 more minutes on Saturday than she did on Friday.

a) How many minutes of the movie does she watch on Saturday?

b) How many minutes has she watched on Friday and Saturday combined?

c) If the movie is 134 minutes long in total, how many minutes does she need to watch on Sunday to finish the movie?

Descriptive Doing – ANSWERS

a) How many minutes of the movie does she watch on Saturday?
49 + 8 = 57 minutes

b) How many minutes has she watched on Friday and Saturday combined?
57 + 49 = 106 minutes

c) If the movie is 134 minutes long in total, how many minutes does she need to watch on Sunday to finish the movie?
134 – 106 = 28 minutes

Reflective Doing

Two families win £2,500 on a travel website to spend on a holiday.

	The Spencer family	The Patel family
flights	£897	£789
hotel	£1,037	£1.153
car hire	£321	£283

Which family has the most spending money leftover from the £2,500 prize?

How much more does that family have as spending money than the other family?

Reflective Doing - ANSWERS

Which family has the most spending money leftover from the £2,500 prize?

Spencer family: £1,037 + £897 + £321 = £2,255; £2,500 - £2,255 = £245

Patel family: £1,153 + £789 + £283 = £2,225; £2,500 - £2,225 = £275

How much more does that family have as spending money than the other family?

The Patels have £30 more to spend than the Spencer family.

Reflective Doing

On Friday, Sally drove 121 miles.

On Saturday, she drove 33 miles more than she did on Friday.

On Sunday, she drove 33 miles less than she did on Friday.

How far did Sally drive in total?

How many calculations did you have to complete to find Sally's total?

Chen says, "I multiplied 121 by 3 and found the same result."

Explain why Chen's strategy works.

Reflective Doing – ANSWERS

121 – 33 = 88 miles
121 + 33 = 154 miles
Total: 154 + 121 + 88 = 363 miles

Chen's strategy works because 121 is the first figure, then the other two figures are exactly 33 more and 33 less (the same amount) than 121. As multiplication is repeated addition, it works out on average the same as three lots of 121, so adding three lots of 121 or multiplying 121 by 3 will get the same result, 363.

Choose your challenge

Challenges can be found on the document named 'Maths Challenges Day 3'.

Choose an appropriate challenge OR work through green, orange and red.

Answers can be found at the bottom of the document.
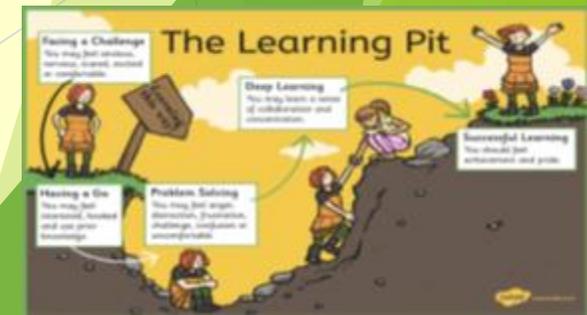
Reflection Time
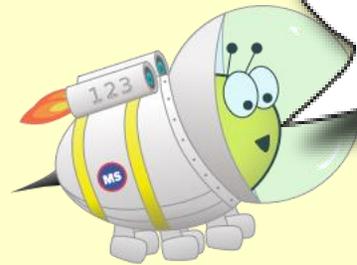
I solved the calculation by subtracting 125 first, then adding 260 on after that.

To be able to solve multi-step problems

Another Activity:

A farmer has 350 eggs.

If another 125 eggs are laid by the hens and the farm shop sells 260 eggs today, how many eggs are on the farm at the end of the day?

Do you agree?

Explain your answer.

I agree/disagree because...
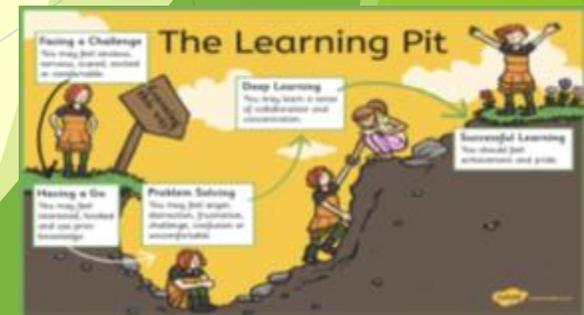
Reflection Time – ANSWERS

I do not agree with Astrobee's strategy.

125 eggs being laid means 125 needs to be added first (350 + 125 = 475), then selling eggs would mean subtracting them from the new total (475 – 260 = 215).


The Learning Pit
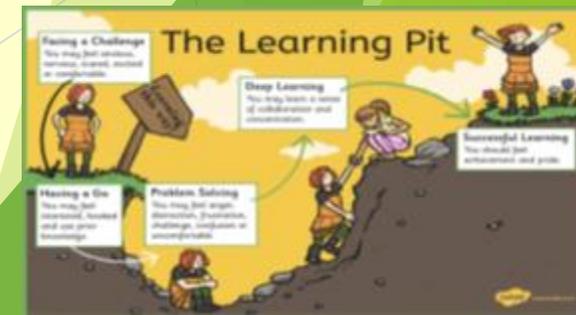
# Multiplication & Division

Day 4

Starter

Which one doesn't belong?
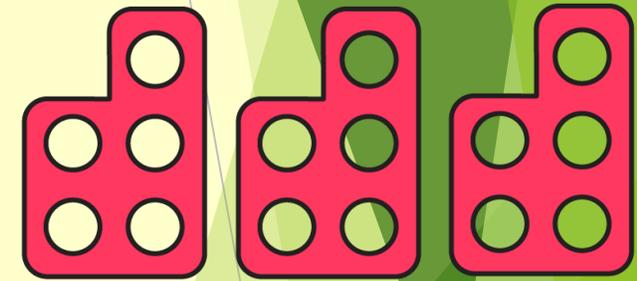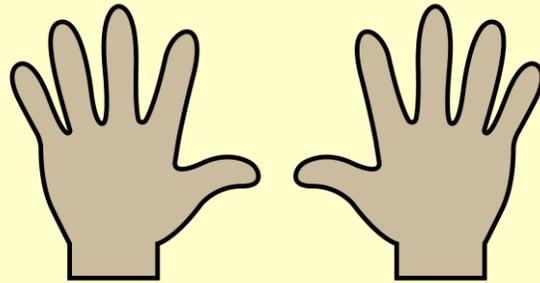
Explain your answer.

Starter - ANSWERS

The £2 coin representation doesn't belong, as the other representations are made up of multiples of five. Four £5 notes totalling £20, two hands totalling ten fingers and three five Numicon shapes totalling fifteen.
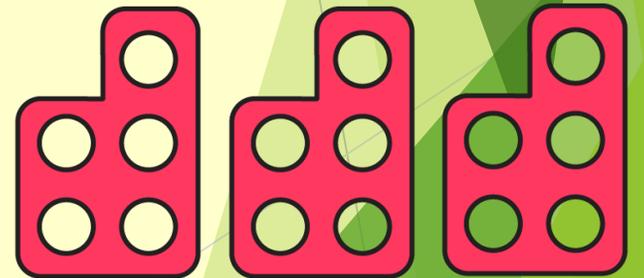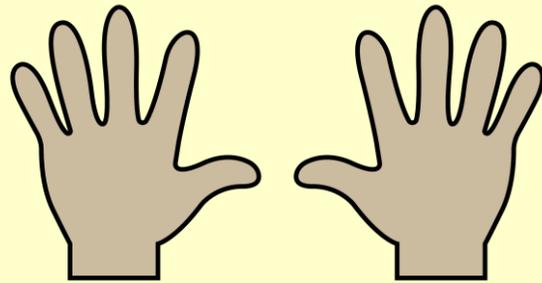
Date: Day 4

LO: To identify multiples of whole numbers.

Success Criteria

I can use my times tables knowledge to identify multiples of whole numbers.

I can explain my reasoning.

Descriptive Doing

Respond to the following statements in full.

a) 5,432 is not a multiple of 2.
   True or false?

b) 2,345 is a multiple of 5.
   True or false?

c) 4,321 is a multiple of 10.
   True or false?

d) 1,234 is a multiple of 2, 5 and 10.
   True or false?

Descriptive Doing – ANSWERS

a) 5,432 is not a multiple of 2.
False – multiples of 2 are all even numbers. 5,432 is even so it is a multiple of 2!

b) 2,345 is a multiple of 5.
True – multiples of 5 end in either 0 or 5. 2,345 is a multiple of 5 as it ends in 5.

c) 4,321 is a multiple of 10.
False – multiples of 10 have 0 in the ones place and 4,321 has 1 in its ones place.

d) 1,234 is a multiple of 2, 5 and 10.
False – it is only a multiple of 2 as it is even, multiples of 5 end in 0 or 5, whilst multiples of 10 must have a 0 in the ones place.

Descriptive Doing

1 2 3 4 5 6

Draw two digit cards from 1 – 6 each time, then complete the table below:

Card 1	Card 2	Product	Multiple of...
3	4	12	1, 2, 3, 4, 6, 12

Descriptive Doing - ANSWERS

Ask an adult to check your table.

Card 1	Card 2	Product	Multiple of...
3	4	12	1, 2, 3, 4, 6, 12

Descriptive Doing

1 2 3 4 5 6 7 8 9

Draw two digit cards from 1 – 9 each time, then complete the grid below:

x	1	2	3	4	5	6	7	8	9
1									
2									
3									
4									
5									
6									
7									
8									
9									

Do some multiples fit in more than one space?

Which number(s) appear most often in the table?

Why might that be?

Descriptive Doing - ANSWERS

x	1	2	3	4	5	6	7	8	9
1	1	2	3	4	5	6	7	8	9
2	2	4	6	8	10	12	14	16	18
3	3	6	9	12	15	18	21	24	27
4	4	8	12	16	20	24	28	32	36
5	5	10	15	20	25	30	35	40	45
6	6	12	18	24	30	36	42	48	54
7	7	14	21	28	35	42	49	56	63
8	8	16	24	32	40	48	56	64	72
9	9	18	27	36	45	54	63	72	81

Reflective Doing

Solve the word problems below.

a) Jamal has an amount of money that is a multiple of nine and is three less than a multiple of seven. It is more than £10, but less than £40.
What amount of money does Jamal have? Explain your answer.

b) Ruth has received a parcel. Its total weight is less than 50 kg, a multiple of seven and five more than a multiple of six.
How much does Ruth's parcel weigh? Explain your answer.

Reflective Doing – ANSWERS

a) Jamal has an amount of money that is a multiple of nine and is three less than a multiple of seven. It is more than £10, but less than £40.
What amount of money does Jamal have? Explain your answer.
Jamal has £18 – the product of 2 x 9 and three less than 7 x 3 = 21.

b) Ruth has received a parcel. Its total weight is less than 50 kg, a multiple of seven and five more than a multiple of six.
How much does Ruth's parcel weigh? Explain your answer.
Ruth's parcel weighs 35 kg – the product of 5 x 7 and five more than the product of 5 x 6 (which is 30).

Choose your challenge

Challenges can be found on the document named 'Maths Challenges Day 4'.

Choose an appropriate challenge OR work through green, orange and red.

Answers can be found at the bottom of the document.

The Learning Pit
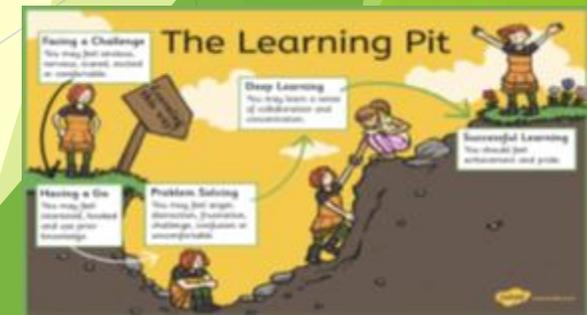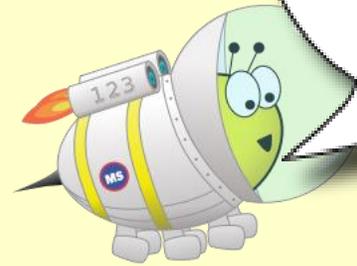
Reflection Time

A multiple of two odd numbers is also a multiple of two.

Is Astrobee's statement sometimes, always or never true?

Explain your answer.

The statement is ____ true because...

The Learning Pit
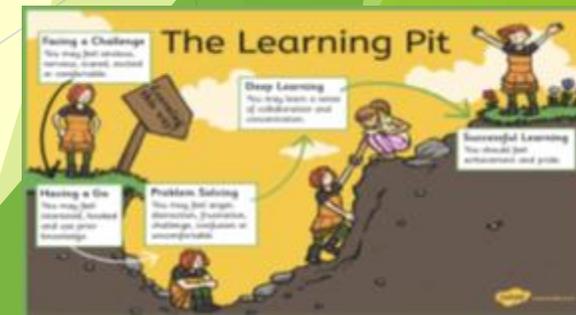
Reflection Time – ANSWERS

Astrobee's statement is never true – for example, 3 x 5 = 15, 5 x 7 = 35 and 9 x 7 = 63. All of these are odd numbers and therefore not multiples of two.


The Learning Pit
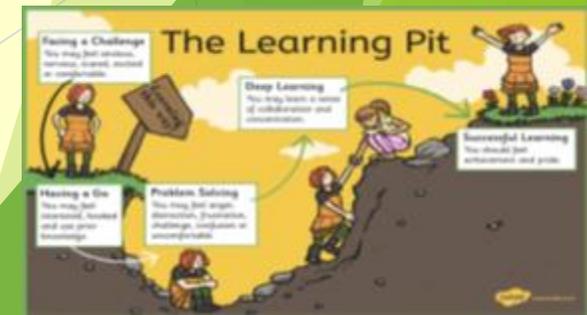
Multiplication & Division

Day 5

Starter

What's the same? What's different?
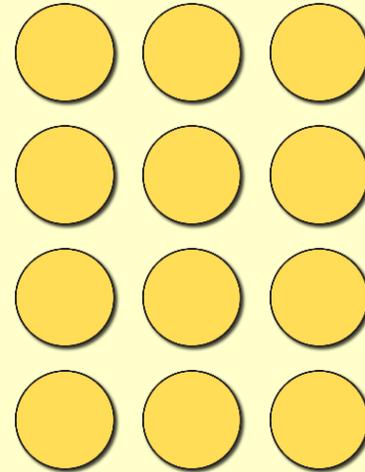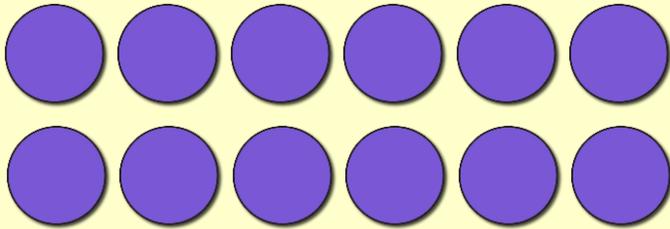
Explain your answer.

Starter - ANSWERS

Both arrays of counters total 12 counters; however, the purple counters are arranged as two rows of six counters (or six columns of two counters), while the yellow counters are arranged as four rows of three counters (or three columns of four counters).
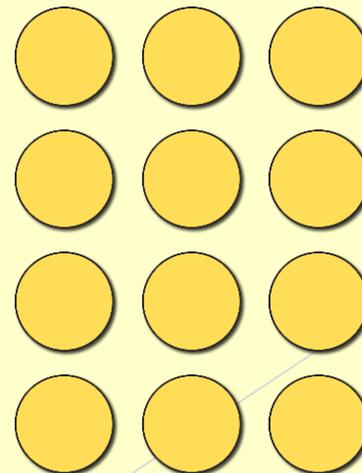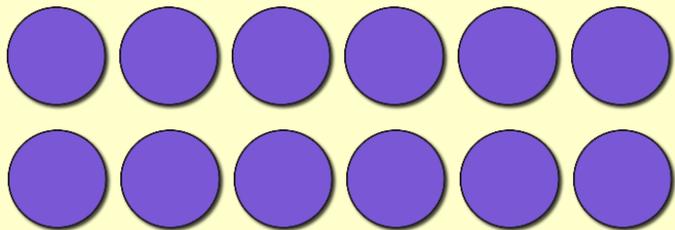
Date: Day 5

LO: To identify factors of whole numbers.

Success Criteria

I can multiply factors together to give a product and know that factors come in pairs.

I can explain my reasoning.

Descriptive Teaching

Watch the video on
https://www.bbc.co.uk/bitesize/topics/zfq7hyc/articles/zp6wfcw to remind yourself about factors.

Descriptive Doing

Find all the factor pairs for the numbers:

1. 2
2. 4
3. 12
4. 15

Descriptive Doing

1. 2 = 1, 2
2. 4 = 1, 2, 4
3. 12 = 1, 2, 3, 4, 6, 12
4. 15 = 1, 3, 5, 15

Reflective Doing

Chen uses a table as his strategy to identify factor pairs. Here's a table he used to identify all the factors for the number 48.

1	2	3	4	5	6
48	24	16	12	N	8

a) What does the 'N' signify?

b) How many factors does 48 have in total?

c) Create your own table for 36.

d) How many factors does 36 have in total?

Reflective Doing – ANSWERS

a) 'N' signifies that there isn't a factor pair for that number.

b) 48 has 10 factors in total: 1, 2, 3, 4, 6, 8, 12, 16, 24 and 48.

c) Create your own table for 36.

1	2	3	4	5	6
36	18	12	9	N	6

d) 36 has 9 factors in total 1, 2, 3, 4, 6, 9, 12, 18 and 36.

Reflective Doing

Are the following statements always, sometimes or never true?

a) Even numbers have an odd-numbered amount of factors.

b) Odd numbers have an even-numbered amount of factors.

Explain your responses in full.

Reflective Doing – ANSWERS

a) Even numbers have an odd-numbered amount of factors.
Sometimes true – for example 16 has an odd-numbered amount of factors (1, 2, 4, 8 and 16) but 8 has an even-numbered amount (1, 2, 4 and 8).

b) Odd numbers have an even-numbered amount of factors.
Sometimes true – for example, 33 has an even-numbered amount of factors (1, 3, 11 and 33) but 25 has an odd numbered amount (1, 5 and 25).

*Square numbers have an odd-numbered amount of factors!*

Choose your challenge

Challenges can be found on the document named 'Maths Challenges Day 5'.

Choose an appropriate challenge OR work through green, orange and red.

Answers can be found at the bottom of the document.
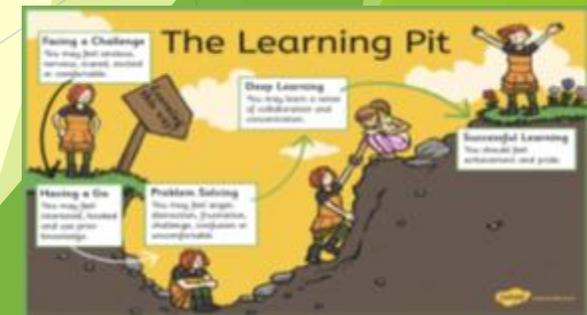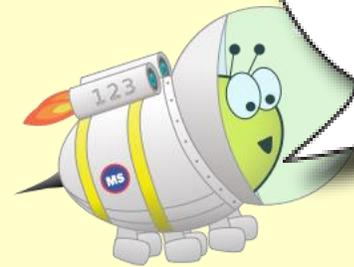
Reflection Time

The smaller of any two numbers has less factor pairs.

Is Astrobee's statement always, sometimes or never true?

Explain your answer.

The statement is ___ true because...

The Learning Pit
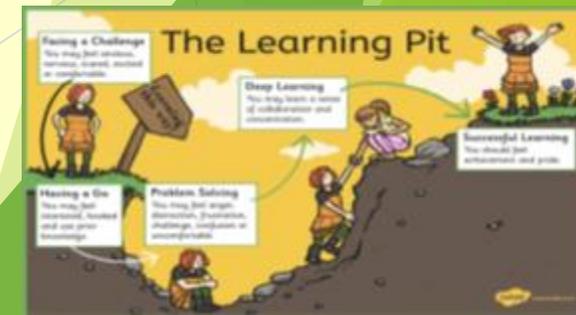
Reflection Time – ANSWERS

Astrobee's statement is sometimes true – for example, 11 only has one factor pair (1 and 11) which is less than 12 which has three factor pairs(1 and 12, 2 and 6, 3 and 4); however, 24 has four factor pairs (1 and 24, 2 and 12, 3 and 8, 4 and 6), whereas 35 (a larger number) only has two factor pairs (1 and 35, 5 and 7).