Autumn 1 Year 5

L.E.A.D. Academy Trust
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Links to prior learning/ objectives:

- Place value/rounding
- Addition and subtraction
- Estimating
- Perimeter of rectangles

Resources:

Place value counters, place value grids, number lines (inc. negative numbers)

Mastery:

(where to find some resources)

- Teaching for Mastery
- White Rose **New and old documents**
- Mastery maths stickers
- Nrich (curriculum mapping)

Vocabulary:

Order, compare, digit, place value, powers of 10, round, million, thousand, more, less, add, subtract, forwards, backwards, ascending, descending, multiple, negative, decimal places, decimals, Roman numerals, column, efficient, regroup, exchange, perimeter, centimetres, metres, millimetres, operations, calculations

Objectives and Teaching

Week 1

Barriers to ARE (misconceptions):

Understanding of place value – column titles, language.
Struggle to add and subtract powers of 10 – bridging 10, 100 etc.
Number recognition – in multiple representations.

Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit

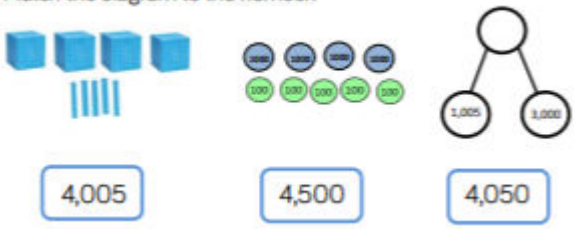
- To develop the skill of representing numbers to 10,000.
- To develop the skill of representing numbers to 100,000.
- To develop the skill of representing numbers to 1,000,000.

Count forwards or backwards in steps of powers of 10 for any given number up to 1000000.

- To develop the skill of counting in 10s, 100s, 1000s, 10,000s and 100,000s

Fluency

Match the diagram to the number.



Problem Solving

Reasoning

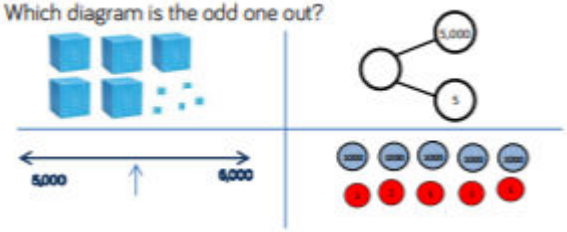
Simon says he can order the following numbers by only looking at the first three digits.

12,516 12,832 12,679 12,538 12,794

Is he correct?

Explain your answer.

Which diagram is the odd one out?



Complete the table.

	Add 10	Add 100	Add 1,000
2,506			
7,999			
		6,070	

Harriet has made five numbers, using the digits 1, 2, 3 and 4

She has changed each number into a letter.

Her numbers are:

1) aabdc
2) acdbc
3) dcaba
4) cdadc
5) bdaab

Here are three clues to work out her numbers:

- Number 1 is the greatest number.
- The digits in number 4 total 12
- Number 3 is the smallest number.

Here is a number line.

What is the value of A?

B is 40 less than A.
What is the value of B?

C is 500 less than B.
Add C to the number line.

Jennie counts forwards and backwards in 10s from 317

Circle the numbers Jennie will count.

427	997	507
1,666	3,210	5,627
-23	7	-3

Explain why Jennie will not say the other numbers.

Week 2

Barriers to ARE (misconceptions):

Understanding of place value – column titles, language.
Struggle to add and subtract powers of 10 – bridging 10, 100 etc.
Number recognition – in multiple representations.

Read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit

- To know how to compare and order numbers to 1,000,000
- To develop the skill of comparing and ordering numbers to 1,000,000

Round any number up to 1000000 to the nearest 10, 100, 1000, 10000 and 100000

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Knowledge of powers of 10 and multiples of when rounding.

- To know how to round to the nearest 10, 100 and 1000.
- To know how to round numbers within 100,000
- To know how to round numbers within 1,000,000

Fluency

Use 6 counters to make **five** different 6 digit numbers.

10,000s	1,000s	100s	10s	1s

Order your numbers from greatest to smallest.

Round 85,617

- To the nearest 10
- To the nearest 100
- To the neatest 1,000
- To the nearest 10,000

Round the distances to the nearest 1,000 miles.

Destination	Miles from Manchester airport	Miles to the nearest 1,000
New York	3,334	
Sydney	10,562	
Hong Kong	5,979	
New Zealand	11,550	

Complete the table.

Rounded to the nearest 100	Start number	Rounded to the nearest 1,000
	15,999	
	28,647	
	56,099	

Problem Solving

Using digit cards 0-9, create three different five-digit numbers that fit the following clues:

- The digit in the hundreds column and ones column has a difference of 2
- The digit in the hundreds column and the ten thousands column has a difference of 2
- The sum of all the digits totals 19

Two five-digit numbers have a difference of 5

When they are both rounded to the nearest thousand, the difference is 1,000

What could the numbers be?

Reasoning

Turn over digit cards 0-9 and select five.

Make the greatest number possible and the smallest number possible.

How do you know this is the greatest or smallest?

Round 59,996 to the nearest 1,000
Round 59,996 to the nearest 10,000

What do you notice about the answers?

Can you think of three more numbers where the same thing would happen?

Week 3

Barriers to ARE (misconceptions):

Understanding of place value – column titles, language.
Struggle to add and subtract powers of 10 – bridging 10, 100 etc.
Number recognition – in multiple representations.
Understanding of decimal numbers – less than one, part of a whole, relationship with fractions.
Ordering decimals – forgetting importance of place value; instead assuming a number is greater/smaller based on how many digits there are.

Read, write, order and compare numbers with up to three decimal places.

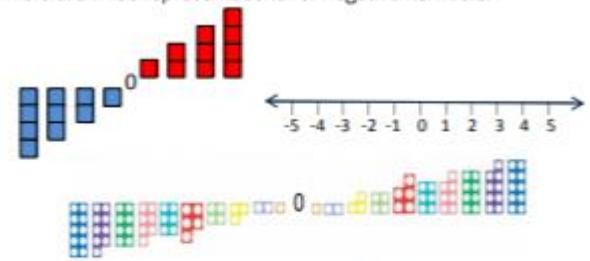
- To understand decimal place value.
- To know how to identify the value of digits in numbers with up to three decimal places.
- To know how to compare numbers with up to three decimal places.
- To know how to order numbers with up to three decimal places.

Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.

- To develop my understanding of negative numbers.

Fluency

Here are three representations for negative numbers.



What is the same and what is different about each representation?

Estimate and label where 0, -12 and -20 will be on the number line.

Jane visits a zoo.
The rainforest room has a temperature of 32°C
The artic room has a temperature of -24°C
Show the difference in the room temperatures on a number line.

Problem Solving

Put these statements in order so that the answers are from smallest to greatest

The difference between -24 and -76

The even number that is less than -18 but greater -22

The number that is half way between 40 and -50

The difference between -6 and 7

Reasoning

True or False?

- The temperature outside is -5 degrees, the temperature inside is 25 degree.
  The difference is 20 degrees.
- Four less than minus six is minus two.
- 15 more than -2 is 13

Explain how you know if each statement is true or false.

Week 4

Barriers to ARE (misconceptions):

Exchanging – especially across zeros in subtraction.

Place value – setting out calculations correctly.

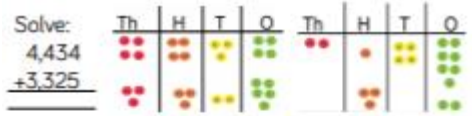
Inverse of subtraction calculations – confusion due to commutativity of addition but not subtraction.

Add and subtract whole number with more than 4 digits, including using formal written methods (columnar addition and subtraction)

Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy

- To know how to add whole numbers with more than 4 digits using the column method *(This may need more than one lesson)*
- To know how to subtract whole numbers with more than 4 digits using the column method *(This may need more than one lesson)*
- To know how to round to estimate and approximate
- To know how to use inverse operations to check addition and subtraction calculations

Fluency



____ + ____ = ____ ____ + ____ = ____

Can you give the other 3 fact family questions that relate to this question? (Inverse operation link)

Answer:

32 461	48 276
+ 4 352	+ 5 613
_____	_____

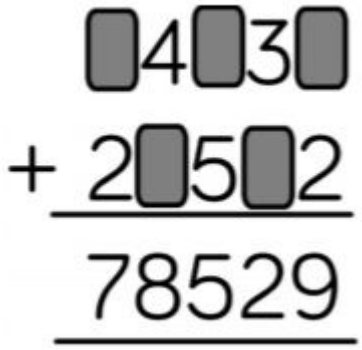
Can you think of a sensible story to represent this question?

Using the column method, answer:

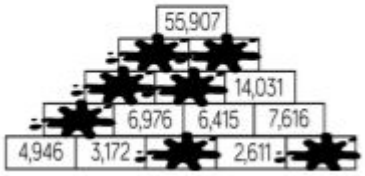
54,311 + 425 + 3,501
35,622 + 24,316 + 7,43
3,942 + 14,356 + 88

Problem Solving

Work out the missing numbers

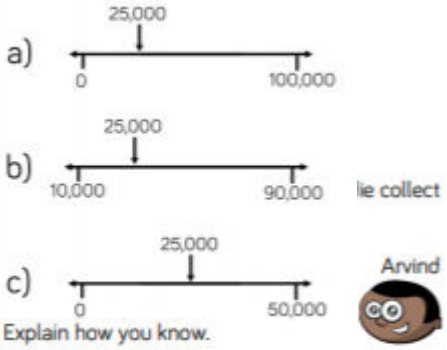


Complete the pyramid using addition and subtraction

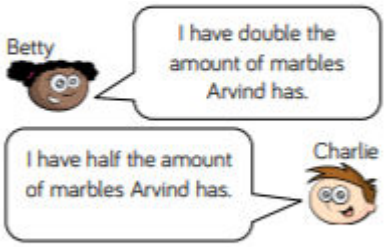


Reasoning

Which estimate is inaccurate?

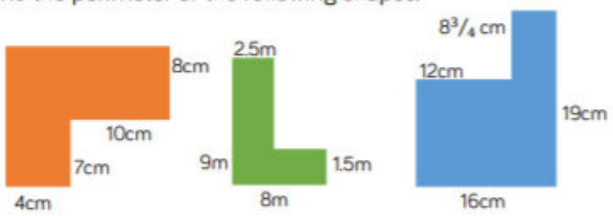
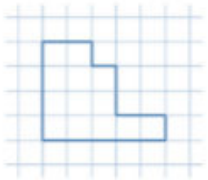


Explain how you know.



In total, they have 8,524 between them.

How many marbles does Freddie have?

Week 5 **Barriers to ARE (misconceptions):**	Add and subtract whole number with more than 4 digits, including using formal written methods (columnar addition and subtraction) (Cont. if needed)	
Fluency	**Problem Solving**	**Reasoning**
Week 6 **Barriers to ARE (misconceptions):** Confusing area and perimeter. Calculation errors. Difficulty with visualization/spatial understanding/inability to identify and see connections between parallel and perpendicular lines.	Measure and calculate the perimeter of composite rectilinear shapes in centimeter and metres • To know how to calculate the perimeter of rectangles. • To know how to measure the perimeter of composite rectilinear shapes. • To know how to find unknown lengths in composite rectilinear shapes. • To know how to calculate the perimeter of composite rectilinear shapes. • To know how to calculate the area of rectangles. • To know how to find the area of composite rectilinear shapes. • To know how to find the area of irregular shapes.	
Fluency Find the perimeter of the following shapes.  Each square has an area of 4 square cm. What is the perimeter of the whole shape? 	**Problem Solving** Here is a square inside another square.  The perimeter of the inner square is 16cm The outer square's perimeter is four times the size of the inner square. What is the length of one side of the outer square? How do you Know? What do you notice?	**Reasoning** Investigate how many ways you can make different squares and rectangles with the same area of 84cm^2 What strategy did you use?  If you cut off a piece from a shape, you reduce its area and perimeter. True or False? Draw 2 examples to prove your thinking. 

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Week 7
Barriers to ARE (misconceptions):

Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

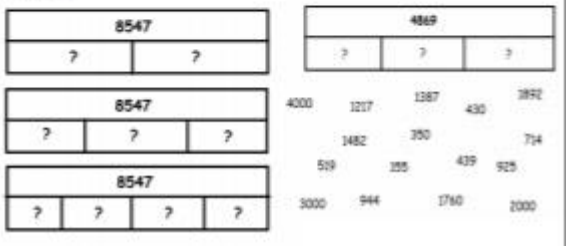
- To develop the skill of solving problems involving…

Fluency

When Claire opened her book, she saw two numbered pages.
The sum of these two pages was 317.
What would the next page number be?

Adam is twice as old as Barry.
Charlie is 3 years younger than Barry.
The sum of all their ages is 53.
How old is Barry?

Solve the following. Find two examples for each bar model.



Problem Solving

On Monday, Dupree was paid £114

On Tuesday, he was paid £27 more than Monday.

On Wednesday, he was paid £27 less than Monday.

How much was Dupree paid in total?

How many calculations did you do?

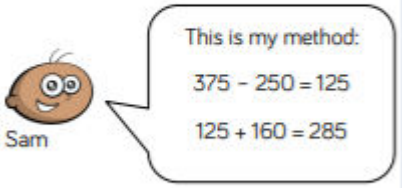
Was there a more efficient way?

Reasoning

A milkman has 250 bottles of milk.

He collects another 160 from the dairy and delivers 375 during the day.

How many does he have left?



Do you agree with Sam's answer?

Explain why.