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Autumn 1 Year 6

<table>
<tr>
<td rowspan="2"><u>Links to prior learning/ objectives:</u>
Reading, writing and ordering numbers to 1 000 000
Rounding
Written method calculations for all 4 operations
Solving multi-step problems
Prime numbers</td>
<td><u>Resources:</u>
Place value counters, place value grids, number lines including negative numbers</td>
<td rowspan="2"><u>Vocabulary:</u>
Compare, order, value, digit, round, multiple, negative, intervals, multiply, divide, add, subtract, operation, calculation, estimate, factor, multiple, prime number, order of operations, BIDMAS
Multiply, divide, multiplication, division, product, share, decimal, two decimal places, tenths, hundredths, estimation, accuracy, calculation, whole numbers, common factors, multiples, factorise
Division, divide, share, decimal, remainder, two decimal places, degree of accuracy, rounding, whole number
Dividing, multiplying, scale factor, scaling, relationships, integer, multiplication, division,</td>
</tr>
<tr>
<td><u>Mastery:</u>
(where to find some resources)
• Teaching for Mastery
• White Rose New and old documents
• Mastery maths stickers
• Nrich (curriculum mapping)</td>
</tr>
<tr>
<td colspan="3">Objectives and Teaching</td>
</tr>
<tr>
<td><u>Week 1</u>
<u>Barriers to ARE (misconceptions):</u>
Place value understanding – inability to see numbers as digits within a larger number.
Recall/understanding of place value headings
Number recognition.</td>
<td colspan="2">Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit

• To know the place value of digits in numbers up to ten million
• To understand place value in numbers up to ten million
• To develop my understanding of place value in numbers up to ten million
• To develop the skill of comparing numbers up to ten million
• To develop the skill of ordering numbers up to ten million</td>
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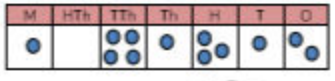
Fluency

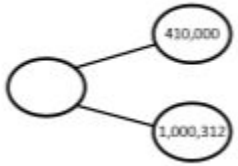
Match the representation to the numbers in digits.

One million, four hundred and one thousand, three hundred and twelve

1,041,312



1,410,312



1,401,312

Complete the missing numbers.

6,305,400 = _____ + 300,000 + _____ + 400

7,001,001 = 7,000,000 + _____ + _____

42,550 = _____ + _____ + _____

Husna's number is 306,042
She adds 5,000 to her number.
What is her new number?

Problem Solving

Put a digit in the missing space below to make the sentence correct.

4,62_,645 < 4,623,64_

Is there more than one option?
Can you find them all?

Lola has ordered eight 6-digit numbers.

The smallest number is 345,900

The greatest number is 347,000

All the other numbers have digit totals of 20 and have no repeating digits.

What are the other six numbers?

Can you order all eight numbers from smallest to greatest?

Reasoning

Miley has this number:

824,650

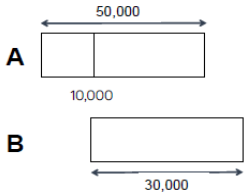
She takes forty thousand away.

Her answer is 820,650

Is this correct?

Explain how you know.

Kayleigh draws bar model A.
Her teacher asks her to draw another where the total is 30,000



Explain how you know bar B is inaccurate.

Week 2

Barriers to ARE (misconceptions):

Place value understanding – inability to see numbers as digits within a larger number.
Recall/understanding of place value headings
Number recognition.
Knowledge of multiples of powers of 10.

Round any whole number to a required degree of accuracy
Use negative numbers in context
Perform mental calculations, including with mixed operations and large numbers

- To know how to round whole numbers up to ten million
- To develop the skill of rounding
- To understand negative numbers
- To develop the skill of calculating with negative numbers

Fluency

Problem Solving

Reasoning

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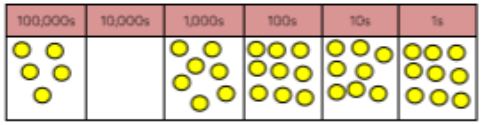


Round the number in the place value chart to:

- The nearest 10,000
- The nearest 100,000
- The nearest 1,000,000

Write five numbers that round to the following numbers when rounding to the nearest hundred thousand.

- 200,000
- 600,000
- 1,900,000

Complete the missing digits so that each number rounds to one hundred and thirty thousand when rounded to the nearest ten thousand.

12[ ], 657	1[ ]1,999	13[ ], 001

Use sandcastles (+1) and holes (-1) to calculate.

Here is an example.

-2 + 5 =

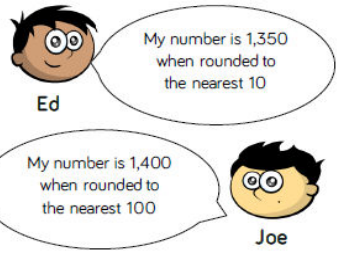
Two sandcastles will fill two holes.
There are three sandcastles left to make positive three.
Use this method to solve:

- 3 - 6
- -7 + 8
- 5 - 9

Use the number line to answer the following:

- What is 6 less than 4?
- What is 5 more than -2?
- What is the difference between 3 and -3?

Filip has £17.50 in his bank account. He pays for a jumper costing £30. How much does he have in his bank account now?



Both numbers are whole numbers.

What is the greatest possible difference between the two numbers?

Miss Grogan gives out the following four cards: 15,987, 15,813, 15,101, 16,101

Four children each take a card and give a clue to what their number is:

Marc says, "My number rounds to 16,000 when rounded to the nearest 1,000"

Daryl says, "My number has one hundred."

Tom says, "My number is 15,990 when rounded to the nearest 10"

Adam says, "My number is 15,000 rounded to the nearest 1,000"

Can you work out which child has which card?
Explain your choices.

Order the flashcards from what you think will be coldest to hottest areas. After you have ordered them, take the temperature and compare the results with your estimates.
Were you correct? Why?

Playground	Kitchen
Cloakroom	Classroom
Hall	

Kiera rounded 2,215,678 to the nearest million and wrote 2,215,000

Can you explain to Kiera what mistake she has made and why she has done it?

A company decided to build offices over ground and underground.

Do you agree?

Explain how you know.

When counting in tens from any single digit, the last number never changes.

When counting back in tens from any single digit, the last number does change.

e.g.

9, 19, 29, 39
9, -1, -11, -21

Explain why this happens.

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<table>
<tr>
<td><u>Week 3</u>
<u>Barriers to ARE (misconceptions):</u>
Place value understanding – inability to see numbers as digits within a larger number.
Recall/understanding of place value headings
Number recognition.
Knowledge of multiples of powers of 10.
Place value – setting out calculations
Multi-step problems – language involved.</td>
<td colspan="3">Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy
(Recap written calculation methods for addition and subtraction)

• To develop the skill of using a formal written method for addition
• To develop the skill of using a formal written method for subtraction
• To develop the skill of solving problems involving…</td>
</tr>
<tr>
<td>Fluency

Calculate

34621 + 25734 = _____

4761325 - 938052 = _____

67,832 + 5,258 =
834,501 – 193,642 =

A four-bedroom house costs £450,000
A three-bedroom house costs £199,000 less.
How much does the three-bedroom house cost?
What method did you use to find the answer?

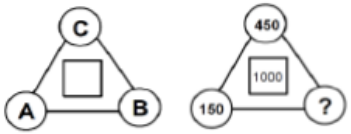
All the missing digits are the same. Find the missing digits

52247□
+3□5904
90□3□2</td>
<td>Problem Solving

Three pandas are eating bamboo sticks. There are 51 altogether. They all eat an odd number of sticks. How many bamboo sticks did they each eat? How many different ways can you do it?

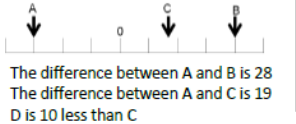
 

• The number in the square in the middle is calculated using the following rule
A + B – C
Work out the value of the question mark.

  </td>
<td>Reasoning

Abdul says “If I add any two 4 digit numbers together is will make a 5 digit number.”
Do you agree? Explain why.

Three numbers are marked on a number line.

The difference between A and B is 28
The difference between A and C is 19
D is 10 less than C
What is the value of D?
How do you know?</td>
</tr>
<tr>
<td><u>Week 4</u>
<u>Barriers to ARE (misconceptions):</u></td>
<td colspan="3">Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication</td>
</tr>
</table>

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Place value understanding – inability to see numbers as digits within a larger number. Recall/understanding of place value headings Number recognition. Knowledge of multiples of powers of 10. Place value – setting out calculations Forgetting/not understanding the zero when multiplying by a multiple of 10. Slow recall of times table facts.	Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context • To develop the skill of using the formal written method of multiplication (This may need more than one lesson) • To develop the skill of solving problems involving… • To develop the skill of using short division to divide up to 4-digit numbers by 1-digit numbers • To know how to use short division to divide up to 4-digit numbers by 2-digit numbers • To know how divide using factors

Fluency

Calculate

$$\begin{array}{r} 4267 \\ \times \quad 34 \\ \hline \end{array} \qquad \begin{array}{r} 3046 \\ \times \quad 73 \\ \hline \end{array}$$

5734 × 26 =

Lauren made cookies for a bake sale. She made 345 cookies. The recipes stated that she should have 17 chocolate chips in each cookie. How many chocolate chips will there be altogether?

Work out the missing number.

6 × 35 = □ × 5

Solve the divisions using short division.

$5\overline{)725}$ $3\overline{)1938}$ $12\overline{)6036}$ 3,612 ÷ 14 =

List the multiples of the number to help you calculate.

Problem Solving

2,190 x 14 = 30,660

Are there any other 4-digit numbers when multiplied by a 2-digit number less than 20 give the answer 30,660?

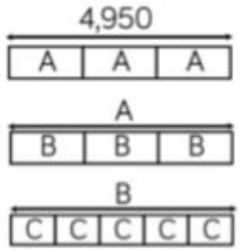
Here are two calculation cards

A = 396 ÷ 11

B = 832 ÷ 13

Find the difference between A and B

Work out the value of C
(The bar models are not drawn to scale)



Reasoning

True or false.

a) 5,463 × 18 is the same as 18 × 5,463

b) I can find the answer to 1,100 × 28 by using 1,100 × 30

c) 70 ÷ 10 = 700 ÷ 100

Find the missing digits

$$\begin{array}{r} 041\square r3 \\ 4\overline{)1\square 59} \end{array}$$

Ivan

To work out 4,320 ÷ 15 I will first divide 4,320 by 5 then divide the answer by 10

Is Ivan correct?
Explain why.

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Week 5

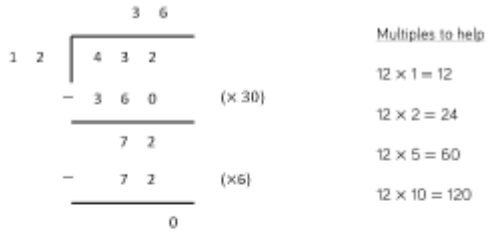
Barriers to ARE (misconceptions):

Place value understanding – inability to see numbers as digits within a larger number.
Recall/understanding of place value headings
Number recognition.
Knowledge of multiples of powers of 10.
Place value – setting out calculations
Remainders in context.
Slow recall of times table facts.

Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context
Use written division methods in cases where the answer has up to two decimal places
Solve problems which require answers to be rounded to specified degrees of accuracy

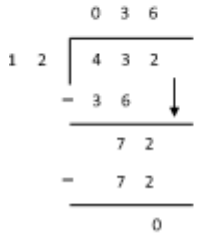
- To know how to use the long division method
- To develop the skill of using the long division method

Fluency



Solve the following divisions using Sam's method. Write out your multiples that may help you.

765 ÷ 17 = 450 ÷ 15 = 702 ÷ 18 =



Use the long division method to solve the following calculations. One has been done for you as an example.

836 ÷ 11 =
798 ÷ 14 =
608 ÷ 19 =

Problem Solving

Here are six 4-digit numbers.

4,455 4,545 4,554
5,445 5,454 5,544

Which number fits the clues below?

- When divided by 5, there is a remainder of 4
- When divided by 3, the digit total of the answer is the same as the digit total of the number being divided

Reasoning

Explain the mistake

746 ÷ 16 =

```
   41
16|746
 -64 | (x4)
  106
-106 (x10)
   0
```

Which calculation could be the odd one out below?

- 512 ÷ 16 =
- 672 ÷ 21 =
- 928 ÷ 29 =
- 792 ÷ 24 =

Explain why.

Week 6

Barriers to ARE (misconceptions):

Confusing multiples and factors – difficulty in seeing relationship between them.
Slow recall of times table facts.

Identify common factors, common multiples and prime numbers

- To develop my understanding of factors and multiples.
- To know how to find common factors.
- To know how to find common multiples.

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- To develop my understanding of prime numbers.
- To develop my understanding of square and cube numbers.

Fluency

What are the common factors of these pairs of numbers?

24 and 36
20 and 30
28 and 45

Which number is the odd one out?

12, 30, 54, 42, 32, 48

Can you explain why?

On a 100 square, shade the first 5 multiples of 7 and then the first 8 multiples of 5
What do you notice?
Choose 2 other times tables which you think will have more than 3 common multiples.

List 5 common multiples of 4 and 3

Problem Sol ving

Tahil has 32 football cards that he is giving away to his friends.

He shares them evenly.

How many friends could Tahil have?

Nancy is double her sister's age.

They are both older than 20 and younger than 50

They are both multiples of 7

Work out their ages.

Reasoning

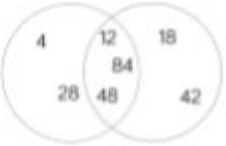
There are 49 apples and 56 pears.

They need to be put into baskets with an equal number in each basket.

Who is correct?

Explain how you know.

Work out the headings for the Venn diagram.



Add in one more number to each section.

Can you think of a multiple of 6 and 8 that is a square number?

Week 7

Barriers to ARE (misconceptions):

Understanding of commutativity.
Knowledge of inverse, particularly when it is appropriate for division and subtraction.
Slow recall of times table facts.

Use their knowledge of the order of operations to carry out calculations involving the four operations
Solve problems involving addition, subtraction, multiplication and division
Perform mental calculations, including with mixed operations and large numbers

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- To understand the order of operations.
- To develop the skill of performing calculations using the order of operations.
- To know how to use estimation when performing mental calculations.
- To develop the skill of mental calculation.
- To develop the skill of reasoning from known facts.

Fluency

Sarah had 7 bags with 5 sweets in each. She added one more to each bag. Circle the calculation below that shows the correct working out.

$7\ (5 + 1) = 42$
$7 \times 5 + 1 = 36$
$7 \times 5 + 1 = 42$

Daniel completed the following calculation and got the answer 168

$2(30 \div 5) + 14 = 168$

Can you explain what he did and where he made the mistake?

Add brackets and the missing numbers to complete

$3 + \square \times 5 =$
$25 - 6 \times \square =$

How could you change the order of these calculations to be able to perform them mentally?

$50 \times 16 \times 2 =$
$30 \times 12 \times 2 =$
$25 \times 17 \times 4 =$

Jamie buys a t shirt for £9.99, socks for £1.49 and a belt for £8.99
He was charged £23.47
How could he quickly check if he was overcharged?

Problem Solving

Write different number sentences using the digits 3, 4, 5 and 8 before the equals sign that use:

- One operation
- Two operations, no brackets
- Two operations with brackets

Use this fact

$3{,}565 + 2{,}250 = 5{,}815$

To work out which statements are true or false.

a) $4{,}565 + 1{,}250 = 5{,}815$
b) $5{,}815 - 2{,}250 = 3{,}565$
c) $4{,}815 - 2{,}565 = 2{,}250$
d) $4{,}065 + 2{,}750 = 6{,}315$

Write three more statements.

Reasoning

Class 6 are solving this calculation:

$2{,}000 - 1{,}287 =$

Fatima: I used the column method and exchanged in the tens, hundreds and thousands columns

I used my number bonds from 87 to 100 and then 1,300 to 2,000

Adam

Stefan: I subtracted 1 from 2,000 and 1 from 1,287 then I did a column subtraction

Class 6 are solving this calculation:

$3{,}912 + 3{,}889 =$

Claire: To solve this I will double 3,900

Explain why Claire has done this.

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