Spring 2 Year 6

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Links to prior learning/ objectives:	Resources:	Vocabulary:
Place value including decimal places. ~ Formal written methods for all 4 number operations. ~ Multiplication facts up to 12 x 12 and how to derive facts based on these. ~ Word problems for all four operations. ~ Using algebra in its basic form- missing numbers, area. ~ Facts relating to units of measure. ~ Imperial measures.	Base10, place value charts, place value counters, multiplication squares, physical objects, Ruler, metre stick, measuring equipment **Mastery:** (where to find some resources) • Teaching for Mastery • White Rose New and old documents • Mastery maths stickers • Nrich (curriculum mapping)	Decimal place, place value, multiply, divide, percent, compare, calculate, Convert, decimal place, decimal notation, Formulae, linear sequence, algebra, missing number, relationships, inverse Formulae, algebra, possibilities, missing numbers, inverse. Expression, rule, equation, formula

Objectives and Teaching	
Week 1 Barriers to ARE (misconceptions): Lack of conceptual understanding of place value to the right of the decimal point. Ordering decimals – associating more digits with larger value of number, disregarding place value. Difficulty in understanding decimals as parts of a whole, less than one, association with fractions. Lack of understanding of the inequality symbols <,> Inability to see pattern of digits moving when multiplying and dividing by 10, 100 etc.	Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places Multiply one-digit numbers with up to two decimal places by whole numbers • To understand place value in numbers with up to three decimal places. • To develop the skill of multiplying by 10, 100 and 1000. • To develop the skill of dividing by 10, 100 and 1000. • To know how to multiply decimals by integers.

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Fluency

Complete the sentences.

There are ___ ones, ___ tenths, ___ hundredths and ___ thousandths.
The number in digits is _____

Use counters and a place value chart to represent these numbers.

3.456 | 72.204 | 831.07

Hundreds	Tens	Ones	Tenths	Hundredths	Thousandths

Write down the value of the 3 in the following numbers.

0.53 362.44 739.8 0.013 3,420.98

Problem Solving

Four children are thinking of four different numbers.

3.454 | 4.445 | 4.345 | 3.54

Teddy: "My number has four hundredths."

Alex: "My number has the same amount of ones, tenths and hundredths."

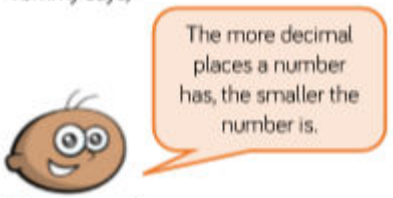
Dora: "My number has less ones that tenths and hundredths."

Jack: "My number has 2 decimal places."

Match each number to the correct child.

Reasoning

Tommy says,



Do you agree?
Explain why.

Alex says that 3.24 can be written as 2 ones, 13 tenths and 4 hundredths.

Do you agree?

How can you partition 3.24 starting with 2 ones?
How can you partition 3.24 starting with 1 one?
Think about exchanging between columns.

Week 2

Barriers to ARE (misconceptions):

Lack of conceptual understanding of place value to the right of the decimal point.
Ordering decimals – associating more digits with larger value of number, disregarding place value.
Difficulty in understanding decimals as parts of a whole, less than one, association with fractions.
Lack of understanding of the inequality symbols <,>

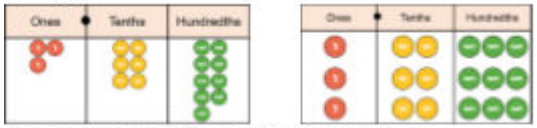
Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

- To know how to divide decimals by integers.
- To develop the skill of solving problems involving decimal numbers.
- To understand the relationship between decimals and fractions.
- To know how to write decimals as fractions.

Difficulty with the method of short division.

Fluency

Divide 3.69 by 3
Use the diagrams to show the difference between grouping and by sharing?



Use these methods to complete the sentences.
3 ones divided by 3 is _____ ones.
6 tenths divided by 3 is _____ tenths.
9 hundredths divided by 3 is _____ hundredths.
Therefore, 3.69 divided by 3 is _____

Decide whether you will use grouping or sharing and use the place value chart and counters to solve:

7.55 ÷ 5 8.16 ÷ 3 3.3 ÷ 6

Amir solves 6.39 ÷ 3 using a part whole method.

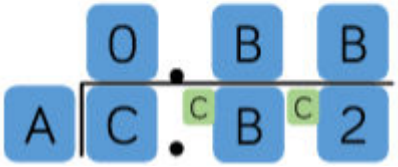
Use this method to solve

8.48 ÷ 2 6.9 ÷ 3 6.12 ÷ 3

Problem Solving

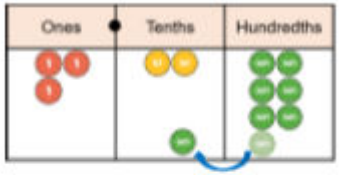
C is $\frac{1}{4}$ of A
B = C + 2

Use the clues to complete the division.

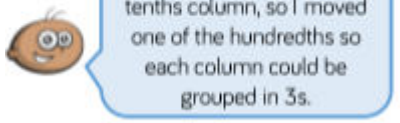


Reasoning

When using the counters to answer 3.27 divided by 3, this is what Tommy did:



Tommy says,



Do you agree with what Tommy has done? Explain why.

Week 3

Barriers to ARE (misconceptions):

Lack of conceptual understanding of place value to the right of the decimal point.
Ordering decimals – associating more digits with larger value of number, disregarding place value.
Difficulty in understanding decimals as parts of a whole, less than one, association with fractions.
Lack of understanding of the inequality symbols <,>
Lack of conceptual understanding of what a fraction and percentage actually is.
Viewing percentage as a number rather than representing a number/part of an amount.

Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 8 3]

- To know how to convert fractions to decimals.
- To develop the skill of converting fractions to decimals.
- To know how to convert fractions to percentages.
- To understand equivalent fractions, decimals and percentages.
- To know how to order fractions, decimals and percentages.

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Children don't know/can't quickly recall most common equivalences between fractions, decimals and percentages eg ½ = 50% = 0.5.
Misrepresenting fractions as decimals eg ¼ = 1.4
When converting between fractions and percentages, they use the value of the percentage as the denominator eg 24% = 1/24.

Fluency

Match the fractions to the equivalent decimals.

$\frac{2}{5}$	0.04
$\frac{1}{25}$	0.4
$\frac{1}{4}$	0.25

Use your knowledge of known fractions to convert the fractions to decimals. Show your method for each one.

$\frac{7}{20}$ $\frac{3}{4}$ $\frac{2}{5}$ $\frac{6}{200}$

Mo says that $\frac{63}{100}$ is less than 0.65

Do you agree with Mo?
Explain your answer.

Problem Solving

Dora and Whitney are converting $\frac{30}{500}$ into a decimal.

- Dora doubles the numerator and denominator, then divides by 10
- Whitney divides both the numerator and the denominator by 5
- Both get the answer $\frac{6}{100} = 0.06$

Which method would you use to work out each of the following?

$\frac{25}{500}$ $\frac{125}{500}$ $\frac{40}{500}$ $\frac{350}{500}$

Explain why you have used a certain method.

Reasoning

Amir says,

The decimal 0.42 can be read as 'four tenths and two hundredths'.

Teddy says,

The decimal 0.42 can be read as 'forty-two hundredths'.

Who do you agree with?
Explain your answer.

True or False?

0.3 is bigger than $\frac{1}{4}$

Explain your reasoning.

Week 4

Barriers to ARE (misconceptions):

Lack of conceptual understanding of place value to the right of the decimal point.
Ordering decimals – associating more digits with larger value of number, disregarding place value.

Recall and use equivalences between simple fractions, decimals and percentages including in different contexts
Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison

- To know how to find a percentage of an amount.
- To develop the skill of finding a percentage of an amount.

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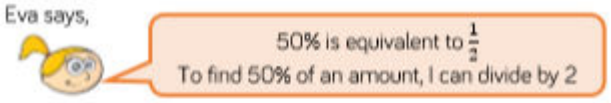
Difficulty in understanding decimals as parts of a whole, less than one, association with fractions.
Lack of understanding of the inequality symbols <,>
Lack of conceptual understanding of what a fraction and percentage actually is.
Viewing percentage as a number rather than representing a number/part of an amount.
Children don't know/can't quickly recall most common equivalences between fractions, decimals and percentages eg ½ = 50% = 0.5.
Misrepresenting fractions as decimals eg ¼ = 1.4
When converting between fractions and percentages, they use the value of the percentage as the denominator eg 24% = 1/24.

- To develop my understanding of percentages by finding missing values.

Fluency



Complete the sentences.

25% is equivalent to $\frac{1}{\square}$ To find 25% of an amount, divide by ___

10% is equivalent to $\frac{1}{\square}$ To find 10% of an amount, divide by ___

1% is equivalent to $\frac{1}{\square}$ To find 1% of an amount, divide by ___

Use the bar models to help you complete the calculations.

50% of 406 =

25% of 124 =

Find:

50% of 300	25% of 300	10% of 300	1% of 300
50% of 30	25% of 30	10% of 30	1% of 30
50% of 60	25% of 60	10% of 60	1% of 60

Problem Solving

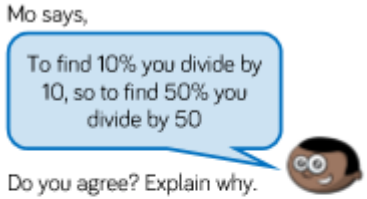
Complete the missing numbers.

50% of 40 = ___% of 80

___% of 40 = 1% of 400

10% of 500 = ___% of 100

Reasoning



Eva says to find 1% of a number, you divide by 100
Whitney says to find 1% of a number, you divide by 10 and then by 10 again.

Who do you agree with?
Explain your answer.

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Week 5

Barriers to ARE (misconceptions):

Awareness of the relationships between numbers to use the inverse.
Children may instantly shut down when they hear the term algebra.
Children may struggle to see that 2a is the value of a multiplied by 2.
Children may struggle to see patterns or be able to explain the pattern that they see/ may struggle to count in multiples.

Use simple formulae
Express missing number problems algebraically

- To know how to write one step functions as simple algebraic expressions.
- To know how to write two step functions as simple algebraic expressions.
- To develop the skill of using algebraic rules.
- To know how to substitute into algebraic expressions.
- To know how to use simple algebraic formula.

Fluency

Here is a function machine.

Input → × 4 → Output

- What is the output if the input is 2?
- What is the output if he input is 7.2?
- What number went in if the output was 22?
- What is the output if the input is a? What about if you put x in?

Complete the table for the given function machine.

Input → + 5 → Output

Input	5	5.8	10	-3	-8				a	y
Output						9	16.9	0		

Write your function as an algebraic rule?
Work out the functions

10 → ☐ → 5
24 → ☐ → 12
7 → ☐ → 3.5

Problem Solving

Lucy is using the following function machine.

Input → ÷ 2 → Output

Lucy put a number into the machine.
She puts the output back into the machine and gets out another number.
The final answer is 2.5

What number did Lucy put in?

Lucy has another function machine.

- She puts a number 8 and gets an output.
- She puts the output back into the machine.
- The final output is -6

What could the function be?

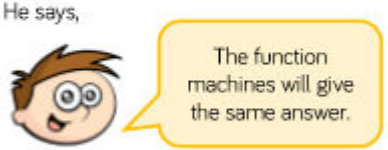
Reasoning

David has a two function machines.

Input → + 5 → × 2 → Output

Input → × 2 → + 5 → Output

He says,



Is David correct?
Is there an input that will give the same output for both machines?

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Week 6

Barriers to ARE (misconceptions):

Children may find it difficult to find or identify when they have found all possibilities.

Children may not recognise that the same letter has the same value.

Children may not recognise that the two unknowns could be more than one possible value e.g. A + B = 25. A and B could be any number bond to 25.

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Generate and describe linear number sequences

Find pairs of numbers that satisfy an equation with two unknowns

Enumerate possibilities of combinations of two variables.

- To know how to generate and describe linear number sequences.
- To know how to solve one step equations.
- To know how to solve two step equations.
- To know how to find pairs of numbers that satisfy an equation with two unknowns.
- To develop the skill of solving problems involving algebra.

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Fluency

a and b are variables:

$a + b = 6$

Find 5 different possible values for a and b.

a	b

X and Y are whole numbers.

- X is a one digit odd number.
- Y is a two digit even number.
- $X + Y = 25$

Find all the possible pairs of numbers that satisfy the equation.

$a \times b = 48$

What is the value of a and b?
How many different ways can you find?

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Problem Solving

a, b and c are integers between -5 and 5

$$a - b = -3$$
$$b + c = 3$$

Find the values of a, b and c
How many different possibilities can you find?

Use the possible values to complete the equation:

$a + c = \square$

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Reasoning

x and y are both positive whole numbers.

$\frac{x}{y} = 4$

Jade says,

x will always be a multiple of 4

Simon says,

y will always be a factor of 4

Who is correct?
Prove it!

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