Number and Algebra: Fractions and Decimals: Decimal Place Value Puzzles

Australian Curriculum

This lesson plan could be used to support the teaching and learning of the following Content Descriptions from the Australian Curriculum.

Y6: Number and Algebra, Fractions and Decimals

Select and apply efficient mental and written strategies and appropriate digital technologies to solve problems involving all four operations with whole numbers (ACMNA123)

Multiply and divide decimals by powers of 10 (ACMNA130)

Aim: To multiply and divide numbers by 10, 100 and 1000 to solve number puzzles.	Success Criteria: I can multiply and divide numbers by 10, 100 and 1000, giving answers up to three	Preparation: Tarsia Triangles Multiplying and Dividing by 10, 100 and 1000 Dominoes – one per		
	decimal places.	group		
	I can multiply and divide a sequence of numbers by 10, 100 or 1000 to solve a	Differentiated Decimal Place Value Puzzles Activity Sheets – one per child		
	number problem.	Extra Challenge Activity Sheet – as required		
Key/New Words:	Resources:	Place Value Circle Game Ouestion Cards -		
Decimal, fraction, tenth, hundredth, thousandth.	Lesson Pack	one per class		

Prior Learning: It will be helpful if children have experience identifying the value of digits in whole numbers and recognise tenths and hundredths in the context of money and measurement.

Learning Sequence

	Tarsia Triangles Dominoes Puzzles: Give each group a copy of the Tarsia Triangles Multiplying and Dividing by 10, 100 and 1000 Dominoes . The children work together to match the edges of the triangles together by multiplying and dividing the given decimals by 10, 100 or 1000.						
Windle Class	Multiplying/Dividing by 10, 100 and 1000: Use the animated place value chart on the Lesson Presentation to help the children visualise what is happening to the digits in decimal numbers when they are multiplied or divided by 10, 100 or 1000.						
	Missing Number Puzzle: Use the text and images displayed on the Lesson Presentation to introduce the missing number puzzles involving multiplying and dividing decimals by 10, 100 or 1000. Work together as a class to calculate the missing number using reasoning.						
	Partner Missing Number Puzzle: Working with a partner, the children apply the learning from the previous slides to find the missing number in a new puzzle displayed on the Lesson Presentation.						
	Decimal Place Value Puzzles: Children complete the differentiated Decimal Place Value Puzzles Activity Sheets , to show they can multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places. Can the children multiply and divide a sequence of numbers by 10, 100 and 1000?						
	Calculate the answer to a calculation involving multiplying and dividing a sequence of numbers by 10, 100 or 1000. Calculate the answer and missing numbers to calculations involving multiplying and dividing a sequence of numbers by 10, 100 or 1000. Calculate the answer and missing numbers to calculations involving multiplying and dividing a sequence of numbers by 10, 100 or 1000. Calculate the answer and missing numbers to more complex calculations involving multiplying and dividing a sequence of numbers by 10, 100 or 1000. An Extra Challenge Activity Sheet is also included.						
Ninole Class	Circle Game: Give each child a Place Value Circle Game Question Card and sit or stand in a circle facing inwards. During each round, a number statement will be shown on the Lesson Presentation . If the answer to the question on their card fits the statement, the children swap places.						
Exploreit							

Quizit: Ask children to write their own questions involving decimal place value and then host a class quiz.

Linkit: Link the use of decimal numbers to experiments in science involving measurements.

Mathematics

Number and Algebra

Mathematics | Year 6 | Number and Algebra | Fractions and Decimals | Multiply and Divide Decimals by 10, 100 and 1000 | Decimal Place Value Puzzles | Lesson 4 of 5

Decimal Place Value Puzzles

Aim

• To multiply and divide numbers by 10, 100 and 1000 to solve number puzzles.

Success Criteria

- I can multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.
- I can multiply and divide a sequence of numbers by 10, 100 or 1000 to solve a number problem.

Tarisa Triangles Domino Puzzles





Multiplying by 10, 100 and 1000

When we multiply a number by 10, 100, or 1000, we move the digits of the number to the left:

- one place for 10
- two places for 100
- three places for 1000

Notice that the number of places we move the digits is the same as the number of zeroes in the number we are multiplying by.

	× 100	0 × 1 00 × 101	000 × 1) 0 × 1	10			
Thousands	Hundreds	Tens	Ones	ten	ths	hundredths	thousandths
			Q)	7	

 $4.07 \times 10 = 40.7$

4.07 x 100 = 407

4.07 × 1000 = 4070

Dividing by 10, 100 and 1000

When we divide a number by 10, 100, or 1000, we move the digits of the number to the right:

- one place for 10
- two places for 100
- three places for 1000

Notice that the number of places we move the digits is the same as the number of zeroes in the number we are dividing by.

÷ 10 ÷ 100 ÷ 1000

÷ 10 ÷ 100 ÷ 1000 🖊

Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
	5	0	8			

508 ÷ 10 = 50.8

508 ÷ 100 = 5.08

508 ÷ 1000 = 0.508



Missing Number Puzzle

Here is a number sentence involving multiplying and dividing decimals.

One of the numbers has been replaced by a shape. How can we use our place value reasoning to calculate the value of the shape?

$5.6 \times 10 \times 10 \times 10 \times 10 = 22400$

Missing Number Puzzle

First, simplify the calculation:

5.6 x 10 x 10
$$\times$$
 $\xrightarrow{}$ x 10 = 22 400

$$(5.6 \times 100) \times \times \times \times 10 = 22400$$

560



Missing Number Puzzle





Partner Missing Number Puzzle 🧔

Work together with your partner to find the value of the shape:

3750 \div 10 \div 10 x \checkmark x 100 = 22500



Partner Missing Number Puzzle

Work together with your partner to find the value of the shape:

$$3750 \div 10 \div 10 \times 10 \times 100 = 22500$$

$$(3750 \div 100) \times 100 = 22500$$

$$37.5 \times 100 = 22500 \div 100$$

$$37.5 \times 100 = 225$$

$$37.5 \times 100 = 225$$



Decimal Place Value Puzzles





Hand out the question cards and sit or stand in a circle facing inwards.

During each round a number statement will be shown on the whiteboard. If the answer to the question on your card fits the statement, you have to swap places with another person whose answer fits

the statement.



Round 1

Change places if the answer to your question has an **even tenths digit**.

Round 2

Change places if the answer to your question has an **odd tenths digit**.

Round 3

Change places if the answer to your question has an **odd ones digit**.



Round 4

Change places if the answer to your question has an **even ones digit**.



Change places if the answer to your question has an **even digit sum**.



Aim

• To multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places.

Success Criteria

- I can multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.
- I can multiply and divide a sequence of numbers by 10, 100 or 1000 to solve a number problem.



Aim: To multiply and divide numbers by 10, 100 and 1000 to solve number puzzles.					Date:					
							Suppo	Support:		
Success Criteria Me Friend Teacher					PPA	s	I	AL	GP	
I can multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.				Notes/Evidence			5			
I can multiply and divide a sequence of numbers by 10, 100 or 1000 to solve a number problem.										
Next Steps										
J										
J	J									

т	Teacher	I	Independent
PPA	Planning, Preparation and Assessment	AL	Adult Led
s	Supply	GP	Guided Practice

Aim: To multiply and divide numbers by 10, 100 and 1000 to solve number puzzles.						Date:					
				Delivered By: Support:				rt:			
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J											
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PPA	Planning, Preparation and Assessment	AL	Adult Led
S	Supply	GP	Guided Practice

To multiply and divide numbers by 10, 100 and 1000 to solve number puzzles.

Use your place value understanding of multiplying and dividing by 10, 100 and 1000 to calculate the answers to these missing number puzzles:

$$4.8 \rightarrow \times 10 \rightarrow \times 10 \rightarrow \times 5 \rightarrow \times 10 = \triangle$$

$$3.9 \rightarrow \times 10 \rightarrow \times 10 \rightarrow \times 3 \rightarrow \times 10 = \triangle$$

$$2956 \rightarrow \div 10 \rightarrow \div 10 \rightarrow \times 4 \rightarrow \div 10 = \triangle$$

$$9876 \rightarrow \div 10 \rightarrow \div 10 \rightarrow \times 8 \rightarrow \div 10 = \triangle$$

$$8.27 \rightarrow \times 1000 \rightarrow \div 10 \rightarrow \times 9 \rightarrow \div 100 = \triangle$$

$$29774 \rightarrow \div 1000 \rightarrow \times 10 \rightarrow \times 6 \rightarrow \div 10 = \triangle$$

To multiply and divide numbers by 10, 100 and 1000 to solve number puzzles.

Use your place value understanding of multiplying and dividing by 10, 100 and 1000 to find the value of the shapes in these missing number puzzles:

$$7.3 \rightarrow \times 10 \rightarrow \times 10 \rightarrow \times 5 \rightarrow \times 10 = \triangle$$

$$8.2 \rightarrow \times 10 \rightarrow \times 10 \rightarrow \times 3 \rightarrow \times 10 = \triangle$$

$$5920 \rightarrow \div 10 \rightarrow \div 10 \rightarrow \times 4 \rightarrow \div 10 = \triangle$$

$$9943 \rightarrow \div 10 \rightarrow \div 10 \rightarrow \times \triangle \rightarrow \div 10 = 79.544$$

$$4.47 \rightarrow \times 1000 \rightarrow \div 10 \rightarrow \times \triangle \rightarrow \div 100 = 40.23$$

$$65\ 286 \rightarrow \div 1000 \rightarrow \times 10 \rightarrow \times \triangle \rightarrow \div 10 = 391.716$$

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To multiply and divide numbers by 10, 100 and 1000 to solve number puzzles.

Use your place value understanding of multiplying and dividing by 10, 100 and 1000 to find the value of the shapes in these missing number puzzles:



Decimal Place Value Puzzles Answers

*

Use your place value understanding of multiplying and dividing by 10, 100 and 1000 to calculate the answers to these missing number puzzles:

$$4.8 \rightarrow \times 10 \rightarrow \times 10 \rightarrow \times 5 \rightarrow \times 10 = 24\ 000$$

$$3.9 \rightarrow \times 10 \rightarrow \times 10 \rightarrow \times 3 \rightarrow \times 10 = 11\ 700$$

$$2956 \rightarrow \div 10 \rightarrow \div 10 \rightarrow \times 4 \rightarrow \div 10 = 11.824$$

$$9876 \rightarrow \div 10 \rightarrow \div 10 \rightarrow \times 8 \rightarrow \div 10 = 79.008$$

$$8.27 \rightarrow \times 1000 \rightarrow \div 10 \rightarrow \times 9 \rightarrow \div 100 = 74.43$$

$$29\ 774 \rightarrow \div 1000 \rightarrow \times 10 \rightarrow \times 6 \rightarrow \div 10 = 178.644$$

Decimal Place Value Puzzles Answers

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Use your place value understanding of multiplying and dividing by 10, 100 and 1000 to find the value of the shapes in these missing number puzzles:

$$7.3 \rightarrow \times 10 \rightarrow \times 10 \rightarrow \times 5 \rightarrow \times 10 = 36500$$

$$8.2 \rightarrow \times 10 \rightarrow \times 10 \rightarrow \times 3 \rightarrow \times 10 = 24600$$

$$5920 \rightarrow \div 10 \rightarrow \div 10 \rightarrow \times 4 \rightarrow \div 10 = 23.68$$

$$9943 \rightarrow \div 10 \rightarrow \div 10 \rightarrow \times 8 \rightarrow \div 10 = 79.544$$

$$4.47 \rightarrow \times 1000 \rightarrow \div 10 \rightarrow \times 9 \rightarrow \div 100 = 40.23$$

$$65286 \rightarrow \div 1000 \rightarrow \times 10 \rightarrow \times 6 \rightarrow \div 10 = 391.716$$

Decimal Place Value Puzzles Answers

Use your place value understanding of multiplying and dividing by 10, 100 and 1000 to find the value of the shapes in these missing number puzzles:

$$7.325 \rightarrow \times 100 \rightarrow \times 10 \rightarrow \times 2 \rightarrow \div 1000 = 14.65$$

$$82\ 902 \rightarrow \div 1000 \rightarrow \div 10 \rightarrow \times 2 \rightarrow \times 100 = 1658.04$$

$$463.2 \rightarrow \div 2 \rightarrow \div 100 \rightarrow \times 3 \rightarrow \div 100 \rightarrow \times 10 = 0.6948$$

$$5.894 \rightarrow \times 100 \rightarrow \times 10 \rightarrow \times 3 \rightarrow \div 10 = 1768.2$$

$$37\ 926 \rightarrow \div 100 \rightarrow \div 10 \rightarrow \times 2.5 \rightarrow \div 10 = 9.4815$$

$$9948.88 \rightarrow \div 2 \rightarrow \div 10 \rightarrow \times 5 \rightarrow \div 100 \rightarrow \times 10 = 248.722$$

Decimal Place Value Triangular Dominoes

Cut out the sixteen triangles. Match the decimal number to the fraction which shows the correct value of one of its digits, to create one large parallelogram.





Decimal Place Value Triangular Dominoes **Answers**



Decimal Calculation Search

To multiply and divide numbers by 10, 100 and 1000 to solve number puzzles.

Hidden within this grid are 24 multiplication and division problems. They may be positioned horizontally (right), vertically (down), or diagonally (up or down to the right). Can you find them all? One of them is already circled. Draw a multiplication or division symbol to show the correct equation.

10	24	10	2.4	3.6	10	36	132	100	1.32
2.54	100	254	100	10	153	10	15.3	40	2.9
1.7	85	100	9.2	10	92	2.81	5.06	10	100
100	373	10	100	10	100	57	100	400	0.029
170	10	4.5	8.5	281	10	100	506	5.6	10
88	37.3	100	10	570	4.2	606	10	100	7.04
100	10	0.045	100	10	100	10	100	560	100
9.14 ×	100	8.8	42	78	100	0.78	10	6.06	704
100	10	100	10	0.12	10	1.2	100	10	100
= 914	100	10	100	10	8.8	10	0.88	100	10

Decimal Calculation Search Answers

Hidden within this grid are 24 multiplication and division problems. They may be positioned horizontally (right), vertically (down), or diagonally (up or down to the right). Can you find them all? One of them is already circled. Draw a multiplication or division symbol to show the correct equation.

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100	10	0.045	100	10	100	10	100	560	100
9.14 ×	100	8.8	42	78	100	0.78	10	6.06	704
100	10	100	10	0.12	10	1.2	100	10	100
= 914	100	10	100	10	8.8	10	0.88	100	10





211.5 ÷ 10 =

924.3 ÷ 100 =

$134 \div 100 =$

1582 ÷ 1000 =





3.607 × 100 =

5.921 × 10 =

$3.634 \times 10 =$

15.97 × 1000 =

211.5 ÷ 100 =

924.3 ÷ 10 =

$134 \div 10 =$

1582 ÷ 100 =



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To multiply and divide numbers by 10, 100 and 1000 to solve number puzzles.	
I can multiply and divide numbers by 10, 100 and 1000, giving answers up to three decimal places.	
I can multiply and divide a sequence of numbers by 10, 100 or 1000 to solve a number problem.	

Number and Algebra | Decimal Place Value Puzzles

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