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

Marsia 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.

## 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

## Decinnal Place Valne 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

Match the edges of the triangles together by multiplying and dividing the decimals by 10, 100 or 1000.


## 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.

$4.07 \times 10=40.7$

$$
4.07 \times 100=407
$$

$$
4.07 \times 1000=4070
$$



## 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.


| Thousands | Hundreds | Tens | Ones | tenths | hundredths | thousandths |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 5 |  |  |  |  |  |
|  |  |  |  |  |  |  |

$508 \div 10=50.8$

$$
508 \div 100=5.08
$$

$$
508 \div 1000=0.508
$$



## 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?

$$
5.6 \times 10 \times 10 \times \underset{\psi}{\hat{\psi}} \times 10=22400
$$

## Missing Number Puzzle

First, simplify the calculation:
$5.6 \times 10 \times 10 \times \hat{\sim} \times 10=22400$
$(5.6 \times 100)$

$$
\times \underset{\sim}{N} \times 10=22400
$$

560

$$
\times \underset{\sim}{N} \times 10=22400
$$

## Missing Number Puzzle

Next, use inverse operations to eliminate any extra calculations:

560

560

560

$$
\times \underset{\sim}{N} \times 10=22400
$$

$$
\times \underset{\sim}{N} \times 10=22400 \div 10
$$

$$
\times \underset{\sim}{n}=2240
$$

## Missing Number Puzzle

How many times does 56 go into 224 ?

$$
\begin{array}{lll}
560 & \times \sim & =2240 \\
2240 & \div \sqrt{w} & =560 \\
2240 & \div 560 & =4
\end{array}
$$

## Missing Number Puzzle


5.6
$\times 10$
$\times 10$

$\times 10$
$=22400$


## Partner Missing Number Puzzle



$$
3750 \div 10 \div 10
$$

 $\times 100$ $=22500$


## Partner Missing Number Puzzle

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

$$
\begin{aligned}
& 3750 \div 10 \div 10 \times \underset{\sim}{~} \times 100=22500 \\
& \text { (3750 } \div 100 \text { ) } \\
& \times \underset{\sim}{\hat{z}} \times 100=22500 \\
& 37.5 \\
& x \sim=22500 \div 100 \\
& 37.5 \\
& x \text { \& }=225 \\
& 37.5 \\
& x \underset{6}{6}=225
\end{aligned}
$$

## Decimal Place Value Puzzles

|  | Decimal Place Value Puzzles |
| :---: | :---: |
|  |  |
| Use gour place inlue understanding of multylying and dividing ay. 10,100 and 2000 to cuiculate tife unvests to thote minaing rumber puzalez: |  |
|  | $4.8-* 10 \rightarrow-10 \rightarrow-5 \rightarrow-10 \cdot \triangle$ |
|  | $\pm .9 \rightarrow \times 10 \rightarrow \times 10 \rightarrow-3 \rightarrow \times 10 . \Delta$ |
|  | $2956 \rightarrow+10 \rightarrow+10 \rightarrow+4 \rightarrow+10-\triangle$ |
|  | $9876 \rightarrow+10 \rightarrow+10 \rightarrow-8 \rightarrow+10 \cdot \triangle$ |
|  | $8.27 \rightarrow+1000-+10 \rightarrow-9 \rightarrow+100 \cdot \Delta$ |
|  | $29774 \rightarrow+1000 \rightarrow-10 \rightarrow-6 \rightarrow+10$ |

cimal Place Value Puzzles

the understanuing of nuiteluing ond dividing by in, 100 and 1000 to find apes in thise missity numbe putules:


Place Value Puzzles

$\longrightarrow-\mathrm{OOO}$
 truaing =umbiar purites


$+100 \rightarrow-\cdot 3 \rightarrow+100 \rightarrow-10 \Delta$
$\rightarrow-10 \rightarrow \Delta \rightarrow-10 \cdot{ }_{-1768.2}$


## Circle Game

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


## Circle Game

Round 1

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

## Circle Game

## Round 2

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

## Circle Game

Round 3

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

## Circle Game

## Round 4

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

## Circle Game

## Round 5

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

## Circle Game

## Round 6

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


Regent Studies| www.regentstudies.com

| Aim: To multiply and divide numbers by 10, 100 and 1000 to solve number puzzles. |  |  |  | Date: |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  |  | Delivered By: |  |  | Support: |  |  |
| Success Criteria | Me | Friend | Teacher | T | 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 |  |  |  |  |  |
| I can multiply and divide a sequence of numbers by 10, 100 or 1000 to solve a number problem. |  |  |  |  |  |  |  |  |  |
| Next Steps |  |  |  |  |  |  |  |  |  |


| T | 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: |  |  |
| Success Criteria | Me | Friend | Teacher | T | 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 |  |  |  |  |  |
| I can multiply and divide a sequence of numbers by 10, 100 or 1000 to solve a number problem. |  |  |  |  |  |  |  |  |  |
| Next Steps |  |  |  |  |  |  |  |  |  |


| T | Teacher | I | Independent |
| :--- | :--- | :--- | :--- |
| PPA | Planning, Preparation and Assessment | AL | Adult Led |
| S | Supply | GP | Guided Practice |

## Decimal Place Value Puzzles

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:

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

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

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

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

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

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

## Decimal Place Value Puzzles

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:

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

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

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

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

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

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

## Decimal Place Value Puzzles

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:

$$
7.325 \rightarrow \times 100 \rightarrow \times 10 \rightarrow \times 2 \rightarrow \times 1000=\triangle
$$




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

$$
37926 \rightarrow \div 100 \rightarrow \div 10 \rightarrow \times \boxed{\div 10}=9.4815
$$

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

## * <br> 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:

$$
4.8 \rightarrow \times 10 \rightarrow \times 10 \rightarrow \times 5 \rightarrow \times 10=24000
$$

$$
3.9 \rightarrow \times 10 \rightarrow \times 10 \rightarrow \times 3 \rightarrow \times 10=11700
$$

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

$29774 \rightarrow \div 1000 \rightarrow \times 10 \rightarrow \times 6 \rightarrow \times 10=178.644$

## 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:

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

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

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

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



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

## 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:

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

$$
82902 \rightarrow \div 1000 \rightarrow \div 10 \rightarrow \times 2 \rightarrow \times 100=1658.04
$$

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

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

$$
37926 \rightarrow \div 100 \rightarrow \div 10 \rightarrow \times 2.5 \rightarrow \div 10=9.4815
$$

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

## 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.


## $1.589 \times 10=$

## $4.708 \times 100=$

## $1.541 \times 1000=$

## $4.8 \times 10=$

## $3.607 \times 10=$

## $5.921 \times 100=$

## $3.634 \times 1000=$

## $15.97 \times 10=$

## $211.5 \div 10=$

## $924.3 \div 100=$

## $134 \div 100=$

## $1582 \div 1000=$

## $433.54 \div 10=$

## $654.6 \div 100=$

## $692 \div 100=$

## $2791 \div 1000=$

## $1.589 \times 100=$

## $4.708 \times 10=$

## $1.541 \times 100=$

## $4.8 \times 1000=$

## $3.607 \times 100=$

## $5.921 \times 10=$

## $3.634 \times 10=$

# $15.97 \times 1000=$ 

## $211.5 \div 100=$

## $924.3 \div 10=$

## $134 \div 10=$

## $1582 \div 100=$

## $433.5 \div 100=$

## $650 \div 1000=$

# $1692 \div 1000=$ 

## $2791 \div 100=$

Number and Algebra \| Decimal Place Value Puzzles

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



| Number and Algebra \| Decimal Place Value Puzzles |
| :--- |
| To multiply and divide numbers by 10, 100 and   <br> 1000 to solve number puzzles.   |
| I can multiply and divide numbers by 10, 100 and <br> 1000, giving answers up to three decimal places. |


| Number and Algebra \| Decimal Place Value Puzzles |
| :--- |
| To multiply and divide numbers by 10, 100 and   <br> 1000 to solve number puzzles.   |
| I can multiply and divide numbers by 10, 100 and <br> 1000, giving answers up to three decimal places. |

Number and Algebra | Decimal Place Value Puzzles

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

Number and Algebra | Decimal Place Value Puzzles

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

Number and Algebra | Decimal Place Value Puzzles

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

Number and Algebra | Decimal Place Value Puzzles

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

