

# PLACE VALUE OF NUMBERS TO THOUSANDTHS.

## INVESTIGATIONS OVERVIEW PAGE

THIS PAGE IS A SUMMARY OF THE INVESTIGATIONS THAT STUDENTS MAY ENGAGE IN TO DEEPEN THEIR RELATIONAL UNDERSTANDING.

INVESTIGATIONS WITH INSTRUCTIONS TO STUDENTS FOLLOW ON SUBSEQUENT PAGES.

- Children record a multiplicative place value chart to thousandths, demonstrating multiplication and division by 10 and 100 and 1000, and explain it to their friend. Doing this often will deepen understanding. Children select cards to make numbers to multiply and divide by 100 and by 1000 using multiplicative place value. They record the original number in a place value chart. They multiply or divide the number by 100 by moving the digits 2 places to the right or left, and by 1000 by moving the digits 3 places to the left or right. They record the new number. They read their original and new number to a friend. The numbers of cards may follow this developmental sequence:
  - 1 card to place in a column
  - 2 cards to place in consecutive columns
  - 2 cards to place in non-consecutive columns
  - 3 cards to place in consecutive columns
  - 3 cards to place in non-consecutive columns
  - 4 cards to place in consecutive columns
  - 4 cards to place in non-consecutive columns

**Reflection:** How can we multiply and divide by 100 and by 1000 using multiplicative place value?

- Children draw a multiplicative place value chart to thousandths. They select cards to make a number with thousandths. They describe their number using standard and non-standard place value. They record their tenths, hundredths and thousandths as decimals and fractions. They check by adding the values on a calculator. **Reflection:** How can we describe numbers with thousandths using standard and non-standard place value?
- Children make a video of themselves explaining how to multiply or divide numbers to thousandths by 100 or 1000 using multiplicative place value. **Reflection:** How can we multiply and divide by 100 and by 1000 using multiplicative place value?
- In pairs, children each select cards to make a number with thousandths. They place their numbers in order, explaining their order using place value. **Reflection:** How did you use place value to order your numbers?
- In pairs, children take turns to take a card and place it in either the thousandths place, hundredths place, the tenths place or the ones place or the tens place. Once placed it cannot be changed. Children read their number out loud and explain their number using standard place value. They each place their number on the same number line, explaining their placements. The child who creates the highest / lowest number takes all cards. **Reflection:** How did you use place value make the highest / lowest number?
- In pairs, children take turns to flip 2 or 3 or 4 or 5 cards and each make a number with thousandths. Children read their numbers out loud. Each child places their number on the same number line. Each child suggests a number that would come between the 2 numbers, using place value to explain how they know. **Reflection:** How did you use place value to record numbers between your numbers?

- In pairs, 2, 3, 4 or 5 cards are selected to be a target number with thousandths. Each child flips 2, 3, 4 or 5 cards to make a number with thousandths. The child who makes a number closest to the target number wins. Reflection: How did you use place value to make a number close to the target number?
- Children convert between kilometres, metres, centimetres and millimetres, using multiplicative place value. For example,  $15 \text{ mm} = 1.5 \text{ cm}$  ( $15 \div 10 = 1.5$ ) and  $1.5 \text{ cm} = 15 \text{ mm}$  ( $1.5 \times 10 = 15$ ),  $135 \text{ cm} = 1.35 \text{ m}$  ( $135 \div 100 = 1.35$ ) and  $1.35 \text{ m} = 135 \text{ cm}$  ( $1.35 \times 100 = 135$ ),  $1350 \text{ m} = 1.35 \text{ km}$  ( $1350 \div 1000 = 1.35$ ),  $1.35 \text{ km} = 1350 \text{ m}$  ( $1.35 \times 1000 = 1350$ ),  $29.356 \text{ km} = 29\,356 \text{ m}$  ( $29.356 \times 1000 = 29\,356$ ),  $5865 \text{ m} = 5.865 \text{ km}$  ( $5865 \div 1000 = 5.865$ ) Reflection: How did you use multiplicative place value convert between metric units of measurement of length?

# Place Value of Numbers to Thousandths

Draw a multiplicative place value chart, including thousandths, demonstrating multiplication and division by 10 and 100 and 1000.

Explain it to a friend.

Select cards to make numbers to multiply and divide by 100 and by 1000 using multiplicative place value.

Record the original number in a place value chart.

Multiply or divide the number by 100 by moving the digits 2 places to the right or left and by 1000 by moving the digit 3 places to the left or right.

Record the new number.

Read your original and new number to a friend.

The numbers of cards may follow this developmental sequence:

- 1 card to place in a column
- 2 cards to place in consecutive columns
- 2 cards to place in non-consecutive columns
- 3 cards to place in consecutive columns
- 3 cards to place in non-consecutive columns
- 4 cards to place in consecutive columns
- 4 cards to place in non-consecutive columns

**Reflection:** How can we multiply and divide by 100 and by 1000 using multiplicative place value?

# Place Value of Numbers to Thousandths

Draw a multiplicative place value chart, including thousandths, demonstrating multiplication and division by 10 and 100 and 1000.

Explain it to a friend.

Select cards to make a number with thousandths.

Describe your number using standard and non-standard place value.

Record your tenths and hundredths and thousandths as both decimals and fractions.

Check by adding the values on a calculator.

**Reflection:** How can we describe numbers with thousandths using standard and non-standard place value?

# Place Value of Numbers to Thousandths

Make a video of yourself explaining how you use multiplicative place value to multiply and divide numbers to thousandths by 10, 100 and 1000.

Reflection: How can we multiply and divide by 100 and by 1000 using multiplicative place value?

# Place Value of Numbers to Thousandths

Sit with a friend.

Each select cards to make a number with thousandths.

Place your numbers in order.

Explain your order using place value.

Reflection: How did you use place value to order your numbers?

# Place Value of Numbers to Thousandths

Sit with a friend.

Take turns to take a card and place it in either the thousandths place or the hundredths place or the tenths place or the ones place or the tens place.

Once placed it cannot be changed.

Read your number out loud.

The child who creates the highest / lowest number takes all cards.

Explain your number using standard place value.

Each place your number on the same number line, explaining your placement.

Reflection: How did you use place value make the highest / lowest number?

# Place Value of Numbers to Thousandths

Sit with a friend.

Take turns to flip 2, 3, 4 or 5 cards and each make a number with thousandths.

Read your numbers out loud.

Each place your number on the same number line.

Each suggest a number that would come between the 2 numbers, using place value to explain how you know.

Reflection: How did you use place value to record numbers between your numbers?



# Place Value of Numbers to Thousandths

Sit with a friend.

2, 3, 4 or 5 cards are selected to be a target number with thousandths.

Each of you flip 2, 3, 4 or 5 cards to make a number with thousandths.

The child who makes a number closest to the target number wins.

Reflection: How did you use place value to make a number close to the target number?

# Place Value of Numbers to Thousandths

Measure and record lengths in millimetres, centimetres, metres and kilometres.

Convert between millimetres, centimetres, metres and kilometres, using multiplicative place value to multiply and divide by 10 and 100 and 1000.

For example,

$$15 \text{ mm} = 1.5 \text{ cm} (15 \div 10 = 1.5) \text{ and } 1.5 \text{ cm} = 15 \text{ mm} (1.5 \times 10 = 15)$$

$$135 \text{ cm} = 1.35 \text{ m} (135 \div 100 = 1.35) \text{ and } 1.35 \text{ m} = 135 \text{ cm} (1.35 \times 100 = 135)$$

$$29.356 \text{ km} = 29\,356 \text{ m} (29.356 \times 1000 = 29\,356) \text{ and } 5865 \text{ m} = 5.865 \text{ km} (5865 \div 1000 = 5.865)$$

Reflection: How did you use multiplicative place value convert between metric units of measurement of length?