

# Place value knowledge organiser

Maths

## Key vocabulary:

place value, 1 million, ten million, ones, tens, hundreds, thousands, ten, thousands, hundred thousands, millions, placeholders, digits, words, numerals, Gattegno chart, place value chart, power of 10, interval, midpoint, 10 times the size of, one-tenth the size of, compare, order, ascending, descending, rounding, integer, multiples, nearest, negative numbers, positive numbers

## Numbers to 10,000,000

## Reading, Writing and Representing Numbers

There are many useful tools to help structure numbers and they can be represented in different ways.

### Numerals

Numbers can be represented with digits.

**4,120,513**

Commas are used to help separate the sections of the number, making it easier to read.

### Words

They can also be written as words as shown below.

**four million, one hundred and twenty thousand, five hundred and thirteen**

## Visual Representations of Numbers

## Place Value Charts

These charts start with the largest value digit of the left and end with the smallest value digit on the right. You can represent the number with counters or digits.

millions	hundred thousands	ten thousands	thousands	hundreds	tens	ones
<b>4</b>	<b>1</b>	<b>2</b>	<b>0</b>	<b>5</b>	<b>1</b>	<b>3</b>

Zeros must always be used as a placeholder when a column does not have a value.

## Different ways of saying numbers to 10,000,000

Some numbers can be said in different ways.

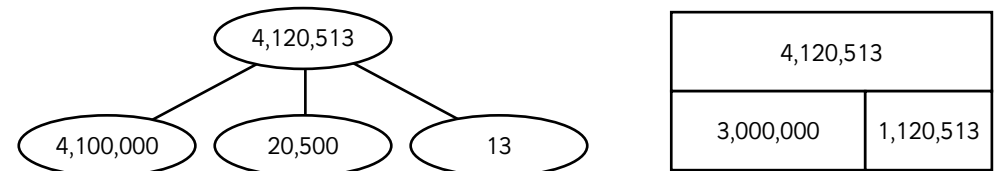
For example:

**500,000 = five hundred thousand = half a million**

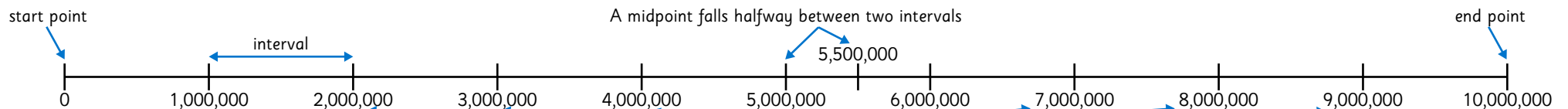
**250,000 = two hundred and fifty thousand = quarter of a million**

## Part-whole and bar models

These models can separate numbers into parts so you can see the relationship between those parts and the whole number.



## Number lines to 10,000,000



Divisions on a number line are worked out by finding the difference between the start and the end point and then dividing this by the number of intervals.

$$10,000,000 - 0 = 10,000,000$$

$$10,000,000 \div 10 = 1,000,000$$



## Powers of 10

1,000,000	2,000,000	3,000,000	4,000,000	5,000,000	6,000,000	7,000,000	8,000,000	9,000,000
100,000	200,000	300,000	400,000	500,000	600,000	700,000	800,000	900,000
10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9

A Gattegno Chart is a useful tool for seeing the relationship between multiplying and dividing numbers by 10, 100 and 1,000.

50,000 is 10 times the size of 5,000  
500,000 is 100 times the size of 5,000  
5,000,000 is 1,000 times the size of 5,000

500 is one-tenth of the size of 5,000  
50 is one-hundredth of the size of 5,000  
5 is one-thousandth of the size of 5,000

### Moving up the chart

Moving up the chart by 1 row means the number is 10 times the size.

Moving up the chart by 2 rows means the number is 100 times the size.

$$10 \times 10 = 100.$$

Moving up the chart by 3 rows means the number is 1,000 times the size.

$$10 \times 10 \times 10 = 1,000.$$

### Moving down the chart

Moving down by 1 row means the number is one-tenth of the size.

Moving down by 2 rows means the number is one-hundredth of the size.

Moving down by 3 rows means the number is one-thousandth of the size.

### Compare and order any integers

You can compare integers by looking at the place value of each digit in a number, starting with the first digit. Integers can be equal to (=), greater than (>) or less than (<) another integer.

$$300,760 = 300,000 + 760$$

$$1,208,465 > 1,098,765$$

$$109,984 < 190,984$$

When you order numbers, you place them in an ascending sequence where the value of the numbers gets larger or a descending sequence where the value of the numbers gets smaller.

$$\text{Ascending: } 309,087 \quad 509,879 \quad 9,054,873$$

$$\text{Descending: } 9,054,873 \quad 509,879 \quad 309,087$$

### Rounding any integer

Numbers 5 or more are rounded up, numbers 4 or less are rounded down.

To round to the nearest 1,000,000, look at the 100,000 digit.

$$1,941,652 \rightarrow 9 \text{ rounds up} \rightarrow 2,000,000$$

$$1,469,237 \rightarrow 4 \text{ rounds down} \rightarrow 1,000,000$$

To round to the nearest 100,000, look at the 10,000 digit.

$$1,941,652 \rightarrow 4 \text{ rounds down} \rightarrow 1,900,000$$

$$1,469,237 \rightarrow 6 \text{ rounds up} \rightarrow 1,500,000$$

To round to the nearest 10,000, look at the 1,000 digit.

$$1,941,652 \rightarrow 1 \text{ rounds down} \rightarrow 1,940,000$$

$$1,469,237 \rightarrow 9 \text{ rounds up} \rightarrow 1,470,000$$

To round to the nearest 1,000, look at the 100 digit.

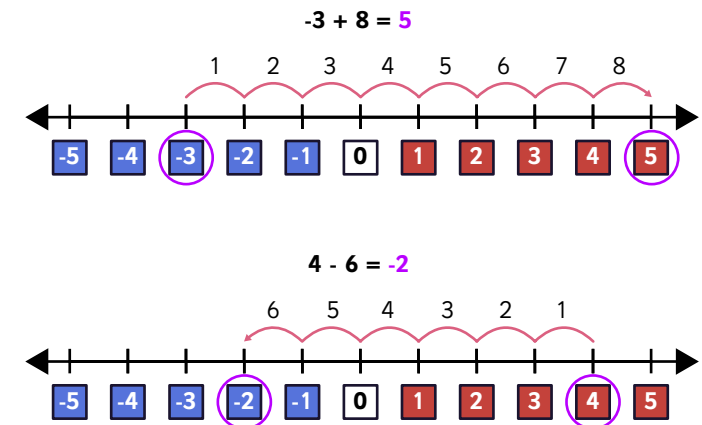
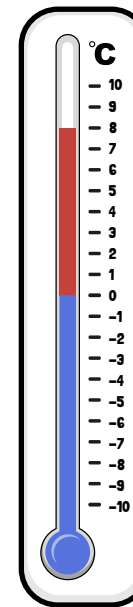
$$1,941,652 \rightarrow 6 \text{ rounds up} \rightarrow 1,942,000$$

$$1,469,237 \rightarrow 2 \text{ rounds down} \rightarrow 1,469,000$$

### Negative numbers

Number lines do not stop at zero. Numbers above zero are called positive numbers and numbers below zero are called negative numbers. Negative numbers are used in real life to show temperature, amounts of money in a bank account and the depth of valleys below sea level.

Number lines are helpful when adding and subtracting negative numbers.



The temperature is 8°C.  
If it drops by 10°C, the new temperature will be -2°C.

