

Maths

Number and Place Value

Need a coherently planned sequence of lessons to complement this resource?

Lesson Breakdown

Below is our suggestion for the most coherent and progressive sequence to teach this area of Planti Maths, steps on the White Rose Maths scheme of learning although we have not aimed to mirror the exact order in which the content is presented.

Read, write, order and compare numbers (1): Powers of 10 up to 1 Mill
Children identify the relationships between powers of 10 from one thousand to one million. They use their understanding of scaling with dividing and multiplying by powers of ten. Sentence stems demonstrate the correct language focus. The listing by of the concepts introduced and being into Mastery resources include further resources.

NC Statement: Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit.
Lesson Aim: To understand the relationship between powers of 10 from 1 hundredth to 10 million.

Read, write, order and compare numbers (2): Dividing Powers of 10 into groups greater than 1000 into 2, 4, 5 or 10 equal parts. Children make connections between the Powers of 10 in Equal Parts Measurement Game, using measuring in context. Fluency reasoning and problem-solving questions are included in the resource.

NC Statement: Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit.
Lesson Aim: To divide powers of 10 into 2, 4, 5 and 10 equal parts.

Introduction

In this unit, the children read and write numbers up to 10 000 000 and continue to identify the value of individual digits in a number. They revisit comparisons of numbers using the greater than and less than symbols and then further develop their skills by reasoning about numbers. Children will focus on rounding numbers to any given degree of accuracy and will also investigate reasoning problems based on rounding numbers. They will work with negative numbers, ordering and comparing them and calculating intervals across zero. They will use negative numbers in context to solve problems. Finally, children will have the opportunity to use all their number and place value skills to solve a range of problems.

Resources
Dice, Gattegno charts, place value charts, place value counters, whiteboards and markers.

Assessment Statements
By the end of this unit, children working towards the expected level will be able to:

- read and write numbers up to 1 000 000;
- identify the value of each digit in a number up to 1 000 000;
- identify the value of a digit in numbers with two decimal places;
- order numbers up to 1 000 000;
- compare numbers using the greater than and less than symbols;
- round numbers to a required degree of accuracy using a number line;
- calculate intervals across zero using a number line;
- compare and order negative numbers;
- solve simple problems involving negative numbers in context;
- solve simple reasoning problems using all of the above.

children working at the expected level will be able to:

- read and write numbers up to 10 000 000;
- identify the value of each digit in a number 000 000;
- identify the value of a digit in numbers with decimal places;
- order numbers up to 10 000 000;
- compare numbers by working out calculated intervals across zero;
- solve problems involving negative numbers in context;
- solve reasoning problems using all of the above.

Number and Place Value
Maths | Year 6 | Skills to Progress Overview

The aim of the overview is to support teachers using Planti Maths to show the most coherent and progressive sequence to teach each area of maths. We also want to fully support teachers who use the White Rose Maths scheme of learning to make full use of the resources available within Planti Maths. Wherever possible, lesson packs have been matched to each of the small steps on the White Rose Maths scheme of learning.

Yearly Overview

| | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 | Week 8 | Week 9 | Week 10 | Week 11 | Week 12 |
|--------|--------------------------------|--------|---------------------|------------------------------------------------------------|-----------------|------------|-------------------------------|--------|-----------------------------------------|---------|-------------------------------|---------------|
| Autumn | Number: Place Value | | | Number: Addition, Subtraction, Multiplication and Division | | | | | | | Order: Position and Direction | Consolidation |
| Spring | Number: Decimals | | Number: Percentages | | Number: Algebra | | Measurement: Converting Units | | Measurement: Perimeter, Area and Volume | | Number: Ratio | Consolidation |
| Summer | Geometry: Properties of Shapes | | Problem Solving | | | Statistics | | | Investigations | | | Consolidation |

Powers of 10 up to 10 Million



Aim

- To understand the relationship between powers of 10 from 1 hundredth to 10 million.

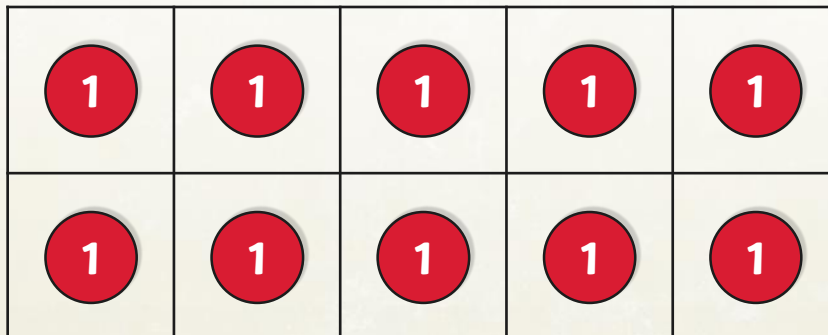
Success Criteria

- I know that each power of 10 is equal to 1 group of 10 of the next smallest power of 10.
- I can identify the number that is 10, 100 and 1000 times the size of a given number and associate this with multiplying or dividing by 10, 100 and 1000.
- I can multiply and divide numbers up to 10 million by 10, 100 and 1000, including calculations that involve numbers with more than one significant digit.
- I can use my understanding of powers of 10 scaling in the context of measures.

Remember It



Complete the sentence stems for the numbers represented on the ten-frame.



10 ones is equal

to 1 ten.

10 is ten times the
size of 1.

Remember It



Complete the sentence stems for the numbers represented on the ten-frame.

| | | | | |
|----|----|----|----|----|
| 10 | 10 | 10 | 10 | 10 |
| 10 | 10 | 10 | 10 | 10 |

10 tens is equal

to 1 hundred.

100 is ten times the
size of 10.

Remember It



Complete the sentence stems for the numbers represented on the ten-frame.

| | | | | |
|-----|-----|-----|-----|-----|
| 100 | 100 | 100 | 100 | 100 |
| 100 | 100 | 100 | 100 | 100 |

10 hundreds is equal
to 1 thousand.

1000 is ten times the
size of 100.

Remember It



Complete the sentence stems for the numbers represented on the ten-frame.

| | | | | |
|-----|-----|-----|-----|-----|
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |

10 tenths is equal
to 1 one.

1 is ten times the
size of 0.1.

Remember It



Complete the sentence stems for the numbers represented on the ten-frame.

| | | | | |
|------|------|------|------|------|
| 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |
| 0.01 | 0.01 | 0.01 | 0.01 | 0.01 |

10 hundredths is equal to 1 tenth.

0.1 is ten times the size of 0.01.

Beyond 1000



Complete the sentence stems for the numbers represented on the ten-frame.

| | | | | |
|------|------|------|------|------|
| 1000 | 1000 | 1000 | 1000 | 1000 |
| 1000 | 1000 | 1000 | 1000 | 1000 |

10 thousands is equal
to 1 ten thousand.

10 000 is ten times the
size of 1000.

Beyond 1000



Complete the sentence stems for the numbers represented on the ten-frame.

| | | | | |
|--------|--------|--------|--------|--------|
| 10 000 | 10 000 | 10 000 | 10 000 | 10 000 |
| 10 000 | 10 000 | 10 000 | 10 000 | 10 000 |

10 ten thousands is equal to 1 hundred thousand.

100 000 is ten times the size of 10 000.

Beyond 1000



Complete the sentence stems for the numbers represented on the ten-frame.

| | | | | |
|---------|---------|---------|---------|---------|
| 100 000 | 100 000 | 100 000 | 100 000 | 100 000 |
| 100 000 | 100 000 | 100 000 | 100 000 | 100 000 |

10 hundred thousands is equal to 1 million.

1 000 000 is ten times the size of 100 000.

Beyond 1000



Complete the sentence stems for the numbers represented on the ten-frame.

| | | | | |
|-----------|-----------|-----------|-----------|-----------|
| 1 000 000 | 1 000 000 | 1 000 000 | 1 000 000 | 1 000 000 |
| 1 000 000 | 1 000 000 | 1 000 000 | 1 000 000 | 1 000 000 |

10 millions is equal

to 1 ten million.

10 000 000 is ten times the
size of 1 000 000.

Scaling by 10, 100 and 1000



This place value chart is called the Gattegno Chart. It visually represents the relationships between powers of 10 from one tenth to ten million.

| | | | | | | | | |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 10 000 000 | 20 000 000 | 30 000 000 | 40 000 000 | 50 000 000 | 60 000 000 | 70 000 000 | 80 000 000 | 90 000 000 |
| 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 |
| 0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 |
| 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 | 0.07 | 0.08 | 0.09 |

Scaling by 10, 100 and 1000



When we look at each column of the Gattegno chart, we can identify numbers that are 1000 times the size and that this is the same as multiplying by 1000. Similarly, we can identify numbers that are 100 times the size and that this is the same as multiplying by 100. Finally, we can identify numbers that are 10 times the size and that this is the same as multiplying by 10.

$\times 1000$
 $\times 100$
 $\times 10$



| |
|------------|
| 10 000 000 |
| 1 000 000 |
| 100 000 |
| 10 000 |
| 1000 |
| 100 |
| 10 |
| 1 |
| 0.1 |
| 0.01 |



$\div 1000$
 $\div 100$
 $\div 10$

Scaling by 10, 100 and 1000



Complete the calculations.

$$100\ 000 \times 10 = 1\ 000\ 000$$

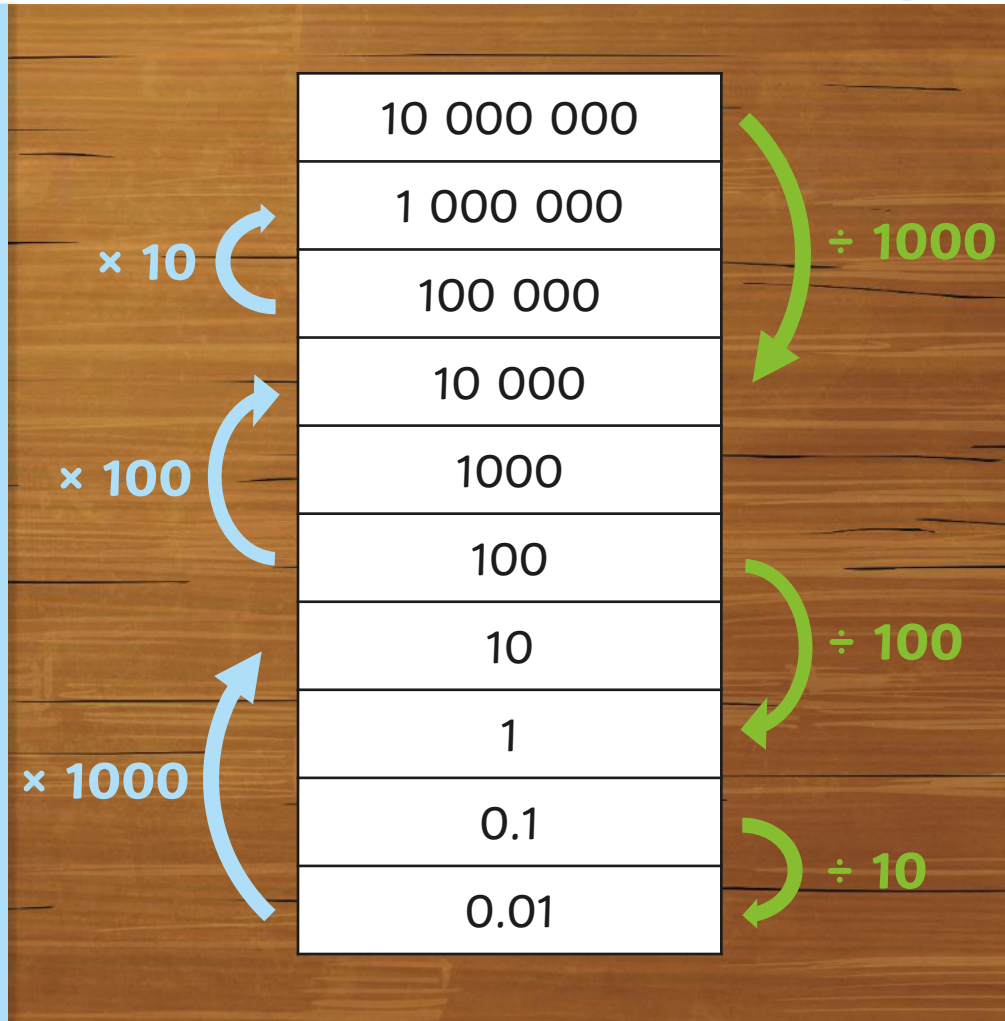
$$100 \times 100 = 10\ 000$$

$$0.01 \times 1000 = 10$$

$$10\ 000\ 000 \div 1000 = 10\ 000$$

$$100 \div 100 = 1$$

$$0.1 \div 10 = 0.01$$



Scaling by 10, 100 and 1000 Roll and Read



Scaling by 10, 100 and 1000 Roll and Read







To understand the relationship between powers of 10 from 1 hundredth to 10 million.

Instructions

- On your turn, roll the dice.
- Choose one of the calculations on the row that matches the number you rolled.
- Complete the stem sentences for the number.
- If your partner thinks you are correct, colour and claim that representation.
- Claim four in a line to win.

_____ is 10 / 100/ 1000
times the size of _____.

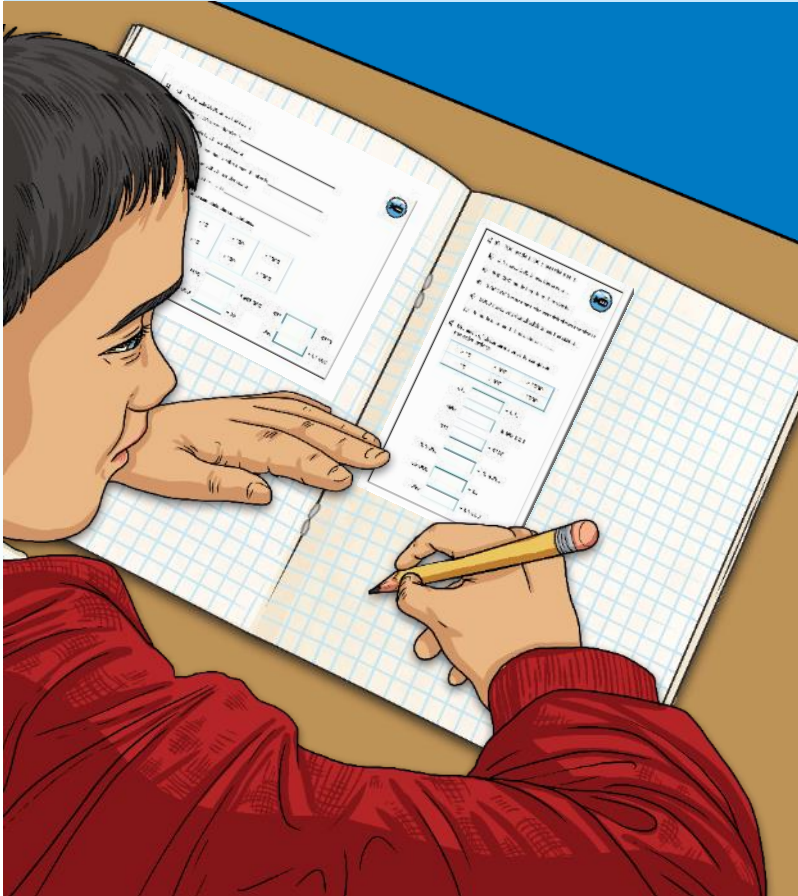


| | | | | | | |
|-------------------------------------------------------------------------------------|----------------------|----------------------|----------------------|-----------------------|------------------------|-------------------------|
|  | 23×10 | 52×100 | 90×1000 | $45 \div 10$ | $36 \div 100$ | $57\ 000 \div 1000$ |
|  | 420×10 | 100×100 | 610×1000 | $780 \div 10$ | $170 \div 100$ | $290 \div 1000$ |
|  | 8000×10 | 7800×100 | 2500×1000 | $1100 \div 10$ | $9300 \div 100$ | $7000 \div 1000$ |
|  | $31\ 000 \times 10$ | $43\ 000 \times 100$ | $82\ 000 \times 100$ | $64\ 000 \div 10$ | $49\ 000 \div 100$ | $81\ 000 \div 1000$ |
|  | $950\ 000 \times 10$ | $890\ 000 \times 10$ | $530\ 000 \times 10$ | $2\ 000\ 000 \div 10$ | $7\ 300\ 000 \div 100$ | $3\ 800\ 000 \div 1000$ |
|  | 6.9×10 | 3.4×100 | 9.4×1000 | $50.1 \div 10$ | $207 \div 100$ | $1600 \div 1000$ |

1600 is 1000
times the
size of 1.6

Diving into Mastery

Dive in by completing your own activity!



1) Both the explicit and implicit costs are _____.

1000 → _____

2000 → _____

2) Use the data to calculate the explicit and implicit costs of attending college for one year.

?

3) Measure the impact of the explicit and implicit costs of attending college on the net benefit of attending college.

M

a) Use the data to calculate the net benefit of attending college for one year.

b) Use the data to calculate the net benefit of attending college for one year.

1) a) 100 made 1000 times the size is _____
b) 0.1 made 100 times the size is _____
c) 900 000 made ten times the size is _____
d) 3 000 000 made one thousand times the size is _____
e) 6000 made one hundred times the size is _____
f) 5 made one tenth times the size is _____

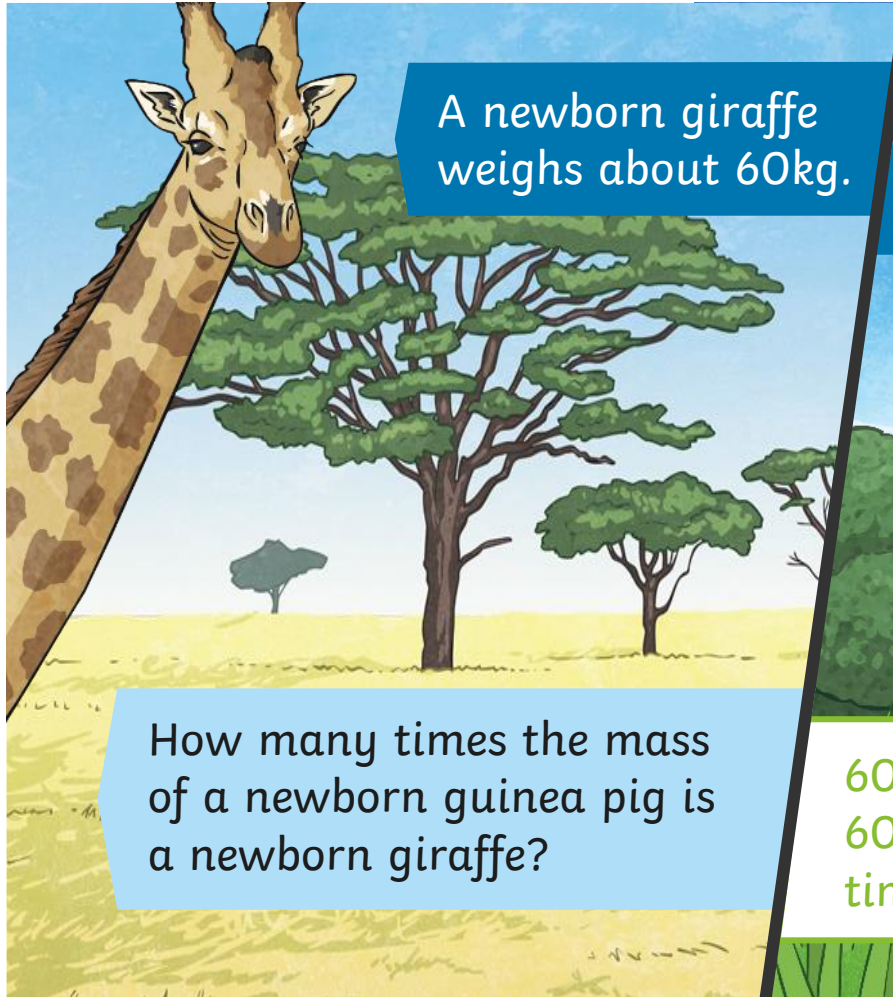
2) Use each of these terms once to complete the calculations.

| | | |
|------|-------|--------|
| • 10 | + 100 | + 1000 |
| - 10 | + 100 | + 1000 |

675 _____ = 6.75 5403 _____ = 5 493 000 932 _____ = 9320

784 092 _____ = 78 409.2 65 000 _____ = 65 846 _____ = 84 600

Word Problems



A newborn giraffe weighs about 60kg.

How many times the mass of a newborn guinea pig is a newborn giraffe?



A newborn guinea pig weighs about 60g.

60kg is equivalent to 60 000g. 60 000 is 1000 times the size of 60.

Word Problems



The distance from the supermarket to the cinema is about 1.6km. The distance from the supermarket to the coast is about 10 times as far.

Approximately how far is it from the supermarket to the coast?



16 is 10 times the size of 1.6 so the distance from the supermarket to the coast is 16km.

Aim



- To understand the relationship between powers of 10 from 1 hundredth to 10 million.

Success Criteria

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- I can use my understanding of powers of 10 scaling in the context of measures.

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9 5698 435 -31
63 567 892 2.542

