



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 PlanIt Maths steps on the White Rose Maths scheme of learning although we have not aimed to mirror the exact order in the scheme.

Read, write, order and compare numbers (1): Powers of 10 up to 1 Mill
 Children identify the relationships between powers of ten from one thousand to one million. They use their knowledge of place value to round numbers to a 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.

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
 Using bar model representations and sentence stems will help children divide greater than 1000 into 2, 4, 5 or 10 equal parts. Children make connections to 10. The Powers of 10 in Equal Parts Measurement Game uses measuring to concept. Fluency, reasoning and problem solving questions are included in the pack.

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.

Read, write, order and compare numbers (3): Place Value of Whole Numbers
 Children identify the value of digits in numbers up to 10 000 000 using the Gattegno charts. By using arrow cards to help them combine and compose numbers, children can be written in an addition calculation in different ways as addition is commutative. They 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.

NC Statement: Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit.
Lesson Aim: To partition and compose numbers up to 10 000 000.

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 up to 10 000 000;
- identify the value of a digit in numbers with two decimal places;
- order numbers up to 10 000 000;
- compare numbers by working out calculations;
- round numbers to a required degree of accuracy using a number line;
- calculate 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 PlanIt 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 PlanIt 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					Fractions		Geometry: 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

765.395289873

Negative Numbers – Temperature



Aim

- To use negative numbers in context.

Success Criteria

- I can calculate intervals across zero.
- I can solve problems involving negative numbers.

Remember It



Write calculations which give the answer -8 , crossing through zero.

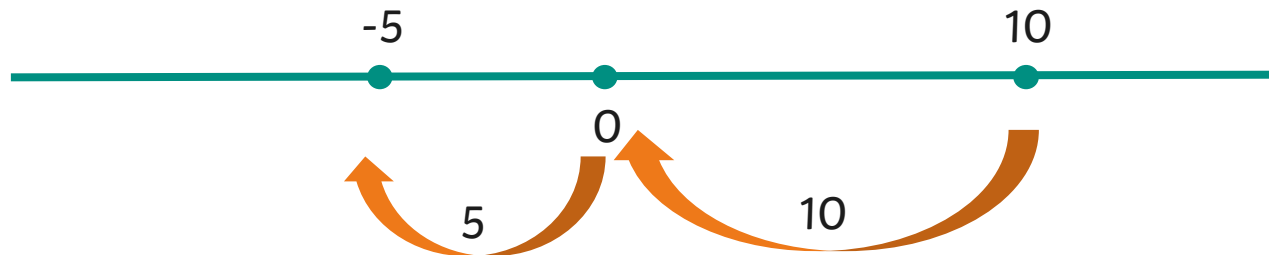


Calculating the Difference Using a Number Line



How would you calculate the difference between a negative and a positive number? Discuss this with your partner.

One method is to use an empty number line.
For example,
find the difference between 10 and -5.



-5 is 5 away from zero. 10 is 10 away from zero.

$$10 + 5 = 15$$

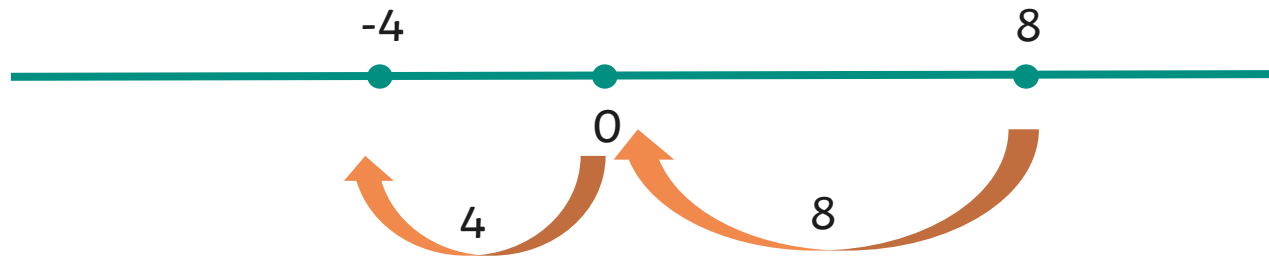
The difference between 10 and -5 is 15.

Calculating the Difference Using a Number Line



?

Draw your own empty number line to calculate the difference between -4 and 8.

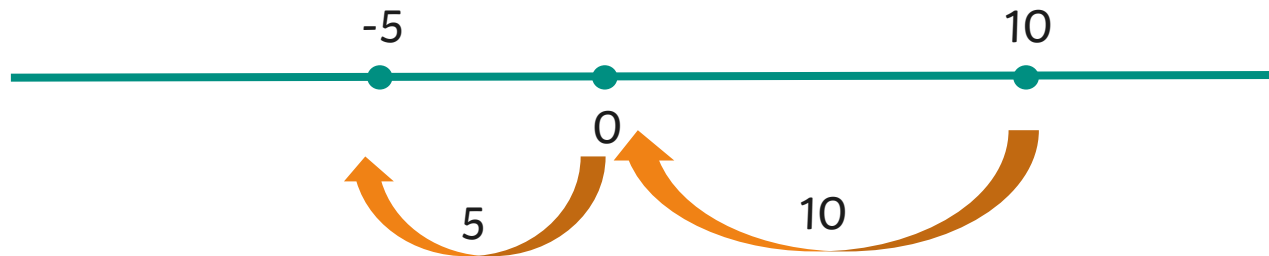


-4 is 4 away from zero. 8 is 8 away from zero.

$$4 + 8 = 12$$

The difference between -4 and 8 is 12.

Calculating the Difference Using a Number Line



Use the number line method to calculate the difference between the following numbers:

A

-8 and 12

20

B

16 and -9

25

C

-14 and 15

29

Calculating the Difference Using a Number Line



Look at the answers to the calculations you have just done.

A

$$-8 \text{ and } 12 = 20$$

B

$$16 \text{ and } -9 = 25$$

C

$$-14 \text{ and } 15 = 29$$

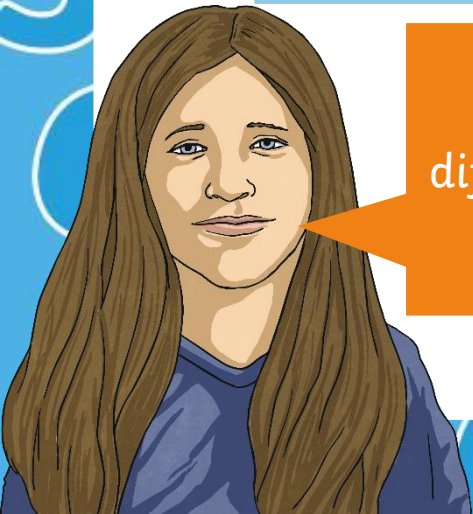
?

Can you visualise the way to do these calculations without using a number line?

How do I calculate the difference between a positive and a negative number?

?

How would you answer this question for Sam?



Calculating the Difference Using a Number Line



Calculate the difference between these numbers, try to do it
in your head:

A

13 and -12

25

B

17 and -8

25

C

22 and -16

38



Differences Between Temperatures

Here are the minimum and maximum temperatures between different European cities in January.

City	Minimum	Maximum
Bucharest (Romania)	-6 °C	2 °C
Alicante (Spain)	6 °C	17 °C
Innsbruck (Austria)	-5 °C	3 °C
Sofia (Bulgaria)	-3 °C	2 °C

Calculate the difference between the minimum and maximum temperatures of each city.



Bucharest: 8 °C Alicante: 11 °C Innsbruck 8 °C Sofia: 5 °C



Differences Between Temperatures

City	Minimum	Maximum
Bucharest (Romania)	-6 °C	2 °C
Alicante (Spain)	6 °C	17 °C
Innsbruck (Austria)	-5 °C	3 °C
Sofia (Bulgaria)	-3 °C	2 °C



What is the difference between the **minimum** temperatures of the following cities?

A

Alicante and Bucharest

12 °C

B

Alicante and Sofia

9 °C

C

Alicante and Innsbruck

11 °C



Differences Between Temperatures

City	Minimum	Maximum
Bucharest (Romania)	-6 °C	2 °C
Alicante (Spain)	6 °C	17 °C
Innsbruck (Austria)	-5 °C	3 °C
Sofia (Bulgaria)	-3 °C	2 °C

?

What is the difference between greatest and the lowest temperature measurement in this table?

17 °C and -6 °C difference = 23 °C

Differences Between Temperatures



-0.5°C

-3°C

2°C

1°C

-1.5°C

?

Which two temperatures have a difference of 1.5°C ?

-0.5°C and 1°C



Differences Between Temperatures

City	Minimum
Kazan (Russia)	-14°C
Brighton (England)	1°C
Athens (Greece)	7°C
Stockholm (Sweden)	-6°C
Madrid (Spain)	11°C



The maximum temperature in Kazan is 12 degrees warmer than the minimum. What is the maximum temperature of Kazan?

-2°C



Differences Between Temperatures

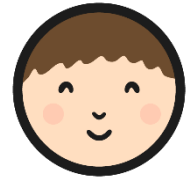
City	Minimum
Kazan (Russia)	-14°C
Brighton (England)	1°C
Athens (Greece)	7°C
Stockholm (Sweden)	-6°C
Madrid (Spain)	11°C



The maximum temperature in Stockholm is 10 degrees warmer than the minimum. What is the maximum temperature of Stockholm?

4°C

World Temperatures

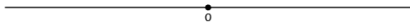


World Temperatures

To use negative numbers in context.

1. Use an empty number line to calculate the difference between a negative and a positive number.

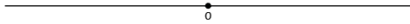
a. 12 and -9



b. -5 and 20



c. 9 and -9



2. Complete this table. Calculate the differences in minimum and maximum temperatures for each city. Show in the space under the table how you worked out your answer.

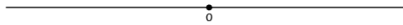
City	Minimum	Maximum	Difference
Nanjing (China)	-2°C	7°C	
Potsdam (Germany)	-3°C	2°C	
Zagreb (Croatia)	-4°C	2°C	
Salzburg (Austria)	-6°C	1°C	

World Temperatures

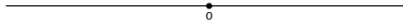
To use negative numbers in context.

1. Draw a number line to calculate the difference between these negative and positive numbers.

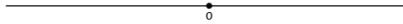
a. -18 and 9



b. 23 and -13



c. -29 and 25



2. Here are the minimum and maximum temperatures between different cities around the world in January:

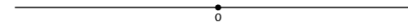
City	Minimum	Maximum
Nikko (Japan)	-8°C	0°C
Melbourne (Australia)	6°C	26°C
Turin (Italy)	-3°C	7°C
King Salmon (USA)	-13°C	-5°C
Gander (Canada)	-11°C	-3°C

World Temperatures

To use negative numbers in context.

1. Draw a number line to calculate the difference between these negative and positive numbers.

a. -19 and 11



b. 32 and -13



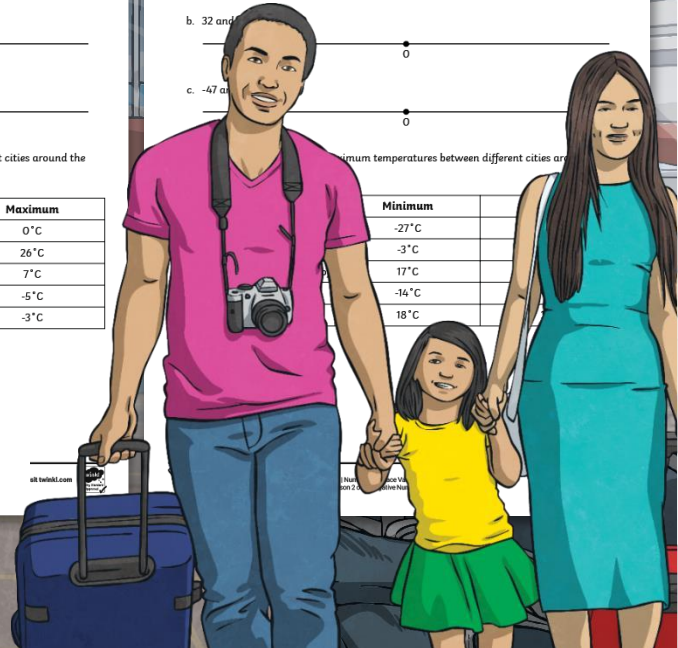
c. -47 and 25



2. Here are the minimum and maximum temperatures between different cities around the world in January:

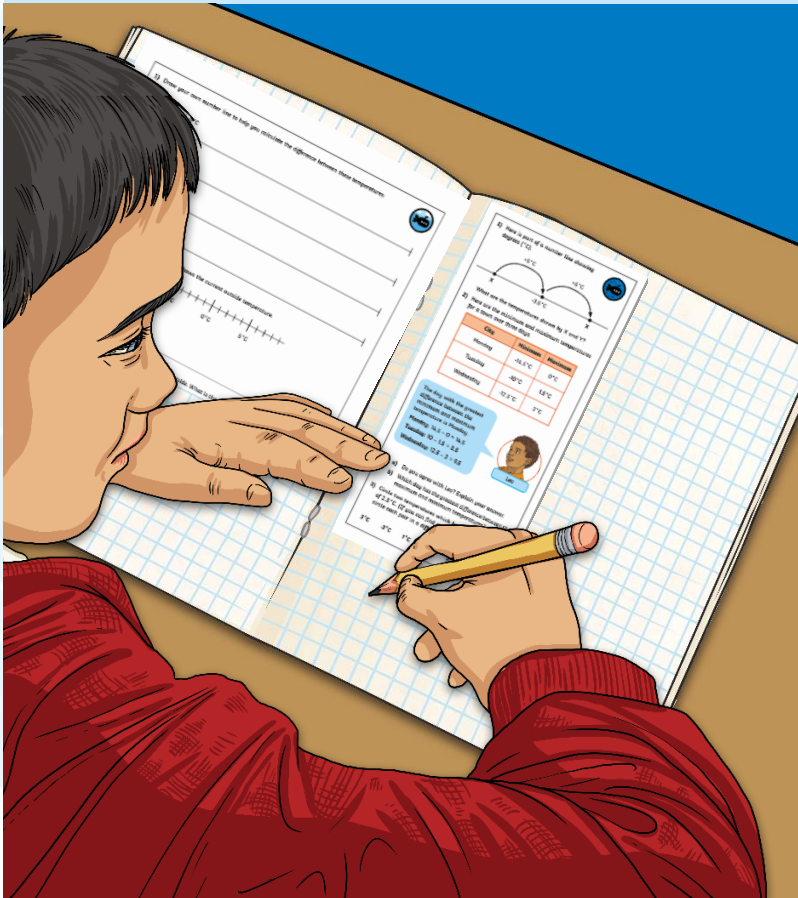
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King Salmon (USA)	-13°C	-5°C
Gander (Canada)	-11°C	-3°C

City	Minimum	Maximum
Nikko (Japan)	-27°C	0°C
Melbourne (Australia)	-3°C	26°C
Turin (Italy)	17°C	7°C
King Salmon (USA)	-14°C	-5°C
Gander (Canada)	18°C	-3°C



Diving into Mastery

Dive in by completing your own activity!



1) Here is part of a temperature scale. A shows the current outside temperature.

What are the temperatures marked on the scale?

X = _____

2) Here are the minimum and maximum temperatures for two places in January.

City	Minimum	Maximum
Gander (Canada)	-11°C	-3°C
Rome (Italy)	3°C	12°C

3) Draw your own number line to help you calculate the difference between these temperatures:

- 12°C and -4°C
- 10°C and -8°C
- 5°C and 7°C
- 11°C and 3°C

2) Here is part of a temperature scale. A shows the current outside temperature.

- What is the outside temperature?
- The inside temperature is 24°C warmer than it is outside. What is the inside temperature?

3) Here are the minimum and maximum temperatures for two places in January.

City	Minimum	Maximum
Gander (Canada)	-11°C	-3°C
Rome (Italy)	3°C	12°C

- What is the difference in minimum temperatures between the places?
- What is the difference in maximum temperatures between the places?

More Temperature Problems

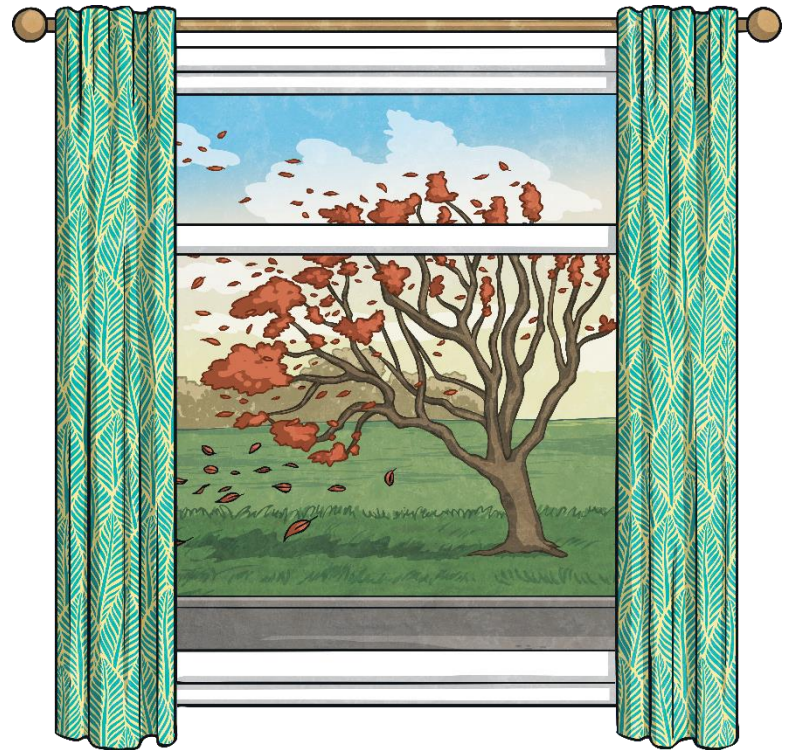


Currently the temperature is -3°C . It is predicted that by 2 p.m. the temperature will have risen by 9°C . What is the predicted temperature?

6°C

Currently the temperature is 12°C . Five hours ago, it was 14°C cooler. What was the temperature five hours ago?

-2°C



More Temperature Problems



Yesterday, the minimum temperature was 2°C . This time last year it was colder by 10°C . What was the minimum temperature this time last year?

-8°C

Today is Friday and the minimum temperature is -5°C . For the next three days, the minimum temperature is set to rise by 2°C each day. What will the minimum temperature be on Monday?

1°C



Aim



- To use negative numbers in context.

Success Criteria

- I can calculate intervals across zero.
- I can solve problems involving negative numbers.

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309 31 238 948
9 5698 435 -31
63 567 892 2.542

