

Year 6 Autumn 1

Unit 1: Place Value

Lesson 3: Compare and order numbers up to 10,000,000 and numbers with up to three decimal places.

Lesson Objectives:

Understand, compare and order numbers.

Lesson Focus:

This lesson extends the learning of previous years to comparing and ordering numbers up to 10,000,000 with different numbers of digits and numbers with up to three decimal places. The children will apply the same principle of comparing the number of digits for whole numbers (and the whole number parts of numbers that include decimals) before looking at the same most significant digit if numbers have the same amount of digits. Children will be working in a predominantly abstract way by the end of the lesson but will start with counters on place value columns.

Starter (No more than 10 minutes)

Recognise and write decimal equivalents of any number of fractional tenths, hundredths or thousandths.

Show page 1 of the SMART Notebook file.

- What fraction is written here? Nine tenths
- How can you write this as a decimal? Show me on your whiteboards.

0.9

Confirm this by circling the denominator and the title of the tenths column in red.

- How many tenths are there? 9 How many ones are there? 0

Complete the answer on the page. See the image on the right.

Repeat for the next two questions.

For $\frac{64}{100}$ circle the denominator and the title of the hundredths column.

- We can't write 64 in the hundredths column so which digit do we write and where does the other digit fit? 4 in the hundredths column and 6 in the tenths because 60 hundredths is the same as 6 tenths.

Move the screen shade to reveal the next set of questions.

- Write the fractions and their decimal equivalents on your whiteboards.

Give children 1 minute to complete these questions before going through the answers as before.

The answers and modelling for the final question can be seen here.

thousands	hundreds	tens	ones	• tenths	hundredths	thousandths

$\frac{9}{10} = 0.$

$\frac{9}{100} = 0.$

$\frac{9}{1000} = 0.$

$\frac{64}{100} = 0.$

thousands	hundreds	tens	ones	• tenths	hundredths	thousandths
			0	9		

$\frac{9}{10} = 0.9$

thousands	hundreds	tens	ones	• tenths	hundredths	thousandths
			0	4	0	0

$\frac{9}{10} = 0.9$ $\frac{569}{1000} = 0.569$ $0.123 = \frac{123}{1000}$

$\frac{9}{100} = 0.09$ $\frac{70}{1000} = 0.070$ $0.03 = \frac{3}{100}$

$\frac{9}{1000} = 0.009$ $\frac{17}{100} = 0.17$ $0.605 = \frac{605}{1000}$

$\frac{64}{100} = 0.64$ $\frac{145}{100} = 1.45$ $0.4 = \frac{400}{1000}$

Initial Problem

Show page 2 of the SMART Notebook file with the initial problem. Read the prompts together.

Put the same digit in the missing spaces below to make the sentence correct.

$$4,62_,645 < 4,623,64__$$

Is there more than one option?
Can you find them all?

Children could be provided with equipment to help them.

Scaffold

- What is the first digit worth in each number? 4,000,000
- What is the second digit worth in each number? 600,000
- What is the third digit worth in each number? 20,000
- What is the fourth digit worth in each number? ? and 3,000
- What does the sign mean between the two numbers?
- What digit could go in the space of the first number?

Take feedback of children's responses and encourage them to use place value columns to ensure the digits that are the same are recognised and that the thousands digit of the greater number is 3 so the thousands digit of the lesser number could be 2, 1 or 0.

Extension

How many different answers are there if the same digit goes in each empty space? Three: 2, 1 or 0
 If the thousands digit of the second number was 4, how many answers would there be? Explain the relationship between the number of thousands and the number of answers.

Guided Learning

Show slide 3 and read the question and prompt together. Check children have written the numbers accurately and allow children time to practise saying the number with their partner before sharing answers as a class.

Say together:

Two million, four hundred and fifty eight thousand, one hundred and twenty three (indicate the millions and thousands titles as these parts are said)

Two million four hundred and fifty seven thousand, one hundred and twenty three.

Show page 4.

- What do you think we need to write in the box between the two numbers? Either $<$, $>$ or $=$ to compare the numbers.
- How can we be certain of which sign to write? What is the purpose of the red shape? The shape can be used to compare corresponding digits in each number.

- What can you see in the shape now? Both numbers have 2 million
- Move the shape to the hundreds of thousands and repeat the question.

Continue until the corresponding digits are not the same.

- Which number has the greater amount of thousands?
- Which number is greater? 2,458,123 is greater than 2,457,123
- Write the correct statement on your whiteboards.

Share answers and complete it on the page.

Optional question to extend thinking:

- Where could we add a counter to the 'blue' number yet keep it less than the 'green' number?

In any place that is less than the thousands column: hundreds, tens or ones.

Show this by adding a blue counter from the top to any of these columns and saying the new number before comparing it to the 'green' number.

Repeat with slides 5 and 6.

Show page 7.

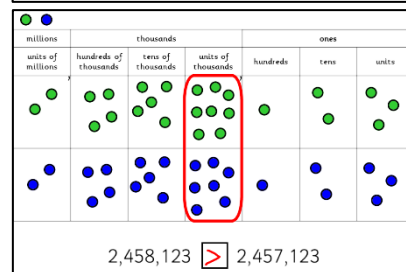
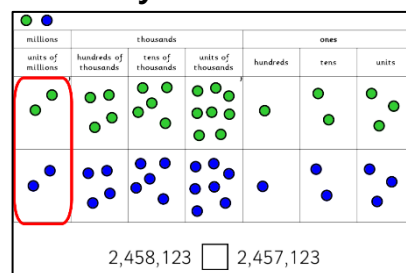
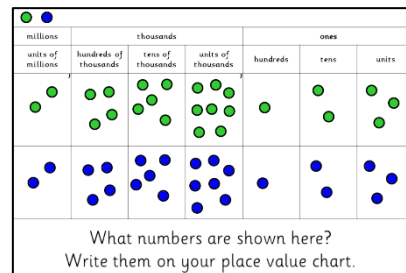
- What is different about these numbers? They are smaller and involve decimals.
- What numbers are shown? Write them on your whiteboards.

Check children have written the numbers accurately and allow children time to practise saying the number with their partner before sharing answers as a class.

Say the numbers together as a class.

Show page 8.

- What is the same about the earlier slide like this one? There is an empty box to put a sign in and a



red shape to help compare the digits in each number.

Repeat the modelling from page 4 and complete the statement on whiteboards before showing on the board. Say together:

Sixty four point five one four is less than sixty four point five two nine.

Repeat the modelling with page 9 where only digits are used rather than counters.

Page 10 asks the children to create their own two numbers for their partner to compare. Check children's understanding and share examples as appropriate.

Ask children to complete **Guided Learning Task 1** (put the correct signs between the numbers).

Guided Learning Task 1 (Put the correct sign < or > between each pair of numbers. Use the place value columns if necessary.)

a) 4,506,228 4,505,328

b) 2,089,417 2,089,409

c) 3,999,968 400,000

d) 38.635 38.634

e) 703.089 703.1

millions	hundreds of thousands	thousands	hundreds	tens	ones	tenths	hundredths	thousandths

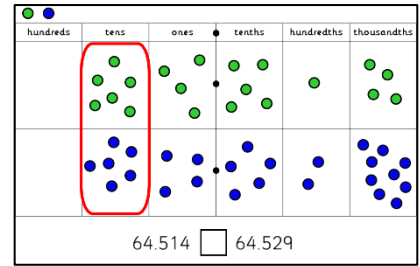
hundreds	tens	ones	tenths	hundredths	thousandths

Circulate and support as necessary.

Extension:

- *When is it easy to compare numbers?*
- *When is it more difficult to compare numbers?*

This is asking children to recognise that with whole numbers, the number with fewer digits must be less. But when the numbers have the same number of digits, then each corresponding digit must be compared.



Show page 12 and read the instruction together.

- *Work in pairs to put the numbers in order.*

After sufficient time, ask:

- *Which number is least/smallest? How do you know?*

843,986 because it only has 6 digits and the others have 7 digits.

Write this number on the top row on the slide.

- *Which number is the next smallest? How do you know?*

3,620,618 because it has 3 millions (the greatest value part) which is less than 5 millions in the other number.

Write this in the second row of the chart.

Write the final number in the bottom row.

millions	hundreds of thousands	thousands	units of thousands	hundreds	tens	units

Order these numbers from smallest to greatest:
5,209,335 843,986 3,620,618

millions	hundreds of thousands	thousands	units of thousands	hundreds	tens	units
	8	4	3	9	8	6
3	6	2	0	6	1	8
5	2	0	9	3	3	5

Order these numbers from smallest to greatest:
5,209,335 843,986 3,620,618

Repeat with slides 13, 14 and 15 in which the variation involves numbers with the same amount of digits, and numbers involving decimals to three decimal places.

Slide 16 removes the scaffold of the place value columns but children should be encouraged to write the numbers one above the other with corresponding value digits aligned in order to help put them in order. Also these are to be ordered from greatest to least.

Children are then asked to create a set of numbers for their partner to put in order.

Say together:

When ordering numbers with the same amount of digits look at the most significant digit.

Ask children to complete **Guided Learning Task 2** (Put these sets of numbers in order).

Guided Learning Task 2 (Put these sets of numbers in order.)

f) 4,380,670 5,000,000 519,448

smallest value _____ greatest value

g) 64.89 63.899 63.989

smallest value _____ greatest value

Place digits in these numbers to put them in the correct order.

h) 7,343__89 7,343,12__ 7__43,120

i) 34__33 34.8__9 34.83__

Circulate and support as necessary.

Extension:

- *Can the numbers in d be in order from smallest to greatest or from greatest to smallest depending on the digits placed? Prove it.*

This requires children to identify that it is possible, examples being:

34.133 34.829 34.831
34.933 34.859 34.839

Independent Learning

Independent Learning Tasks

Put the correct sign < or > between each pair of numbers:
 j) 6,319,054 6,320,001 k) 401.603 401.599

All of these numbers are 7-digit numbers. Some of the digits are covered.
 For each pair, circle the greatest number if it can be identified.

l) 3,290, 3,287, m) 7,669,43 7,669,43

n) 04,295 04,564 o) 8,7 9 8,79 0

p) Circle the greatest number.

q) Write these numbers in order, starting with the smallest.

r) Write these masses in order, starting with the lightest.

s) Circle the number that is closest to 20.

The first two questions replicate the thinking from Guided Task 1 without the scaffold of the place value columns. However, children could use these on their tables if necessary. Both pairs of numbers have the same number of digits so analysis of corresponding digits is required.

Questions l to o requires children to identify the greatest number in each pair without seeing all of the digits.

In l, 3 million 290 thousand > 3 million 287 thousand.

In m, both numbers have the same first 6 most significant digits so the greatest number cannot be identified.

In n, it is unknown because the most significant digits are hidden.

In o, 8,71?,??9 < 8,79?,??0

Questions p to s are previous end of key stage test questions to familiarise children with the format of the questions.

Question p is identifying the greatest number from the five given that all have the same number of digits.

Question q is writing the decimal numbers in order with the numbers having a different amount of digits.

Question r is similar but in the context of mass.

Question s takes the learning further as it asks children to identify the number closest to a given number, with the answer being one of the options that has different tens and ones digits to the given number.

Deeper Learning

When tackling this problem, children are likely to use trial and improvement. However, looking at the grid, a good starting point is to identify that in the right-hand column the digits 1, 2 and 3 need to be placed. The top right box has a number that is greater than the one to the left. This cannot be 1 because 1 is not greater than any of the other numbers available. The box below this also cannot be 1 because it is greater than the digit below it. Therefore 1 must go in the box above 4 in the right-hand column. The next step is to identify that the digit 3 must go in the top right box because it cannot be 2 because there is already a 2 on the top row. The right-hand column can now be completed. The top row can also be completed because 3 is greater than 1 (not 4) so the top row reads 2 4 1 3. Further numbers can be filled in by following the clues of the signs and the numbers already given in the rows and columns. The answer is here:

2			<
∇			∇
			4

This is a Futoshiki puzzle.
 All of the digits 1, 2, 3 and 4 are found in each row and column.
 Complete the grid putting 1, 2, 3 or 4 in each box.
 Make sure the digits fit with the inequality signs.

2	4	1	<	3
4	1	3		2
∇				∇
3	2	4		1
1	3	2		4

Key Outcomes

Children can compare and order numbers with up to seven digits and numbers with up to three decimal places by counting the number of digits or comparing most significant digits to identify the least or greatest value.

Resources

- Whiteboards and pens
- Place value columns
- Counters
- Children's task sheets copied (one per child)