National
Numeracy *Strategy*

Unit 1
Place value

Year 5
Spring term

This unit plan is designed to guide your teaching.
You will need to adapt it to meet the needs of your class.

Unit Objectives

Year 5

- Use the vocabulary of comparing and ordering numbers, including symbols such as <, >, ≤, ≥ and =.
- Order a set of integers less than 1 million.
- **Order a given set of positive and negative integers** (e.g. on a number line, on a thermometer).
- Solve a problem by representing and interpreting data in tables, charts and diagrams.
- Develop calculator skills and use a calculator effectively.

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Resources needed to teach this unit:

- 'Greater than/less than indicator' made from card and split pins
- Whiteboards
- Calculators (and OHT)
- Large number cards (-15 to +15)
- Activity Sheet 1.1
- Activity sheet 1.2
- Activity sheet 1.3
- OHT 1.1
- OHT 1.2
- OHT 1.3
- 1-6 dice

Link Objectives

Year 4

- Read and write the vocabulary of comparing and ordering numbers. **Use symbols correctly, including less than (<), greater than (>) and equals (=).**
- Give one or more numbers lying between two given numbers and order a set of whole numbers less than 10 000.
- Recognise negative numbers in context.
- Solve a problem by collecting quickly, organising, representing and interpreting data in tables, charts, graphs and diagrams.

Year 6

- Find the difference between a positive and a negative integer, or two negative integers, in a context such as temperature or the number line, and order a set of positive and negative numbers.
- Develop calculator skills and use a calculator effectively.
- **Solve a problem by** representing, **extracting and interpreting data in tables, graphs, charts** and diagrams.

(Key objectives in bold)

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Planning sheet	Day One (page 1 of 2)	Unit 1 *Place value*	Term: *Spring*	Year Group: *5*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Read and write whole numbers up to 100 000. Give a number lying between two given numbers.	• Write 2794 on the board. Q What number have I written? Add the digit 3 to change the number to 32 794. Q What number is it now? • Create other numbers by altering the position of the digit 3. Write these on the board in random order. For each number ask the children to say the number. Point to the numbers made and ask: Q What is the value of the digit 3 in this number? • Circle any two numbers. Q What numbers could come between these two? How do you know? Q Which is the smaller number? How do you know? Q Which is the larger number? How do you know? • Repeat. Starting with another four-digit number, place the digit 0 between pairs of digits to make new numbers.	Use the vocabulary of comparing and ordering numbers, including the symbols	• Show the children a 'greater than, equals, less than' indicator, made from two strips of card and two card strips attached to it using split pins. Explain how the < > signs work with the 'open' end for the greater number. • Write a pair of four-digit numbers on the board. Q Which number is bigger? • Insert the appropriate sign between the numbers. Repeat with other pairs of numbers. Q What sign goes between these two numbers? Remind the children that the open end is next to the larger number. Children to practise in pairs putting <, > signs between given numbers. • Say that you want the class to list a set of multiples of 10. Write on the board 320 ≥ [ ] ≥ 270 Q What do you think this sign(≥) means?. Establish that the sign means greater than or equal to. Cover up '≥ 270' and ask the children to read the first half of the statement '320 ≥ [ ] ' Q What numbers could go in the box? Establish that any multiples of 10 less than 320 or 320 itself can go in the box. Repeat, covering up '320 ≥' to establish that any multiple of 10 greater than 270 or 270 itself can go in the box. Q How many numbers are there that can go in the box? Begin to list the multiples of 10. Q How else can we record these numbers? • Take children's responses and demonstrate how to record the numbers using the empty number line.	• Ask children to draw the following diagram on their whiteboards [ ][ ][ ] > [ ][ ][ ] Explain that you will roll a 6-sided die 6 times. Each time the children should place the number rolled in one of the 6 boxes so that the number statement is true. As you roll the dice write the digits on the board. Q What two three-digit numbers could you make with these six digits that will have the greatest difference between them? Q What two numbers will have the least difference between them? Play the game several times. • Homework - Give out Activity sheet 1.1. Ask the children to find at least 10 numbers on foods, in newspapers etc. that fit in the different categories and to write them in, giving some examples and including the units. e.g. 250 grams 35 000 football fans
VOCABULARY digit digit value thousands digit ten-thousands digit hundred-thousands digit RESOURCES OHT 1.1		VOCABULARY greater than less than greater than or equal to less than or equal to RESOURCES 'Greater than , less than indicator' made out of card and two split pins 1-6 dice Activity sheet 1.1		

Planning sheet	Day One (page 2 of 2)	Unit 1 *Place value*	Term: *Spring*	Year Group: *5*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
	• Show OHT 1.1. Ask children to find the sets of numbers that satisfy the conditions. They are to show their answers on a number line. • Collect and discuss children's answers. **Q** Which gave the largest/ smallest set of numbers? Establish question 6 has no values.		Use the empty number line to explain that the number statement 320 ≥ [ ] ≥ 270 means that the number in the box must be greater than or equal to 270 and less than or equal to 320. • Repeat for multiples of 30 and the condition. 600 ≥ [ ] ≥ 400. Collect answers and discuss strategies. Record answers on a number line. 420 450 480 510 540 570 600	**By the end of the lesson, children should be able to:** • **Compare and order numbers, understand and use the symbols: <, >, ≤ , ≥ =.** (Refer to supplement of examples, section 6, page 9.)

Planning sheet	Day Two	Unit 1 *Place value*	Term: *Spring*	Year Group: *5*

Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	**Teaching Activities**	**Objectives and Vocabulary**	**Teaching Activities**	**Teaching Activities/Focus Questions**
Order a set of integers less than 1 million.	• Ask the children to write down a five-digit number on their whiteboards. • Write on the board: 20 000 < ☐ < 70 000. **Q** Could your number go in the box? • Establish that the children know what the signs mean and whether their number could go in the box • Ask children to show their numbers and thumbs up or down if their number will or won't go in the box. Collect some answers for the class to read the numbers and confirm the answer. • Repeat for other ranges of numbers, include four-digit and five-digit numbers.	Order a given set of positive and negative integers (e.g. on a number line, on a thermometer). Calculate a temperature rise or fall across 0°C	• Review the homework. Collect and discuss examples. • Display OHT 1.2 which shows a temperature scale from +40°C to below -20°C. Indicate a main point on the scale (a multiple of 10). **Q** What temperature is this? Choose intermediate points on the scale. Check that the children understand the scale on the thermometer. Count backwards and forwards through zero in steps of different sizes 10, 5, 2 etc. Stop at particular values and ask children to identify the value on the scale. • On the board write (not in sequence) a set of positive temperatures. Order them with the children's help from the highest to the lowest. Ask the children what the weather would be like for the different temperatures. • On the board write: -7°C, -14°C. **Q** Which is colder, -7°C or –14°C? Repeat with other pairs of temperatures. • Write a set of positive and negative temperatures on the board. Ask the children to order the temperatures from the coolest to the warmest. **Q** What is the highest / lowest temperature? **Q** What is 10°C cooler than 3°C? Ask children to explain how they worked out their answer and establish that they can use an empty number line or a thermometer scale to work out the answer to the question. • Give out Activity Sheet 1.2, which gives temperatures at different places round the world in June. Ask the children to mark the temperature on the scale using an arrow and the letter that corresponds to the place. **Q** What is the difference in temperature between Moscow (G) and Buenos Aires (A)? Repeat for other differences.	• Tell the children that you are thinking of two different places from those on Activity sheet 1.2. Say that on another day in June when the temperatures were different the temperature difference between the two places you are thinking of was 15°C. **Q** What could the two places have been? **Q** What could the temperatures have been? • Get children to give the temperatures and explain their reasoning • Discuss the children's responses and record results in a table **By the end of the lesson children should be able to:** • **Use negative numbers in the context of temperature.** (Supplement of examples, section 6, page 15.)

Plenary table:

Place 1 and Temperature	Place 2 and Temperature	Diff

Oral and Mental VOCABULARY:
integer
difference
order

RESOURCES
Whiteboards

Main Teaching VOCABULARY:
minus
degrees Celsius
integer
positive
negative
negative five etc

RESOURCES
Number cards
OHT 1.2
Activity Sheet 1.2

Planning sheet	Day Three	Unit 1 *Place value*		Term: *Spring*	Year Group: *5*
Oral and Mental		**Main Teaching**			**Plenary**
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities		Teaching Activities/Focus Questions

Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
Order a given set of positive and negative integers Develop calculator skills and use a calculator effectively VOCABULARY integer negative positive RESOURCES Large digit cards including range +15 to –15 OHT calculator	• Shuffle a large set of digit cards containing the numbers –15 to 15 inclusive. Select 10 cards from the set and place them at random on the board. Invite the children to sequence the cards in ascending order. Q Which is the smallest number? Q Which is the largest number? • Use an OHT calculator to remind children of how to set up a 'counting machine' using the constant function (25 + + 4 = = should give 25, 29, 33 etc. 25 - - 4 = = should give 25, 21, 17, 13 etc.). Key in a sequence to count up in fours from zero. Q I am on 32, how many more times must I press = to reach 48? How do you know? • Using the constant key start at 32 and count back in steps of seven. Q What is the first negative number going to be? Why? • Repeat using different starting values and step sizes. Ask children to predict before you generate the sequence.	Solve a problem by representing and interpreting data in tables, charts and diagrams. RESOURCES Activity Sheet 1.3 OHT 1.3	• Give out Activity sheet 1.3. Explain that the table gives information of the temperature on the first day of each month for two cities. Confirm that the temperature on the first of January in Brussels was 1^0C. Q What was the temperature in Brussels on the first of March? Q What was the temperature in Irkutsk on the first of February? Q If we wanted to find out the temperature in Brussels on the first of August what would we need to do? Take children's responses and discuss their methods. • Record on the board: 'Temperature in Brussels on 1 August = 1^0C + 2^0C + 4^0C – 1^oC + 4^oC + 5^0C + 3^0C – 1^0C = 17^0C' Confirm that children understand this calculation. Ask them to work in pairs to find the temperature for Brussels and Irkutsk at the beginning of October. • Explain that the table is useful for showing how the temperature varies but is not very helpful in showing the actual temperature at the beginning of each month. Say that you want to represent the information in another way that will still show how the temperature varies but will also be able to show the temperature for the beginning of each month. • Ask the children how they might use the grid on Activity sheet 1.3. Discuss children's answers and responses. Establish that the children remember how to plot points on a grid. • Ask children to draw crosses on the grid to represent the temperatures, first for Brussels then for Irkutsk.	• Discuss the patterns in the temperature. Q When was it coldest in Irkutsk? Ask other questions to ensure the children understand the data points on the graph. • Show OHT 1.3. Explain that this is a bar chart that shows how the temperature varies in a greenhouse over 12 hours. Q What was the difference in temperature between 7 a.m. and 3 p.m.? Q Between which two hours was there the greatest rise in temperature? Q What do you think could have happened between 11 a.m. and 2 p.m.? Q If it was 12^oC colder outside, what was the outside temperature at 6am, 6pm? Collect and discuss answers. **By the end of the lesson children should be able to:** • **Use negative numbers in the context of temperature;** • **Use the constant function on a calculator;** • **Interpret data and graphs.** (Supplement of examples, section 6, pages 15, 71 and 117.)

1. Multiples of 50:   350 > ☐ > 270

2. Multiples of 2:   37 > ☐ > 29

3. Odd numbers: 3444 > ☐ > 3400

4. Hundreds: 34 < ☐ < 870

5. Multiples of 20:   340 ≥ ☐ ≥ 270
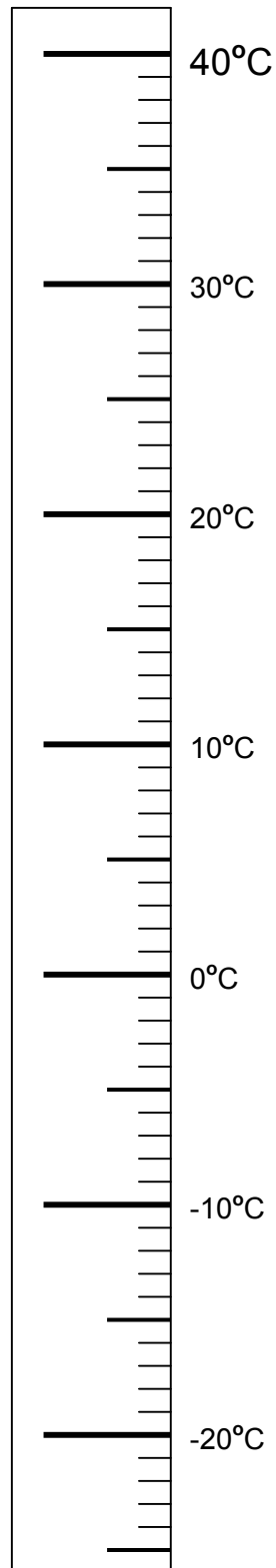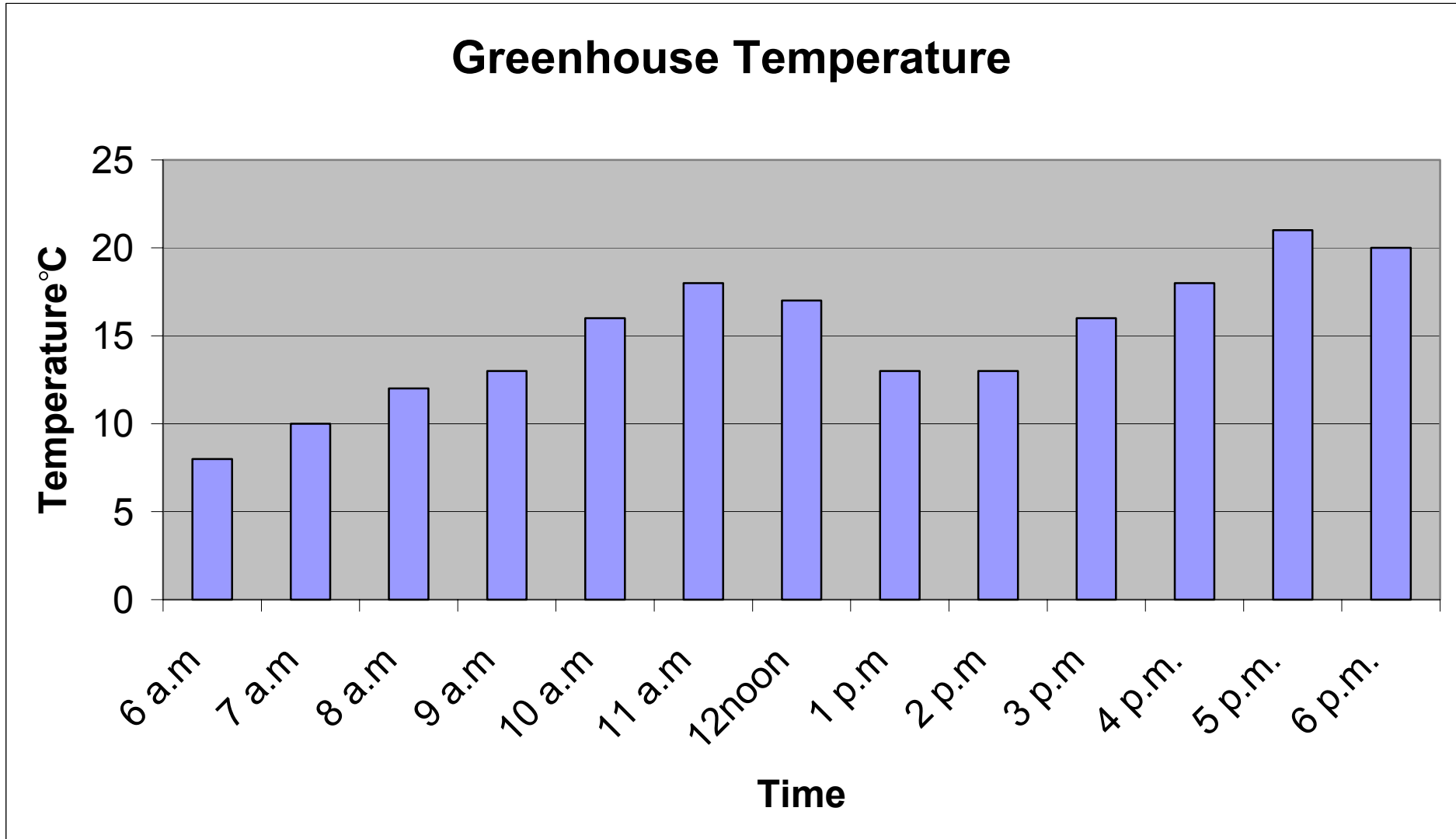
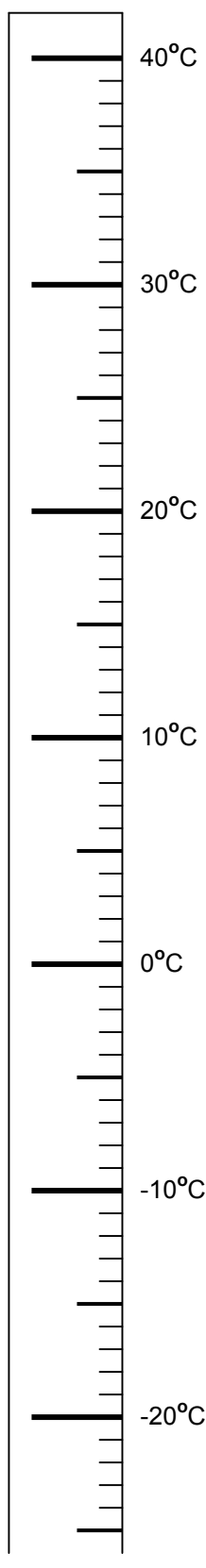6. Hundreds: 100 < ☐ < 200

7. Square numbers: 120 ≥ ☐ > 11

8. Multiples of 9:   17 < ☐ < 27

Greenhouse Temperature

Sorting Numbers

> 0 but ≤ 10	> 10 but ≤ 100	> 100 but ≤ 1000	> 1000

Here is the normal temperature in June for eleven places. Mark each temperature on the thermometer.

(Argentina)	Buenos Aires (A)	10°C
	Singapore (B)	25°C
(Australia)	Darwin (C)	27°C
	Bahrain (D)	33°C
(Belgium)	Brussels (E)	18°C
(Canada)	Montreal (F)	22°C
(Russia)	Moscow (G)	19°C
(Australia)	Australian Alps (H)	-22°C
(Siberia)	Irkutsk (I)	13°C
(Greenland)	Eismitte (J)	-15°C
(Ethiopia)	Addis Ababa (K)	15° C
(Chile)	Santiago (L)	-6°C

40°C

30°C

20°C

10°C

0°C

-10°C

-20°C

Write the temperature difference between five pairs of places:

Difference

…………………… and ……………………   °C

…………………… and ……………………   °C

…………………… and ……………………   °C

…………………… and ……………………   °C

…………………… and ……………………   °C

Temperature graph for Irkutsk (Siberia) and Brussels (Belgium)

Month	Brussels Change In Temp	Temp	Irkutsk Change In Temp	Temp
January		1°C		-23°C
February	up 2°C		up 5°C	
March	up 4°C		up 7°C	
April	down 1°C		up 9°C	
May	up 4°C		up 10°C	
June	up 5°C		up 7°C	
July	up 3°C		down 1°C	
August	down 1°C		down 1°C	
September	down 1°C		down 5°C	
October	down 5°C		down 10°C	
November	down 7°C		down 10°C	
December	down 2°C		down 8°C	

20°C
15°C
10°C
5°C
0°C
-5°C
-10°C
-15°C
-20°C
-25°C

J   F   M   A   M   J   J   A   S   O   N   D