Number and Place Value: Negative Numbers – Temperature

Aim:	**Success Criteria:**	**Resources:**
Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate. To use negative numbers in context.	I can calculate intervals across zero. I can solve problems involving negative numbers.	Lesson Pack
	Key/New Words: Negative, temperature, degrees, centigrade, warmer, colder, crossing zero.	**Preparation:** Differentiated World Temperatures Activity Sheet — one per child Extra Challenge Activity Sheet – as required Diving into Mastery Activity Sheets – per child as required

Prior Learning: It will be helpful if children know what a negative number is and have read temperatures with negative numbers.

Learning Sequence

	**Remember It:** Use the Lesson Presentation to explain the task. Children write calculations which would give the answer -8. Encourage children to draw their own number lines to help their calculations.	
	**Calculating Differences Using a Number Line:** Children use an empty number line to calculate the difference between a negative and a positive number; use the Lesson Presentation to demonstrate how to do this. Children work through several examples, drawing their own empty number lines on a whiteboard. After using a number line, children are asked to visualise the calculations and complete further examples mentally. They then calculate the difference between negative and positive numbers mentally. Can children calculate intervals across zero?	
	**Differences between Temperatures:** Children practise the skills they have learnt by calculating differences between maximum and minimum temperatures of different European cities shown on the Lesson Presentation. Can children solve problems involving negative numbers?	
	**World Temperatures:** Children complete the World Temperatures Activity Sheet, using negative numbers and answering questions involving calculations which cross zero.  Children use an empty number line to calculate the difference between a negative and a positive number. A number line with zero marked is drawn for children. They calculate the difference between maximum and minimum temperatures.  Children use an empty number line to calculate the difference between a negative and a positive number. A number line with zero marked is drawn for children. They calculate the difference between maximum and minimum temperatures. Children are given the difference in temperature of two cities and they are asked to identify the two cities.  Children calculate the difference between a positive and negative number. They calculate the difference between maximum and minimum temperatures. Children are given the difference in temperature of two cities and they are asked to identify the two cities. They find the range of the temperatures involved. They solve a word problem about the temperatures, crossing zero. An Extra Challenge Activity Sheet is also included.	

	**Diving into Mastery:** Schools using a mastery approach may prefer to use the following as an alternative activity. These sheets might not necessarily be used in a linear way. Some children might begin at the 'Deeper' section and in fact, others may 'dive straight in' to the 'Deepest' section if they have already mastered the skill and are applying this to show their depth of understanding.  Children calculate the difference between temperatures, crossing zero.  Children use their reasoning skills to solve problems involving temperatures, crossing zero.  Children use their problem-solving skills to answer problems that involve a greater depth of thinking when using negative numbers in the context of temperatures.	
	**More Temperature Problems:** Children solve more problems, involving rise and fall in temperatures, including crossing through zero.	

Exploreit

Measureit: (This activity is best done where minimum temperatures are below zero, or use past data where this happened.) Children use a thermometer and record the temperatures for a week. They can calculate differences between different days.

Researchit: Children research data for different world cities and ask questions for others to answer. They provide answers to their questions.

Learnit: Children will find this visually exciting **Knowledge Organiser** a useful tool for enhancing their knowledge of number and place value.