

Max's Expedition: Exploring the Negative Numbers

Learning objective: To calculate intervals across zero and solve problems involving negative numbers in context.

Help Max the monkey prepare for his mountain expedition. Use your knowledge of number lines and temperature drops to solve the challenges below. Remember that as you go below zero, the numbers get further away from zero but smaller in value.

Word bank: interval · descend · ascend · degrees Celsius · below zero · difference · calculate · magnitude

1. Max starts at base camp where the temperature is 4°C . As he climbs the mountain, the temperature drops by 7°C . Explain the calculation you would use to find the new temperature at his current altitude. (2 marks)

2. At the summit, the temperature is -3°C . If the temperature at base camp is 5°C , what is the difference in temperature between the two locations? Justify your method. (3 marks)

3. Max finds a deep cavern where the temperature is -8°C . If the temperature rises by 5°C , what will the new temperature be? Show your working out clearly. (2 marks)

4. Compare and contrast the value of -2°C and -9°C . Explain why -2°C is considered the 'warmer' temperature despite the numbers involved. (3 marks)

5. What might happen if the temperature at the summit is -10°C and it falls by a further 4°C ? Calculate the final temperature and explain how you moved along the number line. (3 marks)

6. Max wants to buy thermal gear for his climb. The gear costs £45, but he has a discount voucher that brings his balance to -£12 (a debt he owes the shop). If he pays off £15, what is his new balance? Is he now in credit or debt? (3 marks)

Extension challenge: Design a 'Temperature Log' for a fictional planet where the temperature fluctuates between 20°C and -20°C. Write three complex word problems for a partner to solve, ensuring at least one problem requires crossing the zero threshold.