

OBJECTIVES

- Understand negative numbers as positions on a number line; order, add and subtract negative numbers.
- Solve word problems and investigate in the context of number; compare and evaluate solutions.

STARTER

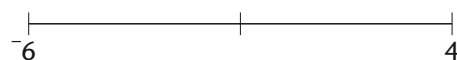
10 minutes

Resources

Resource 8N1.2a – number cards printed back to back and cut out as cards; one set per pair
Framework examples, pages 40, 48

Draw a blank number line and write a number at each end. Put a mark or a cross halfway along the line and ask pupils what number will be at the mid-point.

For example:



Ask pupils how they found the mid-point. Discuss their methods, using the number line to model their thinking.

Quickly model another two examples, such as the mid-point between -11 and 5, and between -3.5 and -1.

Ask pupils if their strategies change when they are dealing with different types of number, or when the end numbers are close or far apart.

Ask pairs of pupils to practise finding mid-points, using a set of number cards (**resource 8N1.2a**). Pupils each choose a card and then they find the number halfway between the numbers they have chosen, using a blank number line if they wish.

MAIN ACTIVITY

45 minutes

Resources

Resource 8N1.2a
Framework examples, pages 48, 92, 94

Using blank number lines (horizontal and vertical) or by extending number patterns (Framework examples, page 48), model addition and subtraction of positive and negative integers. Ensure that pupils can record their number statements consistently.

Pose the problem:

Q Using any number of double-sided cards, some with 7 on one side and -2 on the other and others with 5 on one side and -3 on the other, what values could you find?

Discuss some of the possible values using both addition and subtraction.

$$5 + -2 + -2 + -2 = -1$$

$$7 + -3 - 5 = -1$$

$$-3 - 2 = -1$$

Ask pupils:

Q Can you find every value from -5 to 5?

Discuss responses, acknowledging different ways of obtaining the same value.

Support: Use only positive values, by allowing the use of any number of cards or by using addition only.

As an extension, ask pupils to consider whether values are impossible to find.

- Q Can you find integers that produce all the values from -25 to 25 ?
- Q Does this mean that any value could be found?
- Q How can you justify your answer?

PLENARY

5 minutes

Discuss results and strategies, for example by asking pairs:

- Q Is it possible to make -6 ?
- Q How many different ways are there to make -6 ?
- Q Is it possible to make every value from -10 to 10 ?
- Q How can you convince someone that this is true?

Summarise the results and, if possible, get a pupil to demonstrate a systematic way of recording them.

Set the following problem for homework.

- Q Fill in the missing numbers so that each row, each column and each diagonal adds up to 3.

-2		
3	1	
2		4

KEY IDEAS FOR PUPILS

When solving problems, remember to:

- be systematic;
- keep a careful record of your findings as you go along;
- identify patterns in your findings and draw on these to come to some conclusions that you can explain and justify.

-10	-19
-8	-17
-6	-15
-4	-13
-2	-11

1	12
3	14
5	16
7	18
9	20