Year 6 Maths No Problem Teaching Guidance to go with online Maths No Problem lessons

Chapter 13: Position and Movement

Chapter Overview

In this chapter, pupils work with polygons on coordinate grids. They differentiate between translation and reflection before moving on to express movement using algebra. In the first lesson, pupils review negative numbers on horizontal and vertical axes. They then learn to describe the position of objects in relation to a common starting point. Pupils begin to use a coordinates grid from different starting points and recode the coordinates of the points. The coordinate grids become more complex as the chapter progresses, using all four quadrants and translating and reflecting objects. The chapter ends by describing movement (translation and reflection) on a grid using algebra.

Lesson 1: Showing Negative Numbers

Lesson Approach

To begin this lesson, show pupils the In Focus task. Ask them how they can determine the difference in temperature from the thermometers. Tell pupils your friend says she knows an easy method for solving this type of question. All you need to do is subtract 2 from 6. The temperature difference is 4 °C. Is this correct? Will this lead to the correct answer? Can we show this on a number line?

Allow pupils to explore this idea on a number line to prove your friend is wrong. Ask them to show the temperatures on both a horizontal and vertical number line. When might either of these be seen in everyday life? Give pupils time to discuss this and draw their answers. Ask them if they can articulate what −6 is compared to 0 and what 2 is compared to 0. Are they saying the same thing?

During Guided Practice, pupils are comparing 'increases by' with 'increases to', and identifying and placing numbers onto a number line.

Lesson 2: Describing Position

Lesson Approach

To begin this lesson, show pupils the In Focus task. With the given information, ask them how can they can describe the position of the birds. Allow them some time to do this. Tell them your friend says she can describe the pink bird as being 8 m away from the birdwatcher. Is this correct? What about the direction? How can we describe that? Is there a way to describe both the position and direction at the same time?

Tell pupils your other friend says using a coordinate grid would be really helpful. What is a coordinate grid? How would it help us find the position of the birds? Provide pupils with a coordinate grid and ask them to mark the bird watcher in the middle at (0, 0). Now can we describe the position of the birds? Is there an order when we write coordinates? Which number do we start with, the number from the x axis or the number from the y axis?

During Guided Practice, pupils are determining the coordinates of different points on a grid using the (x, y) method.

Lesson 3: Describing Position

Lesson Approach

To begin this lesson, show pupils the In Focus task and ask them if they can describe the positions of each point using coordinates. What do we need to use to identify the coordinates? Allow pupils some time to decide what to do. Guide them to recall from previous lessons that in order for coordinates to be identified, we need a coordinate grid. Ask them if they would be able to draw two number lines on the square grid to create the coordinates grid. Allow pupils to create coordinate grids on their own and describe the position of each point using coordinates. Then ask them to present and share their coordinates.

Pupils should notice that the coordinates for each point will vary. Why is this the case? Ask them to compare their coordinate grid with others. Do they notice any differences? What could have caused them to describe the points with different sets of coordinates? Let pupils study each other's coordinate grid and discuss this. Guide them to see that when the position of the origin (0, 0) differs, the coordinates for each point will be different. Ask them to identify the coordinates for each point with D as (0, 0), B as (0, 0) and C as (0, 0).

During Guided Practice, pupils are determining the coordinates of different points, and positioning a point to create an isosceles triangle.

Lesson 4: Drawing Polygons on a Coordinate Grid

Lesson Approach

To begin this lesson, show pupils the In Focus task and ask them to discuss who is correct. What is the definition of a trapezium, a kite, a square? Ask them to describe the properties of those shapes. Then ask pupils to explore these ideas and see if it is possible to position point B to make the three shapes. Give them some time to do this, then ask them to compare what they have drawn with each other. Do you have the same coordinates for B to make the square? What about the kite and trapezium? Why do you think this is the case? Could there be other possibilities to make the kite and trapezium? Can we identify all of the possibilities? Allow pupils time to work on this.

During Guided Practice, pupils are creating polygons by positioning points on a grid.

Lesson 5: Describing Translations

To begin this lesson, show pupils the In Focus task. This is an activity-based lesson using a board-game style approach to translation. Provide the grid, the car cutouts and a dice to each pair of pupils. Go through the instructions with pupils and ask them if they can explain what is meant by 'Decide the starting position'. Discuss this with the class, then let them them play the game.

After the game, ask pupils how many points each figure has. When a figure moves 2 steps to the left, what happens to all the points? Ask them if they know what to call this type of movement. It is called a translation. In a translation, all the points of a figure move in the same direction and for the same distance.

During Guided Practice, pupils are describing the translation of a figure from a starting point that has been identified and recording the new coordinates.