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Teaching Guide

Minecraft: Coordinate Islands

Use this guide in conjunction with the Coordinate Islands world in Minecraft.

The Coordinate Islands world contains four lessons, designed to be completed sequentially. If you wish to complete individual lessons out of sequence, type **/function Islandhop** and select one of the buttons when prompted:

- **Polar** (Lesson 2)
- **Lava** (Lesson 3)
- **Rock** (Lesson 4)

The first lesson starts shortly after entering the world and does not have a shortcut.

Unit Overview

Students will meet Captain Grid who explains they must visit each of the outer islands to obtain keys to improve their home island. To obtain keys, students complete activities that teach how to determine the ordered pair of a graphed point, graph a point given its ordered pair, work with compass directions on a coordinate plane, and display a data set by creating and graphing ordered pairs.

Estimated time per lesson: 15–25 min

Unit objectives

- Name points using ordered pairs, using (*x*, *y*) format, limited to the first quadrant.
- Describe how to interpret an ordered pair.
- Graph a point in the coordinate plane, limited to the first quadrant.
- Describe the process for graphing ordered pairs of numbers in the first quadrant of the coordinate plane.
- Graph points that represent a real-world situation, limited to the first quadrant.
- Interpret the coordinate values of a point graphed in the coordinate plane in the context of the situation described, limited to the first quadrant.

Lesson 1: Skull Island

Lesson goals

- Name points using ordered pairs, using (*x*, *y*) format, limited to the first quadrant.
- Describe how to interpret an ordered pair.

Materials

- Coordinate Islands world

Vocabulary

- ***x*-axis** – the horizontal number line on a coordinate plane
- ***x*-coordinate** – a number on the *x*-axis
- ***y*-axis** – the vertical number line on a coordinate plane
- ***y*-coordinate** – a number on the *y*-axis
- **origin** – the point where the *x*-axis intersects the *y*-axis
- **ordered pair** – the *x*- and *y*- coordinates that describe the location of a point

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Activities

1. **The Observation Walls:** Students view four coordinate planes, each containing a face (plotted point). They compare the location of each point to its ordered pair shown on a nearby sign.
2. **The Walls with Lights:** Students use switches on the ground to turn on lights at corresponding locations on a wall. In doing so, they learn how the *x*- and *y*-coordinates of a point are determined. There is a wall for a point not on an axis and a wall with a point on each axis.
3. **The Practice Walls:** Students practice describing points with ordered pairs as they determine the location of a face on each of the four coordinate planes.

Questions

1. How are the coordinate planes in the Coordinate Islands world like other coordinate planes you have seen? How are they different?
2. When will the ordered pair for a point contain a coordinate of 0?
3. Where is a point whose first coordinate is 0? Where is a point whose second coordinate is 0? Where is a point whose first and second coordinates are 0?

Lesson 2: Polar Island

Lesson goals

- Graph a point in the coordinate plane, limited to the first quadrant.
- Describe the process for graphing ordered pairs of numbers in the first quadrant of the coordinate plane.

Materials

- Coordinate Islands world

Activities

1. **The Path to the Hat:** Students get the feel for graphing a point by walking the path that would be used to graph the point.
2. **The Fish and the Flags:** Students first graph points by digging through the ice to catch and release a fish. They then graph points by placing caution flags at given locations.
3. **The Snow-Covered Items:** Students practice graphing points by digging at locations described by ordered pairs to retrieve useful items.

Questions

1. How do you graph a point given its ordered pair?
2. Could it be possible that two different ordered pairs describe the same location?
3. Would the point described by (15, 3) be closer to the *x*-axis or closer to the *y*-axis?

Lesson 3: Lava Island

Lesson goals

- Graph points that represent a real-world situation, limited to the first quadrant.
- Interpret the coordinate values of a point graphed in the coordinate plane in the context of the situation described, limited to the first quadrant.

Materials

- Coordinate Islands world

Vocabulary

- **compass** – a device that shows the compass (cardinal) directions of north, east, south, and west, indicated by N, E, S, and W

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Activities

1. **The Plant That Must Be Moved:** Students use compass directions to create ordered pairs and then graph the ordered pairs by digging up and replanting a plant in a new location.
2. **The Compass Rocks:** Students practice using compass directions to create ordered pairs to describe the locations of important rocks.
3. **The Famous Statue:** Students interpret an ordered pair for a point on a coordinate plane where the units represent more than a single unit of measure.

Questions

1. Which direction is the opposite of north? Which direction is the opposite of east?
2. The *y*-axis on a coordinate plane faces north. From any given point, how would you move west?
3. Each unit on a coordinate plane represents 20 meters. Describe the distances and directions involved in moving from (6, 3) to (2, 1).

Lesson 4: Rock Island

Lesson goals

- Graph points that represent a real-world situation, limited to the first quadrant.

Materials

- Coordinate Islands world

Vocabulary

- **steady rate of change** – a consistent increase or a consistent decrease in a changing amount

Activities

1. **Shirley's Guided Tours:** Students use a two-column table to create ordered pairs and then graph the points by placing blocks. They observe the blocks form a pattern because the costs increase at a steady rate.
2. **Juan's Remaining Money:** Students examine a set of ordered pairs and determine that the graph of the data should display a pattern because it is decreasing at a steady rate. Students then graph the points.
3. **Heidi Clare's Boat Tour:** Students graph points showing a steady increase given data displayed as ordered pairs.
4. **Justin's Sled Weight:** Students graph points showing a steady decrease given data displayed in a two-column table.

Questions

1. How can you determine, from a two-column table, whether the data show a steady rate of change?
2. How can you determine, from a list of ordered pairs, whether the data show a steady rate of change?
3. What does the graph of a data set with a steady increase look like? What does the graph of a data set with a steady decrease look like?

Endgame

Once students have completed the activities on all the islands, they can use the gemstones they collected to view the coordinates native to the Minecraft world and watch those coordinates change as they move throughout the world, which will then be completely open for building and survival. Minecraft coordinates are given as an ordered triple in the form (*x*, *z*, *y*).

Optional Extension Activities

- Have students find a map, paper or digital, and discuss how it is similar to and different from a coordinate plane in math. For example, one of the sides may display letters instead of numbers.

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- Assign students the task of placing their home, or a room in their home, on a coordinate plane. Encourage them to orient the *y*-axis with north.
- Lead a discussion that compares one- , two-, and three-dimensional space.

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