

# Relationship of Latitude and Longitude to Coordinate Planes

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**Grade Level** 5  
**Duration** 1-3 class periods

## National Standards

### GEOGRAPHY

#### Element 1: The World in Spatial Terms

1. How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information

## AZ Standards

### MATHEMATICS

5.G.A Graph points on the coordinate plane to solve mathematical problems as well as problems in real- world contexts.

5.G.A.2 Represent real-world and mathematical problems by graphing points in the first quadrant of the coordinate plane and interpret coordinate values of points in the context of the situation.

## Arizona Social Science Standards

### GEOGRAPHY

**The use of geographic representations and tools help individuals understand their world.**

5.G1.1 Use and construct maps and graphs to represent changes in the United States. Key concepts include but are not limited to physical and human features of the United States, the regions of the United States and their characteristics, geographic location of major events, the growth of the United States through territorial expansion, demographic changes, and the states and their capitals

## SIOP Elements

<b>Preparation</b> Adapting content <b>Linking to background</b> <b>Linking to past learning</b> Strategies used	<b>Scaffolding</b> <b>Modeling</b> <b>Guided practice</b> <b>Independent practice</b> <b>Comprehensible input</b>	<b>Grouping Option</b> <b>Whole class</b> <b>Small groups</b> Partners Independent
<b>Integrating Processes</b> Reading Writing <b>Speaking</b> <b>Listening</b>	<b>Application</b> <b>Hands on</b> Meaningful Linked to objectives <b>Promotes engagement</b>	<b>Assessment</b> <b>Individual</b> <b>Group</b> <b>Written</b> Oral

## Arizona English Language Proficiency Standards

### Grade 4 and 5

#### Basic

#### Speaking and Writing

Standard 5 By the end of each language proficiency level, an English learner can adapt language choices to purpose, task, and audience when speaking and writing.

B-1 demonstrate awareness of the need to adapt language choices according to purpose, task, and audience.

B-2: use grade-appropriate general academic and content specific words, phrases, and expressions with developing control.

## Overview

Latitude and longitude are imaginary lines on Earth's surface that are used for locating places. This grid of lines corresponds to the mathematical concepts of coordinate planes.

## Purpose

In this lesson, students will make a real world connection between graphing on a coordinate plane and locating places on earth using degrees of latitude and longitude. The lesson contains adaptations for diverse learners (ELLs).

## Key Vocabulary

*Note: The capitalization of Equator, Prime Meridian, North Pole and South Pole is variable depending on the grammar source. Please make consistent with your ELA instruction.*

**latitude:** distance north or south of the Equator measured in degrees up to 90 degrees

**longitude:** distance measured in degrees east or west from an imaginary line (called the Prime Meridian) that runs from the North Pole to the South Pole and that passes through Greenwich, England

**Prime Meridian:** an imaginary line that runs from the North Pole to the South Pole through Greenwich, England

**Equator:** an imaginary circle around the middle of the Earth that is the same distance from the North Pole and the South Pole

**coordinate plane:** a two-dimensional **plane** formed by the intersection of a vertical line called the y-axis and a horizontal line called the x-axis

**horizontal:** positioned from side to side rather than up and down (parallel to the ground)

**vertical:** positioned up and down rather than from side to side (going straight up)

## Materials

- Image of a globe or an actual globe
- Projection device
- BrainPOP Video  
<https://www.brainpop.com/search/?keyword=Latitude%20and%20Longitude>  
or  
YouTube video. Latitude and Longitude (3.57 min)  
<https://www.youtube.com/watch?v=HvCvANs7O7k>
- Vocabulary cards and scissors

- World map such as this:  
<https://geoalliance.asu.edu/sites/default/files/maps/World-at.pdf>
- Rags to Riches Game  
[https://www.quia.com/rr/2967.html?AP\\_rand=1172506353](https://www.quia.com/rr/2967.html?AP_rand=1172506353)
- Handheld devices and internet
- Brain Pop reading on Coordinate Planes
- Where Am I? worksheet and Answer Key
- Vocabulary Test and Answer Key
- Location of Arizona Cities worksheet (optional)

## Objectives

The student will be able to:

- 1) Locate places on the earth's surface using latitude and longitude.
- 2) Understand quadrants to locate and describe the location of places on a map.
- 3) Navigate using specific coordinates and relative location.

## Procedures

*Prior Knowledge: Students should know the states in the U.S. If not, use a map with states labeled for Where Am I worksheet practice.*

### SESSION ONE

#### Engage:

1. Begin the lesson by projecting an image or holding an actual globe. Review the name of this item (globe), what it represents (the planet Earth), and what can be identified using a globe (waterbodies, landforms, places, locations, etc.).
2. Distribute a blank sheet of paper, and ask students to draw a picture of a globe. Instruct them to include as much detail as they will have time to draw in 5 minutes. (**Preparation: Linking to past learning; Application: Hands on, Promotes engagement**)
3. Have students share their drawings in small groups. The group discussion should focus on what's common and what's different in their pictures. Have groups share their responses with the whole class. Record their responses on the whiteboard. (**Grouping option: Small groups, Whole class, Integrating Processes: Speaking and Listening**)

#### Explore:

4. If small groups do not identify the lines on the globe, add the word "lines" to the whiteboard. Using the projected image or the actual globe, point out the lines. Ask: What these lines are

## Relationship of Latitude and Longitude to Coordinate Planes

and what they are used for? (**Preparation: Linking to past learning**)

5. **Option 1:** Introduce longitude and latitude with a Brain Pop video that requires a sign in to this website and paid subscription.

<https://www.brainpop.com/search/?keyword=Latitude%20and%20Longitude>.

**Option 2:** Introduce latitude and longitude with a free YouTube video. Latitude and Longitude (3.57 min)

<https://www.youtube.com/watch?v=HvCvANs7O7k> It is suggested that you stop at about 3 min as the video goes into material not used in this lesson.

6. Ask students to THINK-PAIR-SHARE about what they have learned in the video using the sentence starter: I learned that \_\_\_\_\_.

(**Scaffolding: Comprehensible input**)

7. Introduce and discuss the vocabulary for this lesson by projecting the vocabulary cards.
8. Then distribute a set of the vocabulary cards and a pair of scissors to groups of four. Have the students cut the definitions from the words and cut the illustration from the definition. Have students play a matching game in their groups seeing how many times they can match the words to the definitions and the illustrations in the time remaining for this class session.

(**Scaffolding: Comprehensible input, Application: Hands on, Promotes engagement**)

### SESSION TWO and THREE

1. Have students share why latitude and longitude are helpful map tools. (It would be difficult to pinpoint a location on Earth without using a coordinate system?)
2. Review lines of latitude and longitude can be used to locate places on the Earth's surface. First, we look for how far north or south of the Equator a point is. Then we look for how far east or west it is of the Prime Meridian. (**Preparation: Linking to past learning**)
3. Project a world map such as this: <https://geoalliance.asu.edu/sites/default/files/maps/World-at.pdf> Distribute a copy to the students.
4. Model for the students how to find the countries on their maps. Demonstrate how the longitude lines curve due to the Earth being a sphere. Also say that you could give a range of latitude numbers and longitude numbers but for our purposes, just look for the center of the country. Practice finding locations by finding the latitude, then the longitude of the following countries. (**Scaffolding: Guided practice, Modeling**)

- United States (40°N, 100°W)
- Mexico (20°N, 100°W)
- Brazil (10°S, 60°W)
- Australia (30°S, 140°E)
- India (20°N, 80°E)

5. After the guided practice, have students identify the four coordinate planes on the world map by drawing on the Prime Meridian and the Equator. Discuss how this relates to finding points on a graph.

**Explain:**

6. Demonstrate the "Rags to Riches Game" to practice their knowledge about latitude and longitude. Have students access the game and play on their handheld devices. [https://www.quia.com/rr/2967.html?AP\\_rand=1172506353](https://www.quia.com/rr/2967.html?AP_rand=1172506353) (**Application: Promotes engagement, Scaffolding: Independent practice**)

**Elaborate:**

7. **Option:** If you have a subscription to Brain Pop, you can project and read a Related Reading on Coordinate Planes where it describes how an engineer in North Carolina realized that by dividing up the land into zones, he could map the state. (**Linking to background**).
8. Distribute and project the Where am I worksheet. Have students work in groups or individually to answer the questions. (**Assessment: Individual or Group, Written**)
9. If needed, have students complete the Location of Arizona Cities worksheet. (**Assessment: Individual or Group, Written**)

## Assessment

### Mathematics and Geography,

The Where Am I? worksheet can be graded for accuracy. A score of 80% or higher will be considered mastery.

The Vocabulary Test can be given to measure language acquisition. A score of 80% or higher will be considered mastery.

## Extensions

Group the students into 2 groups - X and Y. X will pick a number between 0-90°, and Y will pick a number between 0-180°. The X student will then pick a North or South. The Y student will pick an East or West. Then, they will create a coordinate plane using the ordered pair and mark it on the big world map. For Example: X picked 48° and North. Y

## Relationship of Latitude and Longitude to Coordinate Planes

picked 110° and West. The ordered pair is 48° North, 110° West. The students must then identify the location as to what waterbody or landform it is.

### Sources

- BrainPOP Video—  
<https://www.brainpop.com/search/?keyword=Latitude%20and%20Longitude>
- Rags to Riches Game  
[https://www.quia.com/rr/2967.html?AP\\_rand=1172506353](https://www.quia.com/rr/2967.html?AP_rand=1172506353)
- Vocabulary cards  
<https://www.theschoolrun.com/what-is-horizontal>  
<https://www.theschoolrun.com/what-is-vertical>

<http://www.land-navigation.com/latitude-and-longitude.html>  
[https://en.wikipedia.org/wiki/Meridian\\_\(geography\)](https://en.wikipedia.org/wiki/Meridian_(geography))  
<https://www.britannica.com/place/Equator>  
[https://web.cfa.harvard.edu/space\\_geodesy/ATLAS/positioning.html](https://web.cfa.harvard.edu/space_geodesy/ATLAS/positioning.html)  
<http://taylormath.pbworks.com/w/page/19602882/Coordinate%20Plane>