

RESOURCE LIBRARY
ACTIVITY : 1 HR

A Latitude/Longitude Puzzle

Students use latitude, longitude, and research on characteristics of different states and regions to solve a puzzle.

GRADES

3, 4

SUBJECTS

Geography

CONTENTS

2 Images, 3 Links, 2 PDFs

OVERVIEW

Students use latitude, longitude, and research on characteristics of different states and regions to solve a puzzle.

For the complete activity with media resources, visit:

<http://www.nationalgeographic.org/activity/latitudelongitude-puzzle/>

DIRECTIONS

1. Review latitude and longitude.

Remind students that cartographers long ago created a system of imaginary gridlines for the whole globe. The grid lines are called latitude and longitude. They are measured in degrees.

Project the Lines of Latitude diagram and invite a volunteer to point out the Equator. Ask: *What's the number next to this line? (0 degrees)* Explain that locations along this line all the way around the globe are at 0 degrees latitude. Lines of latitude measure the distance north or south of the Equator. Point out the lines to the north, labeled with an "N." Ask: *Which of these lines of latitude do you think are in the northern hemisphere? Which are in the southern hemisphere? How do you know?* Have volunteers come to the board and explain.

Project the Lines of Longitude diagram. Ask students to name the location of the prime meridian (0 degrees). The lines of longitude show locations to the east or west of the prime meridian.

2. Name locations on a map of the United States.

Next, give each student a printed copy of the MapMaker 1-Page Map of the United States. Ask: *Which lines are lines of latitude? Which are lines of longitude?*

Have students find New Orleans, Louisiana on their maps. Ask: *How could we name the location of this city using lat/long—short for latitude and longitude?* Have students move a finger along the lines at the point of the city to the margins and explain that it is at 30 degrees N latitude and 90 degrees W longitude. This pair of numbers is called the location's coordinates. Explain that some sites will not be so close to lines of latitude or longitude, so we estimate based on distance to the lines. For example, Denver, Colorado, is at 40 degrees N, 105 degrees W. The longitude measurement is about halfway between 100 and 110 degrees W.

Ask: *For what other places can we name the location using lat/long on this map?* Give students an opportunity to work in pairs to select 2-3 sites and identify the lat/long for them. Tell students to set the map of the United States aside—they will use it again later.

3. Have students practice using latitude and longitude.

Give each student a copy of the worksheet Earth's Grid System. Point out to students that the locations of latitude and longitude on the worksheet map are the same for any map or globe. Have them find Albuquerque, New Mexico on the worksheet. Ask:

- *Along what line of latitude is Albuquerque? (35 degrees N)*
- *Which two lines of longitude is it between? (105 degrees W and 110 degrees W)*
- *What degree longitude do you think it is, between 105 and 110? (It's in the middle but closer to 105, so about 107 degrees W.)*

Next, look at the MapMaker Interactive together as a class, and zoom in to find Albuquerque. Change the units of measure to decimals at bottom left. Put the cursor on Albuquerque and show students the lat/long measurement at the bottom left. Ask: *Is it close to 35 degrees N, 107 degrees W?* Explain that information on maps that we use on computers and global positioning systems (GPS) is all organized by lat/long. Depending on students' math level, have them round the decimals to whole numbers or use the decimals.

Have students complete the worksheet Earth's Grid System to practice finding locations using lat/long measurements. Check for understanding by reviewing the answers together as a class.

4. Have students apply their learning to a lat/long puzzle.

Explain that students will be using lat/long and some clues to solve a puzzle. Give each student a copy of the handout A Summer Day and have them retrieve the map of the United States from Step 2. Have students work independently to read the passage and follow the directions. Provide access to atlases and geography links such as 50states.com for students' research.

When students have identified the coordinates, completed their research, and identified the state they think is described in the passage, regroup as a whole class. First, focus on the coordinates that do not match the place characteristics in the paragraphs. Ask students for their ideas.

- A: Arizona—Students may respond that maple and oak trees are not common in Arizona.
- B: Montana—Students may respond that corn is not common in Montana.
- D: Florida—Students may respond that the air would probably not be cool in summer in south Florida, and there would be little need to stack firewood.

Both physical and cultural characteristics of Wisconsin fit the description. Explain that it is important to know where places are, but also to understand what those places are like. Have students complete the rest of the worksheet.

5. Have students create a puzzle with clues using a world map.

As a homework assignment, have students use the provided MapMaker 1-Page Map of the world or another map showing lat/long to create a similar puzzle. Have students identify three locations and write coordinates for each. Then have them use atlases and other resources to create three clues that describe one of those locations. Collect and check the puzzles for accuracy and understanding. Have them exchange their puzzles for additional practice with lat/long and characteristics of different places.

Tip

Point out that lines of latitude and longitude do not actually exist as lines drawn on Earth. They are imaginary lines used to communicate the exact location of places on Earth.

Tip

Provide several world maps and globes for students to study in groups of two or three. Have them look for lines of latitude and longitude, the prime meridian, and the Equator.

Informal Assessment

Check students' A Summer Day worksheets and the quizzes they create for the world map for understanding.

Extending the Learning

- Have students research the history of latitude and longitude as it was used by explorers. The means for measuring latitude was created much earlier, while longitude was much more difficult to measure. This difficulty resulted in many errors in early maps and explorations.

Have students create a timeline of advances in measuring latitude and longitude, including 20th century advances in geo-technologies, using websites such as the [PBS NOVA Teacher site](#) or [The Galileo Project](#) site.

- Have students explore the content on [The Degree Confluence Project](#) and look for places where people have used a GPS to find whole number coordinates in their state or a state or country of interest. Discuss the purpose of this project “to create an organized sampling of the world.” Have students find ten sites of interest, mark them on a state, country, or world map, and include a description of the places. Post these on a bulletin board for others to see the project.

OBJECTIVES

Subjects & Disciplines

Geography

Learning Objectives

Students will:

- identify locations on a map using latitude and longitude
- compare and contrast the characteristics of places to determine the likelihood of an event
- consider how the characteristics of a place influence our activities

Teaching Approach

- Learning-for-use

Teaching Methods

- Discussions
- Hands-on learning
- Visual instruction

Skills Summary

This activity targets the following skills:

- 21st Century Student Outcomes
 - Information, Media, and Technology Skills
 - Information, Communications, and Technology Literacy
 - Learning and Innovation Skills
 - Communication and Collaboration
- Critical Thinking Skills
 - Applying
 - Understanding
- Geographic Skills
 - Acquiring Geographic Information
 - Asking Geographic Questions

National Standards, Principles, and Practices

NATIONAL COUNCIL FOR SOCIAL STUDIES CURRICULUM STANDARDS

- Theme 3:

People, Places, and Environments

NATIONAL GEOGRAPHY STANDARDS

- Standard 1:

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

COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY

- Reading Standards for Informational Text K-5:

Integration of Knowledge and Ideas, RI.5.7

- Reading Standards for Informational Text K-5:

Integration of Knowledge and Ideas, RI.3.7

- Reading Standards for Informational Text K-5:

THE COLLEGE, CAREER & CIVIC LIFE (C3) FRAMEWORK FOR SOCIAL STUDIES STATE STANDARDS

• Geographic Representations: Spatial Views of the World: D2.Geo.1.3-5:

Construct maps and other graphic representations of both familiar and unfamiliar places.

Preparation

What You'll Need

MATERIALS YOU PROVIDE

- Atlases (1 per student or 1 per pair)

REQUIRED TECHNOLOGY

- Internet Access: Required
- Tech Setup: 1 computer per classroom, Projector

PHYSICAL SPACE

- Classroom

GROUPING

- Large-group instruction

BACKGROUND & VOCABULARY

Background Information

Understanding the latitude and longitude (lat/long) grid system allows students to communicate about any place on Earth. Lat/long is a form of global address. If you want to give an exact address on land, you can use street numbers and postal codes. Out at sea or deep in a wilderness it may be more difficult to describe location. Using degrees of latitude and longitude enables you to name an exact location.

There are many real-life applications for using latitude and longitude, including scientific research to track animal movements or getting directions using satellite technology when you are lost.

Prior Knowledge

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Recommended Prior Activities

- [Introduction to Latitude and Longitude](#)
- [Location and Place: A Geographic Perspective](#)

Vocabulary

Term	Part of Speech	Definition
cartographer	<i>noun</i>	person who makes maps.
coordinates	<i>noun</i>	a set of numbers giving the precise location of a point, often its latitude and longitude.
degree	<i>noun</i>	unit of measurement for latitude and longitude.
Equator	<i>noun</i>	imaginary line around the Earth, another planet, or star running east-west, 0 degrees latitude.
grid	<i>noun</i>	horizontal and vertical lines used to locate objects in relation to one another on a map.
latitude	<i>noun</i>	distance north or south of the Equator, measured in degrees.
longitude	<i>noun</i>	distance east or west of the prime meridian, measured in degrees.
map skills	<i>noun</i>	skills for reading and interpreting maps, from learning basic map conventions to analyzing and comprehending maps to address higher-order goals.
prime meridian	<i>noun</i>	imaginary line around the Earth running north-south, 0 degrees longitude.

For Further Exploration

Reference

- [National Geographic: Tracking Animal Migrations GeoStory](#)

Websites

- [The Degree Confluence Project](#)
- [Movebank–Animal Tracking Data](#)



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