

## 1.3 USING LATITUDE AND LONGITUDE



### FOCUS QUESTIONS:

- How do the invisible lines of latitude and longitude help us identify the location of places on earth?
- What other geographic variables contribute to the climate and 'quality of life' of a place or region?

## STANDARD #3 PEOPLE, PLACES AND ENVIRONMENTS.

### LESSON OVERVIEW:

After reviewing the concepts of latitude and longitude, students will apply their understanding by using the coordinates on a map to find various locations in Germany. Their comprehension will be further challenged in an activity designed to use higher level thinking skills to compare the latitude of German, American, and Canadian cities.

### TEACHER BACKGROUND INFORMATION:

Most geographic study begins with learning the location of places. Latitude and longitude help us to identify the absolute location of such places. The basics of latitude and longitude presented in this lesson are useful steps in determining not only where Germany is located in the world, but what environmental factors may influence its climate.

Lines of latitude measure distance north or south from the equator. The earth's equator measures at  $0^\circ$  latitude, and the geographic north and south poles each measure  $90^\circ$  north and south, respectively from the equator. Latitude is the most significant factor when assessing the condition of a locations climate. The climate of Germany (based on its latitude) is relatively moderate, without strong trends in cold or heat.

Longitudes (meridians) are measures which run north or south, converging at the north and south poles. The  $0^\circ$  line of longitude (Prime Meridian) passes through the Royal Observatory in Greenwich, England. Each longitude line is measured from one axis to another. Longitude lines running from  $0^\circ$  to  $180^\circ$  east and from  $0^\circ$  to  $180^\circ$  west can be thought of as dividing the Earth in half.

Any given area's climate is greatly influenced by its latitude. While other variables such as weather patterns and elevation have a large impact on any geographical area, latitude is probably the single most important determining factor. A discussion of climate in Germany must incorporate a discussion of the impact of the Gulf Stream, which tempers the climate of



Europe. Although located mostly at latitudes north of the United States-Canadian border and thus closer to the Arctic Circle than to the equator, Germany's climate is moderate and is generally without sustained periods of cold or heat. This is not what one would surmise if only the latitude and longitude coordinates were given.

**Source:** Lerner, Lee K., & Wilmoth Lerner, Brenda (Eds.) (2008). *The Gale Encyclopedia of Science*. (4th ed.) Detroit: Gale.

## TIME:

1-2 Class Period(s)



## INSTRUCTIONAL RESOURCES:

- Latitude and Longitude Maps (**Handout 1.3 A on Resource Disc**)
- Where in Germany Am I? (**Handout 1.3 B on Resource Disc**)
- German Cities Worksheet (**Handout 1.3 C on Resource Disc**)
- Comparison Chart: Latitude of German, American and Canadian Cities (**Handout 1.3 D on Resource Disc**)

## PROCEDURE:



### DAY 1:

#### Anticipatory Set:

- The teacher will ask the students to think about what types of nets they have seen or know of (fishing net, basketball net, hair net, soccer net, badminton, volleyball, or tennis net, bed netting, and the latest being the Internet!). The teacher will write the generated list on the board. When the list seems exhausted, the teacher should ask:
  - What do the nets have in common? What is the purpose of a net? To catch something so that it cannot escape?
  - What invisible lines have “netted” the globe, allowing every location to be found? (Latitude and longitude)
- The teacher should distribute *Where in Germany Am I?* (**Handout 1.3 B on Resource Disc**) and explain to the students that they will be traveling throughout Germany. The students should take a few minutes to “pack” 5 items that they will need on their trip. When their bags are packed, the students should share one packed item that is different from everyone else's until the list is exhausted.
- The teacher should distribute *Latitude and Longitude Maps* (**Handout 1.3 A on Resource Disc**) to the students and project it (or use another map of Germany). After a brief review of latitude and longitude, the teacher will locate Berlin and announce that Berlin's coordinates are 52°N 13°E. Next, the teacher will call upon students to use latitude and longitude coordinates to locate the cities that are at 50°N, 8°E (Frankfurt) and 51°N, 14°E (Dresden) and fill the information in on *Where in Germany Am I?* (**Handout 1.3 B on Resource Disc**). The teacher may elicit from the students the fact that all of Germany's coordinates are north latitude and east longitude.
- After handing out the *German Cities Worksheets* (**Handout 1.3 C on Resource Disc**) the teacher should assign the students either the city names and ask them to indicate the latitude and longitude or the coordinates and ask them to identify the city. The students should work together in pairs. Their assignment is to write the coordinates of as many German cities as they can.
- Partners will come to the front and give the coordinates of a city they found. The other students are to use their map to follow along and locate the city as well.

**DAY 2:**

- The teacher should either distribute **Comparison Chart: Latitude of German, American and Canadian Cities (Handout 1.3 D on Resource Disc)** or project the information. Students should analyze the data and begin to draw conclusions. They may share their thoughts with the class. When there are no more suggestions, the teacher may ask the following:
  - A. What might you be wearing if you were standing outside at:
    - 60°N latitude in January
    - 10°N latitude in February
    - 35°N latitude in July
    - 20°N latitude in August
    - 50°N latitude in July
  - B. If Germany could fit onto the North American continent, what country would it cover? (Canada)
  - C. If you lived in the southern part of Germany, what US state would share the same latitude? (Washington)
- The teacher should introduce the topic of climate in relation to latitude (latitude has a significant effect on the climate of a location). Introduce the country of Canada and its most populated cities (Toronto and Montreal). The teacher should ask the students why they think that fewer people live above the latitude lines of Toronto and Montreal. Examine Germany's latitude: what type of climate do the students think they would find there? Students should understand that areas further away from the equator tend to be cooler and that, except in places closer to the equator and those places with a higher elevation, temperatures are cooler in the winter and warmer in the summer.
- The teacher should have the students look at the physical map of the world (wall map or projected), and review the general climate patterns that occur as latitude increases, or discuss the seasonal temperature variations. [The teacher may also wish to use a colored map of **World Climate Patterns/Zones**.] The students should learn that areas further away from the equator tend to be cooler and that, except in places closer to the equator and those places with a higher elevation, temperatures are cooler in the winter and warmer in the summer. The teacher should also indicate that climate is often affected by more factors than just latitude and discuss the impact of the Gulf Stream on the climate of the European Continent.

**WHOLE GROUP REFLECTION:**

After using imaginary lines of latitude and longitude to help find locations on the globe, ask the students the following questions:

- What is the purpose of latitude and longitude?
- Does it affect the way we live?
- What do the coordinates tell us about a location?

**MODIFICATIONS:**

- Depending upon the students' background and understanding of latitude and longitude and geographic variables that contribute to climate, the teacher may wish to increase the time frame to 3 class periods.
- For homework, the teacher should instruct the students to draw an extra column on the **German Cities Worksheets (Handout 1.3 C on Resource Disc)** and list an appropriate souvenir purchase that they would make in each city.

**EXTENSIONS:**

- The teacher may wish for students to create a folder to contain the handouts and materials pertaining to geography. This could be called Geo-Gazetteer and the students could add the *Where in Germany Am I?* handout, and outline maps to this folder for future reference.
- The teacher may wish to require the following Individual Formative Assessment to evaluate student comprehension through the use of the Internet or other geography resources:

**Where Am I, At Home and In Germany?****Directions for the Tasks:**

- Take notes:
  1. Select your town or a city near you.
  2. Identify the latitude and longitude coordinates of that location in the United States.
  3. Select a city in Germany that you would like to visit someday.
  4. Identify the latitude and longitude coordinates of that location in Germany.
  5. For each of the sites that are selected in the U.S. and Germany, identify and name the climate zone, the location on a continent, the major wind patterns, significant landforms (mountains, proximity to bodies of water etc.), or other geographic variables that contribute to the quality of life in an environment.
- Complete a Venn diagram using the information notes.
- Write a letter to a German “friend.”
  1. Please consider all of your notes and your Venn diagram when you write a letter to a German student who is about your age.
  2. Tell your German friend about yourself, where you live, your “absolute location” and what is special about your “place” in the world.
  3. Ask your friend some questions about what to expect when you visit their special “place” in the world. What will be similar and what will be different about the environment and why?
- This is an English Language Arts activity demonstrating the use of social studies vocabulary by American literary giant, Mark Twain. The teacher may share the quote with the students and discuss its meaning as a group, or divide the students into groups of 3 to complete the analysis. Students need to interpret the quote and also explain what social studies knowledge is needed in order to make the interpretation. Each group can share its interpretation with the class. This exercise will help students to understand how learning the vocabulary of the social studies discipline will help them to understand and interpret literary works.

“When I’m playful I use the meridians of longitude and parallels of latitude for a seine, and drag the Atlantic Ocean for whales. I scratch my head with the lightning and purr myself to sleep with the thunder.” ~Mark Twain