Critical Thinking about GEOGRAPHY

United States, Canada, and Greenland

Jayne Freeman

WALCH EDUCATION®

1 2 3 4 5 6 7 8 9 10

ISBN 978-0-8251-6594-8

J. Weston Walch, Publisher

40 Walch Drive • Portland, ME 04103

www.walch.com

Printed in the United States of America

Contents

Introduction

Critical Thinking About Geography: United States, Canada, and Greenland includes a collection of map activities that engage students in opportunities to practice and apply the geography skills and concepts that they're learning. It contains 30 maps with 15 accompanying lessons. You may use these activities for whole-class, small-group, or individual instruction. A debriefing discussion after each map lesson provides an opportunity for students to reflect on their experiences and synthesize their thinking. It also provides an additional opportunity for informal assessment to assist instructional planning.

Implementation Guide

The following guidelines will help you prepare for and use the activity sets in this text.

Preparing for Instruction

Each lesson consists of instructional notes that provide background information about each map, answers to the student activity sheet, suggestions for debrief/discussion, and suggestions for extending and enhancing learning. Each map is reproducible; you should also make additional resources available to students. Prepare copies of student activity sheets (one copy per student in the class). Distribute any additional materials (if described in the instructional notes). To keep students engaged, have them record their answers on their own sheets of paper.

Timing the Activities

The activities are designed to take approximately 20–30 minutes per lesson. If time is short, you might plan on having students complete half of the activities in one session, and the rest of the activities on a different day. For longer time frames, have students complete a group activity such as creating their own map. It is helpful to give students a "five-minute warning" before it is time to gather for a debrief discussion.

Debriefing the Activities

After students have completed the activities as a whole class, small groups, or individuals, bring them together for a brief discussion. At this time, you might have students pose any questions they had about the activities. Before responding to individuals, ask if other students encountered the same difficulty or if they have a response to the question. The class discussion is also a good time to draw out the essential ideas of the activities. The questions that are provided in the teacher's notes for each activity set can serve as a guide to initiating this type of discussion. You may wish to collect the student activity sheets before beginning the class discussion. However, it can be beneficial to collect the sheets afterwards so that students can refer to them during the discussion. This also gives students a chance to revisit and refine their work based on the debriefing session.

National Geography Standards

The geographically informed person knows and understands . . .

Essential Element I. THE WORLD IN SPATIAL TERMS

Standard 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Standard 2. How to use mental maps to organize information about people, places, and environments in a spatial context.

Standard 3. How to analyze the spatial organization of people, places, and environments on Earth's surface.

Essential Element II. PLACES AND REGIONS

Standard 4. The physical and human characteristics of places.

Standard 5. That people create regions to interpret Earth's complexity.

Standard 6. How culture and experience influence people's perceptions of places and regions.

Essential Element III. PHYSICAL SYSTEMS

Standard 7. The physical processes that shape the patterns of Earth's surface.

Standard 8. The characteristics, distribution, and migration of human populations on Earth's surface.

Essential Element IV. HUMAN SYSTEMS

Standard 9. The characteristics and spatial distribution of ecosystems on Earth's surface.

Standard 10. The characteristics, distribution, and complexity of Earth's cultural mosaics.

Standard 11. The patterns and networks of economic interdependence on Earth's surface.

Standard 12. The processes, patterns, and functions of human settlement.

Standard 13. How the forces of cooperation and conflict among people influence the division and control of Earth's surface.

Standard 14. How human actions modify the physical environment.

Essential Element V. ENVIRONMENT AND SOCIETY

Standard 15. How physical systems affect human systems.

Standard 16. The changes that occur in the meaning, use, distribution, and importance of resources.

Essential Element VI. THE USES OF GEOGRAPHY

Standard 17. How to apply geography to interpret the past.

Standard 18. How to apply geography to interpret the present and plan for the future.

LESSON 1

Reading a Political Map

Goal: To develop concepts and skills related to obtaining information from a political map

National Geography Standards

Standard 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Preparing Students for Instruction

Before starting the first activity, review the following with students:

- Make sure students understand how to read a map legend.
- Review measuring distance using a map scale.

Map Overview

This political map of the United States shows state boundaries and capital cities. Alaska and Hawaii are included in separate boxes in the lower left part of the map.

Answer Key
1. Texas and California (in either order)
2. Texas, Louisiana, Mississippi, Alabama, and Florida (from west to east)
3. Cuba, Bahamas, and Haiti
4. Juneau, Alaska, and Montpelier, Vermont; some may also list Augusta, Maine
5. The distance is greater from Austin to Pierre than it is from Trenton to Springfield.
6. Answers will vary. Some possibilities are: - The two states are alike in that they both are separated from the mainland of the United States. - They are also alike in that both are located in or near the Pacific Ocean. - The two states are in different locations. Alaska is close to Canada and Hawaii is in the Pacific Ocean. - They are also different in that one is a group of islands and the other is a peninsula, attached to land on one side.
7. Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, and New York (in any order)
8. Answers will vary. Jobs may include anything related to water activity, such as the loading and offloading of ships, ship's captain or crew, guide for tourist boat trips, boat and ship construction and repair, and customs officer.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. When would you be likely to use a map scale?
2. If you wanted to add other items to the map legend of this political map, what would you add, and what would be the symbols?
3. What are possible uses of a political map?

Suggested Appropriate Responses

1. Map scale uses include: for planning a trip, to compare the distance between locations, or to compare the sizes of certain states.
2. Answers will vary. Have students draw their map legend symbols on the board. Major rivers could be added to the map. (Remind students that blue is the traditional color for water on a map.) A symbol for cities within each state that are not capital cities might be added to the map. County boundaries within states could be added. A symbol for cities over a certain size in area or population could be added. *Note:* Students should not suggest symbols such as forests, mountains, or highways that more properly belong to other types of maps.
3. Uses of a political map include: to compare the size and location of states within a country, to identify the capital cities of a state, or to discover which states are landlocked and which states border a body of water.

Extending and Enhancing Learning

- Have students work in groups to create a political map of an imaginary country. Give them specific criteria for their maps, such as the following:
  - Each state or province must have a capital city.
  - Each country must have a certain number (5–10) of states or provinces, at least one lake, and borders with at least one other country.
  - Each map must have a map legend and map scale.
  - Students can create a name for their country, and the adjoining countries and bodies of water.
  - They can create names for capital cities, including the capital of the country.
- After making their maps, have student groups create 3–5 questions about their map. Each group exchanges their map with another group, and answers the questions by reading the map. Verify correct answers by having groups create an answer key to be given only after the questions are answered. Display completed maps in the classroom.

- For students who need more support, have them work in pairs or small groups to practice reading the map. To encourage students to look closely at the map, have them play a map-reading *Jeopardy!* game, using the map to find the answers. Use the following *Jeopardy!*-type answers/questions, or others of your choice:
  - State capitals that start with the letter *S* (What are Salem, Sacramento, Salt Lake City, Santa Fe, St. Paul, and Springfield?)
  - State names that start with *M* (What are Missouri, Mississippi, Montana, Minnesota, Michigan, Maryland, Massachusetts, and Maine?)
  - This state is bordered by two different bodies of water (labeled on the map), one on either side. (What is Florida?)
  - The bodies of water that surround Florida (What are the Atlantic Ocean and the Gulf of Mexico?)
  - Ten states that have two words in their names (What are North Dakota, South Dakota, New Mexico, North Carolina, South Carolina, West Virginia, New Jersey, New Hampshire, Rhode Island, and New York?)
  - Nine state capitals that have two or more words in their names (What are Carson City, Salt Lake City, Santa Fe, Oklahoma City, St. Paul, Des Moines, Jefferson City, Little Rock, and Baton Rouge?)
- Groups or pairs can "race the clock" to see who finishes first with the most correct answers. Have student groups write down their responses, and when everyone is done, call on volunteers to read their answers.
- To challenge students further, have them go online, download, and print a political map of another country. Have them answer questions about their maps, such as: what countries border this country; what bodies of water are on this map; what is the distance from the eastern border of this country to the western border, and the border distance from north to south; and what are the names of states or provinces? Students may also create questions about their maps and exchange with other students as in the first group activity listed on the previous page.

Name: _____

LESSON 1

Reading a Political Map

Geography Vocabulary

map legend: a table that explains symbols used on a map

map scale: a ratio that compares a distance on the map to the actual distance between locations

political map: a map showing a country's political divisions (such as states, provinces, and territories), boundaries, and capitals

Reading the Map

Look at the political map of the United States. This map shows all 50 states and their capital cities. It also shows bodies of water and the countries that border the United States. Note the map legend. The legend shows what kind of lines divide states and which divide countries. Symbols for capital cities and the national capital are noted. Look at the map scale. It shows how many inches (or centimeters) on this map equal how many miles or kilometers in the real world.

Understanding the Map

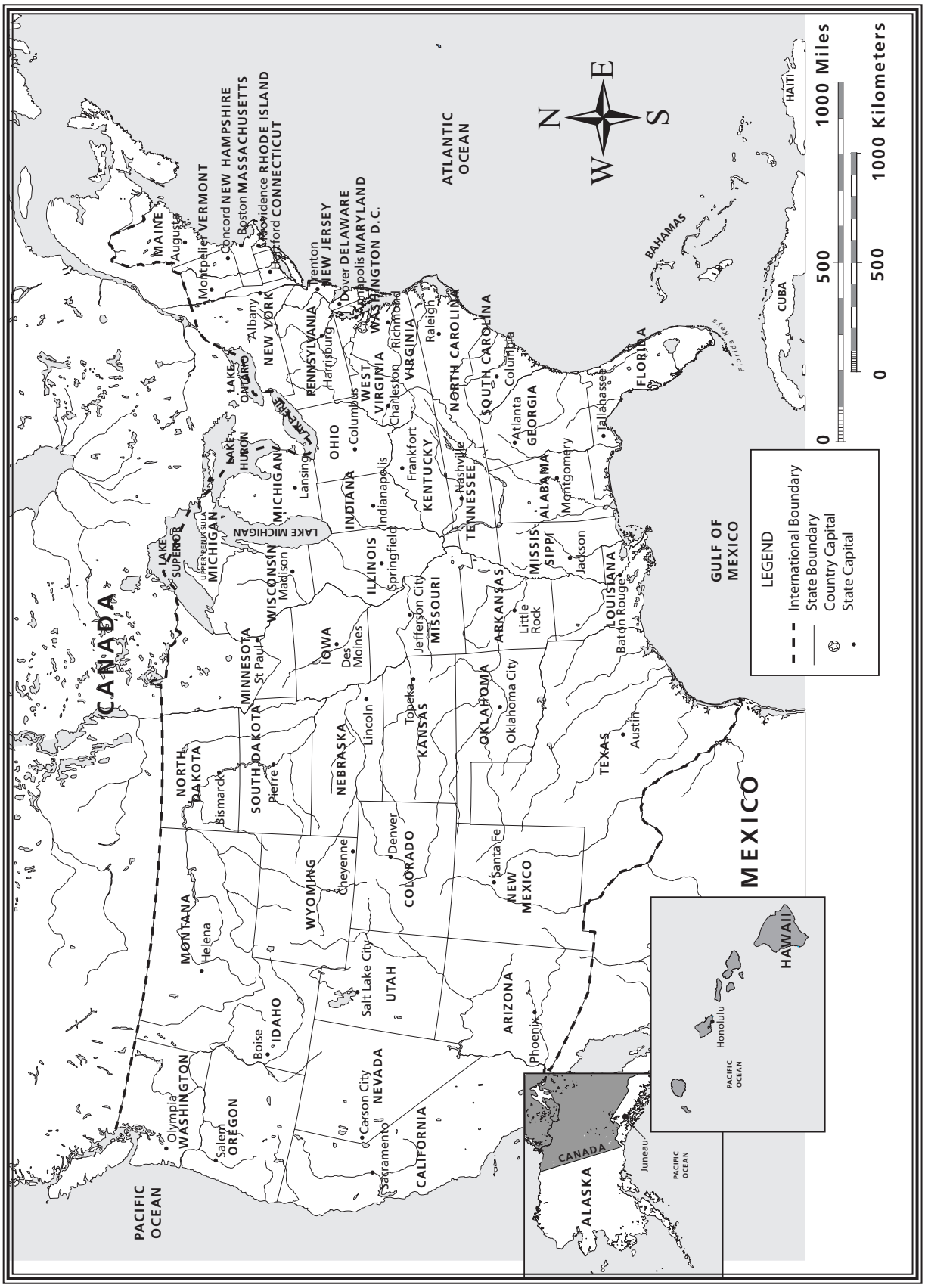
1. Use the map scale. Find and list two states that are approximately 1200 km or 744 miles in length from their northern border to their southern border. (*Hint:* You must measure each of these states on a slight diagonal rather than straight up and down.)
2. List all the states that border the Gulf of Mexico. List them in order from west to east.
3. Besides Canada and Mexico, what other countries are on the map?
4. Name two states whose capital cities are very close to another country (within 100 miles). Name the city and the state.

Analyzing the Map

5. Using the map scale, determine which distance is greater: from Austin, Texas, to Pierre, South Dakota, or from the capital of New Jersey to the capital of Illinois. Name all four cities in your answer, for example, "The distance is greater from X (city name) to Y (city name) than it is from A (city name) to B (city name)."
6. Using only information given on this map, compare and contrast what this map shows about the states of Hawaii and Alaska. Tell two ways the two states are different from each other, and two ways they are similar to each other.
7. List the states that border the Great Lakes. Underline the states located near the lakes that form a national border with Canada.
8. What jobs might a person have in states that border a body of water that would not be found in a "landlocked" state such as Missouri?

Name: _____

Political Map of the United States



LESSON 2 Using the Legend and Compass Rose to Obtain Information from a Site Map

Goal: To develop concepts and skills related to using a map's legend and compass rose to get information from a site map

National Geography Standards

Standard 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Preparing Students for Instruction

Before starting this activity, review with students the skills of using a legend and a compass rose.

Map Overview

This map shows the site of an RV park in detail. When introducing this map, tell students that site maps like this are common in everyday life. There are site maps of shopping malls, apartment complexes, hotels, state parks, and more. Your school may have a site map for visitors, so they can find the classroom they are visiting. Students may be able to name different site maps they have seen or used. With a site map, reading the legend is crucial because each map has its own symbols. This map also has a compass rose. Students will work with the compass rose as well as the legend.

Answer Key
1. Pet walk, wetlands, pond, and turnaround
2. The Dumpster at the western end of the park is between RV sites 54 and 55.
3. Restroom, shower, laundry, newspaper, and telephone. The facilities are accessible to the handicapped.
4. Northeast
5. Restroom, shower, laundry, newspaper, and telephone; these facilities are not handicapped accessible.
6. Southeast
7. They are near the restroom, shower, laundry, telephone, and newspaper.
8. Sites 29 through 54 because they are near the pet walk
9. They are all close to the river, and scenic.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. If your family had an RV and came to this park, which site would you want? Why?
2. Do you think this park is well designed? Why?
3. What other symbols might be added to the legend?

Suggested Appropriate Responses

1. Answers will vary. Accept all reasonable responses, such as closeness to facilities, pet walk, or Dumpster, or closeness to a scenic area beside the river.
2. Answers may vary from "No, because the sites are too close for privacy" to "Yes, because everything you need is not far away from any site."
3. Possible answers include symbols for the pet walk, pond, wetlands, and turnaround. Have volunteers draw appropriate symbols on the board for the items they would add to the legend.

Extending and Enhancing Learning

- Have each student create a site map of the classroom or of their neighborhood. Instruct students to include a legend. Then have students write four or five questions about their maps, leaving space for answers, and exchange their maps and questions with other students. Students answer the questions, and the student who wrote the questions corrects those answers.
- For students who need more support, ask a series of additional questions about the map to give them more practice using the legend and compass rose. For example, "The Dumpster in the southeast corner of the park is near what numbered site?" or "The facilities close to the highway are in what part of the park? Use the compass rose in your answer."
- To challenge students further, have them research the history of the compass rose, write a brief report, and draw an artistic compass rose to accompany their reports.

Name: _____

LESSON 2 Using the Legend and Compass Rose to Obtain Information from a Site Map

Geography Vocabulary

compass rose: an element of a map used to show direction

Reading the Map

Look at the site map of an RV park. This map shows numbered parking places for RVs and also shows the location of some facilities within the park.

Understanding the Map

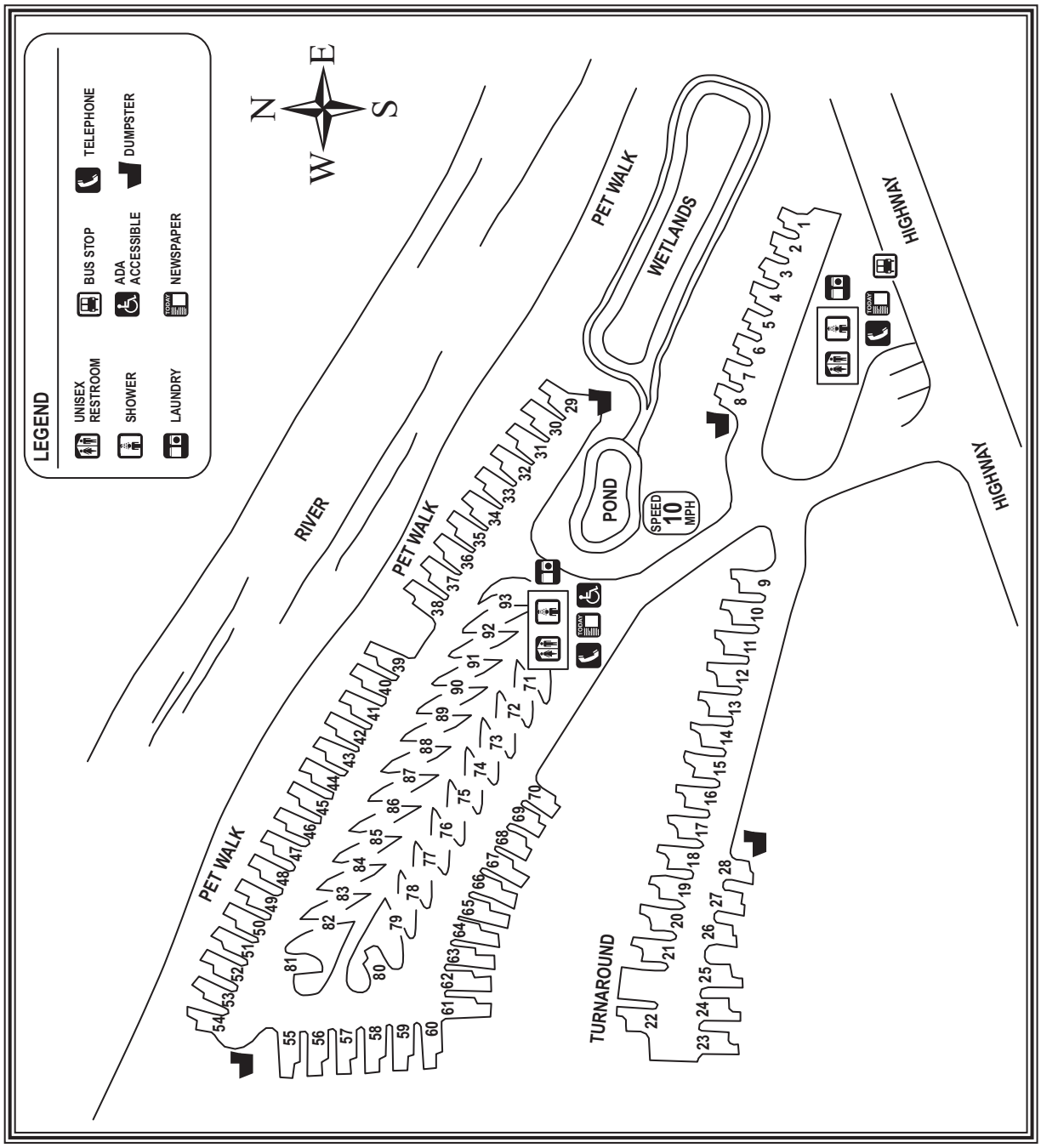
1. What areas in the park, besides the RV parking slots, are not included in the map legend?
2. Use the legend and compass rose. Find the Dumpster at the west end of the park. Between what two numbered RV sites is it located?
3. What facilities are clustered together in the center of the park?
4. If you took your dog for a walk along the pet walk, and stopped halfway, turning to look at the river, in what direction would you be facing?
5. If you stood at the bus stop, waiting for a bus, what park facilities would be just behind you? Are they handicapped accessible?

Analyzing the Map

6. If your RV was in site 34, in what direction would you walk to find the closest Dumpster?
7. Why do you think someone might request sites 71 or 93?
8. What sites would a pet owner probably prefer? Why? Phrase your answer as a range of numbers such as "sites 1–10," followed by your reason for the choice.
9. For what other reason might someone request those same sites?

Name: _____

Site Map of RV Park



LESSON 3

Finding Places in the World: Latitude and Longitude

Goal: To develop concepts and skills related to latitude and longitude and their uses on a map and in the real world

National Geography Standards

Standard 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Preparing Students for Instruction

Before starting this activity, review with students the names of the continents and review the concepts of latitude and longitude.

Map Overview

Students will examine maps of the world and the United States with latitude and longitude lines. They will use map coordinates to find specific locations.

Answer Key
1. Europe, Africa, and Antarctica
2. Brazil
3. Greenland
4. Answers will vary. Some possibilities are for navigation, to locate a particular place on the earth, to calculate the distance between places, and for travelers to know where they are and where they are going.
5. You would be wearing a warm hat, gloves, and a warm coat. You would be in Alaska.
6. You would be dressed even more warmly. That location is near Antarctica.
7. Summer clothing: shorts, sundresses, etc. You would be in Australia.
8. 27°N and 80°W would be better for a beach vacation, because it's on the coast of Florida. 40°N and 105°W would be better for skiing, because it's near Denver, Colorado.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. How do people today use Global Positioning Systems (GPS), which are based on latitude and longitude? (If possible, show students a hand-held GPS device. Program it to show the latitude and longitude of the classroom.)
2. How do latitude and longitude help sailors at sea?
3. What other uses can you think of for latitude and longitude?

Suggested Appropriate Responses

1. GPS devices that use latitude and longitude are in many cars to help drivers find their destinations. Handheld GPS devices show people the exact latitude and longitude of where they are when they are on a recreational walk, hike, bike, or boating trip. Owners and installers of TV and Internet dishes that access satellites use their current latitude and longitude to aim the dish at the satellite.
2. Sailors need to know where they are on an ocean with no landmarks. They need to sail in the correct direction to get to their destination. Knowing latitude and longitude makes this possible.
3. Answers will vary. Latitude and longitude are used for map making. Legal documents such as for ownership of property describe the land in terms of latitude and longitude. The exact latitude and longitude can help you locate any place you want to go.

Extending and Enhancing Learning

- Have students play a latitude/longitude Treasure Hunt game. Divide students into teams. They are to imagine that they are looking for buried treasure. They have a page of clues. All the clues are in the form of the latitude and longitude of specific major U.S. cities. The first letter of each city will spell out the name of the city where the treasure is located. Give teams the student page map of the United States with the treasure hunt's latitudes and longitudes below it. Have them estimate city locations when they are not precisely on the map's lines. The first team to detect the name of the place where the treasure is located is the winner. Coordinates to use for the game: 32°N, 86°W (Montgomery); 61°N, 150°W (Anchorage); 39°N, 104°W (Denver); 39°N, 86°W (Indianapolis); 35°N, 105°W (Santa Fe); 46°N, 122°W (Olympia); 36°N, 86°W (Nashville). The first letters spell MADISON (Wisconsin), where the treasure would be found.
- For students who need more support, have them work in pairs to play a latitude/longitude game called "Where Am I Now?" One person looks at the map, possibly the student U.S. map, and finds a city's location in latitude and longitude numbers. Tell students to be sure to add east or west, north or south to the hints about the location. The second person must find this location on the map. Students change places and play again. One point is earned for each correct location.
- To challenge students further, have them research the historic problem of ships at sea not being able to calculate longitude without a clock. A large prize was offered for the first person to devise a clock that was completely accurate and could be carried on a ship. Students write a presentation for the class and present it.

Name: _____

LESSON 3

Finding Places in the World: Latitude and Longitude

Geography Vocabulary

equator: the imaginary great circle around the middle of the earth's surface; the line of latitude numbered zero

Global Positioning System (GPS): a global satellite navigational system

latitude: imaginary circles on the earth's surface, parallel to the equator and above and below it

longitude: a series of imaginary lines on the earth's surface passing through the North and South poles

meridian: a line of longitude; an imaginary great circle on the earth's surface passing through the North and South poles

parallels: lines of latitude; imaginary circles on the earth's surface, parallel to the equator and above and below it

prime meridian: the line of longitude numbered zero

Tropic of Cancer: a line of latitude 23 degrees north of the equator

Tropic of Capricorn: a line of latitude 23 degrees south of the equator

Reading the Maps

Look at the world map. This map shows lines of latitude and longitude that help find places on the earth. Lines of latitude are also called parallels. The lines run parallel to the equator and are numbered north and south of the equator. The equator is the zero line of parallels. Crossing those parallels are lines of longitude, also called meridians. These lines run north and south through the poles. Lines of longitude are numbered east and west of the zero meridian, which is called the prime meridian. Find these places on the map before you begin the activities that follow: Tropic of Cancer, equator, Tropic of Capricorn, and the prime meridian. Lines of longitude are always named as east or west of the prime meridian. Lines of latitude are labeled as north and south of the equator. Use the world and U.S. maps showing latitude and longitude to answer the questions.

Understanding the Maps

1. The prime meridian runs through which three continents?
2. What country is at the intersection of the equator and 60° W?
3. Where in the world would you be if you found yourself at 45° W and 65° N?

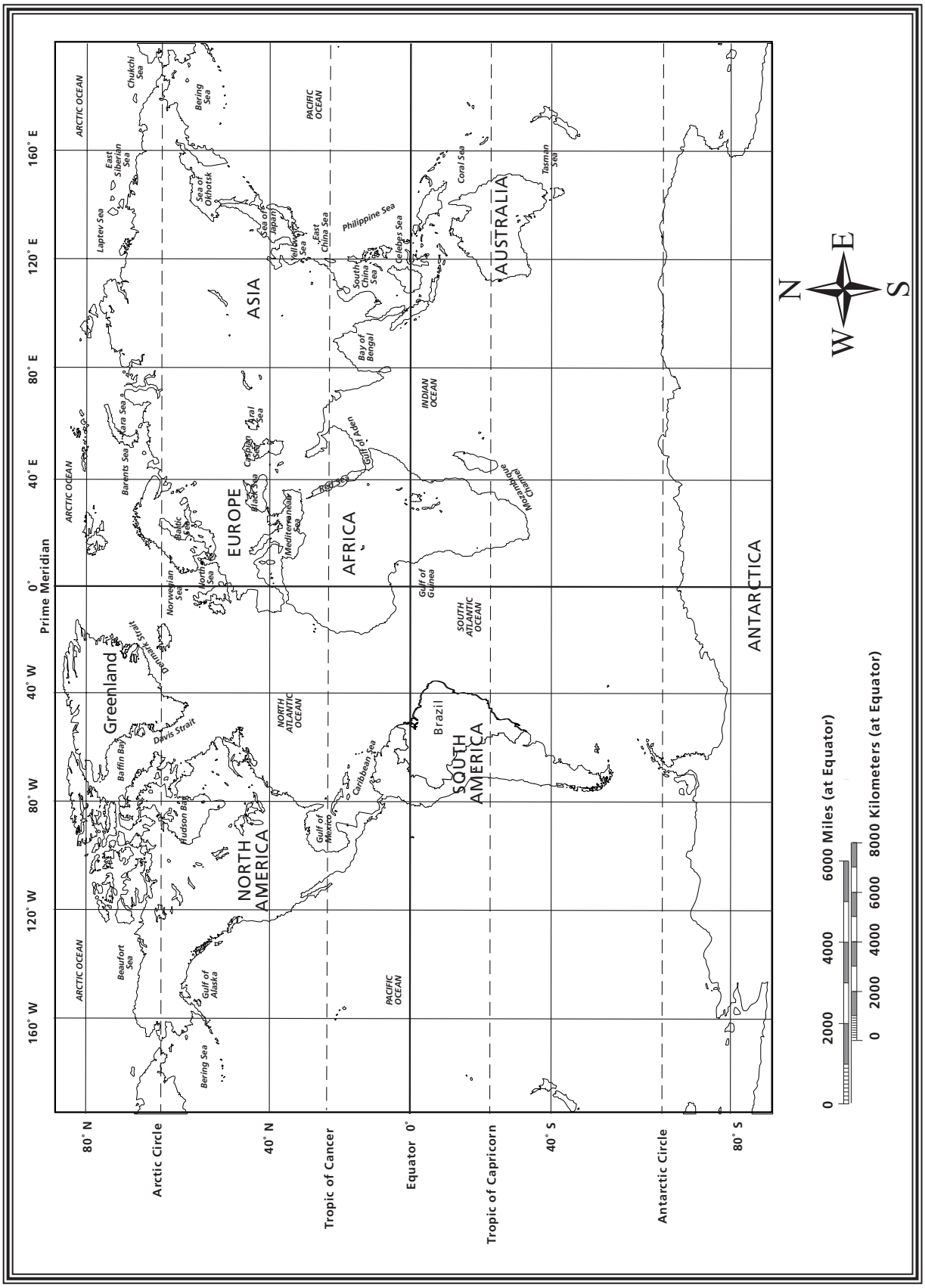
Name: _____

Analyzing the Maps

4. Explain why you think lines of latitude and longitude were added to maps and globes.
5. The weather is usually warm close to the equator. The farther you go north or south of the equator, the more likely it is that you will find yourself in cooler weather. How might you be comfortably dressed in November if you were at 60° N and 150° W? Explain. Where would you be?
6. How would you be dressed if you were at the opposite, 60° S and 150° E? Explain. About where would you be?
7. In North America, June through September is summer. December through March is winter. Seasons are reversed south of the equator. What kind of clothes would you pack to travel to 30° S and 135° E in January? Explain. About where would you be?
8. Look at the United States map. Which location would be best for a beach vacation: 27° N and 80° W, or 40° N and 105° W? Which would be better for skiing? Explain your answers.

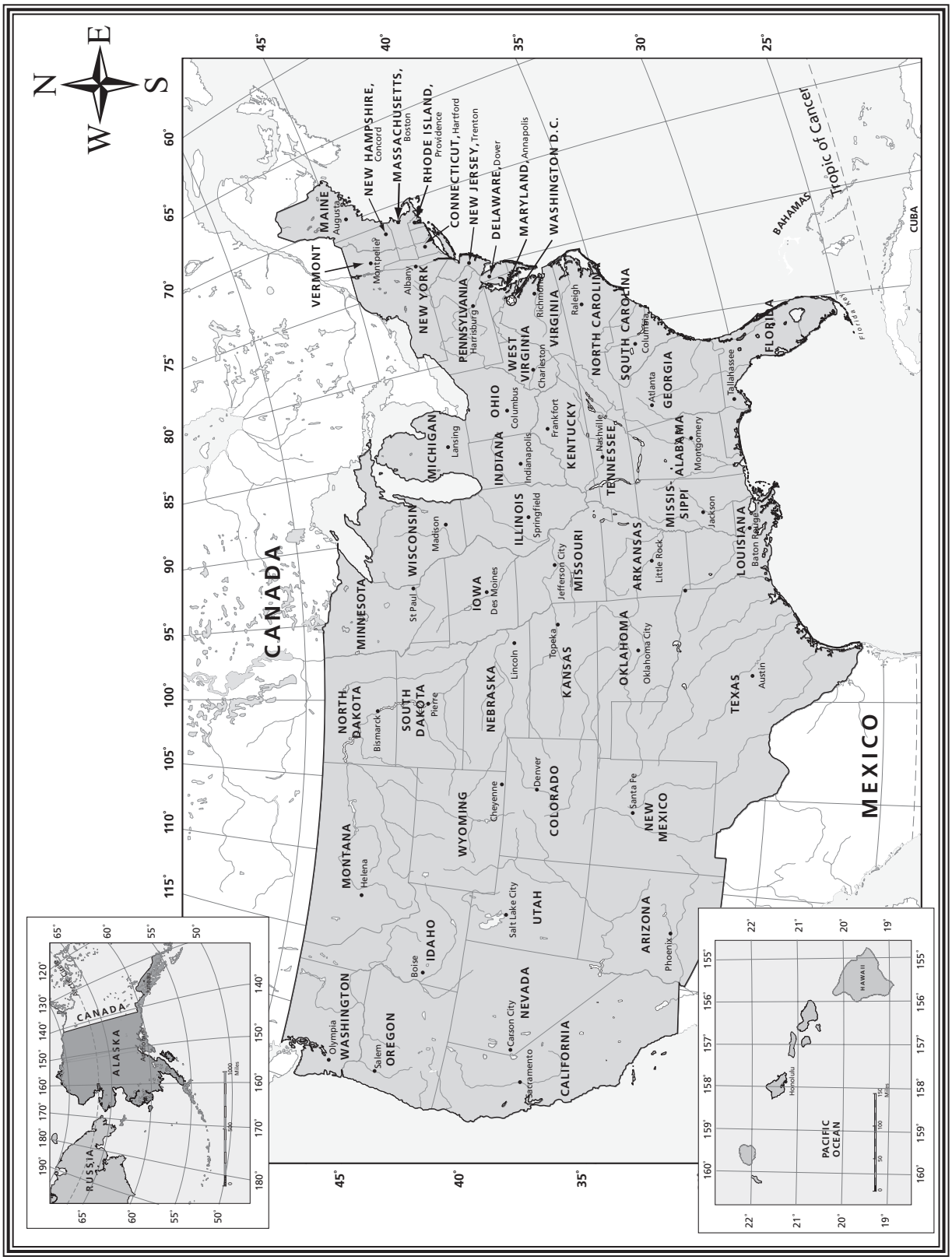
Name: _____

Map of the World Showing Latitude and Longitude



Name: _____

Map of the United States Showing Latitude and Longitude



LESSON 4

Understanding Map Projections

Goal: To develop an understanding of different kinds of map projections and their uses

National Geography Standards

Standard 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Preparing Students for Instruction

Before starting the first activity, review the following terms with students:

equator: the imaginary great circle around the earth's surface

lines of latitude: lines around the globe equidistant from the equator and north or south of it

lines of longitude: lines around the globe that pass through the North and South poles

Map Overview

Maps are flat representations of a round planet. As a result, all maps are distorted. The kind of distortion varies depending on how the maps are created. All maps will have some kind of inaccuracy. The Mercator projection is a kind of map widely used for ship navigation. Its straight lines correspond to the great circle lines of a globe. The Mollweide projection is a kind of map that accurately depicts land areas.

Answer Key
1. Larger
2. Australia
3. The Mercator. (On the Mollweide, the areas enclosed by the intersection of meridians and parallels are not all the same size, and they also are not rectangles.)
4. Answers may vary. Students should notice that the lines of latitude are straight in both projections. In the Mollweide projection, the lines of longitude are curved. In the Mercator projection, lines of longitude are straight. The areas formed when parallels and meridians meet are not identical to each other in either projection.
5. The distance is greater on the Mollweide projection. Observations may vary.
6. The map with the correct latitude would help you accurately find your destination. The drawback would be, with land areas distorted, you wouldn't know how far a distance you had to travel.
7. The ranger is responsible for a relatively small area, and the people he or she is helping don't travel very far within the park. He or she would benefit most from a map that shows accurate land areas.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. The area of Greenland is about 2 million square kilometers. The area of Australia is about 7.6 million square kilometers. Based on this information, which of the two map projections more accurately depicts area?
2. What uses can you think of for the Mercator projection? Why would people use this map?
3. What uses can you think of for the Mollweide projection?
4. What did you learn about mapmaking from the activity with the orange? (See Extending and Enhancing Learning section below.)

Suggested Appropriate Responses

1. The Mollweide
2. Answers may vary but should include that because the lines of latitude are straight and accurate, travelers might use this map to get from one place to another.
3. Since land masses are accurate in the Mollweide projection, people might use this map to compare areas of land in terms of agriculture or for business.
4. Awareness of the difficulty of trying to portray a round object on a flat surface

Extending and Enhancing Learning

- Have students work in groups. Give each group an orange and a permanent marker. Tell them their orange represents the earth. Have them draw the equator, and a line of longitude in a complete circle on the orange. Then have group members draw continents on the map. Have students carefully peel the orange (in a single piece if possible), and lay the skin on the table. Tell students to try to lay the peel out as flat as they can. Have them note that the flattened peel shows some distortion. This is the problem faced by mapmakers. Discuss other observations.
- For students who need more support, have them work in pairs to study the two projections and make a list under two headings (Mercator and Mollweide) of what they observe. Lists may include the names of continents and oceans, the names of the lines of latitude and longitude, and which lines are straight and which are curved.
- To challenge students further, have them look up "map projections" on an Internet search engine. Instruct them to choose one projection and study its history: how, why, and when it was created and how it is used. Then have students write a report on this projection, share the report with the class, and display it in the classroom.

Name: _____

LESSON 4

Understanding Map Projections

Geography Vocabulary

continents: the major land masses on the earth

distortion: a change in the shape of an image resulting from imperfections in portraying it

map projection: an attempt to portray the surface of the earth or a portion of the earth on a flat surface

Reading the Maps

Look at the first three drawings. They show three ways of making a map by projecting a light through a globe onto a flat surface. Maps are two-dimensional ways of showing all or part of our three-dimensional planet. That is, maps are flat and the earth is a globe. No map can show an area as accurately as a globe. Some maps distort the shape or size of the land masses. Other maps distort distances.

Now compare the two maps on the page following the drawings, the Mercator projection and the Mollweide projection. The Mercator is a cylindrical projection. The Mollweide is called a "pseudo-cylindrical" projection. Look at how North America and Greenland are displayed on both maps. If possible, compare an area on both maps to the same area on a globe.

Understanding the Maps

1. Look at Greenland on the Mercator projection. Does it appear to be larger or smaller than Australia?
2. Now compare Greenland and Australia on the Mollweide projection. Which is larger?
3. On which map do the lines of latitude and longitude make rectangles that are not all the same size?
4. What differences do you note between the two maps?

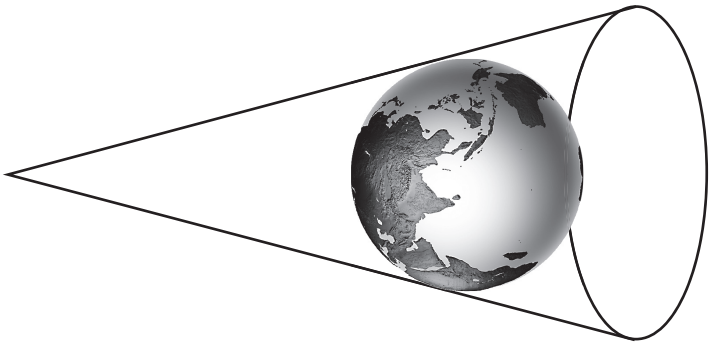
Analyzing the Maps

5. Using a ruler, measure the distance between 120 degrees (longitude) west and 120 degrees east on both maps. Which map shows the greater distance? Explain your observations.
6. If you were traveling from Phoenix, Arizona, to Little Rock, Arkansas, what would be the advantages of using a map that distorted land areas but had accurate lines of latitude? What would be the difficulties of using this map? Explain the reasons for your answer.
7. If you were a forest ranger in charge of park visitors who were camping and hiking, would you use a map that distorted distances but had accurate land areas? Explain your answer.

Name: _____

Types of Map Projections

Planar Projection Surfaces

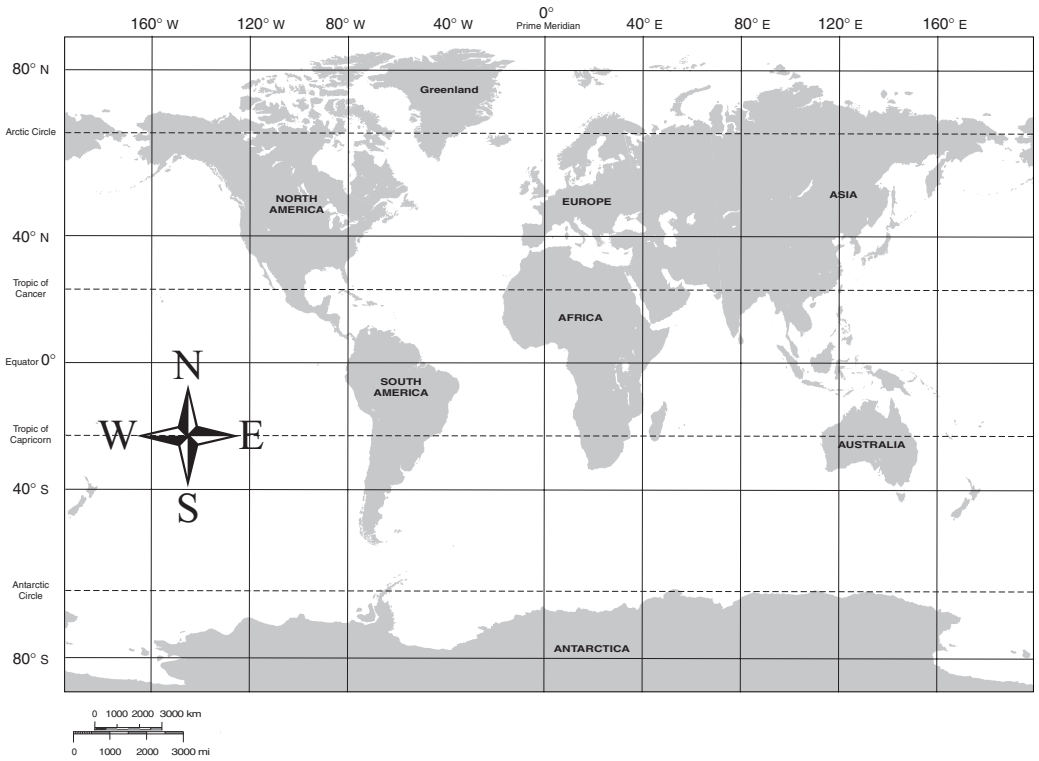


Conical Projection Surface

Secant Cylindrical Projection

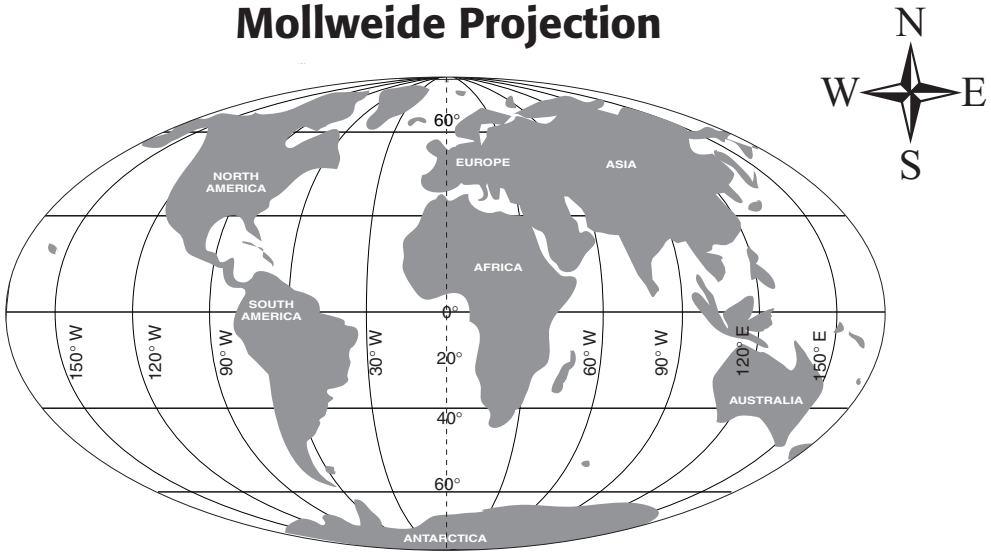
Name: _____

Mercator Projection



On the Mercator projection (above), lines of latitude and longitude meet at right angles. Mercator maps are often used by ships at sea to calculate a course, because all the straight lines are accurate as to direction. The Mercator projection does not show the size or area of land masses correctly.

Mollweide Projection



The Mollweide projection is often used for world maps. It shows the area of land masses accurately.

LESSON 5

Mountains and Valleys: Reading a Physical Map

Goal: To develop concepts and skills related to reading a physical map and inferring information from the map

National Geography Standards

Standard 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Standard 3. How to analyze the spatial organization of people, places, and environments on Earth's surface.

Preparing Students for Instruction

Before starting the first activity, review the following with students:

- Review concepts of landforms: mountains, deserts, valleys, plateaus, rivers.
- Make sure students understand how to use the map legend to identify areas on the map.
- Review the use of a compass rose to determine direction. Remind students that most maps are oriented with north at the top of the map.

Map Overview

Physical maps help us understand the features of an area, which may determine lifestyles and cultures, modes of transportation, needs, and products.

Answer Key
1. The landforms of an area, such as mountains, valleys, and/or deserts
2. Cascade Range
3. West
4. Baffin Bay
5. Answers will vary but may include the land around Hudson Bay and the narrow strip of land on the southern west coast of Canada.
6. Answers may vary, but the United States will likely be selected because of its many rivers that supply water for inhabitants, and large areas of flat land where food can be grown.
7. First you would have to cross a mountain chain, then go around Great Slave Lake, go around or across Hudson Bay, and arrive at your destination either by ship or by airplane, as Iqaluit is on an island.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. What can we learn from a physical map?
2. When would someone use a physical map?
3. How can a physical map give clues to the location of settlements in an area or country?

Suggested Appropriate Responses

1. We can learn about the landforms within a country, state, or province. We can learn the distribution of water sources, mountains, deserts, plains, and valleys.
2. Answers will vary. A physical map could be used by engineers planning highways or buildings. It could be used by a traveler to determine the shortest or most convenient route (in combination with a highway map). It could be used by settlers searching for a place to start a community.
3. Certain areas are better for settlement than others. Climate, transportation, food, and water sources are all important factors. The isolated islands of northern Canada do not have any cities or large settlements because they are remote and the land is unsuitable for growing food. Settlements usually spring up near water sources such as lakes and rivers. Ideally, they are located in mild climates and in places where the land is relatively flat.

Extending and Enhancing Learning

- Have students work in groups to create "planned communities" using one of the physical maps. Assign each group a different quadrant of either the U.S. or the Canadian map. Print out and distribute quadrants to each group. Direct groups to imagine they are settlers in the 1800s who have arrived in this land. They can travel to whatever area they select. They must decide the best location to grow their own food, build houses using local material, and have a supply of fresh water. When finished, each group is to report on the location of their community and the reasons for their choice. They should tell what food and water sources may be available and what materials will be used to construct houses and other buildings.
- For students who need more support, have them work with a partner as "travel agents." Imagine they have customers who want to travel from one area to another. Use the map of the United States and assign each pair certain starting points and destinations. Students will measure the distance using the map scale. They will report to their "customers" on how far the trip will be and which landforms must be crossed to get to each destination. Which customers will have to cross mountains or deserts to get to their destinations?
- To challenge students further, have them make physical maps of imaginary countries. Maps must include lakes, mountains, deserts, plains, and rivers. Instruct students to decide where cities are most likely to develop, and mark each city with a dot and a made-up name.

Name: _____

LESSON 5

Mountains and Valleys: Reading a Physical Map

Geography Vocabulary

physical map: a map that shows landforms

plateau: an area of flat land raised above the surface of surrounding land

valley: an area of land that is drained or irrigated by a river

Reading the Maps

Look at the physical maps of the United States and Canada. These maps show features of the land including mountains, deserts, plateaus, and valleys. Find lakes and major rivers shown on each map.

Understanding the Maps

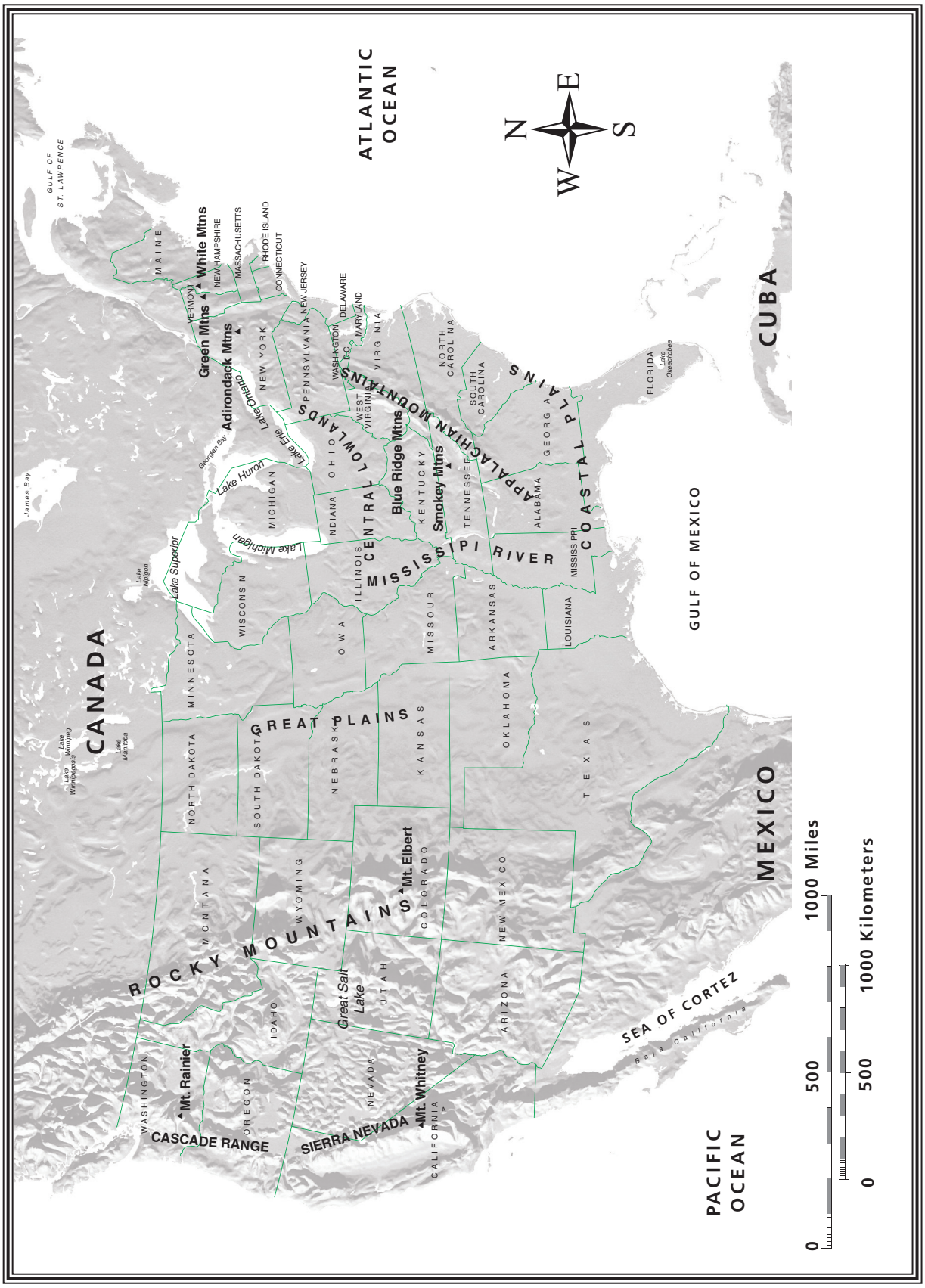
1. What features are on a physical map?
2. Which mountain range runs north-south through Washington state and Oregon?
3. Are the mountainous areas of the United States mostly in the east or the west?
4. Look at the map of Canada. What is the name of the body of water off the northeast coast of Baffin Island?

Analyzing the Maps

5. Some landforms are hard to live in. People tend to settle where they can obtain food and water. What parts of Canada appear likely to have settlements? Give reasons for your answer.
6. Compare the maps of Canada and the United States. Look at the landforms on each map. Based on what you see on these maps, which country is likely to have the largest population? Give reasons for your answer.
7. Look at the map of Canada. If you lived in Whitehorse and decided to travel to Iqaluit, what natural features of the land might make your trip difficult?

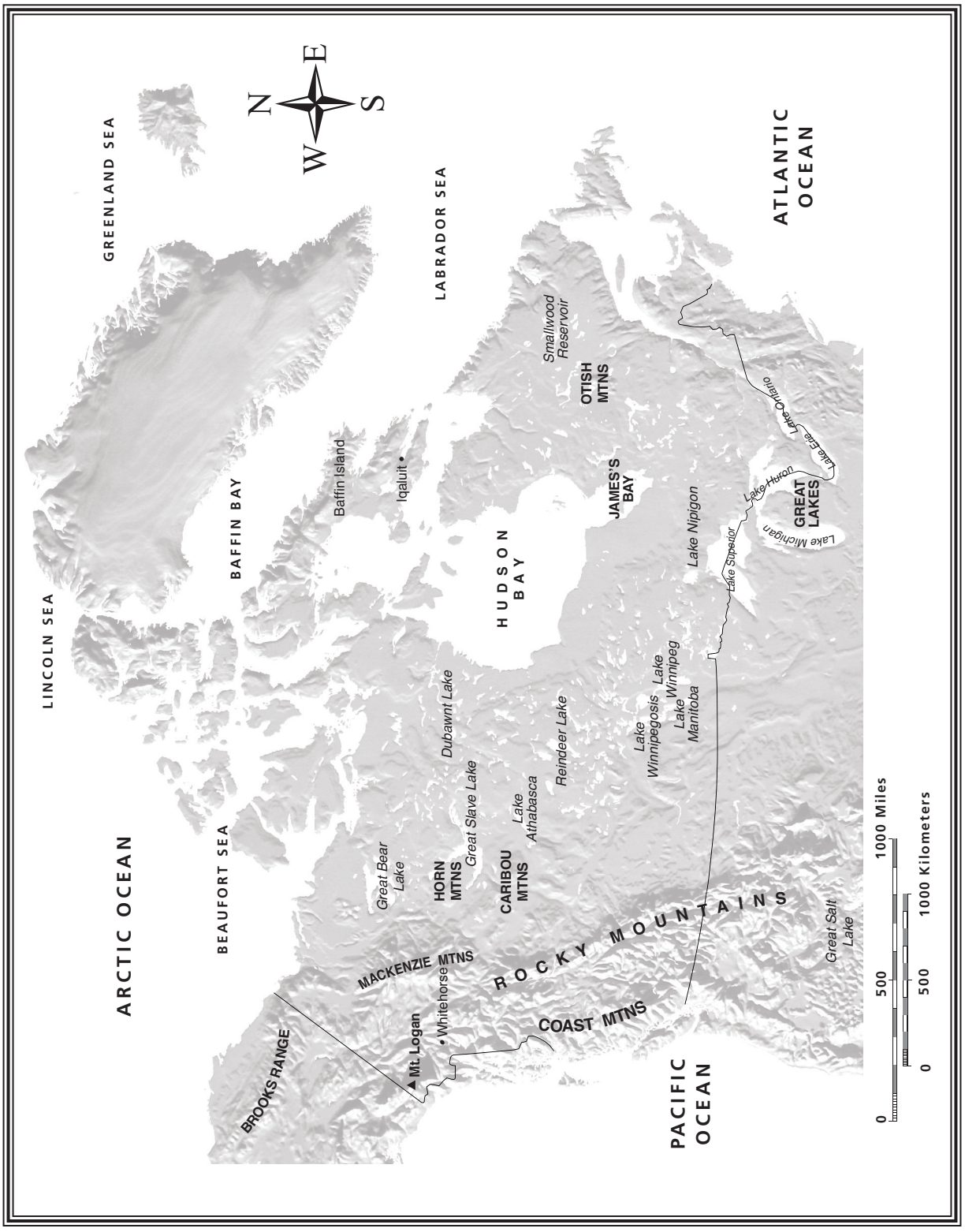
Name: _____

Physical Map of the United States



Name: _____

Physical Map of Canada



LESSON 6

Reading an Economic Resources Map

Goal: To develop concepts and skills related to reading an economic resources map

National Geography Standards

Standard 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Standard 3. How to analyze the spatial organization of people, places, and environments on Earth's surface.

Preparing Students for Instruction

Review reading a map legend with students and discuss the types of symbols found on this map. Remind students that symbols on a map vary with the kind of map.

Map Overview

This map shows the distribution of materials such as coal and oil in the state of Pennsylvania.

Answer Key
1. Six
2. Portland cement, iron ore, clay for bricks, and metal ores
3. The southwest part of the state
4. Titusville
5. The southern/southeastern part of the state
6. Answers will vary. Most of the resources on the map might be made into products used by a family, with the exception of radioactive materials.
7. Answers will vary. Investors, manufacturers, and businesspeople might use this map to find locations where they could easily get material for the products they manufacture and sell. People collecting information on the distribution of coal and other minerals throughout the United States would use this map.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. Which of Pennsylvania's economic resources do you think is most valuable? Why?
2. Which of these resources might be used when building a house?
3. What do you learn about Pennsylvania from this map?

Suggested Appropriate Responses

1. Radioactive materials are rare and may be valuable. Also, almost everyone needs coal, oil, and natural gas.
2. Limestone, dolomite, Portland cement, clay for bricks, natural gas or coal for heat and electricity
3. Answers will vary but may include that Pennsylvania has a large number of economic resources that can be turned into products. People who live in the state have many job choices and settlement choices.

Extending and Enhancing Learning

- Have students create an economic resources map for an imaginary state. Prompt students to think about the land first: Is it mountainous or level? What resources might be found in each type of area?
- For students who need more support, have them make a list of how many sites they find for each kind of economic resource on the Pennsylvania map. Which materials are found in only one site?
- To challenge students further, have them research economic resources for a different state, and then write a report to share with the class. Alternatively, students could research new energy resources, such as wind power, discover where they are being developed, and report on that.

Name: _____

LESSON 6

Reading an Economic Resources Map

Geography Vocabulary

economic resource: a naturally occurring material such as coal, oil, and minerals that can be used to gain wealth

Reading the Map

Look at the Economic Resources map. This map shows which natural resources are found in the state of Pennsylvania. Note the map legend, which tells you what each symbol on the map stands for.

Understanding the Map

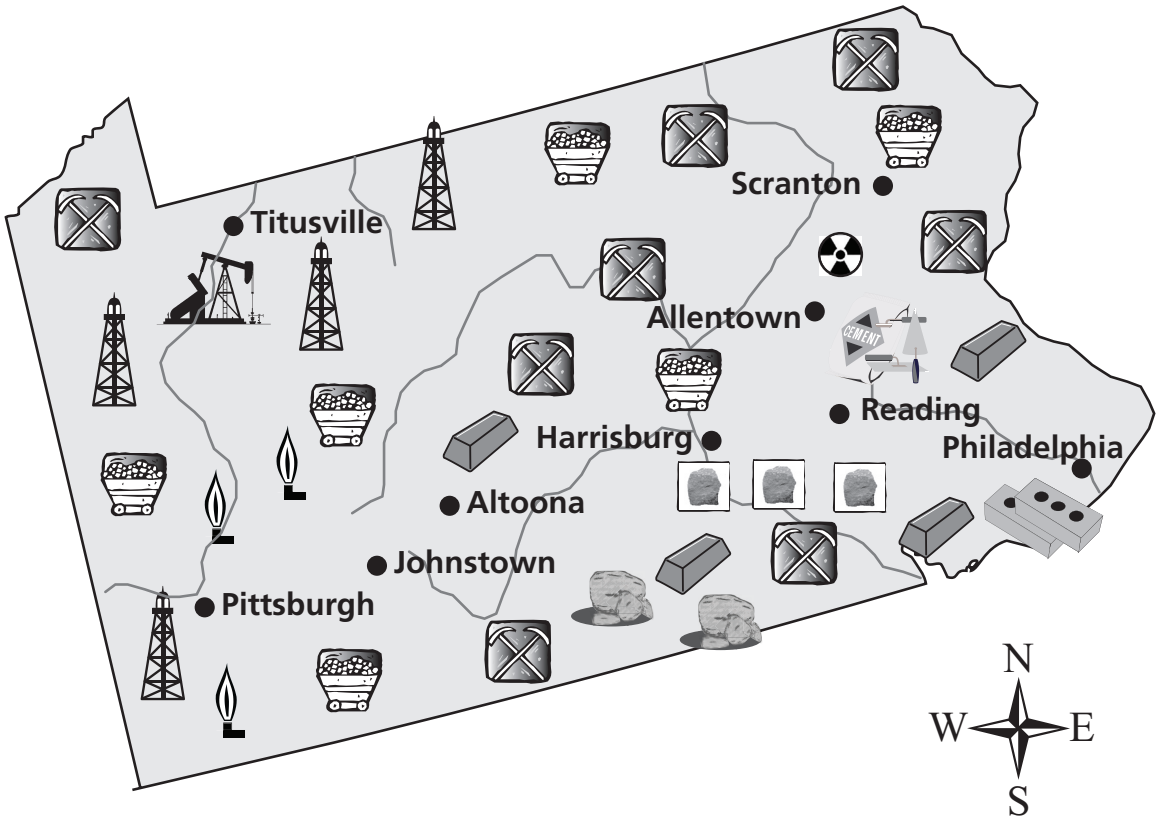
1. Use the map legend to locate coal. Coal is used for heating homes and for producing electric power. How many areas in Pennsylvania are sources of coal?
2. Which economic resources are found in the southeastern corner of the state close to Reading and Philadelphia?
3. In which part of the state would you find coalbed methane?
4. In which city would you find oil drilling?

Analyzing the Map

5. If you wanted a job as an iron-ore worker, in which part of the state would you be likely to find it?
6. Find three Pennsylvania resources that might be made into products your family could use. For each resource, name one product made from it that your family would use.
7. Who do you think might use this map? Explain.

Name: _____

Economic Resources of Pennsylvania



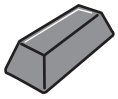
Legend

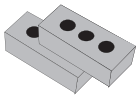

Coal


Surficial Materials, Limestone, and Dolomite


Crude Oil and Natural Gas

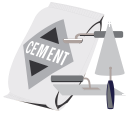

Radioactive Minerals


Metal Ores


Brick Making Clays and Shales


Iron Ore


Coalbed Methane



Portland Cement


Crude Oil Drilled


Rocks Used to Make Tools

LESSON 7

Getting Information from a Climate Map

Goal: To develop concepts and skills related to gaining information from a climate map and to use information in a climate map to predict possible areas of population

National Geography Standards

Standard 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Standard 3. How to analyze the spatial organization of people, places, and environments on Earth's surface.

Preparing Students for Instruction

Review with students the skill of reading a map legend with a variety of patterns in the legend.

Map Overview

The climate map gives a great deal of information about places in the Western Hemisphere, and makes it possible to speculate on industries and lifestyles in different areas. The map of Greenland offers the opportunity to use information from the climate map to understand the location of towns and cities in Greenland.

Answer Key
1. Tundra, subarctic, and cold temperate
2. The coldest areas are located in the extreme north and south, close to the North Pole and South Pole. The warmest areas are near the equator.
3. Tropical
4. Answers will vary but should be accurate and based on a close reading of the map.
5. The climate map shows that most of Greenland is covered with ice. That is why there are no towns in the large central area of the island. The only areas that are not ice-covered are along the coastlines, which are tundra. The cluster of towns along the west coastline indicates that this area may have the warmest climate on the island.
6. The United States is farther north than areas where tropical climates are found. Most tropical climates are close to the equator.
7. Students should observe that the Arctic Circle marks a change from subarctic to tundra, or tundra to ice in Greenland.
8. Northern North America, because it's much colder there

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. Why might the manufacturer mentioned in the last question on your activity sheet NOT find as many customers for his new warm coats as the climate map leads him to believe?
2. What do we learn about climates from their latitudes and longitudes? Which is more useful in predicting climate?
3. As you examine the climate map, which three climates seem to cover the largest areas? What conclusions about population can you draw from this information?

Suggested Appropriate Responses

1. Cold areas may have small populations because of the climate.
2. Latitude is a good predictor of climate. Warm climates are near the equator, in the lower latitudes. Cold climates are near the North Pole or the South Pole, in the high latitudes. Medium climates are near the Tropics of Capricorn and Cancer.
3. Subarctic, tropical, and ice cap; the populations are probably clustered in the warmer and wetter parts of the earth.

Extending and Enhancing Learning

- Have students work in groups to create fictional stories of the effect of climate on lifestyle. Assign each group one climate area in North America. Each group is to imagine that they are settlers trying to move to this climate zone. What problems might they encounter? What kind of food are they apt to find in this climate? What materials are available for building homes? What clothing will they need? Groups are to collaboratively compose a diary of a settler describing the climate and its effect on the settlers' lifestyle. One person from each group is to read the diary to the class.
- For students who need more support, have them make headings on a sheet of paper that correspond to the major climate zones. Work with them to list under those headings which continents have that particular climate zone.
- To challenge students further, have them create a climate game called "Where in the Hemisphere Are We?" On small pieces of paper, group members write statements that show the effect of climate upon an individual; for example, "It's very cold here. We can only find low-growing plants. We have to wear warm coats." Each group makes at least ten of these, places them in a box, and plays the game with another group. Each player, one at a time, draws a piece of paper from the box. If the player can identify the probable location of the imaginary person who "wrote" the statement, she or he earns one point. (For the example, correct answers would be northern Canada and coastal Greenland, i.e., tundra zone.) Winners are players with the highest scores.

Name: _____

LESSON 7

Getting Information from a Climate Map

Geography Vocabulary

arid: extremely dry; not having enough rainfall to support the growing of crops

subarctic: very cold but not as cold as arctic/ice

temperate: moderate in temperature; not subject to prolonged extremes of hot or cold weather

tropical: hot and humid

tundra: a treeless area between the icecap and the tree line of arctic regions; can support the growth of low plants such as lichens and mosses

Reading the Climate Map

Look at the Climate Map of the Western Hemisphere. This map shows the average climate of regions in North and South America. Find an area that is tropical. Move your finger across the page and find an arid area.

Understanding the Map

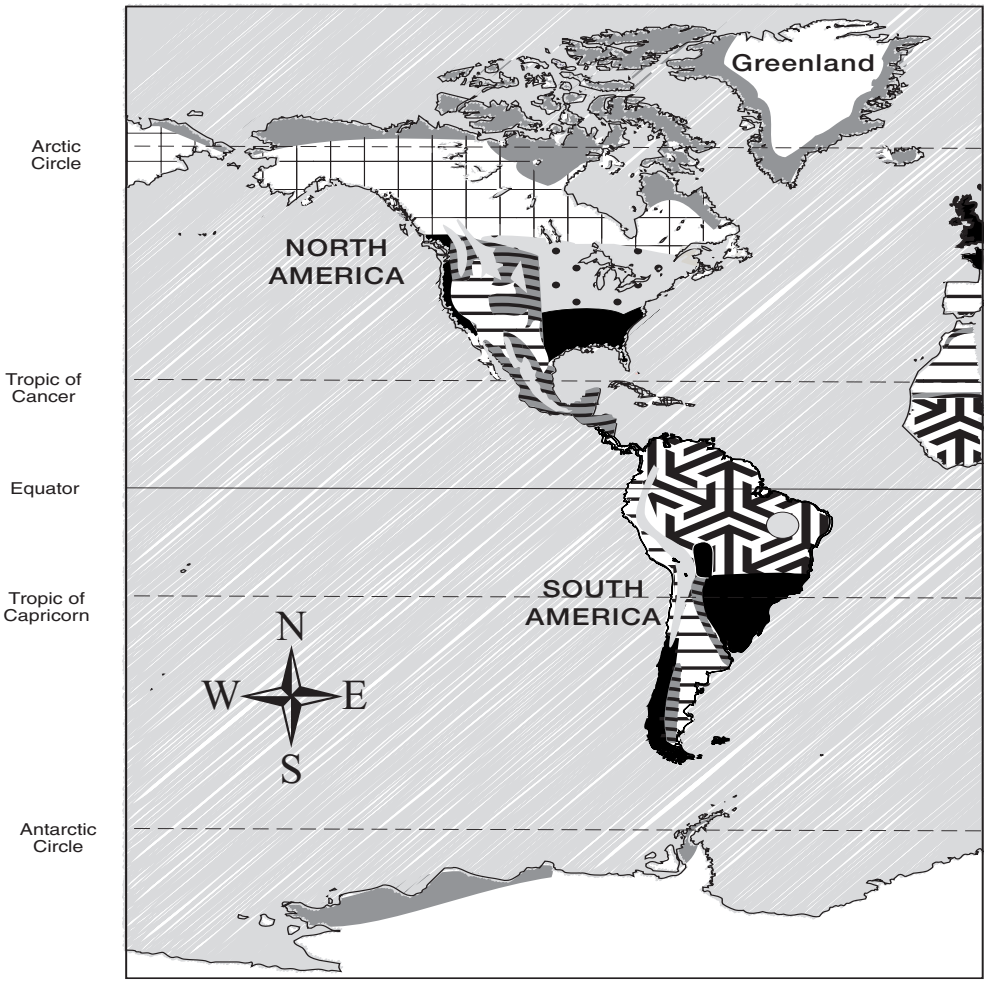
1. Name the three types of climate that cover the most area in North America.
2. Find the coldest areas on the map. Now find the warmest areas. What does this tell you about the locations of warm and cold climates?
3. What is the main climate in most of South America?
4. Find the area where you live. What is its climate?

Analyzing the Map

5. Compare the Climate Map of the Western Hemisphere with the political map of Greenland. Why do you think most of the cities or towns in Greenland are located on the west coast? Why are there no cities in the central part of the island? Explain.
6. The United States does not have any areas of tropical climate. Why do you think this is so? Examine the tropical areas to help you with your answer.
7. Look at the area near the Arctic Circle. What do you observe?
8. If you were the manufacturer of a new fabric that kept the body warm and could be used in making coats or parkas, where on the Western Hemisphere map would you expect to find the most customers? Why?

Name: _____

Climate Map of the Western Hemisphere

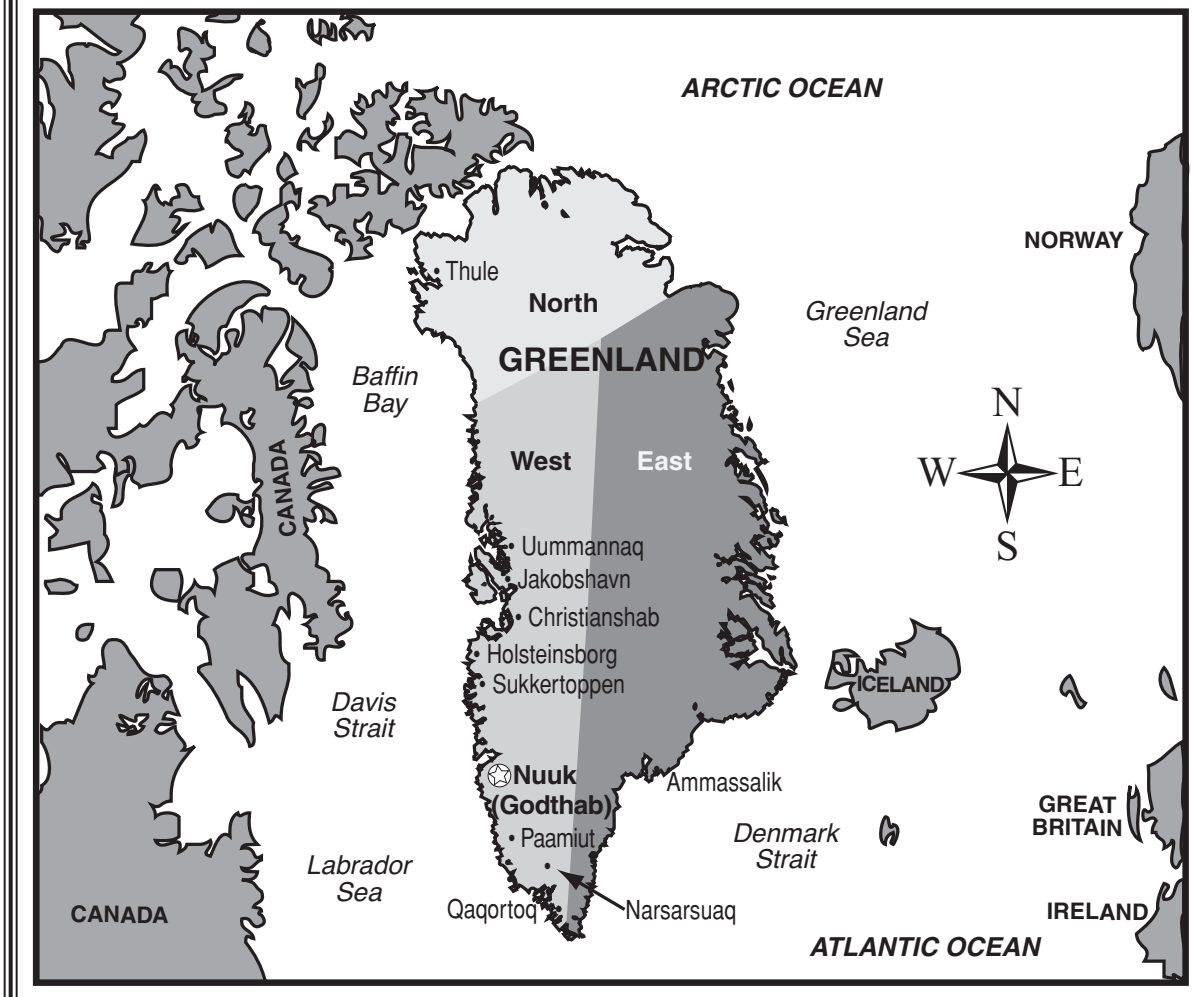


Climate Key

- Ice Cap
- Highlands
- Tundra
- Subarctic
- Cold temperate climates
- Warm temperate climates
- Arid/desert
- Semi arid
- Tropical

Name: _____

Political Map of Greenland



LESSON

8 Reading a Highway Map

Goal: To develop concepts and skills related to getting information from a highway map and measuring distance on a map using the map scale

National Geography Standards

Standard 1. How to use maps and other geographic representations, tools, and technologies to acquire, process, and report information from a spatial perspective.

Standard 3. How to analyze the spatial organization of people, places, and environments on Earth's surface.

Preparing Students for Instruction

Before starting this activity, review with students how to measure distance on a map using a ruler and the map scale.

Map Overview

Highway maps are an important part of most people's lives. They show us where we are, the best way to get where we want to go, and the distance between here and there. In this lesson, students will examine routes of travel and measure distance on the map scale.

Answer Key
1. You would use Interstate Highway 385, which merges with Highway 26, and continue on 26 to travel from Greenville to Columbia. The distance is about 80 miles.
2. A smaller highway would be the best choice. The distance is about 48 miles.
3. It's easier to get to a rest stop that is on the same side of the highway as you are driving.
4. You might take Highway 85 to Highway 26 and then to Highway 20, or Highway 77 to Highway 20 to Augusta. Students should recommend the Highway 77 route because it is shorter. The Highway 85 route is about 210 miles. The Highway 77 route is about 150 miles.
5. Welcome centers are mostly located near South Carolina's boundaries with other states. This is so that travelers from another state can visit the welcome center and get information about South Carolina.
6. They are probably small towns.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. When do we use highway maps?
2. If you were going to plan a vacation trip to South Carolina, what areas would you select, and why?
3. What is the one city that three of the freeways pass through, or go around? Why do you think that is so?
4. Two of the cities on the map, Greenville and Columbia, have circular highways around them. What do these highways do for travelers, and why do you think they were they constructed that way?

Suggested Appropriate Responses

1. We use them when traveling somewhere new or unfamiliar. We use them to plan a trip or to guide us on the road.
2. Answers will vary. Students may choose areas near lakes or rivers, or the Atlantic coast, or they may prefer to visit one of the larger cities.
3. Columbia, because it is the capital city
4. These roads, sometimes called "ring roads," make it possible to avoid the traffic of a large city by going around it. While city populations are not given on this map, students may infer that both cities are large.

Extending and Enhancing Learning

- Have students work in groups to plan a trip to somewhere they would like to go, such as a theme park or famous city. Give each group a highway map and tell them that they need to plan a trip of 3 or 4 days. They will travel 200 miles a day. Have them use the map scale to choose a town where they will stop overnight after traveling about 200 miles. They can make their report in the form of a trip log or diary, with a paragraph for each day telling about the trip.
- For students who need more support, have them plan a trip all around the state of South Carolina that would use as many freeways as possible. For example, starting from Spartanburg they can take Highway 85 to Charlotte and then take Highway 77 to Columbia. Where can they go from there, and on which highways? Challenge students to find this out by using the map.
- To challenge students further, have them search online for a highway map of a different state and plan a trip around that state.

Name: _____

LESSON 8

Reading a Highway Map

Geography Vocabulary

interstate freeways: a network of limited-access highways that go through more than one state

limited access: limited access to a highway means that you can only enter it by using an on-ramp

Reading the Map

Look at the highway map. This map shows the network of highways in South Carolina. Notice that the double lines stand for freeways and the single lines show smaller highways which sometimes extend into neighboring states. Also notice the map scale, which shows that 1 inch equals about 50 miles.

Understanding the Map

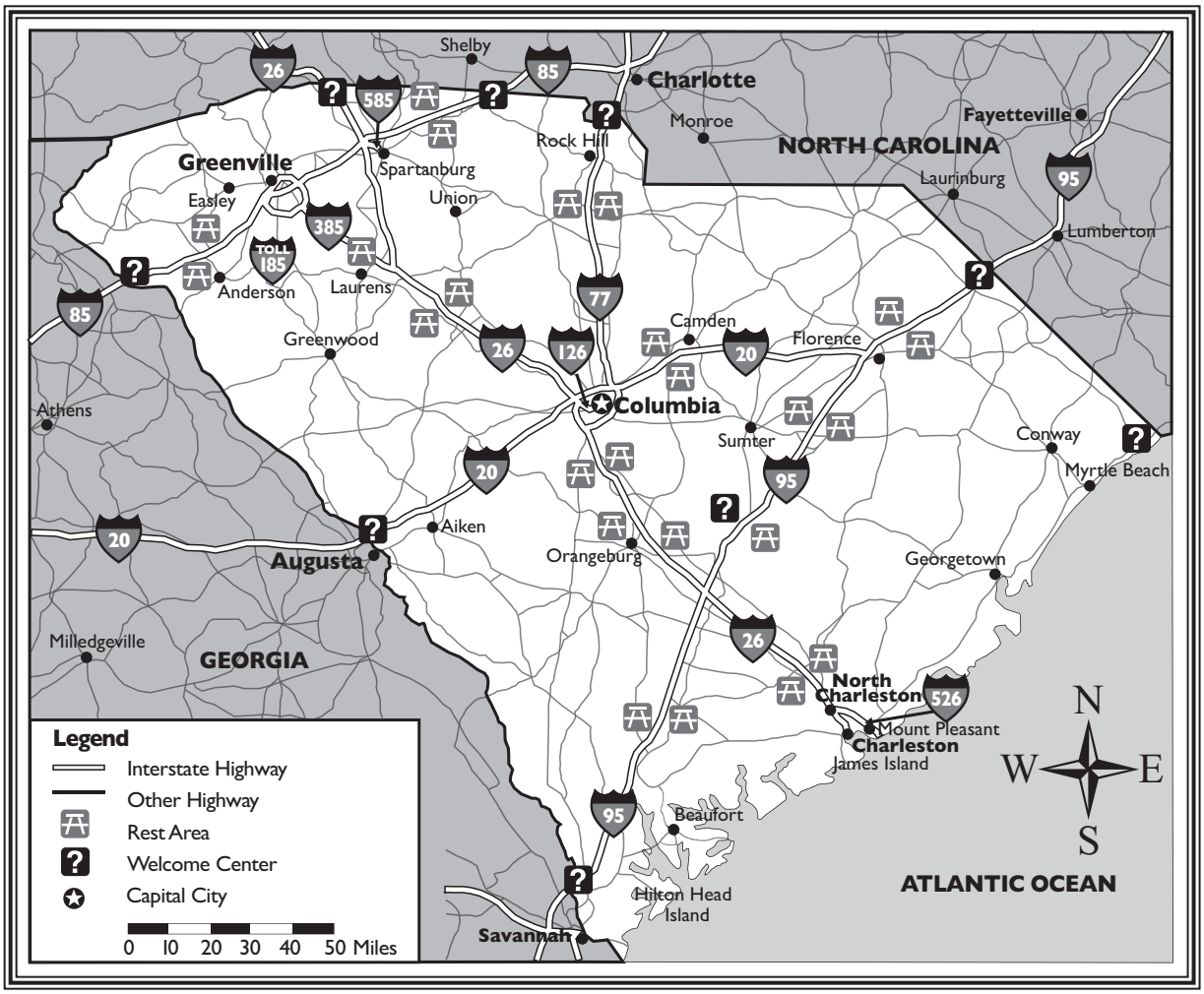
1. If you were going to travel from Greenville, South Carolina, to the state capital, what highways would you use? How far would you travel? In your answer, name the state capital.
2. If you travel from Aiken to Greenwood, would the best route be a freeway or a smaller highway? How long is the trip in miles?
3. Look at the rest stops on this map. They are clustered on both sides of some highways. Why do you think rest stops are located on both sides of a highway?

Analyzing the Map

4. There are two possible routes through South Carolina from Charlotte, North Carolina, to Augusta, Georgia. List what they are. Which one you would recommend? Explain why.
5. Look at the welcome centers. In what kind of areas are most of them located? Why do you think that is?
6. What can you infer about towns such as Georgetown and Sumter that are connected only by thin lines and are not near highways?

Name: _____

Highway Map of South Carolina



LESSON 9 Comparing the Effects of Climate and Precipitation on Settlement

Goal: To develop concepts and skills related to understanding the geographical factors that influence settlement

National Geography Standards

Standard 3. How to analyze the spatial organization of people, places, and environments on Earth's surface.

Standard 7. The physical processes that shape the patterns of Earth's surface.

Standard 8. The characteristics, distribution, and migration of human populations on Earth's surface.

Standard 12. The processes, patterns, and functions of human settlement.

Preparing Students for Instruction

Before starting this activity, review the following with students:

- Make sure students know how to use the map legend to find and interpret areas on a map.
- Explain the meaning of terms in the climate and population legends, such as "semiarid" and "Mediterranean," that students may not know. Alternatively, have students look these up in a dictionary or online.

Map Overview

Students compare information from three maps to help them understand the way climate and precipitation influence population in the United States. They study a climate map, a precipitation map, and a population map of the United States, and explore the effects of climate and precipitation on settlement.

Answer Key
1. The Northwest, mainly the state of Washington
2. The western and west-central parts of the country
3. 32–48 inches per year
4. The area east of the Mississippi
5. Michigan and Illinois
6. Answers may vary, but might include the area on both sides of the Mississippi, and the north central part of California. One has a Mediterranean climate, and the other has a warm summer climate. Both have sufficient rainfall.
7. The driest area is also the area of least population.
8. Answers may vary. The driest areas cannot produce much food, may have limited water resources, and may be less comfortable areas for people to live in.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. Use the maps to select an area of the country where you might want to settle.
2. Give reasons for your choice of settlement, referring to all three maps for information.
3. Notice that the population map shows a cluster of cities along both coasts and the Gulf of Mexico. Why do you think people settled there long ago and still live there today?
4. Who might use a population map?
5. Who might use a precipitation map?

Suggested Appropriate Responses

1. Answers will vary. Students who want to live in cities may choose somewhere in the eastern half of the country. Other attractive areas are in the south and southwestern parts of the country.
2. Answers will vary. Accept all that have reasonable rationales based on the maps.
3. Answers will vary. Immigrants may have arrived there in ships, and stayed wherever they first arrived. People may have been attracted to coastal areas because of fishing and the arrival of ships with supplies. They may have liked the marine climate.
4. People keeping track of statistics about population growth, manufacturers looking for markets for their products, or people wishing to settle in urban or rural areas
5. Manufacturers of items such as umbrellas, farmers looking for land on which to grow crops, or people considering settling in a certain part of the country

Extending and Enhancing Learning

- Have students research the climate and precipitation statistics for their own area. Students will create a map of local climate and precipitation, and write a report discussing the relationship among climate, precipitation, and the lifestyle of their particular community. For example, what are popular winter sports? What are common summer activities?
- For students who need more support, have them use the Internet to locate climate, precipitation, and population statistics for several cities whose locations are suggested by the population map (Seattle, Phoenix, Miami, Los Angeles, and Denver, for example) and discover the average winter and summer temperatures and the average precipitation for those cities. Have them speculate on how the climate and precipitation affect lifestyle in these cities.
- To challenge students further, have them select a state and study its population, climate, and precipitation patterns and see how they are connected. Where are the major cities? How do they deal with rainfall, or the lack of it? What accommodations must they make for the weather—such as snowplows in winter and/or flood precautions in spring or summer? Have students make presentations to the class about the results of their studies.

Name: _____

LESSON 9

Comparing the Effects of Climate and Precipitation on Settlement

Geography Vocabulary

Mediterranean climate: a climate where summers are hot and dry and winters are mild but rainy

population: all of the people who live in a particular place

precipitation: the falling of water in the form of rain, sleet, hail, or snow

Reading the Precipitation Map

Look at the precipitation map. This map shows the average annual rainfall for the United States. Use the legend to help you understand where the greatest and least precipitation occurs.

Understanding the Precipitation Map

1. In which area or areas of the United States do you find more than 80–128 inches of rain per year? Answer by naming a general area such as the Southwest, Southeast, Northwest, or Northeast.
2. Which is the driest area of the country?
3. What is the average rainfall in the area between Lake Superior and Lake Michigan?

Reading the Population Map

Look at the population map. Find the areas that are most populated and the areas that are least populated. Use the map legend.

Understanding the Population Map

4. Which U.S. region has the larger population, the area east or west of the Mississippi River?
5. Which states do you think have cities located on the shore of Lake Michigan that have populations of more than 500,000 people?

Understanding the Climate Map

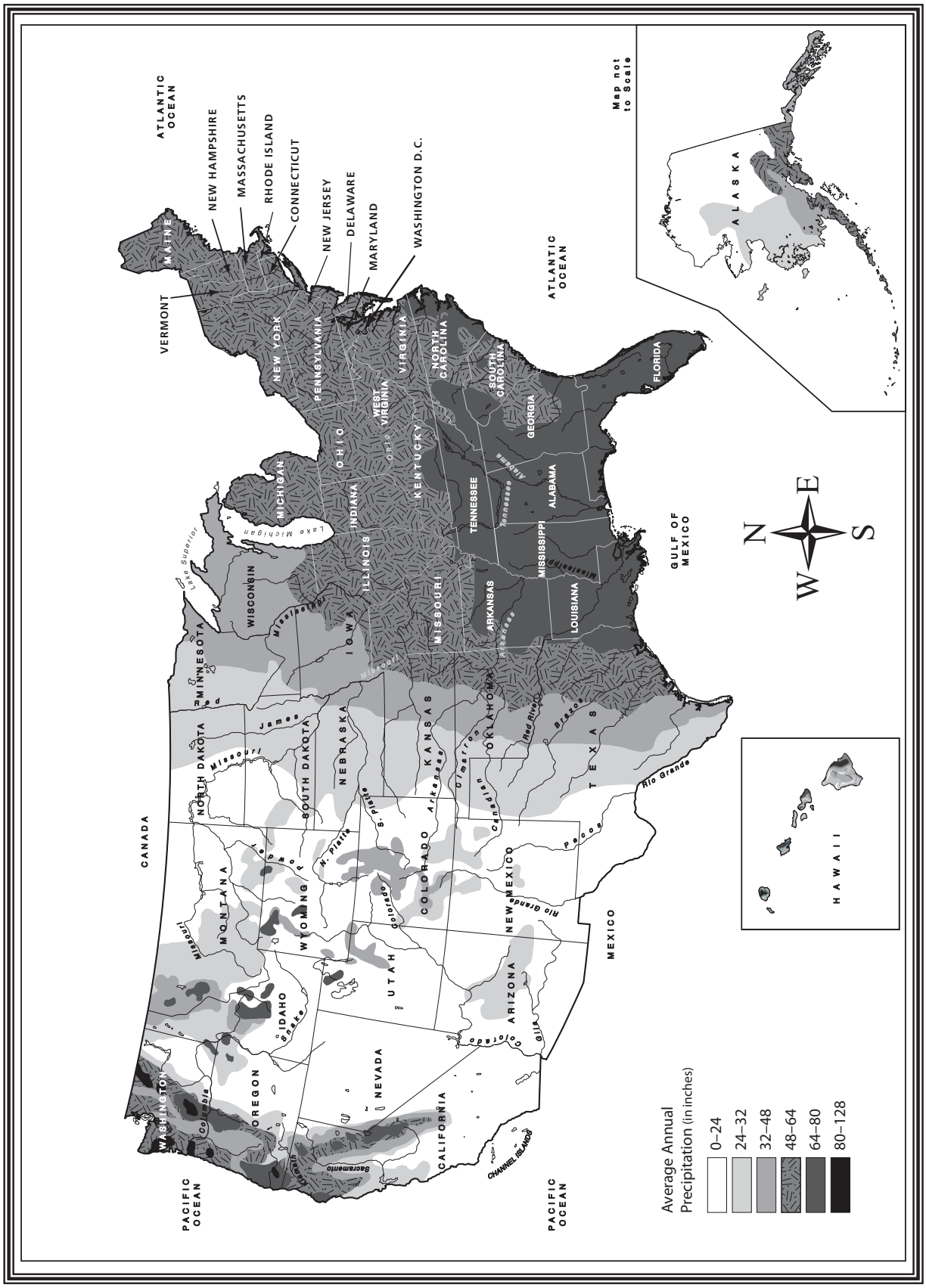
6. Name two areas where the precipitation and climate maps indicate the land would be good for growing crops. That is, areas where the climate is mild and there is some rainfall, but not so much that it would drown the crops.

Analyzing the Maps

7. Compare the climate, population, and precipitation maps. What observations can you make? Look at the area west of the Mississippi River.
8. Why do you think the driest area is also the area of low population?

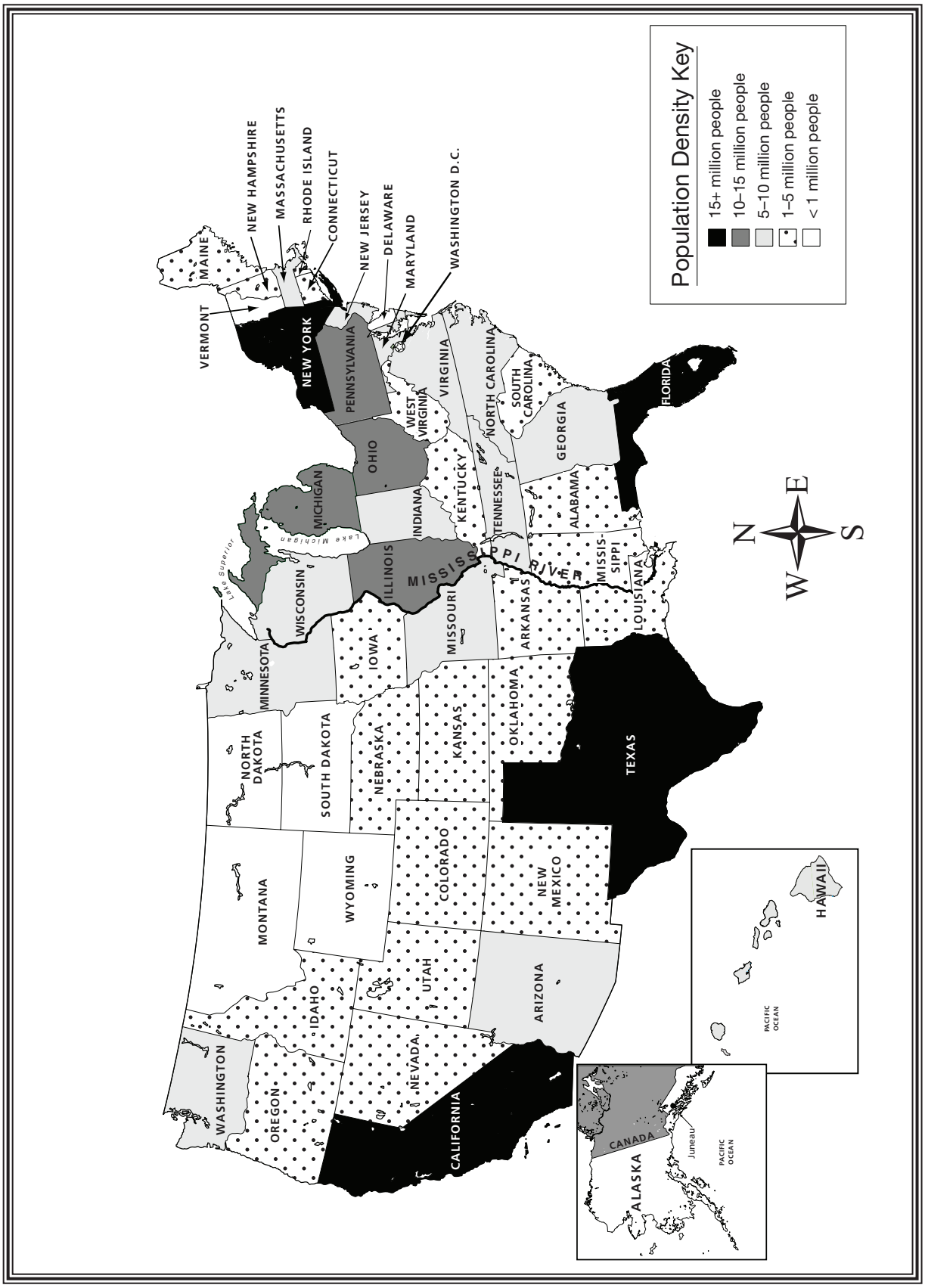
Name: _____

Precipitation Map of the United States



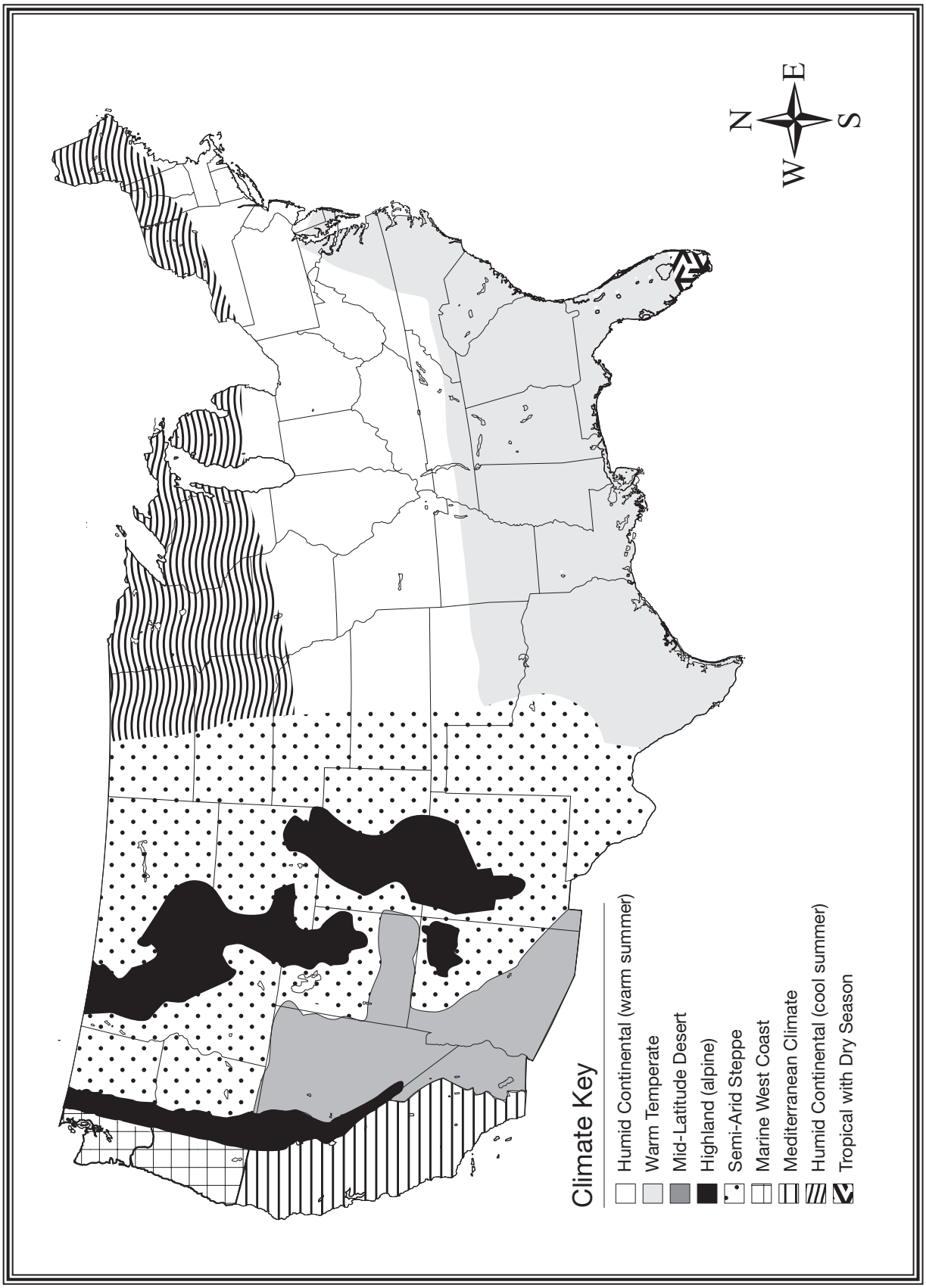
Name: _____

Population Map of the United States



Name: _____

Climate Map of the United States



LESSON 10

Regions of the United States, Canada, and Greenland

Goal: To develop concepts and skills related to using maps to discover the similarities and differences among regions of the United States, Canada, and Greenland

National Geography Standards

Standard 4. The physical and human characteristics of places.

Standard 5. That people create regions to interpret Earth's complexity.

Preparing Students for Instruction

Before starting this activity, review what students have learned in previous lessons about climate, rainfall, and population in these regions (e.g., that the Southwest has a warm, dry climate, while the Northeast has a cool climate with moderate rainfall). Make sure students recall which regions are cold, which have a lot of rain, which have a high population and which have a low population, and so forth.

Map Overview

The United States is divided into seven regions on this map: the Northwest, Pacific, Southwest, West Central, East Central, Southeast, and Northeast regions. Canada has only two regions: Eastern Canada and Western Canada. Greenland has three regions: North, East, and West. Each region in each country is unique in some way. Students should recall what they learned when reading climate, precipitation, and population maps of the three countries.

Answer Key
1. British Columbia, Alberta, Saskatchewan, Manitoba
2. Nunavut
3. On a coast
4. Southwest region
5. The Southwest and Southeast regions would probably have the warmest climate because of their southern locations. The closer to the equator a region is, the more likely it is to have a warm climate.
6. The West, because more cities are located in that region
7. Coastal regions that are near the ocean, and those regions that include some of the Great Lakes. This includes all regions except the West Central: the Pacific, the Pacific Northwest, the Northeast, the Southeast, the East Central, and parts of the Southwest that are on the Gulf of Mexico.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. What do you think the states in the Southwest region have in common besides location?
2. If you were part of a family wanting to relocate to a farming area in the United States, which region would you be likely to select?
3. Which regions probably have very cold winters? Why do you think so?
4. Who would find a regional map helpful, and why?

Suggested Appropriate Responses

1. They have a warm climate and little rainfall. They probably have industries that do not depend on agriculture or fishing.
2. The West Central region
3. The West Central, East Central, and Northeast regions because they are the farthest north (winters in the Pacific Northwest are modified by the ocean)
4. Answers will vary. One possibility is the manufacturer or seller of a product with national distribution. Regional characteristics could be taken into account in sales promotions in each region.

Extending and Enhancing Learning

- Divide students into groups. Assign each group a region of the United States or Canada. Each group will research regional climates, interests, natural resources, products, and so on, and present what they have learned to the class.
- For students who need more support, have them play a game called "What's My Region?" Before playing the game, write clues to the identity of each region. Write the clues on small pieces of paper that can be folded and put into a box. Divide students into two teams. Each student on each team uses the regional map to locate the answers. The first player draws a question from the box. (For example, "This region is near several large lakes.") The student must identify the correct region from the clues. Teams earn one point for each answer. If the student answers incorrectly, the question passes to the other team.
- To challenge students further, have them divide a political map of a state or foreign country into regions. Have students name the regions and give reasons for their grouping.

Name: _____

LESSON 10

Regions of the United States, Canada, and Greenland

Geography Vocabulary

region: a group of areas with something in common, usually location

Reading the Maps

Look at the map of the regions of the United States and Canada. This map shows each country divided into smaller areas called regions. Regions are subdivisions of a country. Each state in a region is close to the others. Regions may have other things in common such as climate, rainfall, or culture. People within regions may have a pattern or an accent to the way they speak, as well as other kinds of cultural similarity. Dividing a country into regions helps us understand each region in depth.

Look at the map of Greenland's three regions. Notice that each region has at least one settlement.

Understanding the Maps

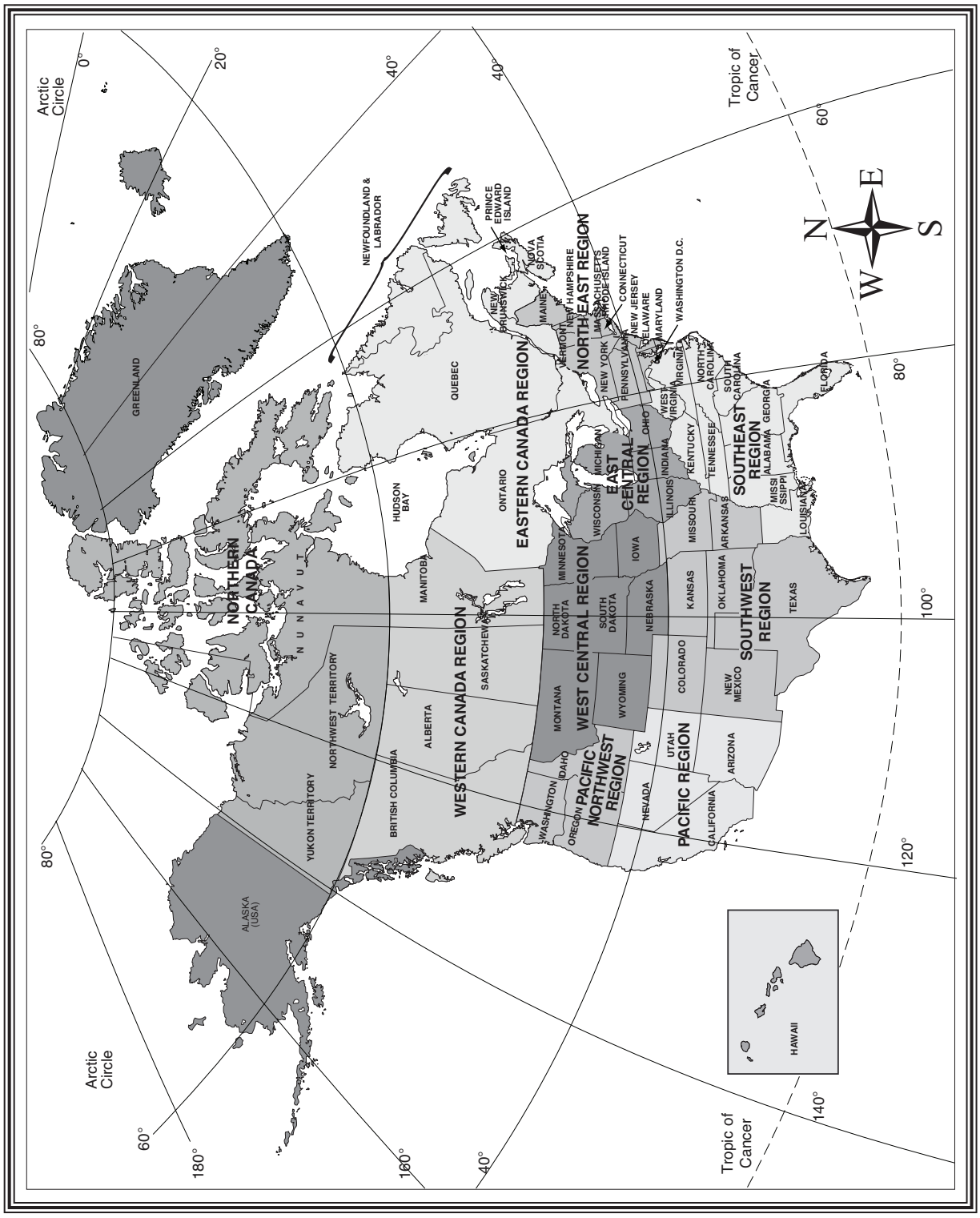
1. List the provinces in Canada's Western region.
2. Which Canadian province borders a foreign country that is NOT the United States?
3. Where are the settlements in each of Greenland's regions located?
4. In which region of the United States is Texas located?

Analyzing the Maps

5. Which U.S. regions would probably have the warmest climate in the country? Give reasons for your answer.
6. Which Canadian province borders a foreign country that is not the United States?
7. In which regions of the United States would fishing probably be an important industry? Give reasons for your answer.

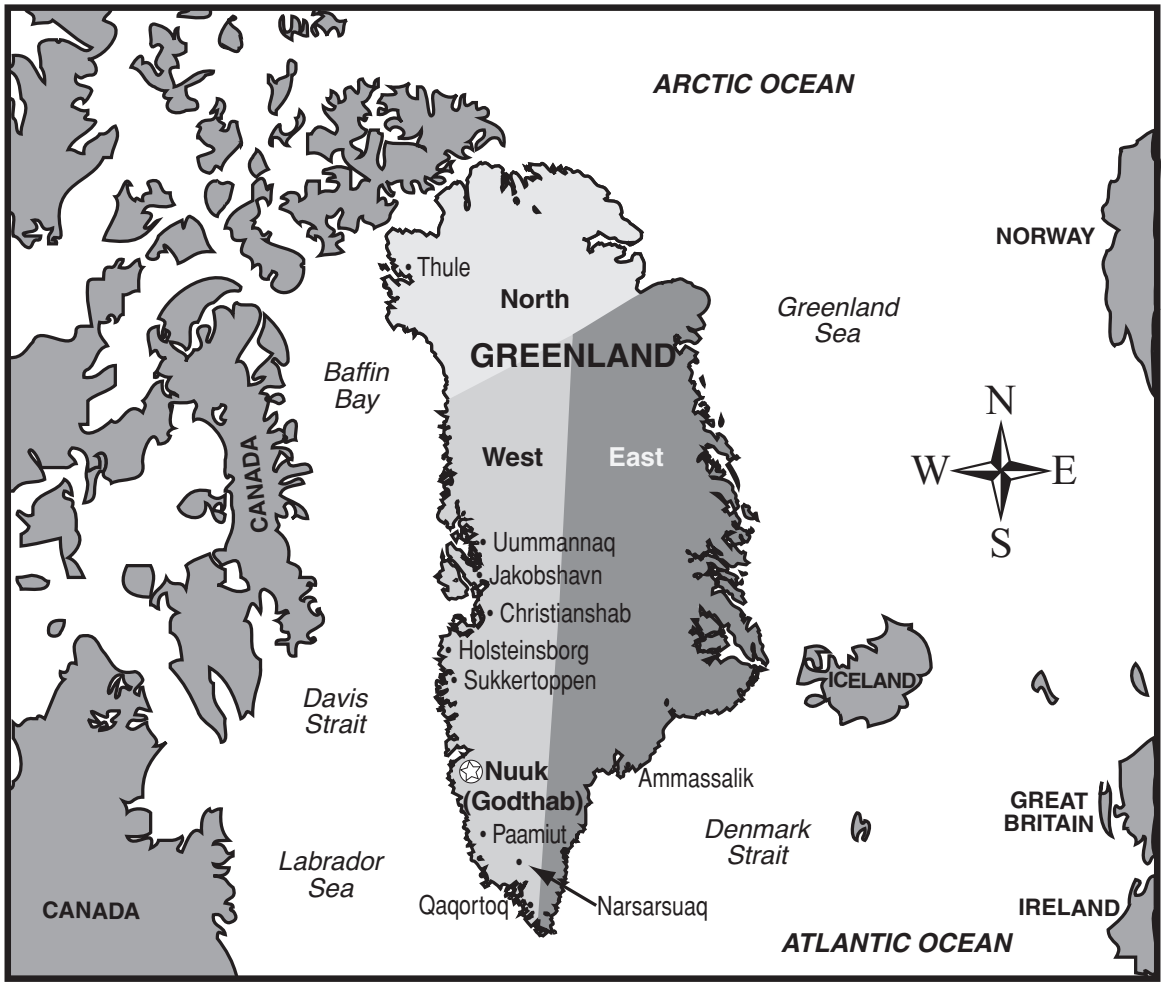
Name: _____

Regions of the United States and Canada



Name: _____

Regions of Greenland



LESSON 11

Connections Between Culture and Geography

Goal: To develop concepts and skills related to understanding how geography affects culture

National Geography Standards

Standard 4. The physical and human characteristics of places.

Standard 15. How physical systems affect human systems.

Standard 17. How to apply geography to interpret the past.

Preparing Students for Instruction

Before starting this activity, review the following with students:

- how to get information from climate and precipitation maps
- how to read a map legend

Map Overview

These maps show the landforms and climate of the Pacific Northwest region of the United States, and its settlement by various groups of Native Americans. From these maps we can draw conclusions about the culture in each area. For example, skills of fishing, canoe building, and sailing were important to the Coast Salish tribal groups but not to the Interior Salish tribes.

Answer Key
1. Precipitation ranging from 30 to 100 inches per year; highland and marine climates
2. The Interior Indians
3. The Interior Indians
4. Pend d'Oreille, Coeur d'Alene, Bannock, Western Shoshone
5. Mostly fish
6. Coastal Indians
7. Answers will vary, but it could be inferred that these interior tribes hunted animals for food, and made clothing and shelter from animal skins. The climate and rainfall statistics do not make it likely that crops were a major food source, and they were too far inland for fishing to be an important activity. They did not have access to very many, if any, trees (based on climate and rainfall) to build their homes of wood.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. In some Native American cultures, a "rain dance" is an important religious activity. The rain dance expresses the group's need for water, and petitions gods or spirits to bring rain. Would any of these Pacific Northwest tribal groups have been likely to have a rain dance as part of their culture? If so, which one? Why?
2. For which of these groups would obtaining food have been more difficult? Why?
3. How do people respond to the geographical characteristics of the region where they live?

Suggested Appropriate Responses

1. The Interior tribal groups might have had this concern.
2. The Coastal groups had an abundant supply of fish year round. The Interior groups, relying on hunting, might have had more difficulty obtaining food, especially in the cold, dry winter months.
3. People base much of their lifestyle on the geography of where they live, especially in terms of filling the basic needs for food, clothing, and shelter. For example, if trees abound, houses are made of wood. If clay soil is available, houses may be brick or adobe.

Extending and Enhancing Learning

- Have students work in groups to develop plausible lifestyles for geographical situations. Give each group a different set of geographic factors to work with: for example, one group may be in the desert with little rain but a warm climate, while another is in the mountains with trees and snowy winters. Have students determine what these people would eat and how they would obtain their food, what kind of shelters they would build, what kind of ceremonies they might have, how they would deal with the harsher aspects of their climate, and so on. Each group draws up a report in the form of an explorer's narration of what he or she discovered upon finding this group of native dwellers in this area. Have groups share their reports with the rest of the class.
- For students who need more support, have them work in pairs or small groups to answer questions using climate, precipitation, and physical maps of a different area, and the Native American groups that lived there. Questions can be similar to those asked in this lesson about things such as food sources, shelter, and customs.
- To challenge students further, have them analyze the customs and lifestyles of other Native American and Canadian groups, such as the Inuit, Navajo, and Cherokee. Students find a description of a group's lifestyle and match it with the geographic factors that produced that lifestyle. Students conclude with an analysis of how these people responded to geographical influences.

Name: _____

LESSON 11

Connections Between Culture and Geography

Geography Vocabulary

alpine climate: the climate of an area that is above the tree line; high altitude produces a cold climate.

culture: the customs and way of living of a group

marine west coast climate: a cool and usually rainy climate found along the west coasts of all the continents

semiarid steppe climate: a climate halfway between humid and arid

Reading the Maps

Look at the precipitation, climate, and tribal maps. Think about how the climate and precipitation affected the lifestyle of the Native American groups living in the Pacific Northwest before the arrival of European and non-Indian American settlers.

Understanding the Maps

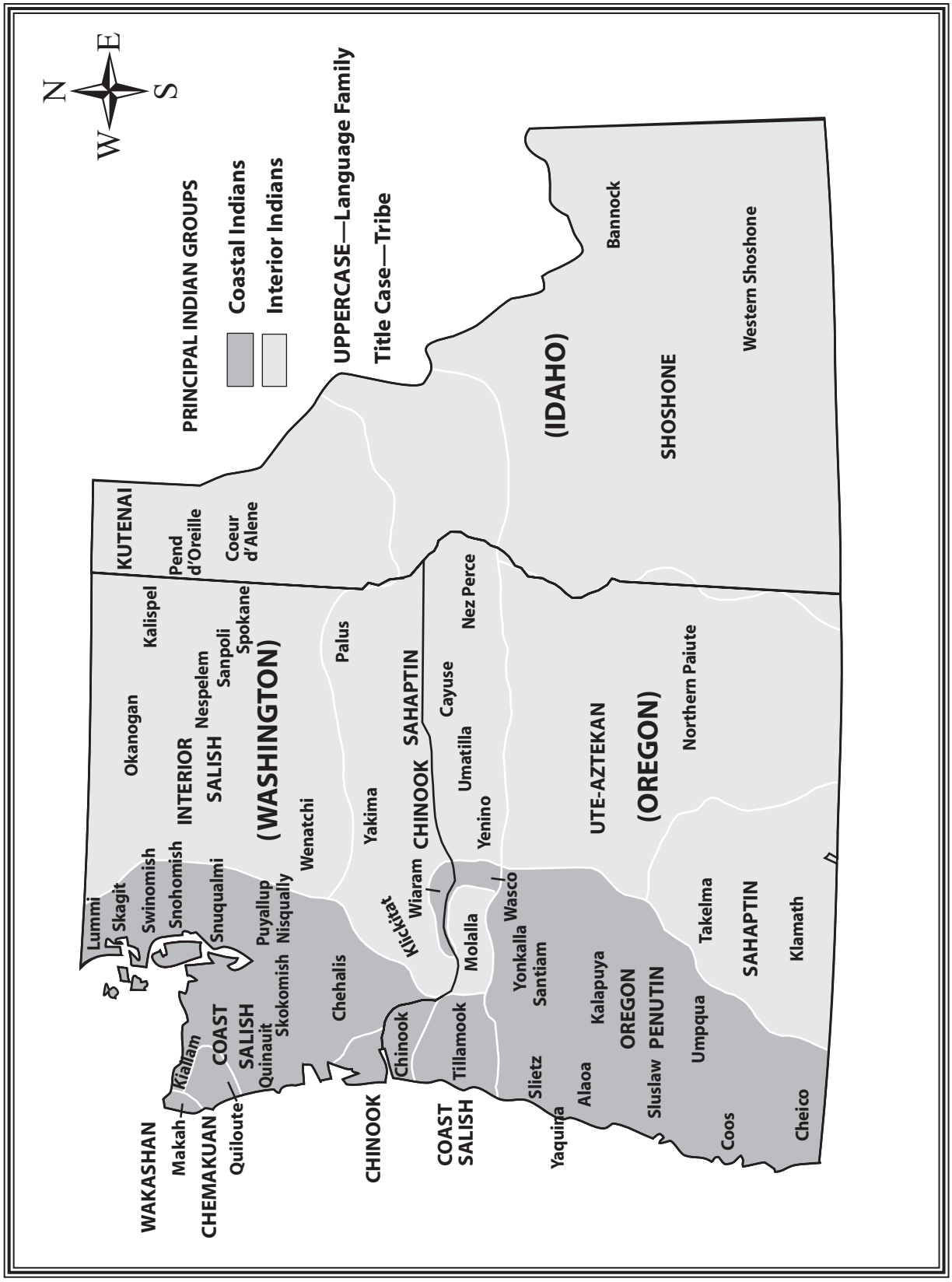
1. Describe the climate and precipitation of the area where the Coast Salish group lived.
2. What group of tribes lived in a semiarid climate?
3. What group of tribes lived where the rainfall was between 5 and 30 inches per year?
4. List the tribes in the Shoshone group.

Analyzing the Maps

5. Look where the Coastal Indian groups lived. Given the climate, rainfall, and closeness to the ocean, what kinds of food do you think they ate?
6. Think about what you have learned about the group locations, climate, and average rainfall. Which group would probably fit the following description?
   - Some of this group's clothing was made of woven grasses that would shed water.
   - Canoe building was an important skill in this culture.
   - Several families lived together in large lodges that provided shelter and warmth in the winter.
   - Tribal leaders gave lavish feasts at which salmon was the main entrée served.
   - Besides fish, this group gathered food that grew wild around them, such as edible plant roots, nuts, and berries.
7. Describe the types of food, clothing, and shelter that the Interior Indian groups most likely had. Explain.

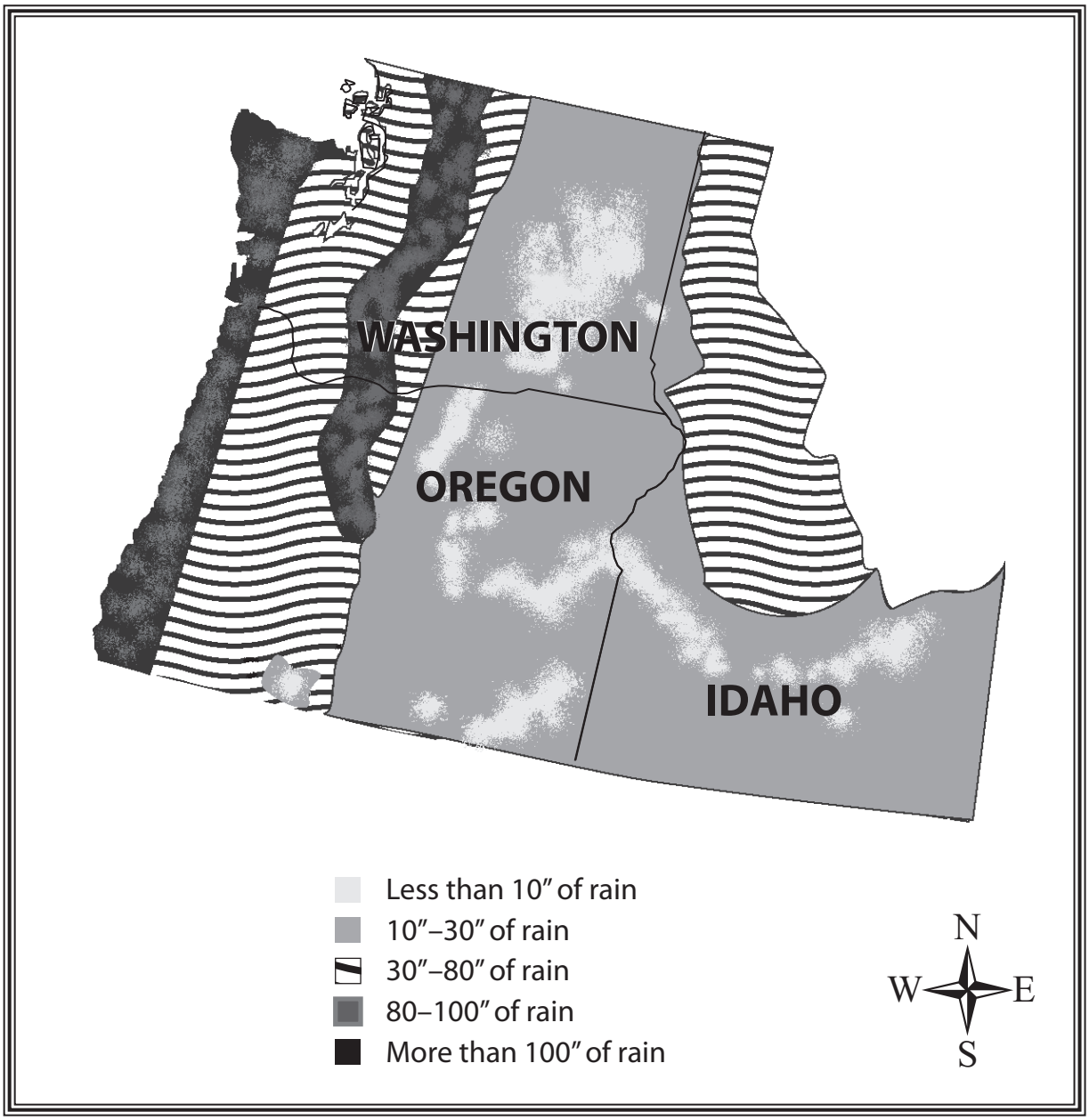
Name: _____

Principal Indian Groups of the Pacific Northwest
(Washington, Oregon, and Idaho)



Name: _____

Average Annual Precipitation, Pacific Northwest



Name: _____

Climate Zones of the Pacific Northwest

LESSON 12

Geographic Influences on Canada's Settlements

Goal: To understand the geographical reasons for Canada's sparse population density and its settlement patterns

National Geography Standards

Standard 12. The processes, patterns, and functions of human settlement.

Standard 15. How physical systems affect human systems.

Preparing Students for Instruction

Before starting this activity, review with students why it is important to use a map's legend when reading a map.

Map Overview

These two maps show a distinct correlation between the population density of Canada and Canada's climate. Canada is physically a very large country, but parts of it are permafrost and ice year-round, and unsuitable for habitation. Consequently, the population is clustered in the southern part of the state where temperatures milder.

Answer Key
1. The area between Quebec and Windsor
2. The northern territories and the northern part of most provinces
3. More than 300 persons per square mile
4. –40 to –20 degrees, depending on location
5. In the northern parts of the country
6. Answers will vary. There is an obvious correlation between temperature and population density.
7. Answers will vary. If Canada's climate warmed, its population might grow as people moved into areas presently considered by most people to be too cold to live in.
8. Students may say that geography has a large effect on settlement of an area, with most people choosing to live in areas with milder temperatures.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. Other than climate, what geographic factors might affect settlement?
2. If you were going to move to Canada, where would you like to settle? What would affect your decision? Give reasons for your answer.
3. The warmest climate zone in Canada is not as warm as Florida. How could you find out exactly the warmth or coldness of an area? What kind of statistics would you need?

Suggested Appropriate Responses

1. Factors include the following: landforms such as mountains, deserts, or forests; the availability of water; and a way of getting food.
2. Answers will vary. Students may like coastal areas, or the Great Lakes area, areas of large population density or areas of small population density. Some may even like the frozen north.
3. You would need the average temperatures in different seasons.

Extending and Enhancing Learning

- Have students work in groups to research the provinces and territories of Canada. What is the province's climate? Where are its largest cities? Do the students think geography had anything to do with the locations of cities within a province? What other factors may cause a city to grow?
- For students who need more support, have them read a population density map and a climate map of Greenland. Why do they think most of the population is clustered on the southwest coast of this island?
- To challenge students further, have them research the history of their own town or city to find reasons why settlers came to this particular location. How much of a part did geography play in the beginning?

Name: _____

LESSON 12

Geographic Influences on Canada's Settlements

Geography Vocabulary

climate zones: divisions (zones) of an area based on each zone's total weather characteristics in a given year, including temperature, rainfall, humidity, etc.

marine climate: a climate influenced by its closeness to the sea; a marine climate is usually warmed by the sea.

population density: the number of people living in a given unit of space

Reading the Population Density Map

Look at the Population Density of Canada map. Population density means the number of people living in a certain space. Look at the map legend. This map shows density per square mile, from 1.3 persons per square mile up to 300+ persons per square mile.

Understanding the Population Density Map

1. Which area of Canada shows the greatest population density?
2. What area has the least population density?
3. What is the population density of the city of Edmonton in Alberta?

Reading the Temperature Zone Map

Six temperature zones are shown on this map. They are listed from coolest to warmest. Black is cold. White is arctic. Closeness to an ocean generally results in a warmer climate than that found inland at the same latitude.

Understanding the Temperature Zone Map

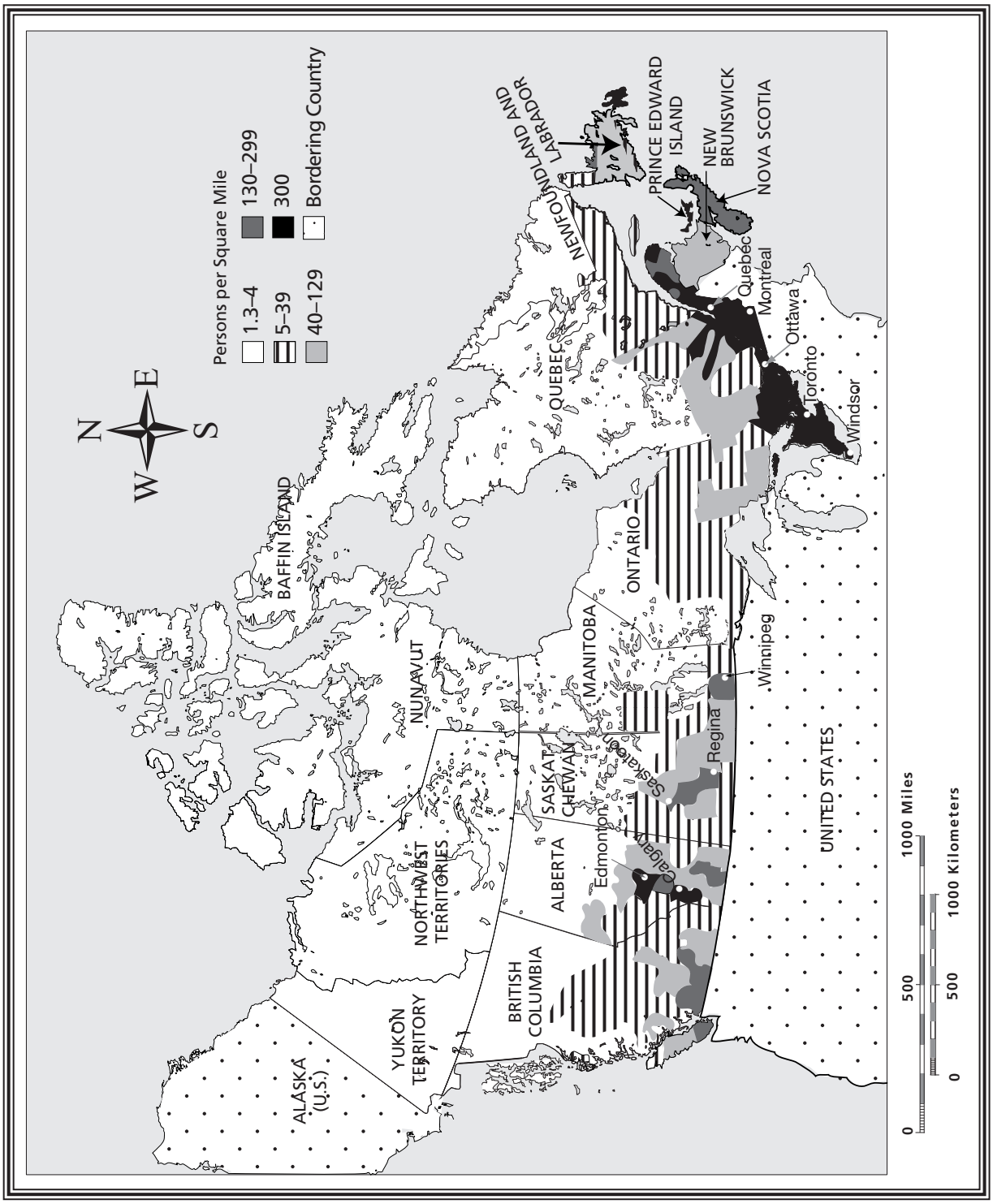
4. What is the temperature range in the area near the Great Lakes?
5. Where is the coldest temperature zone?

Analyzing the Maps

6. Look again at the two maps. Look at the temperature zone map to find the warmest areas. Look at the population density map to find the areas of most dense population. Describe how these areas are alike.
7. Some scientists predict that the world's climate is warming. Why might a warmer climate be good for Canada? Explain.
8. Summarize what effects geography has on the settlement of an area.

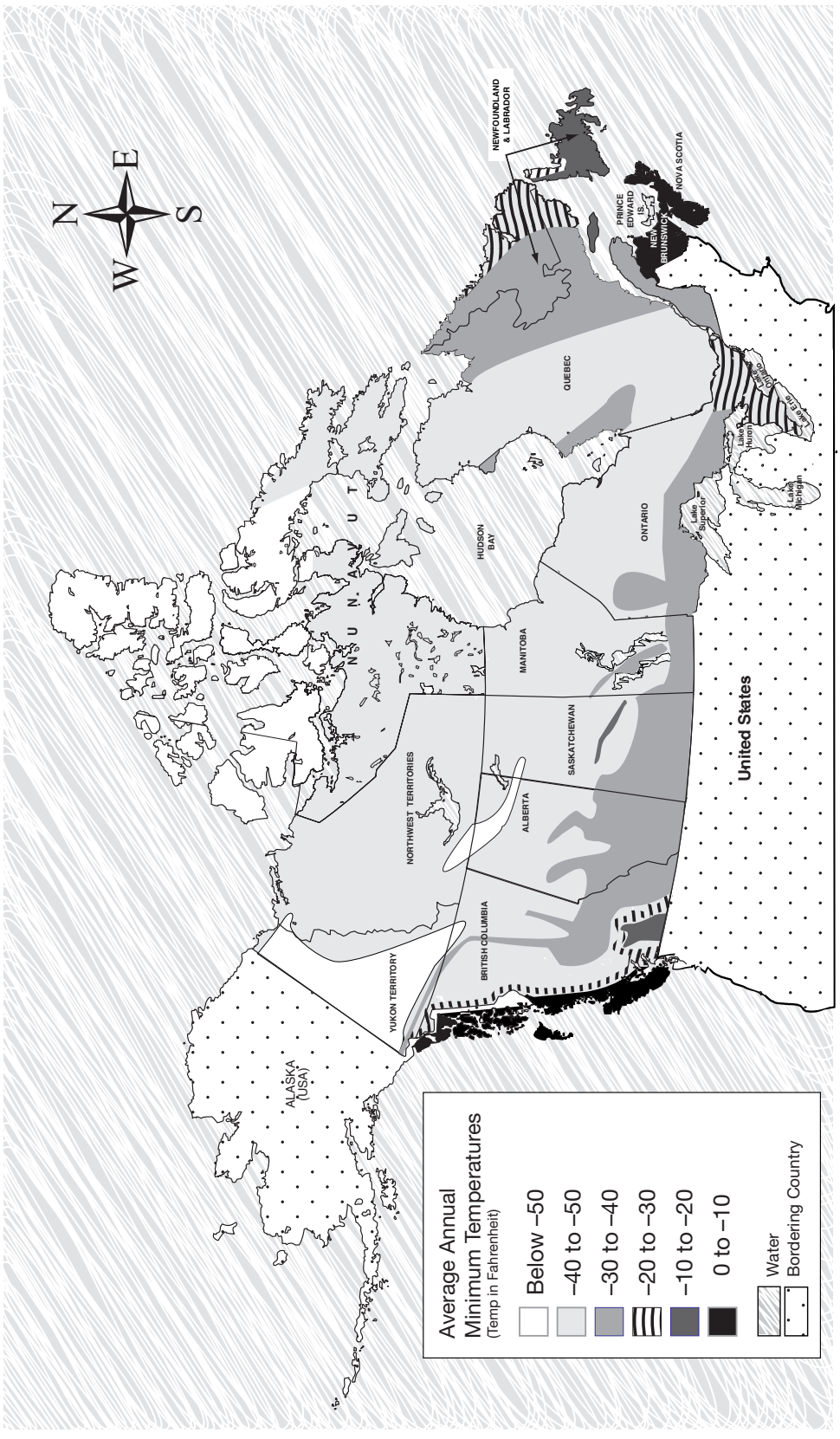
Name: _____

Population Density of Canada



Name: _____

Temperature Zones of Canada



LESSON
13 Getting Information from Historical Maps

Goal: To provide opportunities for students to develop concepts and skills related to getting information from historical maps

National Geography Standards

Standard 13. How the forces of cooperation and conflict among people influence the division and control of Earth's surface.

Preparing Students for Instruction

Before starting this activity, make sure that students know how to read a map legend.

Map Overview

These three maps show the gradual growth of the United States in terms of how much land it held, from 1800 to 1860.

Answer Key
1. France and Spain
2. Indiana Territory, Territory Northwest of the Ohio River, Territory South of the Ohio River, and Mississippi Territory
3. Maine, Ohio, Indiana, Illinois, Alabama, Mississippi, and Louisiana (in any order)
4. Spain
5. Possible answers: It was a "claimed area;" it was bordered by Spanish and British territory.
6. Missouri was a "special status area."
7. This map shows no foreign or special status territories.
8. California and Oregon
9. Answers will vary, but should recognize that the country grew westward during this period, and continually acquired territories and states until it reached from coast to coast by 1860. Land originally owned by France, Spain, and Mexico and claimed by Great Britain was obtained by the United States through treaty or purchase. Territories became states.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. In which of these time periods do you think the United States grew the most and acquired the most new land?
2. Which territories became states between 1800 and 1820?
3. How did the United States acquire all the land from 1800 to 1860?
4. As the inhabited parts of the country grew and expanded, where did the country get the population to live there? Where did all these people come from?

Suggested Appropriate Responses

1. From 1800 to 1820. In 1800, the United States occupied only a small portion of the land area, about one-fourth. By 1820, its holdings had expanded all the way across to the opposite coast.
2. Part of Indiana Territory became the states of Illinois and Indiana; Territory Northwest of the Ohio River became Ohio; Territory South of Ohio River and Mississippi Territory became the states of Mississippi and Alabama.
3. By purchases and treaties with Spain, France, Mexico, and Great Britain
4. Most likely through immigration

Extending and Enhancing Learning

- Have students work in groups to research the process of a territory becoming a state. Assign each group a different territory. Each group does the research and then writes a report, which includes a map of the territory before it became a state or states, and a map of the new state or states.
- For students who need more support, have them work in groups to play a "Which State Am I?" game. First, each student in the group writes three questions on small pieces of paper that are hints about a state. For example, "I am a state that was first part of the territory of Indiana. In 1820, I was the state just west of a small part of Lake Michigan." All questions are put in a container, a box, or a basket. To play the game, each player draws out a question and then uses the maps to decide on the answer. The author of the question determines if it was answered correctly. Correct answers earn one point. When all questions have been drawn and answered, the player with the most points wins the game.
- To challenge students further, have them research the period between 1800 and 1860 in U.S. history, then write the journal of someone who traveled west to places such as Oklahoma, California, or Oregon. Journals should include the reasons for the change of location, such as acquiring their own piece of land or (in California) hoping to get rich mining gold. Students can draw a picture of the character they are portraying, trying to include accurate information about dress of the time. Have students present their reports to the class. Students may wish to dress in costume while reading their "journals."

Name: _____

LESSON 13

Getting Information from Historical Maps

Geography Vocabulary

territory: an area owned by a country such as the United States or Canada that is not a state or a province

Reading the Map of the United States in 1800

Look at the first map. This map shows all of the United States in 1800. There wasn't very much land, but the country had already grown. Kentucky, Vermont, and Tennessee had become states in the late 1700s. The striped and dark gray areas show that the United States claimed several territories, but the land west of the Mississippi River belonged to foreign countries.

Understanding the Map of the United States in 1800

1. Which two foreign countries owned land near the United States?
2. What are the names of the territories owned by the United States in 1800?

Reading the Map of the United States in 1820

Look at the second map. The United States had grown a great deal in 20 years. Part of this was due to the Louisiana Purchase in 1803, when the French government sold a large tract of land to the United States. Some of these changes and their dates are noted.

Understanding the Map of the United States in 1820

3. Which new states had been added since 1800?
4. Which foreign country still owned land near the United States in 1820?
5. What do you notice about the area called the Oregon Country?
6. Why does Missouri look different from other areas on this map?

Reading the Map of the United States in 1860

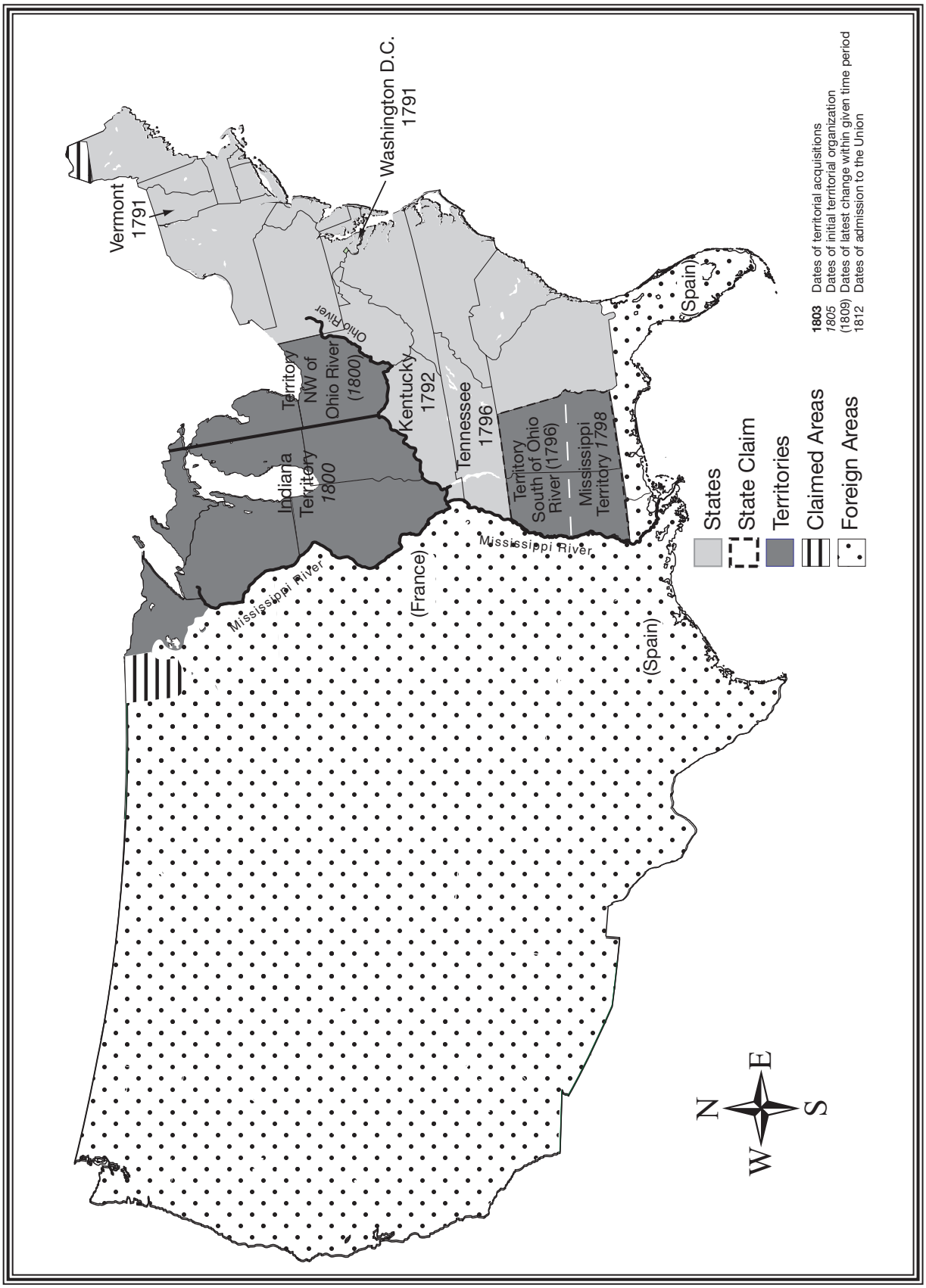
7. Look closely at this map. Compare and contrast it with the two other maps. What do you observe?
8. What two states were on the west coast of the United States in 1860?

Analyzing the Maps

9. What were the major changes to the United States between 1800 and 1860? Explain.

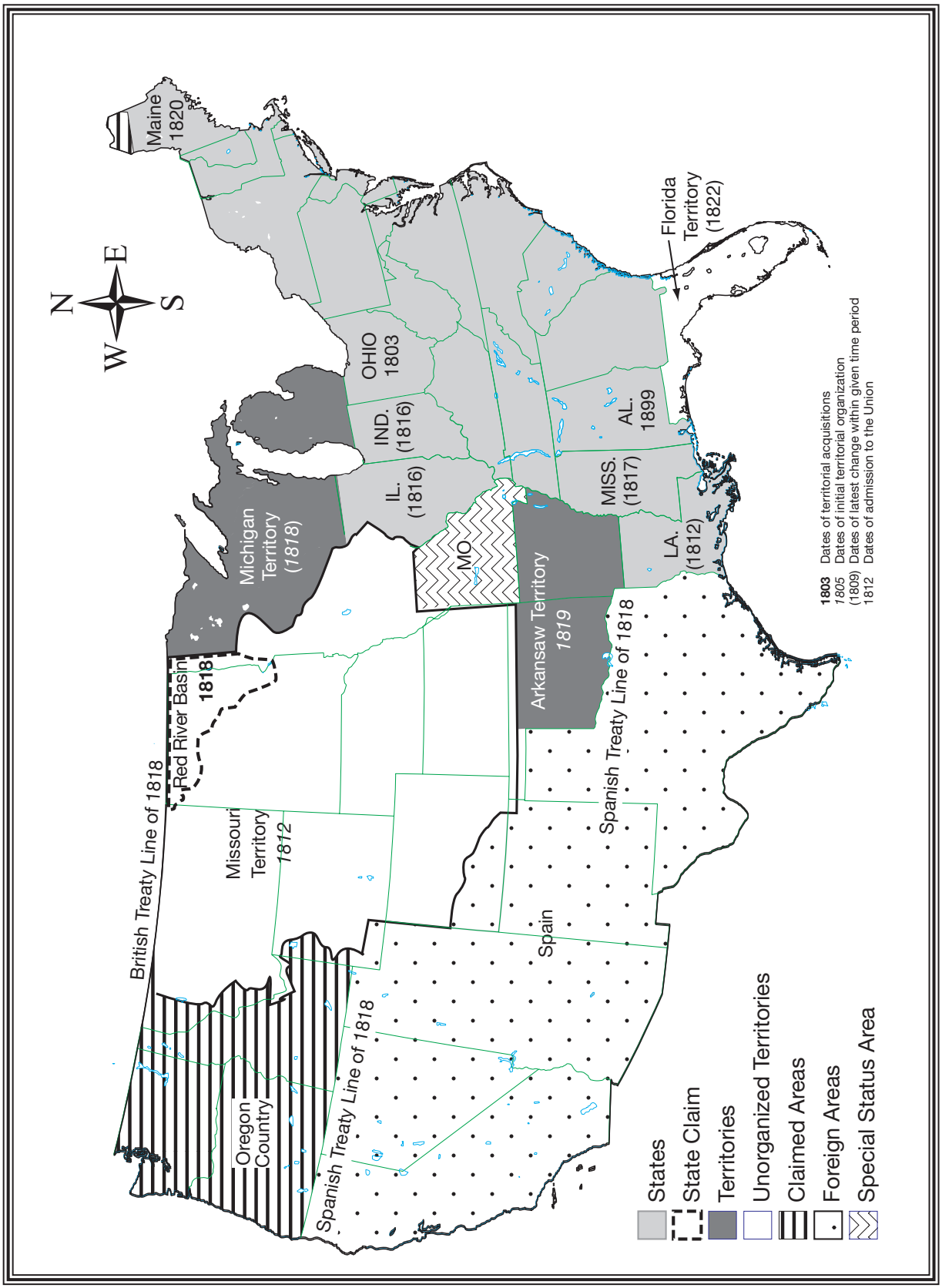
Name: _____

United States 1800



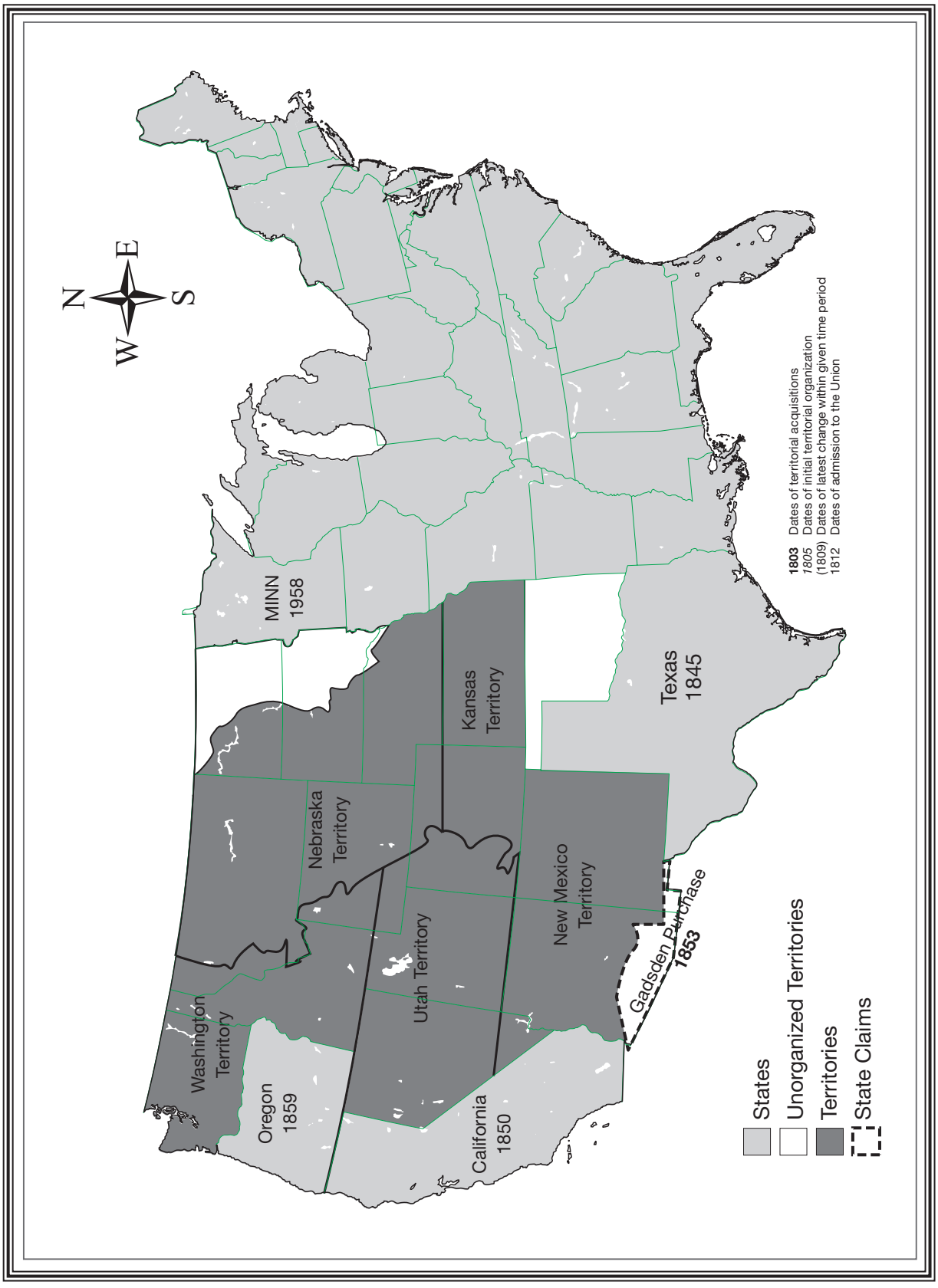
Name: _____

United States 1820



Name: _____

United States 1860



LESSON 14 Understanding the Distribution of Ecosystems on Earth

Goal: To provide opportunities for students to develop concepts and skills related to understanding the distribution of ecosystems around the world

National Geography Standards

Standard 9. The characteristics and spatial distribution of ecosystems on Earth's surface.

Preparing Students for Instruction

Before starting this activity, review the following with students:

- Latitude and longitude as distance above and below the equator
- Reading distance on a map in degrees north or south of the equator
- Reading scales along the sides and bottom of a map

Map Overview

An ecosystem consists of a collection of living things and the environment in which they live. For example, a prairie ecosystem includes coyotes, the rabbits on which they feed, and the grasses that feed the rabbits. These two maps show the distribution of ecosystems on the earth. The first map shows the effects of altitude, precipitation, and temperature on the distribution of ecosystems. The second map shows the effect of latitude—distance north and south of the equator—on the distribution of ecosystems.

Answer Key
1. Hot desert
2. 5 degrees Celsius
3. Tropical deciduous forest, or desert, depending on rainfall
4. 60°
5. Evergreen coniferous forest
6. High-altitude cold temperate zones with an average temperature of 0 degrees Celsius or colder. These forests are also found at latitudes above 60 degrees north or south.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. Which ecosystem do we have in this area?
2. Which ecosystems do you think would be difficult for human habitation? Why?
3. Which ecosystems appear to be comfortable areas for humans to inhabit? Why?

Suggested Appropriate Responses

1. Answers will vary. Be sure students name the appropriate ecosystem.
2. Answers will vary but may include arctic tundra because it is very cold and only mosses grow there; boreal or evergreen forests because of cold climate; hot desert because of lack of water and also because of heat; tropical evergreen/rain forest because of too much rain and too much heat.
3. Tropical deciduous forest, grassland or savanna, tropical montane forest, and temperate deciduous forest. These regions all have relatively mild climates and sufficient rain for crops to grow.

Extending and Enhancing Learning

- Have students work in small groups or pairs to research each ecosystem. They should find out what grows there, what animals are there, whether or not humans live there, and what the food chain is in this particular ecosystem. Instruct students to make a map showing the area where the ecosystem is found, prepare a report, and deliver it to the class. Reports can be displayed after they are given, under the group title "World Ecosystems."
- For students who need more support, have them work with a partner to find different ecosystems on the maps. One partner will locate an ecosystem and give the other partner clues about its location, referring to temperature, precipitation, or latitude. The second person must name the ecosystem. Then partners change places.
- To challenge students further, have them explore the human impact on a particular ecosystem. How did this impact change the ecosystem? Were the changes beneficial or harmful?

Name: _____

LESSON 14

Understanding the Distribution of Ecosystems on Earth

Geography Vocabulary

boreal: related to forests of the north temperate zone; usually consist of coniferous trees such as spruce, fir, and pine

ecosystem: a group of living things and their environment

Reading the Maps

Look at the maps of world ecosystems. Each map shows the influence of a different factor on the ecosystems found in a certain place. The first map shows the effect of altitude—distance above sea level. Look at this map from bottom to top. The higher you go, the cooler the climate. At very high altitudes, the ecosystem consists of a mossy growth called tundra. Other factors included in this map are mean annual rainfall and mean annual temperature.

The second map shows the distribution of ecosystems based on latitude—distance above or below the equator. Find "arctic tundra" on both maps. This cold-area ecosystem can occur close to the North Pole, as shown on the second map, and it can also occur at high altitudes in mountains, as shown on the first map.

Understanding the Altitude, Temperature, and Precipitation Map

1. What kind of ecosystem do you find where the precipitation is less than 20 inches per year and the temperatures range from 25 to 30 degrees Celsius?
2. What is the mean annual temperature in the temperate rain forest ecosystem?

Understanding the Latitude Map

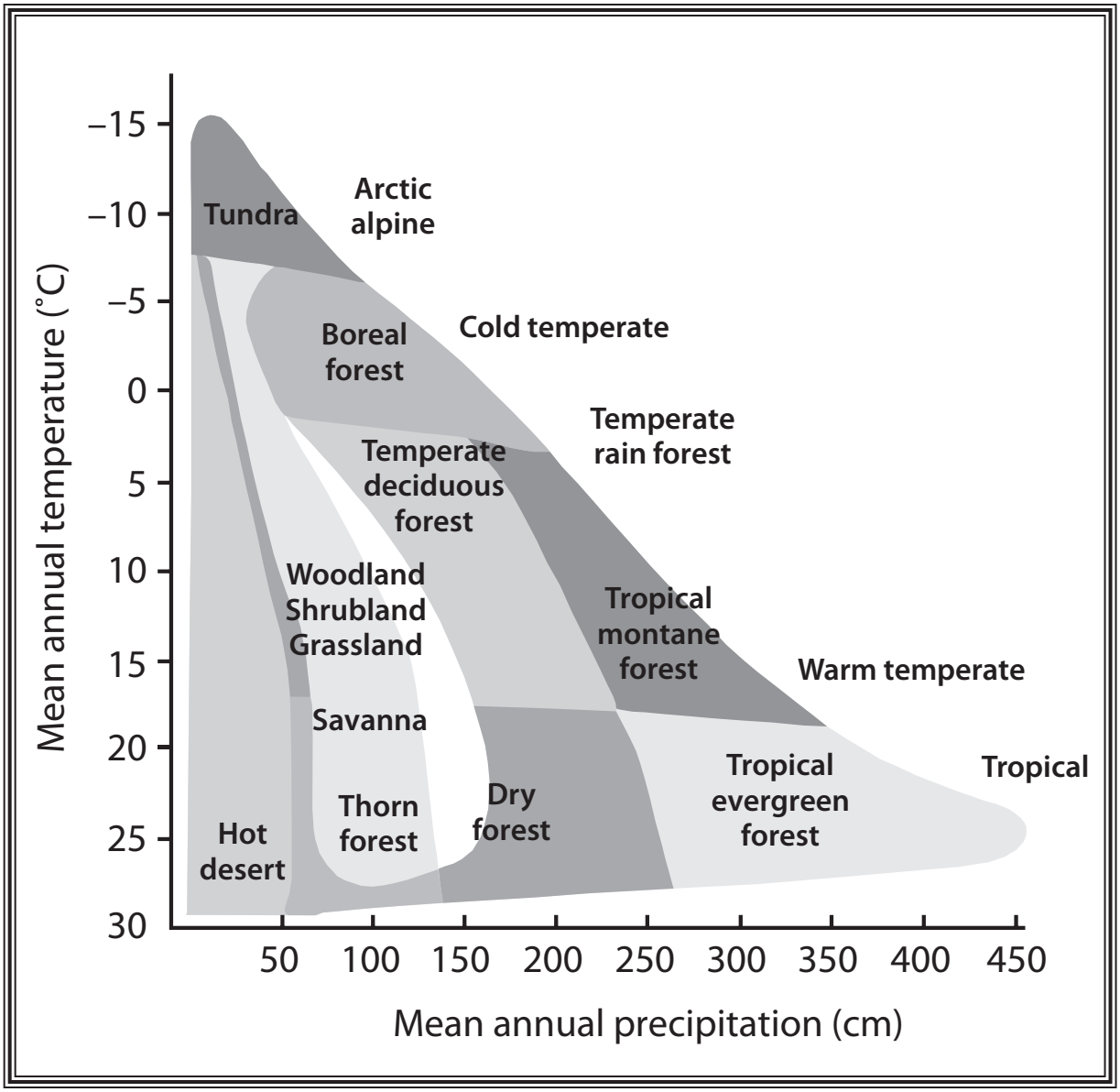
3. What ecosystem is found 30 degrees north of the equator?
4. At about how many degrees south of the equator would you find grassland?

Analyzing the Maps

5. Compare both maps to answer this question. Find the area on the altitude map where a boreal forest is located. What comparable forest do you find on the latitude map?
6. What conditions produce a boreal forest or the comparable ecosystem shown on the latitude map? Use both maps in your answer.

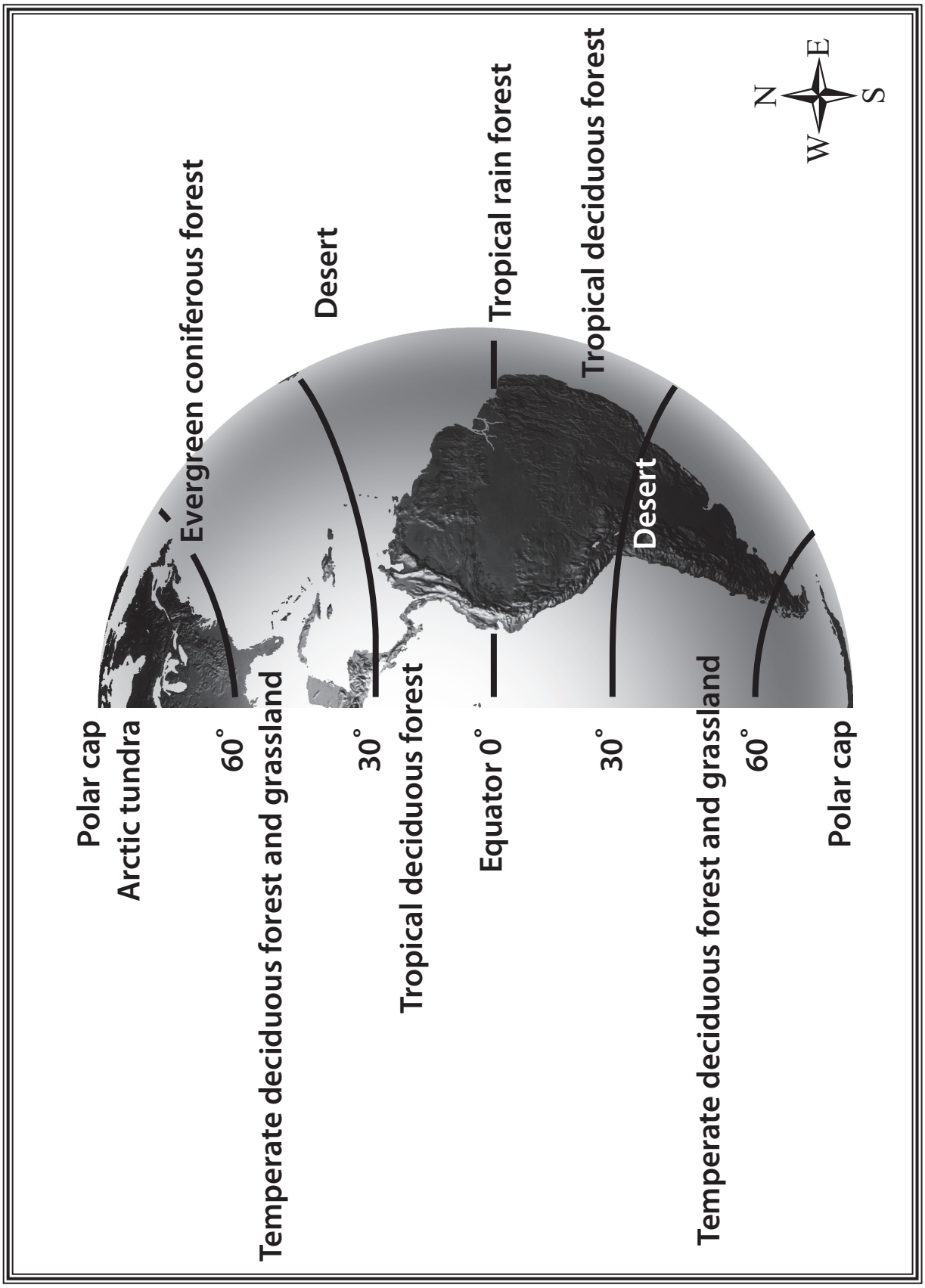
Name: _____

Distribution of World Ecosystems Based on Altitude, Temperature, and Precipitation



Name: _____

Distribution of World Ecosystems Based on Latitude



LESSON 15 Understanding the Effect of Human Activity on Salmon Populations

Goal: To provide opportunities for students to develop concepts and skills related to understanding how human activity can affect the population of an ecosystem

National Geography Standards

Standard 14. How human actions modify the physical environment.

Preparing Students for Instruction

Before starting this activity, review with students how to get information from a pie chart.

Map Overview

These two maps give information about the northwest coast of the United States. Map 1 also gives information about the southwest coast of Canada. Map 1 shows the historic range of wild salmon in those coastal areas and the percentage of salmon in each area that are presently at risk or extinct. Map 2 shows ten major dams constructed along northwestern U.S. rivers. The correlation between construction of these dams and salmon endangerment can be seen by studying both maps. The ten dams present a formidable series of obstacles to salmon seeking to spawn in the Snake River, and an even greater obstacle to the young salmon, the smolts, seeking to return to the ocean via that river.

Tell students that wild salmon live in the ocean, but when they are ready to spawn, to lay eggs, they swim up rivers to wherever they were hatched, lay their eggs there, and die. The young salmon hatched from those eggs make their way down the river to the sea, where they live until they are ready to spawn.

Answer Key
1. Alaska
2. 38%
3. Idaho
4. Two: Hells Canyon Dam and Dworshak Dam
5. Columbia River and Snake River and, for the Dworshak Dam, the Clearwater River
6. Answers will vary. Students may postulate that there are few or no dams along the southeastern Alaska rivers where the salmon spawn.
7. Answers will vary. Students may postulate that the journey from the Pacific Ocean to Idaho was the longest trip and had the most hazards for salmon.

Discussion Guide

To support students in reflecting on the activities and to gather some formative information about student learning, use the following prompts to facilitate a class discussion to "debrief" the map activities.

Prompts/Questions

1. How do dams create a problem for wild salmon?
2. What solutions can you suggest for this problem?

Suggested Appropriate Responses

1. They block the salmon's way up a river to spawn. They block young salmon's way downriver to the sea.
2. Answers will vary. Students may know that some dams have built "fish ladders." Other solutions include moving the fish by truck or other vehicle up to their spawning grounds or down to the sea. Destruction of the dams offers another solution but means that communities would need alternate power sources.

Extending and Enhancing Learning

- Have students work in groups to decide on solutions to the problem of fish population decrease. Students can go online to discover what environmental groups suggest, and their reasons. Each group presents a report to the class recommending a solution and explaining their rationale.
- For students who need more support, have them research other endangered species such as grizzly bears or wolves. Students can map their locations. Students should discover the causes of their species' endangerment and whether or not it involved human actions, and discuss solutions that would preserve or protect the species without causing disruption to human activities.
- To challenge students further, have them engage in a mock "town hall" discussion. Divide students into two groups. One is an environmental group opposed to dams, the other a group that believes dams are necessary. Each group meets before the town hall meeting to plan their strategy. Each group must draw up a list of persuasive arguments that support their position. Students should use information from the maps. Environmental groups can use the statistics in the first map to show how much at risk the fish population is. They may draw up a list of alternative energy sources so that hydroelectric power would no longer be needed. The other group can use the dams in the second map and discuss how each dam provides needed power to nearby communities. They may argue that people are more important than fish. After the preparation period, the groups engage in a "debate" and state their positions.

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LESSON 15 Understanding the Effect of Human Activity on Salmon Populations

Geography Vocabulary

range: the area in which an activity takes place

Reading Map 1

Adult salmon live in the ocean. As part of their life cycle, when they are ready to spawn (lay their eggs), salmon swim up the freshwater river from which they were hatched. They lay their eggs and die. New salmon hatch from the eggs. Young adult fish make their way downriver to the ocean.

These two maps show one way that human activity can affect wildlife in an ecosystem. Ten dams have been constructed in Oregon, Washington, and Idaho to provide hydroelectric power to the region. As a result, wild salmon have become "at risk" or even extinct.

Map 1 shows the extinction and endangerment of wild salmon in parts of the northwestern United States and southwestern Canada. Look at the area labeled "Historical range of salmon." Are you surprised to see that it covers a large land area?

Understanding Map 1

1. Which state or province has the smallest percentage of endangered salmon?
2. What percentage of wild salmon are at risk in Washington?
3. What area has the highest percentage of extinct salmon?

Reading Map 2

Put your finger on the mouth of the Columbia River, where it meets the ocean. Follow a path along that river to the Snake River, where many salmon spawn, and along part of the Clearwater River. Count the number of dams that block the way. "Fish ladders" have been constructed at these dams to ease the passage of salmon. Even with this help, young salmon incorrectly swim away from the sea and die.

Understanding Map 2

4. How many dams are in or on the border of Idaho? What are their names?
5. What are the names of the rivers along which the dams on Map 2 were constructed?

Analyzing the Maps

6. Why do you suppose that the least percentage of salmon are at risk in southeast Alaska? Explain.
7. Why do you think more salmon became extinct in Idaho than anywhere else? Explain.

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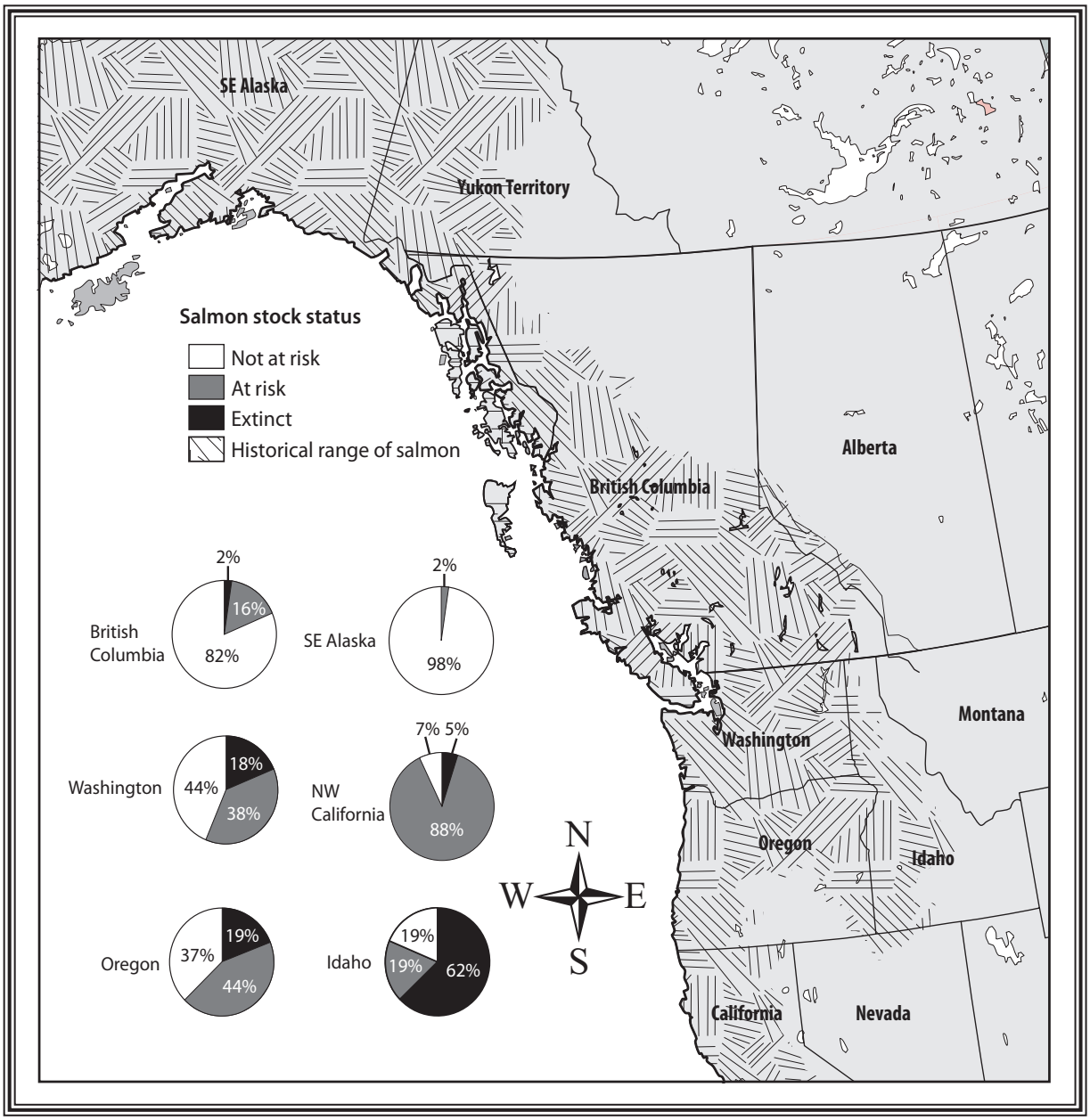
Map 1: Changes in the Distribution of Wild Salmon on the Northwest Coast



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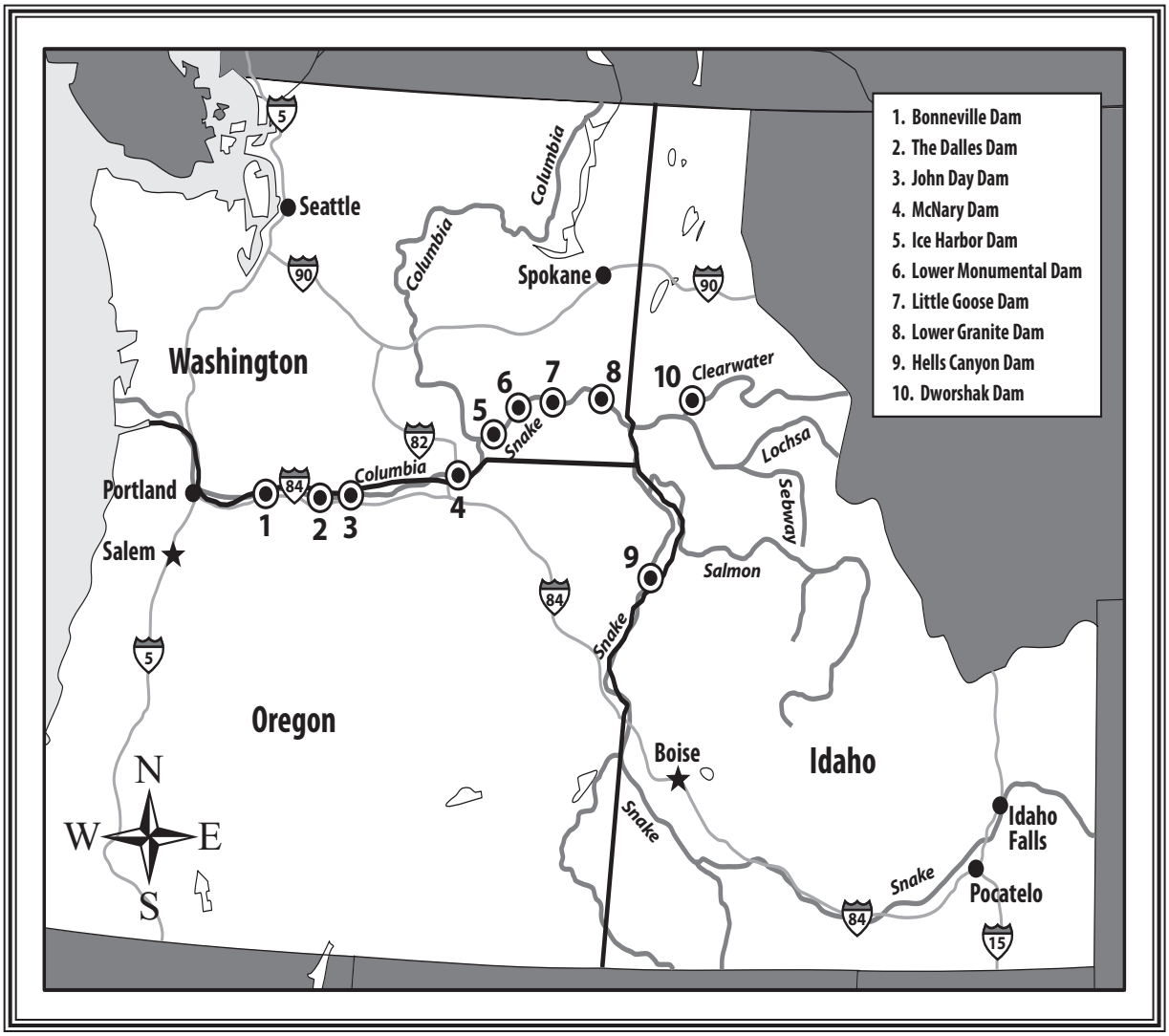
Map 2: Major Dams in Washington, Oregon, and Idaho Along the Columbia River Basin



Glossary

alpine climate: the climate of an area that is above the tree line; high altitude produces a cold climate.

arid: extremely dry; not having enough rainfall to support the growing of crops

boreal: related to forests of the north temperate zone; usually consist of coniferous trees such as spruce, fir, and pine

climate zones: divisions (zones) of an area based on each zone's climate characteristics

compass rose: an element of a map used to show direction

continents: the major land masses on the earth

culture: the customs and way of living of a group

distortion: a change in the shape of an image resulting from imperfections in portraying it

economic resource: a naturally occurring material such as coal, oil, and minerals that can be used to gain wealth

ecosystem: a group of living things and their environment

equator: the imaginary great circle around the middle of the earth's surface; the line of latitude numbered zero

Global Positioning System (GPS): a global satellite navigational system

interstate freeways: a network of limited-access highways that go through more than one state

latitude: imaginary circles on the earth's surface, parallel to the equator and above and below it

limited access: limited access to a highway means that you can only enter it by using an on-ramp

longitude: a series of imaginary lines on the earth's surface passing through the North and South poles

map legend: a table that explains symbols used on a map

map projection: an attempt to portray the surface of the earth or a portion of the earth on a flat surface

map scale: a ratio that compares a distance on the map to the actual distance between locations

marine climate: a climate influenced by its closeness to the sea; a marine climate is usually warmed by the sea.

marine west coast climate: a cool and usually rainy climate found along the west coasts of all the continents

Mediterranean climate: a climate where summers are hot and dry and winters are mild but rainy

meridian: a line of longitude; an imaginary great circle on the earth's surface passing through the North and South poles

parallel: a line of latitude; an imaginary circle on the earth's surface, parallel to the equator and above and below it

physical map: a map that shows landforms

plateau: an area of flat land raised above the surface of surrounding land

political map: a map showing a country's political divisions (such as states, provinces, and territories), boundaries, and capitals

population: all of the people who live in a particular place

population density: the number of people living in a given unit of space

precipitation: the falling of water in the form of rain, sleet, hail, or snow

prime meridian: the line of longitude numbered zero

range: the area in which an activity takes place

region: a group of areas with something in common, usually location

semiarid steppe climate: a climate halfway between humid and arid

subarctic: very cold, but not as cold as arctic/ice

temperate: moderate in temperature; not subject to prolonged extremes of hot or cold weather

territory: an area owned by a country such as the United States or Canada that is not a state or a province

tropical: hot and humid

Tropic of Cancer: a line of latitude 23 degrees north of the equator

Tropic of Capricorn: a line of latitude 23 degrees south of the equator

tundra: a treeless area between the icecap and the tree line of arctic regions; can support the growth of low plants such as lichens and mosses

valley: an area of land that is drained or irrigated by a river