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## Let's Learn: All About Maps - Teacher Guide

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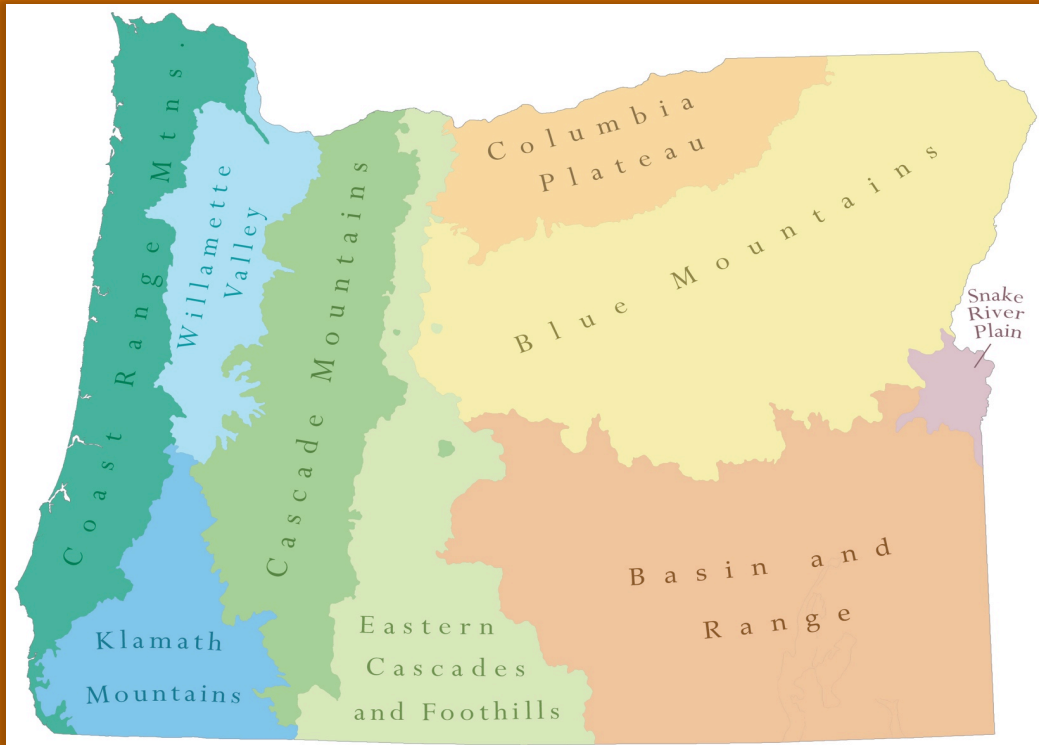
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# Let's Learn *teacher guide!* All About Maps!



Oregon Ecoregions

Inside you will find fun activities to help you learn about maps and how they are used in everyday life.

Keep an eye out for me, Sandy, for fun facts and helpful hints along the way!



2015

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# Let's Learn *teacher guide!* All About Maps!

Geography skills are an essential part of navigating and understanding today's world, and this workbook is meant to serve as an introduction to maps and geographic concepts.

**Pages 42-43:** Teaching Standards - National Geography Standards (NGS), Oregon Geography Standards (OGS), and Oregon Environmental Literacy Standards (OELS)

Each of the activities in this book includes at least one of the following symbols:



*National Geography Standards (NGS)*




*Oregon Geography Standards (OGS)*



*Oregon Environmental Literacy Standards (OELS)*

These symbols serve as a guide to how the workbook activities connect to the state and national standards.

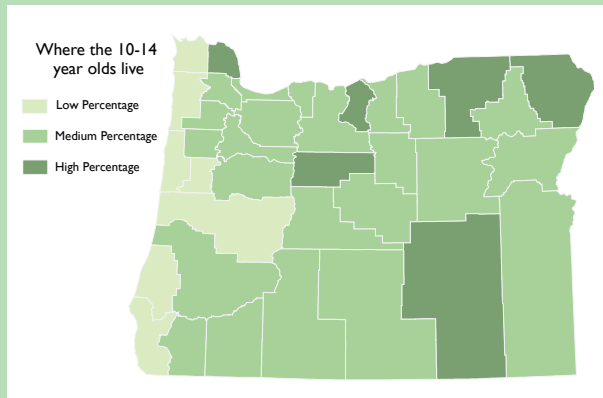
**Additional Resources:** A red apple (  ) at the bottom of the page indicates additional activity resources for teachers, which are located on Page 44.

**We hope you find this workbook helpful in improving map and geographic literacy in Oregon!**

# How Geographers Use Maps

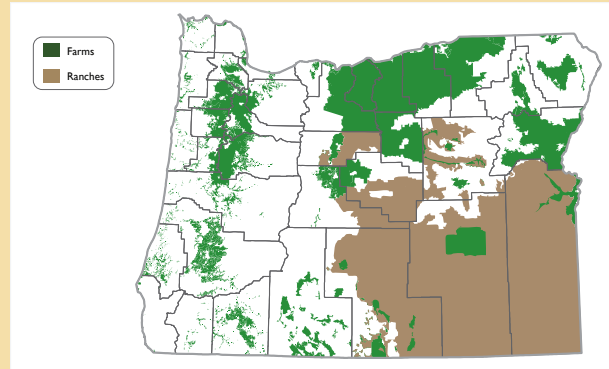
The maps on Page iii and iv show how maps can be used in connection with the six essential elements of the national geography standards.

## Human Systems



Geographers study where people are located on the earth as well as the characteristics of people located in an area, such as age, religion, or education level. The map above shows where Oregonians who are 10-14 years old live.

## Environment and Society



Geographers use maps to show relationships between humans and the environment. One example is where we farm and ranch. The places above that are in green show where we grow crops like fruits and vegetables. These areas are close to rivers so that the crops can be watered. Places where we ranch are large, open areas where ranchers graze cattle, such as in Southeast Oregon.

## The Uses of Geography

Geographers use maps to help understand the past and plan for the future. Many people use maps regularly at their jobs to plan for the future. Some examples are:

- |               |                     |                         |
|---------------|---------------------|-------------------------|
| City planners | Weather forecasters | Park rangers            |
| Hydrologists  | Pilots              | Wetland managers        |
| Tour guides   | Delivery people     | Police and firefighters |

Satellite image of Hurricane Katrina



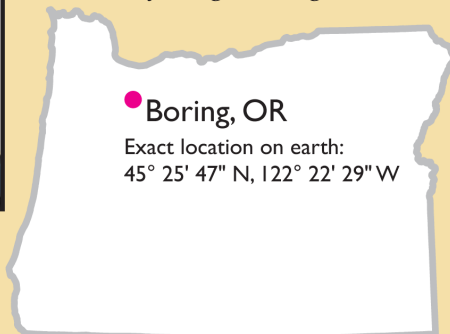
# How Geographers Use Maps

Geographers use maps to show distributions. The maps help us see patterns and relationships of things. What geographers map is related to the Six Essential Elements of Geography:

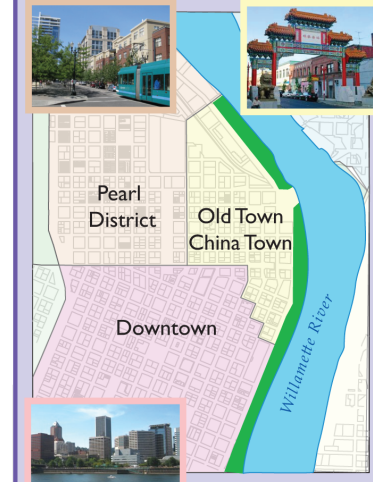
- The World in Spatial Terms
- Places and Regions
- Physical Systems
- Human Systems
- Environment and Society
- Uses of Geography

## The World in Spatial Terms

Geographers use maps to show where things exist in the world so we can understand patterns and relationships of anything existing on earth.

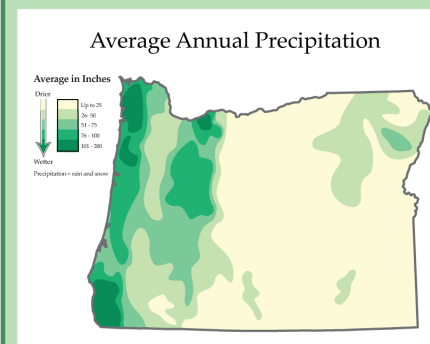


## Places and Regions



Places and regions are defined by the cultural and physical features found there. Geographers use maps to identify places and regions that share common characteristics, such as a “Downtown” region with skyscrapers, a “Pearl District” area with residential housing, and a “Chinatown” region with Chinese sculpture and art.

## Physical Systems



Geographers use maps to help understand how the earth is affected by physical systems. This map shows where rain and snow fall in Oregon. We can look at the map to understand not only where precipitation falls but also where vegetation that depends on rain grows.

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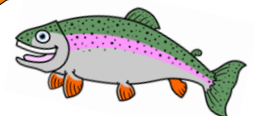
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## What Are Maps Used For?

**A map is a representation of an area.** Maps can show you how to get somewhere, display where things are located, and show the distance between things.

**Who uses maps?** Everyone! Maps are guides that help people with many different activities. There are even specific maps for different activities, such as hiking, biking, sailing, camping, caving, public transit, and scavenger hunts. Hikers sometimes use *topographic* maps to show how steep mountains are; construction workers use maps called *blueprints* as a guide for constructing new buildings; and meteorologists use *satellite* and *radar* maps to predict the weather. These are just a few examples of the many different kinds of maps!

Hi! I'm Sandy the Chinook Salmon. I'm the official Oregon state fish, and I'll be your friendly guide through the activities in this book!!



# What is a Map?



## Picture



A picture shows places as they appear in real life. This picture shows a view of Crater Lake that you would see if you went there yourself and looked at the lake from ground level.



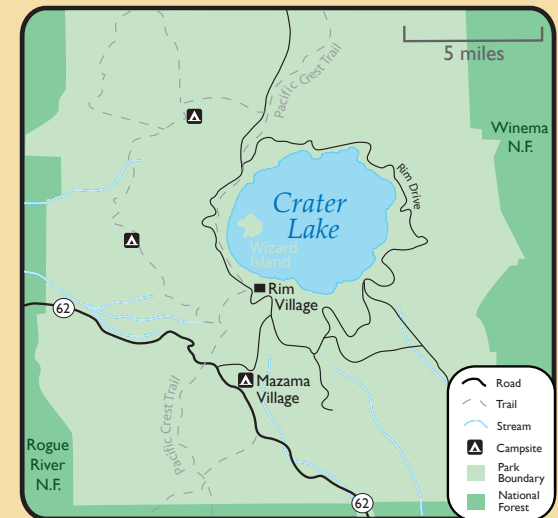
## Aerial Photo

An aerial photo is a picture taken from an airplane or satellite. This photo shows Crater Lake from above.



## Map

A map is like a photograph taken from directly overhead - a bird's eye view. The map maker uses colors, lines, symbols, and labels to represent the features that we would see in the photograph.



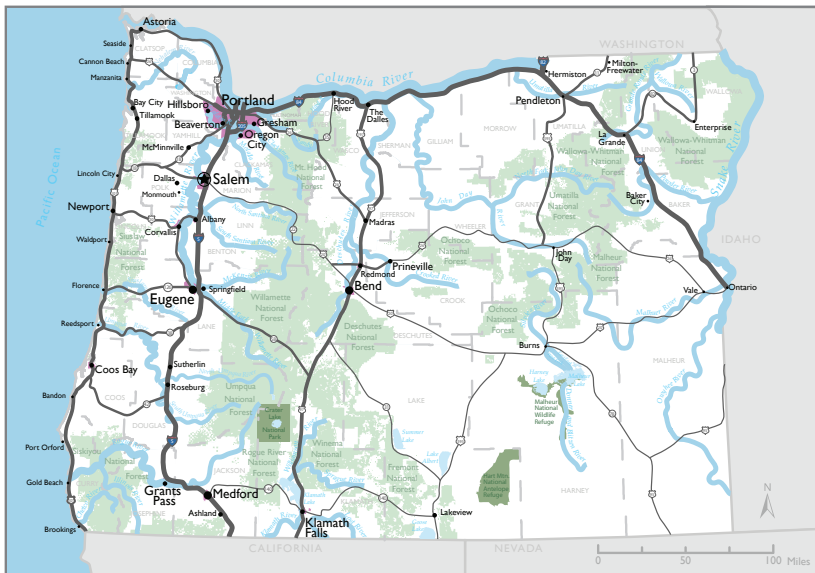
## Cartographer

A "cartographer" is a person who makes maps.

# Types of Maps

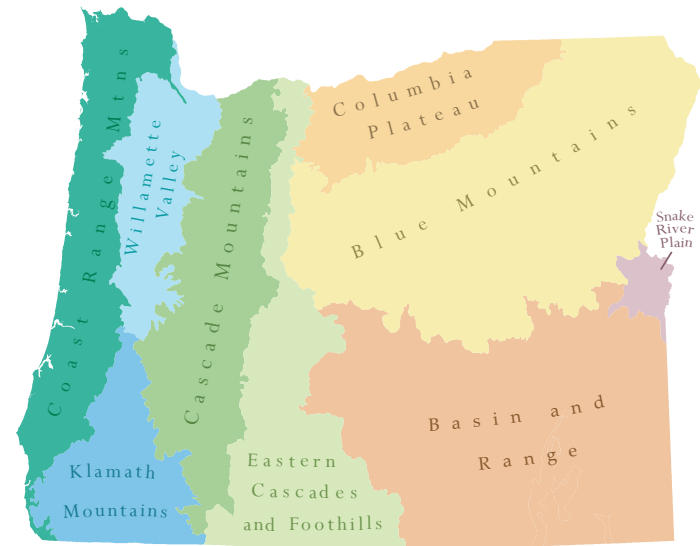
## General Reference

**General Reference Maps** use symbols to show the exact location of things on the earth. For example, where the black line is drawn for the roads is where you can actually find the road in real life. The map of Oregon, below, is an example of a **general reference map**.



## Thematic

**Thematic Maps** use symbols to show a pattern or “theme.” Usually, the symbols used on these maps are not in an exact location because the maps provide only general information about the theme or pattern. The map of Oregon’s ecoregions, below, is an example of a **thematic map**.

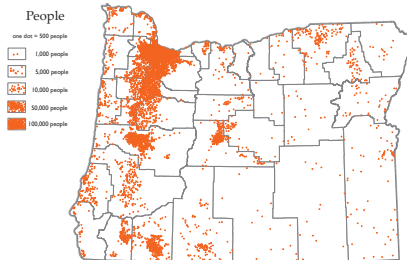




# Types of Thematic Maps

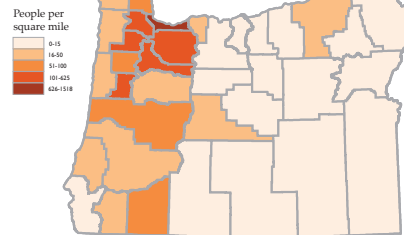
All five thematic maps show where people live in Oregon, but each map uses a different way to show that distribution.

## Dot Density



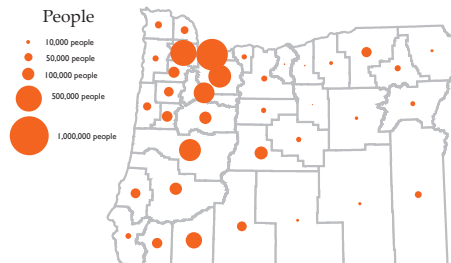
- One dot equals a certain number of people
- If dots are close together, lots of people live in one area
- If dots are spread out, not very many people live in one area

## Choropleth



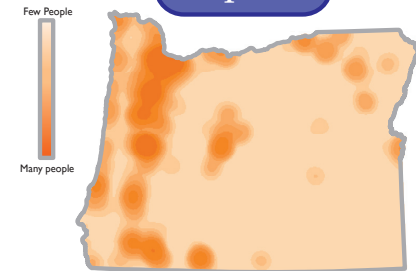
- Each county is shaded a color to show density or number of people per square mile
- The symbol covers an entire county, but it does not mean that people live everywhere inside the county

## Graduated Circle



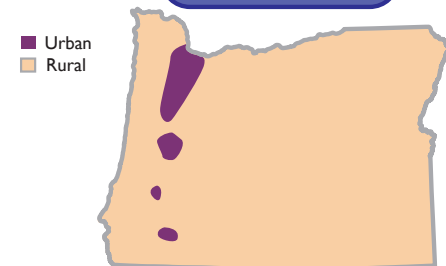
- One circle represents how many people live in that county
- The size of the circle is proportional to the number of people that live in a county - the more people that live in a county, the larger the circle

## Isopleth



- This map shows a continuous distribution of population
- Because we do not know how many people live in every single place in Oregon, we take an average of two cities in an area to estimate the number of people in that area

## Color Patch



- This map draws boundaries around different groups of people (for example, urban residents and rural residents)
- The map does not show how many people are in each group, just where each group is located

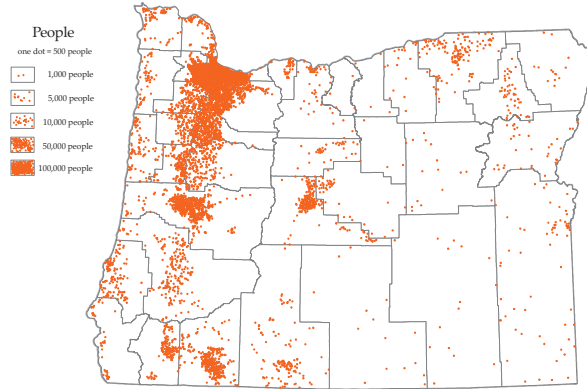
# Examples of Map Types

Below are some examples of different maps of Oregon and Portland. Some of the maps are *general reference* and some are *thematic*; can you tell which is which?

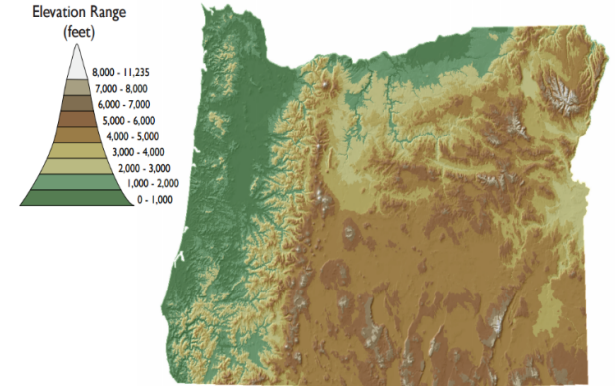
**A: Highways**



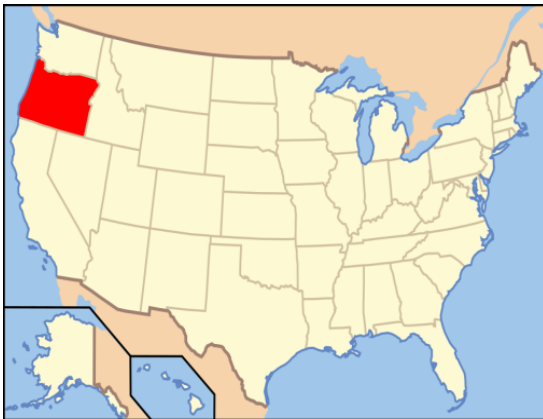
**B: Population**



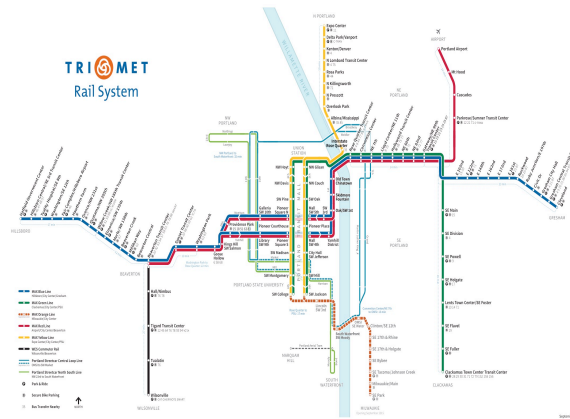
**C: Topography**



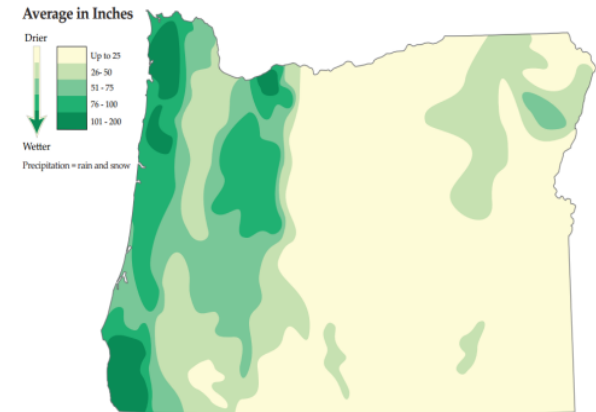
**D: Country**



**E: Transportation**



**F: Average Annual Precipitation**



# Map Types Activity

Different maps show different information depending on the map's purpose. Use the maps on the previous page to answer the questions below.

1. Which map would be the most helpful while driving across Oregon? Why? \_\_\_\_\_  
**A, because it shows highways and roads**

2. Which map would be the most helpful for comparing Oregon's size with the size of other states? Why? \_\_\_\_\_  
**D, because it shows all of the U.S. states for comparison**

3. Which map would be most helpful for getting around Portland without a car? Why? \_\_\_\_\_  
**E, because it shows Portland's public transportation lines**

4. Which map might a farmer use to decide what types of crops to plant? Why? \_\_\_\_\_  
**F, because it shows precipitation patterns**

5. Which map would be the most helpful for finding the locations of Oregon's mountains and valleys? Why? \_\_\_\_\_  
**C, because it shows topography (elevation)**

6. Which map shows where people live? Which part of Oregon has the most people living in it? Which area has the least? Why do you think this is? \_\_\_\_\_  
**B. Portland and the Willamette Valley have the most people. Eastern Oregon has the fewest people. Possible reasons include city concentration along the Willamette Valley and the fact that much of Eastern Oregon is farm and ranch land.**

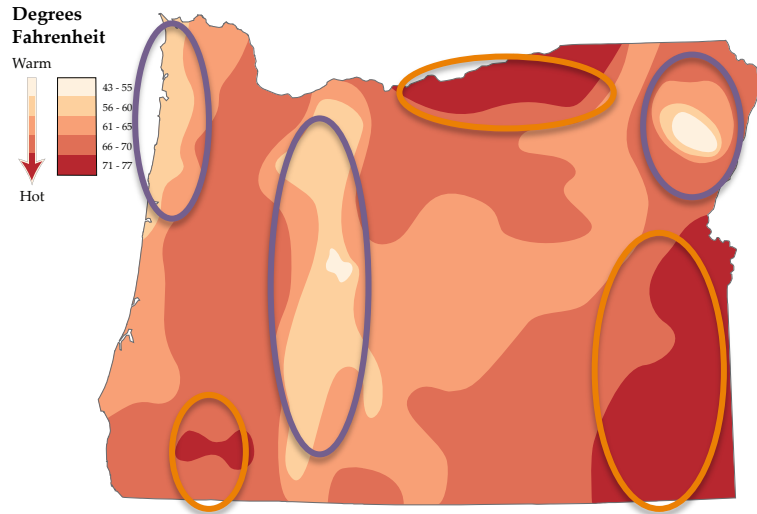
7. Which of the maps are general reference maps, and which are thematic maps? How can you tell? \_\_\_\_\_  
**General reference: A, C, E**  
**Thematic: B, D, and F. You can tell which is which based on the content and purpose of the different maps.**



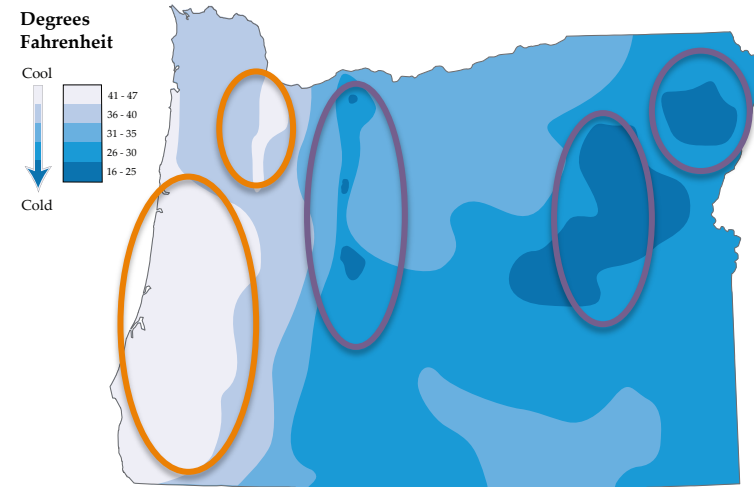
# Comparing Maps of Oregon

Below are two *thematic* maps of Oregon showing the average temperatures for July and January. There is a *map key* to the left of each map explaining what the different color variations on the maps mean in terms of temperature. **Use the maps to answer the questions below.**

## Average July Temperature



## Average January Temperature



I like living in water with a temperature between 45-60 degrees. That way, it is not too hot, and not too cold!



1. On the July temperature map, circle and label the best places in Oregon to go to escape the heat, and identify the hottest parts of the state. On the January temperature map, circle and label the coldest and warmest areas in Oregon.
2. Why is there a cold spot in Northeast Oregon in July? (Hint: think of the role topography plays in temperature) \_\_\_\_\_  
**The Wallowa Mountains are located here (higher elevations have lower temperatures).**
3. Why do you think the Oregon coast is cooler than the Willamette Valley in the winter and warmer than the Willamette Valley in the summer?

**The ocean provides a moderating effect on temperatures, making the coast cooler in the summer and warmer in the winter.**



NGS: 3, 4, 7



OGS: 1, 3



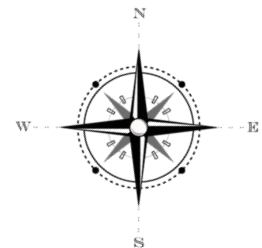
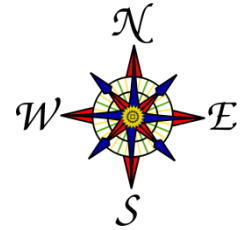
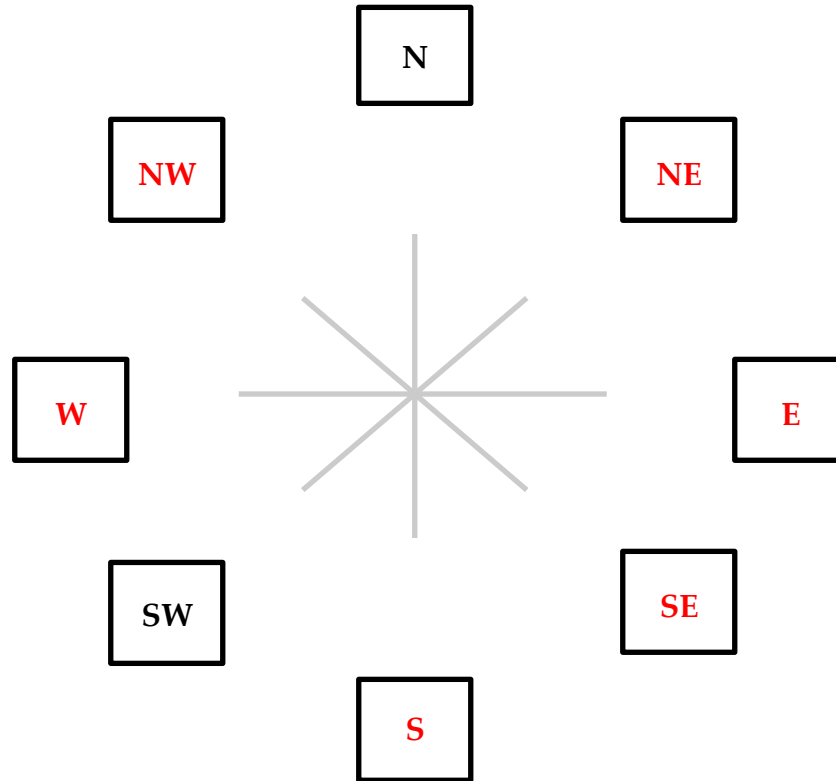
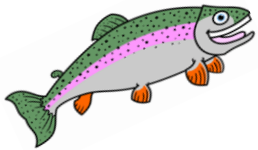
OELS: 2

# Orientation Activity

**Which way is which on a map?** Most maps have a *compass rose*, which tells the reader which direction is which. You can usually find the compass rose on the top, bottom, or corner of the map. It's also often near the legend. There are four main directions on a compass: **North, East, South, and West**. North is usually at the top of the compass. Below are some examples of what a compass rose looks like. In addition to being helpful they are also often beautiful and ornate.

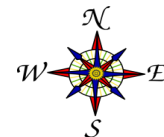
Below, draw your own compass rose using the lines as your guide, and fill in the missing direction letters.

One helpful way to remember the order of directions around a compass is to **Never Eat Slimy Worms!** Mmmm, more worms for me!



# Orientation and Directions Activity

Now that you know how to orient yourself using a compass, help Sandy get to the end of the spawning stream! Below, write directions to the finish line, specifying N, E, S, W and NE, SE, SW, NW, and how many squares to go. Sandy has to stay in the water (Sandy can not go through rocks or on land), and it is your job to make sure Sandy does not end up in the same square as any predators (being diagonal to one is okay) like the fishhooks and bears in this stream.



Use the compass for reference when writing out directions

## Directions for Sandy:

1. **Various answers possible** \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_
13. \_\_\_\_\_
14. \_\_\_\_\_
15. \_\_\_\_\_

Adult Chinook salmon like me can spend between one and eight years in the ocean before returning to the stream where we were born (called a "natal stream") to spawn!



NGS: 1,3



OGS: 1

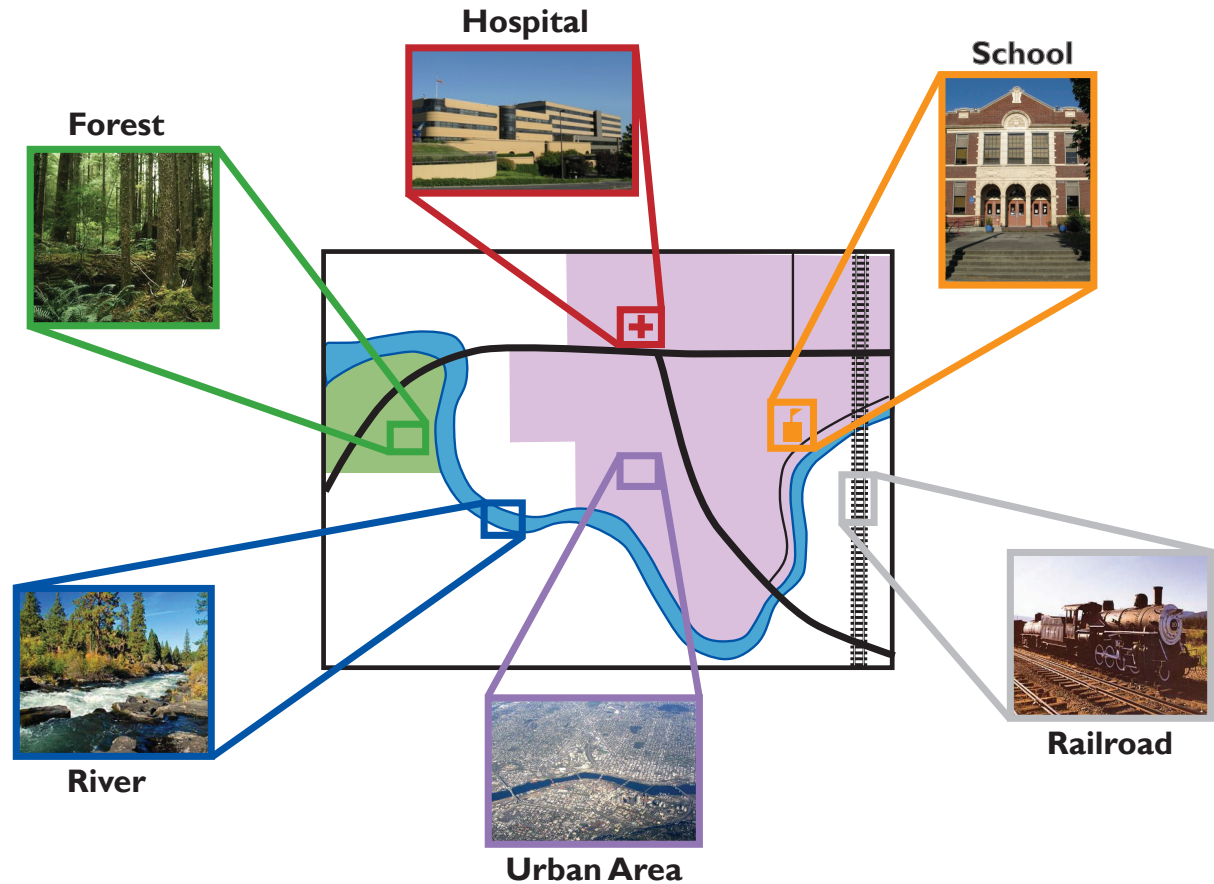
# Map Legends and Keys: How Cartographers Use Symbols








Cartographers use different symbols on maps to represent real features from the world. Three common types of symbols are point symbols, line symbols and area symbols.

Cartographers use point symbols to show exactly where one thing (a school or a hospital) is located on the map. The symbol is usually a dot or a picture.

When a feature is long and in the shape of a line, cartographers use line symbols to represent these things. On the map, a blue line is used for a river and a black line is used for a road.

When something on a map is not a specific point, but rather a whole area, a cartographer uses an area symbol. These symbols shade an area to represent places such as forests, urban areas, and oceans.



<u>Point Symbols</u>	<u>Line Symbols</u>	<u>Area Symbols</u>
 School	 River	 Forest
 Hospital	 Street	 Urban Area
	 Railroad	

# Map Legends and Map Key Activity

**How do you show what things are on a map?** *Map legends* (also called *map keys*) are guides that show what the different symbols and features on maps represent. The legend, or key, can usually be found in a small box on one edge of the map.

On a map key or legend...

A **school** might look like this:




A **hospital** might look like this:

A **river** might look like this:

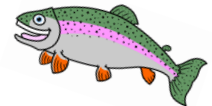
A **street** or **highway** might look like this:

**Train tracks** might look like this:



1. What could  represent? Airport
2. What could  represent? Stable/Barn
3. What could  represent Fire

My symbol would probably look something like this! I'm pretty cute, huh?



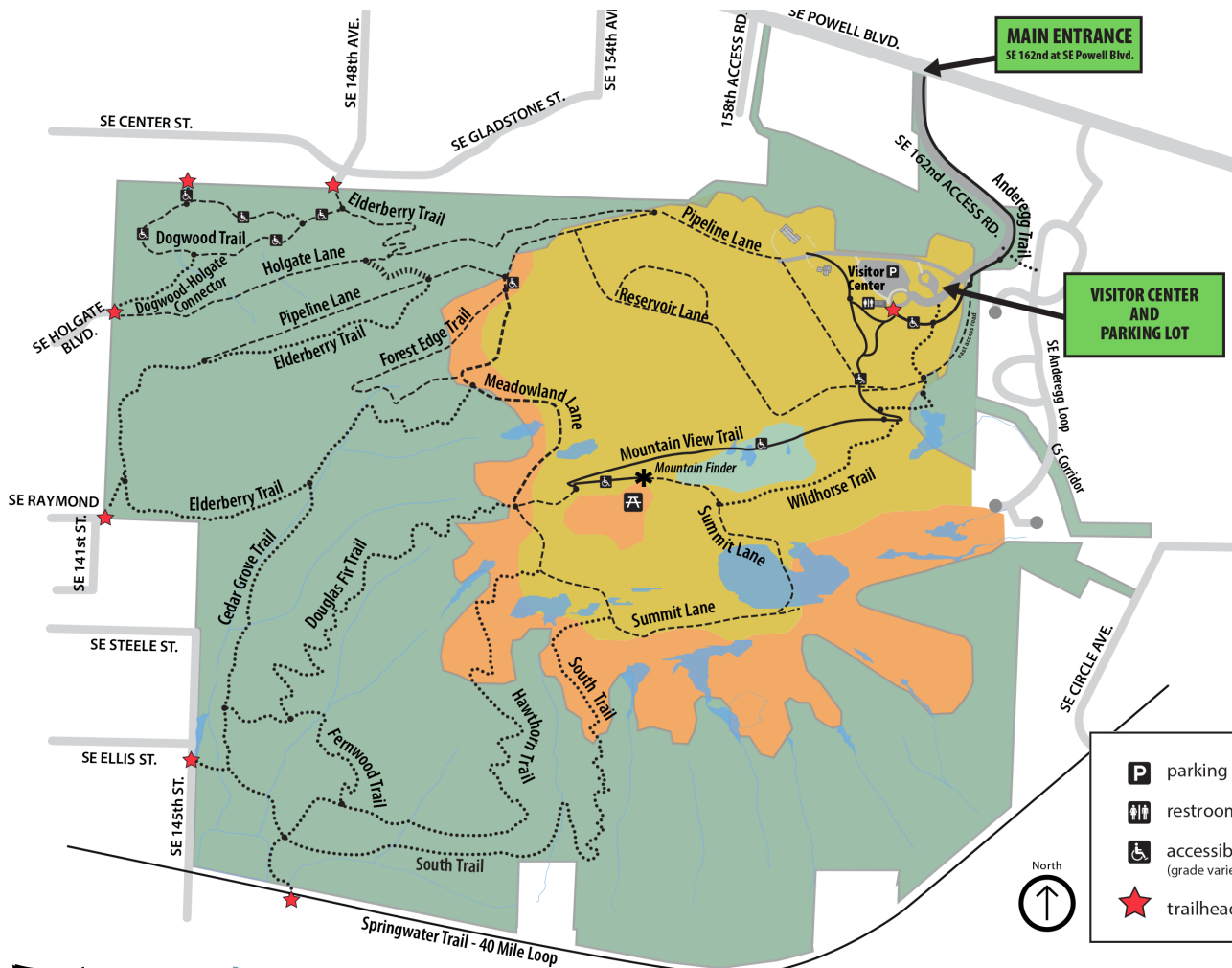
Now it's your turn! Create three map symbols below. Make sure to write down what each symbol represents.

Symbol for: _____ Various answers possible	Symbol for: _____ Various answers possible	Symbol for: _____ Various answers possible
---	---	---



# Map Legends and Keys Activity

Why are map legends important? Below is a map of Powell Butte Nature Park and its trails in Portland, Oregon. What role does the map legend play in helping visitors plan a hike? What features can the legend help you find? Is there anything you would add to the legend that you often find in maps (such as distance)?



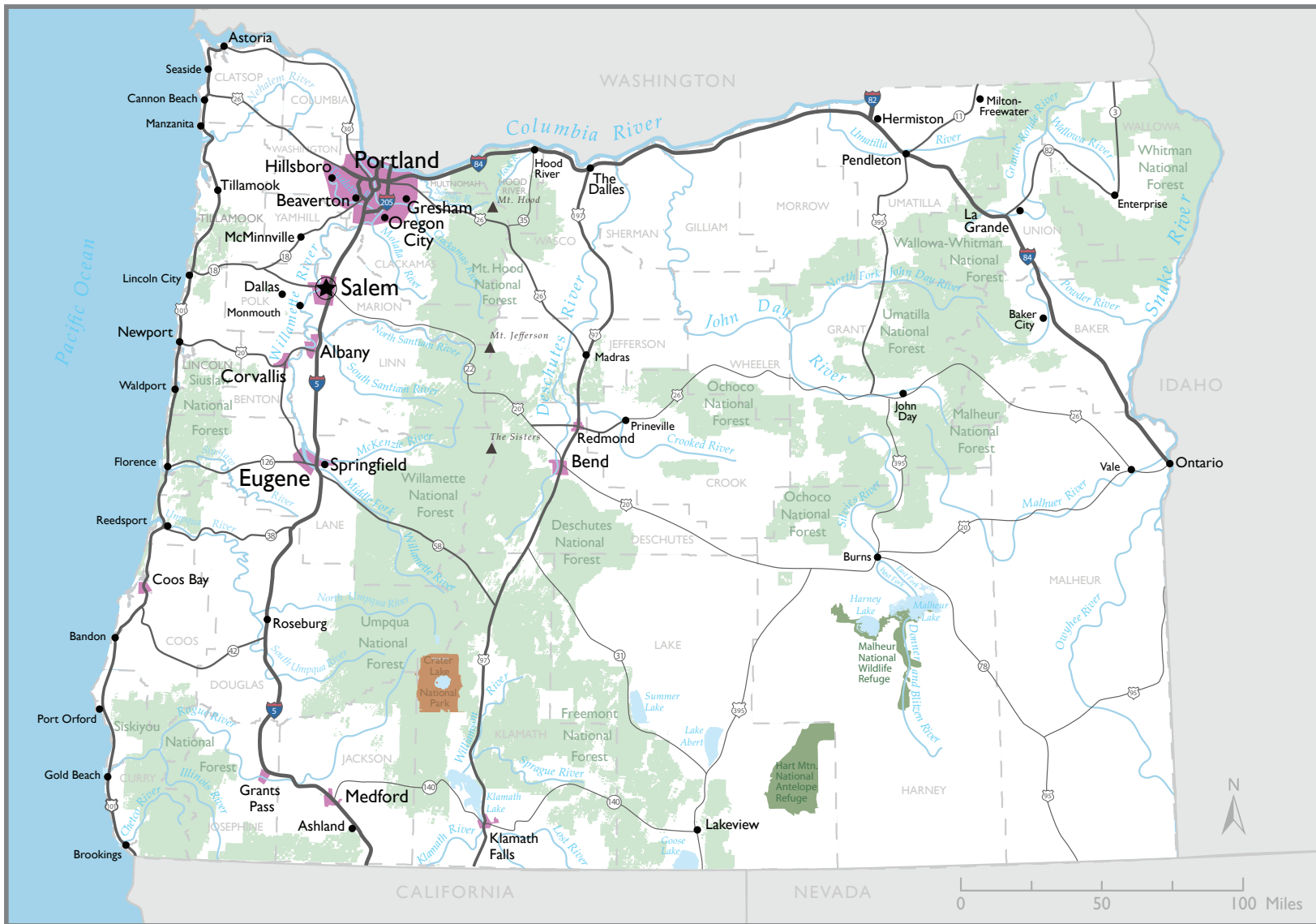
## Answers

The legend explains the symbols found on the map.

The legend can help you find physical (or landscape) features, and features made by humans (such as parking areas).

Add scale

# General Reference Map of Oregon



# Reading a Map of Oregon

**Oregon is a big place!** The state is 96,981 square miles (or 251,161 square kilometers) in size, and as of 2016 Oregon was home to nearly 4 million people. Portland alone has a population of approximately 610,000 people, and the city is still growing. Portland is the biggest city in Oregon, followed by Eugene and Salem (the state capital). The map above shows Oregon's cities, major roads, state forests, and the sole national park. Can you find your home on the map? What places in Oregon have you visited?

Use the information on this page and the map of Oregon on Page 13 to answer the questions below:

1. Can you find Portland on the map? Where is it (North, East, Southwest, etc.)? **Northwest**
2. What town is the farthest south in Oregon? **Brookings**
3. What four states border Oregon? **Washington, Idaho, Nevada, and California**
4. How are forests represented on this map? **Forests are represented by continuous green spaces on the map**
5. What is the name of Oregon's only National Park? (Hint: it's depicted in brown on the map) **Crater Lake**
6. There are three major roads that run all the way through Oregon, from Washington to California. What are they? Have you been on any of them before? **I-101, I-5, and Highway 97**

Create a map legend for the map of Oregon on Page 13. Draw four symbols and write their meanings below:

Various answers possible

I live in the Columbia River, which borders Washington and Oregon. Can you find my home on the map? Can you find your city or town on the map?



# Making a Globe Become a Map

## How do you make something round become flat?

1. A globe is a best model of the earth because it is round like the earth. But it isn't easy to carry around with us.



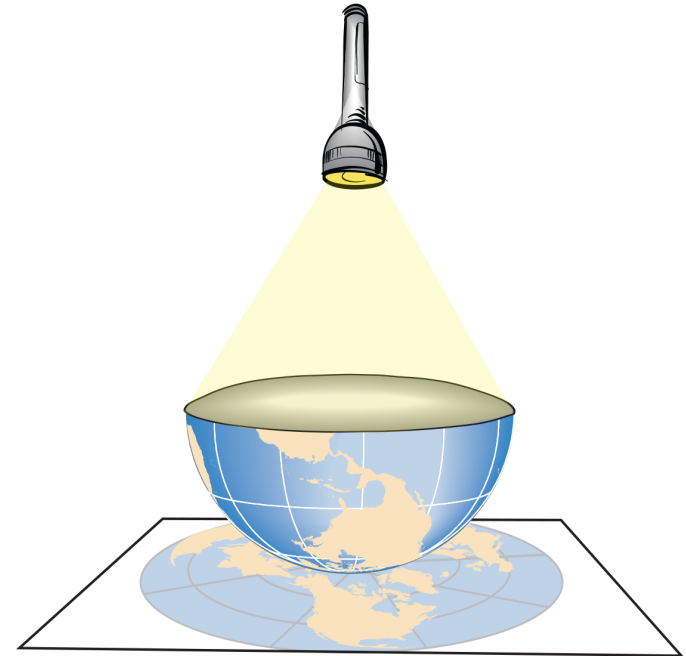
2. Cartographers have to find a way make the round earth flat so we can carry it around.



3. Once we flatten the round globe out, it stretches and changes shapes and sizes of the continents as it does when you flatten cookie dough.

## What is a Map Projection?

A map projection is how cartographers flatten the earth onto paper



A map projection can be made by shining a flashlight into the middle of the globe and putting a piece of paper on the globe. Then, the flashlight shines onto the paper and you can trace the continents.

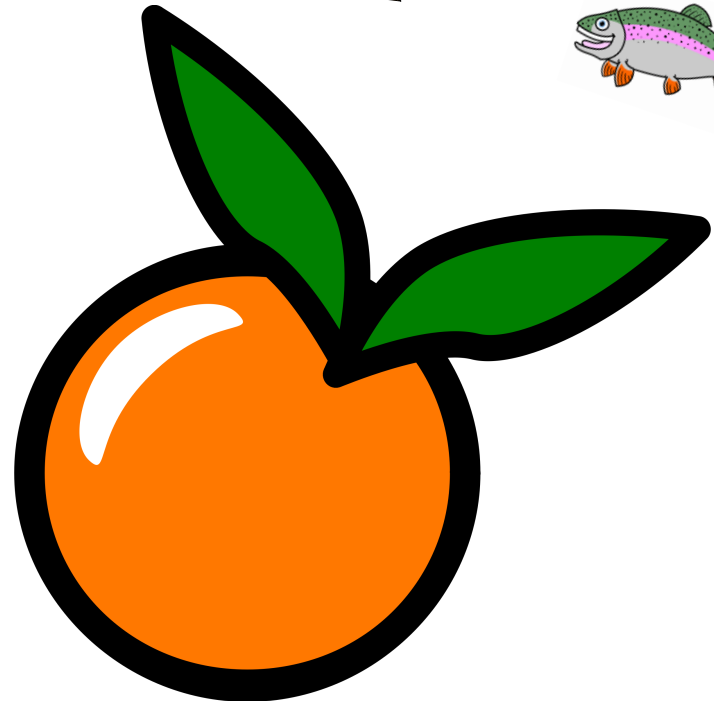
# Map Projection Activity

Now that you understand how maps take a three dimensional object and make it two dimensional, let's practice taking a "three-dimensional" image and making it flat. **Imagine that the orange below represents the Earth (they are both round). If you peel the orange, what will the peel look like when you flatten it out? Draw it below.**



Possible example

Woah! That's a big orange! Remember, when you make any three dimensional object two dimensional there will always be some error. With modern map-making technology the error is much less than it used to be.

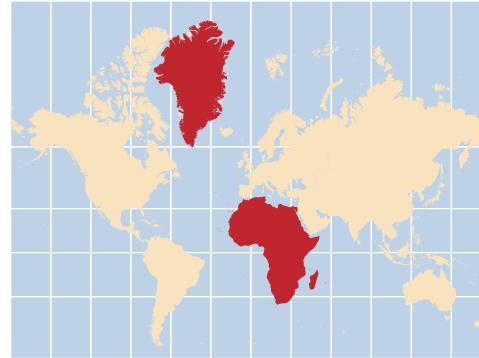


# Map Distortions

When we flatten a round earth onto a piece of paper, there will be problems with any projection we choose. Just as flattening a ball of cookie dough stretches and pulls the dough into a new surface, the map projection stretches and pulls the parts of the earth into a new surface so it all can lie flat on the paper.

Since we know that all map projections have errors (distortions), we have to know what types of errors a map has so that we can pick the best projection to show the information we want to map. Maps will have distortions of one or more of these properties: **Distance**, **Direction**, **Area**, **Shape**, or **Scale**.

## Mercator Projection



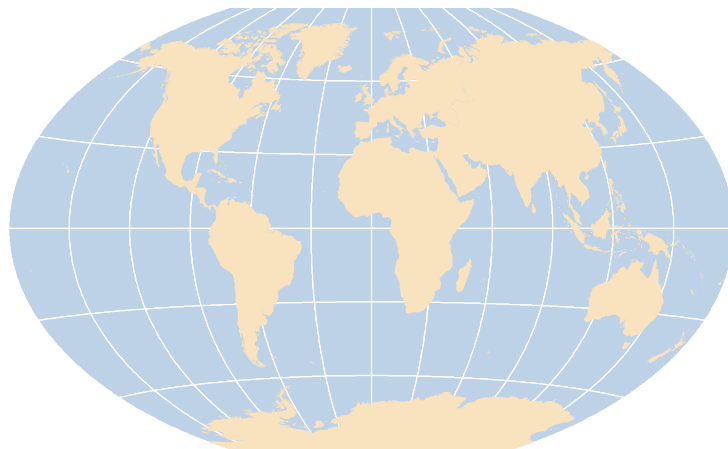
Greenland is the same size as Africa on this map. The Mercator Projection distorts **area**.

## Gall-Peters Projection



South America looks like it has been stretched. The Gall-Peters Projection distorts **shape**.

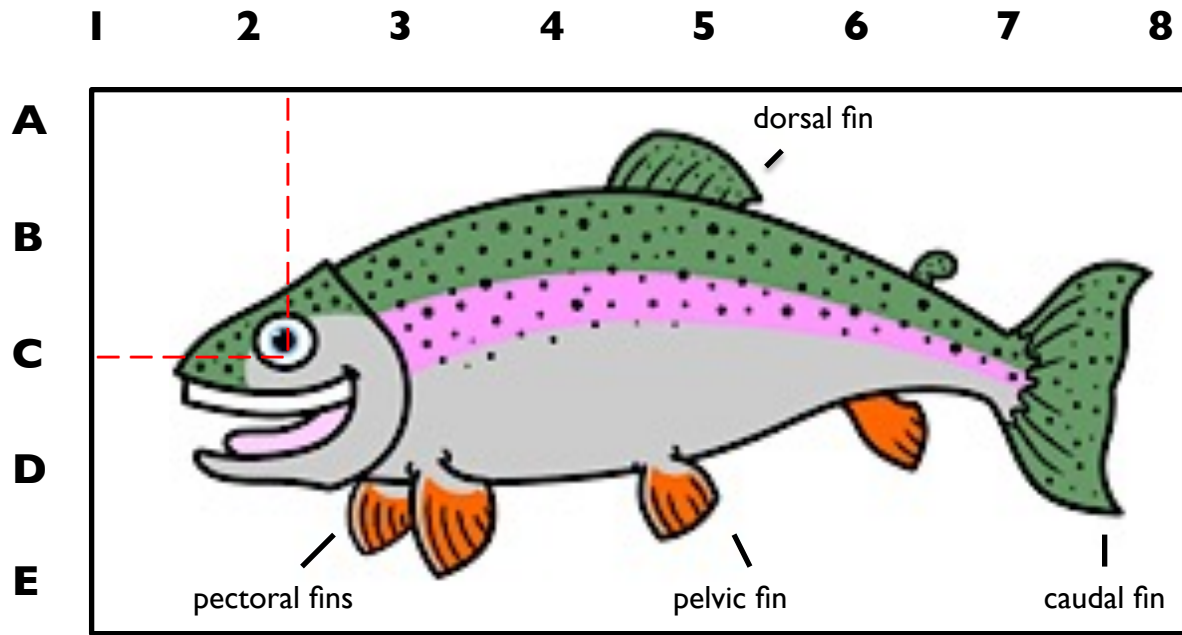
## Winkel Tripel Projection: A Compromise



Some projections, known as compromise projections, have distortions but map makers try to make them as small as possible so that the map projection looks like what we are used to seeing on the globe. The Winkel Tripel Projection, for example, has distortions of area, direction, and distance, but they are small distortions.

# Map Grid Systems Activity

A lot of maps use a grid system to help the reader find specific locations more quickly. Below is an example of a grid system, which we will use to identify various parts of Sandy the Salmon. Follow the steps below, and then answer the questions on the right side of the page.



## Where is Sandy's eye located?

1. First, find the letter C on the side of the map
2. Next, find the number 2 on the top of the map
3. Draw a line across from C to Sandy's eye
4. Draw a line down from 2 to Sandy's eye
5. The two lines meet at C2 – **Sandy's eye is located at "C2"!**

Now that you know how a grid system works, draw the connecting lines and give the location of these other parts of Sandy:

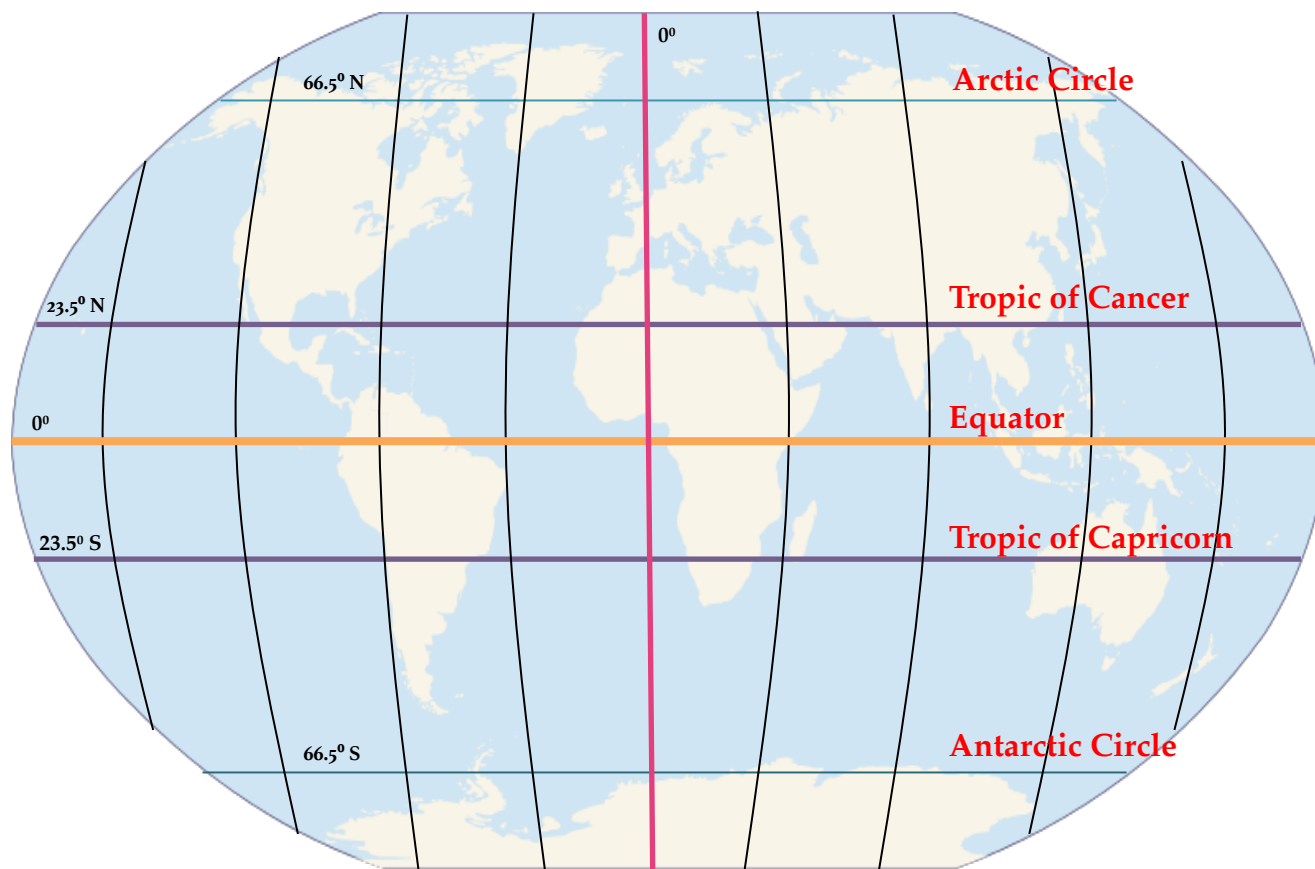
1. Caudal fin \_\_\_\_\_  
**D7 or D8**
2. Dorsal fin \_\_\_\_\_  
**Between A5 and B5**
3. The pectoral fins are located at: \_\_\_\_\_  
**E3**
4. What do you find at D5? \_\_\_\_\_  
**Pelvic Fin**
5. Draw something for Sandy to eat at B1. What did you draw?  
**Various answers possible**

# Map Grids and Key Lines

The Earth is almost a perfect sphere. The **Equator (orange line)** is located at  $0^{\circ}$  latitude, splitting the Northern and Southern hemispheres (hemisphere means “half a sphere”). The **Prime Meridian (pink line)**, located at  $0^{\circ}$  longitude, splits the the Eastern and Western hemispheres. The **Tropic of Cancer** is located at  $23.5^{\circ}$  North, and the **Tropic of Capricorn** is located at  $23.5^{\circ}$  South (**purple lines**). The **Arctic Circle** is located at  $66.5^{\circ}$  North, and the **Antarctic Circle** is located at  $66.5^{\circ}$  South (**teal lines**).

Now that you know about key lines, label the Equator, Prime Meridian, Arctic Circle, Antarctic Circle, and Tropics of Capricorn and Cancer on the map below.

Prime Meridian



Fun fact! The Earth is over 70% water, and only 2.5% is fresh water. This is good for fish like me, since many salmon are anadromous, which means we spend part of our lives in fresh water, and part of our lives in salt water.



NGS: I



OGS: 5



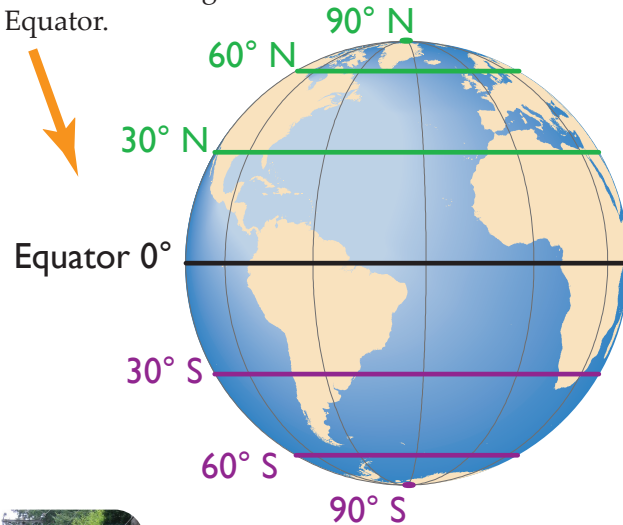
TR: I - Latitude, Longitude , and Temperature Activity



# Latitude and Longitude Lines

## Latitude

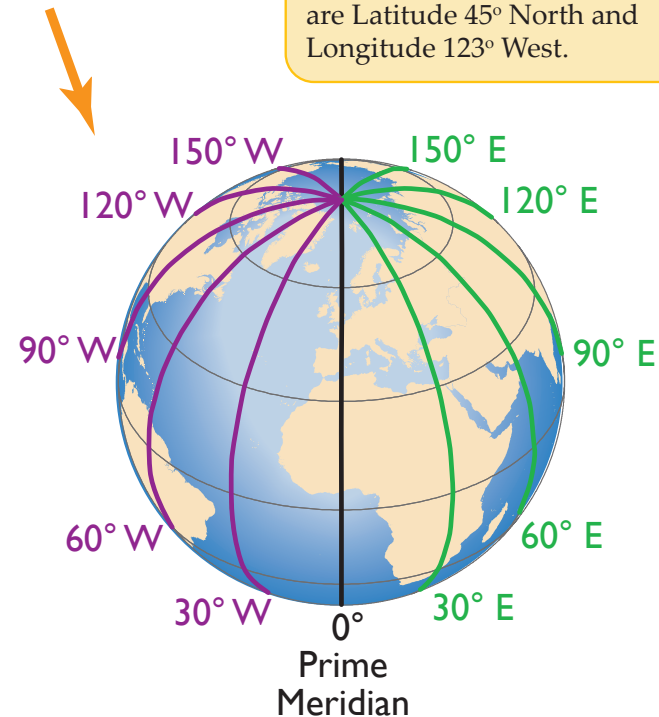
Lines of latitude go across the earth from East to West, but they measure the globe from North to South starting at the Equator.



In this picture, the sign marks the 45th parallel, but there is no line on the ground because these lines are imaginary. We draw imaginary lines on the earth to help us find and explain exact locations of places on earth.

## Longitude

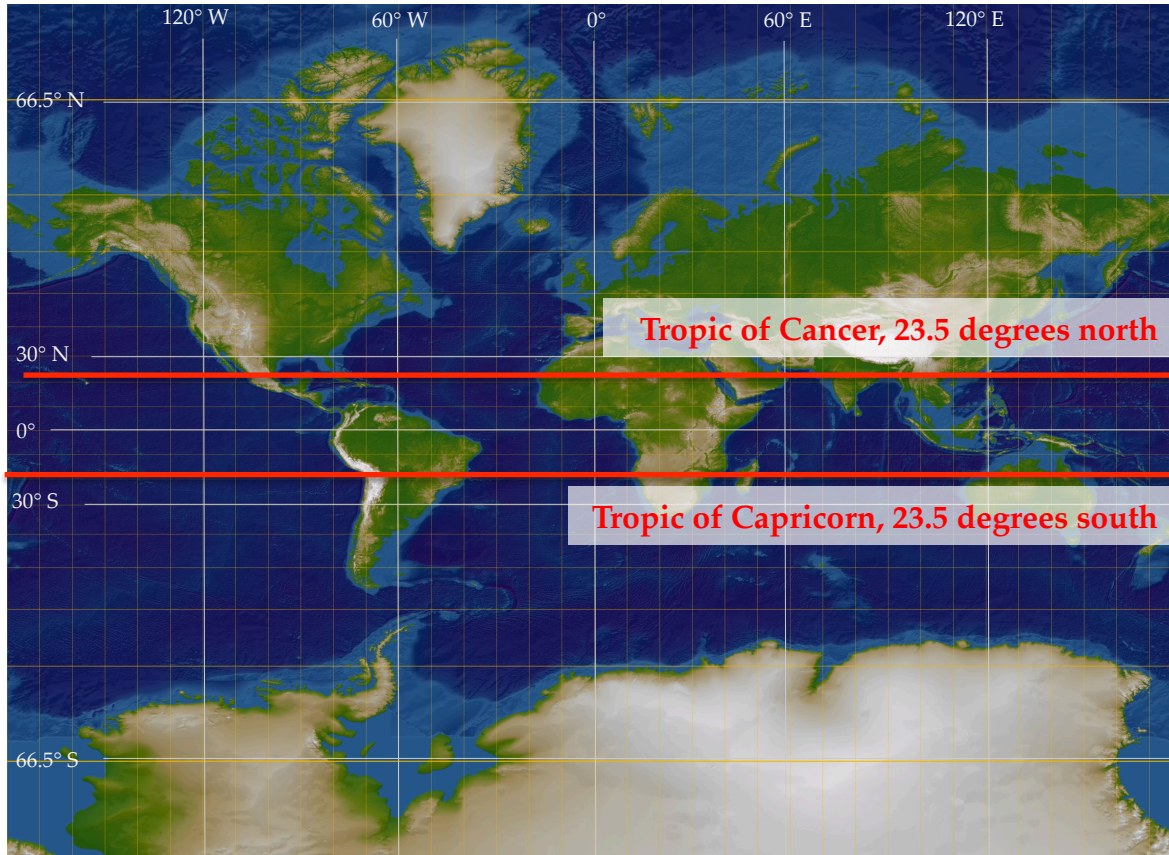
Lines of longitude run across the globe from North to South, but measure East and West starting at the Prime Meridian.



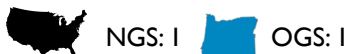
To find a place exactly, we need crossing lines that create an intersection or grid system. One grid system used by cartographers is the Latitude and Longitude Grid. Each location on the globe touches a line of latitude and a line of longitude. The crossing of the latitude and longitude lines is called a **coordinate**. Latitude and longitude are measured in degrees represented by the symbol "°". The coordinates for Salem, Oregon are Latitude 45° North and Longitude 123° West.

# Map Grids and Key Lines Activity

Now that you understand how the Earth's grid system works, it's time to practice. Below is an image of a *Mercator Projection*, one of the most popular map styles. **Use the map below and the information on Pages 19 and 20 to answer the questions below.**

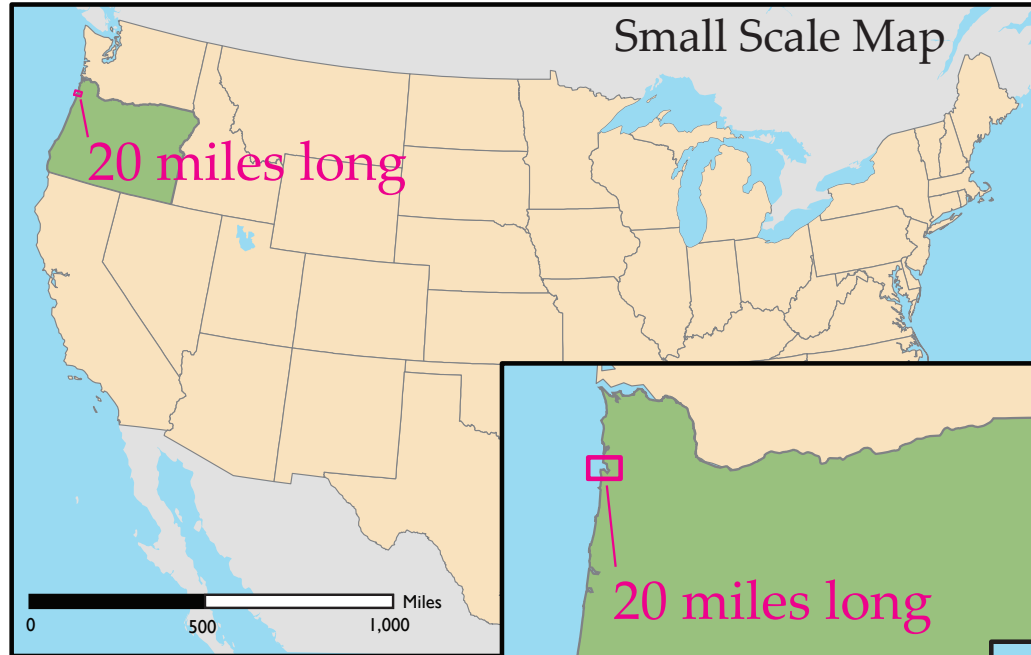


Portland, Oregon is located at  $45^{\circ}$  N and  $122^{\circ}$  W. Eugene, Oregon's second largest city, can be found at  $44^{\circ}$  N and  $123^{\circ}$  W. Salem, which is the state capital and the third largest city, is also located at  $44^{\circ}$  N and  $123^{\circ}$  W.



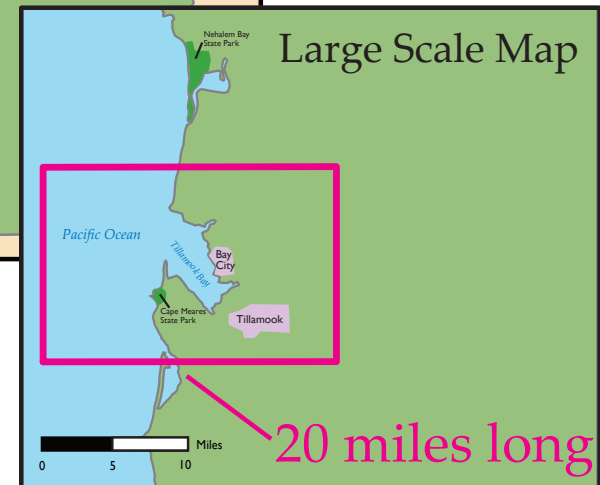
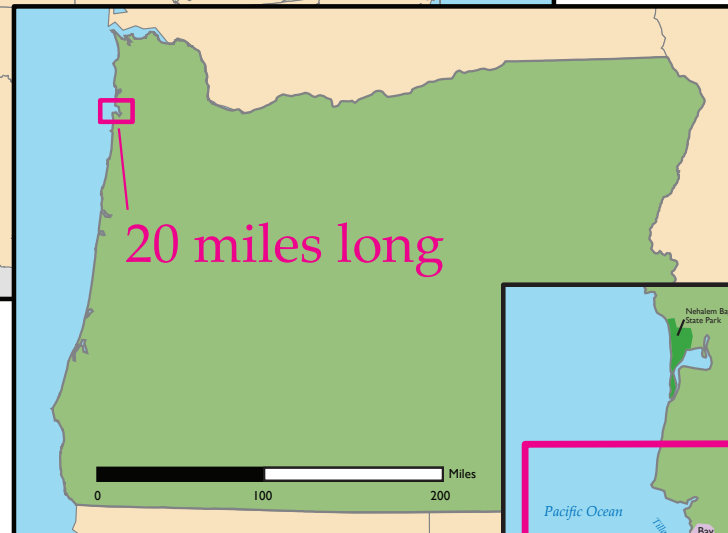
1. On the map, draw and label the Tropics of Cancer and Capricorn. Make sure to include the degrees of latitude.
2. If you were standing at  $30^{\circ}$  South latitude and  $60^{\circ}$  West longitude, what continent would you be on?  
**South America**
3. What country would you be in if you were at  $60^{\circ}$  North latitude and  $120^{\circ}$  West longitude? \_\_\_\_\_  
**Canada**
4. At what latitude and longitude can you find the southern tip of Africa?  
 **$30^{\circ}$  S latitude,  $25^{\circ}$  E longitude**
5. Why is it important to indicate north, east, south, and west when you refer to degrees latitude and longitude?  
**It is important because there are two sets of degree points for every location, and you need to specify which location you mean.**

# Map Scale



Mapmakers can show more detail on a large scale map because one unit on the map represents fewer units on the ground than on a small scale map. So if you want to show details of your town, you would use a large scale map. But if you want to show the whole country, you would use a small scale map.

Map scale is the ratio, or comparison, of the distance on the map to the real distance on the ground. When you change the scale of your map from small scale to large scale, it is the same as “zooming in.”



# Map Scale Activity

When map scale is changed to show a large area without much detail (think of it as “zooming out”) it is a *small scale* map. When the scale is changed to show a small area with lots of detail (think of it as “zooming in”), it is a *large scale* map. **Use the spaces below to draw a small and large scale map of your school yard.**

**Small scale**

**Should show a large area with little detail.**

**Large scale**

**Should show a small area with many details.**



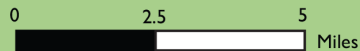
**SANDY'S HINT:** This map might show the entire school area – building, parking, and yard.

**SANDY'S HINT:** This map might show just the yard.

# Using Scale Bars

## Ways to Represent Scale

### Graphic Scale



You can use the scale bar to measure distances on the map.

### Verbal Scale

1 centimeter equals 1,000 meters

You can use a ruler to measure distances on the map and then multiply the distance by 1,000 to find out the distance on the ground.

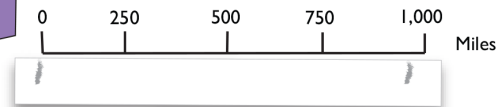
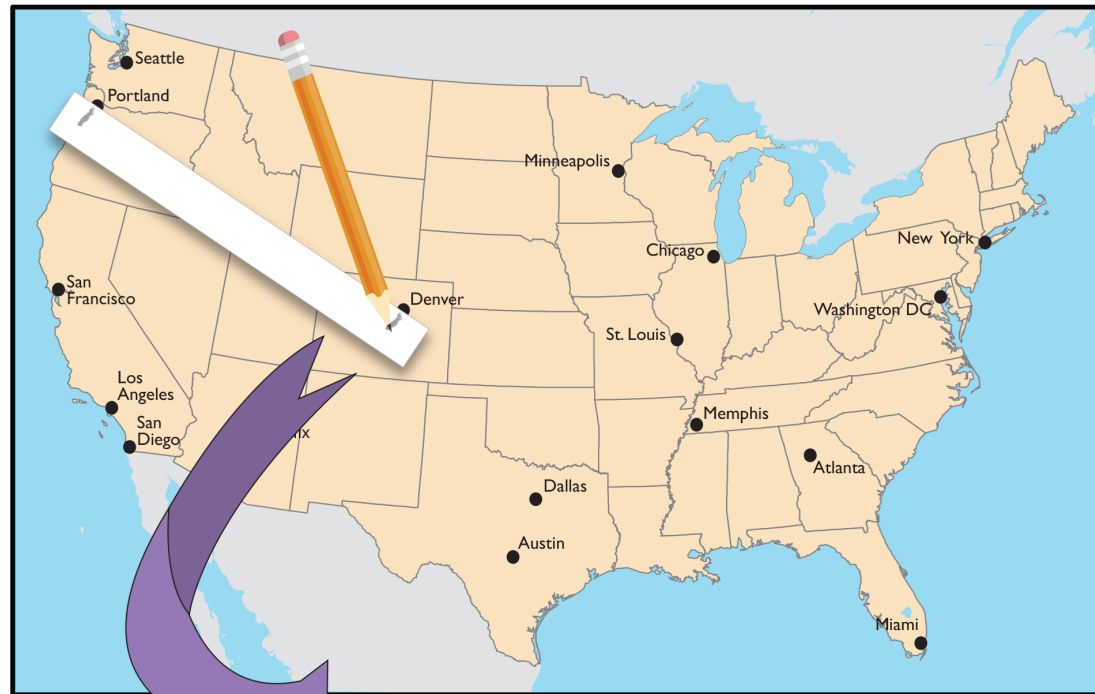
### Representative Fraction

1:100,000

This ratio tells you that one unit (inch, centimeter, meter, etc.) on the map is equal to 100,000 of the same units on the ground. So if you found a distance of 5 centimeters on the map, you would know that it is equal to 500,000 centimeters on the ground.

Using the map scale to measure from Portland, OR to Denver, CO:

1. Put a piece of paper on the map to connect Portland and Denver
2. Draw marks on the paper where the dots are
3. Place the paper under the map scale and determine how many miles it is from Portland to Denver



# Map of the United States



The United States (minus Alaska and Hawaii) is around 2,680 miles long, and 1,580 miles wide!



Verbal Scale: One inch on the map is equivalent to 320 miles on the ground

# Scale Bar Activity

**How do I show map scale?** The map of the United States on the next page uses two means of showing scale: a *Graphic Scale* and a *Verbal Scale*. **Use the map of the United States and the instructions below to determine distances using the map scales.**

Find the following sets of state capitals on the map:

- |                             |     |                         |
|-----------------------------|-----|-------------------------|
| 1. Austin, Texas            | and | Salem, Oregon           |
| 2. Harrisburg, Pennsylvania | and | Madison, Wisconsin      |
| 3. Santa Fe, New Mexico     | and | Oklahoma City, Oklahoma |
| 4. Sacramento, California   | and | Richmond, Virginia      |
| 5. Helena, Montana          | and | Phoenix, Arizona        |

Next, use a ruler and a pencil to trace the distance between each set of points, and write down the number of inches between each set of cities below. Then, using the Graphic Scale or Verbal Scale, calculate how many miles are between each set of cities and write the answer below

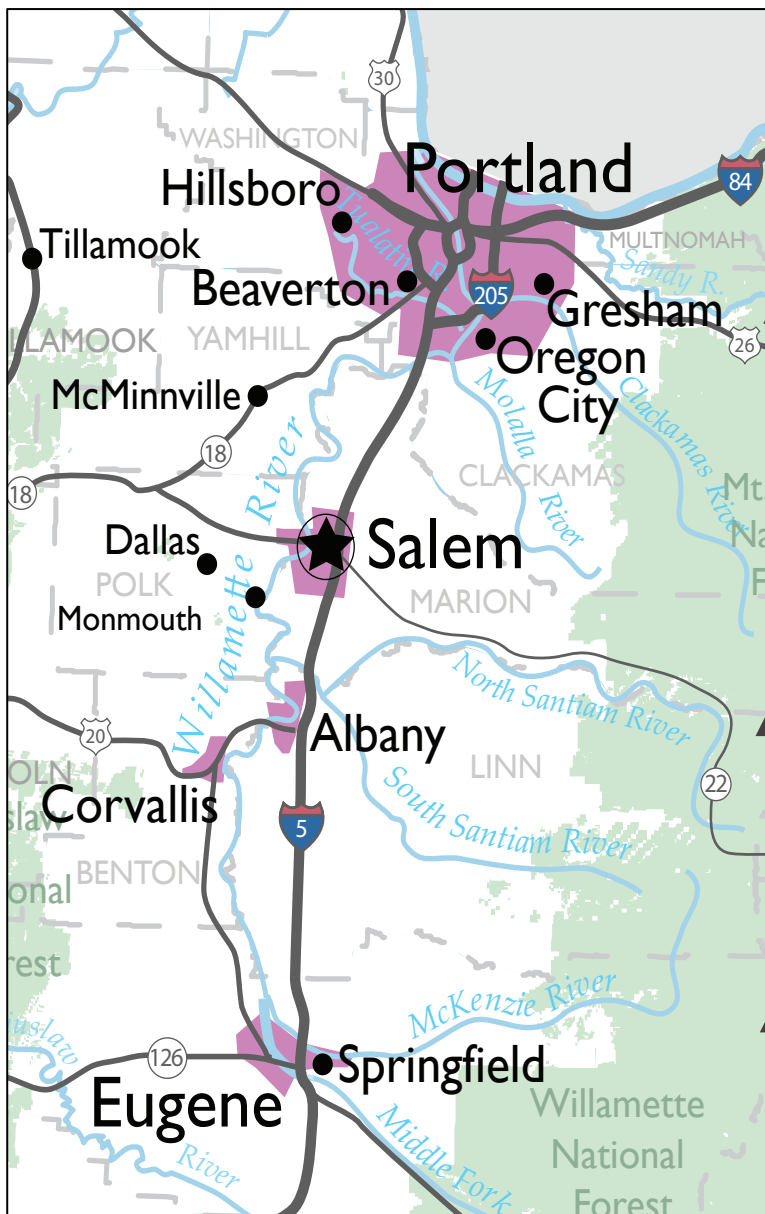
Inches Between Cities

Miles Between Cities

- |    |                      |                    |
|----|----------------------|--------------------|
| 1. | <u>5.25 inches</u>   | <u>1,680 miles</u> |
| 2. | <u>2.0625 inches</u> | <u>660 miles</u>   |
| 3. | <u>1.5 inches</u>    | <u>480 miles</u>   |
| 4. | <u>7.25 inches</u>   | <u>2,320 miles</u> |
| 5. | <u>2.75 inches</u>   | <u>880 miles</u>   |



# Reading a Map of the Willamette Valley



Now that you know how to use different forms of map scale, let's apply that knowledge to reading a map of Oregon's Willamette Valley. The Willamette Valley is an important physical and cultural region of the State of Oregon and, as you already learned, most of Oregon's population lives there. **Use the map to the left to answer the questions below.**

1. In real life, the straight line distance between downtown Portland and Salem is about 44 miles. If the distance from downtown Portland to Salem is about 2.75 inches on this map, what is the verbal scale for this map?

One inch is equivalent to 16 miles

2. The driving distance between Salem and Corvallis is different from the straight line distance. Why? Do you think the same is true for Portland and Salem? Why or why not? What influences this?

**The driving distance is different because the road is not straight, making the driving distance longer (the shortest distance between objects is a straight line). The same is true for Salem and Portland, but to a lesser degree. This is because the road from Portland to Salem is much closer to being a straight line than the route from Salem to Corvallis.**



NGS: 1



OGS: 5



# Reading a Map of Portland Activity

To the right is a map of downtown Portland, Oregon. Use the map and map legend at the bottom to answer the questions below.

- Find the Oregon Convention Center on the map. What are some of the different routes you could take to get to the Oregon Convention Center from Portland State University? What forms of transit can you use?

**You could take the MAX light rail (yellow or green lines) or you could drive. Student could also describe one or more specific routes to take.**

- If you were in the University District and wanted to get to Tanner Springs Park without walking or driving, what type of transit could you take?

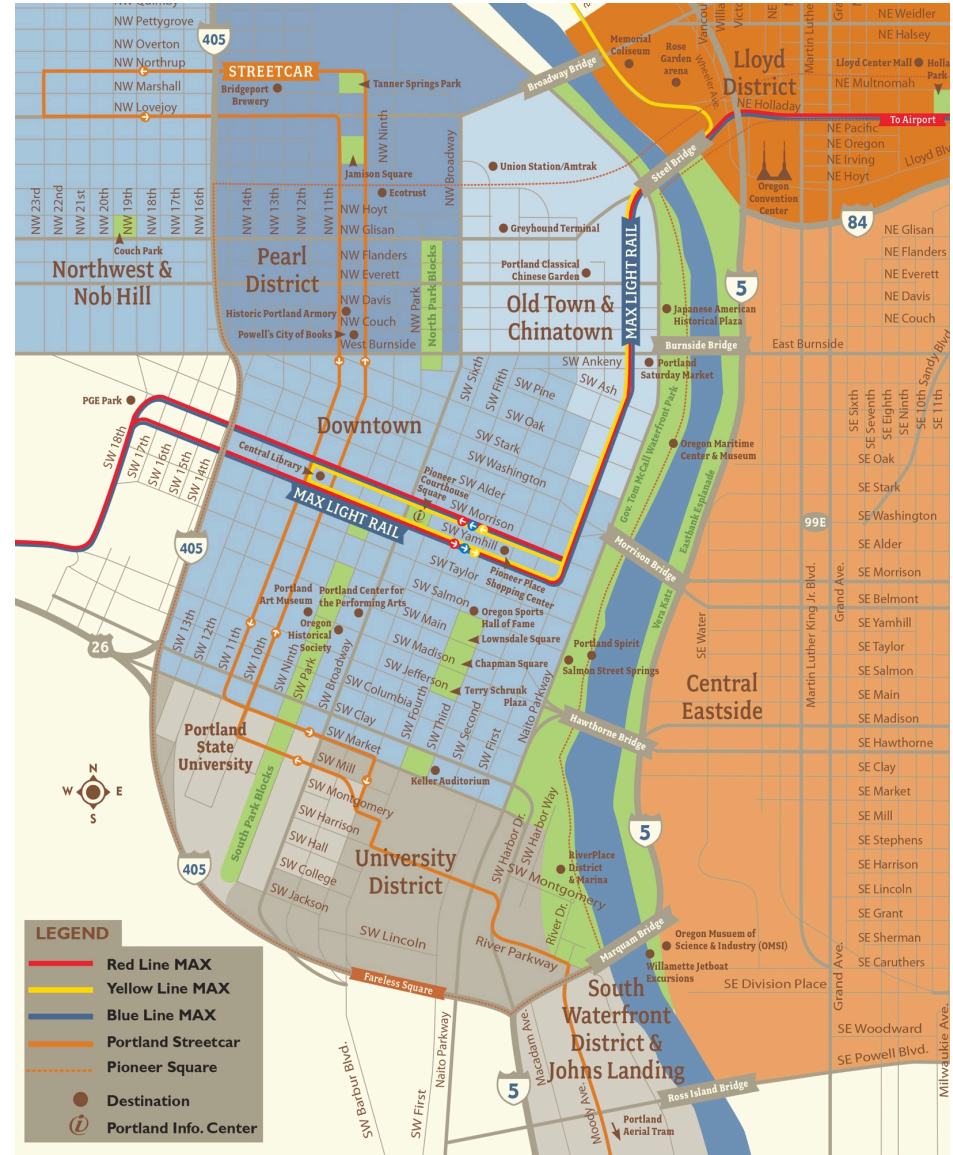
**Portland Streetcar**

- What are some of the ways this map distinguishes different features (roads, highways, transit, points of interest, etc.)?

**You could take the MAX light rail (yellow or green lines) or you could drive. Student could also describe one or more specific routes to take.**

- Streets in this map of Portland are labeled “SE”, “SW”, “NW”, and “NE”. Can you figure out the dividing lines between each of the sections (or “quadrants”) of the city?

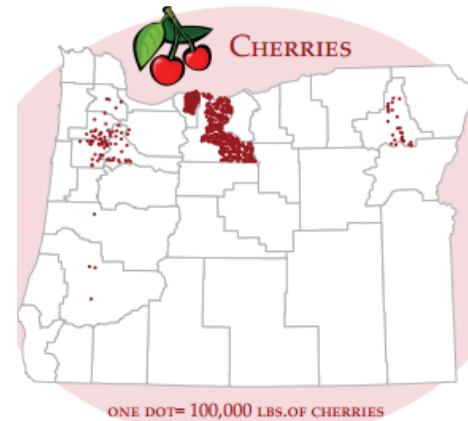
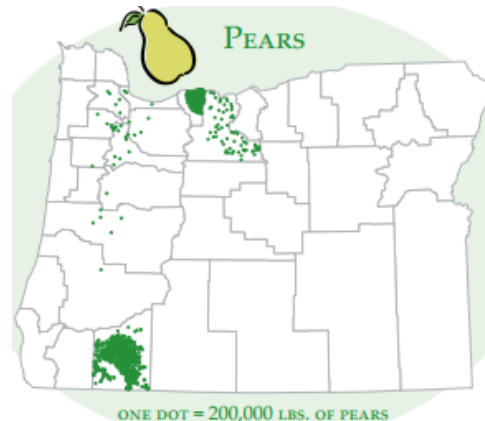
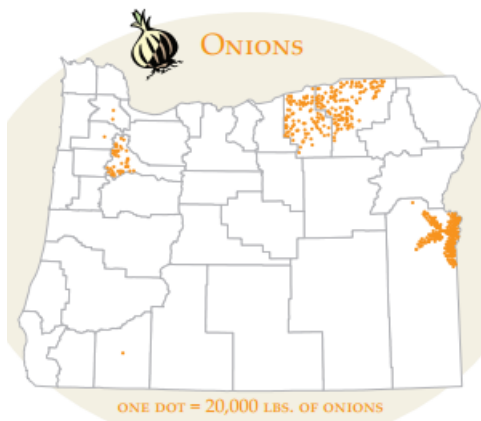
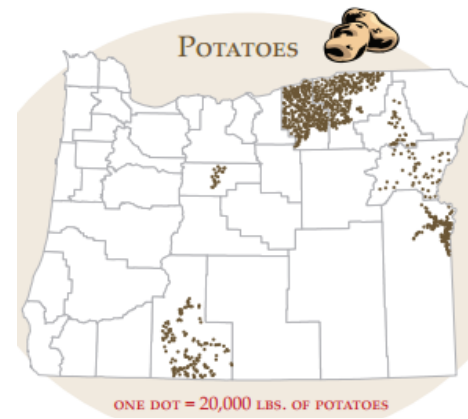
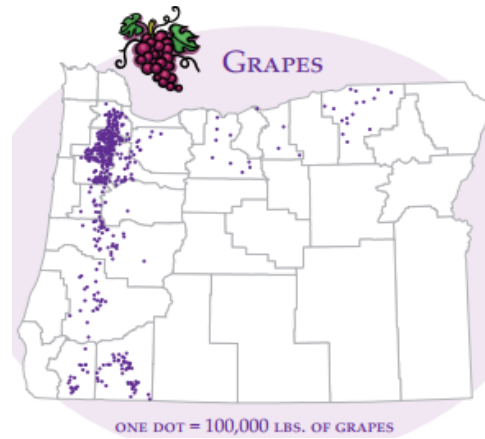
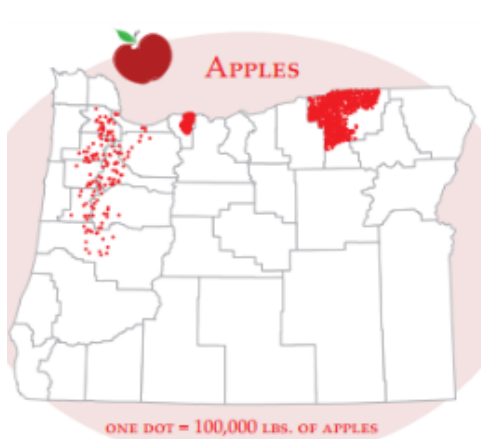
**Burnside divides north and south, and the Willamette divides East and West.**



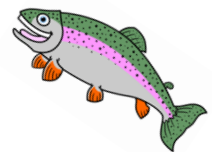
# Maps and Agriculture Activity

The location of various crops in Oregon is shown below. On the next page there are two maps of Oregon; one that displays average annual precipitation, and one that displays average July temperature.

Answer the following questions on the next page: What does the location where each crop is grown tell you about its climate preferences? Is the crop in an area with lots of rain, or is it relatively dry? Is the crop spread throughout Oregon, or is it condensed in one spot? Which crop has the largest North/South range?



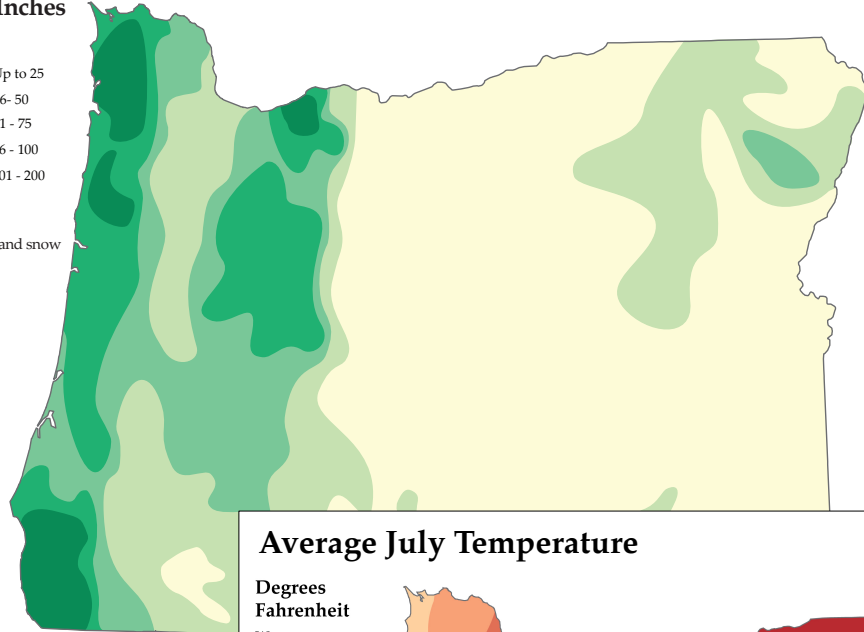
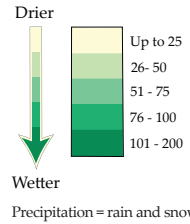
Too bad there's not a map showing me where all the yummy bugs are!



# Maps and Agriculture Activity

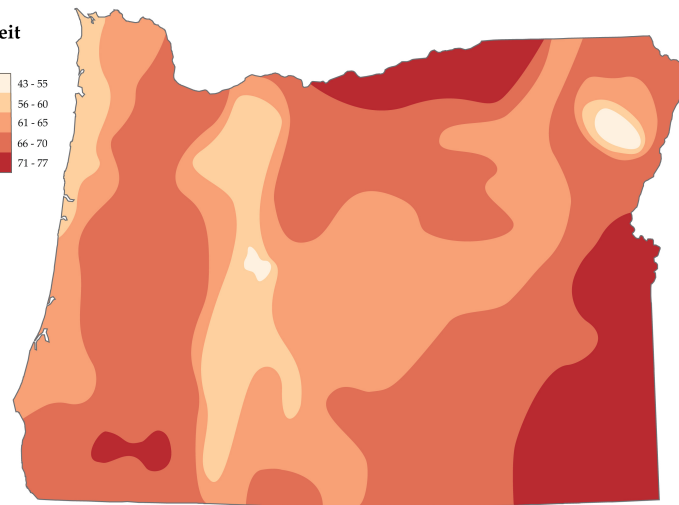
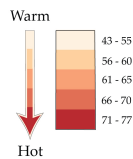
## Average Annual Precipitation

Average in Inches



## Average July Temperature

Degrees Fahrenheit



Lots of rain isn't just important for crops; it helps keep the rivers where I live healthy and full of fresh water!



Various answers possible, but students should demonstrate an understanding that Oregon's crops grow in relatively wet areas with lower summer temperatures.

The crop with the largest north/south range is grapes.



NGS: 4, 7, 15



OGS: 3



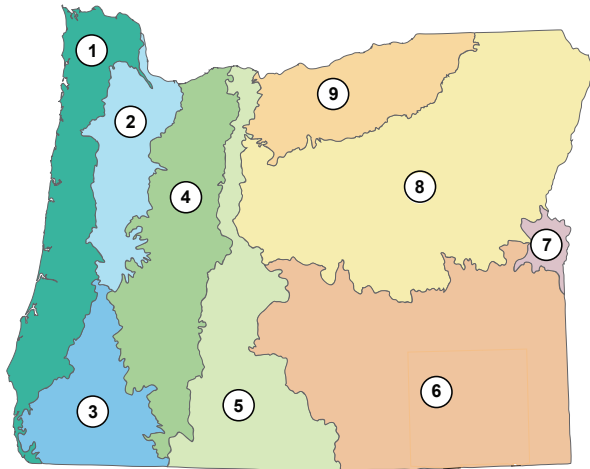
OELS: 1, 2, 3



TR: 4 – What is the Future of Earth's Climate?

# Oregon's Ecoregions

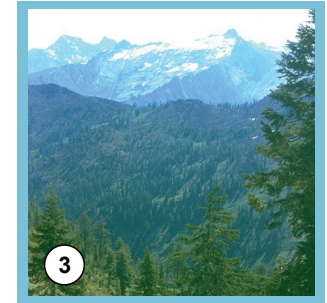
**Ecoregions** are areas of land with distinct climates, weather patterns, plants, and animals. Oregon is divided into nine ecoregions, ranging from the hot, arid Basin and Range full of juniper and sagebrush to the moist, cool, conifer-filled Cascade Mountains.



Coast Range



Willamette Valley



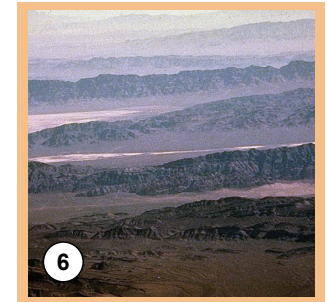
Klamath Mountains



Cascade Mountains



Eastern Cascades and Foothills



Basin and Range



Snake River Plain

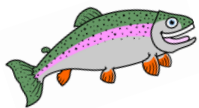


Blue Mountains



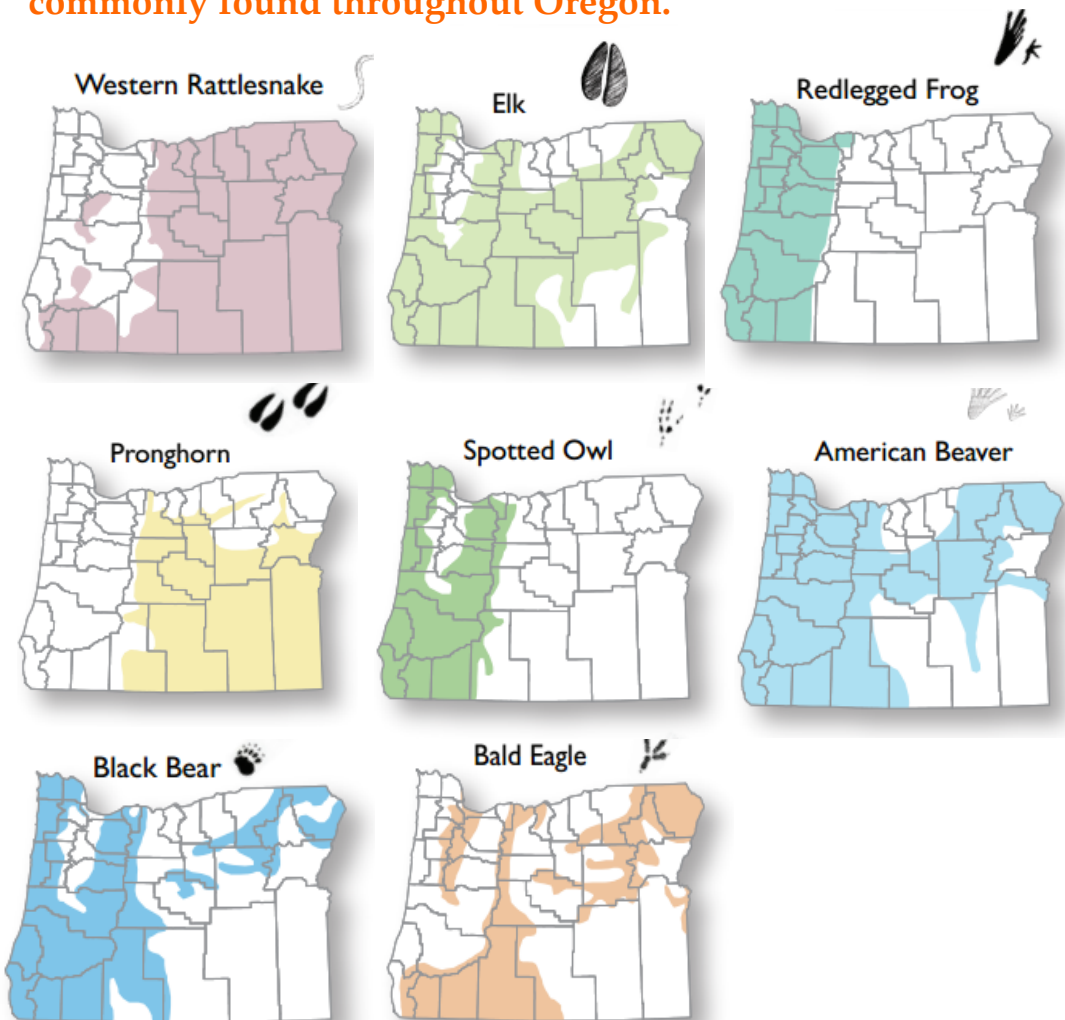
Columbia Plateau

What ecoregion do you live in? You can usually find me in the Willamette Valley. I also like hanging out in the Columbia River and along the Coast Range!



# Ecoregions and Animals Activity

Below are a series of maps showing the geographic area (or *range*) where different animals in Oregon can be found. Use these maps the ecoregions map on Page 31 to answer the following questions about animals commonly found throughout Oregon.



In which ecoregions do each of these animals live?

- Rattlesnake: 3, 5, 6, 7, 8, 9
- Elk: 1, 2, 3, 4, 5, 7, 8
- Frog : 1, 2, 3, 4
- Pronghorn: 5, 6, 7, 8, 9
- Owl: 1, 2, 3, 4
- Beaver: 1, 2, 3, 4, 5, 6, 7, 8
- Bear: 1, 2, 3, 4, 8
- Bald Eagle: 4, 5, 8

What range of temperature and precipitation do you think each animal prefers? (*Hint*: look at the map on Page 30 showing the annual average precipitation in Oregon.)

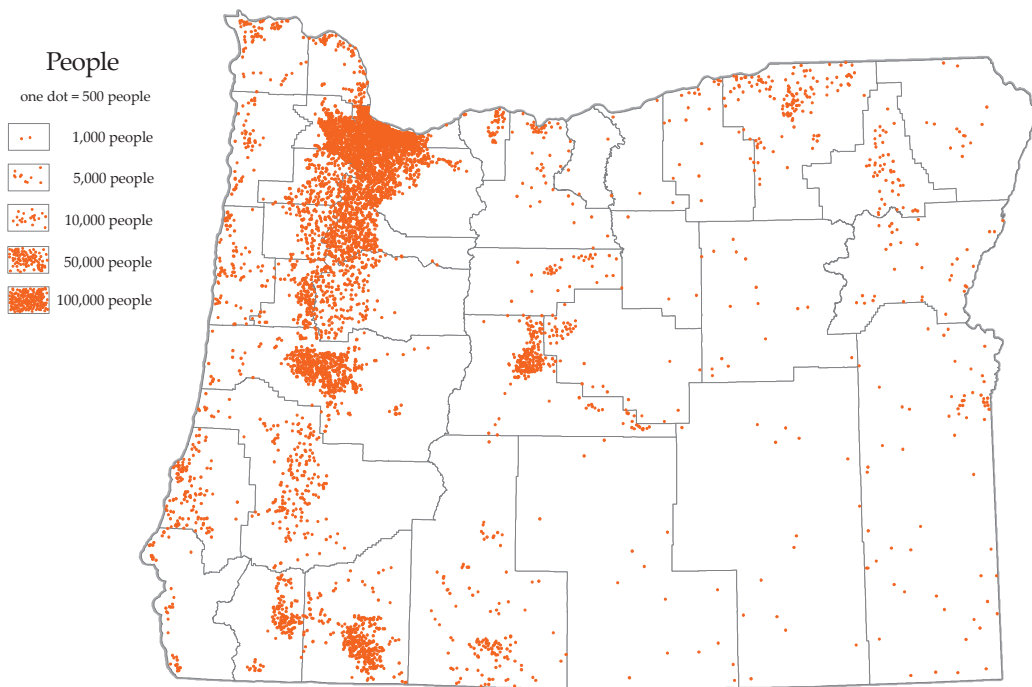
- Rattlesnake: Answers may vary
- Elk: \_\_\_\_\_
- Frog: \_\_\_\_\_
- Pronghorn: \_\_\_\_\_
- Owl: \_\_\_\_\_
- Beaver: \_\_\_\_\_
- Bear: \_\_\_\_\_
- Bald Eagle: \_\_\_\_\_

Which animal has the largest range in Oregon?  
Which animal had the smallest range?

- Largest: Western rattlesnake
- Smallest: Spotted owl

# Oregon Population Activity

Below is a population map of Oregon. Population maps are useful for exploring human settlement patterns. The dot map below shows areas of “high population density”, where many people live, and areas of “low population density”, where few people live. **Use this map and the map of Oregon on Page 13 to answer the questions to the right of this page.**



As of 2016, the State of Oregon had a human population of nearly 4 million. By comparison, the State of Washington has over 7 million residents, and California has nearly 39 million residents. That's a lot of people!



1. Where do most people live in Oregon? What large cities are located in those areas?  
Willamette Valley; this area includes Salem, Portland, Eugene, Corvallis
2. There is a “high density” population cluster in the middle of the state. What is located there?  
Bend
3. What parts of Oregon have few people (“low population density”)? Why might this be?  
Eastern Oregon; this area is primarily agricultural, and there are relatively few large cities
4. What part of the state has the *highest* population density? Why might this be?  
Portland; large cities have high population density (lots of jobs and amenities to attract people)
5. Does the county where you live have low or high population density? Why do you think this is?  
Various answers possible.

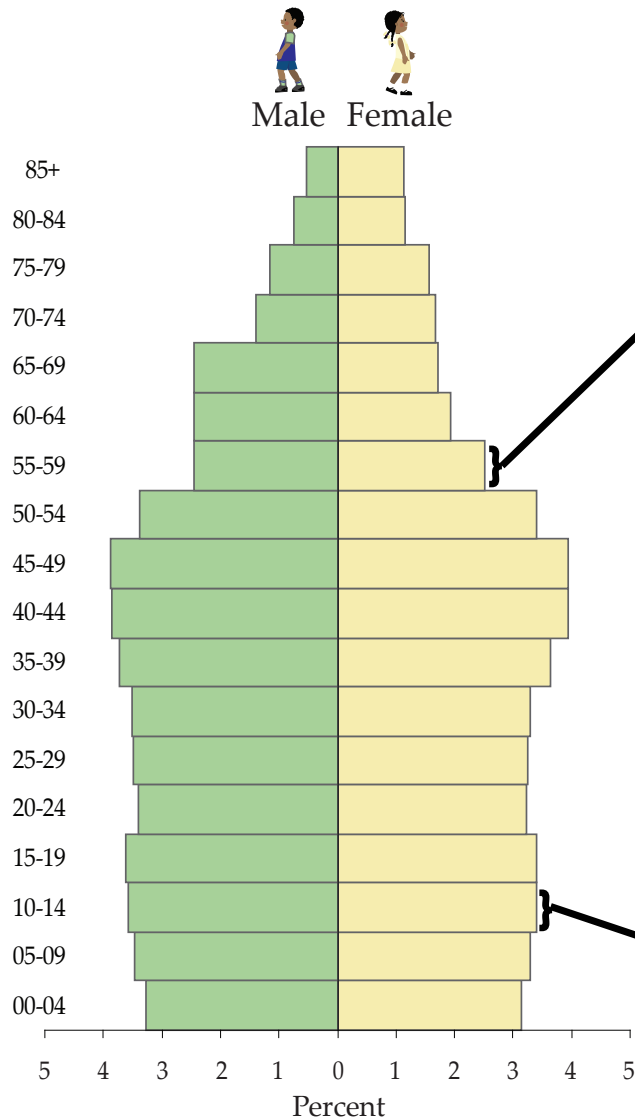
# The Age of Oregon's Population

## What is a Population Pyramid?

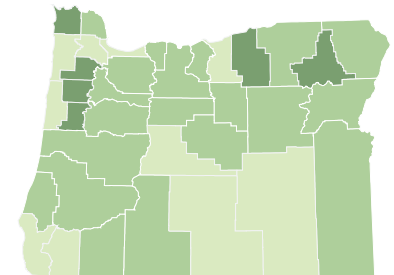
A population pyramid divides a population by gender (male or female) and by age (from youngest at the base to oldest at the peaks). Each bar of the pyramid represents a percentage of the population.

This pyramid shows Oregon's 2002 population, and each bar represents five years of the population.

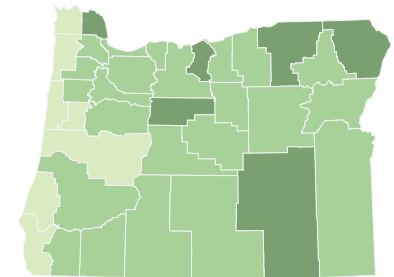
Another way to show a state's population is with a choropleth map. The two maps at the right show where the 10-14 year olds and the 55-59 year olds live in Oregon.



Where the 55-59 year olds live



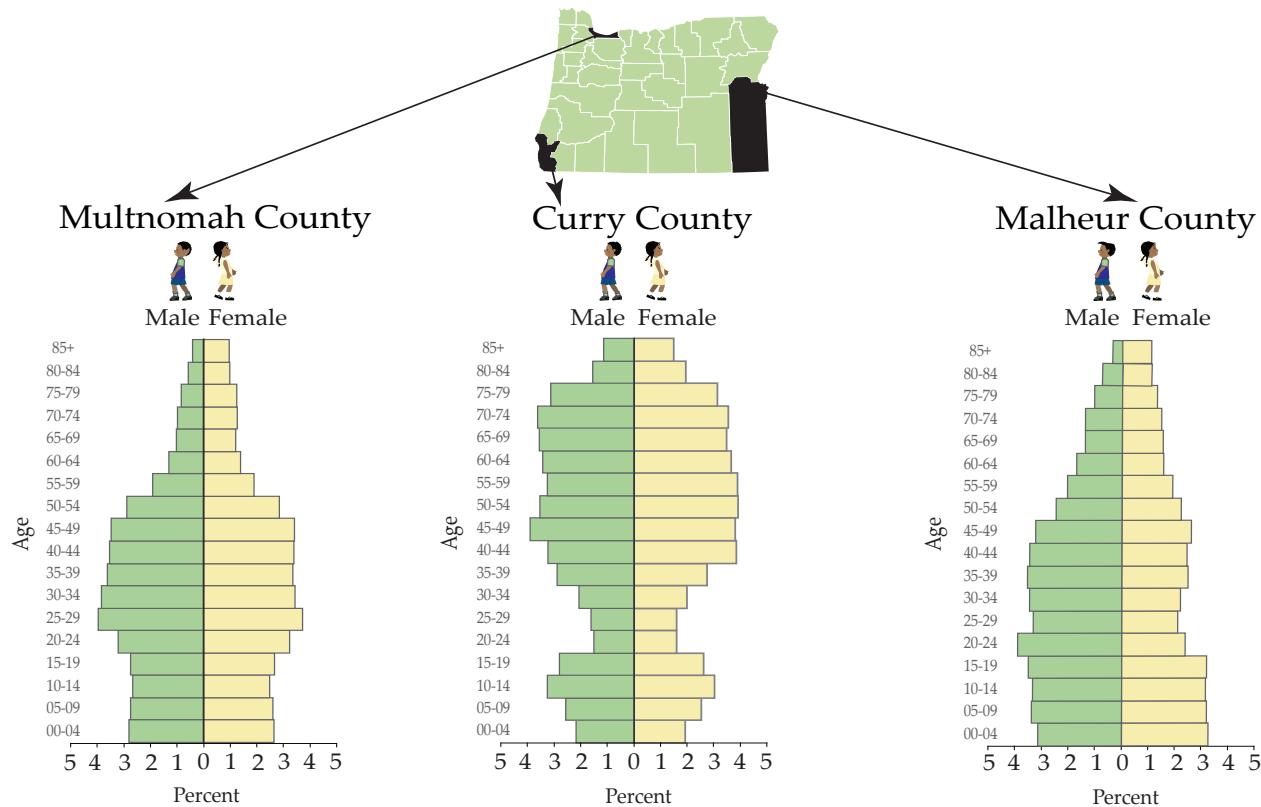
■ Low Percentage  
■ Medium Percentage  
■ High Percentage



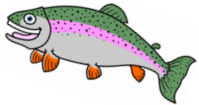
Where the 10-14 year olds live

# Oregon Population Pyramids Activity

Below are the population pyramids for three counties in Oregon: Multnomah, Curry, and Malheur. Use the information in the *population pyramids* below to answer the questions at the bottom of the page.



If you are having trouble answering some of the questions below, think about why different people live in different places. People often pick where to live based on natural amenities (such as the mountains or the beach), job availability, political or religious beliefs, or climate.

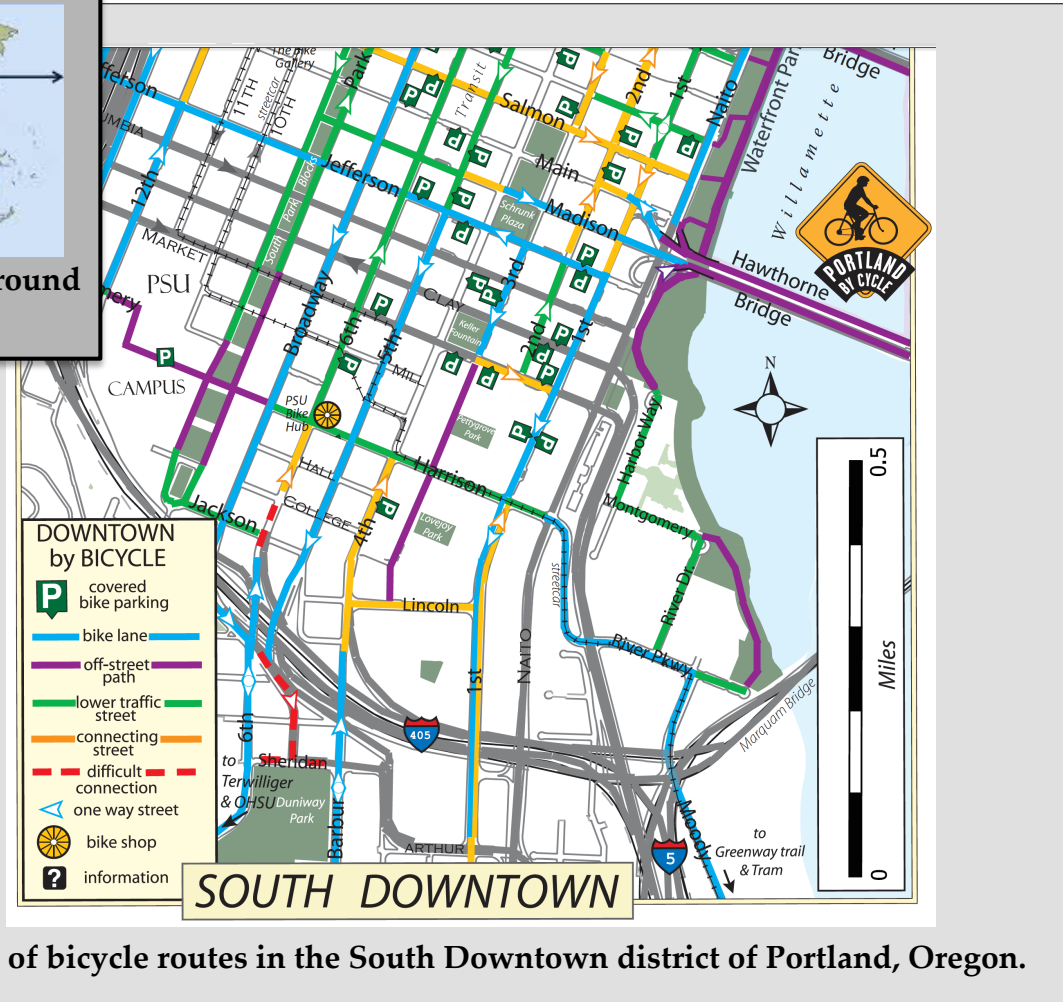
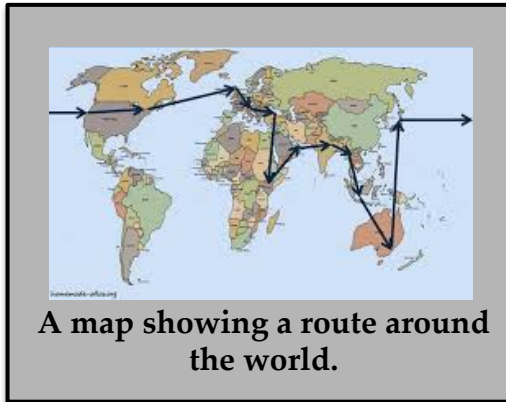


1. Which county has the highest percentage of people over the age of 85? Why do you think that is? Curry County: a coastal county, with a high percentage of retired residents
2. One of the counties has significantly more men than women. Which one? Why might this be the case? Malheur: county is located in Eastern Oregon, with a workforce primarily engaged in ranching (a profession dominated by men)
3. Which county has the most 20-30 year old residents? Which has the least? Why might this be the case? Multnomah county has the most; Curry has the least. Young people move to areas with lots of jobs/education availability



# Additional Activities: Using Maps to Solve Problems

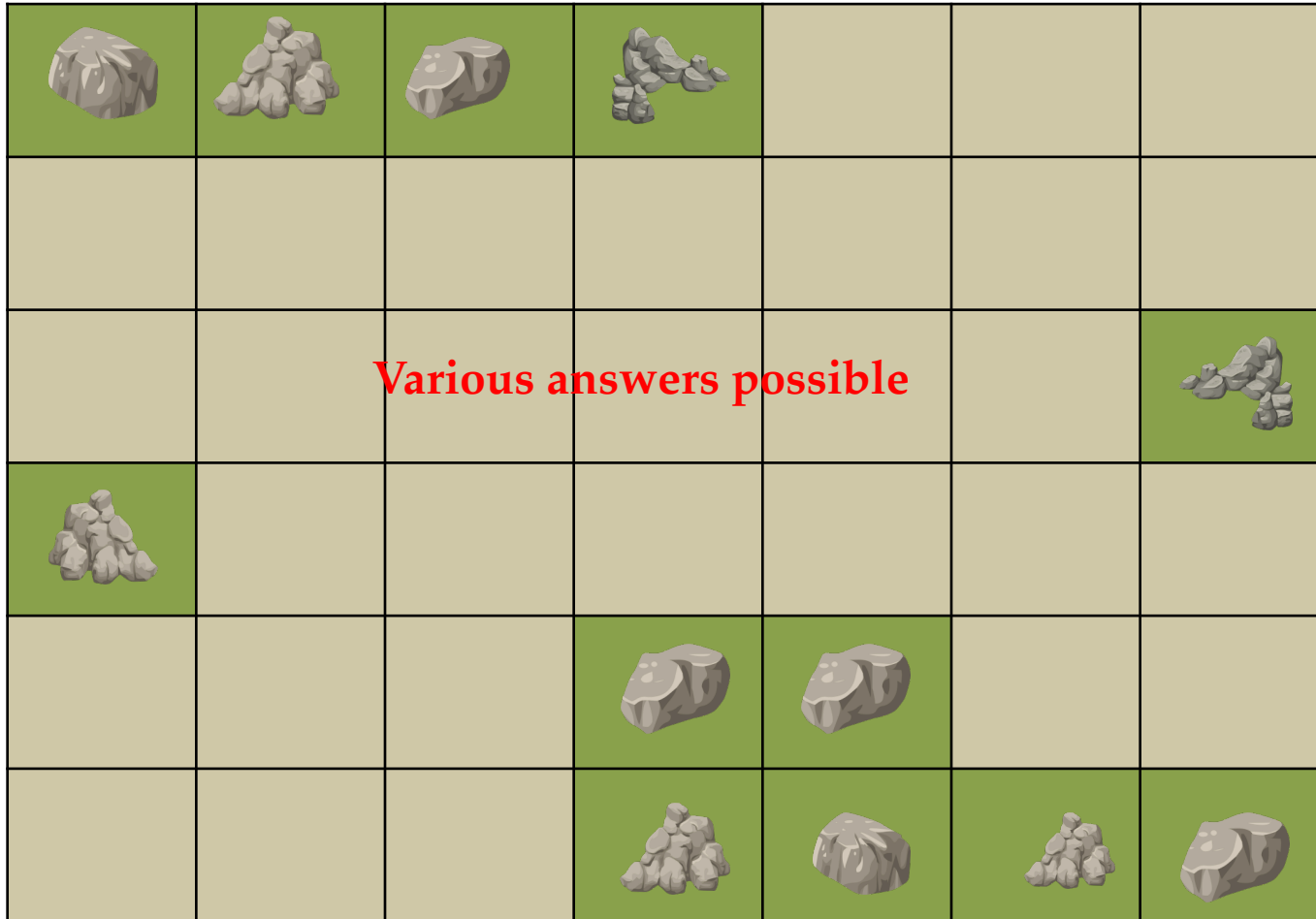
Whether looking for a route across the ocean or trying to find your way to the skate park or mall, maps can be useful tools for navigating and learning about the world.



A map of bicycle routes in the South Downtown district of Portland, Oregon.

# Planning Construction Using a Map

**What else can you use maps for?** In addition to navigation, maps are useful tools for planning construction projects. Below is a plot of land that measures seven by six squares (each square represents 15 square feet). Your town owns the land and wants to build a new public library that will take up 25 squares of land. There are some other building requirements, too, which are listed below. **Use different colors to create a building and building features using the guidelines below, but be careful not to build on rocks or boulders.**



## Additional Building Requirements

*Within the 25 squares the town also wants:*

1. Two squares for public parking
2. One square for employee parking
3. Six squares for outdoor space (park, picnic area, garden, etc.; the squares don't have to be attached to one another)

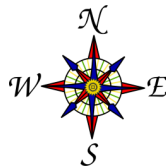
When you're designing the landscaping, you should add an outside space for me and my fish friends to live!



# Planning Errands Using a Map

Maps can also be helpful for planning the most efficient route to do a task. You live in a house on Davis St., between 4<sup>th</sup> St. and 3<sup>rd</sup> St. (look for the **blue star**), and you need to find the shortest route to run your errands. First, find all of the different places you need to go, and draw your route on the map to the right. Then, write directions to your different destinations below.

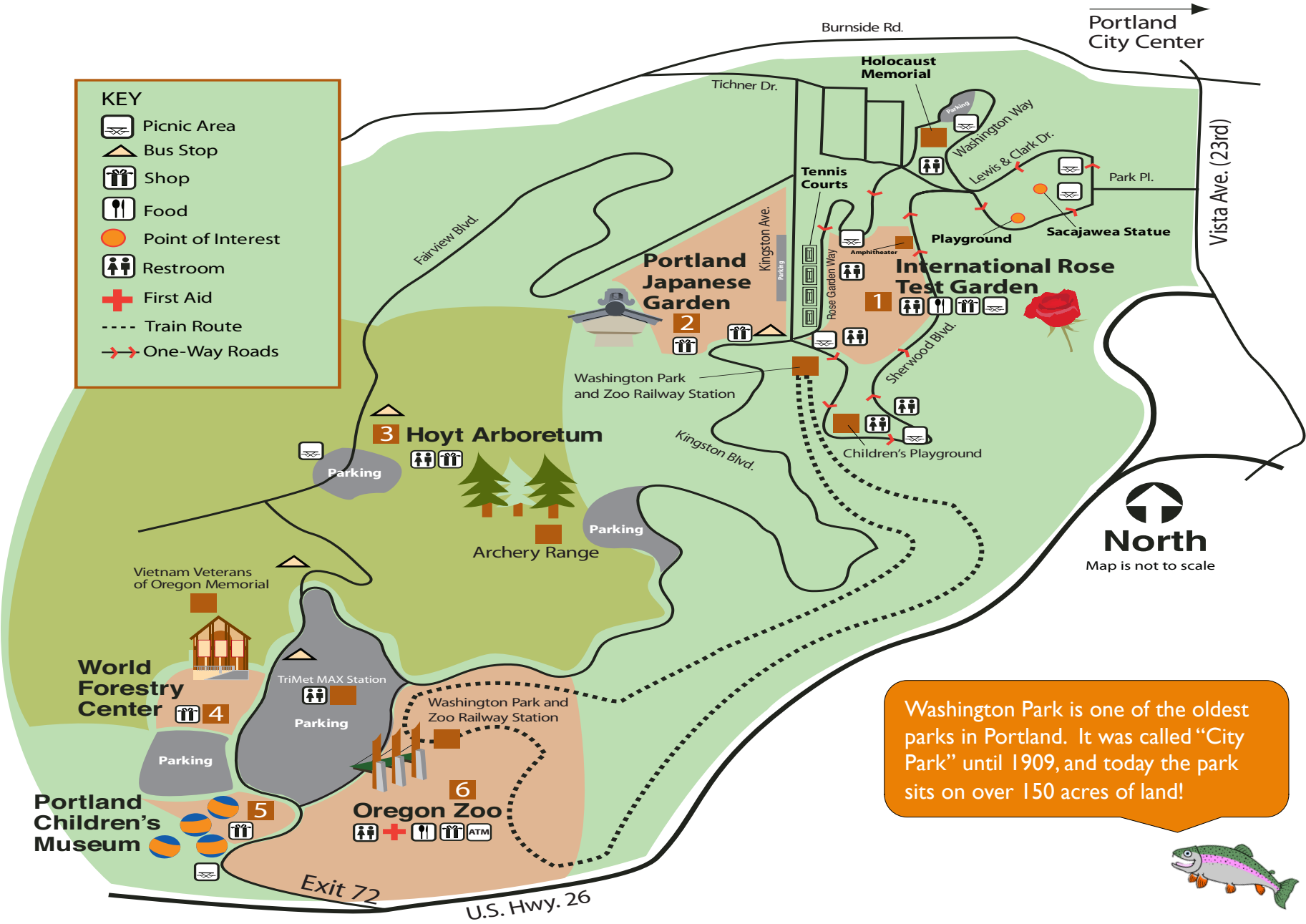
**Example:** To get to the pond from your house, walk South on 4<sup>th</sup> St. to the gas station, then turn West onto Glisan Street.



- To get to the FRUIT STAND from your HOUSE \_\_\_\_\_
- To get to the CANDY SHOP from the FRUIT STAND \_\_\_\_\_
- To get to the GAS STATION from the CANDY SHOP \_\_\_\_\_
- To get to the SCHOOL from the GAS STATION \_\_\_\_\_
- To get to the LEMONADE STAND from the SCHOOL \_\_\_\_\_

**Various answers possible**





**KEY**

- Picnic Area
- Bus Stop
- Shop
- Food
- Point of Interest
- Restroom
- First Aid
- Train Route
- One-Way Roads

Washington Park is one of the oldest parks in Portland. It was called "City Park" until 1909, and today the park sits on over 150 acres of land!



# Planning a Trip Using a Map

Maps are also a great way to plan an exciting trip. Imagine you're planning a trip to Washington Park in Portland, Oregon. There are a lot of fun things to do in the park, such as visiting the Oregon Zoo and the World Forestry Center. Take a minute to look over the map on the next page and see what's there.

**Write directions to four different places in the park, starting from the Oregon Zoo. Make sure to use street names, and specify what mode of transportation (walking, railway, bus, or car) you'll be taking from one place to the next.**

**Use the space below to write out directions for your visit to Washington Park:**

**Various answers possible**



# Image Sources

The images in this workbook come from the sources listed below. Any images not listed come from the Center for Geography Education in Oregon's *Student Atlas of Oregon (second edition)\**.

<u>PAGE</u>	<u>PHOTO</u>	<u>SOURCE</u>	<u>PAGE</u>	<u>PHOTO</u>	<u>SOURCE</u>
Cover	Fish (Sandy)	Picture Spider	Page 37	Rocks	Open Clipart
Page 1	Leaf	Open Clipart	Page 38	Compass	Open Clipart
	U.S.A	Wikimedia Commons: DrRandomFactor (modified)		Library	Open Clipart
	Apple	Open Clipart		Brick Pile	Clker
Page 6	Trimet Map	Trimet		Yellow House	Open Clipart
	Map of USA/Oregon	Wikimedia Commons		Brown House	Open Clipart
Page 8	Compass Rose 1 and 3 (from top)	Open Clipart		Produce Stand	Open Clipart
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	Compass	Open Clipart		Hospital	Clipart Lord
	Brown bear	Clker		Portland Building	Open Clipart
Page 11	Airplane	Open Clipart		KOIN Center	Open Clipart
	Stable	Open Clipart		School	Open Clipart
	Fire	Open Clipart		Candy Shop	Clker
	Fish	Clker		Gas Station	Open Clipart
Page 12	Powell Butte Nature Park Map	Portland Parks and Recreation		Swing Set	Clker
Page 16	Orange	Open Clipart	Page 40	Teeter Totter	Open Clipart
Page 20	Map of the Globe	Wikimedia Commons		Merry Go Round	Clker
Page 22	Map of the Globe	Wikimedia Commons		Map of Washington Park	Portland Department of Parks and Recreation
Page 27	Map of the United States	Wikimedia Commons			
Page 28	Map of Downtown Portland	University of Texas, Austin – Perry-Castañeda Library			
Page 36	Around the World Map	Portland Bureau of Transportation			
	South Downtown Map	Portland Bureau of Transportation			

\*A free copy of the Atlas can be obtained from <http://studentatlasoforegon.pdx.edu/>.

# Educational Standards



## National Geography Standards (NGS)

### **Essential Element: The World in Spatial Terms**

1. How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information
2. How to use mental maps to organize information about people, places, and environments in a spatial context
3. How to analyze the spatial organization of people, places, and environments on Earth's surface

### **Essential Element: Places and Regions**

4. The physical and human characteristics of places
5. That people create regions to interpret Earth's complexity
6. How culture and experience influence people's perceptions of places and regions

### **Essential Element: Physical Systems**

7. The physical processes that shape the patterns of Earth's surface
8. The characteristics and spatial distribution of ecosystems and biomes on Earth's surface

### **Essential Element: Human Systems**

9. The characteristics, distribution, and migration of human populations on Earth's surface
10. The characteristics, distribution, and complexity of Earth's cultural mosaics
11. The patterns and networks of economic interdependence on Earth's surface
12. The processes, patterns, and functions of human settlement
13. How the forces of cooperation and conflict among people influence the division and control of Earth's surface

### **Essential Element: Environment and Society**

14. How human actions modify the physical environment
15. How physical systems affect human systems
16. The changes that occur in the meaning, use, distribution, and importance of resources

### **Essential Element: The Uses of Geography**

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

# Educational Standards



## Oregon Geography Standards (OGS)

1. Apply geographic skills, concepts, and technologies (e.g. maps, GIS, Google Earth) to gather, display, and analyze spatial information.
2. Analyze economic, social, human migration, settlement, and distribution patterns.
3. Locate and examine physical and human characteristics of places and regions, their impact on developing societies, and their connections and interdependence.
4. Evaluate how human cooperation and competition for resources shape the Earth's political, economic, physical, and social environments.
5. Evaluate how technological developments, societal decisions, and personal decisions and actions influence Earth's sustainability.

**For geography standards by grade, please see:**

<http://www.ode.state.or.us/teachlearn/subjects/socialscience/standards/adoptedsocialsciencesstandards8-2011.pdf>



## Oregon Environmental Literacy Strands (OELS)

### 1. **Systems Thinking**

Students study systems and issues holistically, striving to understand the relationships and interactions between each system's parts. They use the knowledge gained to assess the effects of human choices on economic, ecological, and social systems, and to optimize outcomes for all three systems.

### 2. **Physical, living, and human systems**

Students understand the characteristics of Earth's physical, living, and human systems.

### 3. **Interconnectedness of people and the environment**

Students understand the interdependence of humans and the environment, and appreciate the interconnectedness of environmental quality and human well-being.

### 4. **Personal and civic responsibility**

Students understand the rights, roles, and responsibilities and actions associated with leading or participating in the creation of healthy environments and sustainable communities.

### 5. **Investigate, plan, and create a sustainable future**

Students apply civic action skills that are essential to healthy, sustainable environments.





# Additional Resources for Teachers

1. Latitude, Longitude , and Temperature Activity:  
<http://education.nationalgeographic.com/activity/latitude-longitude-temperature/>
2. Selecting Settlement Sites:  
<http://education.nationalgeographic.com/activity/selecting-settlement-sites/>
3. Investigating Map Projections:  
<http://education.nationalgeographic.com/activity/investigating-map-projections/>
4. What is the Future of Earth's Climate?:  
<http://education.nationalgeographic.com/lesson/what-future-earths-climate/>

# Produced by the Center for Geography Education in Oregon (C-GEO)

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C-GEO is dedicated to the improvement of geographic education and awareness in the State of Oregon. C-GEO's mission includes: increasing public awareness of the importance of geographic education, increasing emphasis on geography in grades pre-K through 12, and improving geographic teaching methods and materials.

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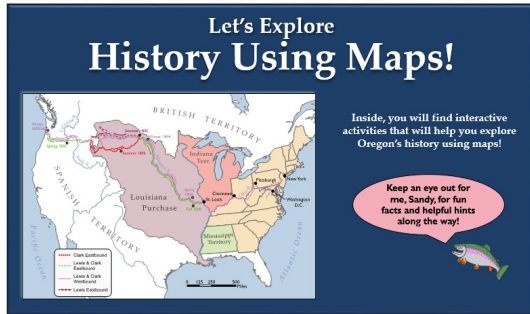


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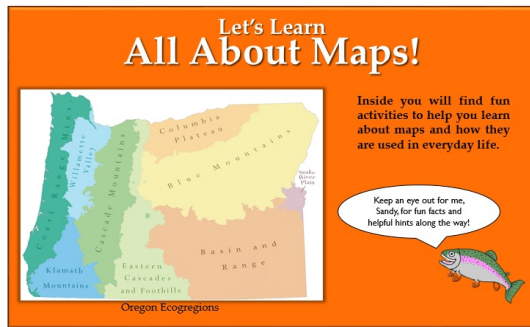
**Website:** <http://www.pdx.edu/geography-education/>  
**Telephone Number:** 503-725-5864

Free digital copies of these booklets can be found at:

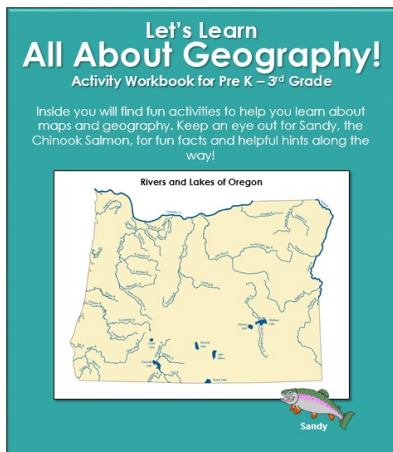
<http://www.pdx.edu/geography-education/instructional-materials-0>



- Let's Explore History Using Maps! Student/Teacher Editions



- Let's Learn All About Maps! Student/Teacher Editions



- Let's Learn All About Geography! (Pre-K-3<sup>rd</sup>) Student/Teacher Editions

