

Activity 1 The Earth on Maps and Globes



Key Words: distortion, projection, map key, compass rose, cardinal directions, intermediate directions

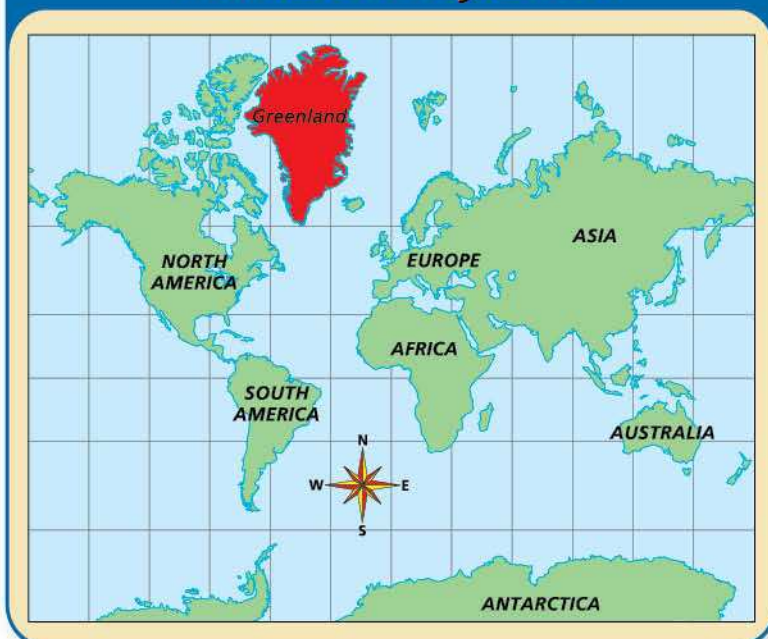
Imagine that you peel an orange and keep the peel in one piece. Then you press the peel flat—what happens? It bends and breaks. The only way you can flatten the peel and keep it in one piece is to stretch it. But that stretching causes **distortion**—the peel gets twisted and bent away from its true size and shape.

Like an orange, a globe is round. That's obvious, but important. Why? Because a round globe is the most accurate way to show the round Earth. On a globe all the continents are the same shape as they are on the Earth. Also, each continent is the correct size in relation to the others. There is no distortion, because a globe is shaped like the Earth.

Globes are accurate, but for many uses maps are handier. Maps can show small areas in great detail. Because maps are flat, you can fold them and take them on a trip. Making a map, however, is like flattening an orange peel. When you take the round Earth and show it as a flat picture, the surface of the Earth gets distorted.



Mercator Projection



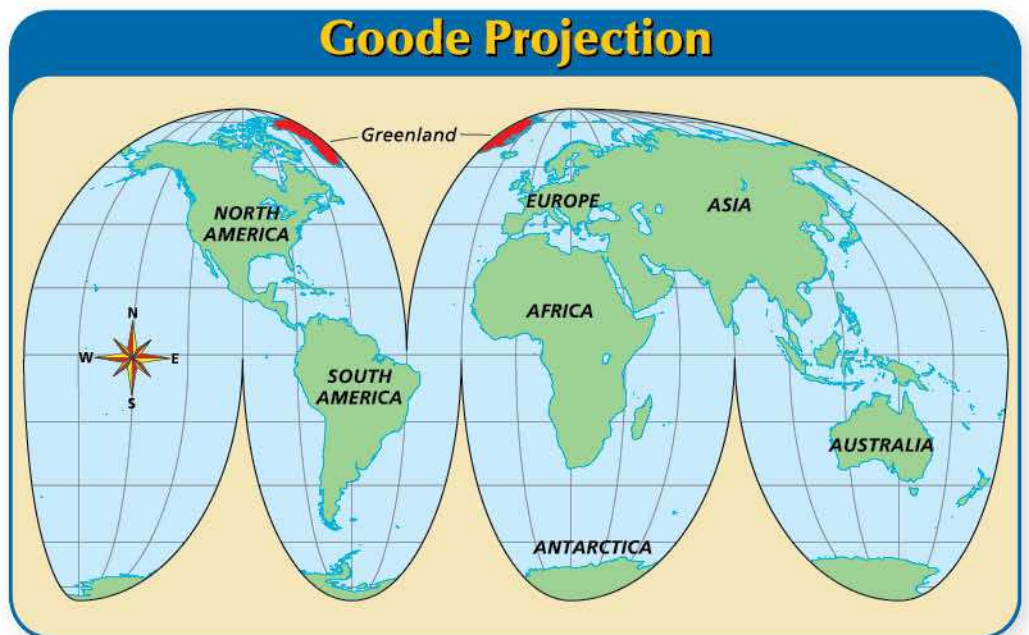
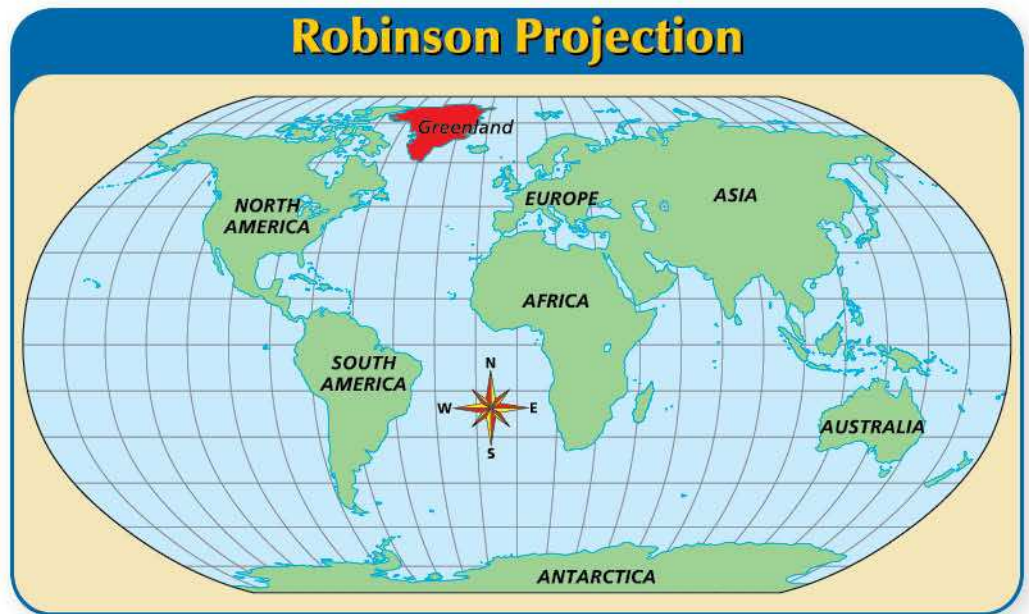
Let's compare how a globe and a map represent one part of the Earth. Look at the globe pictured above. You can see the continents of North America and South America. You can also see the large island called Greenland. On the globe, Greenland is very small compared to the rest of North America. On the globe Greenland is very small compared to North America.

Now look at how a map shows the same part of the world. This map is called a **Mercator projection**. A projection is a way of showing the round Earth on a flat map. There are many kinds of projections, often named for the person who invented them.

Find Greenland on both the map and the globe. On Earth, Africa is fourteen times bigger than Greenland. On Mercator's map, however, Greenland looks about the same size as Africa. The farther you go from the Equator (the imaginary line running around the middle of the Earth,) the more the Mercator projection distorts the size of places on the Earth.

Other projections distort the Earth less than Mercator's map. Look at the Robinson projection. On this map, Greenland looks much more like it does on the globe. Look at the Goode projection, which also has much less distortion than the Mercator projection. To reduce distortion, Goode's map leaves out parts of the oceans.

Goode's projection does a better job than Mercator's map in showing the true shapes and sizes of the Earth's land masses, but if you want to navigate a ship, don't use Goode's map or you'll sail off course!



1. Review the seven continents. Find North America, South America, Europe, Africa, Asia, Australia, and Antarctica on a globe and on each of the maps.
2. Compare the Mercator projection to a globe. Besides Greenland, what other land masses are most distorted on the Mercator projection? (Look mostly near the North and South Poles.)
3. Compare the way North America looks on a globe to the way it looks on the Robinson and Goode projections. What differences do you see?

Look at the map of New York State. This map shows a much smaller area than a world map shows. Maps that show small areas have almost no distortion compared to maps that show the whole Earth.

A **map key**, also called a legend, helps you understand what is shown on the map. The key for this map is in the upper left corner. It tells you what symbols you can expect to find on the map and what those symbols mean.



Use the map key to find these places:

4. Which city is the state capital of New York?
5. Identify two places of interest.
6. Identify two parks.
7. Identify two lakes.

This map has a **compass rose** to show the directions. As on many (but not all) maps, the compass rose shows north pointing toward the top of the map.

This compass rose shows the four **cardinal directions**: north, south, east, and west. It also shows the four **intermediate directions**: northeast, northwest, southeast, and southwest.

8. What direction would you travel to go from Buffalo to Schenectady?
9. What direction would you travel to go from New York City to Albany?
10. What direction would you travel to go from Utica to Jamestown?
11. Is Niagara Falls in the eastern or western part of the state?
12. Is New York City in the northwestern or southeastern part of the state?
13. Identify three states that touch the eastern border of New York. (A border is the dividing line between two places.)
14. Look at the small map of the United States in the bottom left corner, called a locator map. Is New York located in the northwestern or northeastern part of the country?



New York City



Skill Builder

Review

1. Which is a more accurate picture of the Earth, a map or a globe? Why?
2. Which shows more distortion, a Mercator projection or a Robinson projection?
3. Imagine you have two maps, each the same size as this book. One map shows the world. The other map shows the state of Texas. Which map shows more distortion?
4. Draw a compass rose. Label the cardinal and intermediate directions.

Try It Yourself

Fold a blank piece of paper in half and then in half the other way. Unfold the paper and turn it so a long side is on the bottom. Draw a light pencil line over each fold. Label one fold as the prime meridian and the other as the Equator. Draw the seven continents from memory. Rough shapes are good enough. Label the continents and the oceans. Check your work against the world map on pages 64-65.