

## **World Map Lesson 5**

### **World Projections, Distance, and the North Pole - Grade 6+**

**Activity Goal**      To identify map projections and features, map scales and distances, and polar maps.

**Materials Needed:** A pencil and a Cram World map.

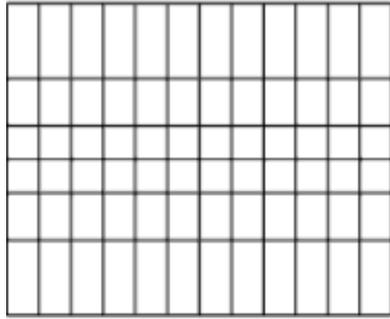
### **Lesson**

#### **World Projections**

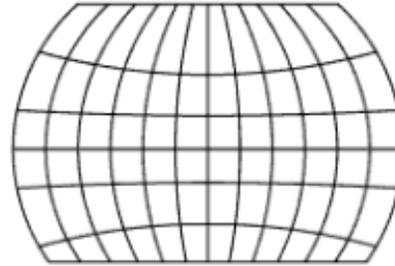
A flat (2 dimensional) world map represents the Earth, which is a 3 dimensional sphere. A globe is the most accurate representation of the Earth because both are spheres. However, a flat world map can be easier to use. You can see the Earth's entire surface on a map. Also, maps are larger and therefore easier to read and locate places.

When changing from a globe to a flat map, distortions will occur. The globe shows four features accurately: shape, size, distance, and direction. At the most, a flat world map can only keep one of these features accurate, with the other three features being distorted.

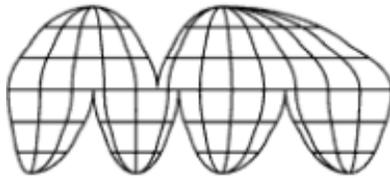
Some world maps make compromises, with some features shown more accurately than others. Distortions on world maps are most obvious near the north and south polar areas, and are least noticeable at the equator. Compare the size and shape of Greenland on a globe and a world map to see an example of distortion.



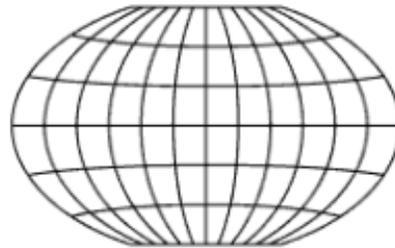
**Mercator**  
designed in 1569 for  
use by navigators, and  
still in use today.



**Van der Grinten**  
a compromise projection,  
when shown in full size  
it is a circle.



**Goode's Homolosine**  
an equal area map with  
good shapes, but has  
"interrupted" oceans.



**Winkle**  
a compromise projection  
used by many mapmakers  
today.

??? 1. What is the projection of the world map you are using? \_\_\_\_\_  
Is it shown above? \_\_\_\_\_

### **Distance on a World Map**

Most maps will show a measurement of distance called scale. On world maps, this measurement of distance is usually only accurate at the equator or along individual lines of latitude. Distance measurements in a diagonal or vertical direction are less reliable.

??? 2. Check the scale on the world map at the bottom on the left side. Write it down.  
1 inch = \_\_\_\_\_miles

Note that it is Equatorial Scale. This means it is only accurate at the equator. The further from the equator you go, the more inaccurate the scale becomes.

3. Now measure the length of the Equator on the world map in inches.

\_\_\_\_\_ inches

4. To find out the circumference of the world at the Equator, (distance around the world at the Equator), multiply the scale by the length of the Equator.

\_\_\_\_\_ miles in 1 inch X \_\_\_\_\_ inches = \_\_\_\_\_ miles (actually 24,902 miles)

## North and South Polar Maps

Since scale becomes more inaccurate as you move closer to the North and South Poles, special polar maps are used to show the north and south polar areas.

Polar maps are equal-distance projections. The maps show a scale bar and a statement, "scale true along the meridians". This means that the measurement of distance is accurate when measured outward from the North or South Pole only.

The North Pole is the joining point of all longitude lines, and is called the "True" North Pole. The True North and True South Poles are also the location of the axis on which the Earth rotates. The location of the North and South Poles are only stated as latitude, 90 degrees north latitude, or 90 degrees south latitude.

## North Magnetic Pole

The North Magnetic Pole is the location where a compass points. It is separate from the "True" North Pole mentioned above. The North Magnetic Pole is located near the northern Canadian island of Ellef Ringnes. The North Magnetic Pole actually moves very slowly, perhaps 5 miles a year.

??? 5. What is the present latitude and longitude location of the Magnetic North Pole?

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