MAPS AS MODELS OF THE EARTH

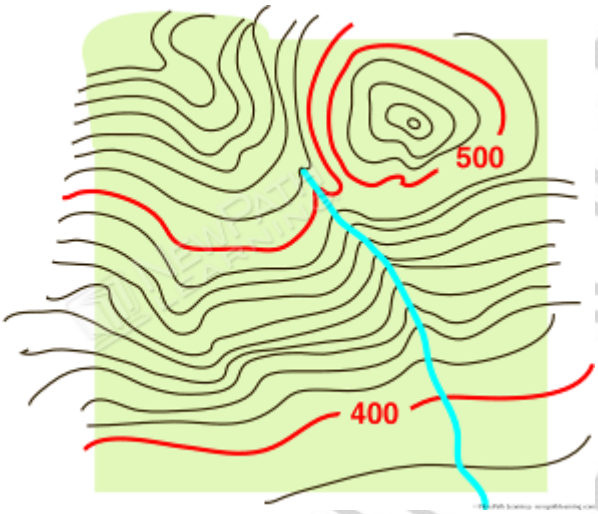
Overview

Geologists use a variety of different types of maps to model or depict the three-dimensional Earth on a two-dimensional surface. Each type of map serves a purpose because each type has its special strengths. All maps, however, also have their weaknesses, so geologists use the map that is best for the application at hand.

Topography and Topographic Maps

Topographic maps use contour lines to show elevation and the contours (that is, the changes in elevation) of the land. Very close contour lines indicate the elevation is changing rapidly and is, therefore, very steep. Widely spaced contour lines, on the other hand, indicate less dramatic changes in elevation.

Contours create specific shapes when they intersect various land features. For example, contours always form a V-shape that points upstream when they intersect rivers and streams. Contours form concentric circles when they indicate individual hills (or depressions).



For a topographic map to be fully useful, one must know the difference in elevation between two consecutive contour lines. This is called the contour interval. **The larger the contour interval, the more dramatic the changes in elevation between contour lines.** Smaller contour intervals indicate gently rolling topography and relatively s er.

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Other Ty

Topograph elevation in a particular region. Earth scientists need a variety of other types of maps to be able to effectively study the Earth. Some of these other types of maps include Mercator Projections, Conic Projections, and Azimuthal Projections.

As the surface of the Earth is projected onto the two-dimensional surface, different portions of the map are distorted while others remain more accurate.

- **Mercator Projections** are maps created by projecting the surface features of the Earth onto a cylinder of paper.

- **Conic Projections** are created when the surface of the Earth is projected onto a piece of paper folded into a cone shape.

- **Azimuthal Projections** are created by projecting a portion of the Earth's surface onto a flat piece of paper; the paper touches the globe at a single point (usually the North or South Pole.) By comparison, Azimuthal Projections are very accurate near the point of contact but become more distorted further away from the point of contact.

Azimuth Projection

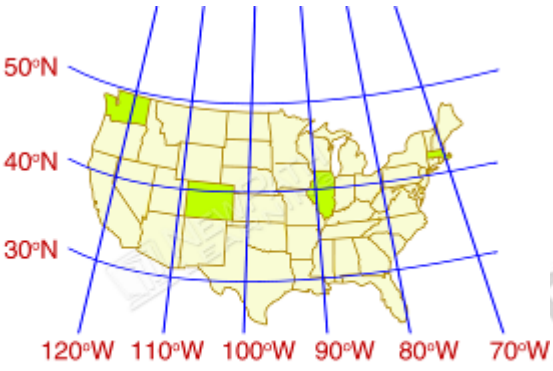
Symbols Tell the Story

In order for any type of map to be of value, one must understand the symbols and purposes of the different maps. Every map has a scale to indicate the relationship between distance on the map and distance on the Earth's surface.

Maps have a **compass rose** to indicate North, South, East and West on the map.

Maps must ... rious symbols used on that particular map. The symbols on different maps can vary widely from each other; the symbols used will be very much dependent on the purpose of the particular map. Also, a date the map was created and a title for the mapped region is included in the legend.

Lesson Checkpoint:
Where do you look on a map to find out which direction points North?



International Conventions Help Share Knowledge

There are basic conventions that all scientists and cultures agree to in order to make maps useful worldwide. Defining the location of any specific town, city, or location on the Earth is done using degrees of longitude and latitude.

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It is also a[illegible]nce and direction f[illegible] called lines of **latitude** (also called parallels because they are parallel to one another). The equator is 0 degrees latitude. The equator is the line that is exactly halfway between the North and South poles. Latitude is measured by degrees North and degrees South of the equator.

By using these conventions, it is possible to locate any specific point on the Earth and define it in terms of degrees longitude and latitude.

Lesson Checkpoint:
Name one universal convention of measurement on a globe which is used to make maps useful throughout the world?