Mr. Standifer

**Mapping**

**Objectives**

* Students will demonstrate understanding of and be able to use major reference lines on a map such as: Lattitude, Longitude, Prime Meridian, Equator.
* Students will demonstrate understanding of and be able to use Time Zones.
* Students will demonstrate understanding of and be able to use the Scale on a map.
* Students will be able to identify the symbols on, and use Topographic maps.

**Latitude and Longitude**

**Cartography** is the science of mapmaking

* The **equator**
	+ circles Earth halfway between north and south poles
	+ Separates Earth into 2 equal halves
	+ northern and southern hemisphere.
* Lines of latitude
	+ Run 1.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ Show distance in degrees 2.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the equator.
	+ Latitude is thus measured from 3.\_\_\_\_ at the equator to 4\_\_\_\_\_ at the poles.

**Degrees of Latitude**

* 1 degree latitude = 111 km
* 1 degree latitude = 60 minutes (‘).
* 1 minute = 60 seconds (‘’).

Longitude divided into 5.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Longitude**

* Distance in degrees 6.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the prime meridian.
* **Prime meridian**
	+ 0° longitude
	+ 7.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ GMT
* Points east/west of prime meridian are 8.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Lines of longitude are 9.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ like latitude lines
* semicircles extending from pole to pole.
* Distances covered by degrees of longitude vary with location.
* One degree of longitude equals
	+ 111 km at equator
	+ 0km at the poles.

**Time Zones**

* Earth is divided into 24 times zones
* The **International Date Line**, or 180° meridian, serves as the transition line for calendar days
* Each time zone is 15° wide, corresponding roughly to lines of longitude.
* Time zone boundaries have been adjusted in local areas for convenience
* 6 zones in the United States.

**Objectives**

* **Compare** and **contrast** different map projections.
* **Analyze** topographic maps.
* **Describe** map characteristics, such as map scales
and map legends

**Types of Maps**

* Maps are a flat 2-D model of a 3-D object.
* ***All*** flat maps 10.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* A map projection is made by transferring points and lines on a globe’s surface onto a sheet of paper.

**Mercator Projections**

* Has 11.\_\_\_\_\_\_\_\_\_\_\_\_\_\_ lines of lat. & lon.
* shapes of land are 12.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Areas are 13.\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Conic Projections**

* made by projecting points and lines from a globe onto a cone.
* very little distortion where the cone touches the globe
* Strong distortion 14.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the projection.

**Azimuthal / Gnomonic Projections**

* Made by projecting a globe onto a piece of paper that touches the globe at a single point.
* distort 15.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between landmasses.
* used in plotting 16.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
	+ great-circle routes

**Topographic Maps**

* detailed maps showing changes in the elevation of terrain.
* Elevation
	+ 17\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Elevation on a topo map is shown with 18.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* A **contour line** connects points of 19.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Contour Intervals**

* The difference in elevation between two side-by-side contour lines.
* The contour interval is dependent on terrain.
* The steeper the slope the 20.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the contour lines
* Index contours are **21.\_\_\_\_\_\_\_\_\_\_\_\_** contour lines marked by numbers representing their elevations.

**Depression Contour Lines**

* Depression contour lines are used to represent features that are 22.\_\_\_\_\_\_\_\_\_\_\_\_ than the surrounding area.
* On a map, depression contour lines have *hachures,* or 23.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the contour line that point toward the lower elevation, to indicate depressions.

**Map Legends**

* Topographic maps and most other maps include both human-made and natural features that are located on Earth’s surface.
* These features are represented by different symbols.
* A **map legend** explains what the symbols represent.

**Map Scales**

* the ratio between distances on a map and actual distances on the surface of Earth.

**3 Types of Map Scales**

* A 24.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ expresses distance as a statement, such as “One centimeter is equal to one kilometer.”
* A 25.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ consists of a line that represents a certain distance, such as 5 km or 5 miles.
* A 26.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_expresses distance as a ratio, such as 1:63,500

**Remote Sensing**

* Until recently, mapmakers had to go on-site to collect the data needed to make maps.
* Today, advanced technology has changed the way maps are made.
* 27.**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** is the process of collecting data about Earth from far above Earth’s surface.

**The Electromagnetic Spectrum**

* Satellites detect different wavelengths of energy reflected or emitted from Earth’s surface.
* This energy has both electric and magnetic properties and is referred to as electromagnetic radiation.
* Electromagnetic radiation includes visible light, gamma rays, X rays, ultraviolet waves, infrared waves, radio waves, and microwaves.

**Wave Characteristics**

* All electromagnetic waves travel at the speed of 300 000 km/s in a vacuum, a value commonly referred to as the 28.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Electromagnetic waves have distinct wavelengths and frequencies.
* The **electromagnetic spectrum** is the arrangement of electromagnetic radiation according to 29.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* **Frequency** is the number of waves that 30.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* These unique characteristics help determine how the energy is used by different satellites to map Earth.

**Landsat Satellites**

* A **Landsat satellite** receives reflected wavelengths of energy emitted by Earth’s surface, including some wavelengths of visible light and infrared radiation.
* Since the features on Earth’s surface radiate warmth at slightly different frequencies, they show up as different colors in images

***Topex/Poseidon* Satellite**

* The ***Topex/Poseidon* satellite** uses radar to map features on the ocean floor.
* Radar uses high-frequency signals that are transmitted from the satellite to the surface of the ocean.
* A receiving device then picks up the returning echo as it is reflected off
the water.
* The distance to the water’s surface is calculated using the known speed of light
and the time it takes for the signal to be reflected.
* Variations in time indicate the presence of certain features on the ocean floor.

**The Global Positioning System**

* The **Global Positioning System,** or **GPS,** is a radio-navigation system of at least 24 satellites that allows its users to determine their exact position on Earth.
* Each satellite orbits Earth and transmits high-frequency microwaves that contain information about the satellite’s position and the time of transmission.
* A GPS receiver calculates the user’s precise latitude and longitude by processing the signals emitted by multiple satellites.