Lesson Nine

GIS AND MAP INTERPOLATION

Open a topographic map. On the edges are latitude (horizontal lines) and longitude (vertical lines) measurements. Usually latitude and longitude measurements are in increments of 15 degrees (See Global Map below). Measure out how many centimeters (inches) lie between the degree markings on the map grid. Place a ruler along the edge of the map. Record the answer on your paper.

Example:

Each marking is $15° = \dfrac{15}{10} = \mathbf{1.5°/cm}$

To interpolate, find the location of sample site. Place the ruler (or meter/yard stick) on the map with the ruler's zero measurement along the edge of the map where the grid begins. Measure the distance to the sample site from the map edge horizontally (centimeters or inches). Slide the ruler up to the edge of the map grid and measure how many degrees that area consumes.

Example:

$$\frac{8cm}{10cm} = \frac{x°}{15°} =$$

$$10x = 120$$
$$X = 12°$$

Cross multiply and divide to obtain an interpolation of the latitude measurement. Add or subtract the interpolation to the closest marked degree of latitude or longitude on the map (See map below). Record the measurement. Repeat the process vertically to obtain longitude measurements.
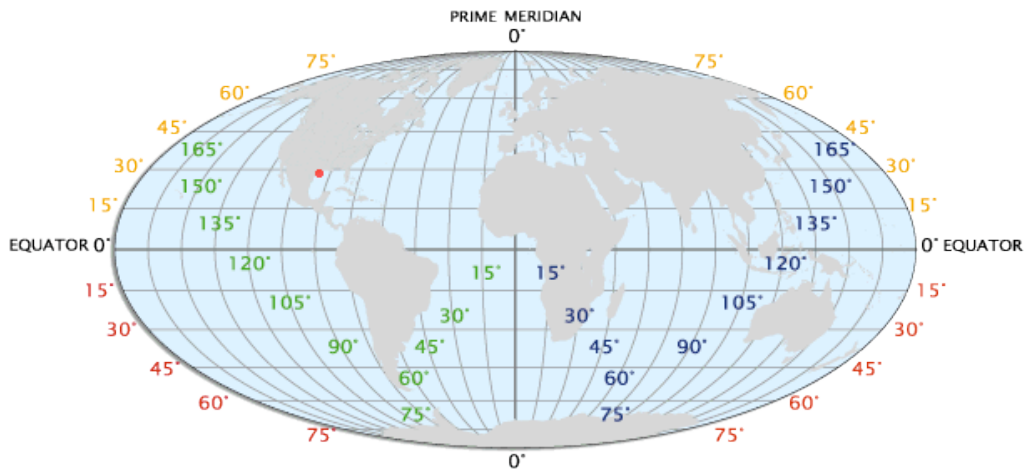
↑+12°

Lines of Latitude→
(run horizontally)

↓-12°

←+12° or -12°→

Lines of Longitude   (run vertically) ↑

Global Map of Latitude and Longitude in 15° increments

Find the website: http://earth.google.com/. Download the free version of Google earth.

Type the address of the site sampled. The program will zoom in and give you an "x" inside of a square with the address next to it. The "pointer" figures in the lower left hand corner of the photo gives the latitude and longitude of the site sampled. **Compare with interpolated latitude and longitude from the above activity.**

Print out a photo of your home.
If time, allow students to play with the program to view their home from several angles and to see how the program works.
NEXT:
The top menu has a peg icon: Select it   A new menu will appear: Select "Placemark."
The placemark should be titled as your **NAME or SAMPLE ID#**.

At the next menu create a new folder entitled "Water Quality Parameters."
In the description site list all the information you were able to gather about the water quality. List the data as follows:

> pH………………………………6.3 (example)
> Conductivity……………………μS/cm
> Nitrates…………………………mg/L
> Chloride………………………..mg/L
> Hardness …...…………………mg/L
> Iron……………………………mg/L

When you place your mouse over the "placemark," all of your information will appear. Each student can place their address on one site to gain a comprehensive photo of the entire study.

Go to top menu and select "File"; "Save As"; and then name it by Project, School, Class, and Date.