**The Cause of Climate: Internet Research and Map**

**Directions/Purpose:** In groups of 4, you will plot climate information on a map of the United States. After all partners have completed their tasks, the group will share the information, and each partner will individually complete the entire map. You will then analyze that information and answer the questions (i.e., “The Cause of Climate: Questions”).

**All students must complete steps 1 and 2.**

**1. Mapping:** The “Key” is meant for symbols; not data. The information you write on this map will be used to answer questions at a later date. This means that you must properly label (e.g., names, measurements, etc.).

**2. Cities to Research:** Open Google Maps. Make sure that it is on “Map” view and not “Satellite” view (i.e., If you see the satellite box in the right corner, you are on the wrong view.). Next, find the following cities and plot them on your map.

1. Buffalo, New York 2. Detroit, Michigan 3. Denver, Colorado 4. Seattle, Washington

5. New Orleans, Louisiana 6. Las Vegas, Nevada 7. Los Angeles, California 8. Kansas City, Missouri

**PARTNER #1**

**3. Average Annual Precipitation:** Go to the website listed below. On your data table, write down the annual precipitation for each of your 8 cities. Make sure to label it “Precipitation” in “Inches”. (e.g., Ann Arbor: Precipitation 37.6 inches)

<http://www.currentresults.com/Weather/US/average-annual-precipitation-by-city.php>

**4. Average Annual Temperature:** Go to the website listed below. On your data table, write down the annual average temperature for each of your 8 cities. Make sure to label both the “High F°” and “Low F°” temperatures.

(e.g., Ann Arbor: Temperature High 59° F / Low 40° F)

<http://www.currentresults.com/Weather/US/average-annual-temperatures-large-cities.php>

**5. Average Annual Snowfall:** Go to the website listed below. On your data table, write down the annual average snowfall for each of your 8 cities. Make sure to label them “Snowfall” in “Inches”. (e.g., Ann Arbor: Snowfall 57.3 inches)

<http://www.currentresults.com/Weather/US/annual-snowfall-by-city.php>

**6. Latitude:** Go to the website listed below.On your data table, write down the latitude for each of your 8 cities. Make sure to label as “Latitude” in “Degrees North” (e.g., Detroit: Latitude 42° N). Note: You only need the first latitude column on the data table (i.e., degrees ° N); not the longitude.

<http://www.infoplease.com/ipa/A0001796.html>

**7. Elevation:** Find the elevations for the 8 cities and write the information on the data table.

 Note: properly label as “elevation” in “feet or meters above sea-level” (e.g., Detroit: Elevation 500 ft. ASL).

<http://pmiusa.biz/pdf/US%20City%20Elevation%20Chart.pdf>

**PARTNER #2**

**8: Jet Stream:** On the internet, research the 4 different Jet Streams. On your map, draw the **Polar and Subtropical Jet Streams** for North America. Note: The jet stream meanders (i.e., moves) up and down a great deal.

<http://www.earthlyissues.com/jetstream.htm> <http://commons.wikimedia.org/w/index.php?title=File%3AAerial_Superhighway.ogv>

**9. Prevailing Winds:** Draw an arrow that shows the diction that wind travels across the United States. The prevailing winds for the United States are called Westerlies (i.e., start in west).

<http://www.lsrhs.net/departments/science/faculty/brandesa/images/winds.jpg>

<http://www.sciencemag.org/content/323/5920/1434/F1.small.gif>

**10. Ocean Currents:** On your map, draw the warm and cold ocean currents. Properly color code (i.e., red & blue), label, and put in key. Major ocean currents can be found on page 617, in your book. Next, complete the data table for warm or cold current.

**Note: You are only drawing the 4 currents around the United States, not the entire world**

**(i.e., only draw the Cali. Current, Gulf Stream, N. Pacific, and N. Atlantic).**

**PARTNER #3**

**11. Air Masses:** Go to the website listed below. Draw and **label** the air mass patterns, on your map. Color code air mass patterns and place in key.*Do not* color code these blue and red (would be same as ocean currents’ color code). Note: Southern California’s air is **winter only**. Make sure that seasonal air mass is properly labeled on your map (i.e., winter only), because it is important for understanding task 11 (i.e., Santa Ana seasonal wind).Finally, complete the data table for air masses.

<http://www.sleepingdogstudios.com/Network/Earth%20Science/ES_19.3_files/frame.htm#slide0011.htm>

<http://faculty.uml.edu/nelson_eby/87.202/IMAGES/AirMasses.jpg>

<http://www.atmos.illinois.edu/~snodgrss/Fronts_lab_files/image002.jpg>

**(For additional information on air masses, read/look at page 580 in your textbook.)**

**12. Seasonal Winds:** Look at the air masses on your map (#11). Note that the Maritime Tropical winds, in Southern California, happen during the late winter and early spring months.Now, research the **Santa Ana winds**. Note that these seasonal winds happen in southern California during the fall and early winter months. Write a short description, draw wind patterns, color code, label, and plot these seasonal winds on your key (**Note**: do not color code red/blue or the air masses’ colors). **Furthermore,** **notice that these winds cover a geographical small area (i.e., southern California).**

<http://webtv.accuweather.com/en/weather-news/santa-ana-winds-return-to-sout-1/57152>

<http://en.wikipedia.org/wiki/Santa_Ana_winds>

<http://www.weather.com/outlook/weather-news/news/articles/how-santa-ana-winds-develop_2011-10-13>

http://mrjacobsearthscience.weebly.com/lecture-10-seasonal-winds.html

**13. Large Water Bodies:** Study the 8 cities that you have plotted on your map. Open Google Maps and **quickly** estimate how far each city is from a **large body** of water (i.e., **ocean** or **great lake**). Use the map scale, in the bottom left corner, to calculate the distance. Make sure that you only use an **ocean** or **great lake** that has an impact on the city’s climate. Look at the air masses for the United States (#11) to figure out which ocean or great lake has an impact on the city’s climate. Note, this is most important for Denver and Kansas City. Finally, write the distance on your data table (e.g., Dundee: 17 miles from Lake Erie).

**PARTNER #4**

**14. Mountain Ranges:** First, make sure that your Google map is set to “Map” view. On your map, color the major mountain ranges (i.e., Rocky, Appalachian, Sierra Nevada, and Cascade). **Be very detailed around the required cities.** Only draw the areas that are **GREEN**. Write this color code on your key. Next, write on your data table if the city is windward, leeward, or not near a mountain.

**Note**: You must research the different mountain chains (i.e., Rocky, Appalachian, Sierra Nevada, and Cascade).

**15. Deserts:** First, make sure that your Google map is set to “Map” view. On your map, color the major deserts in the west (i.e., Mojave, Great Basin, Sonoran, and Chihuahuan). Only draw the areas that are **GRAY**. Write this color code on your key.

**Note**: You must research the different deserts (i.e., Mojave, Great Basin, Sonoran, and Chihuahuan).