

Factors that Affect Climate

8th Grade Science

2017

What is climate?

- **Climate** is the average weather conditions over a long period of time
 - Includes average temperatures and precipitation, wind patterns, humidity, air pressure
- **Weather** is what it is **NOW**, climate is what it **SHOULD BE**.

How is this different from “weather”?

- Weather changes day to day.
- Weather can fall inside normal ranges or outside of what is expected from the climate- “above or below average”
- Climate is the benchmark; *what we expect*

Springfield Averages

- Average yearly precipitation: 45 in.
- Average April precipitation: 2.1 in.
- Record High Temp. 4/17: 84° F
- Record Low Temp. 4/17: 27° F
- Average April Temp: 49° F

Climate Factors

Temperature Factors

- Latitude (distance from equator)
- Altitude (height above sea level)
- Distance to a Body of Water
- Ocean Currents

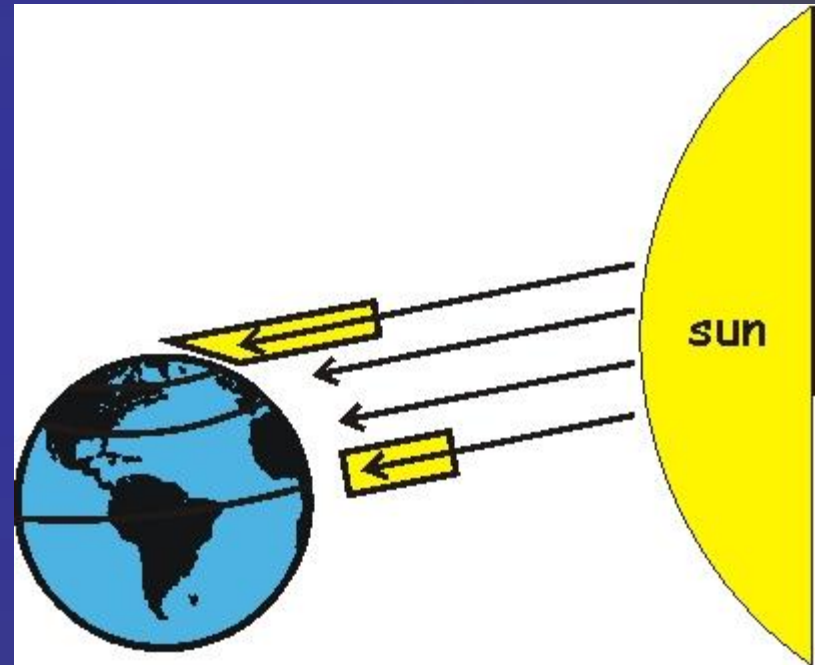
Precipitation Factors (TP)

- Topography
- Prevailing Winds

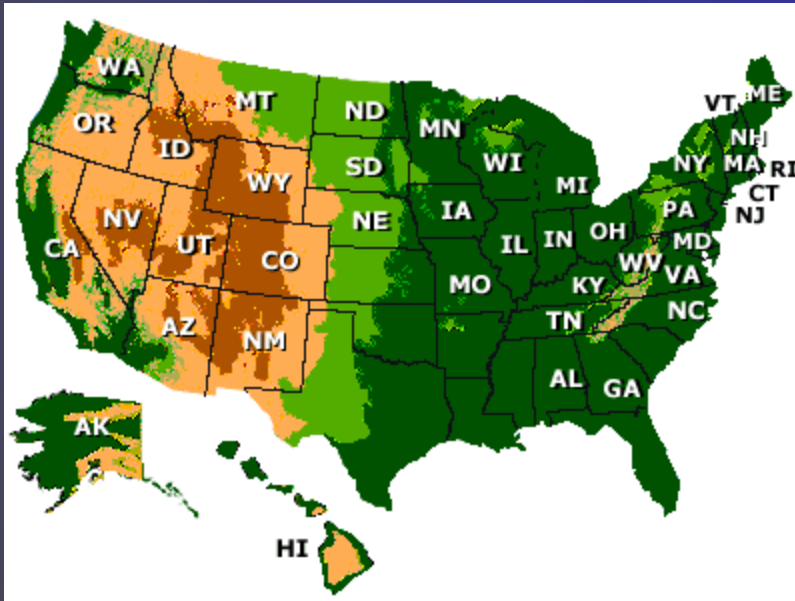
How does Latitude affect climate?

(the angular distance N or S of the equator)

- Latitude is the most significant factor for determining climate
- Warmer at the equator
- Colder at the poles – in general
- Seasons are REVERSED between N. and S. Hemisphere



How does Altitude affect climate?



- As you go up in altitude, you go down in temperature and sometimes precipitation

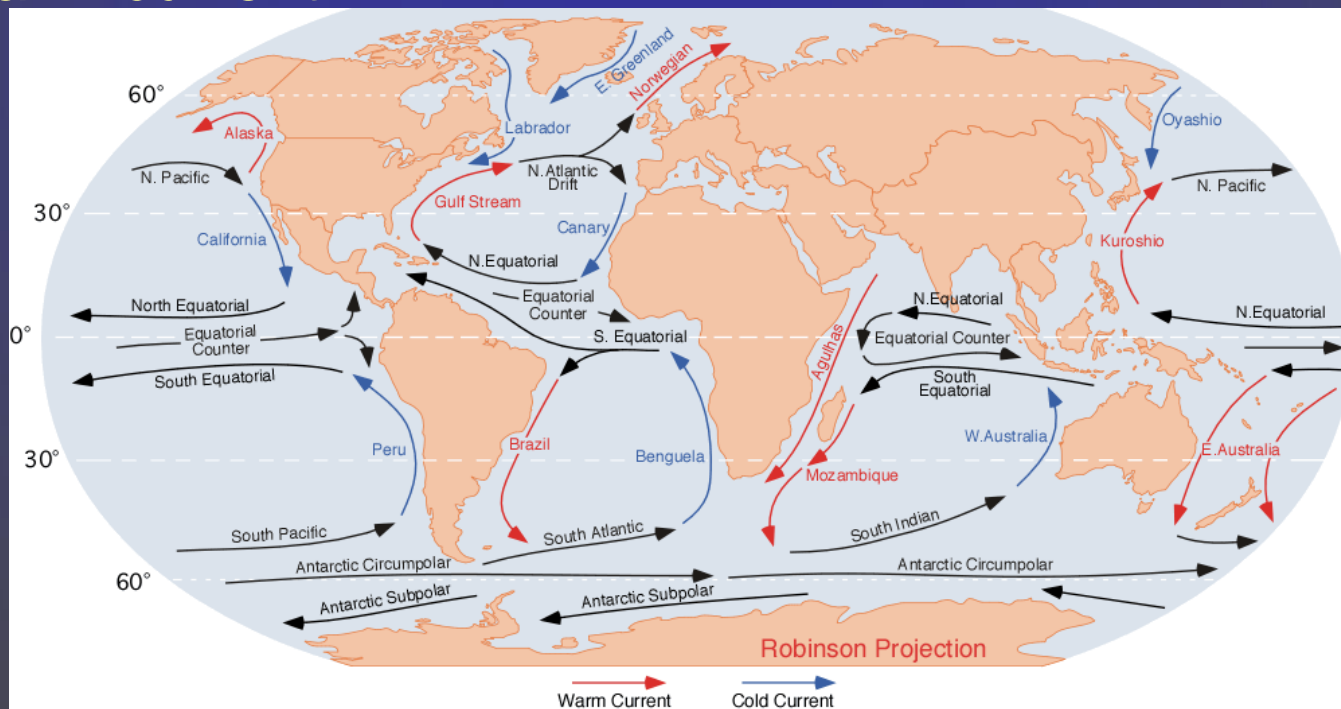
How does the Distance from large bodies of water affect climate?



- Large bodies of water regulate temperature due to water's properties.
- The ocean thermostat- keeps it **warmer in winter and cooler in the summer** - less fluctuation
- Inland climate have more extreme temperature fluctuations throughout the year

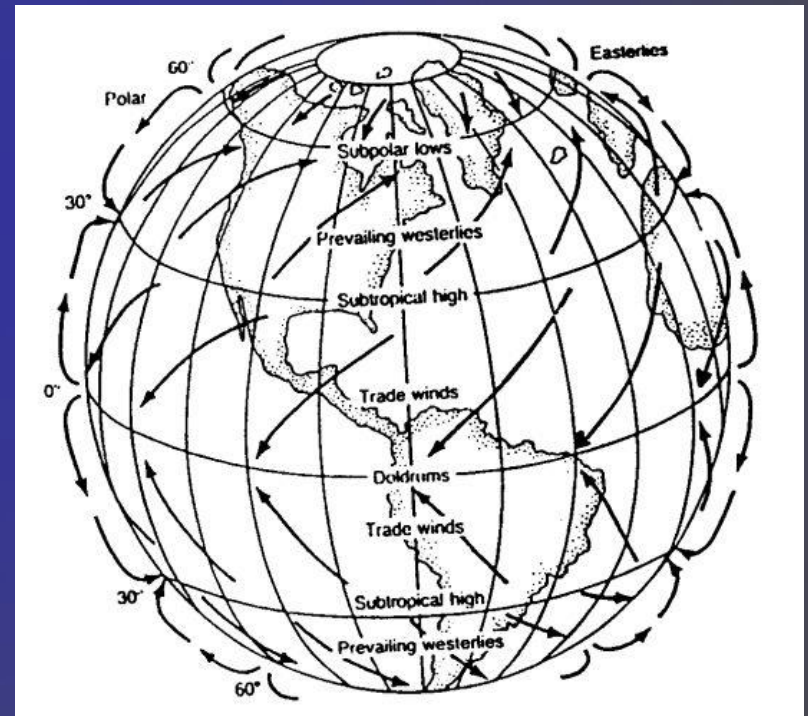
How do nearby Ocean Currents affect the climate?

- Warm and cold ocean currents bring warm moist air near to coastal areas.
- Great Britain is an example – latitude position puts it in the cold and dry climate zone
- However it is moist and warmer due to the Gulf Stream, a warm current.

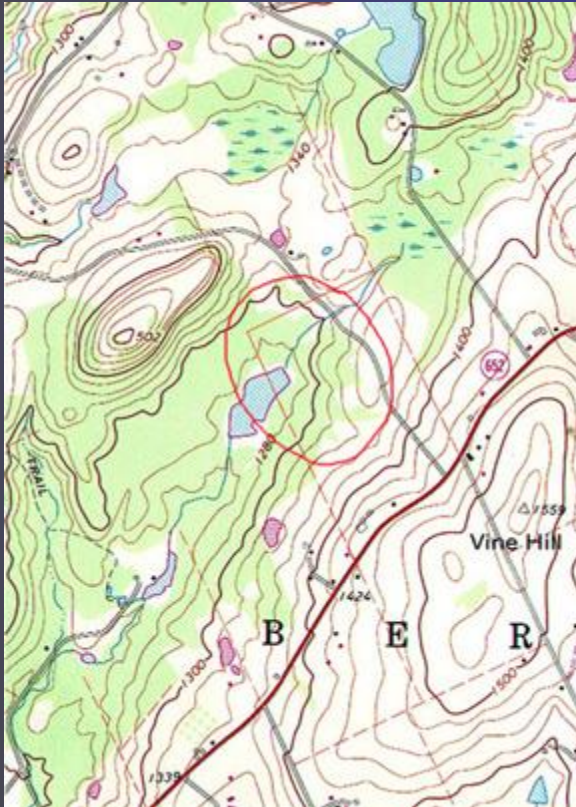


How do the Prevailing winds affect climate?

- Global winds are generated by the rotation of the earth and move air around the globe.
- Prevailing winds (like the Trade Winds) regulate climate
- Winds bring storms, air masses of different temps.



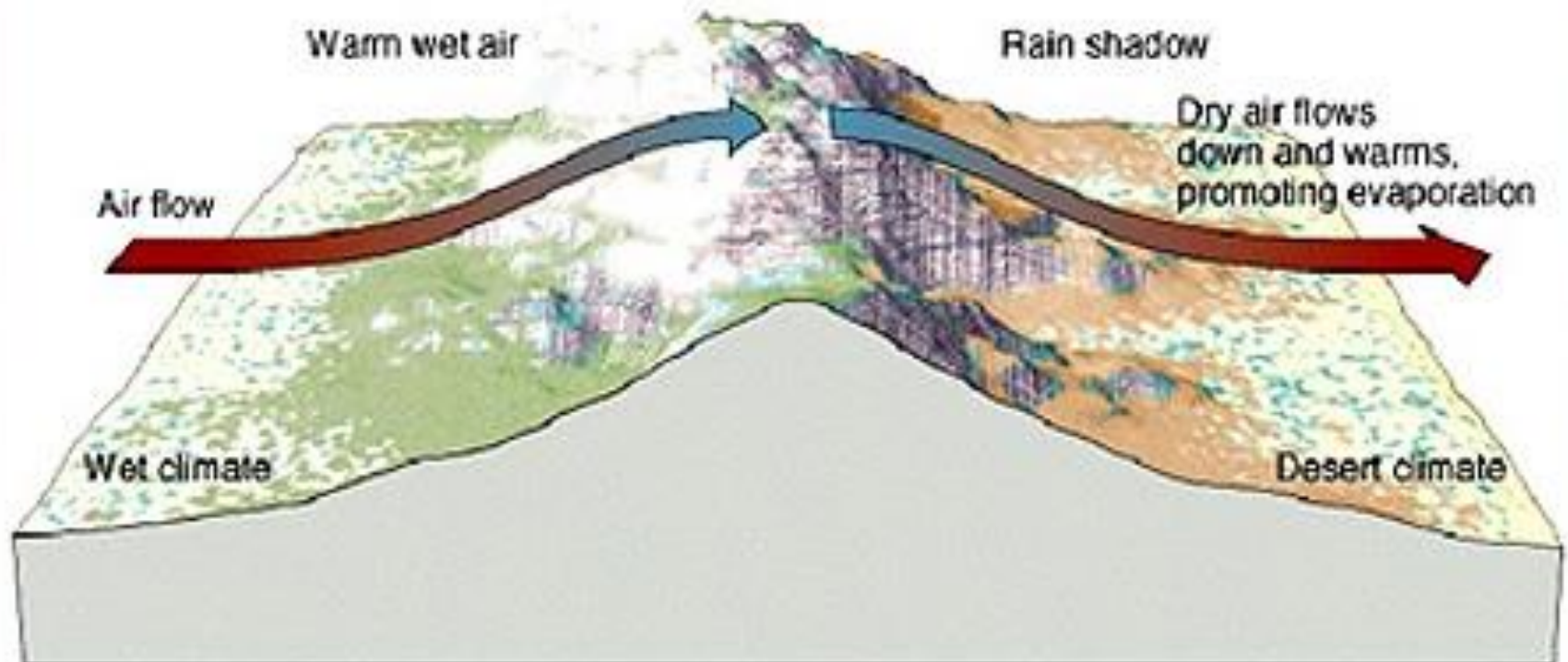
How does Topography affect the climate?



- The lay of the ground plays an important role in regulating climate
- Ex. The **windward** side of a coastal mountain range is **wetter** than the leeward side – **rain shadow effect**

Orographic effect - Rain Shadow

As air is forced upward over the mountains, it cools, causing water vapor to condense and rain out



Other Factors- Volcanic Eruptions

- Volcanoes can warm AND cool the planet
- Volcanoes emit CO_2 which is a greenhouse gas → **global warming**
- But volcanoes also emit SO_2 and aerosols (tiny solid particles) that REFLECT sunlight back into space
 - Less radiation reaches Earth → COOLING

Ice Ages

- Earth naturally fluctuates between ice ages and interglacial periods
- ICE AGE- an era of cooler than normal global temperatures
- INTERGLACIAL PERIOD- era of warmer than normal temps.
- Scientists claim the next ice age is 50,000 years away

What We Know

- Earth's climate HAS changed many times over time naturally
- Our climate IS changing right NOW, but it's different than ever documented before
 - WHY????
- Humans adding GHGs has warmed the planet in the past 200 yrs → ***This is a well documented FACT!***

Climate and Latitude

- For this activity you will look at factors affecting climate
- You will choose 3 cities – 1 east coast, 1 west coast, 1 mid-states
- All three cities should have latitudes within 1° of each other
- You will go to infoplease.com
 - Click The Fifty States Tab
 - Scroll down to US Cities
 - Chose a west coast city (under latitude tab)
 - Find a mid and east coast city with similar latitudes
 - Collect the required information for all 3 cities

Which factor?

- After collecting all of your data, use the internet to research the geography of your cities. Think about the factors that affect climate
 - Latitude?
 - Altitude?
 - Distance to Large Body of Water?
 - Ocean Currents?
 - Topography?
 - Prevailing Winds?
- On notebook paper answer questions 4 and 5.

Graphing Climate Data

- Next use the internet to find one of the following:
 - Average monthly rainfall
 - Average monthly temperature
 - Average high temperature
 - Average low temperature
- Make a table of the above information
- Create a triple line graph of your data table (BE SURE TO INCLUDE ALL CRITICAL COMPONENTS OF A GRAPH)
- EXTRA CREDIT OPPORTUNITY: Complete 1 other graph of one of the other pieces of data for your three cities.