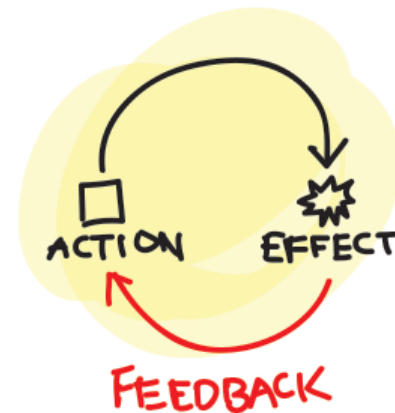


Bell Ringer

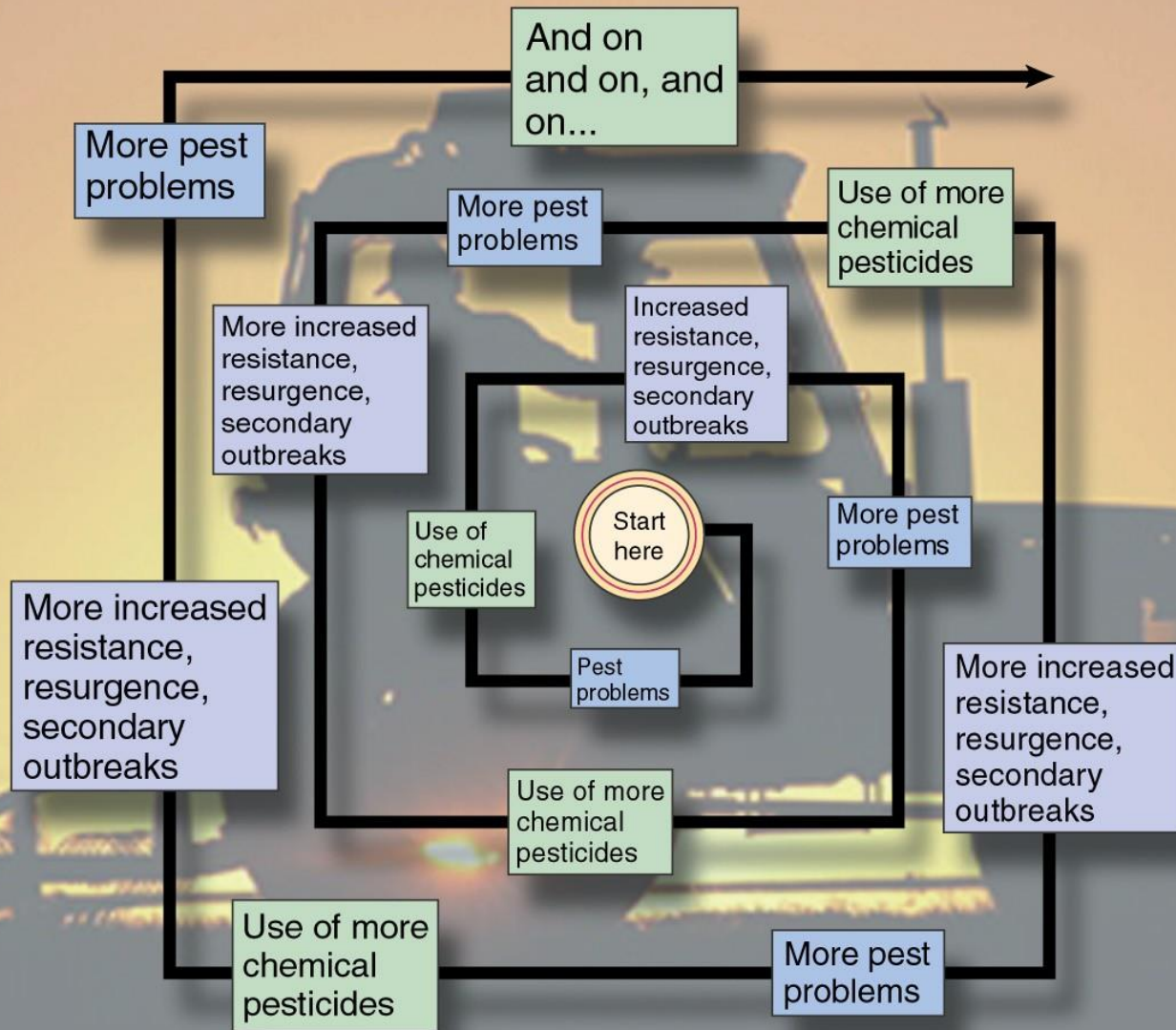
1. This is the first day of the last term. Set a specific goal for these last 2.5 months (not just 'get good grades' or 'don't fail' or 'wake up on time'. **How** are you going to do these things. Set action word goals)
2. What science are you planning on taking next year?

Earth's feedback loops

- Earth has lots of feedback loops that either build on each other or balance each other out, depending on their effects.



Example - Pesticide



Positive and Negative Feedback

- **Positive** feedback –
Makes the original change even more extreme. E.g. – the pesticide example.
- Enhance or amplify changes; this tends to move a system away from its equilibrium state and make it more unstable.
- **Negative** feedback –
Pushes a system back to its original position.
- E.g. – You get cold, you shiver and put on a jacket, you get warm again.
- Tend to dampen or buffer changes; this tends to hold a system to some equilibrium state making it more stable.

Characteristics of Climate

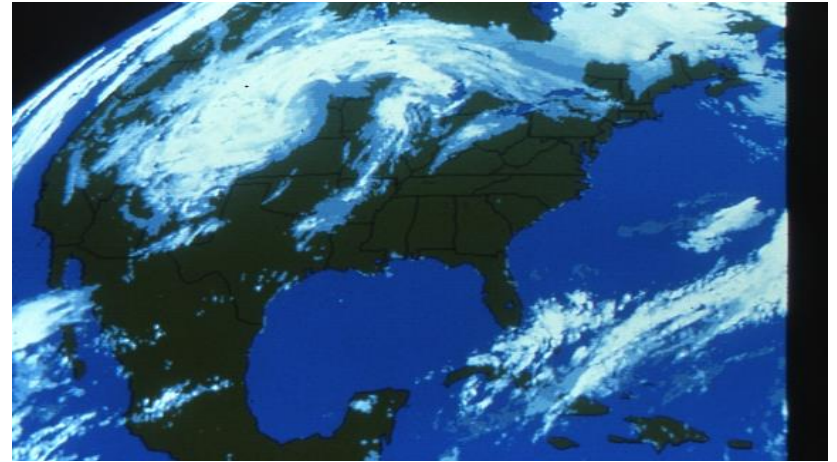
Worksheet

Characteristics of Climate

The answers...

1. What is the difference between *climate* and *weather*?

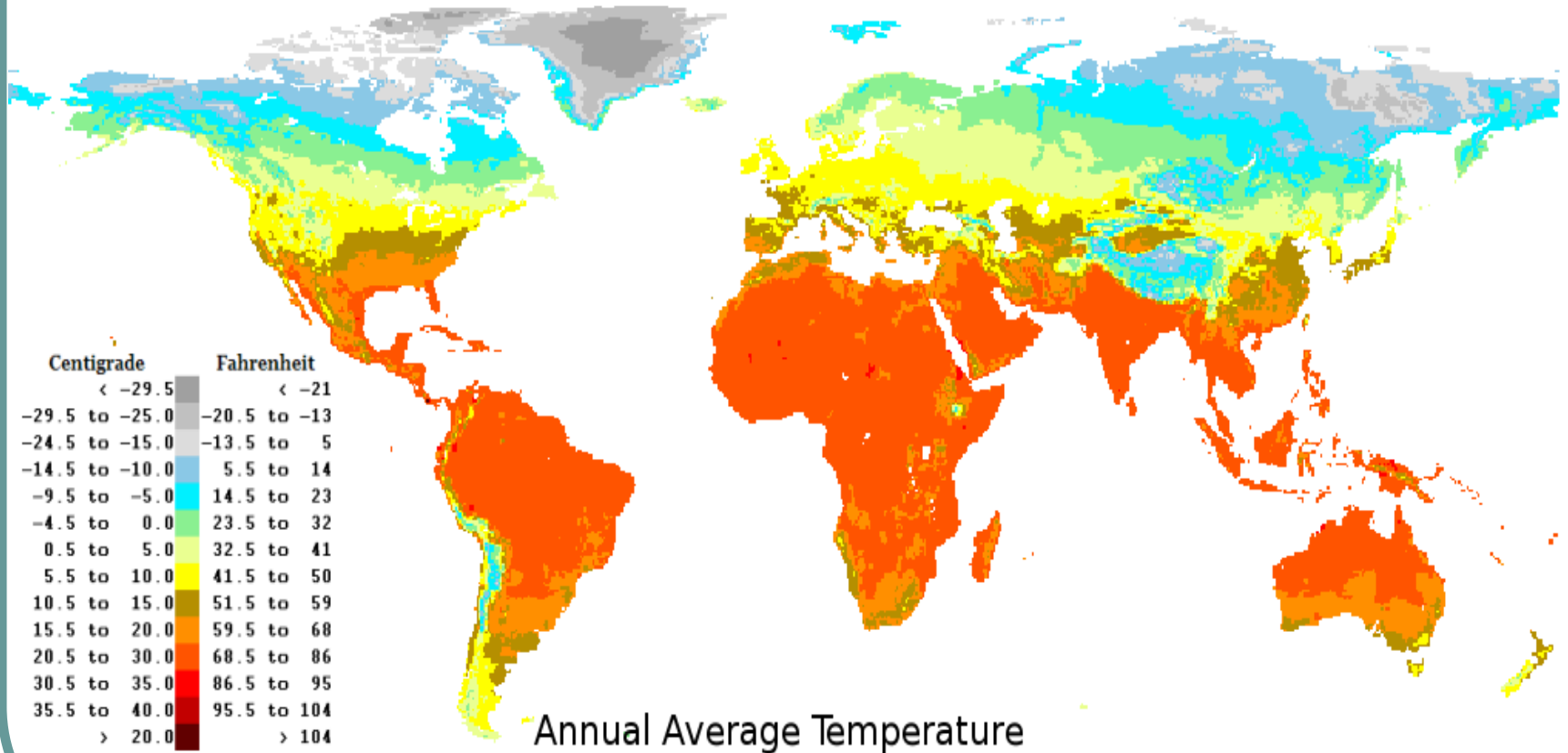
- Weather is what the atmosphere does on a day to day basis.
- Climate is the average weather over a long period of time (dozens to thousands of years).
- https://www.youtube.com/watch?time_continue=62&v=e0vj-0imOLw



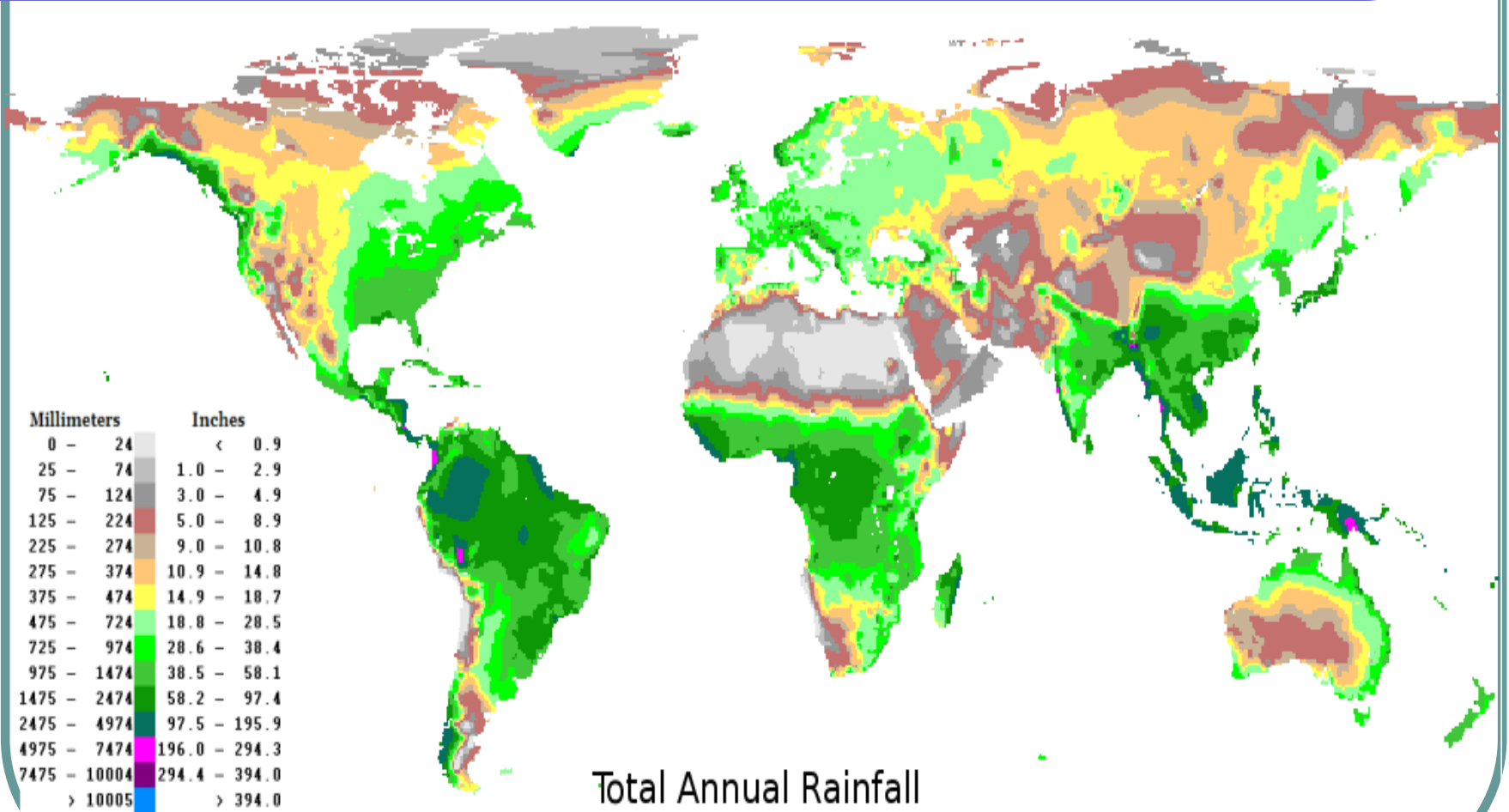
2. What are the *2 basic factors* that determine the climate of a place?

Climate is determined by the average temperature and precipitation of a place.

Annual Average Temperature



Total Annual Rainfall



Precipitation = also snow

<https://weather.com/news/video/southwest-passenger-films-attempted-landing-at-ronald-reagan-airport>

3. Describe how *latitude* influences the climate of a place.

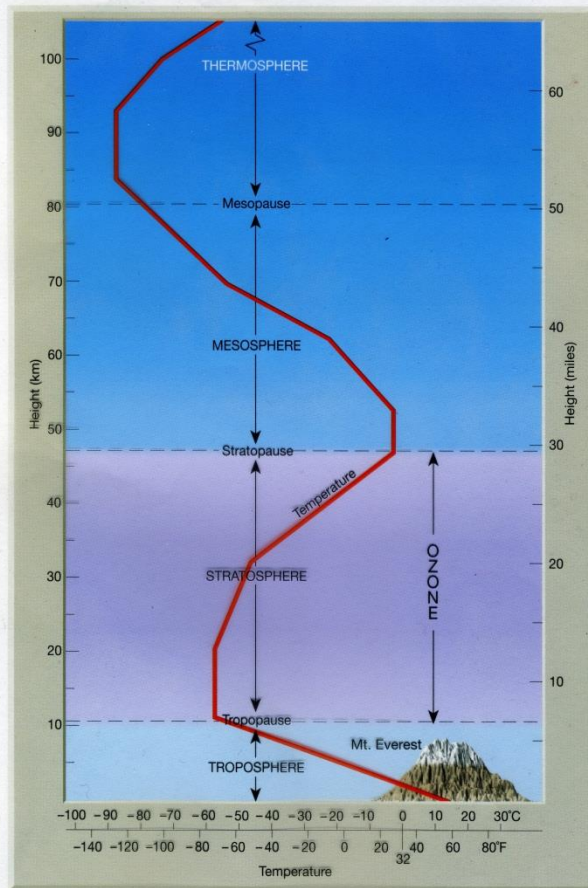
Temperature is related to latitude as...

Places closer to the poles are cooler.

Places in the middle tend to have a wide range of seasons.

Places closer to the equator are warmer

4. Describe how *altitude above sea level* influences the temperature of a place.



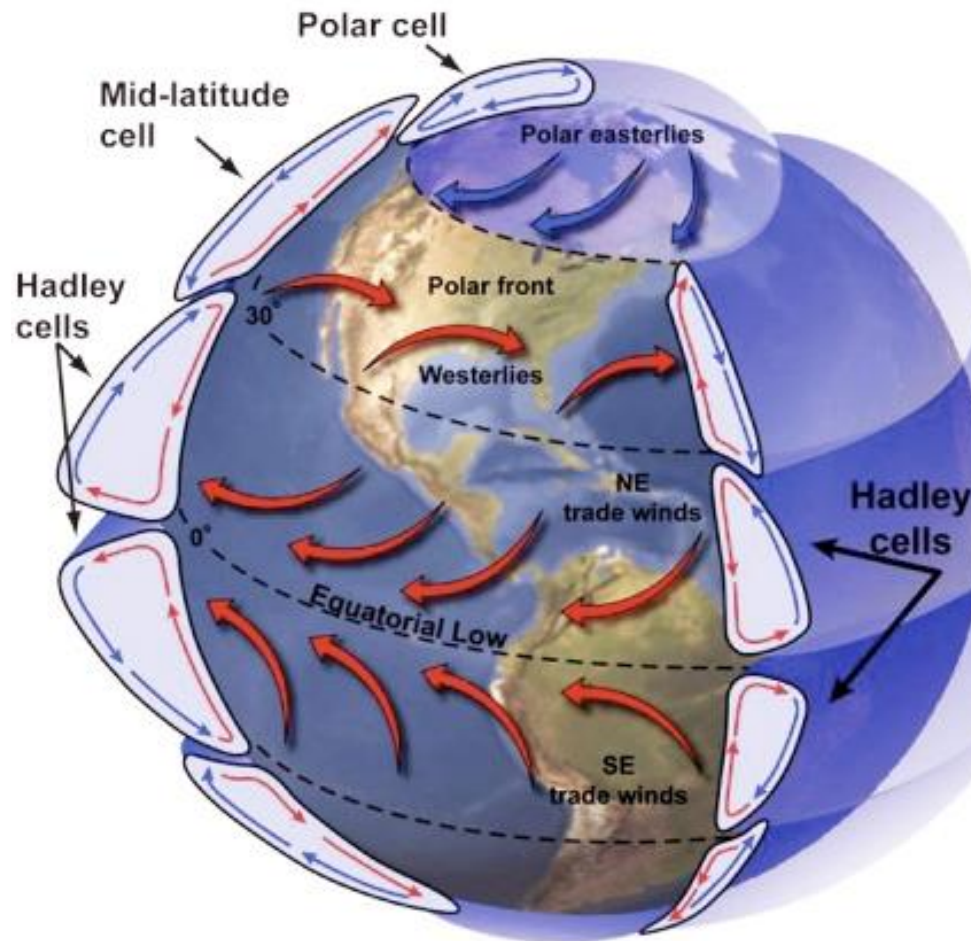
Because the troposphere cools as you rise, higher altitudes have overall cooler climates.

5. Describe how *nearness to an ocean* influences the temperature of a place.

- Because oceans have the ability to absorb and retain lots of heat, places near oceans have moderate climates that stay the same year-round.
- Places inland away from oceans tend to have wider ranges of temperatures, so like hot summers and cold winters.

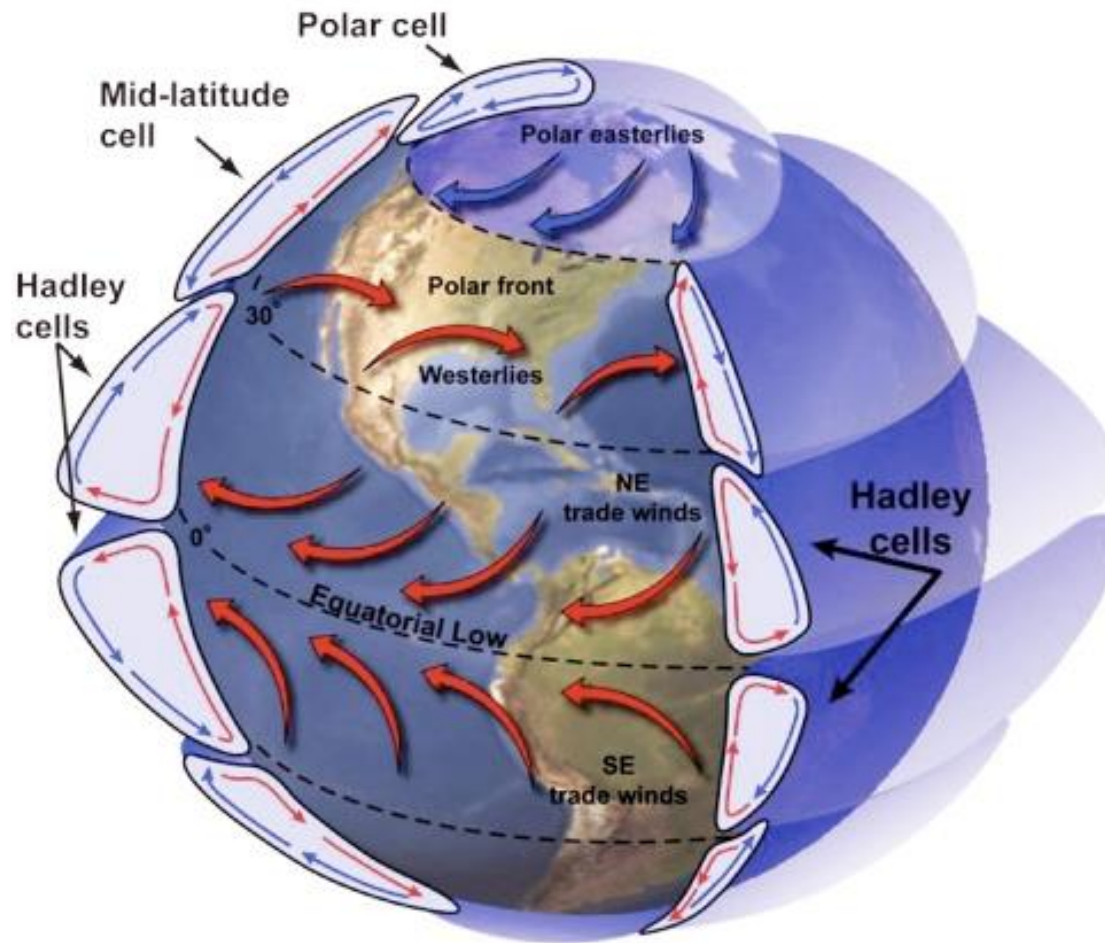
City	Coollest Average Temp	Hottest Average Temp
Santa Monica, CA	57 F	71 F
Seattle, WA	50 F	70 F
San Francisco, CA	46 F	70 F
Salt Lake City, UT	26 F	90 F
Kansas City, KA	22 F	92 F
St. Louis, MO	23 F	90 F
Chicken, AL	-17 F	71 F
Honolulu, HI	65 F	85 F

6. Describe how *global wind belts* influence the temperature of a place.



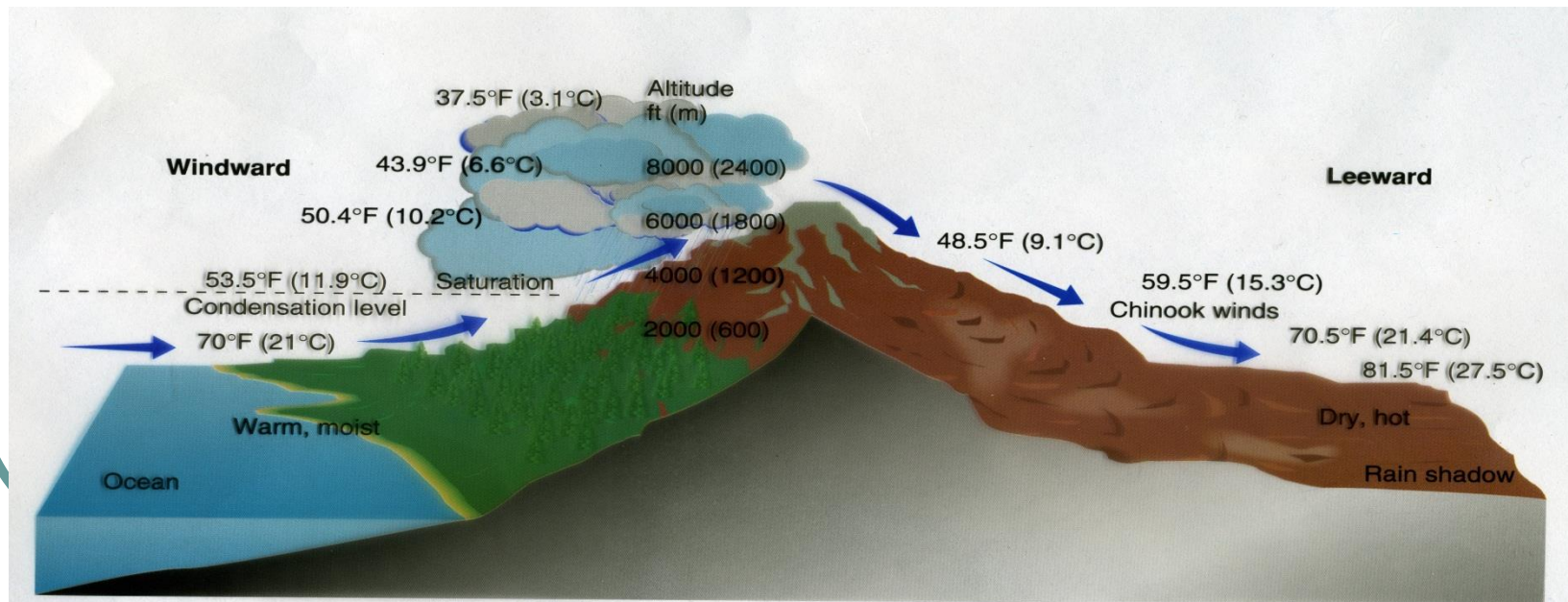
6. Describe how *global wind belts* influence the temperature of a place.

- A place that has its prevailing wind coming from the **ocean** will have *moderate, even temperatures*.
- Places with the prevailing wind coming from the **center of a continent** will have *wider temperature ranges*.



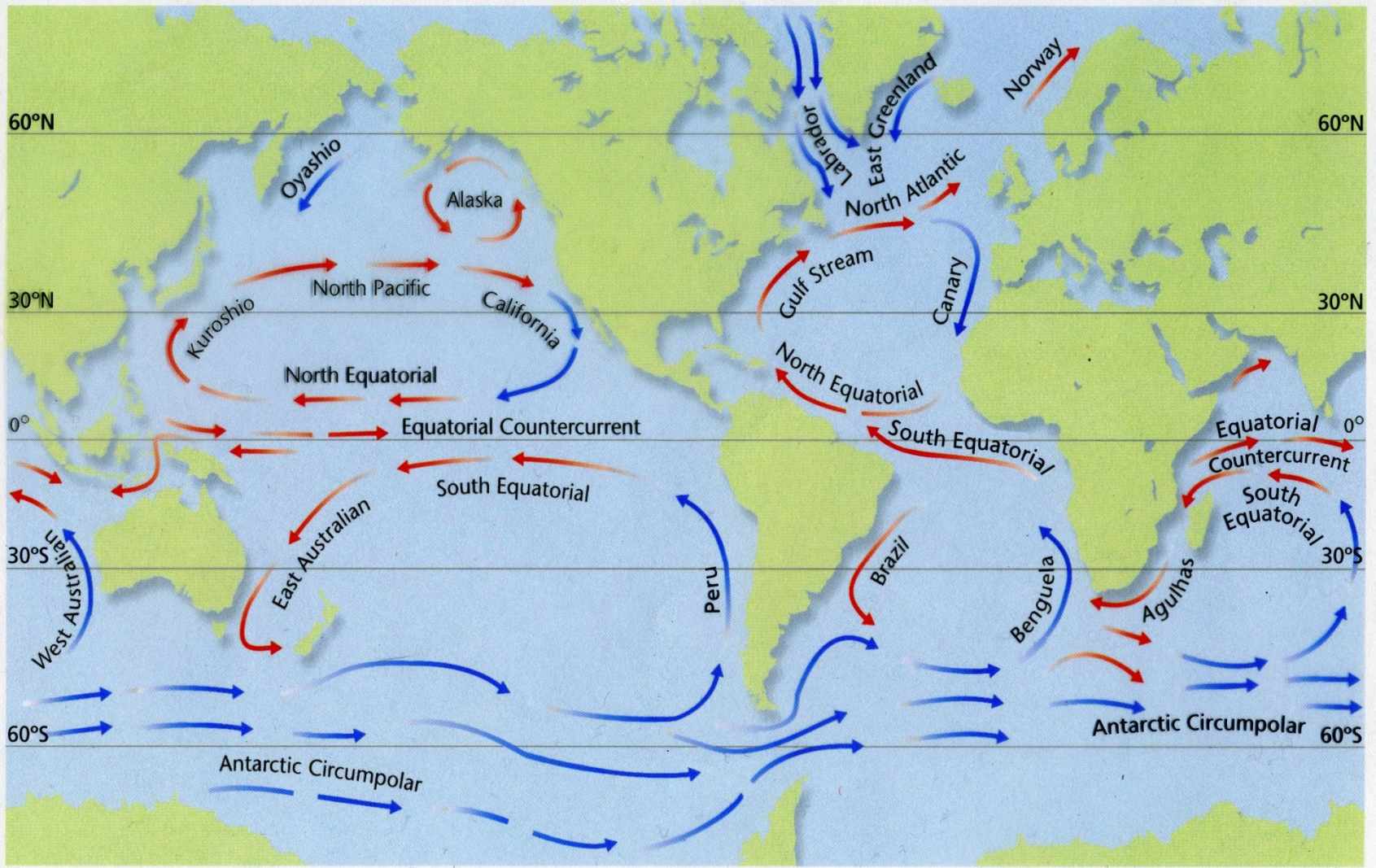
7. Describe how *topography* (the shape of the land) influences the temperature of a place.

- Mountains tend to block winds that can affect temperature. Places on the **windward** side of a mountain will usually be more moderate, and places on the **leeward** side away from the wind will have wider temperature range.



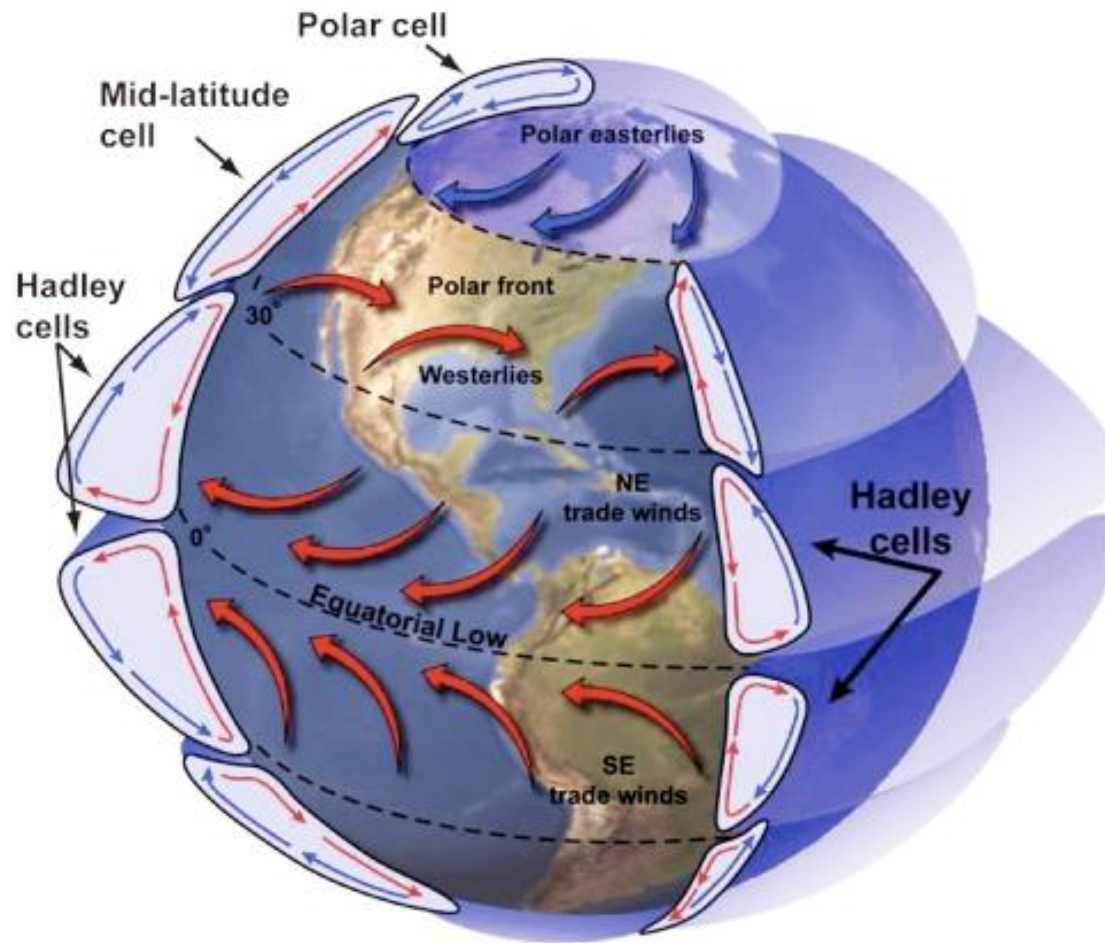
8. Describe how *ocean currents* influence the temperature of a place.

- Places on the **west sides** of continents will have **cooler climates** because of the cold ocean currents there.
- Places on the **east sides** of continents will be **warmer** because of the warm ocean currents there.



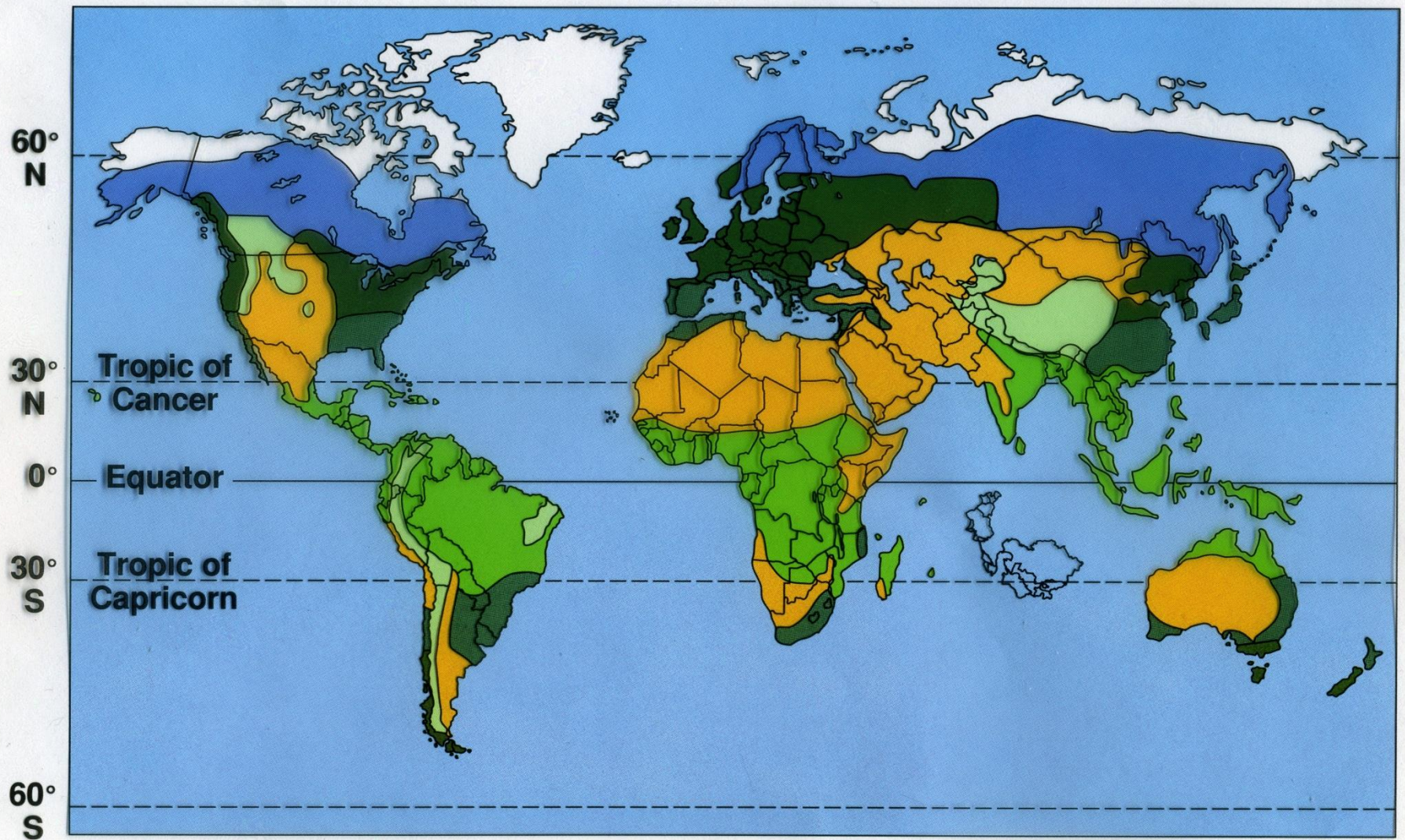
9. Describe how *global wind belts and latitude* influence the precipitation of a place.

- The global wind belt that a place is under will affect the amount of precipitation it receives. At the **equator**, **warm air rises** there, so much rainfall occurs. Remember- all of the worlds great jungles are at the equator.
- At **30° N & S**, **cool air is sinking**, so these places **receive little rainfall**. Remember- all of the world's great deserts are at this latitude.










9. Describe how *global wind belts and latitude* influence the precipitation of a place.

- In between, the amount of *precipitation* will vary based on the season.
- At 60° and higher, there is *little precipitation* as the air is *too cold to hold much water*, and the climate is dominated by ice anyway.

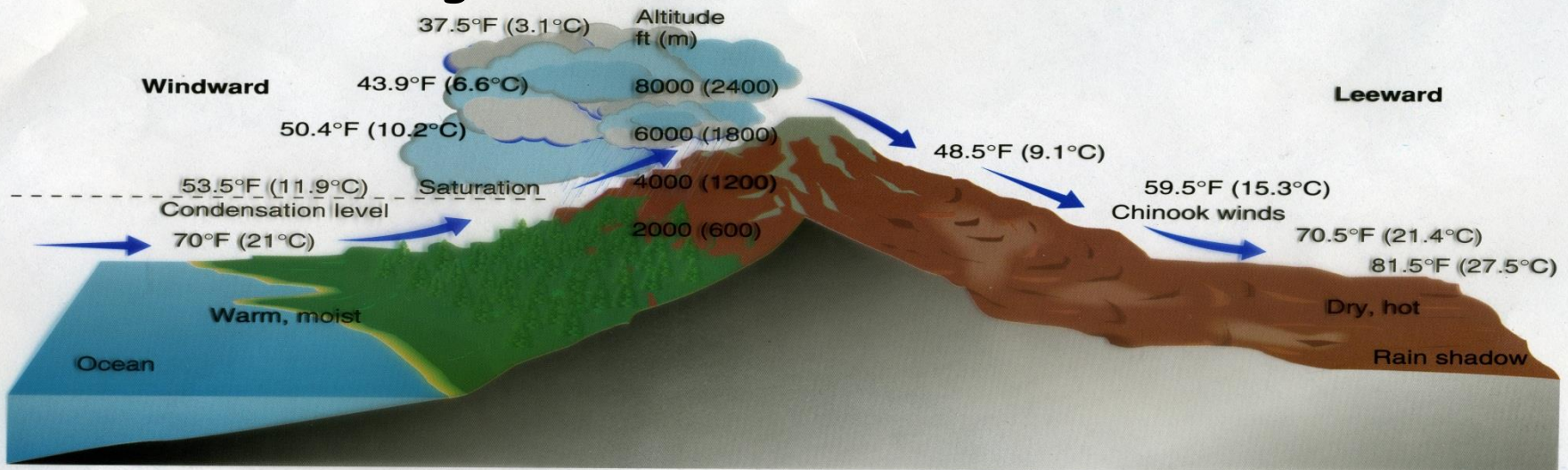


Types of climate

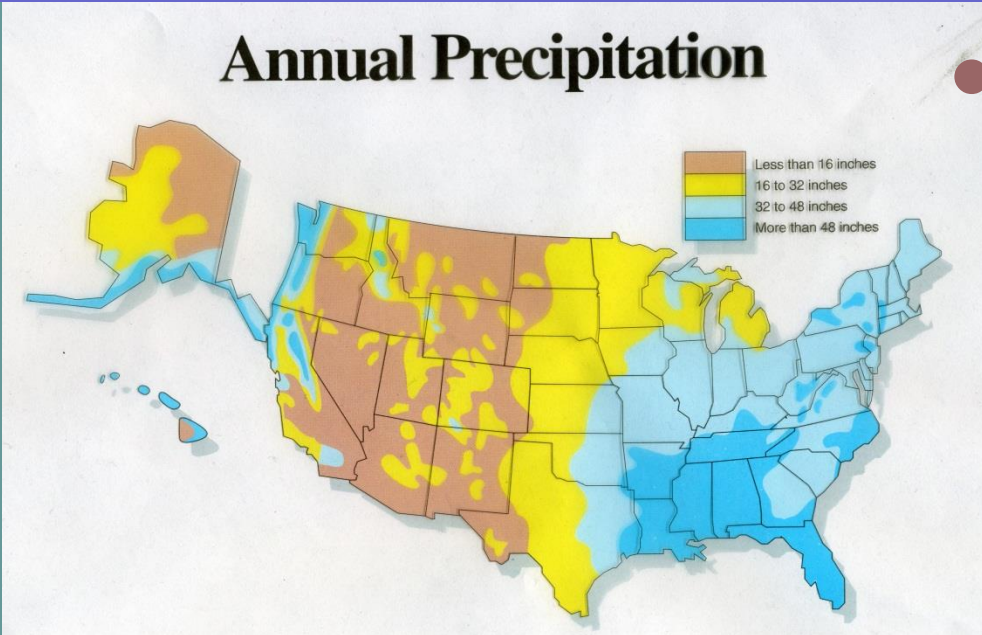
- | | | | |
|--|--|--|--|
|  Polar (ice) |  Cool temperate |  Dry |  Highland |
|  Subarctic (snow) |  Warm temperate |  Tropical | |

10. Describe how *mountain ranges* influence the precipitation of a place.

- Mountain ranges tend to trap or block precipitation, depending on the which side the place is on. Sides facing the prevailing wind direction (windward) will be wet, while *places facing away from the wind (leeward) will be dry*. The dry side of a mountain range will be called a **"rain shadow"**



11. Describe how *oceans* influence the precipitation of a place.



- Because ocean areas will have a lot of humidity in the air, **coastal regions will be wetter**, especially if the prevailing wind carries the air inland.

12. What events could cause Earth's global climate to *cool*?

- Could the Sun produce less energy?
- Asteroid impacts could place lots of dust in the air, blocking sunlight.
- Volcanic eruptions could place ash in the air that blocks sunlight (has been measured!)

12. What events could cause Earth's global climate to *cool*?

- The location and size of continents and oceans will vary over time due to plate tectonics. Depending on where these are, ocean circulation patterns may change, and this could cool the planet.

How would *cooling* affect Earth's spheres?

- If the climate were to cool, precipitation patterns could change; snows may last longer into the summers. Over a long period of time, even ice ages could occur and sea levels would lower. As a result, biomes would change.

13. What events could cause Earth's global climate to *warm*?

- Solar energy output could increase.
- Burning of fossil fuels could place more heat absorbing gases, like CO₂, in the air.
- Once again, the locations of plates could cause temperature patterns to rise.

How would *warming* affect the Earth's spheres?

- If the climate were to warm, precipitation patterns could change; polar icecaps and glaciers would melt, and this would raise sea levels.
- This would have an effect on the water cycle, ocean circulation, and biomes.

