Climates of Earth

Chapter 14 Lesson 1

What is climate?

define: the long-term average weather conditions that occur in a particular region

depends on average temperature and precipitation and how these variables change throughout the year

What affects climate?

* **latitude** (close to equator, warmer climate)

* **large bodies of water** (along coastlines, climate is more constant, hot summers and cold winters typically happen in the center of continents)

* **altitude** (mountains more rainy or snowy)

* **buildings and concrete** (retain solar energy, cause temps to be higher, special climate)

Latitude

*the amount of solar energy received depends on latitude

*the Earth's curved surface causes the angle of the Sun's rays to spread out over a larger area

near equator: warmer climates
near poles: colder (receive less solar energy)
between 30º and 60º: summers hot, winters cold

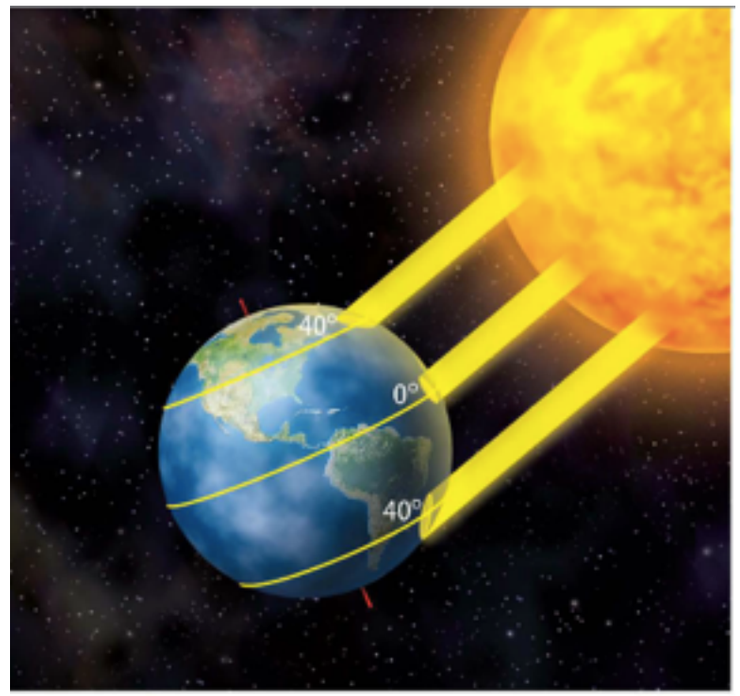


Figure 1 Latitudes near the poles receive less solar energy and have lower average temperatures.

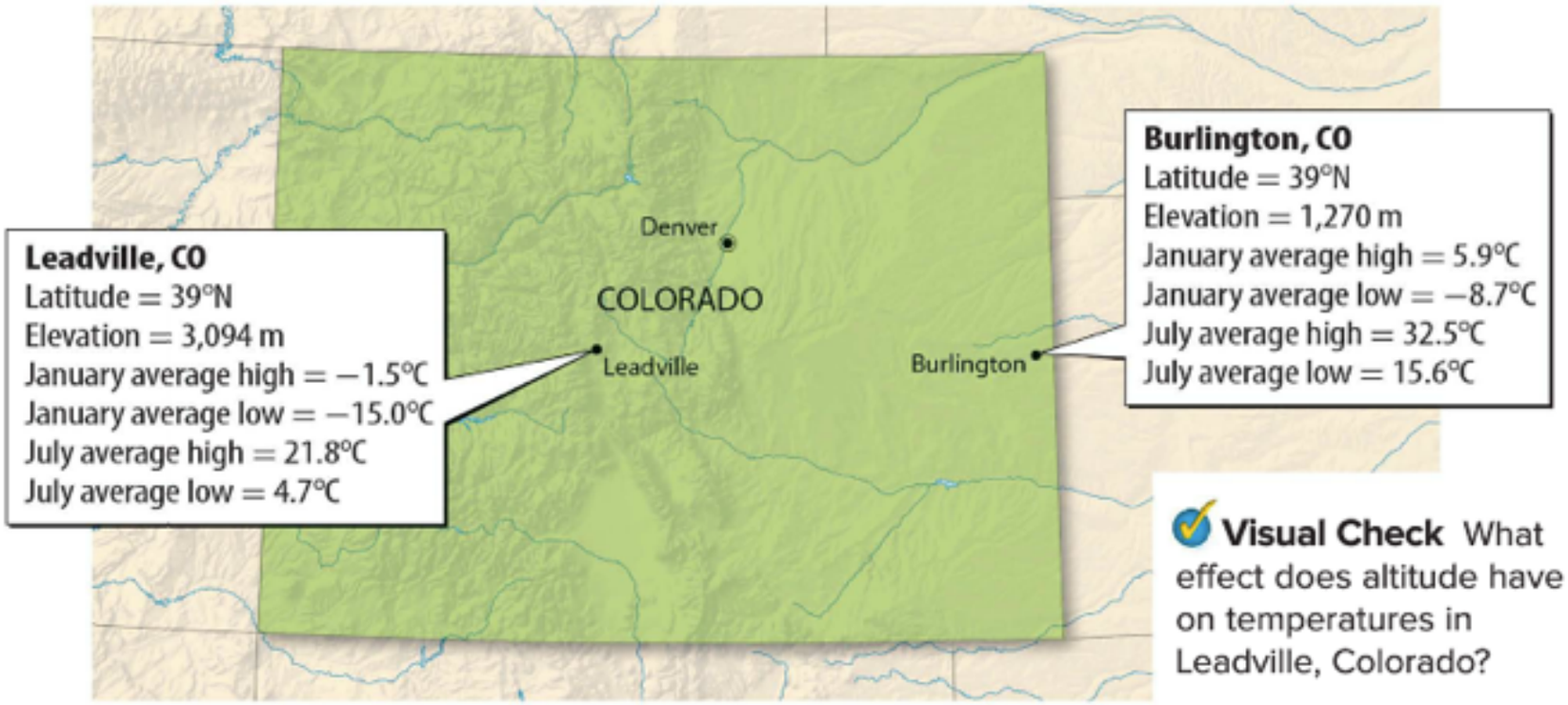
Altitude

temperature decreases as altitude increases in the troposphere

(example: as you climb a mountain, you may experience the same cold, snowy climate that is near the poles)

Altitude and Climate

Figure 2 As altitude increases, temperature decreases.



Visual Check What effect does altitude have on temperatures in Leadville, Colorado?

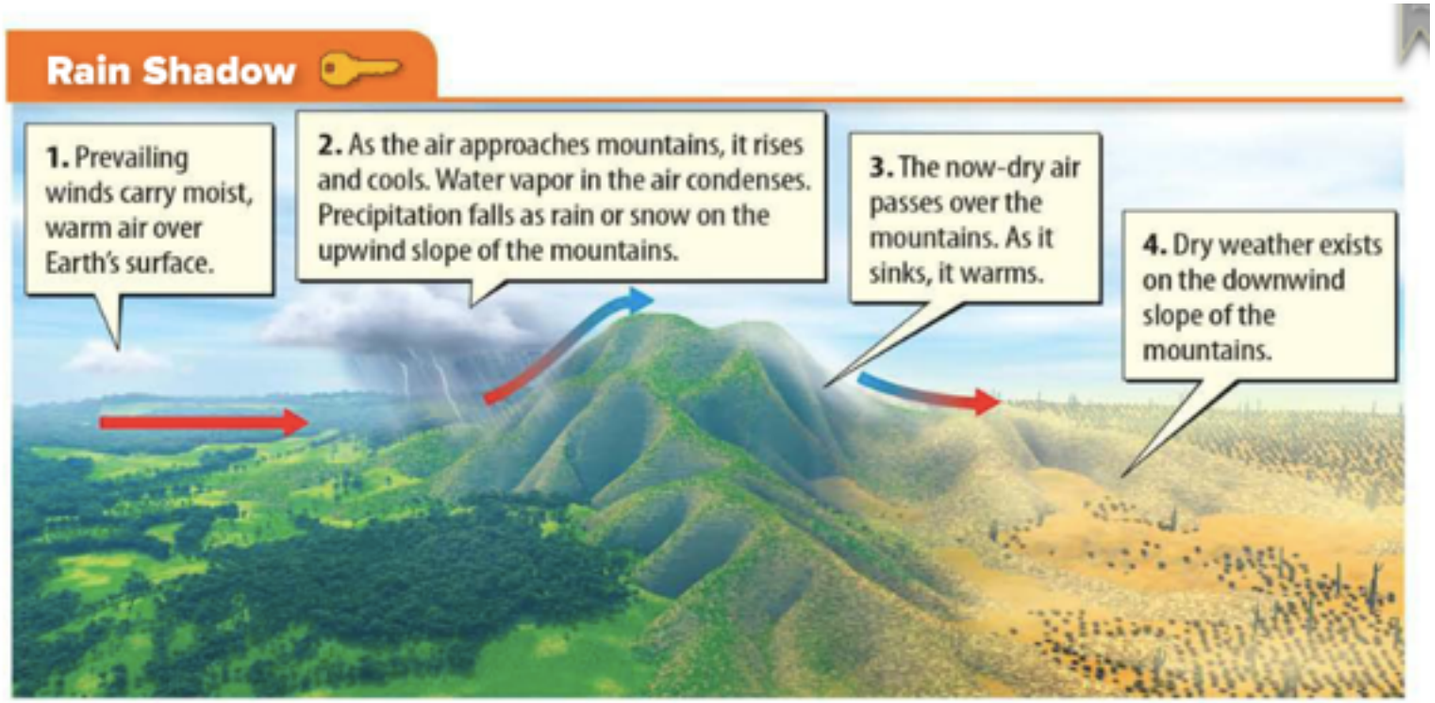
Rain shadows

define: an area of low rainfall on the downwind slope of a mountain

mountains influence climate because they are barriers to prevailing winds

different amounts of precipitation on either side of a mountain range influence the types of vegetation that grows

precipitation side: abundant vegetation
dry side: sparse vegetation



How do large bodies of water influence climate along coastlines?

*__define specific heat:__ the amount of thermal energy needed to raise the temperature of 1 kg of material by 1ºC

of water is about 6 times higher than the specific heat of sand, this means the ocean would have to absorb 6 times as much thermal energy to be the same temperature as the sand

*__ocean currents:__ Gulf Stream is a warm current that flows northward, bringing warmer temperatures from the equator

How are climates classified?

developed by: Wladimir Koppen, 1918

* **temperature**

* **precipitation**

* **vegetation** (native vegetation is often limited to particular climate conditions

What is a microclimate?

define: a localized climate that is different from the climate of the larger area surrounding it

example: **cities-** concrete and buildings absorb solar radiation, causing warmer temperatures than in the surrounding countryside

example: **forests-** cooler and less windy than the surrounding countryside

example: **hilltops-** windier than nearby lower land

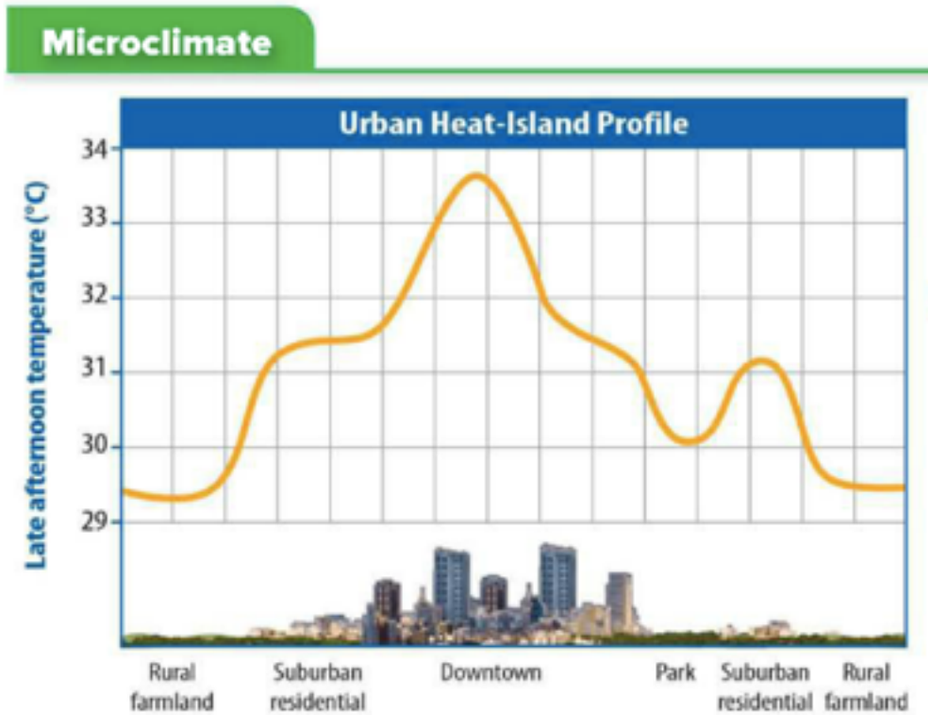


Figure 5 The temperature is often warmer in urban areas when compared to temperatures in the surrounding countryside.

Visual Check What is the temperature difference between downtown and rural farmland?

How are organisms adapted to different climates?

example: polar bears have thick fur and a layer of fat that helps keep them warm in the Arctic

example: camels: adaptations for surviving in hot, dry conditions

example: desert plans have extensive shallow root systems to collect rainwater

example: deciduous trees: found in continental climates, lose their leaves during the winter, which reduces water loss when the soil is frozen

How does climate influence humans?

* average temperature and rainfall in a location help determine the types of crops humans grow there

*influences the way humans design buildings

(example: polar climates, frozen soil [permafrost], houses and buildings built on stilts)

FIGURE 4: World Climates