

Chapter 3 Review

Seasonal and Daily Temperatures

The Earth and the Sun

- Looking down on the North Pole, in what direction does the Earth rotate?
In what direction does the Earth go around the Sun?
- Near what compass point does the sun rise?
- Near what compass point does the sun set?
- How much does the Earth's distance from the Sun vary during the course of a year? (Not much. The orbit is nearly circular. Farthest and closest distances are within 2% of average of 93 million miles.)

The Earth and the Sun

- Why does the Earth have seasons?
- The Tropics of Cancer (Northern Hemisphere) and Capricorn (Southern Hemisphere) are at 23.5 degrees latitude. What is special about those latitudes? (The following Web site for Mazatlan, Mexico has a good discussion of the Tropic of Cancer, which is close to Mazatlan: <http://www.maztravel.com/maz/explain/cancer.html>)
- The Arctic and Antarctic Circles are at 90 – 23.5 = 66.5 deg latitude. What is special about those latitudes?
- At what latitudes is the Sun directly overhead once per year? Twice per year? Never?

The Earth and the Sun

- The Earth's tilt is associated with what two effects that are responsible for less heating in winter and more heating in summer?
- If the Earth's tilt increased, would seasons in midlatitudes probably be more or less extreme?
- How different is the heating between equator and pole in mid summer? In mid winter?
- How different is the temperature at different latitudes during summer? During winter?
- The tropics has a surplus of energy, while mid-latitudes and the poles have a deficit. Why don't the tropics get warmer and warmer and the poles colder and colder?

Temperature Variations

- At what level in the troposphere is the day-night temperature difference usually the largest?
- What is the usual effect of a gusty wind that mixes the air on the daytime high and the nighttime low temperature?
- What time of day usually has the highest temperature? Lowest temperature?
- The Earth's surface is heated by the Sun during the day and cooled day and night by infrared emission, conduction-convection, and evaporation. What is true of the heating and cooling while the surface is warming? While the surface is cooling? While the surface is at its maximum or minimum temperature?

Controls on Temperature (pp. 68, 71)

- How can the side of a hill be warmer than the hilltop or the valley?
- How large is the difference between summer and winter as you go from the tropics poleward?
- How large is the difference between summer and winter over the ocean versus over the interior of a continent?
- Give examples of how ocean currents can affect the temperature of a coastal area.
- How does elevation typically affect temperature?

Temperature

- What does the wind chill index (wind chill temperature) measure?
- Where should you put a thermometer if you want to measure air temperature accurately?
- How does a maximum temperature thermometer work if it uses mercury?
- How does a minimum temperature thermometer work if it uses alcohol and a “slider”?
- What are some other ways of measuring temperature?
- Why was the Automated Surface Observing System (ASOS) developed?