

Weather Factors ▪ *Section Summary*

Winds

Key Concepts

- What causes winds?
- How do local winds and global winds differ?
- Where are the major global wind belts located?

A **wind** is the horizontal movement of air from an area of high pressure to an area of lower pressure. **Winds are caused by differences in air pressure.** Most differences in air pressure are caused by unequal heating of the atmosphere. Cool, dense air with higher air pressure flows underneath warm, less dense air, forcing the warm air to rise.

Winds are described by their direction and speed. Wind direction is determined with a wind vane. The name of a wind tells you the direction the wind is coming from. Wind speed is measured with an **anemometer**.

Wind blowing over your skin removes body heat. The increased cooling that a wind can cause is called the **wind-chill factor**.

Local winds are winds that blow over short distances. **Local winds are caused by unequal heating of Earth's surface within a small area.** Local winds form only when large-scale winds are weak.

A **sea breeze** is a local wind that blows from an ocean or a lake. The sun heats land faster than it heats water, so during the day the air over land becomes warmer than the air over water. The cool air blows inland from the water and moves underneath the warm air. At night, land cools more quickly than water, so air over land becomes cooler than air over water. The cool air blows toward the water from the land and moves underneath the warm air. The flow of air from land to a body of water is called a **land breeze**.

Winds that blow steadily from specific directions over long distances are called **global winds**. **Like local winds, global winds are created by the unequal heating of Earth's surface. But unlike local winds, global winds occur over a large area.** Because Earth is rotating, global winds do not follow a straight path. The way Earth's rotation makes winds curve is called the **Coriolis effect**. In the Northern Hemisphere, global winds curve to the right. In the Southern Hemisphere, global winds curve to the left.

The Coriolis effect and other factors combine to produce a pattern of calm areas and wind belts around Earth. **The major global wind belts are the trade winds, the polar easterlies, and the prevailing westerlies.** The calm areas are called the doldrums and horse latitudes. **Latitude** is distance from the equator, measured in degrees. The trade winds blow between the equator and 30° north and south latitude, the prevailing westerlies between 30° and 60° north and south latitude, and the polar easterlies between 60° north and south latitude and the poles.

About 10 kilometers above Earth's surface are bands of high-speed winds called **jet streams**. These generally blow from west to east.