LESSON 3

EARTH AND SPACE SCIENCE

Weather and Climate

Key Ideas

- Weather is the day-to-day change in atmospheric conditions at a particular place. Climate is the average long-term weather conditions in a region.
- Weather and climate are influenced by global air patterns and ocean currents.
- Daily weather is caused by the movement of air masses and is predicted by meteorologists.

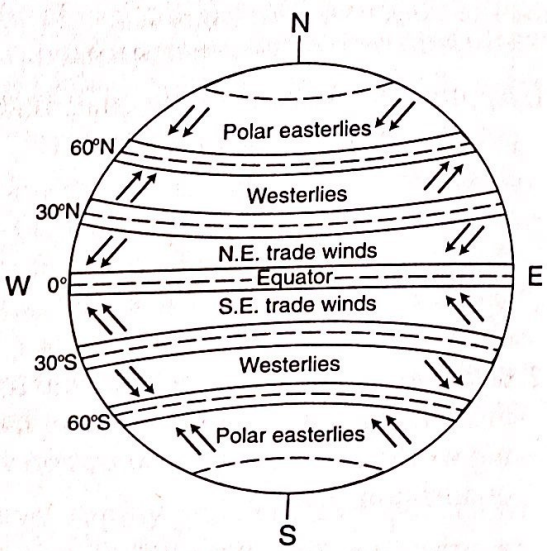
ON THE GED® TEST

About 20% of the questions on the Science Test *will cover Earth and space science topics.*

Weather is the day-to-day change in conditions in the **atmosphere** at a particular place on Earth. **Climate**, on the other hand, is the average weather conditions of a large region over a long period of time.

All weather and climate ultimately arise from the uneven heating of the Earth. The sun's rays fall more directly at the equator than they do at the North and South Poles. This resulting uneven heating causes global wind circulation patterns: the warm air at the equator rises, creating an area of low pressure, and moves toward the poles. Cold air at the poles sinks, creating an area of high pressure, and moves toward the equator. The result is a pattern of **prevailing winds** in both the Northern and Southern hemispheres.

Global Wind Patterns



Another major influence on weather and climate, also caused by the uneven heating of Earth, is the worldwide pattern of **ocean currents**. Ocean currents are caused by the wind and by variations in the density of water (warm water is less dense than cold water). Ocean currents help transfer heat from the equatorial regions to the poles.

Daily weather patterns are caused by the movements of **air masses**, large bodies of air with similar temperature, humidity, and pressure. The boundary between two air masses is called a **front**. A **cold front** occurs where a cold air mass overtakes and displaces a warm air mass. A **warm front** occurs where a warm air mass rises over a cold air mass. An **occluded front** occurs when a cold front catches up with a warm front and the two weather systems merge. Clouds and **precipitation** are characteristic of fronts.

Meteorologists study the short-term weather patterns and data of particular areas. At meteorological stations around the world, temperature, humidity, cloud cover, wind, and other weather data are collected. Satellites and radar are also used to collect weather data. Weather predictions are based on comparing present weather conditions to computer models of previous weather conditions and storm systems in an area. When hurricanes, tornadoes, blizzards, or floods are forecast, meteorologists issue storm watches and warnings. For example, if a hurricane might reach an area in 24 to 36 hours, a hurricane watch is issued. If a hurricane is expected in an area in less than 24 hours, a hurricane warning is issued, and people are urged to take precautionary measures against the storm.