Name _____ Date _____ Class _____

Key Concept Builder

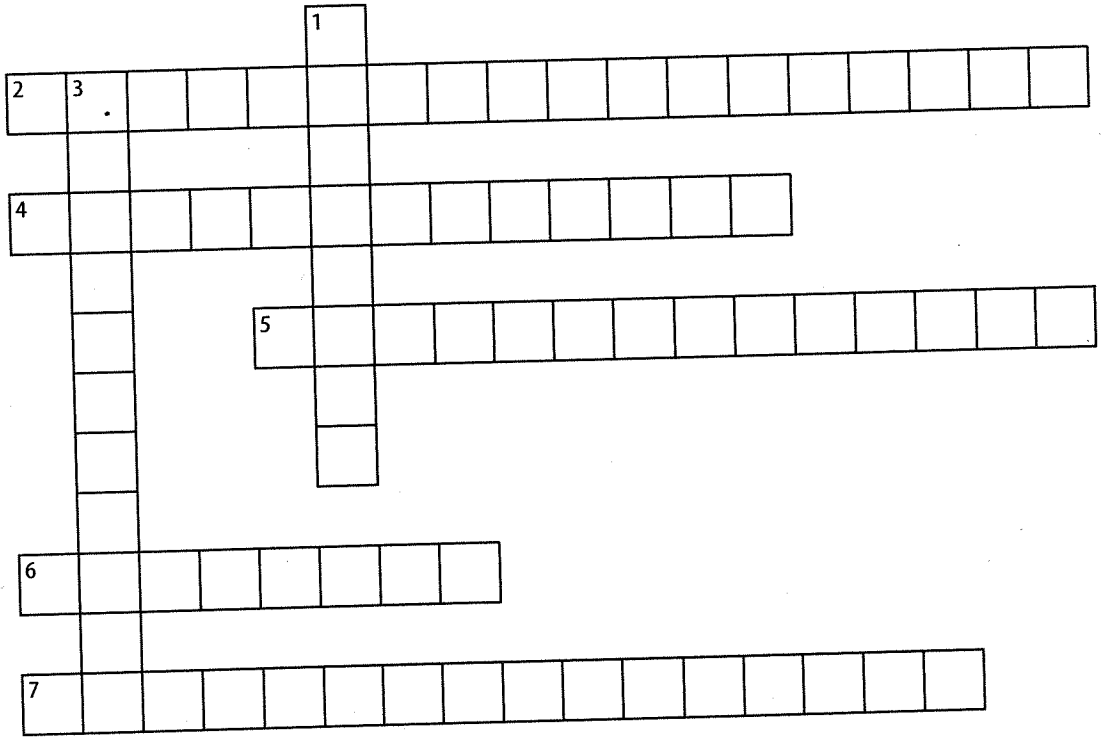
LESSON 1

Describing Weather

Key Concept What variables are used to describe weather?

Directions: *Use the clues and the terms listed below to complete the puzzle.*

air pressure **air temperature** **barometric pressure** **dew point**
humidity **precipitation** **relative humidity**



Clues

Across

2. another term for air pressure

4. when water, in liquid or solid form, falls from the atmosphere

5. measure of the average kinetic energy of molecules in the air

6. amount of water vapor in the air

7. amount of water vapor in the air relative to the maximum amount of water vapor the air can contain at that temperature

Down

1. temperature at which air becomes fully saturated

3. pressure that a column of air exerts on the air or surface below it

Name _____ Date _____ Class _____

Enrichment LESSON 1

The Power Plant for Weather

The Sun's energy powers the weather, from cloud formation to the entire water cycle. In fact, there would be no weather at all if we didn't have the Sun. Earth receives less than a billionth of the energy that the Sun produces, but that is enough to run the water cycle, drive the weather, move ocean currents, maintain wind patterns, and enable photosynthesis.

Electromagnetic Energy

The Sun drives most surface processes on Earth. The energy to do this work arrives on Earth's surface in the form of electromagnetic energy. Electromagnetic energy is radiated by the Sun in waves. The range of electromagnetic energy Earth receives is the electromagnetic spectrum. This spectrum includes rapid, high-energy gamma rays; X-rays; ultraviolet rays; visible light; infrared; microwaves; and long, slow radio waves. Each of these types of waves is distinguished by wavelengths in a particular range.

What causes weather?

The Sun's energy reaches Earth's surface as parallel rays. If Earth were a flat disk that faced the Sun, all parts of the surface would receive an equal amount of energy. But Earth presents a curved surface to the incoming electromagnetic radiation from the Sun. Only one place on Earth—the equator—receives rays from the Sun straight on. All other areas receive rays at the angle of incidence. A location near the equator receives rays at a high, or more intense, angle of incidence, and a location near a pole receives rays at a low, or less intense, angle of incidence. The angle of incidence becomes increasingly lower with increasing latitude north or south. As Earth proceeds in its yearly orbit around the Sun, the angle of incidence varies with the seasons, except at the equator.

Variations in the intensity of energy from the Sun received on Earth's surface cause thermal energy to be unequally distributed in the atmosphere. This energy tends to move toward a more even distribution. The movement of energy results in more or less constant changes in the atmosphere, which cause the weather.

Weather can be defined as the changes in the atmosphere at a given location for a short period of time. Earth's rotation and orbit affect how much energy the parts of the surface receive from the Sun at any given time. Heating and cooling on a daily basis and on an annual basis drives changes in temperature, air pressure, winds, precipitation, humidity, cloud cover, and storms—all of which are weather variables.

Applying Critical-Thinking Skills

Directions: *Respond to each statement.*

1. **Predict** what Earth might be like without the Sun.
2. **Explain** in terms of angle of incidence why equatorial rain forests experience more vegetative growth and a wetter climate than other parts of Earth.
3. **Summarize** how typical weather conditions in the Amazon might differ from typical weather experienced in Anchorage, Alaska.