

GPS: S6E3. Students will recognize the significant role of water in Earth's processes.

b. Relate various atmospheric conditions to stages of the water cycle.

S6E4. Students will understand how the distribution of land and oceans affects climate and weather.

a. Demonstrate that land and water absorb and lose heat at different rates and explain the resulting effects on weather patterns.

b. Relate unequal heating of land water surfaces to form large global wind systems and weather events such as tornados and thunderstorms.

S6E5. Students will investigate the scientific view of how the earth's surface is formed.

j. Describe methods for conserving natural resources such as water, soil, and air.

S6E6. Students will describe various sources of energy and with their uses and conservation.

a. Explain the role of the Sun as the major source of energy and the Sun's relationship to wind and water energy.

1. Weather is the condition of Earth's atmosphere at a particular time and place.
2. Clouds form when Water Vapor condenses out of the air to form tiny droplets of liquid water or crystals of ice.
3. By trapping energy from the Sun, the atmosphere keeps most of Earth's surface warm enough for water to exist as a liquid.
4. Acid rain forms when nitrogen oxides and sulfur oxides combine with water in the air to form nitric acid and sulfuric acid.
5. Because air has mass, it also has other properties, including density and pressure and it exerts a force per unit area called air pressure which is the result of the weight of a column of air pushing down on an area.
6. Density can be calculated by using the formula: $\text{Mass} \div \text{volume}$ or $\frac{\text{mass}}{\text{volume}}$
7. A barometer is an instrument that is used to measure air pressure.
8. Altitude, or elevation, is the distance above sea level, which is the average level of the surface of the ocean.
9. Since the air is less dense at a high altitude – like a mountaintop, there are fewer Oxygen molecules to breathe in each cubic meter of air than at sea level so you would become short of breath quickly at high altitudes.
10. Scientists divide Earth's atmosphere into four main layers classified according to changes in temperature.
11. The troposphere is the layer of the atmosphere in which Earth's weather occurs.
12. The stratosphere is the second layer of the atmosphere and contains the ozone layer.
13. The ozone layer is important because it protects Earth's living things from dangerous ultraviolet radiation.
14. The mesosphere is the middle layer of the atmosphere that protects Earth's surface from being hit by most meteoroids.
15. The thermosphere is the outermost layer of the atmosphere which extends outward into space and is divided into the ionosphere and the exosphere.

16. Energy travels through space to Earth in the form of electromagnetic waves from the Sun.
17. An instrument called a thermometer is used to measure how hot or cold the air is.
18. On the Celsius scale, the freezing point of pure water is 0°.
19. The transfer of heat energy coming directly from the Sun in the form of electromagnetic waves is called radiation.
20. The direct transfer of heat from one substance to another substance that is touching is called Conduction.
21. The transfer of heat by the movement of a fluid (liquid or gas) is called Convection.
22. Winds are caused by differences in air pressure.
23. Cool air tends to be more dense and flows underneath the warm, less dense air forcing the warm air to rise.
24. The increased cooling a wind can cause is called the wind chill factor.
25. The way Earth's rotation makes winds curve – to the right in the Northern Hemisphere and to the left in the Southern Hemisphere - is called the Coriolis Effect.
26. Doldrums are a calm area near the equator where warm air rises.
27. Horse latitudes are calm areas of falling air and are located about 30 degrees north and south latitude.
28. Trade winds blow from the horse latitudes toward the equator. These are steady easterly winds.
29. Prevailing westerlies blow away from the horse latitudes toward the poles. These have a large impact on the weather in the United States.
30. Polar easterlies blow cold air away from the poles.
31. Jet streams are found about 10 kilometers above Earth's surface. They are high bands of high-speed winds that generally blow from west to east.