

# 8

## Universe, Earth, Environment (Earth Science)

### Essential Question: How do matter and energy interact between themselves,

Enduring Knowledge	Science Concepts	GE	Evidence of Understanding
<p><u>Atmosphere, Water Cycle, Weather, Seasons:</u> The universe, earth and all earth systems have undergone change in the past, continue to change in the present, and are predicted to continue changing in the future.</p>	<p>a. The cycling of water in and out of the atmosphere plays an important role in determining climatic patterns. Water evaporates from the surface of the earth, rises and cools, condenses into rain or snow, and falls again to the surface. Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate, because water in the oceans holds a large amount of heat.</p> <p>b. The entire planet is surrounded by a relatively thin blanket of air composed of nitrogen, oxygen, and small amounts of other gases, including water vapor.</p> <p>c. Heat from the sun is the primary source of energy for changes on the earth's surface. The differences in heating of the earth's surface produce the planet's weather patterns.</p> <p>d. Seasons result from variations in the amount of the sun's energy hitting the earth's surface. This happens because of the tilt of the earth's axis and the orbit of the earth around the sun.</p>	<p>48</p>	<p>Diagramming, labeling and explaining the process of the water cycle (precipitation, evaporation, condensation, run-off, ground water, transpiration)</p> <p>Identifying the major gases of earth's atmosphere</p> <p>Explaining how differential heating can affect the earth's weather patterns</p> <p>Creating a model showing the tilt of the earth on its axis and explaining how the sun's energy hitting the earth's surface creates the seasons</p>

**Earth's atmosphere, and Earth's surface?**

Concepts in Detail	Potential Inquiries/Activities	Resources/Notes
<ul style="list-style-type: none"> <li>- Climates usually follow patterns, but can be affected by environmental influences and can change.</li> <li>- The cycling of water in and out of the atmosphere plays an important role in determining climatic patterns.</li> <li>- Water moves into the atmosphere through evaporation from the surface of the earth (oceans, lakes, ponds, land, etc.). When it evaporates, it moves into the atmosphere as water vapor.</li> <li>- In the atmosphere, it can cool and condense into water droplets (rain) or water crystals (snow).</li> <li>- After it condenses it falls to the surface of the earth (moves out of the atmosphere).</li> <li>- The conditions of temperature and water vapor amount can change in the atmosphere.</li> <li>- Global patterns of atmospheric qualities and movement can influence local weather (El Nino affect, for example).</li> <li>- The water in the oceans holds a large amount of heat and possible water vapor. This heat and water vapor can have a major effect on the atmosphere and climates.</li> <li>- The water cycle is made up of precipitation, evaporation, condensation, run off, ground water, and transpiration.</li> <li>- <u>Evaporation</u>: occurs when the sun heats up water in oceans, lakes, ponds, rivers, streams, puddles, etc. The heated water turns into water vapor and rises into the air.</li> <li>- <u>Condensation</u>: occurs when water vapor in the air cools and changes back into liquid form and forms clouds.</li> <li>- <u>Precipitation</u>: is rain, hail, sleet, or snow. Precipitation occurs when so much water vapor has condensed that the air can not hold it; the clouds become too dense.</li> <li>- <u>Transpiration</u>: is the evaporation of water from the leaves of plants (It could also evaporate from stems, flowers, and fruits).</li> <li>- <u>Run-off</u>: occurs when precipitation or other water comes in contact with soil. This mixture of water, soil, and other particles found in the soil is carried elsewhere.</li> <li>- <u>Ground water</u>: is water located beneath the ground's surface. This water fills the spaces between the soil and rocks.</li> </ul>	<ul style="list-style-type: none"> <li>- Using the evidence from the investigation, predict how convection currents would move between the shore and ocean during the day and night.</li> <li>- Investigation: shine a strong light on a container of sand and a container of water. Have thermometers inserted in each so bulbs are just below surface. Measure temperature change in each for 20 minutes as light is on and 20 minutes as light is off.</li> <li>- Create a working model of the water cycle.</li> <li>- See Evidence of Understanding column.</li> </ul>	



- The entire planet is surrounded by the atmosphere.
- The atmosphere is a thin blanket of air.
- The major gases in the earth's atmosphere are: nitrogen, oxygen, and carbon dioxide. Other gases and water vapor are also found in the atmosphere.