Climate and Currents

Concepts related to the California State Science Standards

Grade Five:
Earth Sciences

3. Water on Earth moves between the oceans and land through the processes of evaporation and condensation. As a basis for understanding this concept:

a. *Students know* most of Earth's water is present as salt water in the oceans, which cover most of Earth's surface.

b. *Students know* when liquid water evaporates, it turns into water vapor in the air and can reappear as a liquid when cooled or as a solid if cooled below the freezing point of water.

c. *Students know* water vapor in the air moves from one place to another and can form fog or clouds, which are tiny droplets of water or ice, and can fall to Earth as rain, hail, sleet, or snow..

4. Energy from the Sun heats Earth unevenly, causing air movements that result in changing weather patterns. As a basis for understanding this concept: a. *Students know* uneven heating of Earth causes air movements (convection cur-rents).

Grades Nine through Twelve

Earth Science - **Energy in the Earth System**

5. Heating of Earth's surface and atmosphere by the sun drives convection within the atmosphere and oceans, producing winds and ocean currents. As a basis for understanding this concept:

a. *Students know* how differential heating of Earth results in circulation patterns in the atmosphere and oceans that globally distribute the heat.

b. *Students know* the relationship between the rotation of Earth and the circular motions of ocean currents and air in pressure centers.

d. *Students know* properties of ocean water, such as temperature and salinity, can be used to explain the layered structure of the oceans, the generation of horizontal and vertical ocean currents, and the geographic distribution of marine organisms.

All Grades:

Investigation and Experimentation

Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations.

Standards (cont'd)

Concepts related to the National Science Standards

1- The sun warms the Earth's surface, which controls global currents and climate, keeping the earth habitable.
2- Water and air behave in similar ways as fluid.
3- Atmospheric cells and ocean gyres redistribute heat from low to high latitudes, which influences climate, weather, and ocean temperature.
4- The ocean is one continuous body of water with global currents that interact, with water surrounding all landforms.
5- Ocean circulation affects climate and plant and animal populations on land and in the ocean.
6- Surface currents are created by the prevailing wind system.
7- Water density is affected by temperature and salinity, resulting in deep water currents.
8- At the poles, very cold, salty water sinks to the ocean bottom and flows toward the equator.
9- The primary source of oxygen for the deep sea is the cold polar bottom current.
10- The weathering of rocks continually adds sodium to the Earth's rivers and subsequently to the oceans.
11- The water on Earth dates from Earth's beginnings and continues to be recycled.