Key Concepts

Earth/Space Systems and Cycles

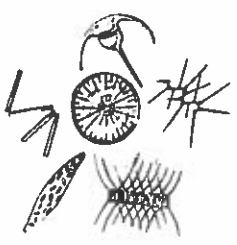
(SOL 5.6)

Oceans

- Oceans cover about 70 percent of the surface of the Earth.
- Important features of the ocean floor near the continents are the **continental shelf**, the **continental slope**, and the **continental rise**. These areas are covered with thick layers of sediments (sand, mud, rocks).

- The depth of the ocean varies. Ocean **trenches** are very deep, and the continental shelf is relatively shallow.
- Ocean water is a complex mixture of gases (air) and dissolved solids (salts, especially sodium chloride). Marine organisms are dependent on dissolved gases for survival. The **salinity** of ocean water varies in some places depending on rates of evaporation and amount of runoff from nearby land.
- The *basic motions* of ocean water are the **waves**, **currents**, and **tides**.
- Ocean currents, including the **Gulf Stream**, are caused by wind patterns and the differences in water densities (due to salinity and temperature differences). Ocean currents affect the mixing of ocean waters. This can affect plant and animal populations. Currents also affect navigation routes of boats and ships.

- As the **depth** of ocean water increases, the temperature decreases, the pressure increases, and the amount of light decreases. These factors influence the type of life forms that are present at a given depth.
- Plant-like **plankton** (phytoplankton) produce much of the Earth's oxygen and serve as the base of the ocean ecosystem. Plankton flourish in areas where nutrient-rich water upwells from the deep. Phytoplankton are eaten by animal-like plankton, swimming organisms, and those things that live on the ocean bottom.



Parts of the Ocean Floor

- ***Continental shelf***
  - Covered with sand, mud, and rocks; the gently sloping edge of the continent that is covered by ocean water
  - Most fishing, drilling for oil, and water recreation take place in this part of the ocean.
  - The continental shelf is relatively shallow.

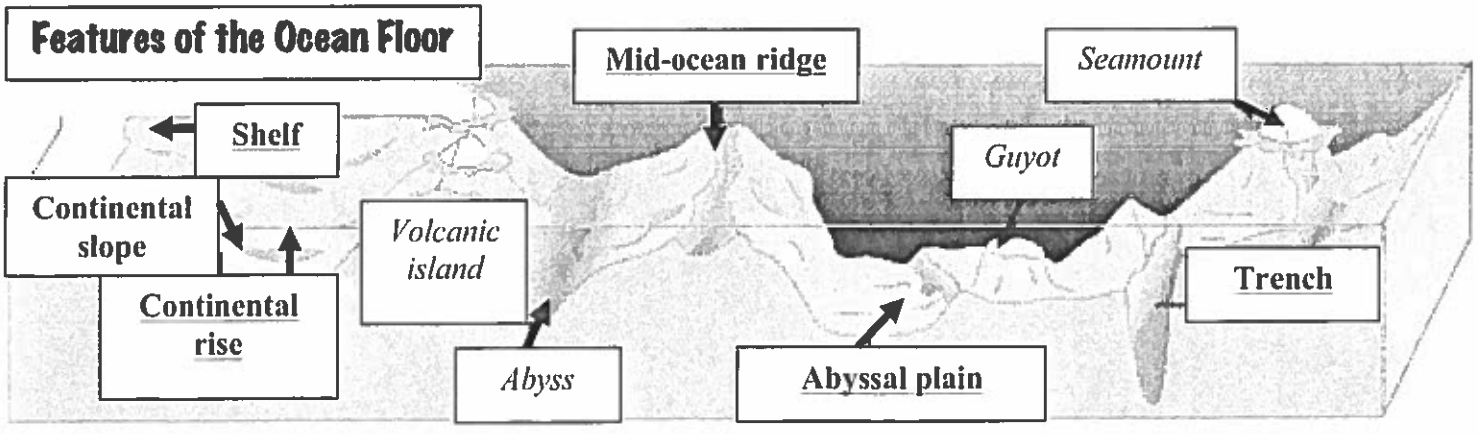
- ***Continental slope***
  - Covered with sand, mud, and rocks
  - This is where the continental shelf begins to slope steeply.

- ***Continental rise***
  - Found at the bottom of the continental slope
  - It is covered with sediment from the continental shelf and the continental slope.

- ***Oceanic Trench***
  - Long, deep, narrow canyons in the sea floor plains that form the deepest parts of the ocean
  - Trenches are formed where tectonic plates are colliding.

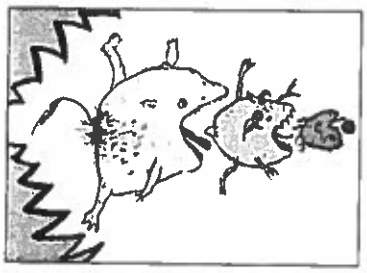
- ***Abyssal plain***
  - Wide, flat areas at the base of the continental slope
  - The average depth of the world's oceans on the floor is 4 km.

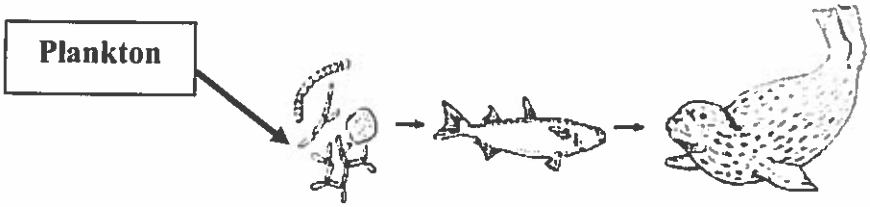
- ***Oceanic ridge***
  - Long mountain chains that run along the ocean floor
  - Formed by volcanic activity under the ocean floor where tectonic plates are diverging



Ocean Food Chain

Plant-like **plankton** (phytoplankton) produces much of the Earth's oxygen and is at the bottom of most ocean food webs. Plankton lives in areas where sunlight and nutrients are abundant either in shallow water or near the surface in deep water.





Basic Motions of the Ocean Water

Wave

- Any disturbance seen on the surface of the water
- Waves are usually caused by wind.

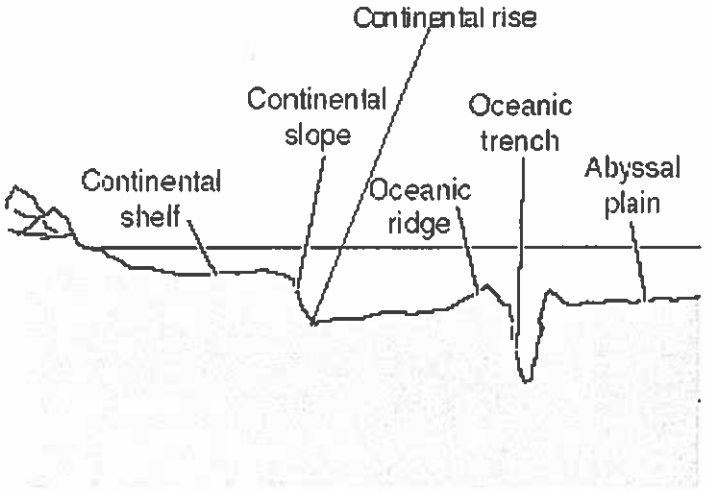
Ocean current

- A river of water that flows through the ocean
- Caused by wind patterns and differences in water densities (due to salinity and temperature differences)
- Currents can cause changes in the weather, affect the mixing of ocean waters, and affect navigation routes. Example: The Gulf Stream

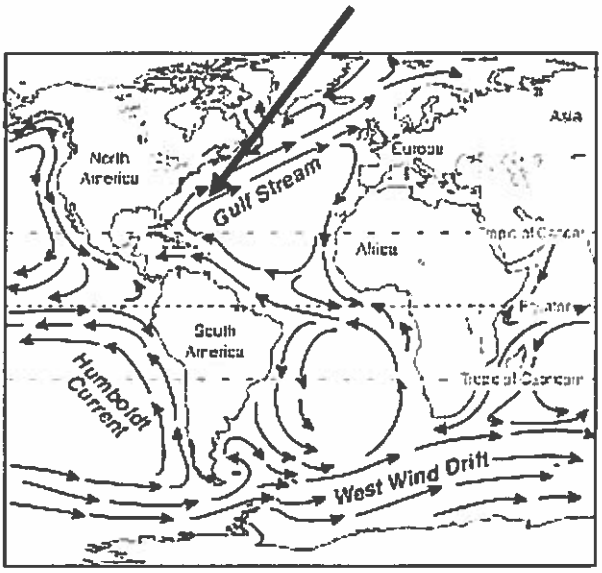
Tide

- The rise and fall of the surface level of the ocean caused by the pull of the moon on the Earth
- Tides change approximately every six hours. If the tide is low at 6:00 AM, it will be high at 12:00 noon. It will not be low again until 6:00 PM.

Ocean Floor

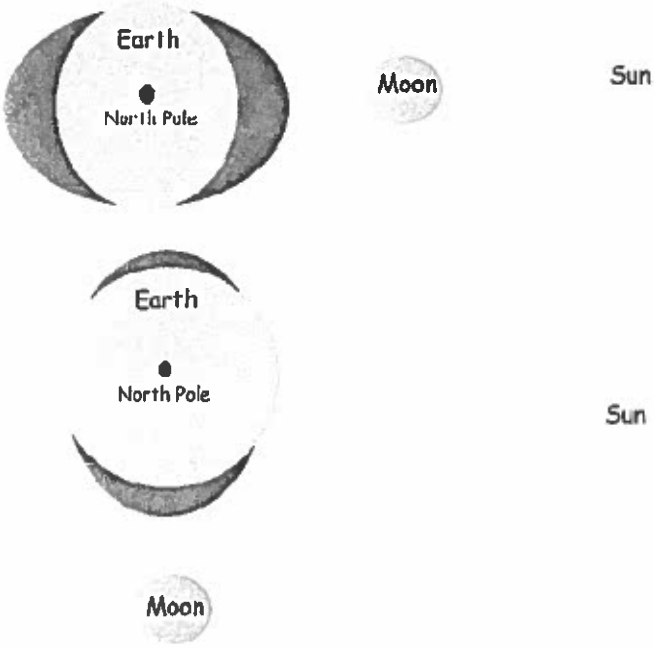


Gulf Stream Current



Rise and Fall of the Tides

The ocean life zone between the high **tide** mark and the low tide mark is covered with water for about half of a twenty-four hour day.



Directions: Use the word bank to complete the paragraph.

navigation	***moon***	***river of water***	***wind***	***plant***	***salinity***
Gulf Stream	***animal***	***temperature***			

The basic motions of ocean water are wind, ocean currents, and tides. Waves occur on the surface of the water and are caused by the _____. A current is like a _____. It is caused by wind patterns and the differences in water densities due to _____ and _____. One of the best known currents is the _____, which flows from the Gulf of Mexico up the coast of North America. Currents can affect_____ and _____ populations. Currents can also affect _____ routes. Tides are caused by the pull of the _____ on the earth. Tides change approximately every six hours and cause the rise and fall of the surface of the ocean.

Directions: Indicate whether the following statements are **true** or **false.**

_____ 1. As the depth of ocean water increases, the temperature decreases.

_____ 2. The main difference between ocean water and lake water is algae.

_____ 3. Salinity is the amount of dissolved solids (salts, especially sodium chloride) in water.

_____ 4. Oceans cover about 50 percent of the surface of the Earth.

_____ 5. The salinity of ocean water can vary from place to place.

_____ 6. Marine organisms are dependent on dissolved gases for survival.

_____ 7. Plankton produces much of the Earth's oxygen and serves as the base of the ocean ecosystem.

_____ 8. As the depth of the ocean water increases, the amount of light increases.

Directions: Label the parts of the ocean floor: ***continental rise***, ***abyssal plain***, ***oceanic ridge***, ***oceanic trench***, ***continental shelf***, and ***continental slope***.