

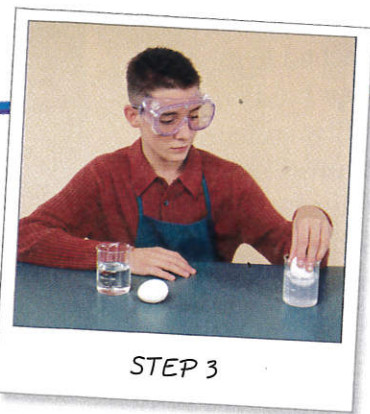
# 10-3 What are some properties of the ocean?

## INVESTIGATE

### Testing the Density of Ocean Water HANDS-ON ACTIVITY

1. Fill two 250-ml beakers or jars with 200 ml of tap water.
2. Add 3 tsp of salt to one beaker. Stir until the salt dissolves.
3. Place a whole, uncooked egg in each jar. Handle the eggs carefully to avoid breaking them. **CAUTION:** Wash your hands when you are finished with this activity.

**THINK ABOUT IT:** What happened to the two eggs? What does this tell you about the difference between salt water and fresh water?



STEP 3

### Objective

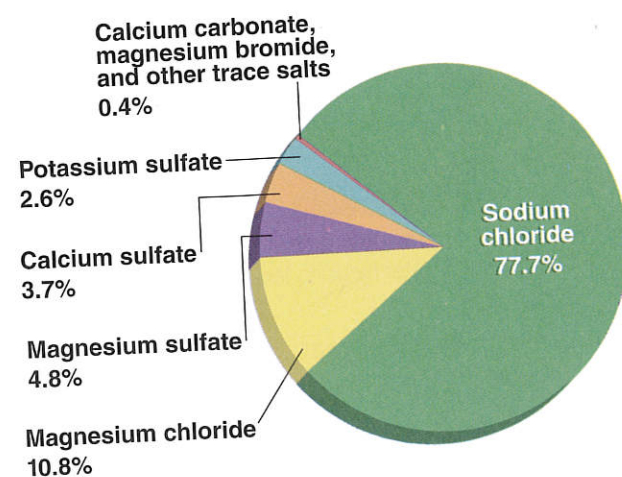
Explain why ocean temperatures and salinity in the oceans vary.

### Key Terms

**salinity** (suh-LIHN-uh-tee): amount of dissolved salts in ocean water

**thermocline** (THUHR-muh-klyn): layer of ocean water in which the temperature drops sharply with depth

**The Salty Sea** The water in Earth's oceans is salt water. Salt water contains more dissolved salts and other minerals than fresh water does.



▲ Figure 10-8 Minerals in salt water

The amount of dissolved salts in ocean water is called **salinity**. Ocean water contains from 33 to 37 g of dissolved salt in every 1,000 g of water.

- 1 **DEFINE:** What is salinity?

**Levels of Salinity** The salinity of ocean water differs slightly from place to place. Fresh water from rivers, precipitation, and melting glaciers lowers ocean salinity.

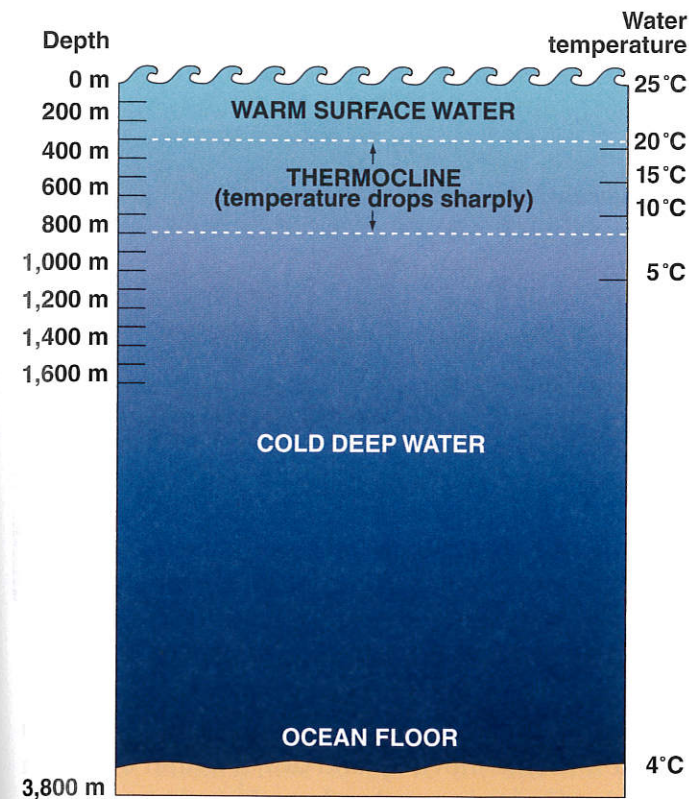
During the day, water evaporates from the surface of the ocean. Evaporation leaves behind dissolved salts. This raises salinity. Salinity varies more at the surface than in deep ocean water.

- 2 **INFER:** Would rain increase or decrease the salinity in ocean water? Explain.

**Temperature Layers** Oceanographers recognize three "layers" of the ocean based on temperature. These layers are surface, thermocline, and deep.

Heat from the Sun warms ocean water. The water is warmest at the surface and coldest near the ocean floor. The surface layer is from 100 to 300 m deep. Constant winds and waves keep the water in the surface layer well mixed. As a result, the temperatures vary slightly in the ocean's surface layer.

Below the surface layer is the **thermocline**. In this layer, temperatures drop sharply with depth. The ocean below the thermocline, the deep layer, is even colder. Here the temperatures are usually below 5°C.



▲ Figure 10-9 Ocean temperature decreases as depth increases.

- 3 **IDENTIFY:** What is the thermocline?

**Desalination** Only a small part of Earth's fresh water is potable (POHT-uh-buhl), or fit to drink. Fresh water is a valuable natural resource that is in short supply.

As the population of the world increases, more fresh water is needed. Most supplies of fresh water depend on precipitation. During dry periods, those supplies are reduced.

Scientists have discovered a way to use ocean water to meet the increasing need for water. Before people can use the supply of water available in the ocean, minerals and salts in the ocean water must be removed.

In many places, desalination (dee-sal-uh-NAY-shuhn) plants have been built to remove the salts from ocean water. These plants use several different methods to remove salts. The most common is to heat the water until it evaporates, leaving the salts behind. The water vapor is then condensed to recover fresh water. Another method is to freeze ocean water. When ocean water is frozen, the ice formed is free of salts. The ice is then cleaned and melted to provide fresh water. Currently, Saudi Arabia, Israel, Malta, and some U.S. states operate desalination plants.



▲ Figure 10-10 A desalination plant changes salt water into drinking water.

- 4 **DESCRIBE:** What happens when you desalinate water?

### CHECKING CONCEPTS

1. The amount of dissolved salts in ocean water is called \_\_\_\_\_.
2. Adding fresh water to salt water \_\_\_\_\_ the salinity of the water.
3. Ocean water is warmest at the \_\_\_\_\_.
4. There are \_\_\_\_\_ different temperature layers in the ocean.
5. Salinity varies more at the \_\_\_\_\_ than in deep ocean water.

### THINKING CRITICALLY

6. **SEQUENCE:** Use Figure 10-8 to list the minerals found in oceans, from the greatest percentage to the least.
7. **PREDICT:** The Mediterranean Sea has a high rate of evaporation. Would it have a high or low salinity? Explain.

### BUILDING READING SKILLS

**Vocabulary** Write the definitions of the following words that contain the prefix *thermo*, meaning "heat": thermocline, thermoelectric, thermograph, thermomagnetic, and thermometer. Circle the part of the definition that relates to the prefix.