Summary of Key Ideas

22.1 Modern oceanographers work in land laboratories and on research vessels. They use satellites to collect data from moored buoys.

22.2 The water molecule is dipolar. Hydrogen bonds between water molecules make water stable over a wide temperature range. When water and salt are in solution, the temperature range widens.

22.3 Oceanographers measure salinity, the proportion of dissolved salts in seawater, to trace water masses. The relative proportions of ions is the same in all seawater, even when salinity is different. The mixed layer is the only zone with enough light for photosynthesis. Below it is the thermocline, a zone of rapid temperature drop. Deep water is very cold.

22.4 Phytoplankton are microscopic photosynthetic protists. Zooplankton, microscopic animals, eat phytoplankton. At hydrogen sulfide vents near mid-ocean ridges, hydrogen sulfide-eating bacteria, rather than sunlight-using phytoplankton, are the basis of the chain. Dissolved oxygen is most abundant near the ocean surface and decreases with depth. The concentration of carbon dioxide is high near the ocean floor.

Key Vocabulary

- aqueous solution (p. 493)
- black smoker (p. 502)
- boiling point (p. 494)
- buffer (p. 494)
- coral (p. 500)
- diatom (p. 499)
- freezing point (p. 494)
- hydrogen bonding (p. 493)
- mixed layer (p. 497)
- nekton (p. 501)
- oceanography (p. 490)
- phytoplankton (p. 499)
- polarity (p. 493)
- salinity (p. 495)
- thermocline (p. 498)
- water mass (p. 495)
- zooplankton (p. 500)

Vocabulary Review

Write the term from the key vocabulary list that best completes the sentence.

1. A region of ocean water having the same temperature and salinity throughout is an ( ).
2. The ocean layer that shows a rapid decrease in temperature is called the ( ).
3. Although the individual animals are themselves very tiny, ( ) lives in a large colony fastened to the sea floor.
4. Not only extremely small species of sea animals but also the immature versions of larger animals such as crabs, can be found among ( ).
5. Ocean water has a lower ( ) than pure water does.

Concept Review

6. Name some of the scientific fields involved in oceanography. Tell what role each might play in the study of Earth’s oceans.
7. Explain how hydrogen bonding causes solid pure water to be less dense than liquid pure water.
8. What is salinity? What does 35‰ mean when applied to sea water? Identify some factors that cause ocean salinity to fall below 35‰ and to rise above 35‰.
9. Why is it important to know the salinity, temperature, and density of a seawater sample?
10. Describe the thickness of the mixed layer as it relates to latitude. Identify two factors that determine the temperature of the mixed layer.
11. Describe the two different types of ocean floor vents.
12. What are two sources of oxygen for the upper waters of the ocean? How does oxygen reach the deep waters of the ocean? Why does carbon dioxide accumulate in deep ocean waters?
13. How are the animals that live in the deep ocean different from other ocean life?