

Chemistry of Life: Bonding and Properties of Water

Student Name

Date

Observations

Activity 1: Solubility

Record your observations about the solubility of table salt (sodium chloride) in each solvent from Activity 1.

1. What can you conclude about the polar nature of benzoic acid in Activity 1?
2. What type of mixture is benzoic acid and water? What type of mixture is sucrose and isopropanol? Explain your answers.

Activity 2: Adhesion and Cohesion

Record your observations from Activity 2.

1. What type of mixture is pepper and water? Explain your answer.

Activity 3: Density and Miscibility

Record your observations from Activity 3.

1. Explain the layers that formed from the two liquids in Activity 3.

Activity 4: Heat Capacity

Record your observations from Activity 4.

1. 580104 01 REMEMBERING

Which of these bonds is formed due to the opposite charges of cations and anions being attracted to each other?

- A. covalent
- B. hydrogen
- C. oxygen
- D. ionic
- E. nonpolar

2. 580104 02 REMEMBERING

Which of these refers to the relative ability of an atom to attract electrons?

- A. solubility
- B. saturation
- C. electronegativity
- D. adhesion
- E. cohesion

3. 580104 03 REMEMBERING

Which type of bond will form when two nonmetal atoms share one pair of electrons?

- A. covalent
- B. ionic
- C. colloid
- D. cationic
- E. anionic

4. 580104 04 REMEMBERING

Which of these is the part of a solution that dissolves in the solvent?

- A. polar substance
- B. nonpolar substance
- C. solute
- D. aqueous solution
- E. immiscible substance

5. 580104 05 UNDERSTANDING

What property of the vegetable oil in salad dressing requires you to shake the dressing to mix up the oil, water, and vinegar before pouring it onto a salad?

- A. surface tension

- B. cohesion
- C. adhesion
- D. hydrophilic
- E. hydrophobic

6. 580104 06 REMEMBERING

What property allows a large body of water, such as a lake, to maintain relatively constant temperature throughout a 24-hour period, even though the ambient temperature may drastically rise and fall throughout the daytime and nighttime hours?

- A. saturation
- B. low surface tension
- C. hydrophilic
- D. adhesion
- E. specific heat capacity

7. 580104 07 UNDERSTANDING

Which of these terms describes why a dog has to shake so hard in order to dry its fur?

- A. adhesion
- B. cohesion
- C. surface tension
- D. polarity
- E. hydrophilic

8. 580104 08 REMEMBERING

What does it mean for a substance to be immiscible?

- A. It is completely soluble with another substance.
- B. It is insoluble with another substance.
- C. It is an adhesive substance.
- D. It is a cohesive substance.
- E. Hydrogen bonds form between the substance and water molecules.

9. 580104 09 REMEMBERING

When fine clay is mixed in water and left to stand, the clay will settle to the bottom of the container. Which term best describes this mixture?

- A. suspension
- B. colloid
- C. aqueous solution
- D. saturated solution

E. emulsion

10. 580104 10 REMEMBERING

Which property of water allows a water strider to run across the surface of standing water?

- A. polarity
- B. adhesion
- C. low solubility
- D. high surface tension
- E. nonpolarity

11. 580104 11 REMEMBERING

Smoke and gelatin are examples of what type of mixture?

- A. suspension
- B. colloid
- C. solution
- D. cation
- E. anion

12. 580104 12 UNDERSTANDING

Which of these statements is NOT true of water?

- A. Water has the property of cohesion.
- B. Water has the property of adhesion.
- C. Adjacent water molecules form hydrogen bonds with one another.
- D. Water is the solvent in aqueous solutions.
- E. Water has a low specific heat capacity.

13. 580104 13 APPLYING

Explain the "like dissolves like" rule and give an example.

14. 580104 14 ANALYZING

Explain how rain falling from the sky can be an example of both adhesion and cohesion.

15. 580104 15 EVALUATING

Water can dissolve many ionic and polar covalent compounds. Describe at least two ways in which this property of water has significant biological and environmental implications.

16. 580104 16 UNDERSTANDING

Is sodium chloride (NaCl) an ionic compound or covalent compound? What happens to the atoms in NaCl when the compound is dissolved in water?

17. 580104 17 APPLICATION

Is sucrose ($C_{12}H_{22}O_{11}$) an ionic or a covalent compound? What happens to the sucrose molecules when this solute is dissolved in water?