St. Andrews Scots School

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Subject: Science
Class :VIII

Chapter: 9 - The Amazing World of Solutes, Solvents and Solutions

(Answer Key)

Big Question: Page No. 122

The properties and interactions of solutes and solvents determine how solutions form, behave and are used in daily life. When a solute dissolves in a solvent, the solute particles spread evenly among the solvent particles to form a homogeneous mixture. The solubility depends on factors like temperature, pressure and the nature of the solute and solvent — for example, sugar dissolves easily in water but not in oil because of differences in particle attraction. These interactions affect many everyday uses, such as:

• Preparing drinks and medicines (solutions of sugar, salt or drugs in water).

• Cleaning, where detergents dissolve grease in water.

• Industrial processes, like dissolving metals in acids for electroplating.

• Environmental systems, such as oxygen dissolved in water for aquatic life. Thus, the way solutes and solvents interact helps us understand and apply solutions in science, health, industry and nature.

Look Around: Page No. 122

Yes, one common mixture I have prepared in the kitchen is salt and water while making lemonade. When salt is added to water and stirred, it dissolves evenly to form a homogeneous mixture. Another example is mixing flour and water to make dough, which forms a non-homogeneous mixture because the particles are not evenly mixed.

Self-Assessment:

Oral Questions: Page No. 126

1. Sugar mixes faster in hot milk because heat increases the movement of particles, allowing sugar to dissolve more quickly.

2. Two uniform mixtures used in daily life: salt water and lemonade.

Self-Assessment:

Oral Questions: Page No. 128

1. The property of gases that helps aquatic animals survive is that oxygen gas dissolves in water, allowing them to breathe.

2. Some objects float because they are less dense than water, while others sink because their density is greater than that of water.

Think Beyond: Page No. 129

A 1-litre pack of oil or ghee weighs only about 910 grams because oil and ghee are less dense than water. Density is the mass of a substance per unit volume. Water has a higher density, so 1 litre of water weighs 1000 grams, but 1 litre of oil or ghee weighs less as their particles are more loosely packed.

EXERCISE

SECTION-A

A. Oral Questions:

1. A solute is a substance that dissolves in a solvent to form a solution. Example: Sugar dissolving in water.

2. The SI unit of volume is the cubic metre (m3).

B. Multiple Choice Questions:

Tick (√) the correct options:

1. (b) 2. (c) 3. (c) 4. (c) 5. (d) 6. (b)

C. Assertion-Reason Based Questions:

1. (a)

2. Both assertion and reason are wrong.

3. (a)

D. Case-Based Questions:

1. After four teaspoons of salt were added, a saturated solution was formed.

2. When more salt can be dissolved, the solution is called an unsaturated solution.

3. If the solution is heated slightly, more salt will dissolve because solubility increases with temperature.

SECTION-B

A. Very Short Answer Questions:

1. Solute: Sugar Solvent: Water

2. Chalk powder in water is a non-uniform (heterogeneous) mixture.

3. The SI unit of density is kg/m3.

4. Solubility is the maximum amount of solute that can dissolve in a given amount of solvent at a specific temperature.

B. Short Answer Questions:

1. Solute: The substance that dissolves in a solvent (e.g. sugar). Solvent: The substance that dissolves the solute (e.g. water).

Solution: A uniform mixture of solute and solvent (e.g. sugar solution).

2. Uniform (homogeneous) mixtures have the same composition throughout, e.g. salt water.

Non-uniform (heterogeneous) mixtures have uneven composition, e.g. sand and water.

3. To measure the volume of an irregular object, fill a measuring cylinder with water and note the initial level. Submerge the object completely and note the new level.

Volume of object = Final reading – Initial reading (using the water displacement method).

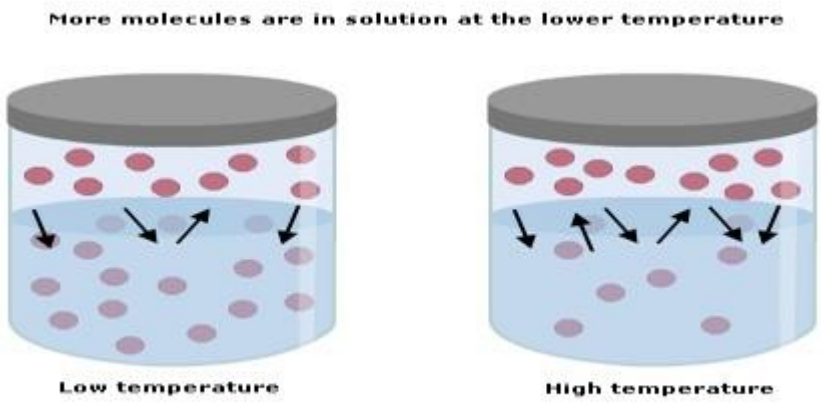
C. Long Answer Questions:

1. Activity to show the effect of temperature on solubility of a solid:

• Take two glasses of water — one cold and one warm.

• Add equal amounts of sugar to both and stir.

• Sugar dissolves faster in warm water because higher temperature increases the motion of water particles, helping solute particles mix faster.



2. Density is the mass per unit volume of a substance.

Formula:

Density = Mass ÷ Volume

Example: If mass = 100 g and volume = 50 cm^3, then density = 100 ÷ 50 = 2 g/cm^3.

3. Mass is the amount of matter in a body, measured in kilograms (kg) using a beam balance. Weight is the force with which Earth pulls an object, measured in newtons (N) using a spring balance.

4. Given: Mass = 60 g, Density = 3.5 g/ cm^3

Volume = Mass ÷ Density = 60 ÷ 3.5 = 17.14 cm^3 (approx.)

5. Given: Mass = 800 g, Volume = 200 cm^3

Density = Mass ÷ Volume = 800 ÷ 200 = 4 g/ cm^3

6. Rahul's object: Density = 50 ÷ 250 = 0.2 g/ cm^3

Radhika's object: Density = 100 ÷ 20 = 5 g/ cm^3

Therefore, Radhika's object has higher density.

D. Application-Based Questions:

1. Priya can infer that oil is less dense than water, which is why it floats on the surface.

2. No, the 250 mL cylinder is not suitable for measuring 350 mL of water because its capacity is smaller. She should use a 500 mL measuring cylinder or larger to measure accurately without overflow.

F. Life Skills:

I would tell my friend that sugar cannot keep dissolving in water forever. After a certain point, the water becomes a saturated solution, meaning it cannot dissolve any more sugar at that temperature.

Activity to understand: Take a glass of water and keep adding sugar one spoon at a time, stirring after each addition. After a few spoons, the sugar will stop dissolving and settle at the bottom. This shows that a limit exists to how much solute can dissolve in a solvent.