| INDIAN SCHOOL AL WADI AL KABIR		
Class: VIII	DEPARTMENT: SCIENCE 2025-26	DATE: 07-12-2025
WORKSHEET NO: 10	TOPIC: THE AMAZING WORLD OF SOLUTES, SOLVENTS AND SOLUTIONS	NOTE: A4 FILE FORMAT
NAME OF THE STUDENT:	CLASS & SEC:	ROLL NO.

I. OBJECTIVE-TYPE QUESTIONS

1. What is the relationship between a dilute solution and a concentrated solution?
 (a) A dilute solution has more solvent relative to solute than a concentrated solution.
 (b) A dilute solution has more solute relative to solvent than a concentrated solution.
 (c) A dilute solution and a concentrated solution have the same amount of solute.
 (d) A dilute solution is always saturated.

2. The following diagram shows a measuring cylinder used to measure the volume of a small stone in mL. What is the volume of the stone?

(a) 8 mL
(b) 9 mL
(c) 14 mL
(d) 26 mL
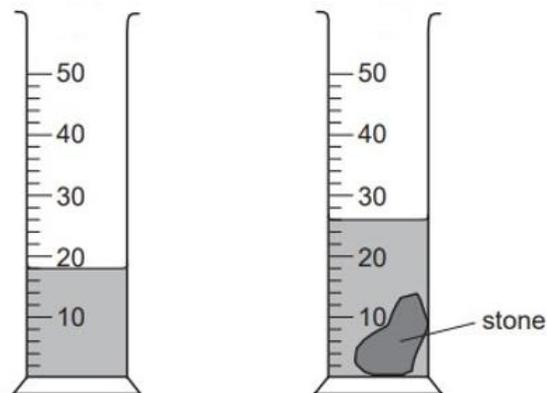
3. An object of density 0.8 g/cm³ is placed in a liquid of density 1.2 g/cm³. What happens?

(a) It sinks completely
(b) It floats partially
(c) It floats completely
(d) It dissolves

4. What is the relationship between 1 cm³ and 1 mL?
 (a) 1 cm³ = 10 mL
 (b) 1 cm³ = 0.1 mL
 (c) 1 cm³ = 1 mL
 (d) 1 cm³ = 100 mL

5. Choose the correct statement regarding a measuring cylinder that can measure up to 100 mL with markings every 10 mL and 10 divisions between each marking?
(a) The smallest volume it can measure is 0.1 mL
(b) The smallest volume it can measure is 1 mL
(c) The smallest volume it can measure is 10 mL
(d) The smallest volume it can measure is 100 mL

6. A solution in which more solute can be dissolved at a given temperature is called:
(a) saturated
(b) unsaturated
(c) uniform
(d) non-uniform

7. Which reading rule for a colourless liquid in a measuring cylinder is correct?
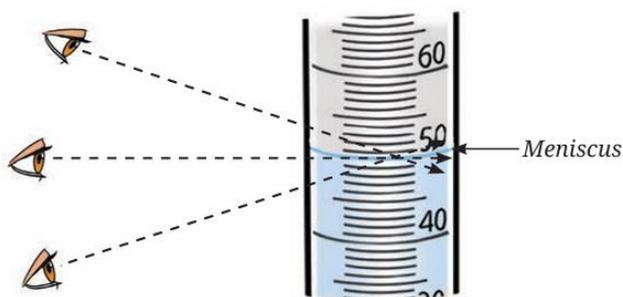
(a) Read at the top of the meniscus, from above eye level.
(b) Read at the bottom of the meniscus, with eyes level to it.
(c) Read any visible line; eye position doesn't matter.
(d) Always add 1 mL for the meniscus.

For question numbers 8-10, two statements are given- one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below -
(i) Both A and R are true, and R is the correct explanation of the assertion.
(ii) Both A and R are true, but R is not the correct explanation of the assertion.
(iii) A is true but R is false.
(iv) A is false but R is true.

8. **Assertion (A):** Materials become more compact as we move towards the centre of the Earth.

Reason (R): The decreasing pressure and temperature inside the Earth cause the particles of matter to move closer together.

9. **Assertion (A):** A mixture of sand and water is a solution.
   Reason (R): A solution is said to be formed when two or more substances mix to form a uniform mixture.

10. **Assertion (A)**: One cubic metre (m³) is the volume of a cube where each side is one metre in length.
    Reason (R): The volume of smaller objects is expressed in cubic decimetres (dm³) or cubic centimetres (cm³).

II. VERY SHORT ANSWER TYPE QUESTIONS (2M):

1. An object has a mass of 16.400 g and displaces water from 50 mL to 55 mL in a cylinder. Find its density.
[Hint: Displacement gives volume = 55−50 = 5 mL = 5 cm³;
**Density = Mass / Volume = 16.400 g / 5 cm³ = 3.28 g/cm³.]**
2. Differentiate between unsaturated and saturated solutions.

[Hint: The solution in which more solute can be dissolved at a given temperature is called an unsaturated solution. However, when the solute stops dissolving and begins to settle at the bottom, the solution is called a saturated solution at that particular temperature.]
3. How can you determine the volume of solid objects with regular and irregular shapes?
[Hint: For objects with regular shapes like a cuboid (e.g., notebook, shoe box, dice), measure length (l), width (w) and height (h) with a scale using the formula: Volume =l x w x h.
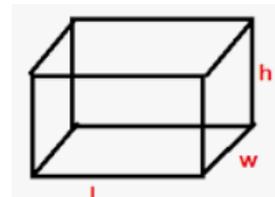
For irregular objects, such as a stone, use water displacement in a measuring cylinder to determine the volume.
4. How are uniform mixtures different from non-uniform mixtures?
[Hint: Uniform mixtures are called solutions, and their components are not visible separately. In non-uniform mixtures, the components can be seen with the naked eye or with a magnifying device.]
5. What is the principle behind the working of hot air balloons?
[Hint: The air inside the balloon is heated, causing it to expand and become less dense than the cooler air outside. This density difference creates lift, causing the balloon to ascend.]

III. SHORT ANSWER TYPE QUESTIONS (3M):

1. Define solubility. How does temperature affect the solubility of a substance?

[Hint: The maximum amount of solute that dissolves in a fixed quantity of the solvent is called its solubility. Temperature has a significant effect on the solubility of most solids and gases in liquids. Generally, as the temperature increases, the solubility of solids increases, allowing more solute to dissolve in the solvent. But for gases, the solubility typically decreases with an increase in temperature, meaning that warmer liquids can hold less gas than cooler ones.]

2. Explain the different units used to measure volume.

[Hint: The SI unit of volume is cubic metres, written as m^3. It is the volume of a cube whose each side is one metre in length. Volume of smaller objects is conveniently expressed in decimetre cube (dm^3) or centimetre cube (cm^3). One centimetre cube is also written as one cc. Volume of liquids is expressed in litres (L), which is equivalent to 1 dm^3. A commonly used submultiple of a litre is millilitre (mL), which is equivalent to 1 cm^3.]

3. What is meant by the term relative density?

[Hint: Relative density is a comparison of a substance's density to the density of a reference substance, most often water. It is calculated by dividing the density of the substance by the density of the reference material and has no units because the density units cancel out. A substance with a relative density greater than 1 will sink in water, while one with a value less than 1 will float.

Relative density of any substance with respect to water = $\dfrac{\text{Density of that substance}}{\text{Density of water at that temperature}}$]

4. Ice floats on water. Justify this statement with an explanation.

[Hint: Ice floats on water because it is lighter than liquid water. Water has a special property that its density is highest at 4 °C. It means water is heaviest at 4 °C.
As the temperature drops, and water turns into ice at 0 °C, its structure changes—the particles arrange themselves in a way that takes up more space. This process is called expansion. Because the same amount of water now occupies a larger volume, its density decreases. As a result, ice becomes lighter than liquid water and floats on its surface.

5. What is the effect of pressure on the density of a substance?

[Hint: Pressure affects density differently depending on the state of matter. For gases, increasing pressure causes the particles to move closer together. As a result, the volume of the gas decreases and its density increases. In the case of liquids, pressure has a small effect because they are nearly incompressible. As the particles in solids are very close to each other, solids are even less affected by pressure than liquids, and changes in their density are usually negligible.]

IV. LONG ANSWER TYPE QUESTIONS (5M):

1. What are the precautions to be taken while measuring volume using a measuring cylinder?

[Hint: i. Place a clean, dry measuring cylinder on a flat surface. Pour water slowly into the measuring cylinder up to the required mark.

ii. The water inside the measuring cylinder forms a curved surface. This curved surface is called the meniscus. Read the mark on the measuring cylinder that coincides with the bottom of the meniscus for water or other colourless liquids.

iii. Make sure that the eyes are at the level with the bottom of the meniscus while noting the readings.

iv. Once it reaches the required level, transfer this water to the required container.

v. In case of coloured liquids, the mark on the measuring cylinder should coincide with the top of the meniscus.]

2. Describe how to measure mass using a digital weighing balance.

[Hint: i. Switch ON the digital weighing balance.

ii. Observe the initial reading on the digital weighing balance display. It should show a zero reading. If not, then we must bring it to zero by pressing the tare or reset button.

iii. Place a dry and clean watch glass or butter paper on the pan.

iv. Note the reading on the digital weighing balance. Reset the digital weighing balance reading to zero by pressing the tare or reset button.

v. Carefully place the solid object, such as a stone, on the watch glass and note the reading displayed on the balance.]

V. CASE STUDY- BASED QUESTIONS/PASSAGE-BASED QUESTIONS:

1. Two soda bottles are opened—one at room temperature and one from the refrigerator. The room-temperature bottle quickly loses its fizz, while the chilled soda stays bubbly for longer. This shows how gas escapes differently at different temperatures.

(i) Why does soda lose fizz faster at room temperature than in the fridge?

(ii) What property of gas solubility does this demonstrate?

(iii) Explain how temperature affects the solubility of gases in liquids as seen in this case.

[Hint: (i) Gas escapes faster from soda at higher temperatures, reducing fizz.

(ii) Gas solubility decreases as temperature increases.

(iii) Higher temperatures give gas particles more energy to escape from the liquid; lower temperatures keep gases dissolved longer.]

2. At a picnic, friends make lemonade by stirring sugar into water. After adding too much sugar, they notice some sugar grains settle at the bottom of the glass. They realise no more sugar can dissolve at that temperature, no matter how much they stir.

(i) What does it mean when sugar settles at the bottom and does not dissolve further?

(ii) What type of solution is formed before and after the sugar settles?

(iii) How can temperature changes affect how much sugar dissolves in water in this scenario?

[Hint: (i) It means the solution is saturated; no more sugar can dissolve at that temperature.

(ii) Before settling, the solution is unsaturated; after settling, it is saturated.

(iii) Increasing temperature usually increases solubility; thus, more sugar can dissolve in warmer water, while decreasing temperature may cause sugar to crystallise out.]

ANSWERS FOR OBJECTIVE TYPE QUESTIONS 1 - 10

1. (a) A dilute solution has more solvent relative to solute than a concentrated solution.

2. (a) 8 mL

3. (c) It floats completely

4.(c) 1 cm³ = 1 mL

5. (b) The smallest volume it can measure is 1 mL

6. (b) Unsaturated

7. (b) Read at the bottom of the meniscus, with eyes level to it.

8. (iii) A is true but R is false.

9. (iv) A is false but R is true

10. (ii) Both A and R are true, but R is not the correct explanation of the assertion.

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