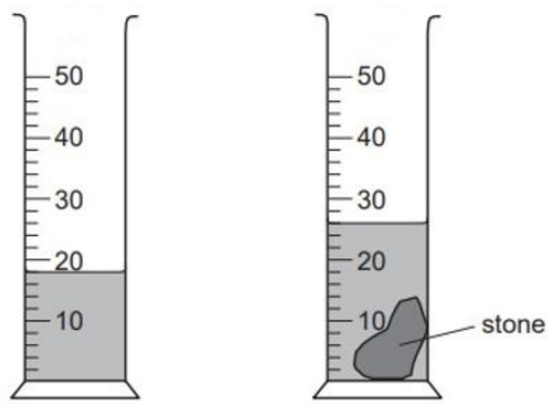
INDIAN SCHOOL AL WADI AL KABIR		
Class: VIII	**DEPARTMENT: SCIENCE 2026-2027**	**DATE: 07/09/2026**
WORKSHEET NO: 7	**TOPIC: THE AMAZING WORLD OF SOLUTES, SOLVENTS AND SOLUTIONS**	**NOTE: A4 FILE FORMAT**
CLASS & SEC:	**NAME OF THE STUDENT:**	**ROLL NO.**

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

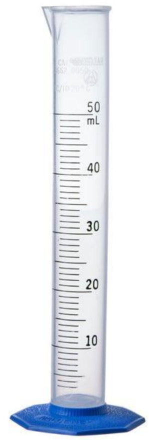
3. An object of density 0.8 g/cm^3 is placed in a liquid of density 1.2 g/cm^3. What happens?

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

4. What is the relationship between 1 cm^3 and 1 mL?
(a) 1 cm^3 = 10 mL
(b) 1 cm^3 = 0.1 mL

(c) 1 cm^3 = 1 mL
(d) 1 cm^3 = 100 mL

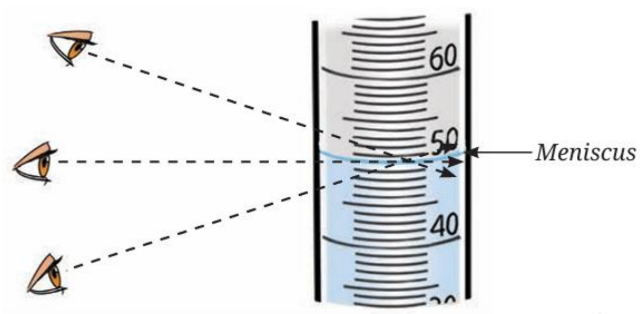
5. Choose the correct statement regarding a measuring cylinder that can measure up to 100 mL with markings every 10 mL and 10 divisions between each marking?



(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 (A), (B), (C) and (D) as given below -

(A) Both A and R are true, and R is the correct explanation of the assertion.

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

(C) A is true, but R is false.

(D) 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 (m^3) 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 (dm^3) or cubic centimetres (cm^3).

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

1. An object has volume 250cm^3 and density 2.5g/cm^3. What is its mass?

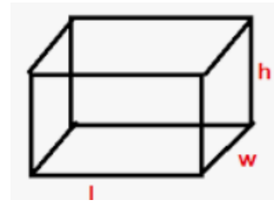
[Hint: Given Volume = 250cm^3
Density = 2.5g/cm^3
Density = Mass / Volume
Mass = Density x Volume
= 2.5 x 250
= 625g

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), height (h) with a scale using the formula: Volume =l x w x h.
For irregular objects like a stone, use water displacement in a measuring cylinder to find 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 either 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.]

6. Identify the solute, solvent, and whether the mixture is uniform or not in the following:
Lemonade, saltwater, sugar solution, sand – water solution

	Solute	**Solvent**	**Uniform or not**
Lemonade	**Lemon juice**	**Water**	**Uniform**
Saltwater	**Salt**	**Water**	**Uniform**
Sugar solution	**Sugar**	**Water**	**Uniform**
Sand water solution	**Sand**	**Water**	**Non-uniform**

7. The density of a liquid is 0.8 g/cm³. What is the volume of 320g of this liquid?
[Hint : Density = Mass / Volume
Volume = Mass / Density
= 320 g ÷ 0.8 g/cm³
= 400 cm³

III. SHORT ANSWER TYPE QUESTIONS (3M):

1. Air is a gaseous solution. Justify.
[Hint: Air is a gaseous solution because it is a homogeneous mixture of different gases.
Nitrogen is the major component of air and acts as the solvent.
Oxygen, carbon dioxide, water vapour and other gases are present in smaller amounts and act as solutes.
These gases are uniformly mixed throughout the air.
Therefore, air is called a gaseous solution.]

2. A measuring cylinder reads 70mL after placing a stone in 50mL water. The stone weighs 40g. Calculate its density. Will it float or sink?

[Hint: Given:

- **Initial volume of water = 50 mL**
- **Final volume of water + stone = 70 mL**
- **Mass of stone = 40 g**

Step 1: Find the volume of the stone

Volume of stone = Final volume − Initial volume
= 70 − 50
= 20 mL
Since 1 mL = 1 cm^3, volume = 20 cm^3

Step 2: Calculate density

Density=Mass/ Volume = 40/20 =2 g/cm^3

Step 3: Will it float or sink?

Density of water = 1 g/cm^3
Since the density of the stone (2 g/cm^3) is greater than the density of water (1 g/cm^3), the stone will sink.]

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 = $\frac{\text{Density of that substance}}{\text{Density of water at that temperature}}$]

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, it undergoes a change in structure—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. Why is the effect of pressure on density significant in gases but negligible in solids and liquids?

[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.]

6. Why does the solubility of solids increase and the solubility of gases decrease with temperature rise?
[Hint: The effect of temperature on solubility is different for solids and gases:
Solids: The solubility of most solids in water increases when temperature rises. This is because heating gives the particles more energy, helping the solid dissolve more easily.
Example: More sugar dissolves in hot water than in cold water.
Gases: The solubility of gases in water decreases when temperature rises. Heating gives gas particles more energy, so they escape from the water more easily.
Example: Cold drinks contain more dissolved carbon dioxide than warm drinks.]

IV. LONG ANSWER TYPE QUESTIONS (5M):

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

1. **Keep the measuring cylinder on a flat, level surface.**
2. **Pour the liquid carefully to avoid spilling.**
3. **Take the reading with your eyes at the same level as the liquid.**
4. **For water and most liquids, read the bottom of the curved surface (meniscus).**
5. **Make sure the measuring cylinder is clean and dry before use.**
6. **Avoid reading the scale while the cylinder is being held in your hand.]**

2. How does the concept of density help explain floating and sinking in water?
[Hint: Density helps us understand why some objects float, and others sink in water.
If an object's density is less than the density of water (1 g/cm^3), it floats.
If an object's density is greater than the density of water, it sinks.
If an object's density is equal to the density of water, it may remain suspended in water.
Example: A piece of wood floats because its density is less than that of water, while an iron nail sinks because its density is greater than that of water.]

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 cm^3 = 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. (C) A is true, but R is false.
9. (D) A is false, but R is true
10. (B) Both A and R are true, but R is not the correct explanation of the assertion.

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