

Intermediate Science 7
Unit 3: Mixtures and Solutions
Topic 3: Making A Solution



Student Name _____

Solutions: is a homogeneous mixture that they appear as ONE substance.

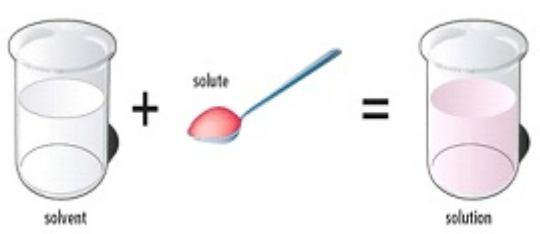
Examples:

- tap water
- Vinegar
- gold jewelry

A solution consist of 2 parts:

Solute: is the substance in a solution that is present in lesser amount?

Solvent: refers to the substance in a solution that is present in greater amount



Note: The solute dissolves into the solvent.

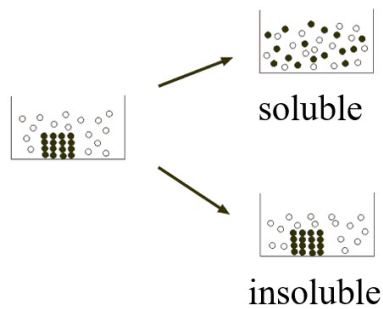
Different States Of Solutes And Solvents:

Solvents can be either: Solid, Liquid, Gas

Solutes can be either: Solid, Liquid, Gas

Solution	Solute	Solvent	State of solute	State of solvent
air	oxygen, carbon dioxide and other gases	nitrogen	gas	gas
soda Water	carbon dioxide	water	gas	liquid
vinegar	acetic acid	water	liquid	liquid
filtered Ocean Water	sodium chloride (salt) and other minerals	water	solid	liquid
brass	zinc	copper	solid	solid
antifreeze	alcohol	water	liquid	liquid

Solubility refers to the amount of solute that will dissolve in a given amount of solvent at a given temperature:



Soluble:

- If the particles of the solute are more attracted to the particles of the solvent.
- Dissolving occurs.
- The solute is said to be soluble in that solvent. (ie. Solution)

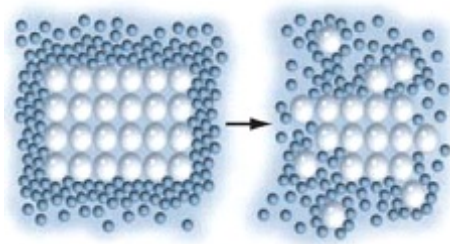
Insoluble

- If the particles of the solute are more attracted to their own particles than the solvent particles.
- Dissolving does NOT occur.
- The solute is said to be insoluble in that solvent. (ie. Mechanical)

Why Some Substances Dissolve?

1. Solute becomes attracted to the solvent.

Solute particles are attracted to solvent particles - so they mix.



Example: sugar particles are attracted to the water particles, mixing with the water particles.

2. Movement

Mixing causes movement. When 2 substances are mixed, the weak attractions are broken by the motion of the particles.



Example: oil is mixed with gasoline. Both have very weak attractions that are broken by the motion.

PART A: MULTIPLE CHOICE

Instructions: Shade the letter of the correct answer on the computer scorable answer sheet provided.

1. What is another term for a solution?
 - (A) Compound
 - (B) Element
 - (C) Homogeneous mixture
 - (D) Heterogeneous mixture

2. Which of the following describes a solute?
 - (A) A homogeneous mixture of two or more substances.
 - (B) The material that dissolves in the solvent portion of a solution.
 - (C) Only dissolved in water.
 - (D) Usually the material present in the largest amount in a solution

3. What is a solution?
 - (A) Solute
 - (B) Solvent
 - (C) Solvent + solute
 - (D) Solvent - solute

4. Which state(s) of matter can a solute be found?
 - (A) Gas
 - (B) Liquid
 - (C) Liquid
 - (D) All of the above

5. Which best describes a solute?
 - I) It is substance that is of lesser amount in the solution
 - II) It gets dissolved
 - III) It can be found as a solid, liquid of gas
 - (A) I
 - (B) II
 - (C) III
 - (D) All are correct

6. Which of the following refers to a substance that is dissolved in a solvent?
 - (A) Solid
 - (B) Solute
 - (C) Solvent
 - (D) Substance

7. A salt is placed in a glass of water will dissolve. In this case, what term best describes the salt?
 - (A) Solid
 - (B) Solute
 - (C) Solvent
 - (D) Substance

8. Which state(s) of matter can a solvent be found?
- (A) Gas
 - (B) Liquid
 - (C) Liquid
 - (D) All of the above
9. Which best describes a solvent?
- I) It is substance that is of greater amount in the solution
 - II) It dissolves the solute
 - III) It can be found as a solid, liquid or gas
- (A) I
 - (B) II
 - (C) III
 - (D) All are correct
10. What is the most common solvent in everyday life?
- (A) Blood
 - (B) Ethanol
 - (C) Maple syrup
 - (D) Water
11. Which substance listed below is not a common solvent?
- (A) Bar of soap
 - (B) Hand moisturizer
 - (C) Nail polish remover
 - (D) Water
12. Air is a solution of 78% nitrogen, 21% oxygen and 1% other gases. Which part of this solution is the solvent?
- (A) Air
 - (B) Nitrogen
 - (C) Other gases
 - (D) Oxygen
13. A sugar cube placed in a glass of water will dissolve. In this case, what term best describes the water?
- (A) Solid
 - (B) Solute
 - (C) Solvent
 - (D) Substance
14. Alloy is a mixture consisting of two or more metals. For example, brass is an alloy made of copper with zinc dissolved in it. What states of matter are the solute and solvent for brass?
- (A) Metal + metal
 - (B) Metal + liquid
 - (C) Metal + Gas
 - (D) Liquid and Gas

15. Which of the following best describes the solubility of a material?
- (A) The maximum amount of solute that can go into solution at any temperature.
 - (B) The minimum amount of solute that can go into solution at a particular temperature.
 - (C) The amount of solute that will dissolve into solution at a particular temperature.
 - (D) A useless concept since all solutes have a different solubility.
16. Which of the following best describes a mixture of oil and water?
- (A) Insoluble
 - (B) Solute
 - (C) Soluble
 - (D) Solvent
17. What term best describes the solubility of sugar in water?
- (A) Insoluble
 - (B) Solute
 - (C) Soluble
 - (D) Solvent

PART B : MATCHING

[5]

Match each thermometer on the left with the best Descriptor on the right. Each Descriptor may be used only once. Place your answer on the scantron

<i>Term</i>	<i>Descriptor</i>
18. ___ Solution	A. Describes when a substance that can dissolve in a particular solvent.
19. ___ Solvent	B. Describes when a substance that cannot dissolve in a particular solvent.
20. ___ Solute	C. The substance that dissolves the solute; the substance that is in greater amount in the solution
21. ___ Insoluble	D. The substance which is dissolved in the solvent
22. ___ Soluble	E. Another term for homogenous mixture

PART C: WRITTEN RESPONSE

1. What does the term soluble mean?

2. What does the term insoluble mean?

3. Vinegar is insoluble in vegetable oil. Does this mean that vinegar is a totally insoluble substance? Explain why or why not.

4. Why are some substances insoluble in a certain solvent?

5. Identify the solute and the solvent in these examples.

Solution	Solvent	Solute
a) Your friend makes lemonade by mixing lemon-flavoured drink crystals with water		
b) Vinegar is a solution that is made up of 5% acetic acid and 95% water		
c) Humid air is a solution of water vapour in air.		
d) Home-made window cleaner can be made by dissolving vinegar in water.		
e) One way to make apple juice is by mixing water with frozen concentrated apple juice.		
(f) A small outboard motor on a boat is fuelled with a mixture of motor oil and gasoline.		

6. A stainless steel frying pan is a solution called an alloy.

(A) Name the solvent in stainless steel.

(B) Name one solute in stainless steel.
