

# LESSON | What is a solution?

## 16

You can be a magician! Just add sugar to warm water and stir thoroughly. Abracadabra! The sugar disappears!

But is the sugar really gone? No. The sugar and water just mix together. They mix completely. The sugar just seems to disappear.

Sugar and water together form a mixture. There are several kinds of mixtures. Sugar and water form a special kind of mixture. They form a **solution**. There are many kinds of solutions.

A solution has two parts: a **solute** [SAHL-yoot] and a **solvent**. The solvent is usually a liquid. The solute is what "disappears" in the solvent. The solute may be a solid, a gas, or another liquid.

A solution is formed when the solute **dissolves**. The solute spreads out evenly throughout the solvent. The substance that dissolves is said to be **soluble** [SAHL-yoo-bul].

In the example of sugar and water, the water is the solvent. Water dissolves sugar. The sugar is the solute. We say that sugar is soluble in water.

There are many kinds of solvents. There are many kinds of solutes. There are many kinds of solutions.

Remember, a mixture is a solution only if the solute dissolves and spreads out evenly.

## SOLUTIONS AND THE STATES OF MATTER

All the examples in Figures A, B, and C are solutions.

Remember, there are three states of matter—solid, liquid, and gas.

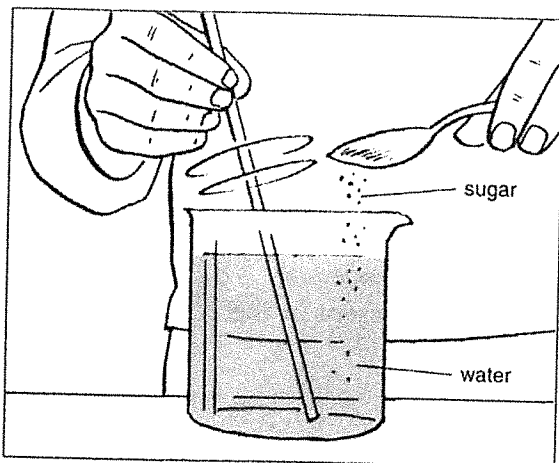


Figure A

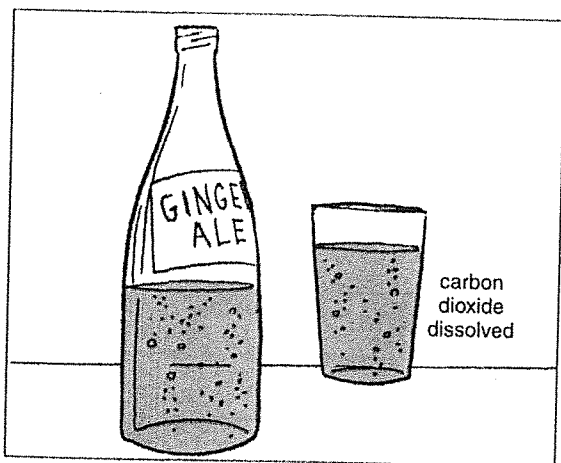


Figure B

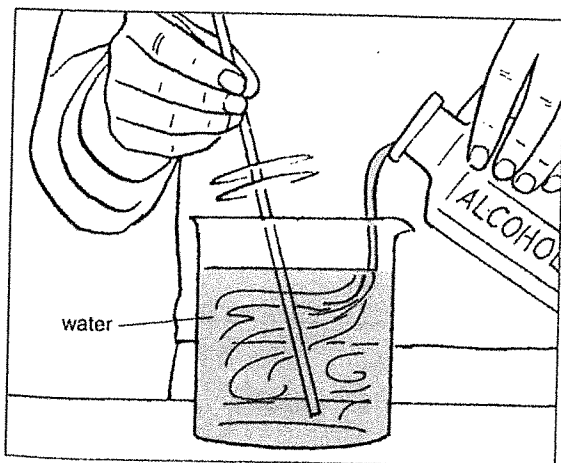


Figure C

1. Name the states of matter in this solution (Figure A).

\_\_\_\_\_ and \_\_\_\_\_

2. The solute is the

\_\_\_\_\_ .  
solid, liquid

3. The solvent is the

\_\_\_\_\_ .  
solid, liquid

4. Name the states of matter of this solution (Figure B).

\_\_\_\_\_ and

\_\_\_\_\_ .

5. The solute is the

\_\_\_\_\_ .  
gas, liquid

6. The solvent is the

\_\_\_\_\_ .  
gas, liquid

7. Name the states of matter of this solution (Figure C).

\_\_\_\_\_ and \_\_\_\_\_ .

**NOTE:** In solutions where all the parts are liquid, we usually say the liquid present in the greater amount is the solvent and the other liquid is the solute.

## COMPLETING SENTENCES

Choose the correct word or term for each statement. Write your choice in the spaces provided.

1. A liquid solution has at least one \_\_\_\_\_ .  
solid, liquid, gas
2. The solute in a solution \_\_\_\_\_ .  
must be a gas, must be a solid, can be any state of matter
3. In solutions of liquids and solids or of liquids and gases, the solvent is always the \_\_\_\_\_ .  
solid, liquid, gas
4. In solutions of all liquids, we usually name the liquid present in the \_\_\_\_\_ amount the solvent.  
greater, lesser

## WHICH ARE SOLUTIONS?

Ten mixtures you know are listed below. Some are solutions, some are not. Think about each mixture, then fill in the boxes.

	Mixture	Do the substances dissolve? (Write YES or NO.)	If the substances dissolved, name the solute (or solutes) and name the solvent.	
1.	sugar water			
2.	muddy water			
3.	salty water			
4.	pebbles in water			
5.	instant coffee drink			
6.	orange juice			
7.	oil and water			
8.	instant tea drink			
9.	ocean water			

## FILL IN THE BLANK

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Complete each statement using a term or terms from the list below. Write your answers in the spaces provided. Some words may be used more than once.

mixture  
two  
solid  
soluble

solution  
liquid  
gas  
water

sugar water  
solvent  
solute

1. Different things close together make up a \_\_\_\_\_.
2. A \_\_\_\_\_ is a special kind of mixture.
3. An example of a solution is \_\_\_\_\_.
4. A solution has \_\_\_\_\_ main parts.
5. One part of a solution is usually a \_\_\_\_\_.
6. The liquid part of a solution is called the \_\_\_\_\_.
7. The other part of a solution can be a \_\_\_\_\_, or a \_\_\_\_\_, or a \_\_\_\_\_.
8. The part of a solution that mixes into the solvent is called the \_\_\_\_\_.
9. A solute that dissolves in a solvent is said to be \_\_\_\_\_.
10. Sugar is soluble in \_\_\_\_\_.

## MATCHING

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Match each term in Column A with its description in Column B. Write the correct letter in the space provided.

	Column A	Column B
_____	1. mixture	a) means "able to dissolve"
_____	2. solute	b) liquid part of a solution
_____	3. solvent	c) different things close together
_____	4. solution	d) a special kind of mixture
_____	5. soluble	e) part of a solution that is dissolved

## REACHING OUT

Be a detective! How can you tell if a mixture is a solution? We will learn more in the following Lessons. Meanwhile, see if you can figure out the clues.

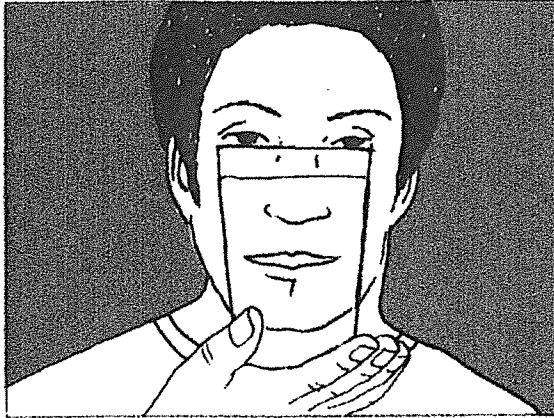


Figure D

- This is a mixture of sugar and water.
- Sugar and water is a solution.

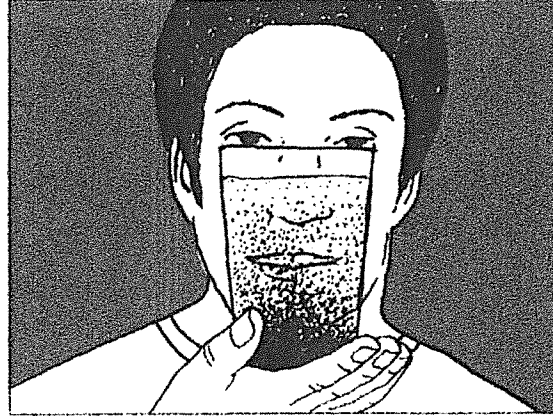


Figure E

- This is a mixture of muddy water.
- Muddy water is not a solution.

Answer YES or NO to these questions.

		Muddy Water	Sugar Water
1.	Are the parts evenly mixed?		
2.	Can you see the separate parts?		
3.	Do particles fall to the bottom?		
4.	Can you see clearly through this mixture?		

How can you tell if a mixture is a solution?

In your own words, list the clues.

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