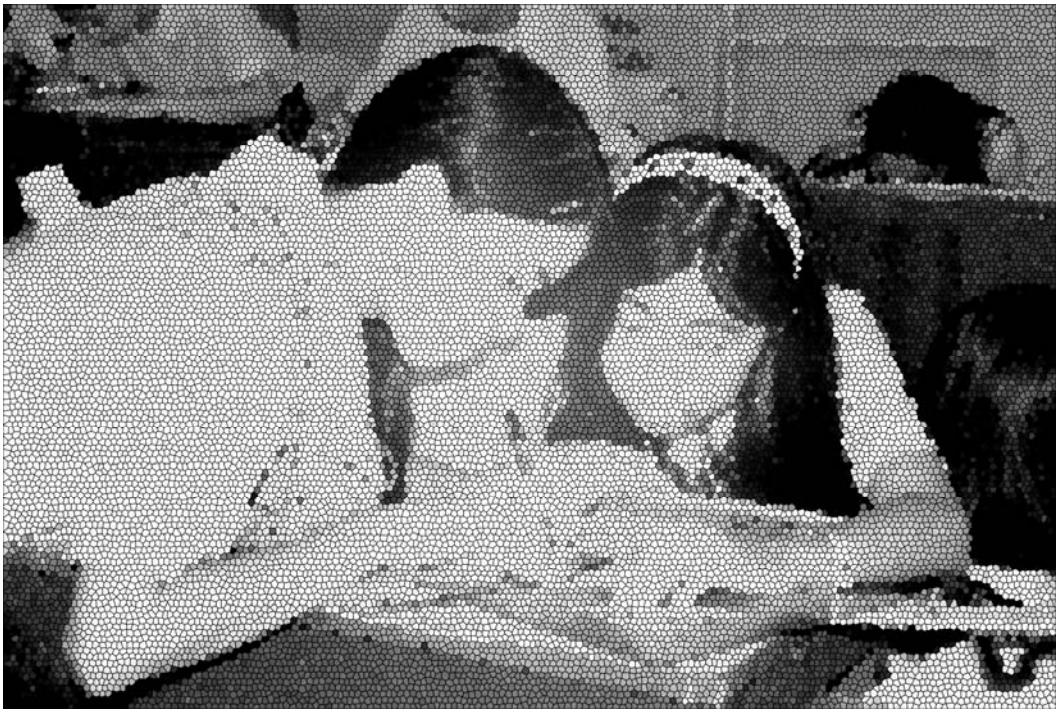
S C I E N C E 4

Modified In-School Off-School Approach Modules (MISOSA)

Distance Education for Elementary Schools

SELF-INSTRUCTIONAL MATERIALS



FACTORS THAT AFFECT HOW A SOLUTE DISSOLVES IN A SOLVENT

Department of Education
BUREAU OF ELEMENTARY EDUCATION
2nd Floor Bonifacio Building
DepEd Complex, Meralco Avenue
Pasig City

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by the Learning Resource Management and Development System (LRMDS),
DepEd - Division of Negros Occidental
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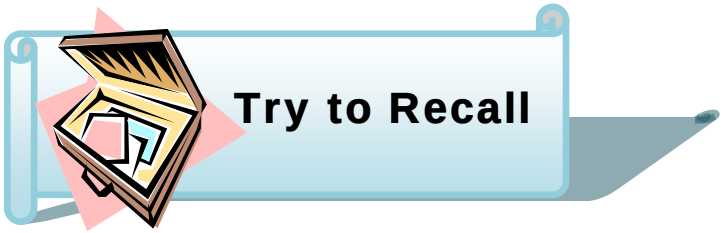
Factors that Affect How a Solute Dissolves in a Solvent

At the end of this lesson, you will be able to:

- describe the effect of stirring materials that are mixed
- describe the effect of temperature on materials that are mixed
- describe the effect of size of solid particles when mixed with other material



A. Study each set of materials. Identify which is the solvent and solute

Mixture	Solute	Solvent
1. sugar + water 2. cement + water 3. 10 ml water + 20 ml alcohol 4. vinegar + salt 5. calamansi juice + sugar		

B. Match Column A with Column B.
Describe what will happen when the materials in Column A are mixed.
Write the letter only.

A	B
1. Sand & alcohol	a. The particles of the two materials cannot be distinguished from each other
2. water & baking soda	b. Mixtures become cloudy
3. face powder & flour	c. Solute settles at the bottom

ACTIVITY 1

Do the following:

1. Prepare to glasses. Half-fill each glass with water.
2. Put one teaspoon of salt into each glasses.
3. Stir the water in one glass. Do not stir the water in the other glass.
4. Observe the two glasses.

Answer the following question in your notebook.

1. In which glass of water did the salt dissolve faster?
2. What do you think will happen if you did not stir the water in the other glass?
3. What made the salt particles dissolve faster? Why do you think this happen?

ACTIVITY 2

Do the following:

a. Prepare two empty glasses.
b. Half-fill the first glass with cold water. With the help of an adult, fill half the second glass with hot water.
c. Place one teaspoon sugar to each glass.
d. Observe in which glass do the sugar dissolved faster

Answer the following question in your notebook.

1. In which glass did the sugar dissolve faster?
2. What made the sugar in one glass dissolves faster than sugar in other glass?
3. What factor affects the sugar to dissolve faster in one glass?

ACTIVITY 3

Do the following:

1. Prepare two glasses, a teaspoon of powdered soap and a small piece of detergent bar.
2. Place equal amounts of water in two glasses.
3. Add a teaspoon of powdered soap in one glass and a small piece of detergent bar in the other glass.
4. Observe which solid dissolves faster.

Answer the following question in your notebook.

1. What solid materials did you add in the two glasses with water?
2. What is the difference between a powdered soap and a detergent bar?
3. Which solid material dissolve faster?
4. What made the powdered soap dissolved faster?
5. If you will crush or break the piece of detergent bar into small pieces and place it in water, will dissolve faster? Why or why not?

Read and learn more:

Substances have different reactions when mixed in water. Some substances like sugar, coffee, milk and salt spread evenly when mixed with water.

These are factors that effect how a solute dissolves in a solvent. These are stirring, crushing and using heat energy.

Stirring or shaking the substance with solutes make the solid particles dissolve faster. This happens because stirring caused the surface of each tiny particle of substances like sugar, coffee and other to be pulled away by the water. The substances will dissolve faster if the surface of all the tiny particles are in contact with the water.

Crushing the solid solute makes it dissolves faster. There are materials in powder form like the powdered soap, rocky salt that dissolve faster than the same materials which are in solid or compact form.

Heat energy is another factor that affects how a solute dissolves in a solvent. The heat increases the temperature of solvent and solute (e.g. hot water) which caused the particles of substances (e.g. sugar) to move faster. As motion of solute and solvent increase, there is also a greater chance for the solvent and solute to make a contact with each other.

Substances have different reactions when mixed with water. Some substances like sugar, coffee, milk and salt spread evenly when mixed with water.

These are conditions that effect how fast a solute dissolve in a solvent. These are stirring or shaking, crushing (particle size), and temperature (heat energy).

Stirring of shaking the mixture causes an increase in the contact or even collision of solute and solvent particles (molecules) due to an increase in their speed of movement (kinetic energy). When they move fast, there is a greater chance fir the particles (molecules) to spread apart and thus facilities faster dissolution.

Crushing cutting or grinding reduce the solute into smaller pieces. This also reduce the surface area of the solute. When the solute are smaller it is easier for the solute to make contact with the solvent thus dissolution is faster.

Temperature The heat energy will cause an increase in the temperature of solvents and solute and will result to faster movement of the particles (molecules). When this

Temperature The heat energy will cause an increase in the temperature of solvents and solute and will result to faster movement of the particles (molecules). When this happens there is a greater chance for the solute and solvent to make contact with each other, thus will-lead to faster dissolution of the in a given solvent.

I learned that:

- Stirring or shaking causes the particles to move faster resulting to greater contact or even collision of the particles of solute and solvent. When this happens, the solute dissolves faster in the given solute.

- Crushing cutting or grinding reduces the solute into smaller pieces which results to a decrease in the surface area of the solute. When the surface area is small it is easier for the solute to make contact with the solvent thus dissolution is faster.

- An increase in temperature (heat energy) will result to faster movement of the particles. When this happens, possibility of contact between the solute and solvent increases thus results to faster dissolution of the solute in a given solvent.

Apply It

A. Identify the condition that will make the solute in each mixture dissolve faster. Write stirring, crushing, or using heat energy in your notebook.

1. magi cubes and water
2. powdered milk and water
3. salt and water
4. instant coffee and water
5. sugar and pure buko juice

B. Read the situations below. Answer the given questions in your notebook.

1. Mother told you to prepare a glass of milk for your small brother. After putting amounts of sugar into the glass, you noticed that the sugar

particulars are still there. What should you do to make the sugar dissolve faster ?

2. In your EPP subject, your group was assigned to cook fish “sinigang” Your classmate bought rock salt instead of fine salt. What should you do to the rock salt so that it will dissolve faster in your sinigang?

3. Mario was asked to dissolve amount of flour in water. What kind of water should he use to dissolve the flour faster?

Test Yourself

A. Identify which of the following mixtures need stirring, crushing and heat energy to dissolve solutes faster. Write your answer in your notebook.

solid sugar and water
rock salt and water
sugar and calamansi juice
powdered milk and water
magi cubes and water
flour and water
salt and water
instant coffee and sugar
powdered soap and water
solid chalk and water
solid alum or “tawas” and water

B. Read the situations below and answer the given questions. Write it in your notebook.

1. Aling Nora sells cold buko juice in the school canteen. She always prepares, jug of “buko juice” for the pupils. In preparing, she mixes sugar, meat of coconut, milk and even water. What do you think should Aling Nora do so that the sugar will dissolve faster?

2. Ramon wants to soak his white uniform in water with powdered detergent. He found out that there were no available powdered soap. If he will use a detergent bar or solid soap, what should he do so that the bar will dissolve faster?

Congratulations for trying your best in accomplishing this module, try to share the things you have learned with your classmate and friends.