

Research Experiences for Teachers (RET) – 2013

LESSON PLAN SURFACE AREA AND SOLUBILITY

MODULE TOPIC:

- Physical properties
- Viscosity

OBJECTIVE(S): Students will be able to:

- Identify the solute and the solvent in a system.
- Compare and contrast solubility of a solid under different conditions.
- Determine how surface area affects the rate of dissolution.

STANDARD(S) & INDICATOR(S):

5-PS1-3. Make observations and measurements to identify materials based on their properties.

MATERIALS:

Stopwatch, mints.

BACKGROUND INFORMATION:

The dissolving medium in a solution is called a *solvent*, and the substance being dissolved is called the *solute*. Several factors can influence the rate at which a solute dissolves in a solvent. For example, increasing the surface area of a solute speeds dissolving. Crushing or pulverizing a large solid into smaller pieces exposes more surface area to the solvent. In this lesson you will see how surface area affects the rate at which candy dissolves in the mouth.

CLASSROOM ACTIVITY DESCRIPTION (LABORATORY/EXERCISES/PROBLEMS) including detailed procedures:

Before activity

1. Divide the class into groups of three students each. Hand out the worksheets.

With the Students

1. Place a mint in the mouth and avoid chewing or moving it around. Record the time it takes the mint to completely dissolve.
2. Place a second mint in the mouth. Use tongue to move it around, but do not chew the mint. Note how long it takes for the mint to dissolve.
3. Place a third mint in the mouth and chew it. Record how long it takes the mint to dissolve.
4. Have groups share, compare and discuss their results with the rest of the class.

SAMPLE QUESTIONS TO ELICIT CLASS DISCUSSION:

- What's surface area? What's solubility?
- Can you think of another example using surface area and solubility concepts?

HOMEWORK ACTIVITY/EXERCISES/PROBLEMS:

Worksheet

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PARAMETERS TO EVALUATE STUDENT WORK PRODUCTS:

Students write a report that utilizes the table of experimental data to determine how surface area affects the rate of dissolution.

REFERENCES:

John Wiley & Sons, Inc. (<http://www.education.com/partner/articles/wiley/>)

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NAME _____ DATE _____

Solubility Worksheet

1. How long did it take each mint to dissolve?
2. Scientifically explain your results. Use the following words in your explanation: *surface area*, *agitation*, *chewing*, *solvent*, *solute*, and *solution*.
3. Complete following table

Solute	Time (in seconds)
Whole mint	
Swirled around mint	
Chewed mint	

4. Do some research and list all the factors that affect the rate at which a solid dissolves in a liquid.