Dissolving Solids and Gases

A factory releases clean, warm water into a stream. The stream becomes severely polluted as a result. How does this happen? Fish living in the water depend on dissolved oxygen in order to breathe. Like other gases, oxygen molecules tend to spread out. In order to dissolve them, it is necessary to confine them. Heat speeds the molecules up and makes them spread out more–exactly the opposite of what is needed to dissolve them. As a result, heat drives the oxygen out of the water, causing the fish to die. The dead fish begin to decay. Growing decay bacteria deplete the water of oxygen even further. In this way, clean warm water can pollute a stream. The process of dissolving gases is opposite to the process of dissolving solids because of the differences between gases and solids.

Answer the questions below based on your reading above and on your knowledge of chemistry.

1. A warm can of soda is dropped and bounces down a flight of stairs. When it is opened, carbon dioxide gas coming out of solution causes it to spray all over. Explain the affect of each of the following:

   a. The fact that the soda was warm. _____

   _____

   b. The fact that the soda was dropped and bounced down a flight of stairs. _____

   _____

   c. The fact that the can was opened. _____

   _____

2. When a gas dissolves, the particles need to be confined. What do the particles of a solid need to do in order to dissolve? _____

3. Sugar is added to a hot cup of coffee and stirred. The sugar dissolves. Explain the affect of each of the following:

   a. The fact that the coffee was hot. _____

   _____

   b. The fact that the coffee was stirred. _____

   _____

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4. Which dissolves faster, a teaspoon of sugar or a sugar cube? Why? _____

5. A solid is added to water and stirred. Some of it dissolves, but not all. What happens to the rate at which the solid is dissolving between when it was first added and when it stopped dissolving? Explain. (*HINT:* Equilibrium!) _____

6. The table below lists four factors that may effect the rate at which solids and gases dissolve. Fill in the table by indicating if the rate of dissolving increases, decreases, or is not effected. Then explain why.

Factor	**Affect on Rate of Solution for:**	
	Solid Solutes	**Gaseous Solutes**
Crushing		
Stirring		
Increasing the amount of dissolved solute		
Increasing Temperature		