

Chapter 5, Lesson 8 Activity Sheet Answers

1. Carbon dioxide
2. Before the bottle was opened, carbon dioxide molecules were dissolved in the water.
3. Carbon dioxide can dissolve in water because it has areas of slight positive and negative charge. These are formed by an unequal sharing of electrons between the oxygen and carbon atoms in the molecule. These polar areas are attracted to the opposite areas of negative and positive charge on a water molecule resulting in dissolving.
4. Carbon dioxide comes out of solution easily because the attractions between individual carbon dioxide molecules and water molecules are weak.
5. The pipe cleaner and M&M candy caused bubbles to form in the carbonated water because they contain rough areas where carbon dioxide molecules can collect. When enough carbon dioxide molecules join together, they form a bubble.
6. Bubbles form on a straw in soda because although the straw seems smooth, it has tiny bumpy areas at the molecular level. These tiny bumps allow carbon dioxide molecules to collect, which eventually form bubbles.
7. Carbon dioxide stays dissolved better in cold water. This was shown in the experiment. More bubbles form in the carbonated water that was heated. Because more bubbles were forming, it meant that more carbon dioxide was leaving the solution, and therefore that more stays dissolved in colder solutions.
8. People probably store soda in the fridge to keep more of the dissolved carbon dioxide in solution, which prevents the soda from going flat. They probably also like their soda cold, too.
9. Warming carbonated water makes it easier for carbon dioxide to come out of solution because in a warm solution, the carbon dioxide molecules have more energy, and can more easily overcome the attractions between themselves and the surrounding water molecules.
10. As the temperature increases, carbon dioxide is *less* soluble in water. This graph matches the observations made in the experiment. In the experiment, we saw that more carbon dioxide remained dissolved in cooler solutions. This graph shows the same thing. Carbon dioxide is most soluble at lower temperatures and is increasingly less soluble as the temperature is raised.
11. While carbon dioxide is *less* soluble in water at higher temperatures, sugar is *more* soluble in water at higher temperatures.
12. There is less dissolved oxygen in the warmer water and the fish try to get some from the air.
13. It is important to cool water when returning it to a lake or river after using it for industrial purposes because the temperature of the water can affect how much oxygen is dissolved in it which is important to the plants and animals in the water.
14. When Mentos are dropped in a bottle of Diet Coke, tiny ridges on the surface of the candies act as nucleation points where carbon dioxide molecules can collect. As the carbon dioxide molecules quickly gather at these points, the dissolved CO₂ in the soda comes out of solution very quickly making bubbles and shooting out of the top of the bottle.