

Importance of solubility in everyday first



**ASSIGN
BUSTER**

For my science project I'll be researching the solubility of various substances. Solubility is an interesting subject because it's very important for everyday life and I knew very little of it before I started my project. My experiment will give me insight on how the rate of solubility is affected by certain factors and if certain liquids struggle to mix together well. For this essay I needed to understand what solubility is, what affects the rate of solubility, where it can be found in nature, how it's used every day, and how solubility works.

The measure of solubility determines how substances dissolve into one another. The substance dissolving into the other is the solute and the substance being dissolved into is the solvent. When you mix salt into water the salt is the solute and the water is the solvent. Though the salt won't dissolve into the water immediately and if a large portion of salt is being dissolved into water, then there will be a portion of salt left over.

Nevertheless, when salt and water do mix a new substance is formed that can have many practical uses. Solubility isn't limited to just liquids mixing with other liquids, however, solids and gases can also mix into liquids. A solution is created when the solute's molecules form intermolecular bonds with the solvent's molecules as they merge. First the solute's molecules drift into the solvent and are surrounded by the solvent's molecules, then the molecular bonds of the solute are broken so that intermolecular bonds can be made with the solvent. This process can be compared to dropping a clod of dirt into a puddle of water.

There are numerous factors that affect solubility such as temperature, stirring, and the substances themselves. These factors can accelerate the rate of solubility or they can prevent certain substances from being soluble.

Temperature is an important factor when it comes to experiments of solubility because the rate of solubility increases with temperature. Solutions are affected by temperature because it causes the molecules to speed up when hotter or slow down when colder and when molecules are moving around quickly they can merge into the other solvent's molecules quickly and vice-versa. Solubility among gases, however, works better when the gases are colder because they're more dense when cold. Stirring is also important when mixing substances for faster solubility because it has a similar affect on molecules that heat has. The ocean's tides and waves stir the dirt and salt in the water, thus causing the substances to quickly mix together.

Certain substances are composed in a way that negates them from being soluble with other substances. This can be caused by the density of a substance and whether the solute's and solvent's molecules are polar. The density of a substance, such as oil, causes it to sink to the bottom of a cup of water rather than mix with the water because the molecules of oil are larger and heavier. The water simply sits on top of the oil and if more oil is added, then it'll just pass through the water. Solids won't mix with other solids because their molecules are too dense, but solids can mix with liquids. Gases can mix with liquids too if the gas's molecules are dense enough. The polar alignment of a substance also prevents it from merging with something of the opposite alignment unless one substance is both polar and non-polar, such as alcohol. Chemists use the phrase "like dissolves like" to describe this circumstance.

Solutions can be found almost everywhere on the earth, from the oceans to the sky. Every ocean and every lake on Earth is a solution. This is because the water has mixed with dirt, salt, and various substances to become a new substance that, though still water, isn't healthy to drink. When rain touches the ground it mixes with dirt, rocks, and so on that it becomes a solution upon contact with the earth. Dirt and rocks are too dense to mix with each other, but when they're small enough they can mix with various substances. Smoke can mix with clouds and create a solution of acid rain that can be very dangerous and carbon dioxide can create the unhealthy phenomenon of smog. Because gases diffuse, the earth's atmosphere isn't a giant solution.

Solubility has many practical applications in our lives such as purifying water, making drinks, and vitamin storage. Because every ocean in the world is a solution of water mixed with dirt, salt, and various substances the water isn't healthy to drink, so it's purified by chemicals that remove the harmful products of the water. Almost everything we drink is a solution because it's had chemicals added to it that make it taste better or make it safer to drink. This process is used on most of the food we eat and liquids we drink to prevent people from getting sick. Chemicals are added to eggs to prevent food poisoning from salmonella and to certain products to increase shelf life.

When you stir sugar in a cup of coffee you're making a solution. The stirring and heat make the process of the sugar dissolving in the coffee faster and afterward you have a tastier cup of coffee. When you make coffee you're making a solution because the coffee beans are added to water and blended until they become a liquid. Blending drinks and making martinis are both ways of making solutions that taste better or worse than their individual

components. Drinks can be carbonated for an interesting taste that is caused by mixing a liquid and a gas under pressure. Most vitamins can be categorized as fat-soluble, which means that the vitamins are stored in our bodies, and water-soluble, which means that the vitamins pass through our bodies and are excreted as urine. Because fat-soluble vitamins are stored in our bodies, they shouldn't be taken in large doses. The names " fat-solubles" and " water-solubles" refer to how they should be used by our bodies.

I learned a lot from my essay about solubility, but I namely learned how often solubility occurs, its uses & limitations, and that solutions are very practical. Solubility is all around us in nature and God implemented it so that we could be healthier and enjoy interesting tastes. Our world would be vastly different if there were no solubility, in fact no living creatures could exist.