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if you've stirred sugar into lemonade or tea or any other water based drink and watched it dissolve then you've already seen the solvent properties of water in action a solvent is simply a substance that can dissolve other molecules and compounds which are known as solutes solution concentrations are typically expressed as molarities and can be prepared by dissolving a known mass of solute in a solvent or diluting a stock solution the concentration of a substance is this section's focus is on solutions where the solvent is water an aqueous solution is water that contains one or more dissolved substances the dissolved substances in an aqueous solution may be solids gases or other liquids some examples are listed in the table above an aqueous solution is a chemical solution in which the solvent is water the solutes are dissolved molecules and ions that are surrounded by water molecules an aqueous solution is shown by writing aq after a chemical formula for example an aqueous solution of salt nacl in water is nacl aq or na aq cl aq when ionic compounds dissolve in water the ions in the solid separate and disperse uniformly throughout the solution because water molecules surround and solvate the ions reducing the strong electrostatic forces between them overview we need to take the statement water is the universal solvent with a grain of salt pun intended of course it cannot dissolve everything but it does dissolve more substances than any other liquid so the term fits pretty well water's solvent properties affect all life on earth so water is universally important to all of us an aqueous solution is a solution in which the solvent is water it is mostly shown in chemical equations by appending aq to the relevant chemical formula for example a solution of table salt also known as sodium chloride nacl in water would be represented as na aq cl aq our focus in this chapter is water as a universal solvent that is a substance in which so many things can dissolve that property is critical to life on earth as we think of how water based aqueous solutions support life in the seas and on land water due to its polarity acts as a fantastic solvent especially for polar substances and ions this is because the positive and negative ends of water molecules are attracted to ions allowing them to dissolve this property is crucial for chemical interactions within cells water is a good polar solvent dissolving many salts and hydrophilic organic molecules such as sugars and simple alcohols such as ethanol water also dissolves many gases such as oxygen and carbon dioxide the latter giving the fizz of carbonated beverages sparkling wines and beers when water is the solvent for a reaction the reaction is said to occur in aqueous solution which is denoted by the abbreviation aq following the name of a chemical species in a reaction three important types of reactions in water are precipitation acid base and oxidation reduction

reactions precipitation reactions when ionic compounds dissolve in water the ions in the solid separate and disperse uniformly throughout the solution because water molecules surround and solvate the ions reducing the strong electrostatic forces between them this process represents a physical change known as dissociation under most conditions ionic compounds will water substance composed of the chemical elements hydrogen and oxygen and existing in gaseous liquid and solid states it is one of the most plentiful of compounds and has the important ability to dissolve many other substances which was essential to the development of life we would like to show you a description here but the site won't allow us a solution in which water is the solvent is called an aqueous solution although water is an excellent solvent not everything dissolves readily in water materials that dissolve well in water are said to be hydrophilic hydro water phil love and those that do not dissolve readily are said to be hydrophobic phobia fear percent solutions can take the form of weight volume wt vol or w v weight weight wt wt or w w or volume volume vol vol or v v in each case the percentage concentration is calculated as the fraction of the weight or volume of the solute related to the total weight or volume of the solution by anne marie helmenstine ph d note that whether or not components start in different phases a solution only consists of one phase for example sugar is a solid while water is a liquid however a solution of sugar water is liquid only characteristics of a solution a chemical solution exhibits several properties salt dissolved in water is a solution the major component of a solution called the solvent is typically the same phase as the solution itself each minor component of a solution and there may be more than one is called the solute a health crisis the water crisis is a health crisis more than 1 million people die each year from water sanitation and hygiene related diseases which could be reduced with access to safe water or sanitation every 2 minutes a child dies from a water related disease water pollution the release of substances into subsurface groundwater or into lakes streams rivers estuaries and oceans to the point that the substances interfere with beneficial use of the water or with the natural functioning of ecosystems

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