The Great Picnic Mix Up: Crash Course Kids #19.1

Physical Science
https://youtube.com/watch?v=jA0PzblYPUM
https://nerdfighteria.info/v/jA0PzblYPUM

(CrashCourse Kids intro plays)

Sabrina: Summer time is picnic time with sweet iced tea and yummy fruit salad. And ants. But still, yummy fruit salad. And hey, did you notice something? Those foods have something in common: they're both mixtures: things made by combining two or more different things.

Not the ants, they're just ants, but the iced tea and the fruit salad are mixtures. Any time you combine two different things, you make a mixture. Whether it's strawberries and bananas, raspberries and blackberries, or cantaloupe and Legos. Which I don't recommend eating at all. I'm just saying it's a mixture.

So let's have a little science with our picnic shall we? Let's talk about the different kinds of mixtures we can discover. For example, if we mix sand and water in a glass we'll get a mixture, even though after a while the sand will settle to the bottom of the glass.

But if we stir some sugar into the water, the sugar looks like it disappears, but it really doesn't. The particles that make up sugar become distributed - or spread around - evenly among the particles that make up water. We call this kind of mixture a solution. Solutions have two main parts, the solute which is the stuff that dissolves, in this case the sugar, and the solvent which is the stuff in which the solute dissolves, in this case the water.

Now, solutions can be made from types of matter that are in different states, too. For example, the air that we breathe is made up of a solution of gases, mostly nitrogen, oxygen, and carbon dioxide. And soda water is really a solution of carbon dioxide gas and liquid water, but no matter what - and this is important - mixing things together in solutions does not make a whole new substance.

Solutions can be separated again, back into the substances that made them. So, for example, if you leave the lid off a bottle of soda water, the carbon dioxide that's dissolved in the water will slowly float up to the top and bubble away. Given enough time, you'll be back to having plain old water in the bottle and carbon dioxide in the air, as two separate things not mixed together. So when you take a sip of your favorite fizzy drink, you're drinking a solution.

But not all substances dissolve easily into other substances. The ability of something to be dissolved is called its solubility. Sand doesn't dissolve in water, for instance, so we say it has low solubility in water, but sugar dissolves pretty easily, so sugar has high solubility in water.

Still, no matter how easily something might dissolve into another thing, you'll eventually reach the point where it can't dissolve any more. Let's say you pour a whole bunch of sugar into a small glass of water, if you keep adding sugar to it to make it sweeter - and who would blame you for trying? - you'll get to a point where no more sugar can dissolve. The extra will just sit at the bottom.

This is called saturation, the point at which no more solute can dissolve into a solution. Saturation happens when there's just no more room for the particles that make up the solute, in this case the sugar, to squeeze between the particles of the solvent.

Hoo. All of this is making me snacky. Let's check out our picnic table again and investigate the different kinds of mixtures we see there.

Let's start with the fruit salad. That's definitely a mixture of different types of fruit. Is it a solution? Nope, because the particles that make it up aren't equally distributed. I can dip my spoon in there and come up with nothing but strawberries one time and then go back for more and get a spoonful of only bananas.

How about the sweet tea? The solution to that is that it's a solution. Particles of, say, water and sugar in the tea are evenly distributed in the glass. Every bit contains water and sugar, they're spread out evenly. Now, can the substances that make up our ice tea solution be taken apart again? Yep! If we heat the tea so the water in the solution changes from a liquid to a gas, it evaporates into the air leaving the sugar behind.

So, let's go over what we learned at our little mixed up picnic. A mixture is made by combining two or more substances. When the particles that make up the substances are evenly distributed, the mixture is called a solution. Solutions can be made of substances that are in the same state of matter, like gases in the air, or in different states of matter like the gas bubbles in soda.

The solute is the part of the solution that is dissolved. The solvent is the part into which the solute dissolves. And solutions and some other kinds of mixtures don't always make new substances, even though it might look that way.

Now, let's enjoy what's left of our picnic, before the ants carry it all away.

(endscreen)