Organizing Properties: Crash Course Kids #35.1

Physical Science
https://youtube.com/watch?v=zD7W5O0BH7g
https://nerdfighteria.info/v/zD7W5O0BH7g

Have you ever thought about all the different kinds of groups you are a part of? If you consider it for a minute you will probably find that there are a lot of them and some of them are more alike than others. Like there is the friends you hang out with, and your family, your hockey team, your crash course fan club, and that's just for starters.

And even though these groups are totally different in each of them there is something that all of its members have in common. Like your family may be from the same town and your friends may all be into Avengers movies.

A couple of episodes back we learned that all objects, that is all things made of matter, have properties. Qualities that make them different from one another.

Like the metal water bottle that we had in out lunch bag was a good conductor of heat and the fruit strip was more malleable than the potato chip.

Just like groups of people have major things in common so do different materials. Instead of a love of super heroes though, the things that these groups have in common are properties.

So, how does that work? How can we group materials by there properties?

You already know that everything is made of matter, some of the particles that make up matter are called molecules and the particles that make up molecules are called atoms.

Now molecules and atoms are the smallest units of a substance. A substance is just matter that is made of all one kind of atom or molecule.

And since it is all made of the same stuff it all has the same properties. Take water, whether you have one drop of pure water or a swimming pool of pure water, the water is made of the same molecules so it has the same properties. So water in the droplet and in the pool would have the same freezing point, reflectivity, and so on.

But wait there's more. If we look really closely at a water molecule we will see that it is made of two other substances. And if we had the right equipment we could break the water molecule down into smaller parts. The atoms of those two substances: hydrogen and oxygen.

These substances can't be broken down into any other substances so we call them elements. Elements are the very basic most kinds of substances and they each have specific properties. So that basically is what stuff is made of.

Now let's see how we can group some substances by their properties, shall we?

To get the substances for our experiment we will check out a place that's near and dear to my heart, the bottom of my backpack. Okay, so it looks like we have got a candy bar, a safety pin, a tissue (unused in case you were wondering), a paper clip, and a magnet. Time to put these things into different groups by looking at their properties.

Let's start with transparency. Well since we can't see through any of them, we can say that non of them are transparent. Good to know, but not really helpful in placing these things into smaller groups.

We can also see that the safety pin and the paper clip are both made of metal. They are pretty shiny which means that they have a pretty high reflectivity.

Lets check out one more, how about magnetism? If we use a magnet on the objects we can see that the safety pin and the paper clip are drawn to the magnet. And again, what do they have in common? They are made out of metal.

So at the end of our little experiment we have three groups: things that are low transparency, things that have high reflectivity, and things that are magnetic.

And that's just using a few of the many properties that are out there. Scientists use many more to organize substances into groups. By looking at these groups scientist have a pretty good idea about how objects mad out of those substances are going to act.

So a substance is matter that is made out of one kind of atom or molecule. Substances have specific properties like reflectivity and magnetism.

And once a substance can't be broken down into any other substances it's called an element. And elements have properties too.

We were able to group objects made of different materials into groups based on things they have in common. Specifically properties like reflectivity and transparency.

And we notice that there are objects that have similar properties that have other things in common too like the objects that were attracted to the magnet were made of metal.

So objects that have properties in common, seem to frequently be made of similar substances.

And speaking of groups that have things in common, I'm due to meet my peeps for a comic book movie marathon.