What's My Property: Crash Course Kids #35.2

Physical Science
https://youtube.com/watch?v=nlSemv2fLN8
https://nerdfighteria.info/v/nlSemv2fLN8

[intro plays]

Sabrina: Let's say my friend and I have just gone to a birthday party, and we each got a gift bag that's full of candy, and my friend makes me an offer - one that I can't refuse. She says I can have any one piece of candy in her bag, but I can only take it without looking.

Now, say I'm in to gummy frogs - they're my thing, that's what I want. Fortunately, I have a secret - a science secret! When I reach in to the bag, I can use the properties of the candy to help me guess. If I want a gummy frog, I'm gonna feel around for something... something that's kind of small, squishy and you know, frog-shaped. But how else can we use this idea? I mean, in other, non-candy related contexts?

Does it work on school supplies? Breakfast cereals? Hardware? What exactly can we tell about an unknown substance by its properties?

[text: Big Question]

We already know that a substance is matter that's made of one kind of atom or molecule and that has specific properties, and that some substances are elements, which means they can't be broken down into other substances through physical changes or chemical reactions. We also know that we can group substances and elements by their properties, like we found that all of the metal things in the bottom of my backpack were shiny and attracted to a magnet.

So metals have high reflectivity and magnetivity. What else do we know about metals? If we think back to our lunch investigation, we know that metals are often good conductors of heat and electricity and metals are often silver or grey in color.

Let's try another substance. What are some properties of gases? Let's think way back to some of our first videos. When we talked about gases, we learned that gases have no definite size or shape. The molecules in a gas spread out to fill the container they're in. Gases are usually transparent, too, light passes through them. If we think about some of the gases we know and love, like carbon dioxide and oxygen, we find that they have these properties. Both of these gases fill up the space they're in and are transparent.

Gases and metals are just two examples of groups of substances that have specific properties, and because those properties are pretty specific, they can come in handy when we're trying to find out about an unknown substance. So let's get the investigation rolling.

[text: Investigation]

Say we have two unknown substances. Both look the same, kind of whitish and powdery, how can we tell them apart? Now would be the time to go over a truly important scientific rule: no tasting! Ever. Right, since that's out, what should we do?

Think back to our picnic. Remember what we tried to do with sand, and with sugar? We tried to see which dissolved in water, so if we took a spoonful of each unknown substance and tried to dissolve it, the one that dissolved would be the sugar. One of the properties of sugar is that it dissolves in water. Sand, as anyone who's been to the beach will tell you, does not dissolve in water... it just gets into our bathing suits.

But now it's time to level up! This time we'll look at two mystery objects that are totally hidden from view. Our mission, should we choose to accept it, is to find out which one is metal. If we use our sense of touch, we can tell that object A is not very flexible, it doesn't flex or give when I press it. Object B on the other hand, is pretty malleable, it squishes when I touch it. Eww.

So far we can make the guess that A is metal, but in science the more evidence the better, because malleability, or the ability to change shape, is actually a property of some softer metals. So we need more data. Let's bring in our trusty magnet! As you can probably see (because I can't) object A seems to be attracted to the magnet, while B isn't. So, object A has the properties of being hard and being attracted to the magnet, so we're going to guess that it's the metal.

And we're right! Object A is a big ol' nail and object B is... hey! My gummy frog!

[Text: Conclusion]

So, substances and elements have specific properties, and because of this we can use properties like hardness, malleability, or magnetism to tell something about, or even to identify unknown substances; it doesn't matter if it's candy or handy hardware. And I'm out of gummy frogs. [sad piano music]

[endscreen]