Wood, Water, and Properties: Crash Course Kids #15.1

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

===== Introduction=====

Quick! Think of three words you'd use to describe yourself. I'll wait.

(intro music)

So, what did you think of? You probably came up with a few things about yourself, or traits that make up who you are. Like, maybe you have black hair, you're smart, you're good at tae kwon do, you wear glasses, you're an amazing artist. Well, you're not the only thing on Earth that has descriptive traits. When it comes to matter, we call these traits properties.

What are some of the properties of matter?

===== Big Question =====

(music)

Some properties have to do with what form, or state, matter is in. You already know that most matter is in the form of a solid, a liquid, or a gas. But the state that matter's in often has to do with other things, like temperature. For example, the water that you use to keep a plant healthy and happy is liquid at room temperature, but, and this is really key, all matter can change states. That is, it can turn from a solid to a liquid to a gas, and the temperatures at which matter changes from one state to another state are unique to that kind of matter. So, they're considered one of its properties.

For example, if you put a bottle of water in the freezer overnight, the next morning you're going to have a really hard time getting a drink out of it. That's because the water reached its freezing point, the temperature at which a liquid becomes a solid. Water's freezing point is zero degrees Celsius, but if we take that bottle with the ice in it and leave it out a few hours in the sun, it's going to warm up above its melting point, the temperature at which a solid turns into a liquid. And, you've guessed it, there's also a temperature at which a liquid turns into a gas. That's called its boiling point. Liquid water turns into a gas at about one hundred degrees Celsius.

If you've ever shone a light onto a mirror, or seen a bright, shiny car or bicycle on a sunny day, then you're already aware that some matter causes light to bounce back at an angle away from the object. We call this property reflectivity. That's the measure of how much a certain type of matter reflects or bounces back light. Things like metal and glass have high reflectivity, but other things, like cloth, don't cause light to bounce back in the same way. These have less reflectivity.

And not all kinds of matter reflect back most of the light that hits it. Windows and other objects made of glass have high transparency, which means a lot of light passes through them. And here's a pro-tip for you: types of matter like bricks and stones have really low transparency, so they make terrible windows.

Now, let's explore different properties by comparing two types of matter: water and wood, otherwise known as these toy blocks.

===== Investigation =====

(music, bouncing sounds)

First, by just looking at the two, you can see at room temperature water is a liquid and wood is solid. They are in two different states of matter at the same temperature.

Now let's see what they each do when light hits them. If you take a cup of water and put it by a sunny window, you'll see that light is reflected off the top of the water. And I bet you've seen this outside too, if you've ever gone to a lake or a river, or maybe on a trip to the beach on a sunny day. You've seen the bright sunlight bouncing off the water's surface. So it's safe to say that water has the property of reflectivity.

How about the wooden blocks? If you put them by a source of bright light, they don't make the same shining glare that water does, so we can say that wood is less reflective than water.

What about transparency? If you shine a light through a glass of water, it comes out the other side. That's because the water, like the glass that it's in, is transparent.

Try to shine a light through a wooden block. Not so much.

===== Conclusion =====

(music)

So, all matter has properties - characteristics that we can use to describe them. Some of these properties have to do with when matter changes into different states, like its freezing point and boiling point, and some have to do with light, like reflectivity and transparency. Taking advantage of my very transparent windows, I can see it's a beautiful day. So I'm outta here.

(Outro music)