

## What Is It?

Imagine that you are sitting in science class when your teacher sets something down in front of you. You have no idea what it is. Your teacher tells you to try to identify the mystery object. What do you do? Where do you even begin? How can you tell what something is when it is unknown to you?

You probably already know that you shouldn't touch any unknown substance until you have determined it's safe to do so. Assuming that the object is safe to touch, what's the next step?

Observation is the key to identifying unknown substances. When we use our senses, we can make very detailed observations about things. We can use those observations to characterize the unknown until it becomes known. A **characteristic** is any feature that a particular substance always has. It doesn't matter if you have a tiny sample or a large piece of matter. The characteristics of that particular matter will remain unchanged. Understanding the characteristics of matter can help us identify unknown substances.

We are always characterizing the world around us in our minds. Putting things into groups is natural for humans. It helps us remember what things are, and it keeps things in order. If your teacher sets an unknown substance down in front of you, chances are you'll start characterizing it without even thinking about it.

There are several characteristics that can help us identify different types of matter. Remember that the size or shape of the substance is not a characteristic. We must use other observations or measurements. There are two keys ways to do this. One is by studying the physical properties of the substance. The other is to observe the chemical properties of the substance. Let's take a closer look at physical and chemical properties of matter.



How can you identify an unknown substance?

## **Physical Properties of Matter**

As you start to puzzle out the unknown substance in front of you, the first things you're likely to notice are physical properties. That's because we can see or feel many of these properties right away. Physical properties of matter include color, odor, and density. Another physical property is boiling point, which is the temperature at which a substance will boil. We can observe a substance's physical properties without changing the substance.



Boiling point is a physical property.

## **Chemical Properties of Matter**

Any time a substance is chemically altered or changed, we can observe its chemical properties. Often, to observe chemical properties, we must change the substance into a new one. Chemical properties include pH level, which tells us if the substance is an acid or a base. Another chemical property is combustibility. A material that is combustible will catch fire and burn easily. One more chemical property is reactivity, or the tendency of a substance to react with other substances to form new substances.

Now that you have an overview of characteristics of matter, you should have a better idea of what to do if your teacher asks you to identify something unknown. You may not be able to identify it exactly yet. That's okay! However, you should be able to understand some of its properties. Knowing more about the characteristics of matter is key to the process.