Water Sensor

Hello, everyone in this lesson I will be going over conduction and what it means to conduct electricity, I also want to introduce to you a simple way to create a water sensor that works very well with nothing but a cup, some water, the BE BOARD, and couple of paperclip chains, so let's get started.

First I want to explain in some detail what conduction is, first off we need to know what an atom is and to be even more specific what an electron is as it is what give conductive material it's property of conduction. Atoms make up everything all matter has atoms, as the saying goes, they are very small and it takes a very powerful microscope to see them, and then there are the subatomic particals these are what make the atom; the electron is one of these subatomic particles and is the main subatomic partical that we will discuss. First it is important to note that current flows in a negative to positive flow this is called electron flow. What is normally showcased is a flow called Conventional Flow which flows from positive to negative, we learned about current in the first couple of lessons, but it is important to reiterate it here. Now back to conduction, materials are conductive when they have "loose" electrons that is to say the outer ring of the atom has a free electron when a voltage is applied these electrons move to the positive terminal; in the potato example the electrons would move towards the penny.

Now that we have a bit more information about conduction we can create a water sensor that will detect when a cup of water is full.

Let's see what we need to complete this lesson:

first we need several paperclips without insulation.

the BE BOARD

a cup

some water

Now that we have everything together we can start this project:

First we need to put together some paperclip chains that we will attach to the paper or plastic cup

<video>

Next take one of those paperclip chains and attach it to the GND on the BE BOARD.

<Video>

Take the other Paperclip chain and connect it to Digital pin 4 of the BE BOARD, but make sure it does not touch the other paperclip as this will be a short which we do not want.

<Video>

That is it for hardware. Next we need to talk about the software so open the Arduino IDE on your desktop, and we will begin to code.

We are going to use the paperclip chains as the switch, when water is touching both of the paperclips we should see a short and the Digital Pin 4 will go low as we are going to need to use the internal pull-up resistor on digital pin 4.

<Video opening Arduino IDE and going over the code in detail>

Once you have uploaded your code to your BE BOARD you can open the serial monitor in the Arduino IDE.

You will notice that "No Water Present" will be displaying if we want "Water Present" to display all we need to do is add water to the cup until the paperclips are submerged.

<Video Make \*\*Speacial Note: make sure to emphasize that the user should be carful with the water as it will damage the BE BOARD if water gets on it\*\*>

You should see "Water Present" in the Serial Monitor now.

If you take some water out you should see "No Water Present" when the water level is below the paperclips.

Thank you for joining me in this lesson please join me for part 2 of this lesson when we explore resistance in depth and create our own potentiometer.