Vacuum In A Bottle

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Parts:

1	Water bottle
3	Popsicle Sticks
1	Hobby motor
2	Wires
1	Green scrub sponge or plastic or cardboard
2	Batteries c or d

Extra Tools:

Hot glue gun
Utility knife
Power drill

People don't really think of vacuums as an empty space; our vacuum suctions on small particles like dust as well as foil or paper ext. A vacuum even the one you are about to make just creates an area of high and low pressure inside the bottle. The high pressure is the air that is moving at a faster rate in and out the bottle same as a household vacuum. The earth is full of air, when the air starts to move at a high velocity more air has to fill that space back up, the rate it refills that same space is not the same. Since its not the same rate it creates an empty space. The low pressure air caries other material in its path as it replace the air that is moving faster. Once the low pressure air hits the impellor it turns into high pressured air causes the impellor through it a high velocity, tuning into high pressure air. The faster it is moving the more force it has and the greater the empty space there is. The vacuum is a great project because it allows us to see air pressure changes in ways that are not normally easy to see. Air is invisible to the human eye under normal circumstances but if you see closely at the material being sucked in. You can see the path the wind is taking and changing speeds. With our vacuum we are easily able to see how low and high pressure regions naturally stability in a much bigger environment.

Our vacuum is a great display of changing air pressures. Another good example of this is the wind. An example of this is when it is really hot the lower you are to the ground the cooler it is. When air is heated it raises to the top course of the particles expanding causing a high pressure. The colder it is the lower the pressure since the particles are closer together making air more dence creating a low pressure.

example of a vacuum in everyday life is an incandescent light bulb. The metal filament is able to last longer because it is in a vacuum with no air pressure.

Concepts:

1. The main force that powers any vacuum is difference in air pressure
2. When air particles are driven forward the density of particles increases in front of the fan and decreases behind the fan.
3. Air pressure is a real force but it can be hard to see.

Questions:

1. What happens if you reverse the direction the motor spins by changing the wires? Will it still vacuum?
2. Can your vacuum pick up pebbles?

3. If you used a two liter bottle instead of a Gatorade bottle what do you predict would happen?
4. Do more batteries make your vacuum more effective?