Build a Sail Car!

Background
Today, most cars still run on gasoline. Gasoline is a fossil fuel that is a nonrenewable source, or a source of energy that will run out once we use it up. Thus, engineers are trying to find another source of energy to power cars.

One renewable source of energy is wind energy. How does wind have energy? Recall that energy gives something the ability to move an object from one place to another or simply put “do something.” Wind is made up of tiny particles or “balls” that move and when they hit an object, it transfers some energy and causes the object to move. Thus wind has energy since it can move an object.

Engineers have tried to create wind-powered cars. A sail car is an example of a wind-powered car because it harnesses or uses wind energy to move. In this experiment, you will create your very own sail car and see for yourself how good it is and determine whether or not sail cars are the cars of the future!

Materials
- 1 box
- 4 Styrofoam balls
- 2 wooden skewers
- Play-doh
- Tape
- Paper (or any other substitute material for the sail like plastic wrap or fabric)
- Straw or stick
- Wind (from nature or a fan)

Experiment
Goal: Build the fastest sail car!
1. Tape one side of the box closed. Then poke 4 holes for the axes of the car. Two holes should be poked on two opposite sides of the boxes. It is recommended that two holes are in the front and two are in the back. Slide the skewers into the four holes. Attach four
Styrofoam balls to the skewers. Make sure that your wheels spin when the car is rolled on the ground. You should now have a normal car ready.

2. Next, you will make a mast for your car. Use a straw, a stick, or a skewer for the mast of your car. Use play-doh and tape to hole the mast in place.

3. Next, design your sail. Think about designs you have seen on sailboats or create an entirely new and unique sail. Your sail can be made out of paper, plastic wrap, fabric, or any other material you like. Decide what kind of sail you would like to make and attach it onto your mast with tape.

4. Now you have a sail car ready to test. If you have a fan at home, you can turn it on and place your sail car in front of it to see how fast it goes. You can also use wind from nature. Bring your sail car outside on a windy day and watch it go automatically.

5. After testing your sail car, think of ways you can make your sail car better. What can you do with the sail to make it go faster in the wind? Try increasing or decreasing the sail of the wind. Try using a different material for the sail. Try adjust the angle the wind hits the sail.

**Engineering Connection**

Engineers build solutions to problems, but when they have a solution, they continue to redesign and rebuild their solution to find an even better solution. In this experiment, you are the engineer! Once you have a sail car (the solution to the problem) and once you have tested it, try making it better. Continue to redesign the car so that it can go even faster in the wind. You can even build another sail car and race it with your first one to see which one is better.

**Reflection**

1. How fast does your sail car travel?
2. Why are we not using sail cars today instead of fuel powered cars?
3. What are some other ways to harness wind?