

# Investigatory project in physics

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## **Investigatory Project in Physics**

### **Balloon Powered Car**

When it comes to powering a race car, there are a ton of different options. Some cars are powered by gasoline, diesel, or other combustible fuels, or you can even power miniature race cars using a mousetrap! In the Balloon Powered Car, we'll show you how to build a racer that uses the power of air pressure to roll across a room.

### **Objectives:**

1. to create a balloon powered race car for maximum speed and distance
2. to incorporate Newton's Laws of Motion

### **Materials:**

- Foam core or corrugated cardboard
- Wooden barbecue skewers
- Regular cardboard
- Straws
- Tape
- Balloons
- Scissors
- Wire cutters

### **Procedure:**

1. Start off by cutting the chassis of your car. We don't condone the use of blow torches or saws during SickScienceexperiments, so you have to create the chassis using scissors and foam core (corrugated cardboard works great, too). Cut a 6x3 inch piece of your chosen material using the scissors.

2. A car is nothing without axles. Given the size of your car, wooden barbeque skewers will make perfect axles. Use wire cutters to snip two 4" pieces of skewer.
3. You need to mount the axles to your chassis in a way that allows the axles to turn freely. For mounts, cut two 3" sections of straw and use tape to fix the mounts to the front and back (3" sides) of your chassis.
4. Now that you have axle mounts, mount your axles! Slide the wooden skewers through the middle of the straws.
5. Axles are great, but humans invented the wheel for a reason. The wheel was invented for use on the Balloon Powered Car! Use scissors to cut four quarter-sized pieces of regular cardboard. If it helps, you can trace a quarter or circle of similar size to give yourself some guidelines.
6. Push the cardboard circles onto the skewers, one on each end of both skewers. Without needing lug nuts or a compression wrench, you've mounted your wheels.
7. Cut the mouth ring (the lip that you blow into) off of the balloon. This will allow for a better seal between the balloon and the exhaust pipe.
8. For the exhaust pipe, insert a straw approximately 1" into the balloon. Use tape to securely fasten the straw inside the balloon. The tighter the seal, the better your exhaust pipe is going to work, so make sure as little air as possible can escape.
9. Mount the exhaust pipe so that the point where the straw and balloon connect is about 1" from the end of your chassis. Taping it at this point

is your best bet. Secure the straw so that it points straight out from the chassis.

10. Inflate the balloon and pinch the straw to keep air inside the balloon. Place the racer on the ground and let it go!

### **Conclusion :**

The concept behind the Balloon Powered Car is pretty simple, but that doesn't make it any less impressive! When you blow up the balloon, set your racer down, and let it go, escaping air from the balloon rushes out of the straw causing propulsion.

The principle at work is Newton's Third Law of Motion, which states that for every action, there is an equal and opposite reaction. In the case of the Balloon Powered Car, the action is the air rushing from the straw. The reaction is the movement of the car! The moving Balloon Powered Car has kinetic energy, but even an object that isn't moving has energy. This energy is called potential energy. The potential energy of the car is in the elastic material of the balloon. As the balloon fills with air, it builds more potential energy. As the air flows from the balloon, it changes to kinetic energy. This is the conservation of energy.