

Air pressure Powered Race Cars

The Challenge:

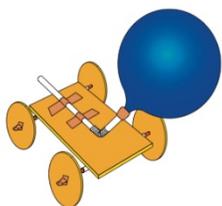
Fast cars are usually powered by gasoline, diesel, or other combustible fuels but can we power one with air?

Materials Needed:

15 cm x 7.5 cm pieces of foam core, Styrofoam or corrugated cardboard
Long wooden barbecue skewers
Regular cardboard
Bendable Straws, Tape, Balloons
Scissors, Wire cutters

Method:

1. Prepare the car base (chassis): If your piece of foam core, Styrofoam or corrugated cardboard is too big, use the scissors to cut it down to 15 cm x 7.5 cm.
2. Make the axles: Use the wire cutters to cut 2 – 10 cm pieces of skewer.
3. Mount the axles: Cut 2 – 7.5 cm pieces of straw and tape them to the bottom of your chassis at the front and the back so that they line up with the edge of the chassis. Make sure you tape them on straight! Now slide the wooden skewers through the middle of the straws.
4. Put on the wheels: Use scissors to cut 4 round wheels and push each one onto one end of both skewers.
5. Build the engine: Cut the mouth ring off of the balloon. Take a straw, insert 2.5 cm of it into the balloon and tape it securely to the balloon. Make sure the seal is tight so that very little air will escape.
6. Centre the exhaust pipe on the top side of the chassis so that the point where the straw and balloon connect is 2.5 cm from the back of your chassis and so that the straw points straight out from the chassis.
7. Blow into the straw to inflate the balloon then pinch the straw, place the car on the ground, let go of the straw and let it rip!



How does this work:

“For every action, there is an equal and opposite reaction.” This is Sir Isaac Newton's third law of motion and it can help us understand why these cars work. The “action” is the air coming out of the straw. This causes the car's reaction, which is racing forward. Every object has potential energy. For this race car, the potential energy is in the elasticity of the balloon. When you fill the balloon with air, the racer now has even more potential energy. What type of energy does the car

have when in motion? Kinetic energy. When the air is released from the balloon the potential energy is converted to kinetic energy and the car moves. This process is called conservation of energy.

Variations:

Use different sizes and types of wheels (lids, buttons, etc.). Does this change the distance your car travels?

Change the length or type of straw you are using for your exhaust. Does the car move any faster?

Will making the chassis longer or shorter, or from a lighter or heavier material affect the reliability of the car?