

OH WOW!

STEM Bottle Car



Standards :

3 . PS2 . 2 : Make observations and or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

MS . ETS1 .4 : Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from that object.

Objectives :

The student will be able to build a bottle car using provided materials.

The student will be able to identify what types of energy are being used.

Academic Language :

Force: A push or pull on an object

Friction: A force created by 2 surfaces moving across one another; can slow an object down

Motion: A change in position

Wind Energy: Renewable energy made from moving air

Kinetic energy: Energy in motion

Potential energy: Energy that is stored and ready to be used

Procedure :

1. Put the long end of a flexible straw into the balloon.
2. Use tape to attach the straw and balloon so no air can escape. This will be the **jet**.
3. Poke 2 holes into the sides of the bottle; make sure they are directly across from one another. Slide the straw through the holes to create the **first axle**. Repeat this step to create the **second axle**.
4. Slide a wooden skewer through each straw.
5. Cut a dry sponge into small pieces. Wedge a piece of the sponge into each bottle cap. Repeat this step to make a total of 4 **wheels**.

6. Attach the wheels by poking the wooden skewers into each sponge.
7. Poke a hole in the top and back of the bottle.
8. Push the **jet** into the bottle. The open end of the straw should poke out of the back; the balloon should be on the top of the bottle.
9. Power the **jet** by blowing up the balloon through the open end of the straw.
10. Cover the end of the straw so no air can escape. Place the bottle car on a smooth surface and release the straw.
11. Your bottle car will zoom!

Extension Activities :

1. Test your bottle car on different surfaces. Test your car on carpet, a table top, a smooth floor, on the sidewalk, or a counter top. When does it move the fastest? When does it move the slowest?

Talking Points :

- Before releasing the air from the balloon, the balloon is filled with potential energy because it is stored in the balloon
- When releasing the jet, the energy is converted to kinetic energy because the energy is in motion
- Wind energy plays a part in the movement of the bottle car because the air is pushing the car
- The friction between the wheels and surface gives off heat or thermal energy

Discussion Questions :

1. How did your bottle car move (straight line, curve, randomly)?
2. Did the bottle car stop suddenly or did it continue to move after the balloon deflated?
3. What kinds of energy were used to make the car move?

Additional Resources :

<https://www.sciencebuddies.org/teacher-resources/lesson-plans/balloon-car>
<https://www.teacherspayteachers.com/Product/STEM-Challenge-Bottle-Car-featuring-Newtons-3rd-Law-2370094>

