

STEM CHALLENGE



Balloon Racers Exploring Action and Reaction

OVERVIEW

Send a balloon traveling down a track to investigate Newton's Third Law of Motion which states for every action, there is an equal and opposite reaction. Challenge a friend to a race or test to see if the type of balloon impacts the speed of your racer. How far and how fast can you make your racer go?

BALLOON RACER MATERIALS

String
Balloons
Drinking Straw
Tape*
Scissors*
Binder Clip

* This item not provided in the kit

LET'S DO IT: BALLOON RACERS

1. Cut a piece of string that is at least 8 feet long and tape one end of the string securely to a wall.
2. Thread the free end of your string through your drinking straw.
3. Blow up your balloon and pinch the end closed with the binder clip.
4. Attach your balloon to the straw with tape. Be sure the opening of the inflated balloon is facing in the opposite direction of where the string is attached to the wall.
5. Pull the string tight and hold it so that it is parallel to the floor.
6. Position your balloon racer at the end of the string closest to your hand. What do you think will happen when you remove the binder clip?

7. Remove the clip and watch it go!

8. Attach another string to the wall and challenge a friend to a race.

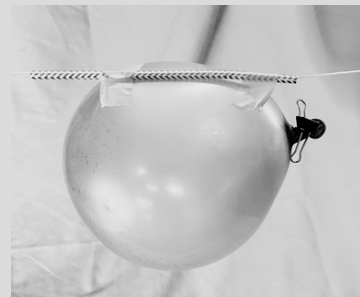
9. Try different shape and size balloons. Which ones work best?

WHAT'S THE SCIENCE?

When you released your balloon, what happened? What direction did the air go as it left your balloon? What direction did your balloon go?

When you released the clip, the air quickly escapes from your balloon. As the air rushed backwards out of your balloon, it pushed your balloon racer in the opposite direction with the same amount of force. You experienced Newton's Third Law of Motion at work...for every action (the air quickly escaping from the balloon), there is an equal and opposite reaction (it pushes the balloon in the opposite direction with the same amount of force).

Newton's Third Law of Motion is also at play when a rocket is launched. A rocket has an engine that produces thrust through action and reaction. The rocket engine produces hot exhaust gases that flow out of the back of the engine (like the air escaping from your balloon). In reaction, a thrusting force is produced in the opposite direction, allowing for liftoff.



Balloon Racers

Exploring Action and Reaction



CAREER PATHWAYS

If you like exploring force and motion, you could be a

- Mechanical Engineer
- Rail Engineer
- Vehicle Safety Technician
- Physicist

READING CONNECTIONS



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