

Activity Sheet: Action and Reaction (Newton's 3rd Law of Motion)

Name:

Instructions

Your goal is to work with your pit crew to design a car powered by the force of a balloon. You will practice identifying action and reaction forces by using the action force of the balloon to get the car to move. As an additional challenge, compete against your classmates to see who can get their balloon car to travel the farthest!

Step 1: Background knowledge

Define Newton's Third Law and come up with your own example.

Step 2: Form a hypothesis

Predict how a balloon-powered car will work. What are the action and reaction forces?

Step 3: Set Up Experiment

1. Each pit crew can only use a toy car, one balloon, straw, and tape. Using a track here is optional but encouraged to keep the car moving in a straight-line path.
1. Assemble your tracks and tape down your tape measure so it follows down the length of the track.
2. Cut a piece of straw into thirds and use one of those pieces to insert into the balloon.
3. Use enough tape to hold the balloon down so no air is escaping except through the straw. You will need to fold the hole-end of the balloon to make sure no air can escape. Test it out by blowing on the straw so that the balloon will blow up.

4. Use more tape to attach the balloon-straw mechanism to the top of the car, so that the balloon end is facing the front of the car and the straw end is facing the back of the car.

Step 4: Test

1. When you're ready, use the straw to blow up the balloon and place it on the starting point of the track, so that the front of the car is at 0".
2. Do this three times, writing down how far the car travels in centimeters for each trial. If one car design does not work well, you can revise the design and try again.

Step 5: Observations and Calculations

Use the table below to record your observations.

	Trial 1	Trial 2	Trial 3	Average
Distance Traveled				

Step 6: Conclusion

Draw a diagram of your balloon car set up, making sure to label and describe the action and reaction force.





Extension

Think of ways to upgrade your cars and see how you can get the car to travel the farthest. For example, use rubber bands as a catapult to apply more force or use different materials to make the car more dynamic.