

# Build a Hovercraft

## **REMEMBER BEFORE YOU START TO**

1. Label Laboratory Notebook with the title of experiment & date you perform it
2. Gather all your materials
3. Read the CAUTIONS
4. Read ALL Methods
5. Write **predictions** in your Laboratory Notebook
6. Wear your goggles, gloves, and lab coat

**GOAL:** Learn about the action-reaction of forces

### **Materials**

Glue gun  
Compact disc (CD)  
Pop-up top of a water bottle  
Balloons  
Toilet paper roll  
Scissors



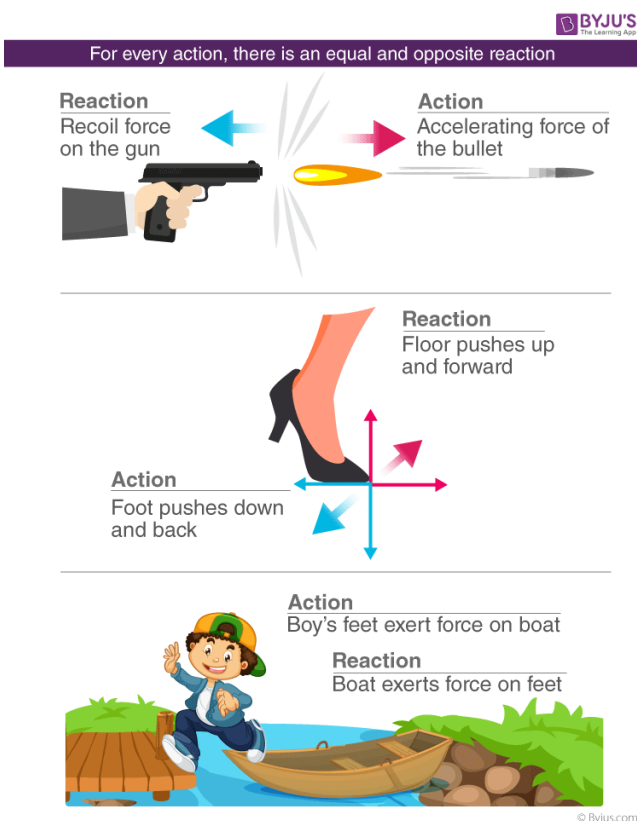
Scissors can be sharp! Get an adult to help

### **Methods**

1. Glue the pop top over the hole in the center of the CD.
2. Cut a toilet paper roll in half and cut a slit in one side. This will create a support for the balloon.
3. Close the pop top attached to the CD so that no air can get through it.
4. Blow up a balloon and secure it over the pop top.
5. Place your balloon support (toilet paper roll) on the CD, around the bottom of the balloon.
6. When you're ready, pull up the pop top to release air from the balloon. You may have to re-secure the support. **What do you think will happen when you open the pop top? Write your predictions in your Laboratory Notebook.**
7. Give your hovercraft a push. **Write down your observations in your Laboratory Notebook.**
8. Try the experiment again with more or less air in the balloon. **What do you think will happen with less air? What will happen with more air? Which will work best and why? Write down your predictions in your Laboratory Notebook.**

## What's Happening

- Sir Isaac Newton was a famous and influential scientist who studied motion and gravity. One of the laws he wrote, called Newton's Third Law, says that for every action, there is an equal and opposite reaction.
- Lots of forces are at work in this experiment. When you first open the pop top on your hovercraft, air rushes out in a downwards direction (action) pushing your balloon up in the opposite direction (reaction.) The CD is heavy though, and its weight keeps the balloon from shooting into the air.
- Once the pop top opens, a cushion of moving air is formed under the CD. This allows the hovercraft to stay slightly off the ground and move around freely, without rubbing on anything that might slow it down if you give it a push.



## Who Uses This in Real Life?

**Physicists** study **matter** and the **forces** (pushes or pulls) that act on it. (**Matter** is what makes up all physical objects). Mechanics deals with the effect of forces on objects and the motions of objects.



**Katherine Johnson** is an American physicist and mathematician. She made the calculations of orbital mechanics that enabled the first and subsequent manned U.S. spaceflights. Johnson was employed for 35 years at NASA, where she calculated the trajectories, launch windows and emergency return paths for the first American in space and the first American in orbit. Her calculations were also used for the Apollo lunar lander and the beginning of the Space Shuttle program. A pioneer for women and African-Americans in STEM, Johnson was awarded with the Presidential Medal of Freedom in 2015.