Age: 7+

N is for… Newton's Laws of Motion

There are three laws of motion by Newton.

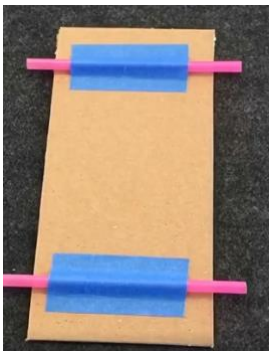
- Newton's 1st Law of Motion:
  - Law of inertia: An object at rest will remain in motion, unless it is acted by an unbalanced force. Example: A soccer ball will not move until someone kicks it
- Newton's 2nd Law of Motion:
  - Law of acceleration: The greater the mass of the object being accelerated, the greater amount of force needed to accelerate the object. It is produced when a force acts on the mass. Example: Greater force= Greater acceleration. Force=Mass X Acceleration
- Newton's 3rd Law of Motion:
  - Law of Action-Reaction: For every action, there is always an equal and opposite reaction. Example: Rocket Car Experiment (see below)

Materials needed:

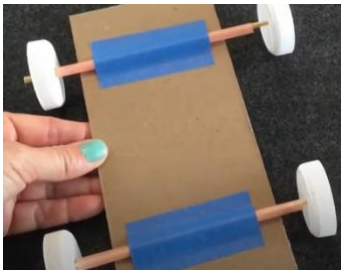
- 1 Balloon
- 4 water bottle caps
- Cardboard
- 2 skewers
- Tape
- 3 straws

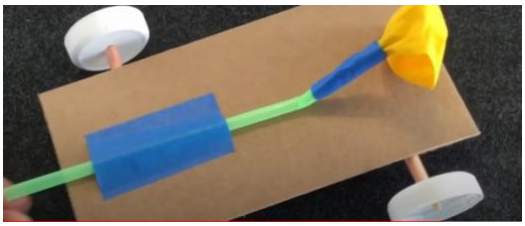
Instructions:

- Cut the cardboard piece into a rectangular shape
- Grab 2 of the straws and cut off about ¼ of each straw
- Tape the straws horizontally to the cardboard
- Use the skewers (or scissors * ask your parent to help you with this) to poke a hole in the center of all 4 bottle caps



- Slide the skewer through the straw and attach a bottle cap on each end. Repeat for the other straw
- Grab the last unused straw and a balloon and tape the end of the balloon around the straw. Try blow through the straw and watch as the balloon inflates
- Next, tape the straw-balloon piece to the base of the cardboard going vertically. Next, blow into the straw and watch as your rocket car moves
- **How does the rocket car show the law of Action-Reaction or Newton's 3rd law? Explain below:**





Job Exploration:

- **Physicist**: Physicists study the ways in which various forms of matter and energy interact. Physicists design and perform experiments with sophisticated equipment such as particle accelerators, electron microscopes, and lasers.
- **Aerospace engineer**: Aerospace engineers design aircraft, spacecrafts, satellites, and missiles with application of principles of physics. They also create and test their machinery to make sure if functions correctly and according to design.
- **Mechanical engineer:** A mechanical engineer designs and builds complex products, machines, and systems. They work with how things are made and how machines operate.

To learn more about this activity, please visit:
https://www.scienceworld.ca/resource/rocket-cars/