Grades 3–5
Journey Through the Universe
Balloon Hovercraft

What is friction? How does friction affect moving objects? How can we use it to power a small hovercraft?

What Will You Learn?
- How friction works
- How we use friction

Materials:
- Balloons
- CDs
- Sports bottle caps
- Model Magic modeling clay

Instructions:
1. On a flat surface, ensure the CD is facing white side up.
2. Roll out the clay to the size of a grape and place it over the CD hole. Smoosh the clay ball down, but not too flat.
3. Push the clay over the center CD hole, but do not push the clay too far that it reaches the other side of
the CD. Excess clay will block air flow.

4. Carefully place the bottle cap at the center of the clay, open side down, and press it down. The bottle cap should stick to the clay (note: not like a cookie cutter, but just sitting nicely in the clay).

5. Gently squeeze the clay around the bottom of the cap, making sure the bottom of the clay is touching the CD. Ensure the entire bottom half of the cap is wrapped around with the clay to make a nice seal so air does not escape. (Note: do not touch the cap or clay too much after it is wrapped.)

6. Tape around the bottle cap and clay to create an extra level of air tight seal.

7. Blow up one balloon to medium-large size and twist the end of the balloon twice.

8. Gripping the balloon, place the seal over the bottle cap tightly, to ensure no escape of air.

9. Hold the blue part of the bottle cap and lift the white nozzle up. Give the CD a little push and watch the hovercraft move around.

**Reflection Questions:**

- What makes the hovercraft float?
- Would this experiment work with an object that is a different shape from the CD? What if it were heavier? Why or why not?
- How do we use friction when we walk? How about sports?

**Explanation:**

- Friction is the force that opposes the movement between two objects. Friction is created when one object rubs against another. The rougher an object is, the more friction it produces. We utilize friction every day in order to walk, drive, or ride the train. Friction is helpful because it prevents items from slipping across each other and slows objects down.

- In the case of the balloon hovercraft, reducing friction is crucial for its smooth movement. The hovercraft achieves this by creating a thin layer of air between the CD and the ground (or any smooth surface). This layer of
air reduces the amount of friction between the CD and the ground, allowing the hovercraft to glide more easily.

Further Reading Recommendations:

How to Be an Engineer

It’s Tough to Lose Your Balloon

Wind Energy Projects

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