Balloon Rocket Science – Exploring Newton's Third Law of Motion

Florida State Standard: SC.6.P.13.3 – Investigate and explain that Newton's Third Law of Motion states that forces act in pairs and for every action, there is an equal and opposite reaction.
Florida State Benchmark: SC.6.P.13.3 – Investigate and explain that forces cause objects to move or change their motion.

Objective:
By the end of the experiment, students will demonstrate Newton's Third Law of Motion by conducting a balloon rocket experiment, observing the motion of the balloon, and explaining how action and reaction forces result in motion.

Materials:

- 1 balloon (any size)
- 1 long piece of string (3–5 meters)
- 1 plastic straw
- Tape (scotch or masking tape)
- 2 chairs (or other sturdy objects to tie the string to)
- Stopwatch (optional)
- Ruler or measuring tape (optional)

Safety Precautions:
This experiment involves the inflation of a balloon, which could burst if overinflated. Ensure that students handle the balloon gently. When setting up the experiment, students should avoid standing directly in front of the balloon during the release. The string should be securely fastened to stable objects (like chairs) to avoid accidents. Always supervise students while conducting the experiment to ensure safety.

Procedures:

1. **Set Up the String:** Tie one end of the string to the back of a chair and feed the straw onto the string. Tie the other end of the string to a second chair, ensuring the string is taut.
2. **Inflate the Balloon:** Inflate the balloon without tying it off. Hold the open end of the balloon shut.
3. **Attach the Balloon to the Straw:** Tape the inflated balloon to the straw, making sure the balloon is parallel to the string with the open end facing away from where it will travel.
4. **Launch the Rocket:** Release the balloon and observe how it moves along the string as air escapes.
5. **Record Observations:** Measure how far and how fast the balloon travels. If possible, use a stopwatch to measure the time and a ruler or tape to measure the distance.

Note: Clean-up
After completing the experiment, deflate any remaining balloons and dispose of them properly.

Unhook the string from the chairs and ensure the area is cleared of any tape or materials used in the experiment. Be sure to return all materials to their proper places.