DIY Rocket Racers

**TOPIC: AIR PRESSURE**

Rocket racers use air and air pressure to propel the balloons through your home while exploring unequal forces. Just like airplanes, rocket racers use thrust to move the racer forward. Have fun exploring Newton’s 3rd Law: equal and oppositeness reactions.

**MATERIALS:**
- String or yarn
- Plastic straw
- Balloon
- Tape

**DIFFICULTY:** 🍯

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What do you call a plane that flies backwards?

*Answer on the back*
**EXPERIMENT:**

Step 1: Gather your materials.
Step 2: Feed the straw onto the string and tie both ends of the string onto something.
Step 3: Blow up the balloon.
Step 4: Tape the balloon to the straw.
Step 5: Let go of the balloon!

**WHY IT WORKS:**

Newton's 3rd law states that for every action, there is an equal and opposite reaction. As you blow up the balloon, the air from your lungs pushes the balloon out in all directions. The air is now in an area of high pressure inside the balloon. When you let it go, the air wants to go where there is less pressure, so it rushes out of the balloon through the opening. Newton’s Law is observed when the air rushes out (action) and the balloon goes the opposite direction (reaction). Taping the balloon to a straw attached to a string, keeps the flight of the balloon controlled.

**EXTEND YOUR LEARNING:**

- What would happen if you used a long balloon instead of a round one?
- Would a different string affect the racer's flight?
- What happens if you loosen or tighten the string?
- Does the angle of the string affect the racer's flight?
- Does the placement of the balloon on the straw impact the flight of the balloon?

**WORKFORCE CONNECTION:**

Research scientists have to think about Newton's third law as they explore the physics of car crashes. They use very lifelike crash test dummies to experience the controlled crash-testing of cars. Researchers then share their data with engineers who work to make the cars safer for us to drive.

**FUN FACTS:**

When someone pops a balloon by piercing it, the hole starts to grow at almost the speed of sound in rubber which is faster than the speed of sound in air. This causes the boom sound that always makes you jump.

*Answer: A receding airline!*