



# Balloon Rocket

**Create a balloon rocket and see how far it goes.**

## What you need

- Balloons
- Balloon pump (optional)
- String/Fishing line
- Straws
- Tape
- Stands (2)
- Paper
- Scissors

## What to do

1. Tie the fishing line to one stand. Leave the other end of the line loosely hanging on the other stand.
2. Cut a two-inch piece off the straw, and then string it through the fishing wire.
3. Blow up a balloon and pinch the end. (Do not tie it.)
4. Tape the balloon to the straw with the balloon opening facing the opposite direction that you want the balloon to travel.
5. Either loosely tie or hold onto the other end of the line, then release the balloon to see how far it will travel. (How fast and far did the balloon travel?)

## Learn More Together

*Aerodynamics* is the science of how things move through air, including how things fly. Scientists who work in aerodynamics try to figure out how to improve planes, helicopters, rockets, and even cars!

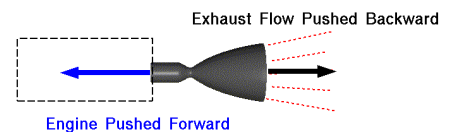
Our balloon rocket is propelled by a force called *thrust*. When you release the balloon, the air inside rushes out at high speeds. All that air pushing out the back of the balloon causes the forward thrust of the balloon. This movement depends on *Newton's Third Law of Motion* – For every action there is an equal and opposite reaction. In this case, the gas pushes against the balloon rocket and the balloon rocket pushes back just as hard against the gas. Real rockets work in a similar fashion, but the thrust is caused by the force of burning rocket fuel blasting from the rockets engine instead of just air being released. As the engines blast down, the rocket goes up! Experiment with the aerodynamics of your balloon by changing the volume of air in the balloon and observe the impact on its speed and distance traveled. Also, vary the path that the balloon needs to travel.



## Newton's Third Law



### Rocket Engine Thrust



*For every action, there is an equal and opposite re-action.*