

I want to lead a 4-H Rocketry Project

4-H Volunteers' Orientation, Lessons, and Training

Talking Points:

How does Newton's Laws of Motion relate to rockets?

Newton's First Law of Motion: Objects at rest tend to stay at rest unless acted on by an unbalanced force. Objects in motion tend to stay in motion in a straight line unless acted on by an unbalanced force.

Newton's Second Law of Motion: As force is increased, acceleration on increases. As mass is increased, acceleration on decreases. Therefore, force equals mass times acceleration. (force = mass x acceleration)

Newton's Third Law of Motion: For every action or force there is an equal, opposite and simultaneous reaction or force.



4-H VOLT

Willa L. Williams, Ed.D
4-H Regional Specialist, Taney Co
williamswl@missouri.edu

Different Types of Rockets

Many of us are familiar with the **model rockets**, such as Estes rockets, that are sold in hobby shops and craft stores. These are great kits but the downside is the cost can be prohibitive if you are teaching a group and want to have multiple launches.

Another option is to choose **water bottle rockets**. This would require a bottle rocket launcher and a bicycle pump. The advantage of these rockets is that every child can design and redesign their rocket after several launches with just the cost of the launch equipment. Similar to water rockets are **straw rockets** which use various types of straw launchers. There are other rocket projects such as fizz or Alka Seltzer™ rockets, balloon rockets, and stomp rockets that may also challenge your rocketry club.

Where should I start?

- 4-H has Aerospace curriculum books that can guide your project work.
- You can build your own launchers or you can purchase them. The Aquapod water bottle launcher is a low-cost and dependable water bottle launcher and you can build your own straw rocket launcher using these plans: <http://bit.ly/1WSzHI8>
- Advance water bottle rocket students can also build overhead launchers using these plans: <http://bit.ly/PQHEQx>
- Estes model rockets are the most popular model rockets on the market. To launch these rockets, you will need a launch pad, controller, rocket, starters, plugs, and recovery wadding. Each Estes rocket kit has a skill level category and that will determine the type of engine and other accessories needed for launches. You can start with a Skill Level E2X or 1 kit that has a launch pad included. Suggested engines, such as A8-3, are included on the side of the packages.
- Start with small launches and work your way up. Rocketry is all about knowing Newton's Laws of Motion. Once you have these laws down, you will be creative and successful in your launch designs.
- Attend a 4-H rocketry workshop or ask to have program for your group. The rocketry project is a great way to incorporate science, technology, engineering, and math (STEM) into your 4-H club.
- Many rocketry resources can be found on the Oklahoma 4-H website at <http://bit.ly/1R50PBs>

UNIVERSITY OF MISSOURI
U Extension



An equal opportunity/ADA institution