



# 4-H AEROSPACE AND ROCKETRY PROJECT



In this project, youth members will learn about aerospace foundations such as lift, drag, and other interactions from when an object interacts with air by exploring and building rockets. Aerospace and rocketry is a project that can turn anyone on to being a rocket scientist! Knowledge is gained through the construction and flight of model rockets powered by air, water, or solid fuel engines. Participants will be able to learn thorough experimentation.

- What properties of rocket design work and why some configurations work better.
- The safety considerations when dealing with the construction and launching of rockets.
- That science, engineering, and technology education can be a blast!

## 4-H THRIVE

### Help Youth:

#### Light Their Spark

A spark is something youth are passionate about; it really fires them up and gives them joy and energy. Help youth find what it is about aerospace and rocketry that excites them.

#### Flex Their Brain

The brain grows stronger when we try new things and master new skills. Encourage youth effort and persistence to help them reach higher levels of success.

#### Reach Their Goals

Help youth use the GPS system to achieve their goals.

**Goal Selection:** Choose one meaningful, realistic and demanding goal.

**Pursue Strategies:** Create a step-by-step plan to make daily choices that support your goal.

**Shift Gears:** Change strategies if you're having difficulties reaching your goal. Seek help from others. What are youth going to do when things get in their way?

#### Reflect

Ask project members how they can use their passion for this project to be more confident, competent and caring. Discuss ways they can use their skills to make a contribution in the community, improve their character or establish connections.

### Starting Out *Beginner*

- Learn how to construct and fly rockets that are powered by air or water
- Learn how to safely handle necessary tools for construction and flight.
- Learn how to build a solid engine rocket from a simple kit.
- Learn how fins reduce turbulence and help stabilize the rocket during flight.

### Learning More *Intermediate*

- Learn how to build advanced rocket kits.
- Learn the proper technique to pack a parachute and flame retardant cloth to prevent damage to the rocket.
- Learn how lift and drag affect the flight of the rocket and how to increase the efficiency
- Learn the process of safely preparing a rocket for launch.

### Exploring Depth *Advanced*

- Learn how to build a rocket without a kit from component materials.
- Learn how to calculate the obtained altitude of the rocket.
- Be able to teach others about aerospace and prepare presentations to assist.
- Expose others in the community to aerospace and rocketry with demonstrations.

The activities above are ideas to inspire further project development. This is not a complete list.



# Expand Your Experiences!

## Science, Engineering, and Technology

- Investigate the concept of aerodynamics and the science behind the flight of the rocket.
- Experiment with differing constructions of rockets to see how flight is affected.
- Use different types launching equipment to see how technology can provide the air/water pressure or electrical current to propel a rocket.

## Healthy Living

- Explore the outside landscape surrounding the launch pad for potential safety hazards.
- Make new friends while building and launching rockets with others.
- Race others to see who can retrieve the launched rocket first.
- Research the effects of high altitude on animals and plants.

## Citizenship

- Demonstrate the use of model rockets to other youth using skills learned in the project.
- Trace the history and contributions of nations to rocket development.
- Invite youth groups (scouts, high school rocketry clubs) to a "Rocket Jamboree" and share information and best practices.

## Leadership

- Teach less experienced members about aerospace and rocketry.
- Become a junior or teen leader.
- Start other Science, Engineering, and Technology projects within the county using Aerospace as a foundation.

## Resources

- National Association of Rocketry and 4-H Partnership—Participate in Team America Rocketry Challenge!  
[www.nar.org/2007/06/4h\\_and\\_nar\\_partnership\\_announc.php](http://www.nar.org/2007/06/4h_and_nar_partnership_announc.php)
- Rockets Away, Water Bottle Rockets  
[//estore.osu-extension.org/productdetails.cfm?PC=2413](http://estore.osu-extension.org/productdetails.cfm?PC=2413)
- Rockets Away, Solid Fuel Rockets  
[//estore.osu-extension.org/index.cfm](http://estore.osu-extension.org/index.cfm)
- Plane Anatomy  
[www.4-hdirectory.org/browse/browseItemDetails.aspx?itemID=%7B4C64E4B2-5F9A-45A0-8796-3842B66D5FCE%7D](http://www.4-hdirectory.org/browse/browseItemDetails.aspx?itemID=%7B4C64E4B2-5F9A-45A0-8796-3842B66D5FCE%7D)
- Balloon Rocket  
[www.4-hdirectory.org/browse/browseItemDetails.aspx?itemID=%7B78572C2-99D7-45E3-B9CB-8C57704788BE%7D](http://www.4-hdirectory.org/browse/browseItemDetails.aspx?itemID=%7B78572C2-99D7-45E3-B9CB-8C57704788BE%7D)
- Drinking Straw Rocket  
[www.4-hdirectory.org/browse/browseItemDetails.aspx?itemID=%7B7017CC6D-941C-4E78-8CE7-03809947EC5B%7D](http://www.4-hdirectory.org/browse/browseItemDetails.aspx?itemID=%7B7017CC6D-941C-4E78-8CE7-03809947EC5B%7D)

### Connections & Events

**Presentation Days** – Share what you've learned with others through a rocketry-related presentation.

**Field Days** – At these events, 4-H members may participate in a variety of contests related to their project area.

Contact your county 4-H office to determine additional opportunities available, such as a field day.

### Curriculum

- National 4-H curriculum - [www.4-hmall.org/Product/4-hcurriculum-aerospace/06881.aspx](http://www.4-hmall.org/Product/4-hcurriculum-aerospace/06881.aspx)
- Paper Helicopter - [www.4-hdirectory.org/browse/browseItemDetails.aspx?itemID=%7B04D36419-2F21-4C48-8629-77F8B2BDF5D9%7D](http://www.4-hdirectory.org/browse/browseItemDetails.aspx?itemID=%7B04D36419-2F21-4C48-8629-77F8B2BDF5D9%7D)
- Paper Airplanes - [www.4-hdirectory.org/browse/browseItemDetails.aspx?itemID=%7B587582A6-3F54-422E-9A7E-8BDC0F1EA61B%7D](http://www.4-hdirectory.org/browse/browseItemDetails.aspx?itemID=%7B587582A6-3F54-422E-9A7E-8BDC0F1EA61B%7D)

### 4-H Record Book

4-H Record Books give members an opportunity to record events and reflect on their experiences. For each project, members document their personal experiences, learning and development.

4-H Record Books also teach members record management skills and encourage them to set goals and develop a plan to meet those goals.

To access the 4-H Record Book online, visit [www.ca4h.org/4hbook](http://www.ca4h.org/4hbook).

The UC 4-H Youth Development Program does not endorse, warrant, or otherwise take responsibility for the contents of unofficial sites.

