

Member Project Guide

Project Background

This beginning level project is designed for 5th-12th grade members. Younger members may take this project only under the direct supervision of an adult. This project explores the basics of rocketry through a variety of hands-on experiments. Members are also encouraged to apply what they learned through the design, construction, and launching of rockets.

A 4-H 2-Liter Bottle Rocket Launch Kit may be available from your county Extension office. This type of kit typically includes a 2-liter bottle launcher and a stopwatch for determining altitude and velocity. For information on purchasing your own launcher, visit our web site at: <http://www.ag.ohio-state.edu/~rockets/>

In addition to the launcher, members need to have access to a tire pump or compressor, pressure gauge, duct tape, Exacto-type knife, calculator, and a 2-liter plastic soft drink bottle.

Check your county project guidelines for additional requirements for taking this project, especially if you choose to participate in county project judging or prepare an exhibit for the fair. Members who complete this project are encouraged to take a self-determined project in rocketry.

Project Guidelines

1. Complete the Planning Section of this guide (steps 1-4).
2. Explore each of the three Interest Areas.
3. Complete all activities within each Interest Area. Going Beyond and Digging Deeper Activities are optional.
4. Take part in at least two Organized Project Activities.
5. Become involved in at least two Citizenship/Leadership Activities.
6. Members are required to build and launch a 2-liter bottle rocket.

$$H=16(t/2)^2$$

Planning Your Project

STEPS 1 and 2: Interest Areas and Activities

Explore each of the three Interest Areas listed below. As you begin to explore an Interest Area, place the current date (month/year) next to it. Plan to complete all activities in each Interest Area selected. Digging Deeper and Going Beyond Activities are optional. Have your parent or advisor initial and date what you complete.

Date
Started
(mo/yr)

Interest Areas

- _____ I. Rockets and How They Move, pages 6-10
 - Experiment 1—Testing Gravity
 - Experiment 2—Let's Get Lifting
 - Experiment 3—Bouncing Things
 - Experiment 4—Kicking Into Action
 - Digging Deeper—Coming and Going
 - Going Beyond—Build Your Own Hero Engine

- _____ II. Moving Questions About Rockets, pages 11-16
 - Experiment 5—Try a Little Lift
 - Experiment 6—Action/Reaction
 - Experiment 7—Add a Nozzle
 - Digging Deeper—Nozzles in Everyday Use
 - Experiment 8—Add a Stick
 - Experiment 9—Add a Fin
 - Experiment 10—Testing Turbulence
 - Experiment 11—Broom Launch

- _____ III. Let's Get Launching, pages 17-24
 - Problem 1—Center of Pressure Too Close to the Center of Gravity
 - Problem 2—Too Much Resistance to Wind
 - Problem 3—Measuring the Altitude and Velocity of Your Rocket
 - Digging Deeper
 - Problem 4—Decrease Weight of Rocket Without Compromising Stability
 - Problem 5—Improving Your Rocket's Design
 - Going Beyond—Rocket Staging

