



# Illinois 4-H | Spark Ideas. Ignite Possibilities.

Imagine shooting a rocket off into space! In this project you will become an aerospace engineer as you design and create your own rocket and then watch it launch into the clear blue sky.



## Exploring 4-H Aerospace

### Spark Activity: Straw and Balloon Rocket

Gather your supplies for blast-off! It's fun to complete this experiment with a friend or family member to compare your results. Each person will need: 2 flexible drinking straws, cellophane tape, 3" square piece of paper, 1 balloon, scissors, ruler.

	Observation	What Happened and Why	Partner - What Happened and Why
1			
2			
3			
4			
5			

1. Inflate a balloon. Let it go. Record Experiment #1 Observation.
2. Cut the rim off the balloon. Cut 1" piece off one of the straws, just below the bend. Insert it into the balloon opening and tape securely to the unbendable, 1" cut piece of straw. Inflate the balloon with the straw piece. Let it go. Record Experiment #2 Observation.
3. Take the remaining piece of straw and insert its end into the non-bendable end of another plastic straw. Tape the 1" straw with balloon alongside the bendable end of the long attached straw. Inflate the balloon. Let it go. Record Experiment #3 Observation.
4. Fold and cut the 3" square paper in half diagonally. Tape the pieces to the end of the straw opposite the balloon to make fins. Inflate the balloon rocket. Let it go. Record Experiment #4 Observation.
5. Experiment with the balloon rocket until you can control its direction of flight. Record Experiment #5 Observations.

\*Include how far each object flies as part of your observation.

## 4-H Project Levels and Goals

### Beginner

- Develop basic skills in science, technology, and engineering
- Build a straw and balloon rocket
- Build two different types of paper airplanes
- Build and fly a kite
- Learn how weather affects flying conditions
- Assemble and launch a skill level 1 rocket kit

### Intermediate

- Apply basic skills in science, technology and engineering
- Assemble and launch a skill level 2 model rocket kit
- Learn the forces that act upon a rocket and experiment with roll, pitch, and yaw
- Construct and launch a water rocket

### Advanced

- Construct / use an altitude tracker
- Measure height with electronic altimeter
- Compare altitude tracker values to electronic meter
- Build a launch system
- Assemble and launch a skill level 3 model rocket kit
- Build and launch a rocket from your own design

## Put Your Project Into Action

### Show Your Skills

- Build a model rocket from a kit
- Build a model rocket from your own design
- Create a display of aviation principles
- Create a poster on specific types of planes, knowledge of how planes work
- Create a poster on how weather affects flying

### Service and Leadership

- Organize a field day rocket launch to teach others about the aerospace project
- Volunteer at the local airport during an airshow or other events they may sponsor
- Lead a Cloverbud rocket workshop
- Assist or lead a beginner level rocket workshop.
- Be a mentor to a younger member learning about the aerospace project

### Entrepreneurship

- Build and sell rockets
- Teach classes on building model rockets

### Technology Connection

- Computer programs - design and flight predictions
- Electronics – creating a launch system
- Attach a video camera to a rocket - record results

### Connecting with a Mentor

- High school science teachers
- High School physics students familiar with rocketry
- Science departments at local colleges
- Talk with your local television station meteorologist, National Weather Service, etc.

### Events

- 4-H project workshops / online training webinars
- Attend a 4-H rocket launch
- Attend a science fair
- Check with local universities for atmospheric science, astrophysics, and engineering symposiums



### Careers for People Interested in Aerospace

Engineer  
Scientist  
Physicist

Pilot  
Aircraft Technician

## Start a Conversation

What are some ways the weather can affect the flight of planes, kites, rockets, etc.?

What are the different parts of a rocket?

## Want to learn more?

[go.illinois.edu/4Haerospace](http://go.illinois.edu/4Haerospace)

## Explore more at Illinois 4-H!

[4-H.extension.illinois.edu](http://4-H.extension.illinois.edu)



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**Credits:** North Dakota State University Extension 4-H project sheet | University of Florida Extension 4-H project sheet | “Rippin Rockets” - Wisconsin Extension 4-H | National 4-H curriculum - “Pre-Flight,” “Lift-Off,” “Reaching New Heights,” “Pilot in Command,” “Flight Crew Helper’s Guide” | 4-H Spark Sheets are a collaborative effort of 4-H staff, volunteers, alumni, and teens from across Illinois. A big thanks to the many contributors and reviewers!