



Lift- Off



Stage
2

Aerospace Activity Guide

Name _____

County _____

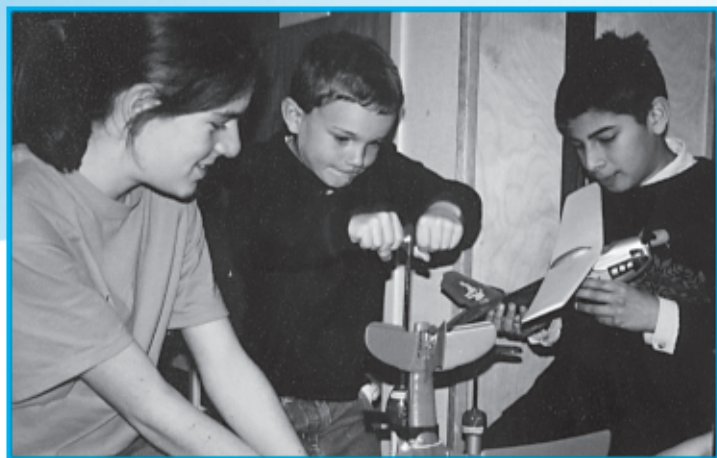


REVIEWED & RECOMMENDED
National 4-H Curriculum

Note to the Project Helper

Congratulations, you have an exciting and challenging role as the helper of a young person interested in exploring the activities in Lift Off. Not only will you be providing encouragement and recognition, you will also be the key person with whom the young person shares each of the experiences outlined in each of the Aerospace Adventures activity guide.

By encouraging young people to set goals and work to complete them, there will be many opportunities to help them develop important life skills they will use each day. These skills include creative thinking, decision making, problem solving, accepting responsibility, managing time and participating as a member of a team. How you are involved will often determine how successful the youth is in developing these critical skills.

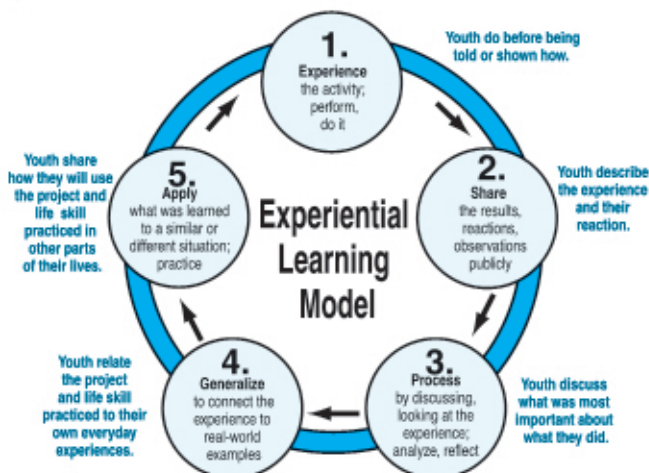


The Aerospace Adventures Series

A total of five pieces are included in this series. The first four activity guides, *Pre-Flight*, *Lift-Off*, *Reaching New Heights* and *Pilot in Command* have been designed to be developmentally appropriate for grades 1-2, 3-5, 6-8 and 9-12 respectively but may be used by youth in any grade based on their project skills and expertise. The fifth piece *Flight Crew* has been designed to provide group activities that can be organized very quickly and conducted with a group of usually three to fifteen youth.

The Experiential Learning Model

The experiential learning model is used throughout this series to maximize the opportunities for both youth development and aerospace related outcomes. A complete description of the model is shown in the Flight Crew Helper's Guide.



Pfeiffer, J.W., & Jones, J.E., "Reference Guide to Handbooks and Annuals" © 1983 John Wiley & Sons, Inc. Reprinted with permission of John Wiley & Sons, Inc.

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Launch Pad

Stage 2 Lift-Off

Introduction

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For more on Aerospace,
look for these other
guides in this set.

Stage 1 Pre-Flight

5...4...3...2...1...
Wonderful Wings
What Do You Do?
Space Buggy

Stage 2 Lift-Off

Rockets Away!
Gnome of Your Own
I Want to Be...
Airfoil Magic
From Here to There!
Follow That Shadow
Can I Fly Today?
Which Way Is Up?
Angle of Attack!
Up, Up and Away
Round and Round
Charlie Oscar Delta Echo
From Nose to Tail

Stage 3 Reaching New Heights

Rippin' Rockets
Fly'n Show
Let's Go Launching
Attitudes, Altitudes and Airspeed
Rudder Away
Follow That Shadow
Flying My Way
Star Gazing
Powerful Payload
Flying Fighters
Mustangs to Zeros
Copters and Robbers
Just Blowing Through

Stage 4 Pilot in Command

Versatile Viking
Altitude Advisors
Future Pilot
Ace Instructor
Cross Country
Knowledgeable
Navigators
Astronaut Aerobics
Brouhaha Box Kite
Care in the Air
Elevator Magic
Circle of Power
My Personal Qualities

Flight Crew Helper's Guide

Aerospace Quiz Bowl
Aircraft Fire Rescue
Afterburner
Top Gun
Far Out!
Community Airport Field Day
Flight 777
Aerospace Experts
Traffic Cop in the Sky
Space Station Skillathon
Aerospace Alphabets Games
Touring An Airport
Full of Hot Air

Getting Started

Ready to lift off?

Whether you have just started exploring aerospace or already know all about rockets, hot air balloons, airplanes and kites you'll enjoy the activities in *Lift-Off*. Get ready to file your flight plan, select your aerospace helper and complete the *Lift-Off* Achievement Program. Enjoy the flight!

Stage 2 Lift-Off Guidelines

1. File your Flight Plan and record your progress.
2. Complete at least seven activities in your Lift-Off Achievement Program each year and at least 20 activities in three years.
3. Discuss each experience with your aerospace helper.
4. Have fun.

Developing Your Skills

This is your own guide to exploring aerospace and developing important skills that will help you throughout your life. As you do the activities you'll be practicing the types of skills employers consider essential to success. These include communication skills, creative thinking, decision making, problem solving, accepting responsibility, managing time, money and human resources, working with diversity, teaching others and participating as a member of a team. Do you know how skilled you are at each of these? The activities will help you build your skill level in each of these important areas.

Your Project Helper

Your project helper is an important part of your overall experience in the aerospace project. The choice of a helper is yours. This person may be your project leader or advisor, troop leader, teacher, family member, neighbor, friend or anyone who has the interest to work with you to complete the Lift-Off Achievement Program. Involve your helper as you set your goals, discuss the Debriefing questions found in each activity and sometimes work together on an activity.

Write the name and phone number of your aerospace helper here:

Helper's name: _____

Phone number: _____



Flight Plan

Stage 2 Lift-Off

Destination Log

Name _____

My most important aerospace project goals:

Year _____

Year _____

Year _____

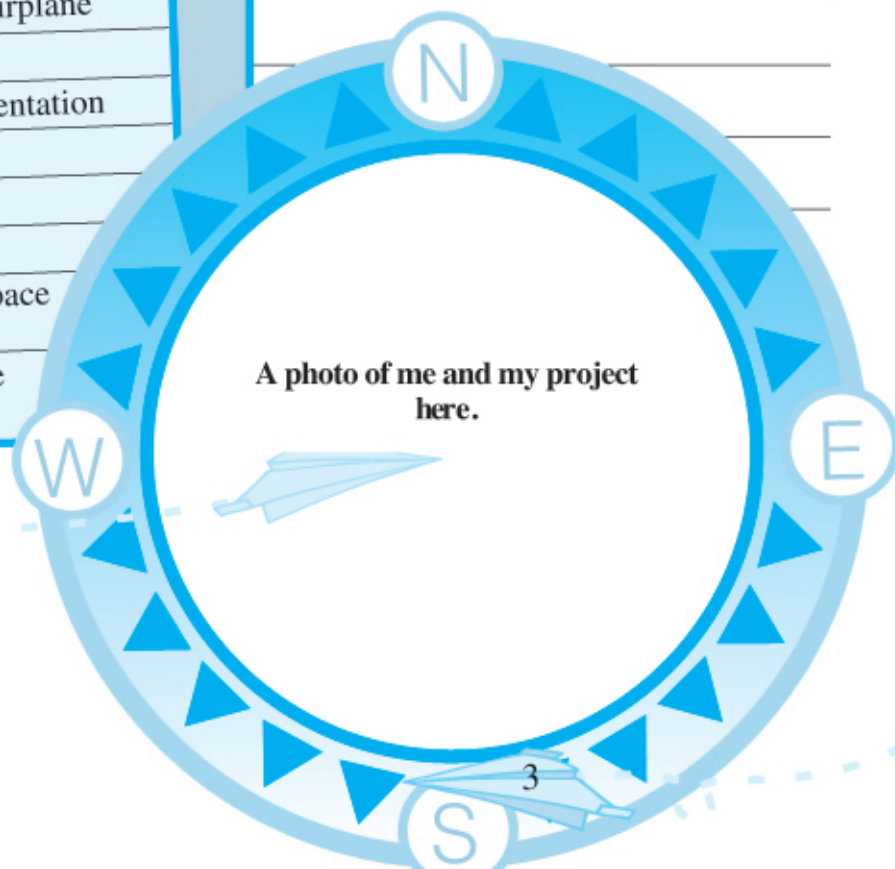
Aerospace Activity Log

Date and list the exciting things you do and learn in the aerospace project.

Learning Experiences

Do a minimum of three each year. Record the date you complete each one.

Year	Year	Year	Activity
			Build a rocket
			Build and fly a model airplane
			Interview a pilot
			Give an aerospace presentation
			Visit an airport
			Exhibit at a fair
			Fly in a real airplane
			Participate in an aerospace skillathon
			Belong to an aerospace club or group



Achievement Program

Stage 2 Lift-Off

To Complete:

1. Do a minimum of ten required and/or optional activities each year
2. Complete at least 20 total activities to pass the Lift-Off Achievement Program
3. Have your project helper date and initial each activity when completed

Required Activities

Complete at least 10 of the 12 activities

Rockets Away!

Date _____ Initial _____

Gnome of Your Own

Date _____ Initial _____

I Want To Be

Date_____Initial_____

Airfoil Magic

Date_____Initials_____

From Here to There!

Date _____ Initial _____

Follow That Shadow!

Date _____ Initi

Can I Fly Today?

Date_____Initi_____

Which Way is Up?

Date _____ Init _____

Angle of Attack

Date _____ Init _____

Up, Up and Away

Date_____Ini_____

Round and Round

Date_____In_____

Charlie, Oscar, Delta, Echo

Date _____ In _____

Solo Flight

Optional Activities

Select and do any of the Solo Flight activities in this guide.

[illegible]

Write your own activity

1.

Date	Initial
------	---------

2.

Date	Initial
------	---------

3.

Date	Initial
------	---------



Lift-Off

Completion Certificate

I certify that

has completed all requirements of the
Lift-Off Achievement Program in the
Aerospace Adventures Series.

Helper's signature _____

Date _____

A picture of me and
my project.



Rockets Away!

As easy as 1, 2, 3 you can make your very own rocket that goes as high as you can blow. In this activity you will make your own drinking straw rocket, discover rocket parts and their purpose, compare your rocket to a model rocket and teach a friend the parts of a model rocket. Building a straw rocket will also help you prepare to build a model rocket kit.

Blast Off

Work with a friend to make your rocket.

1. First cut the labels in half to make four 1" x 1 1/4" labels.

2. Then wrap one label around the end of the large milk shake straw; seal completely to form a nose cone shape.

3. Attach both ends of each of the remaining labels to the bottom of the straw that has the nose cone. Stick the adhesive together and crease to make three fins.

4. Put the drinking straw inside the large milk shake straw. Countdown, "10...9...8..." Aim straight into the air, blow and gently blast-off!

5. Now that you and your friend have made a rocket, teach another friend how to make a similar rocket. Try to teach in a way that lets your "student" learn by doing before being told or shown how.

Life Skills:

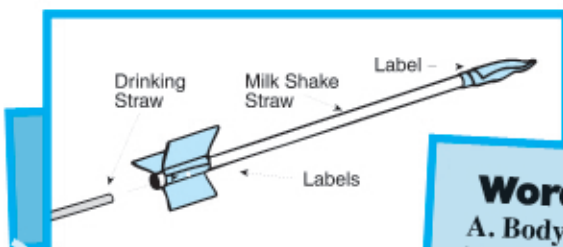
Teaches others coaches to apply related concepts
Building a straw rocket
Building models
Make a drinking straw rocket.

Aerospace Skill:

Science Skill:

What To Do:

Materials: two 1" x 2 1/2" adhesive address labels, drinking straw—regular size, milk shake straw—slightly larger than a pencil
NOTE: Drinking straw must fit just inside the milk shake straw

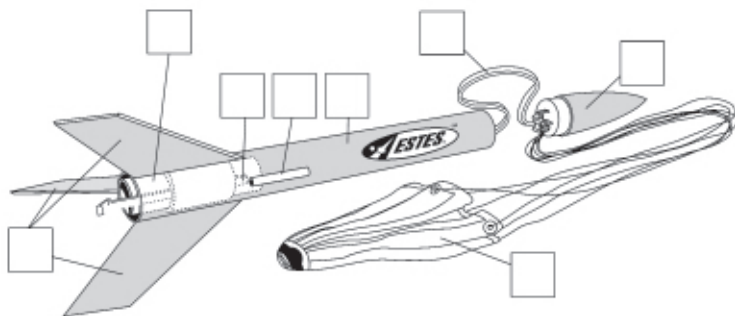


Word Bank

- A. Body Tube
- B. Nose Cone
- C. Engine Hook
- D. Fins
- E. Recovery System (parachute)
- F. Launch Lug
- G. Engine Mount
- H. Shock Cord
- I. Schroud Lines

7. Experiment with your straw rocket by changing the fins. Use larger labels, different numbers of fins, or bend and twist the fins. Estimate and record the length and height of each flight in the chart.

8. Check Hangar Talk for the definitions of the parts, and write in the letter of each part on the illustration below.



Flight Log

	Time Me/Friend	Height Me/Friend	Comments
Flight 1	/	/	
Flight 2	/	/	
Flight 3	/	/	
Flight 4	/	/	

Debriefing

Ground to Ground (Share)

- Explain how you made your rocket.
- Share with your helper how you taught your friend.

Climb Out (Process)

- How is your straw rocket similar to the model rocket?
How is it different?
- What happened each time you changed your fins?

Level Off (Generalize)

- How do you feel about teaching others? About learning from others?
- What do you like others to do when they are teaching you something new?

Cross Country (Apply)

- If you were going to teach a friend how to do something, how would you do it?

FAEROSPACE Facts



- Sir Isaac Newton (1642–1727), an English scientist, astronomer and mathematician, was the first to discover and describe some of the laws of motion and gravity that today help us understand how things move and how they fly. Newton's first law of motion says any object that is still will stay still, and any object that is moving will stay moving, unless they are acted on by an unbalanced force. You can see Newton's first law with your rocket. It will fly nowhere until you blow into it.
- Your breath creates an "unbalanced force" and away it goes!



Solo Flight

1. Make an Estes Wizard™ rocket available from 4-H Source Book. See Prop Shop, page 36.
2. Exhibit a rocket at a fair or other public exhibition.

Changing the fins
can make a difference.

Gnome of Your Own

Perhaps you've watched others build and launch rockets. Maybe you've even helped build one. Today is your day! By the end of this activity you will have your very own Gnome™ rocket. You will also practice following directions.

Blast Off

Look over everything in the kit and read through the directions before beginning to build your rocket.

Begin with the nose cone assembly, move to tube marking and cutting and finish with recovery device attachment and decals. Carefully review the engine size, preflight instructions, launching and NAR rules (refer to your rocket kit). It's best if you can work with a friend or family member who has built and launched model rockets. In the boxes below, check as each step is finished. Then draw your rocket in the space provided.

- ☐ **1.** Read through directions
- ☐ **2.** Gather supplies
- ☐ **3.** Nose cone assembly
- ☐ **4.** Tube marking detail
- ☐ **5.** Tube cutting detail
- ☐ **6.** Fin unit/engine hook attachment
- ☐ **7.** Shock cord mount attachment
- ☐ **8.** Recovery device (streamer) attachment
- ☐ **9.** Finish rocket
- ☐ **10.** Know NAR rules

Aerospace Skill:	Building a Gnome™ rocket
Life Skill:	Following directions
What to Do:	Build a Gnome™ rocket
Materials:	Gnome™ rocket kit, scissors, hobby knife, pencil, plastic cement, masking tape



Draw your rocket in this space

Debriefing

Ground to Ground (Share)

- How did you build your rocket?
- What was easiest? Most difficult?
- How does it feel to have built your own rocket?

Climb Out (Process)

- Why is it helpful to stand the rocket on its nose when you glue the fins on?
- What is the purpose of the fins? On which end of the rocket do they belong?

Level Off (Generalize)

- Why is it helpful to first read the directions?
- When else have you had to follow directions for a successful outcome?

Cross Country (Apply)

- When might following directions be important to you in the future?

FAEROSPACE Facts

Recovery Systems

- Always test-fit parts before applying glue, otherwise parts might not fit properly.
- The recovery system purpose is to bring the rocket safely back to the ground and without hurting someone. The Gnome™ uses a streamer for recovery. Other recovery systems include feather weights, helicopter, glider, and parachute.

Solo Flight

1. Build the Mosquito™ rocket with fins that need to be aligned, sanded and glued.



What's this?



I Want to Be

Do people sometimes ask you what you want to be when you grow up? It's good to think about no matter what your age. Being able to say "I want to be a..." is an important first step to getting there. The next step is to talk with someone who is really doing what you think you might want to do. In this activity you will explore a possible career by interviewing someone.

Aerospace Skill:	Exploring an aerospace career
Life Skill:	Communicating—interviewing
What To Do:	Interview someone in a job you'd like to do someday

Blast Off

1. First select a career, possibly in aerospace, that interests you. Describe the career.

2. Then with the help of a parent or helper contact a person who is in this career. Arrange to interview this person on the phone or, better yet, in person. Conduct the interview and complete the Interview Form.

3. Describe what you like about this job:

Interview Form

Person's Name _____

Position _____

Years in position _____

Other positions held _____

What person does on the job _____

What person likes about work _____

What person would like to change about the work

My questions:

Q. _____

Q. _____

Education required:

☐ High School ☐ Technical College ☐ Graduate School

What skills does this person need?

Mark those that apply with (L) Low or (H) High level of expertise

___ Reading
___ Listening
___ Solving Problems
___ Speaking
___ Thinking
___ Honesty
___ Mathematics
___ Reasoning
___ Leadership
___ Drawing
___ Making Decisions

___ Responsibility
___ Writing
___ Organizing
___ Managing Material
___ Using Information
___ Using a Computer
___ Managing People
___ Working with a Team
___ Teaching Others
___ Using Technology

Debriefing

Ground to Ground (Share)

- How did you arrange the interview?
- What did you learn about the person?

Climb Out (Process)

- Why is interviewing a person a good way to learn about careers?
 - What skills were most important to be successful in this job?
-
-
-
-
-

Level Off (Generalize)

- What are your best skills right now?
-
-
-
-
-



**"With more practice
I'll build that skill!"**

Cross Country (Apply)

- What skills do you need to work on if you want a job like this?
-
-
-
-
-

FAEROSPACE Facts

Colonel Benjamin O. Davis, Jr.

Here is someone who broke new ground to become what he wanted to be.

Colonel Benjamin O. Davis, Jr. was the first African American to command an Air Force base in the United States. Benjamin's parents taught him to do his best, respect himself and others and to be self-disciplined. He worked hard in high school. After graduating he wanted to be a pilot. But at that time, African Americans were not allowed to become pilots. Because of his excellent skills, Ben was chosen to receive pilot training during WWII. He became commander of the first black Air Force unit known as the Tuskegee Airmen.

Solo Flight

I. Check out aerospace careers. There are dozens—maybe thousands—of them. You'll find them at the airlines, in government, in general aviation, aerospace and much more. Research at least five careers and share what you learn with a friend or your helper.