

Mini 4-H

# Aerospace





## 4-H Facts



The 4-H Symbol: A four leaf clover with an “H” in each leaf.

4-H Colors: Green and White

The 4-H Motto: To make the best better!

The 4-H Pledge:

I Pledge  
My Head to clearer thinking  
My Heart to greater loyalty  
My Hands to larger service  
My Health to better living  
For my Club,  
My Community,  
My Country,  
and my World.



## Mini 4-H



**Welcome** to Mini 4-H! You are now a member of the Whitley County 4-H family! We hope that you will have lots of fun learning new things in your 4-H career.

Mini 4-H is designed for youth in Kindergarten through Second grade. It will give you a taste of the 4-H program as well as help you to explore a variety of project areas.

This manual contains fun, age appropriate activities to complete throughout the 4-H year. These activities will help you to learn about the project you have chosen. Additionally, the manual contains all instructions for the exhibit you will be preparing for the Whitley County 4-H Fair in July.

There is no competition in the Mini 4-H program. Each child who completes a project for the Fair will receive the same completion ribbon. Leaders will give each project comment sheets, they are provided only as a way to help you do your very best on future projects.

Mini 4-H will meet January through June. Try to attend as many workshops as you can they are planned especially for YOU! These will give you a chance to meet the leaders, have some hands-on fun, and ask questions about your important Fair display. Mini 4-H is FUN! You will enjoy it.

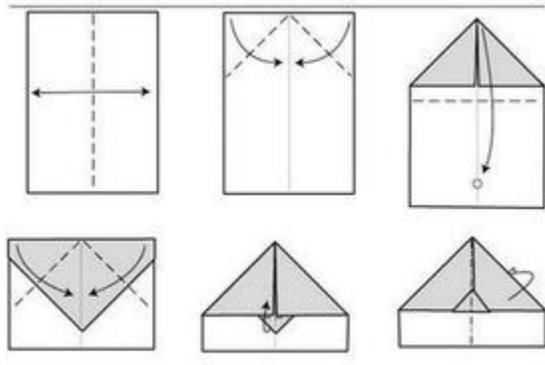
Once you enter third grade you can join a regular 4-H club that meets monthly. You must enroll each year of your 4-H career.

If you have questions about the Mini 4-H program, please call the Purdue Cooperative Extension Office at 260-244-7615. We will be happy to answer your questions.

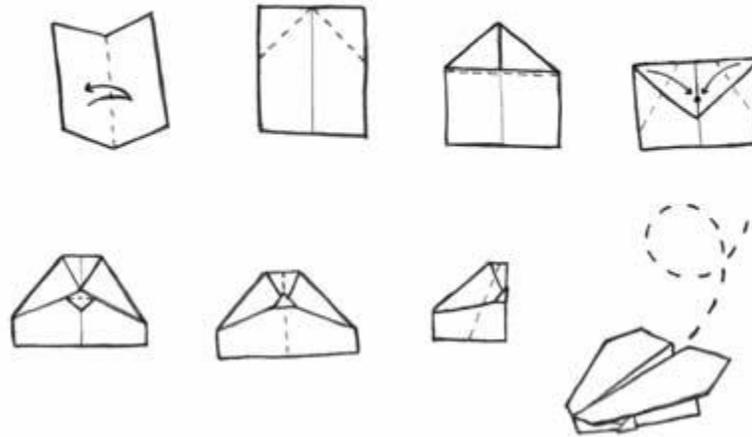
As a Mini 4-H parent, please help guide and encourage your child through the activities. Work with them to help them to “learn by doing”. Activities are designed to help your child learn about the project they have chosen. It is not required that they complete all the activities. Choose those that interest you and your child.

Activity 1

Paper airplane patterns

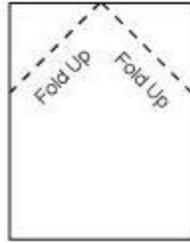


**How to:** Fold a paper airplane

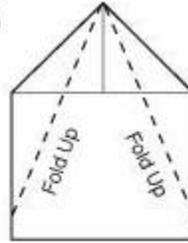


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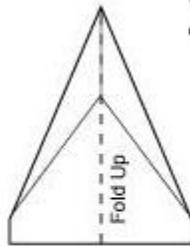
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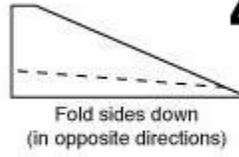
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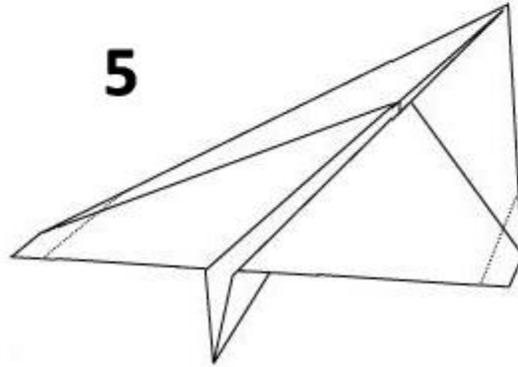
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# 6

## Activity 2

Attend a UAV (Unmanned Aerial Vehicles) Flight Whitley County Jr. Barnstormers will have flights you can observe. Dates to be determined, contact Extension Office for more information.

## Activity 3

### Engines

#### **THREE KINDS OF ENGINES POWER MOST FLYING MACHINES**

Piston engines, jet engines, and rocket engines all depend on the same basic principles to produce thrust.

1. The engine mixes fuel with oxygen or another oxidizer in a combustion chamber.
2. The mixture is ignited.
3. The burning mixture creates hot, expanding gases.
4. The expanding gases either produce thrust directly (in jet and rocket engines), or are used to push a piston or drive a turbine.

**HOW DO ENGINES PRODUCE THRUST?** Newton's Third Law of Motion is often given as an explanation for the generation of thrust. But it explains the effect of thrust, not the cause of thrust. Pressure and shear stress are the only two ways nature exerts an aerodynamic force on an object. Pressure is the basic source of thrust produced by a propeller, jet engine, or rocket engine.

A piston engine cannot produce thrust on its own. It provides power to a spinning propeller, which produces thrust by creating a pressure difference between the front and back of the propeller, resulting in a forward force. Jets or rocket engines produce thrust by increasing the pressure inside the engine. This increased pressure in the jet or rocket engine exerts more force in the forward direction than the rear direction.

The exhaust gases produced by a propeller, jet or rocket, due to Newton's Third Law, are feeling a force opposite and equal to the thrust, and therefore are moved in the direction opposite to the thrust of the engine. Hence, the exhaust is the effect of thrust.

## Kindergarten Requirements

Make 3 different types of paper airplanes and display on poster.  
Number airplanes 1-3 and tell which one flew the best.

## 1<sup>st</sup> Grade Requirements

A poster of 5 airplanes and label with type of airplane

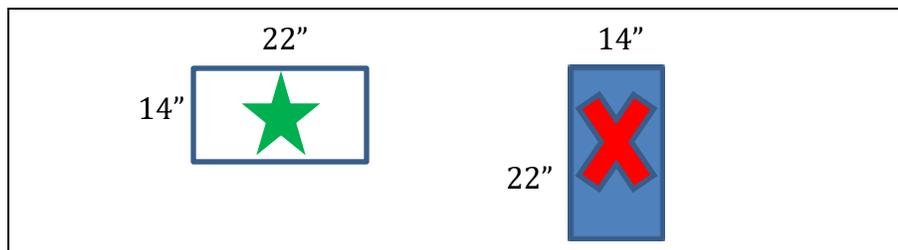
## 2<sup>nd</sup> Grade Requirements

Build rocket (stage 1) **NO ENGINE**

Attend one rocket launch to observe

Poster must be exactly **14 X 22 inches**, displayed horizontally (wider than it is tall) and attached to a stiff backing. You may use foam board. Foam board is already stiff and does not require additional backing. Your poster must be covered with clear plastic. This can be a poster sleeve. If you have made a three dimensional item, you will use clear vinyl.

Poster Layout





**Mini 4-H Aerospace**

Name\_\_\_\_\_

Township\_\_\_\_\_

Grade\_\_\_\_\_

(completed)

**Mini 4-H Aerospace**

Name: \_\_\_\_\_

Grade: \_\_\_\_\_

What was your favorite part of this project? \_\_\_\_\_

\_\_\_\_\_

What was the hardest part of your project? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

What did you learn this year? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Would you like to fly? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_