

# **Inventing Flight**

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**Inventing Flight**  
*The History of The Wright Brothers*  
*And*  
*The Process of Invention*

## Summary

Inventing Flight will focus on the history of the Wright brothers, their contemporary, Paul Laurence Dunbar, and the process of inventing the first sustained, controlled powered flight. The Wright brothers began their flight research in 1899 with a small kite, their first aircraft.

## Hook (Big Picture)

1. The Wright brothers' interest in flight started with a wooden toy "helicopter" powered by two twisted rubber bands. The students will be given a paper airplane propelled by rubber bands to fly. This activity will lead to a reading and discussion about the Wright brothers and flying.
2. Students will visit at least four sites along the Aviation Trail. They will work in teams and each team will orally present to the class the information gathered. They will also write a short poem about or in the style of Paul Laurence Dunbar.
3. The Wright brothers started their flying experiments by building a kite with a five-foot wingspan. To learn about some of the problems that the Wright brothers encountered developing their flying machine, the students will build a kite and observe what happens when the length of the kite tail changes.
4. The Wright brothers progressed from their kite to a glider. In this hook activity the teacher will demonstrate balancing a pencil on a finger and then the students will build a glider. With the glider the students will observe and report how weight and balance influences flight.

## Preparation For the Unit

Students can learn to do competent research as they write papers on the history of kites, and the kite's use to honor cultural or religious icons, to celebrate holidays, share beauty and beliefs, gather food, obtain military intelligence and launch weapons, send messages, build bridges, and study lightning. Students are guided through a fun interactive activity that allows them to conceptualize an idea or invention the way inventors do. Fun, colorful building blocks, science labs, drawing tables, and mock-up material are furnished at each station.

## Overview

On the following page is a summary of the unit including brief summaries of each Authentic Learning Task (ALT). This table provides an overview of the tasks in the unit sections and shows how the activities in the different teaching areas relate to each other.

**Inventing Flight**  
*The History of The Wright Brothers*  
*And*  
*The Process of Invention*

<b>History of Wright Brothers and Paul Laurence Dunbar (Social Studies / Government)</b>	<b>The Process of Invention (Science)</b>	<b>Building The Glider / Construction and Experimentation (Mathematics)</b>
Students will visit the Dayton Aviation Heritage National Historic Park which includes: The Wright Cycle Shop, The Paul Laurence Dunbar Memorial, The Wright Flyer III and The Huffman Prairie.	Students will build a kite to help them understand how the Wright Brothers began to develop the principles of flight.	Students will construct a flying model glider and determine its weight and balance.
Students will prepare an oral report and make a presentation to class on the four sites visited.	Students will learn to use logical thinking skills and how to follow oral and written directions.	Students will name some materials that might be used to build a model glider.
Students will create a short poem based on the information obtained from the history of Paul Laurence Dunbar.	Students will learn to analyze, interpret data and communicate the results.	Students will learn the importance of airplane design.

**Transfer Activity**

1. Each team is responsible for scheduling a guest speaker and orally introducing the speaker's background and how each is associated with aviation history.
2. Each team will submit ten questions and their answers about the Wright Brothers, Paul Laurence Dunbar or Aviation History. These questions will be used for a competition between the teams. The team or "plane crew" that correctly answers the most questions will be the Survivors and receive extra credit points.

## **Section One: History Of Wright Brothers and Paul Laurence Dunbar**

### **ALT One: History of Wright Brothers and Paul Laurence Dunbar**

#### **Summary**

Students will develop knowledge of the contributions and inventions made by these historical figures in their community. Students will visit parts of the Dayton Aviation Heritage Historical Park, in addition to creating a short poem based on Paul Laurence Dunbar's work. (*This activity will be done as a class field trip*).

#### **Competencies**

Students will prepare an oral report and make a presentation to the class on the four sites.

#### **Time**

Students will have one day to visit the four sites, and two days to prepare the information collected.

#### **Materials**

Each group will need pencil, paper.

#### **Instructions:**

1. The instructor will explain the information about the project and students must use their own judgment on how the information will be obtained.
2. Students will be divided into 5 groups
3. As students collect the information, the instructor will evaluate the information to see if it is in relation to the subject.

#### **Evaluation / Assessment of Student's Competency**

Instructor will listen to oral reports and evaluate the quality of the information and the presentation techniques. Students must score an 80% or above for competency.

#### **Closure**

The information from the oral reports will be collected to form a classroom journal.

## Section Two: Building A Kite

### ALT Two: Kite

**Summary:** Students will assemble their materials and follow the distributed directions to create a kite.

### Competencies

1. Following oral, written, and visual directions.
2. Students will determine what happens if the tail of the kite is shortened or lengthened
3. Students will record their observations in a brief journal
4. The student will construct and fly a simple kite and demonstrate how to make the kite fly at different heights.



**20 Kids \* 20 Kites \* 20 Minutes**

**(Source Big Wind Kite Factory [www.aloha.net/~bigwind/20kidskites](http://www.aloha.net/~bigwind/20kidskites)).**

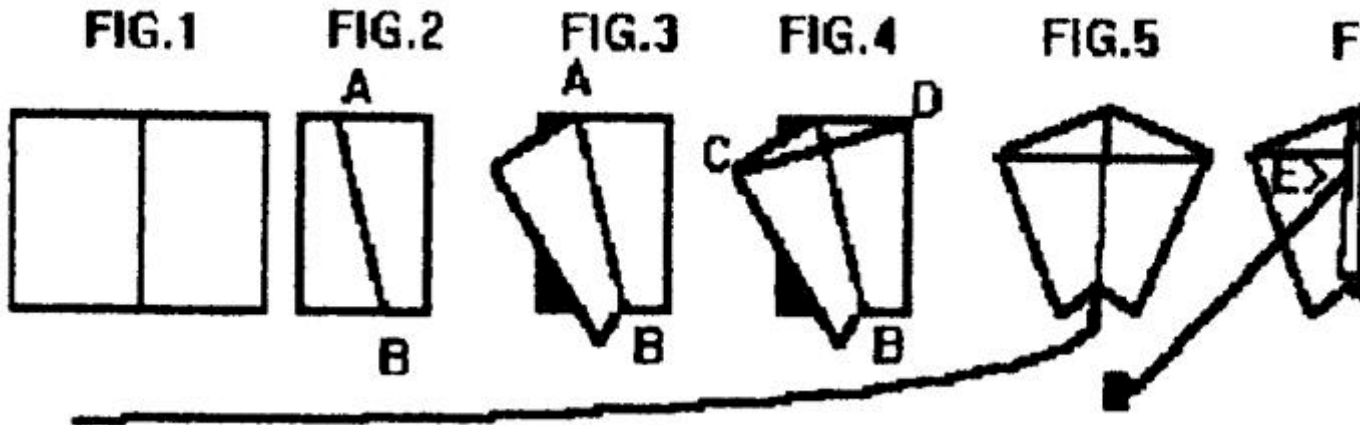
These are the complete time tested instructions to get 20 kids making their own kites and flying them in 20 minutes.

### Material list:

- 20 sheets of brightly colored 8 1/2" x 11" typing paper.
- 20 8" bamboo bar-b-que shishkabab sticks.
- 1 roll of florescent surveyor's flagging plastic tape. Available at any hardware store. A plastic bag cut in a 1" wide spiral all around will also make a great tail.
- 1 roll 1/2"wide masking tape or any type of plastic tape..
- 1 roll of string. (At least 200', 6 to 10 feet for each child.)
- 20 pieces of 1"x 3" cardboard on which to wind the string.
- Scissors.
- Hole punch. (optional)

**Directions:**

1. Fold a sheet of 8 1/2" x 11" paper in half to 8 1/2" x 5 1/2".
2. Fold again along the diagonal line A in Fig.2.
3. Fold back one side forming kite shape in Fig.3 and place tape firmly along fold line AB.(No stick is needed here because the fold stiffens the paper and acts like a spine.)
4. Place bar-b-que stick from point C to D and tape it down firmly.
5. Cut off 6 to 10 feet of plastic ribbon and tape it to the bottom of the kite at B.
6. Flip kite over onto its back and fold the front flap back and forth until it stands straight up.(Otherwise it acts like a rudder and the kite spins around in circles.)
7. Punch a hole in the flap at E, about 1/3 down from the top point A.
8. Tie one end of the string to the hole and wind the other end onto the cardboard string winder.

**Evaluation / Assessment**

The instructor will evaluate the completion of the project by recognizing the various lengths, weight and area of the kite. Teacher will check the observations in the student's journals.

**Closure**

Instructor will compare and estimate the findings and allow for a question and answer feedback.

## Section 3: Building a Glider

### ALT 3: Constructing a Glider

**Summary:** The students will construct a flying glider and determine its weight and balance and learn about basic aircraft design. They will explore the effects of weight and balance on flight characteristics.

### Competencies

1. Students will understand the weight and balance in airplanes.
2. Students will learn about the importance of design.
3. Students will describe and record the flight characteristics.

### Materials

Styrofoam  
Serrated Knife (Plastic)  
Pencil  
Template  
Tape  
Sandpaper / Emery Board

### Hook:

The weight of the model glider must be balanced before it will fly successfully. To determine the “Center of Gravity” of the glider, the model can be balanced much like a pencil on their finger.

### Instructions: (For Glider Information [www.centennialofflight.gov](http://www.centennialofflight.gov))

1. Explain to students that the Styrofoam is lightweight and strong which makes it an ideal material to construct model gliders.
2. Distribute the materials to each group of students.
3. Explain that the template is a guide to cut out the parts of the airplane.
4. Use sandpaper and an emery board to smooth edges.
5. Have the students assemble the glider by inserting the wings and elevator into the fuselage slots.
6. The students may add personal touches. Civilian aircraft have a letter or letters preceding the aircraft’s identification number indicating the country in which it is registered

### Evaluation / Closure

The instructor will use this time for question and answer discussion of how weight and balance affects flight characteristics.

**Unit Closure**

The purpose of this unit is to explore the courageous lives of the men and women who developed the theoretical knowledge and experimented with flight in an atmosphere of ridicule and disbelief. The unit also demonstrates how the scientific method works. The Wright brothers began their interest in flying as children playing with a toy; they evolved to observations of buzzards and how they flew. They used their knowledge of bicycles, asked themselves many questions and solved their problems through experimentation. By researching the Wright brothers history, building a kite and a glider, and discussing how weight and balance affects the aircraft, the students will learn to appreciate the historical significance of flying and understand the challenges that they encountered while “inventing flight.”

## Appendix

Discover Dayton 2002 Edition

Inventing Flight: Dayton 2003 The Centennial Celebration. HYPERLINK

"<http://www.inventingflight.com>" [www.inventingflight.com](http://www.inventingflight.com)

2000 Annual Report and other published pamphlets / paper airplane

The Wright Way: The Process of Invention. The Wright Way: Innovation Through Engineering. Posters. NASA Resources for Educators. Home Page: HYPERLINK

"<http://core.nasa.gov>" <http://core.nasa.gov> and HYPERLINK

"<http://www.centennialof>" [www.centennialof](http://www.centennialof) flight.gov

Big Wind Kite Factory HYPERLINK "<http://www.aloha.net/~bigwind/20kidskites>"

[www.aloha.net/~bigwind/20kidskites](http://www.aloha.net/~bigwind/20kidskites)

*For the Love of Dayton: Life in the Miami Valley 1796-1996* published by the Dayton Daily News in celebration of Dayton's bicentennial