

## Paper Airplane Challenge

**Grade Level:**

6<sup>th</sup> grade

**Title of Lesson:**

Paper Airplane Challenge

**Unit Title:**

Habits of Mind

**Performance Standard(s) Covered:**

S6CS4. Students will use tools and instruments for observing, measuring, and manipulating equipment and materials in scientific activities. b. Estimate the effect of making a change in one part of a system on the system as a whole.

S6CS6. Students will communicate scientific ideas and activities clearly. b. Understand and describe how writing for scientific purposes is different than writing for literary purposes

**Essential Question:**

How does a paper airplane's shape and weight distribution affect its flight pattern and weight-carrying ability?

**Objective:**

During this lesson, students will learn how weight distribution and differing shapes in a paper airplane's body and wings will affect the flight pattern that the airplane takes as well as the airplane's ability to carry cargo (weight). Students will work individually to fold the farthest flying paper airplane they can make. Students will also learn how to cite sources effectively and precisely.

**Key Words and Terms:**

Flight pattern  
Weight distribution  
Rudder  
Flaps  
Wings  
Body  
Lift  
Drag

**Learning Activity**

**Abstract (limit 100 characters):**

Differing paper airplane designs will be studied and tested in order to test the airplane's flight pattern and ability to carry cargo.

**Materials Needed:**

For each student, provide:

2-3 pieces of printer paper

Scissors

Tape

Paper clips (about 5 or 6 per student is necessary)

Computer to perform research and write citations

**Safety Concerns:**

The students will be using scissors. Be sure that there is absolutely no running in the classroom.

Additionally, sharp paper airplane points may prove to be an eye hazard; be sure that no students are aiming and throwing their airplanes at each other.

**Procedure:**

Preparations to do ahead of time:

Lay out the materials for each student at their desks.

Rope off or designate a long area of the classroom that the students can use for testing their paper airplanes.

As students come in be sure to tell them not to touch the materials. Instruct the students to read the entire procedure before starting.

Procedure for the students to follow:

1. Research a paper airplane design that will fly far while carrying cargo (in this case, the weight of the paper airplanes). Follow the instructions for folding the paper airplane or create your own design based upon the designs that you looked up.
2. Test the paper airplane's flight ability. Note its flight pattern – does it fly straight or loop around? How do you have the weight distributed on the plane? How does the body to wing ratio affect the plane's flight?
3. Tweak the design so that the airplane is suited for this experiment's needs. Repeat steps 2 and 3 as deemed necessary.
4. Create an MLA citation for the resource that you used for the airplane design and/or folding instructions. Use the citation creator to create accurate citations – if you are unsure of what to enter into each field, ask the teacher. You will be graded on your citations' correctness.
5. Repeat steps 1-4 to create another paper airplane with a different design.

**Notes and Tips:**

An introductory video at the effects of air lift and drag upon a model airplane might have been helpful. Additionally, a lot of the students were confused as to how to create the citation when some of the information wasn't available (for example, the date or the author's name). Some students were also confused about the small difference between the title of the web page and the title of the website. A brief overview of the breakdown of a citation creator would prevent much of this confusion.

**References:**

Original lesson plan created by Mrs. Joanna Jones

Citation creator: <http://citationmachine.net/index2.php>