



Principles of Flight



Lesson Plan: Similar Paper Airplanes

Grade Level: 5

Subject Area: Science & Math

Time Required: *Preparation:* 1 hour
Activity: 1 hour

National Standards Correlation:

Science (grades 5-8)

- Science and Technology Standard: Understanding about science and technology Standard.
- Physical Science Standard: Motions and forces.

Math (grades 3- 5)

- Geometry Standard: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.
- Measurement Standard: Apply appropriate techniques, tools, and formulas to determine measurements. Choose an appropriate unit and measure lengths and widths to a specified degree of precision in customary measurement

Summary: Students will construct a paper airplane and a similar one half scale in size. The distance each airplane will fly will be compared.

Objectives: Students will:

- Build a paper airplane following written and verbal instructions.
- Build a similar airplane, half-scale in size.
- Reach a conclusion about how size affects the distance flown.

Background: See the “Paper Dart Airplane” lesson (<http://www.nationalmuseum.af.mil/shared/media/document/AFD-090709-089.pdf>)

Materials: You will need:

- Paper airplane pattern
- Paper (8 ½” x 11”)
- Scissors
- Ruler
- Colored pencils
- Pencil

Safety Instructions: Do not fly paper airplanes directly at another person. Use caution when flying the paper airplanes. Create a single direction flight zone. Be sure that students stop flying their airplanes when other students are retrieving airplanes that have already landed.

Procedure: **A. Warm-up**

1. Discuss symmetry. Explain that it is important to keep the wings symmetrical.



2. Discuss similarity. Explain that it is important to measure carefully.
3. Review the four forces of flight (lift, drag, thrust, gravity).

B. Activity I

1. Using the paper airplane pattern as a guide, students will measure the dimensions, divide in half and cut out the resulting rectangle.
2. Using the paper airplane pattern as a guide, students will measure, double and determine placement of all fold lines and cut lines. When complete they should have a similar paper airplane pattern, half-scale in size.
3. Decorate with colored pencils if desired.

C. Activity II

Students will construct each paper airplane. (See the “Paper Dart Airplane” lesson at <http://www.nationalmuseum.af.mil/shared/media/document/AFD-090709-089.pdf>).

D. Activity III

Students will fly each plane, recording which flies the longer distance a total of 5 times.

E. Wrap-up

Students will compare their results with their classmates. Discuss the results.

**Assessment/
Evaluation:**

Students’ airplanes will be checked for similarity. Students can be evaluated by teacher observation of student’s participation in the activity.

Extensions:

Using the original paper airplane pattern, students could make a double size airplane and conduct the same experiment.

