



Principles of Flight



Lesson Plan: Symmetry in Paper Airplanes

Grade Level: 5

Subject Area: Science and Math

Time Required: *Preparation:* 15 minutes
Activity: 2 hours

**National Standards
Correlation:**

Science (grades 5-8)

- Science as Inquiry Standard: Abilities necessary to do scientific inquiry.
- Unifying Concepts and Processes Standard: Change, constancy, measurement.
- Unifying Concepts and Processes Standard: Evidence, models and explanation.

Math (grades 3-5)

- Geometry Standard: Use visualization, spatial reasoning, and geometric modeling to solve problems.
- Geometry Standard: Apply transformations and use symmetry to analyze mathematical situations.
- Measurement Standard: Apply appropriate techniques, tools, and formulas to determine measurements.

Summary: Students will design paper airplanes with middle line symmetry. The paper airplanes will not have any curved lines. They must have right, obtuse and acute angles. After the planes are designed, each designer will measure the angles. Students will exchange their paper airplanes with other students, and continue to practice measuring angles.

Objectives: Student will:

- Learn how to use line symmetry
- Identify right, obtuse and acute angles
- Use a protractor to measure angles

Background: Symmetry is defined as “beauty of form that arises from harmony of proportion.” In other words, symmetry is a balance that is achieved through size, shape, position and even coloring of different parts on opposite sides of a middle line. Symmetry has always played an important part in history and in art. It was very important in the architecture of ancient Greece and the Italian Renaissance.

Materials: You will need:

- White drawing paper
- Protractor
- Colored pencils

Procedure: **A. Warm-up**
Using white drawing paper, have students make a paper airplane, using any method of their choice. Designate one area of the room as a runway. Test fly the airplanes.



B. Activity

1. Ask, "When designing and making the paper airplanes, what did you think about?" "Did you make the airplane symmetrical?" (Have a few examples of symmetry to show the class; so they have a good visual picture of what symmetry is).
2. Now instruct the class that you would like them to build another paper airplane. This airplane must not have any curved lines...only straight lines and angles. Be sure to use at least one acute angle, one right angle and one obtuse angle.
3. Decorate and color the planes symmetrically.
4. With a protractor, have students measure at least five angles on each airplane and record on a chart.
5. Have students trade paper airplanes, and continue to measure angles on other airplanes. Record angles measured.

C. Wrap-up

1. Organize students into groups of 3 or 4. In each group students must choose one airplane to represent their group.
2. As a group, students will design an insignia and make a patch similar to the flight patches that military pilots and astronauts wear on their flight suits. Students may want to name their airplane and include this on their flight insignia.

Assessment/ Evaluation:

Students will be evaluated on their ability to use a protractor correctly and measure angles accurately.

