WOW AIRPLANES
Teaching Guidelines

Subject: Mathematics

Topics: Ratios

Grades: 5 - 8

Concepts:

- Ratio
- Angle
- Average (mean), range, mode, and median

Knowledge and Skills:

- Understands and can use three methods of expressing a ratio ("2 to 3", "2:3", "2/3")
- Can describe a real world situation in terms of ratios
- Can perform binary operations with decimal numbers
- Understands the purpose and value of organizing information in charts
- Can find the mean, median, mode and range of a set of numbers
- Can decide which statistical measure is most appropriate in a given situation.

Subject: Science

Topics: The Nature of Science (Experimental Procedure)

Grades: 5 – 8

Concepts:

- Experimental error

Knowledge and Skills:

- Can create a chart for the collection of experimental results
- Can present experimental results clearly in written form.
- Can design an experiment which compares behavior or characteristics of classes of objects or subjects

Materials: None

Procedure:

This project should be done by students working in teams of three or four.

Distribute the handout and discuss it. Ensure that students understand the assignment.

Stress the importance of using a fair procedure to test the airplanes. Discuss what is meant by "experimental error" and some of the things students can do to minimize that error (for more advanced students, this discussion can include the difference between random error and systemic error sources.)

Tell students that the clarity of their written explanations of their procedures and results are as important as the procedures and results themselves. If the boss cannot understand what they did, the work will have no value.

Give students a schedule for working on the assignment and a due date.

WOW AIRPLANES

To: Engineer Team 8
From: President's office

We've been having a big argument up here on the subject of correct wingspan in comparison to the length of the airplane. I need your help to get it settled.

Here's the project: make a set of paper airplanes using the plan below, but start with different sized sheets of paper, so that the ratio of wingspan to airplane length is different in each case.

Then test the flight characteristics of each plane. We want to know which one will glide the farthest.

You're going to have to figure out how to make it a fair test. Obviously you should fly each plane several times, for one thing, and decide whether to use the average, range, median or mode of the results to show the plane's performance.

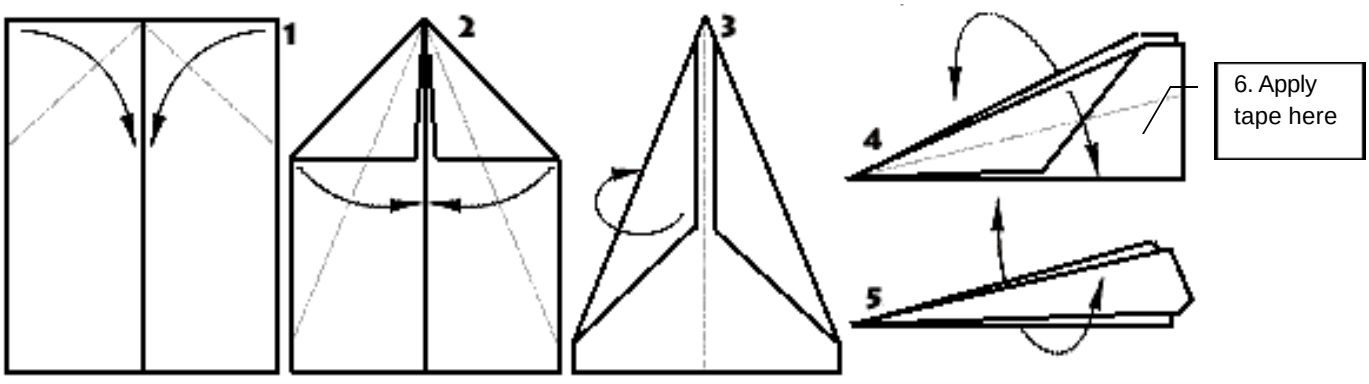
Also, when the plane is thrown the angle at which it is released makes a difference, and so does the speed with which it is released.

And of course you will have to somehow minimize the effects of any atmospheric winds or air currents.

What I need from you is a clear presentation of your results and the exact procedure you used, and a discussion of sources of error.

Forget the X38 project for now. This is much more important. And please get it done as soon as possible.

Wilbur



1. FOLD PAPER IN HALF AND FOLD TOP CORNERS IN TO CENTER LINE. 2. FOLD RESULTING CORNERS IN TO CENTER LINE AGAIN. 3-5. FOLD WINGS DOWN ON OUTSIDE SO THAT EDGES OF WINGS MATCH. 6. TAPE WINGS TOGETHER AT TOP.