

<b>INSTRUCTOR:</b>		<b>DATES:</b>
<b>COURSE TITLE:</b>  National Technology Week Classroom Science Fair Demo		LESSON NUMBER  1
<b>UNIT/DISCIPLINE:</b>  Mechanical Engineering Technology - Aviation	<b>SPECIFIC TOPICS:</b>  Build and Test the Best Paper Airplane	
<b>RATIONALE:</b>  One of the major goals of National Technology Week is to present students in Grades 7 and 8 with information on their career options in science and technology. These are critical years for guiding a student's career path, and science fairs often offer the spark that will start a young student on an exciting adventure in science technology. The following lesson plan offers a relatively simple science fair project that teachers can undertake with their classes as a group activity. It's fun and offers key learning objectives that are designed around curriculum goals for Grades 7-8.		
<b>INSTRUCTIONAL GOALS:</b>  <b>Developing Skills of Inquiry, Design and Communication</b>  Students are encouraged to develop the following attitudes in this project: commitment to accuracy, precision, as well as integrity in observation, experimentation, and reporting.  <b>Relating Science and Technology to the World Outside the School</b>  To many, building a paper airplane is child's play, but the basic principles of aerodynamics and fabrication apply as much to making a superior flying paper plane as they do to designing actual passenger aircraft. This project challenges a student to explore the use of different materials, create or re-create airplane designs, develop a testing methodology and controlled environment and to record test results. This project will spark an interest in aviation, but it will also offer an opportunity for the student to test their own ideas on how aircraft could be designed for various uses (i.e. long versus short haul flying, or speed versus agility).		
<b>PERFORMANCE OBJECTIVE:</b>  This project involves creating new paper airplanes or replicating existing designs to test which model type is the best flyer and why. We have all tried it before, but this project is more involved than just making a few folds in a piece of paper.:  <b>Construct:</b> Construct three paper planes of differing shapes and attributes. For example, you can choose wide-body, narrow body or short model airplanes, or you can choose the same model plane and simply use three different materials. Lesson references are provided below.  <b>Demonstrate:</b> Choose a controlled area to measure the wind resistance of each plane. Place each plane on a stable perch and point it into a standard house fan. Test the reaction of each plane to wind created by the		

fan.

**Evaluate:** Evaluate and record the reactions of each airplane model. Determine what materials or adjustments might be required for each airplane to perform at a similar level during flight.

**Predict:** From the results of your research, predict which plane will fly the furthest. Develop a controlled way to launch each airplane and measure the results of your test

## LESSON REFERENCES:

Believe it or not, there is a tremendous amount of information and even technical resources on how to build the best paper airplane. It's free and available on-line. This is an extremely popular science fair project internationally for students in grades 7 and 8. What's more, it's a really fun project for the whole class! Here are some useful web links you can use to design, build, test and measure the perfect plane:

<http://www.paperairplanes.co.uk/planes.html>

<http://www.zurqui.com/crinfocus/paper/air-fly.html>

## INSTRUCTIONAL PROCEDURES:

Challenge your class to:

- ✓ Design and/or build 3 distinct paper aircraft
- ✓ Establish a controlled testing environment
- ✓ Test the wind resistance and aerodynamics of the airplanes using a traditional fan from your home
- ✓ Fly measure the flight path and flight distance of each airplanes

Record observations and draw conclusions on the best aircraft of all three models.

## STUDENT EVALUATION GUIDES:

### Understanding of basic concepts:

- Understands basic directions to make different styles of paper aircraft
- Always gives complete explanations on the distinguishing characteristics of each model built.

### Inquiry and design skills:

- Can build all forms accurately
- Is able to set-up and evaluate a test area
- Uses tools, equipment and materials correctly with little or no assistance

### Communication of required knowledge:

- Consistently communicates the performance benefits of each model tested
- Consistently uses appropriate science and technology terminology and units of measurement

### Relating science and technology to the world outside the school:

- Shows understanding of the connections between avionics and the potential for fuel consumption, safety (gliding potential), and other concepts

**MATERIALS AND AIDS:**

- Assortment of paper, in 8 ½ X 11" sheets
- A fan