



Drexel-SDP GK-12 ACTIVITY

Subject Areas: Physical Science, Variables, Chemical Science, Technology and Society, AeroSpace

Activity Title: Paper Airplanes: an Introduction to Flight

Grade Level: 5 (5–8)

Time Required: 2 weeks, 2 classes/week & 1hr per class

Group Size: 4-5 students

Expendable Cost per Group: \$0.50 USD

Summary:

Students will learn the basics of flight. This activity can be used to augment curricular lessons, particularly those involving position and direction as well as understanding the effect of a single part to the whole. The students by the end should become familiar with the basics of airplane parts and the ability to identify the different forces acting on a plane and the manipulation of the airplanes parts to get a better design.

Keywords:

Thrust, Drag, Lift, Gravity, Airplane, Force, Nose, Fuselage, Wings, Tail, Aileron, Rudder

Educational Standards:

Learning Objectives:

After this lesson, students should be able to:

- Learn the different parts of the airplane and the forces acting on the airplane.
- Learn to adjust parts of the airplane to maximize flight distance.
- Using scale models in experiments

Materials List:

Each student needs:

- Lab notebook
- Pen or pencil
- Ruler
- Calculator

Each group needs:

- 1 sheet of paper

Procedure:

Students should have a basic understanding of the scientific process, though is not needed and can be explained in the first few minutes of class. Introducing flight should start with some historical aspects of flight starting with the Wright Brothers and including modern jets. This leads into naming the parts of the jet and how it works. The key concept is that a jet has to overcome gravity and drag using lift and thrust. Point out the direction that the forces act on the plane and where they act. To assist the discussion, have the students read pages 15-28 of investigation 3 in their science books. Students can then use a blank sheet to build and fly paper airplanes.

Three key parts of the exercise:

- Build the airplane
- A brief description of the airplane they built
- Test the airplane for distance
- Have the students answer the follow questions in their journals
 - How far did the plane go?
 - What is the length of your airplane from nose to tail?
 - What is the wingspan of your airplane from tip to tip?
 - What is the area of the wing as if it was a triangle ($.5*b*h$)?
 - How did your airplane do compared to everyone else?
- Redesign the airplane
- Retest the airplane
- Have the students answer the following questions in their journals

- What did you change on your airplane?
 - Did it help the plane go further? Why?
- Have the students plot the distance their airplane went VS. the area of the wings of the airplane for the class's data?
Is there a trend?

Assessment:

Grades for this project can be composed of the journal entry.

Activity Extensions: None

Other:

FOSS Solar Energy Unit
<http://lhsfoss.org/scope/5-6.html>

Author: Michael Birnkrant

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