

6. Properties of Air and Characteristics of Flight

Classroom Activity:

Demonstrate how to alter lift/drag in flying devices. Explain how the shape of a surface over which air flows effects how lift overcomes gravity. Use of appropriate vocabulary (i.e. lift, thrust, etc.)

Grade: 6

Strand(s): Understanding Structures and Mechanisms

This task addresses the following overall expectations:

- investigate ways in which flying devices make use of properties of air;
- explain ways in which properties of air can be applied to the principles of flight an flying devices.

and the following specific expectations:

- follow established safety procedures for using tools and materials and operating flying devices;
- use scientific inquiry/experimentation skills to investigate the properties of air;
- use technological problem-solving skills to design, build, and test a flying device;
- use appropriate science and technology vocabulary, including aerodynamics, compress, flight, glide, propel, drag, thrust, and lift, in oral and written communication;
- use a variety of forms (e.g., oral, written, graphic, multimedia) to communicate with different audiences and for a variety of purposes.

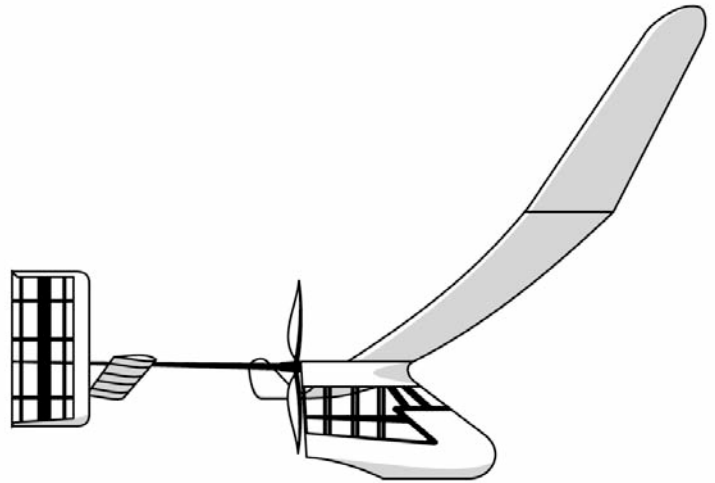
Assessment Categories:

- Knowledge and Understanding
- Thinking and Investigation
- Communication

Type of Activity: Classroom

Preparation: 180 minutes

Time needed to complete the task: 240 minutes



Materials/Resources for teachers:

Internet Resources:

The Hangar: How They Work:

<http://tqd.advanced.org/2819/work.html>

Tufts University K-14 Engineering Education Program. "How Do Airplans Fly?": <http://ldaps.ivv.nasa.gov/>. More information about this activity is available from the Engineer-in-Residence program office at (416) 481-7070.

Materials/Resources for students:

Balsa Glider Kit (1 per group of 4 students)

3X5 Index cards or business cards

masking tape

scissors

Activity Description:

Building and testing a glider is the culmination of a series of sessions designed to introduce the basic principles of flight.

Session 1:

Introduction: discussion of lift, Bernoulli's Principle, and how shapes produce lift.

6. Properties of Air and Characteristics of Flight (continued)

Session 2:

Explain the four main forces of flight: lift, drag, thrust and gravity. Discuss how imbalances in these forces cause changes

in aircraft position. Discuss Newton's Third Law and demonstrate with balloon rockets

Session 3:

Discuss control of aircraft: (roll, pitch and yaw)

Session 4:

How do pilots control planes? Build Glider from kit; add control surfaces and explore/record behaviour.

Session 5:

Discuss results

Tips:

Do not fly gliders outside on a windy day. They are too light. If possible, use the school's gym.

To complement this activity, have students participate in a flying contest using a PC-based flight simulator.