KITES

Lesson Plan: The Diamond Kite

Grade Level: 6-8

Subject Area: Science and Math

Time Required: ***Preparation:*** 30 minutes
Activity: 2 hours

National Standards Correlation:

Science (grades 5-8)

- Science as Inquiry Standard: Abilities necessary to do scientific inquiry.
- Physical Science Standard: Motions and forces.
- Science as Inquiry Standard: Understanding about scientific inquiry.
- Unifying Concepts and Processes Standard: Evidence, models and explanation.

Math (grades 6-8)

- Geometry Standard: Analyze characteristics and properties of two and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships.
- Measurement Standard: Apply appropriate techniques, tools, and formulas to determine measurements.

Summary: Students will construct and fly a diamond kite. Students will be checking the kite for symmetry. If the kite does not fly successfully, students will apply problem solving skills to fix the problems.

Objectives: Students will:

- Identify symmetry in a kite
- Use problem solving skills, measuring skills, and basic geometry in the construction of the kite
- Successfully fly a diamond kite

Background: There are three main forces that affect the flight of a kite. They are: lift, gravity and drag. Lift causes the kite to rise. Gravity causes the kite to fall. Drag is the pull on the kite by the passing air. When all three of these forces are balanced, the kite will fly. A kite has many parts that help keep lift, gravity and drag balanced. The flying line holds the kite so that it will not fly away in the wind. The bridle connects the flying line to the kite at two points. The actual flying line is connected to the bridle at its tow point. The bridle sets the angle of the kite in the wind. If the bridle is not set at the correct angle the kite will not fly properly. The spine (backbone) and struts of a kite provide the framework for the kite. The sail cover, or skin of the kite is the material that covers the rods and makes up the body of the kite. The final part of the kite is the tail. The tail helps increase the drag of the kite. It helps the kite from bobbing and swerving. The best weather condition for flying a diamond kite is light to moderate wind (approximately 6 to 18 miles per hour) with blue skies. Do not attempt to fly a kite in wet or stormy weather.

Materials: Each diamond kite will need:

- 1 piece of 18"x 18" heavy paper
- 1 plastic kitchen garbage bag (18" x 24") for sail cover
- (2) 1/8" diameter dowel rods (18" long)
- Flying line

Originally published as part of *Project SOAR™: Science in Ohio through Aerospace Resources, Volume I-III.* Dayton, Ohio: The National Museum of the United States Air Force and The Air Force Museum Foundation, Inc. 1997-1999.

- 2 strips of heavy paper
- Tape

Each student will need:

- Ruler
- Protractor

Safety Instructions: See "Kites in the Classroom" presentation at http://www.nationalmuseum.af.mil/shared/media/document/AFD-070523-007.ppt

Procedure:

A. Warm-up

1. Review measuring lines with a ruler and measuring angles with a protractor.

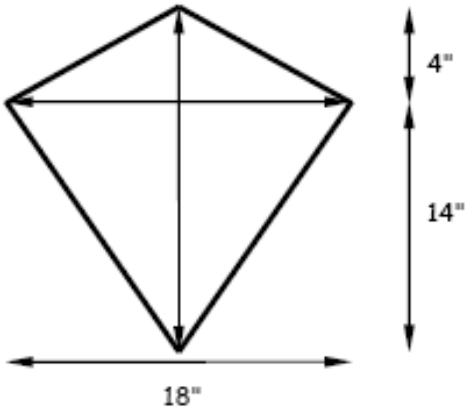
2. Review geometric shapes and the concept of symmetry.

3. Familiarize the class with various kite terminology.

B. Activity

1. Each student, or group of students, working on a kite should receive a piece of paper. Students will draw a diamond that is symmetrical on two sides using the following rules:
   - The diamond should be 18" long at its longest point and 18" wide at its widest point.
   - The widest point horizontally should be 4" down from the top of the kite.

   Students will problem solve until the shape is drawn correctly. Check diamond shape for accuracy before proceeding to the next step.



2. Trace the diamond shape onto a plastic garbage bag and cut it out. Determine where the upright and cross struts will be attached.

3. Fold the kite in half lengthwise and punch a hole just above the intersection of the upright and cross struts.

4. Attach the dowels to the plastic bag using reinforced strapping tape. You may wrap heavy paper around the ends of the cross strut (½" - ¾") and tape to back of kite. (The paper wrap allows the cross strut to be removed.) You may also tape directly to kite skin.

5. Turn the kite to its front side and tie the flying line to the upright strut through the punched holes. Make certain that this is balanced through the holes.

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C. Wrap-up: Let's Go Fly a Kite!

Stand with the wind to your back. Someone should lift the kite to help the wind take hold of the kite. If the kites are balanced they will fly. Kites that have problems flying, should have the bridle and kite dimensions checked for problems.

Assessment/ Evaluations:

Evaluate students on their ability to create the symmetrical diamond with the correct measurements.

Extensions:

1. Research and discuss the history of the kite.
2. Create different kinds of kites and discuss similarities and differences in the kites and their patterns of flight.
3. Measure the angles of the kite and identify acute, obtuse and right angles.

Resources/ References:

Millspaugh, Ben P. and Beverly Taylor. *Let's Build Airplanes and Rockets.* New York: McGraw-Hill Inc., 1996.

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