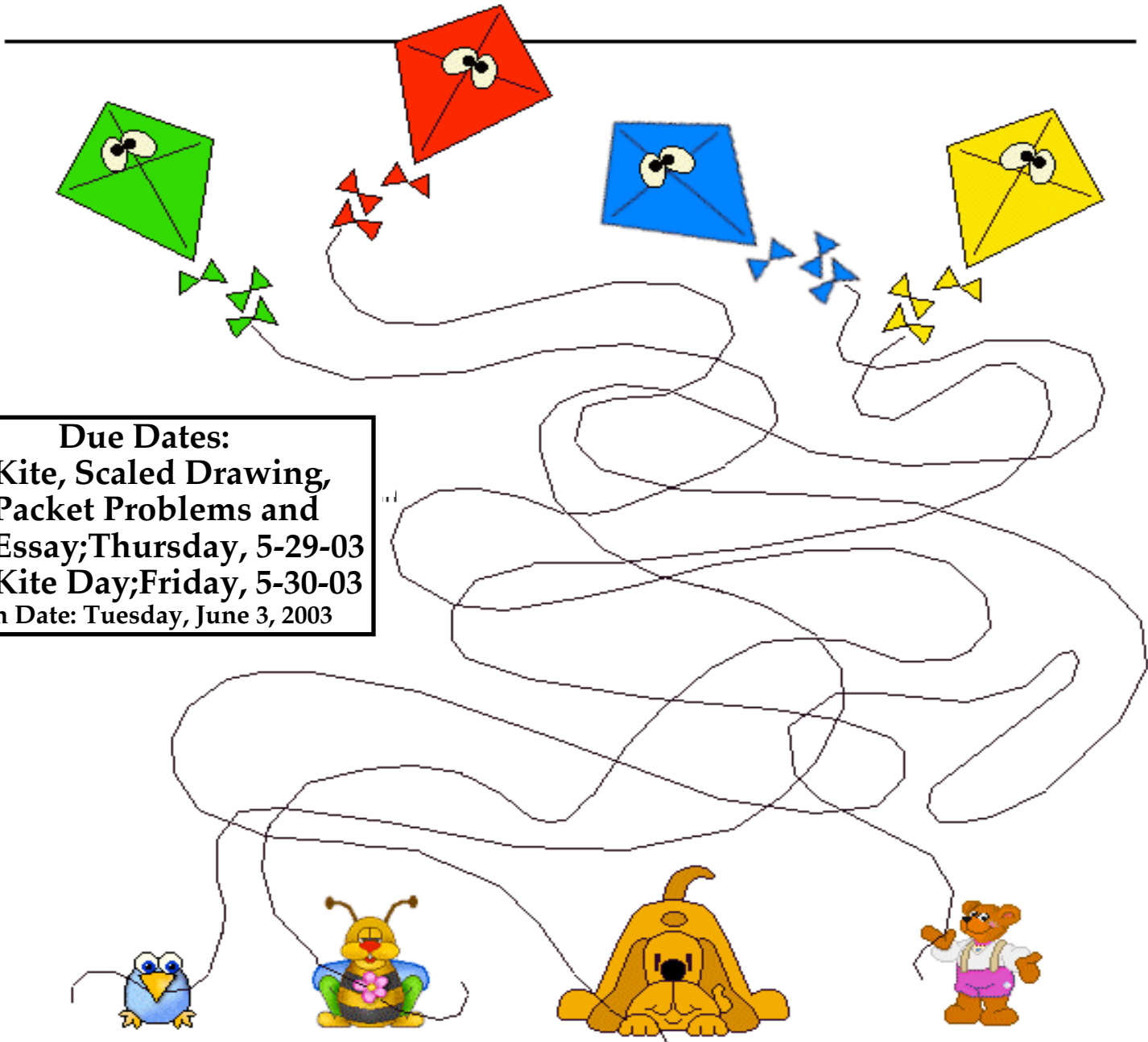


2003 Kite Project



Due Dates:

- Kite, Scaled Drawing, Packet Problems and Essay; Thursday, 5-29-03
- Kite Day; Friday, 5-30-03

Rain Date: Tuesday, June 3, 2003

Kite Trivia - The ancient Chinese believed that kites could ward off evil spirits. Even today in China, the kite is regarded as a symbol of good luck!

Part I - Getting Started

Objective: To design, engineer and fly a kite.

Ground rules:

1. Since it takes two people to successfully launch a kite, this project will be completed by a team of two students.
2. The kite must be at least one square foot and no more than nine square feet of surface area.
3. It will consist of material readily available from the school-home environment (paper, fabric, etc.)
4. The team must complete all six evaluation criteria.

Air rules: The kite should fly!

Critical Questions:

1. Why does a kite fly?
2. What design(s) fly better than others?
3. Do kites have any practical uses
4. Why is it so much fun to fly a kite?



Suggested Resources

A list of suggested resources and internet sites are listed at the end of this packet. Additionally, available resources will be on reserve in the school library.

Part II - Evaluation Criteria

1. Your team will submit a scaled, written, diagrammed plan of the construction of the kite. Your team should be prepared to explain and justify orally to the class reasons for the design, the material, and the construction of the kite. 20%

2. Your team will decorate the kite utilizing geometric designs and constructions which best illustrate the aesthetic values of flight. 10%
3. **Option 1:** Your team will research and explain in a 1-2 page typed essay, the theories on the practical and recreational value of the design and flight of kites, particularly yours. Include a bibliography. 10% **or Option 2:** submit an **original** poem or essay about a personal kite experience
4. Your team will fly your kite on a designated day (May 30th if weather permits, or June 3rd). Evaluation by the class based upon competition. 20%
5. Your team will solve the problems presented in this package. 30%
6. Your team will submit an analysis of the cost of materials and work hours necessary to complete this project. 10%

Kite Trivia - The largest kite in the world is flown each year in Hoshubana, Japan, a small village near Tokyo. It is 36 feet wide and 48 feet long - almost as large as a regulation tennis court! Weighing nearly a ton, this paper and bamboo giant has 200 bridle lines, each one as thick as a broomstick. Depending upon the wind, 50 or more men are needed to send the kite aloft.

Summarily, your grade on this project will be generally based on:

1. Aesthetics
2. Completeness
3. Effectiveness of your presentation
4. Balance of team members' effort/work
5. Cost-efficiency in production
6. Reasonable construction time
7. Observed joy in flying a kite!

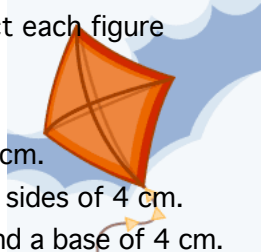


Kite Trivia - During World War II, Kites bearing pictures of enemy aircraft were used by the United States Navy for target practice.

PART III - Constructions

A kite is another special quadrilateral, but it is not a parallelogram or a trapezoid. A quadrilateral is a kite if and only if it has exactly two distinct pairs of congruent consecutive sides, and its diagonals intersect.

Kite Trivia - In 1901, Guglielmo Marconi, inventor of the wireless telegraph, used a kite to loft an antenna four hundred feet in order to receive the first radio signal ever transmitted across the ocean

1. Draw a Venn diagram illustrating the positions of the following quadrilaterals; a parallelogram, a rectangle, a rhombus, a square, a trapezoid, and a kite.
2. Describe (visually) the similarities and differences between each of the following quadrilaterals and kites: parallelograms, rectangles, rhombuses, squares, and trapezoids. Be creative with this problem.
3. With a compass and a protractor, construct each figure described.
 - a) A square SURF with sides of 2 cm.
 - b) A rectangle FISH with sides 2 cm and 3 cm.
 - c) A rhombus WAVE with a 135° angle and sides of 4 cm.
 - d) A trapezoid CRAB with two 45° angles and a base of 4 cm.
 - e) A kite CLAM with a 90° angle between adjacent sides of lengths 4 cm and 9 cm.
4. Draw a kite formed by two congruent isosceles triangles.
 - a) What angle is formed where the diagonals intersect?
 - b) Are the opposite angles congruent? Why or why not?
 - c) Are the opposite sides parallel?
 - d) Do the diagonals bisect the angles of the kite?
 - e) The kite has evolved into what figure?
5. *Derive* formulas for the perimeter and area of a kite.
6. A kite with sides 12 and 5 is inscribed in a circle. Find the radius of the circle.

Kite Trivia - In 1847, a suspension bridge was built across the Niagara River with the aid of a kite. When chief engineer T.G. Hulett was unable to carry the first steel cables across the mighty Niagara Gorge, he decided that a kite might solve his problem. A kite-flying contest was held and Hulett offered ten dollars to anyone who could fly a kite line to the other side of the river. Only one flier was successful - a determined young boy named Homan Walsh. When Walsh's kite landed on the opposite shore, the flying line was then tied to stronger lines, which were used to pull the cables in place.

Kite Trivia - In 1887, E. D. Archibald, an English meteorologist, took the first aerial photograph by attaching a camera to his kite.

PART IV - Trigonometry

1. Describe the trigonometric functions Tangent, Sine and Cosine as they pertain to right triangles.
2. Exhibit a proof of the Pythagorean Theorem.
3. A kite is tethered to a stake in the ground by a string 40 feet long, which makes an angle of 60° with the ground. How high is the kite?
4. In problem number 3, if the kite fell vertically to the ground, how far away from the stake would it land?
5. A kite flying 20 feet above the ground is attached to a string 80 feet long. The string is being held by a person on the ground. Find the angle between the string and the ground.
6. A kite flying 30 feet above the ground is attached to a string which makes a 52° angle with the ground. Find the length of the string.

Kite Trivia - In World War II, huge box kites were flown above American war ships to ward off attacking enemy aircraft. Suspended from each kite were long steel wires, which could severely damage an approaching plane and force it down.

PART V - Summary

1. Construct your kite. You may use “take-offs” of samples suggested.
2. Present your design and construction to the class for evaluations. Explain why you believe your kite can fly.
3. Submit your cost & time analysis, your problem set, and your essay to your teacher.
4. Fly your kite!

Kite Trivia - In 1749, two Scottish scientists, Alexander Wilson and Thomas Melville, fastened thermometers to kites in order to record the temperature of the air at high altitudes. This was the first recorded attempt to obtain scientific data using kites.

Part VI - Flying the Kite

Launching

In good winds, you should be able to launch your kite from your hand. Standing with your back to the wind, hold your kite up to catch the wind. Let the line out smoothly, as fast as the wind lifts your kite.

In light or gusty winds, a high-start launch can help get your kite up to the steadier winds above. Have someone hold your kite at least 100 feet downward from you with the string stretched tight. When your assistant releases the kite, reel in line as needed to make it climb. In very light winds, leave your reel on the ground and pull in line hand-over-hand.

Running is the hardest way to launch a kite and the uncontrolled tugging on the line can make the kite dive and crash. Let the wind and your reel do the work for you.

How much wind do you need?

Generally, less than you think. If the trees are swaying and it is hard to walk, you will have a battle on your hands even if your kite does fly. Gentle breezes are much more fun.

Adjusting for the wind

Most kites can be adjusted to fly in lighter or stronger winds. If your kite loops and dives erratically while pulling hard on the line, the wind is too strong. If it wobbles and fails to climb, the wind is too light. If adjusting does not help, the wind is beyond your kites wind-range, so try another kite or another day.

Tails

Adding or lengthening a tail can help a kite in strong winds and shortening or removing a tail can aid in light winds.

Kite Trivia - On April 4, 1975, Kazuhiko Asaba of Kamakura, Japan, flew 1,050 kites on a single line...a world record.

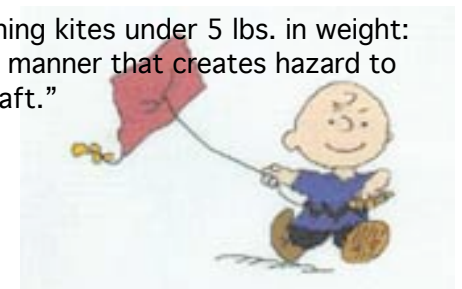
Big Kite Safety

Big kites offer increased performance and excitement but the hazards increase as well. Keep a few common sense precautions in mind whenever flying big kites.

1. Be particularly careful to keep your flying area clear of other people.
2. Fly big kites with a friend. A change in the wind and you may need help to get your kite down.
3. Always wear gloves.
4. If you are unsure of your ability to control a kite in a strong wind, tie the line down before launching. Big airfoils, in particular, can overpower any kite flier in a heavy wind.

What Regulations govern kites?

The FAA has one regulation governing kites under 5 lbs. in weight: “No person may operate a kite in a manner that creates hazard to persons, property, or other aircraft.”



Part VII-Bibliography

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Downer, Marion, Kites, Lothrop, Lee and Shepard Co., N.Y., N.Y., 1959.

Marks, Kites for Kids, Lothrop, Lee, and Shepard Co., N.Y., N.Y., 1980.

Mouvier, Jean Paul, Kites, Franklin Watts, Inc., 1974.

Thomas, Bill, The Complete World of Kites, J.P. Lippincott Co., Philadelphia, PA, 1977.

Wiley and Cheatle, Dynamic Kites, Tab Books Inc., 1988.

Yolen, Will, The Complete Book of Kites and Kite Flying, Simon and Schuster, N.Y., N.Y., 1976.

Suggested Resources:

2003 Internet Sites:

Beginner's Guide to Kites:<http://www.grc.nasa.gov/WWW/K-12/airplane/bgk.html>

Peter's Kite Site: <http://www.win.tue.nl/~pp/kites/>
Plans for making fighter kites
Kites Dot Org:<http://www.kites.org>

The Drachen Foundation: <http://www.drachen.org>

Kites and Kite Flying:<http://www.geocities.com/Colosseum/4569/>

The Virtual Kite Zoo:<http://www.kites.org/zoo/>

Books:

Dolan, Edward, The Complete Beginners Guide to Making and Flying Kites, Doubleday, Garden City, N.Y., 1977.

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