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QuickView

Students design and conduct an experiment to test a KaZoon Kite constructed from a single tetrahedron, from four tetrahedrons, and from 16 tetrahedrons to determine the affect the size of the kite has on lift.

Standards Addressed

NSTA 5-8
Students develop abilities necessary to do scientific inquiry.

- Students identify questions that can be answered through scientific investigations.
- Students design and conduct a scientific investigation.
- Students use appropriate tools and techniques to gather, analyze, and interpret data.
- Students think critically and logically to make the relationships between evidence and explanations.
- Students communicate scientific procedures and explanations.
- Students use mathematics in all aspects of scientific inquiry.

Students develop an understanding about scientific inquiry.

- Students understand mathematics is important in all aspects of scientific inquiry.
- Students understand technology used to gather data enhances accuracy and allows scientists to analyze and quantify results of investigations.

NCTM 6-8
Students select and use appropriate statistical methods to analyze data.

Students develop and evaluate inferences and predictions that are based on data.

Students recognize and use connections among mathematical ideas.

- Students understand how mathematical ideas interconnect and build on one another to produce a coherent whole.

Students recognize and apply mathematics in contexts outside of mathematics.

Students create and use representations to organize, record, and communicate mathematical ideas.

Students select, apply, and translate among mathematical representations to solve problems.

Students use representations to model and interpret physical, social, and mathematical phenomena.

ITEA 6-8
Students develop an understanding of the core concepts of technology.

- Students learn that systems thinking involves considering how every part relates to others.
- Students learn that malfunctions of any part of a system may affect the function and quality of the system.

Students develop an understanding of engineering design.

- Students learn that requirements for design are made up of criteria and constraints.

Students develop an understanding of engineering design.

- Students learn that modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions.

- Students develop an understanding of the role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.
- Students learn that troubleshooting is a problem-solving method used to identify the cause of a malfunction in a technological system.

Time Required

45-90 minutes (will vary with class size)

Content Areas

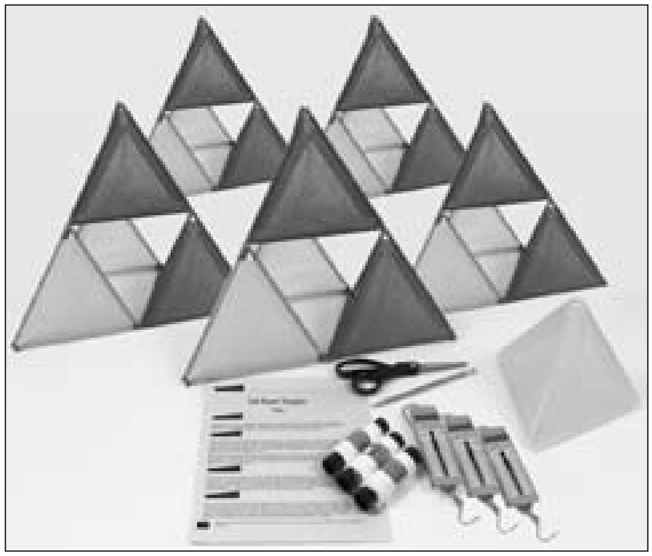
Primary: Science
Secondary: Technology, language arts

Vocabulary

- hypothesis
- lift
- tetrahedron
- vertex
- weight

Materials

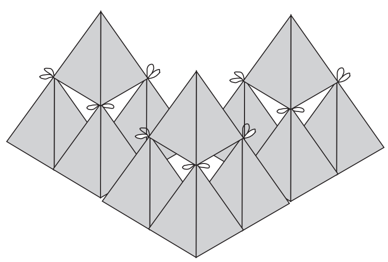
- 5 completed KaZoon Kites
- Completed KaZoon Kite wing
- 3 spools of kite string
- Scissors
- "Lab Report Template"
- Pencil
- 3 spring scales



Procedure

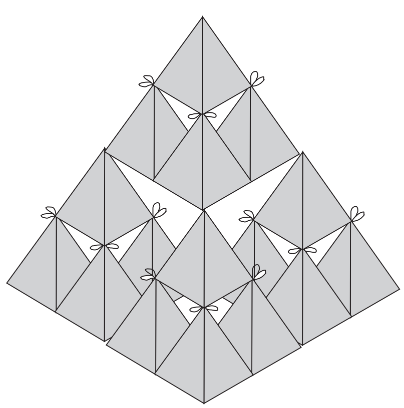
Each KaZoon Kite forms a tetrahedron. Complete the following steps to form four of the kites into a larger tetrahedral kite.

1 Place an uncovered side of each of three KaZoon Kites on a flat surface so they form a triangular shape. Make sure the tissue-covered surfaces point toward the front of the new kite.



2 Use string to tie the corners of the three kites together where they touch at the bases.

3 Place the fourth KaZoon Kite on top of the three attached kites. Make sure the tissue-covered surfaces are all facing the front of the kite.



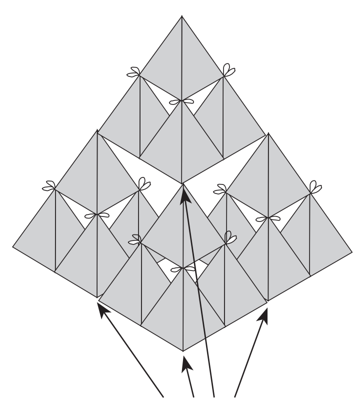
4 Use string to attach the tops of the three base kites to the bottom of the top kite. Trim the excess string from each vertex.

5 The single KaZoon Kite wing, the KaZoon Kite, and the tetrahedral kite made from four KaZoon Kites will be the small, medium, and large kites, respectively, for this experiment.

The large tetrahedral kites are made from 16 wings. All the kites should be similar figures.

6 Attach a spool of kite string to the bottom-front vertex of each of the three kites.

The tissue-covered faces of all wings point toward the front of the kites.



7 Locate the “Lab Report Template.” Write a hypothesis explaining which kite will produce the most upward lift in excess of its mass.

8 Design an experiment to test your hypothesis by attaching the spring scale to the kites while in flight. Hold the spring scale and read the side of the scale to determine the lift of the kite while in flight.

Before the student is allowed to conduct the experiment, verify that it will truly test the hypothesis.

9 Conduct the experiment or experiments you designed and complete a lab report for each experiment following the format of the "Lab Report Template."

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Design and conduct an experiment to test a KaZoon Kite constructed from a single tetrahedron, from four tetrahedrons, and from 16 tetrahedrons to determine the affect the size of the kite has on lift.

Materials

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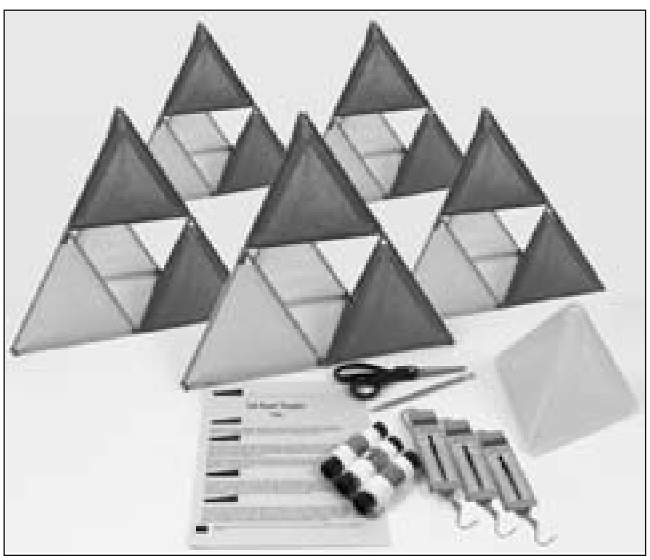

Procedure

Each KaZoon Kite forms a tetrahedron. Complete the following steps to form four of the kites into a larger tetrahedral kite.

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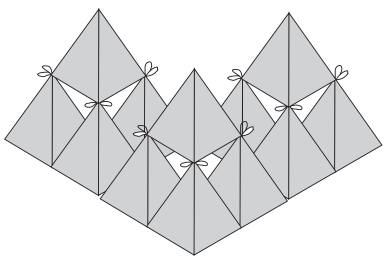
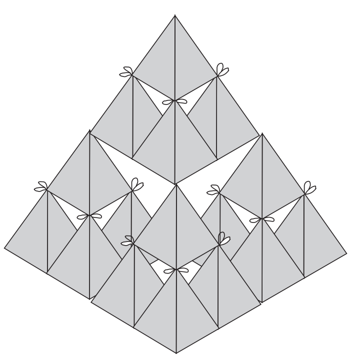


2 Use string to tie the corners of the three kites together where they touch at the bases.

3 Place the fourth KaZoon Kite on top of the three attached kites. Make sure the tissue-covered surfaces are all facing the front of the kite.



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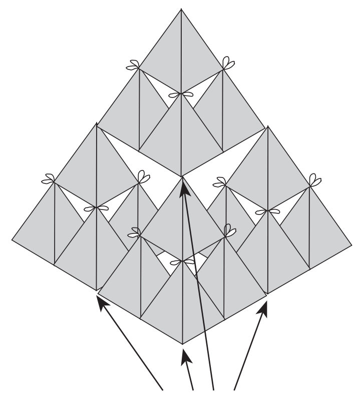

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