



# 4-H Grab and Go: Kites

**Concept:**

Kites rely on wind to overcome gravity

**Age Level:**

Middle School: Grades 5-8

**Education Standard:**

NSES – Physical Science, Science and Technology

**SET Ability:**

Build, Use Tools

**Life Skill:**

Problem solving, Critical Thinking

**Success Indicator:**

Youth will be able to make and fly a kite. They will extend the activity to design and make an improved kite.

**National 4-H Curriculum:**

*The Power of the Wind*  
([www.4-H.org/curriculum/wind](http://www.4-H.org/curriculum/wind))

**PREPARATION**

**Time:** 20 minutes

**Space:** Tables, access to electricity for fans

**Materials**

- 8.5" X 11" sheet of paper for each participant
- Spool of sewing thread for each participant
- Tape
- Scissors
- Fans
- Breezy day

**Background Information:**

Kites have been constructed and flown for thousands of years. They have been used for fun, for military exercises, and for scientific purposes. You may know that Benjamin Franklin used a kite to show that lightning is electricity. There is also historical evidence that General Han Hsin used kites to measure distance in China more than 2200 years ago. Kites have been used to make deliveries across difficult to maneuver distances, and very large kites have even carried people.

Kites are flown in the wind on a line. Lift caused by changes in air pressure overcomes gravity and the line keeps the kite from moving away, so it moves up.

Kites come in many shapes and the lines are attached in a variety of positions. The earliest kites were flat kites that fly at a low angle. In the late 1800's the box kite design appeared, followed by tetrahedral box kites and delta kites.

In this activity you will make a simple small flat kite and then use your engineering design skills to make and build a kite of your own design.

**Instructions for Making a Kite (visuals on page 3):**

**Step 1.** Fold the corner (A) to the opposite side (B) of a sheet of standard 8.5" X 11" paper as shown. Note: There will be a 2 1/2" border remaining on bottom (C).

**Step 2.** Cut off bottom (C). Note: Save the bottom to make the tail in Step 4.

**Step 3.** Fold corner (D) to left side (E). Crease. Turn over and repeat on other side.

**Step 4.** Cut bottom piece (C) lengthwise into four equal strips. Tape together to form kite tail.

**Step 5.** Fold piece (F) down over longer triangle (D). Turn over and repeat on other side.



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## Kites

### BE SAFE

Never fly a kite in rain or lightning.

Do not fly a kite near power lines.

Do not fly a kite near cars or roads.

### QUESTIONS

- What happens when you pull in or let out the kite line?
- Attach a string to a balloon. What happens to the balloon in the wind? Does it fly?
- How is a balloon different from a kite?
- How is a paper airplane different from a kite?

### KITES AND WIND

Part I of the 4-H film, *Into the Wind*, features information about kites. Watch it at [www.projects.4-hcurriculum.org/curriculum/wind/](http://www.projects.4-hcurriculum.org/curriculum/wind/).

Kites fly best when there are no hills, trees or buildings to create turbulence and when wind speeds are between 4 and 12 miles per hour. Observe the wind and use the Beaufort Scale to estimate wind speed. ([www.spc.noaa.gov/faq/tornado/beaufort.html](http://www.spc.noaa.gov/faq/tornado/beaufort.html))

**Step 6.** Make a hole and attach the tail at the end of the end of the kite (at the red circle). Use sewing thread to make a bridle and attach the rest of the spool to the bridle to make the line to complete a kite like the photo.

**Step 7.** Fly your kite!



### Design and Build:

Make some improvements in your kite to help it fly better.

- What happens if you adjust the length of the tail or the length of the bridle?
- What happens if you make the kite larger?
- What else can you change?

Design, build, and fly a kite of your own. Use what you've learned about various kite designs and from flying this small kite.

- Investigate other small paper kites.
- Add struts.
- Consider various points for attaching the bridle.
- Investigate sled kites or delta kites.

### Learn More:

- Do some research to learn about the history of kites.
- Investigate various types of kites.
- Learn about the forces that make kites fly.

The American Kitefliers Association offers valuable information at [www.aka.kite.org/](http://www.aka.kite.org/) and also at their site for National Kite Month at [www.nationalkitemonth.org/](http://www.nationalkitemonth.org/).

The NASA kite site at [www.grc.nasa.gov/WWW/K-12/airplane/shortk.html](http://www.grc.nasa.gov/WWW/K-12/airplane/shortk.html) has information about kite science and mathematics, aerodynamics and other kite information including an Interactive Kite Modeler that allows you to choose from several types of kites to make your own design and see the flight characteristics.

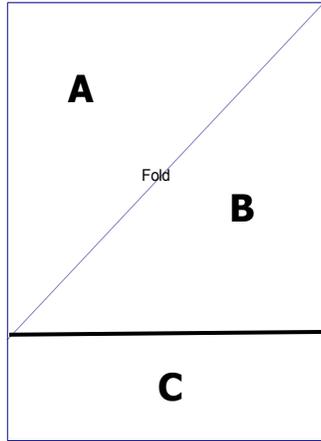
Stanford environmental and climate scientists Cristina Archer and Ken Caldeira are experimenting with kite wind turbines that fly nearly six miles above the earth and generate electricity.

[www.news.stanford.edu/news/2009/june24/high-altitude-winds-062309.html](http://www.news.stanford.edu/news/2009/june24/high-altitude-winds-062309.html)

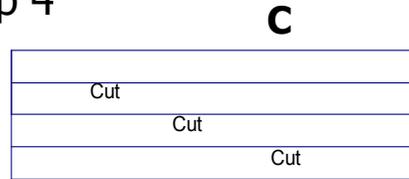


Instructions for making a kite are listed on page 2; visual steps are listed below.

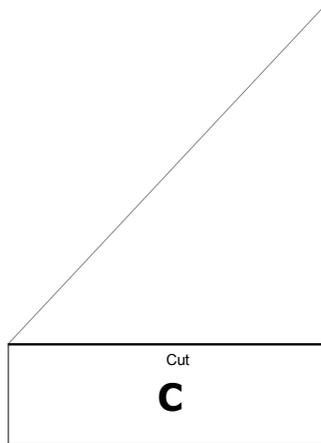
Step 1



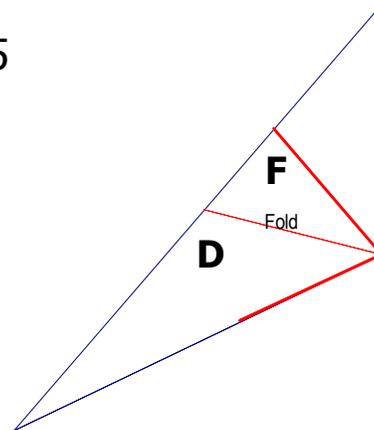
Step 4



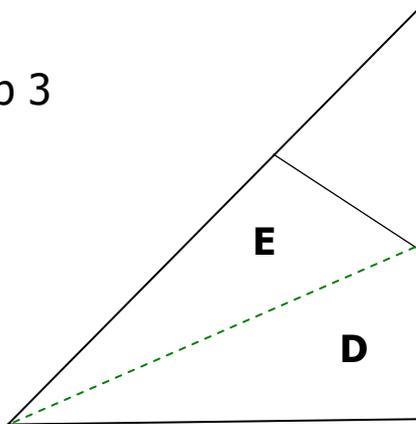
Step 2



Step 5



Step 3



Step 6

