

Curriculum topics

- Aerodynamics
- Engineering
- Forces & Motion
- Measurement
- Ratios & Proportions
- Weather & Climate

Subjects

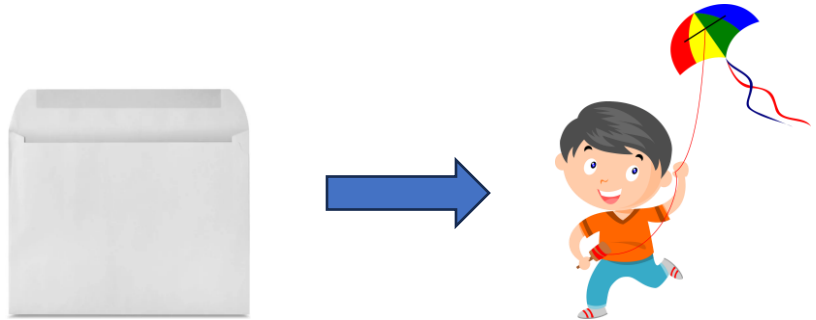
- Earth & Space Science
- Mathematics
- Physical Science

Grade range: 3 – 8

Who we are: Resource Area for Teaching (RAFT) helps transform the learning experience by inspiring joy through hands-on learning.

ENVELOPE KITE

Turn a Large Envelope into a Colorful Kite!



Kites have fascinated people all over the world for centuries. For example, the earliest kites were likely developed in China around 3,000 years ago and were made of bamboo strips covered in silk. The earliest written record of kite flying in China dates to 200 BC. Kites were used for entertainment but were also used for religious or ceremonial purposes, science experiments, and military applications. During World War I (1914 - 1918), equipment and antennae for radio communications were airlifted with kites.

Students make their own kites in this activity by measuring, cutting and folding a large envelope or sheet of paper. They decorate it to their liking and then use it to explore wind, lift, and stability. Students identify points in the kite's design that can be adjusted to optimize flight.



Share Your feedback!

<http://bit.ly/RAFTkitsurvey>

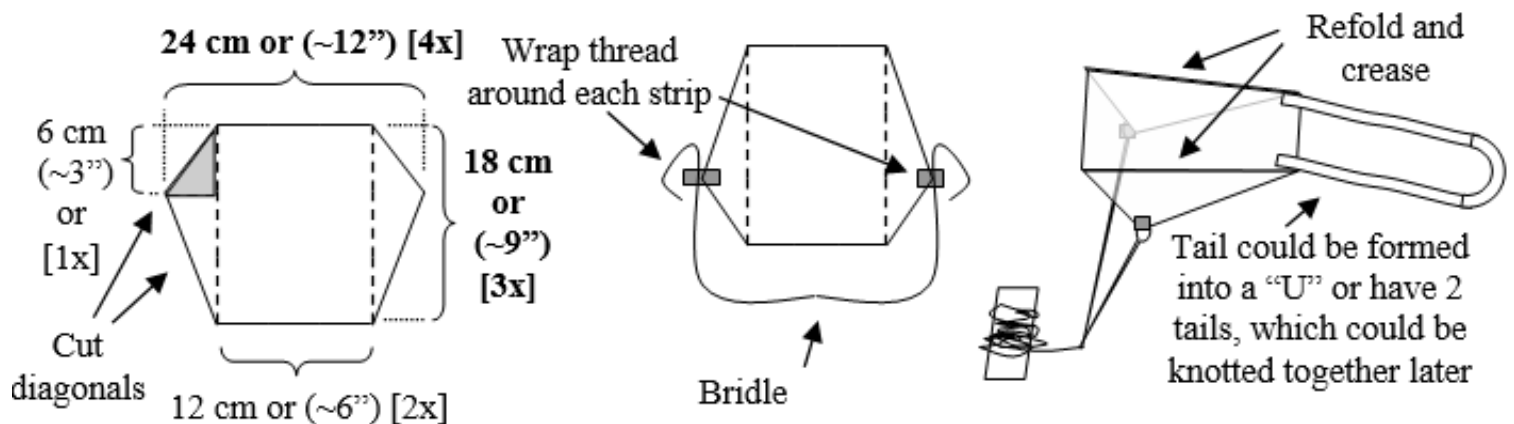
Materials

Materials in the kit may vary but generally, this kit contains the following:

- Envelope, paper or Tyvek, 9-12" (1)
- Cardboard, 2" x 6" (1)
- String, 30 ft. (1)
- Paper clips, small (4)
- **Not included:** Scissors, tape, ruler, pencil, markers/crayons

To Do and Notice

1. **Assembly:** Cut a rectangle from the smooth side of a big envelope using the bolded dimensions or ratios, listed below. Find the middle of a long side by folding or measuring.
2. Fold the narrow sides to the middle, creating 2 creases (dotted lines). Unfold.
3. Fold 2 corners so a side aligns to a crease made in step 2 (see bottom left image).
4. Unfold corners and cut the diagonals as shown.
5. Cut a 3 ft length and a 27 ft length of thread. Securely attach the longer length to a piece of cardboard and wind the slack around the board.
6. Cut two 1½" strips from the envelope's adhesive area. Cut 6-8 longer strips from the remaining envelope material.
7. Attach half of a short strip to 1 side of the kite, as shown below. Wrap the end of the short length of thread around the strip; fold the strip over and attach it to the kite. Repeat for the other side as shown. Use tape or glue if needed.
8. Attach the longer strips together to make a "U" tail or pair of tails. Use paper clips if needed.
9. **Optional:** Decorate the kite with markers, crayons, or stickers.
10. Attach the loose end of the wound thread from step 5 to the bridle's center.
11. **Observation:** Pick a suitable day/time to launch the kite. Avoid power lines or other hazards. The kite can be flown indoors by pulling the kite along briskly.
12. **Discussion:** In which direction is the wind blowing? Is the kite stable (not spinning)? Does the tail need to be made shorter for more lift or longer for more stability?
13. **Share** your learning with RAFT! Submit photos/video via email at education@raft.net or on social media ([Facebook](#), [Twitter](#), [Instagram](#)).



Core Content Skills:

Science & Engineering (NGSS)

Developing and Using Models, Properties of Materials, Cause and Effect, Forces & Motion, Balanced & Unbalanced Forces, Weather and Climate, Engineering, Comparing Multiple Design Solutions

CCSS Mathematics (CCSS)

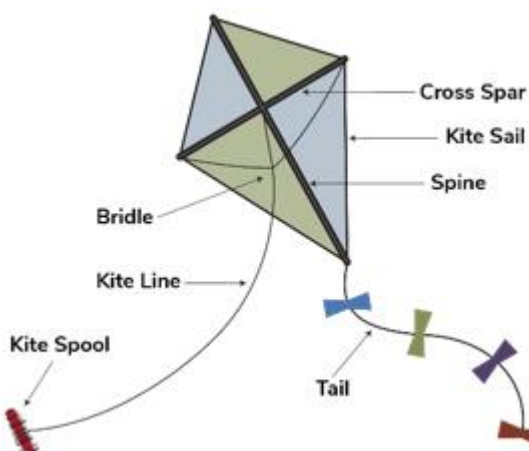
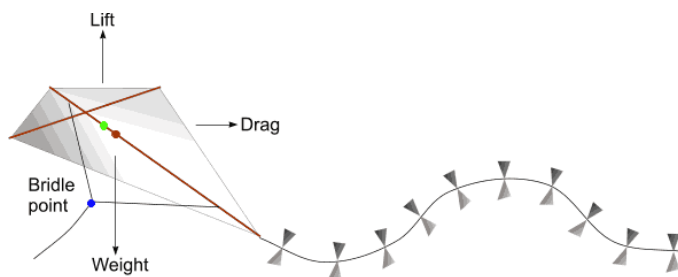
Measurement & Data, Ratios & Proportions

Social Emotional Learning

- Self-awareness
- Self-management
- Responsible decision-making

The Science Behind the Activity

Kites go up when the **lift** (the upward force on a kite due to the kite's surface area, shape, inclination, and the wind) is greater than the kite's **weight** (the downward force of gravity on the mass of the kite). **Drag** for the kite is provided either by vents cut into the body of the kite or by a tail. Drag will help keep the lower end of the kite downward so the kite faces into the wind and is less likely to spin (see below).



Reuse

This kit uses 100% reusable materials designed for other uses. To continue making a positive impact in reducing waste, reuse these materials in other projects. Additionally, any unused materials can be collected and delivered back to RAFT.

Feedback

Please comment on this kit by taking this short survey: <http://bit.ly/RAFTkitsurvey>. Let us know of any material concerns (missing, broken, or poorly fitting parts) as well as any suggestions for improvement.

Visit <https://raft.net> to view related activities!

- Paper in Flight
- Paper Helicopters

Resources

- Top 15 most amazing kites - <https://tinyurl.com/5ckbfmhp>
- Who invented the kite? - <https://tinyurl.com/s7zvmyfd>