

Topics

Aerodynamics,
 Engineering, Ratios &
 Proportions, Wind

Materials

- ✓ Envelope, paper or Tyvek, 9" x 12"
- ✓ String, yarn, or thread
- ✓ Cardboard
- ✓ Ruler
- ✓ Pencil
- ✓ Scissors
- ✓ Tape
- ✓ Optional: Markers, stickers

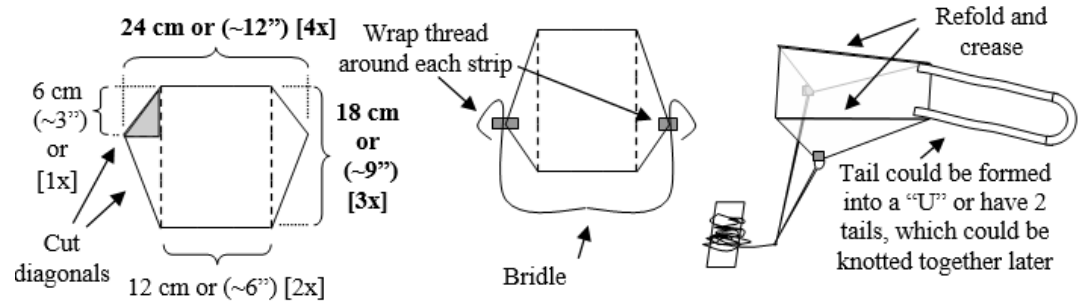
Learning Standards

CCSS Math:
 Measurement & Data;
 Ratios & Proportions

NGSS: Forces & Motion,
 Balanced & Unbalanced
 Forces; Earth & Space
 Science, Wind;
 Engineering, Comparing
 Multiple Design
 Solutions

Envelope Kite

Turn a large envelope into a colorful kite!



Make a kite to explore wind, lift, and stability from an envelope or sheet of paper.

To Do and Notice

1. **Assembly:** Cut a rectangle from the smooth side of a big envelope using the bolded dimensions or ratios, listed above. 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 top left image).
4. Unfold corners and cut the diagonals as shown.
5. Cut a 3 ft length and a 30 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 above. 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.
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. 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?

The Content 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.

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