

Getting Ready

1. Copy the diagram of How an Airfoil Works. If possible, enlarge the copy so that it's easier to see. Mount the diagram onto poster board.
2. If possible, precut the paper strips for the first part of the activity. If not, make sure you have scissors on-hand and give specific instructions about how to cut the paper properly. Note: Make sure students handle scissors carefully.
3. Have some sample Flying Eagle Airplanes constructed before the festival.

Taking Flight!

In this activity participants learn how Bernoulli's Principle works and understand how it creates lift for birds in flight.

Procedure I: Demonstrating Bernoulli's Principle

1. Cut a one-inch-wide strip along the long (11-inch) side of a piece of notebook paper.
2. Hold the front end of the paper between your index finger and thumb.
3. Put your hand below your mouth so your thumb and finger rest just below your lower lip and just above your chin.
4. Now blow. What happens? You might think the paper should be pushed down, but not so. Because of Bernoulli's Principle, it flaps! the air current, being lifted by the low pressure above the strip.

Procedure II: Ready for Flight?

Now have participants try their hands at creating a Flying Eagle Airplane.

1. Copy the Flying Eagle Airplane template and instructions.
2. Follow the instructions to create a flying eagle.
3. Try making adjustments to the wings in order to compare how wing shape affects speed and the length of time the airplane glides before touching the ground. This helps demonstrate the relationship between maximizing lift and minimizing drag (the amount of pull, or friction that air exerts against the wing). Just like the bird's wing, the pressure below is greater and creates lift by pushing up on the wing.

Procedure III: Straw Activity

1. Cut the paper into squares 5 cm by 5 cm.
2. Cut around the bottom of the Styrofoam cup creating a circle 5 cm in diameter. (Make sure the surface of the cup is completely flat on one side or else the experiment will not work.)
3. Cut straws in half creating two half-sized straws.

ZOOM IN, ZOOM OUT!



Practice making and flying the Flying Eagle Airplane ahead of time. The more you practice, the better you will be at helping participants. Here are tips for a successful flight:

- Hold the eagle from behind using your thumb underneath and forefinger above the air-plane by the staple.
- Keep the wings level and nose pointed slightly downwards.
- Make adjustments to the wings, nose, and tail of the eagle to experiment with different flight patterns.

- Try flying your eagle under different conditions:

- At different heights above a fan blowing upwards
- Across the path of the fan wind (i.e. into a crosswind)
- Above the surface of a large object where the wind is hitting the opposite side (this can show lift produced by winds hitting a mountainside and help explain why hawks migrate along mountain ridges)

- Over a black top parking lot on a sunny, still day to see if your eagle can catch thermals

- Have competitions among festival participants to see who can keep their eagle up in the air the longest, who can fly their eagle the fastest, and who can make their eagle perform the greatest number of aerobatics.