



Take Flight

The Big Idea:

Have you ever made a paper airplane? In this activity you'll get to make one, launch it, and do some math to figure out how far it flies!

You Will Need:

- ★ Printer paper: 1 sheet per plane
- ★ A measuring tool (e.g. ruler or measuring tape)
- ★ Pencil and scrap paper

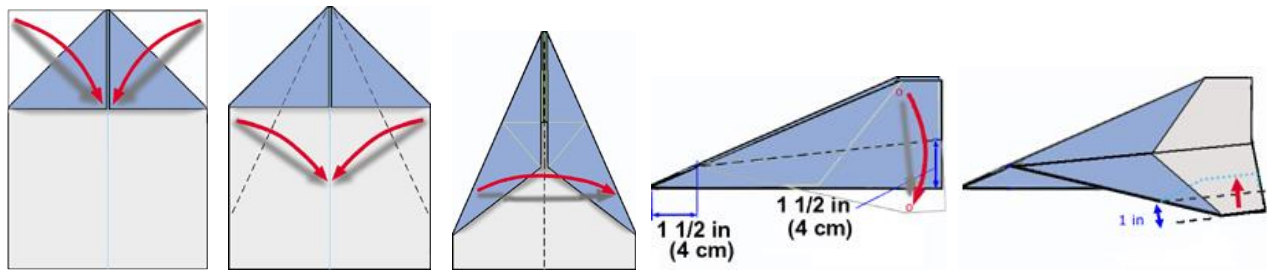
The Math Behind the Scenes:

Just like real airplanes, your paper airplane will rely on aerodynamic forces (thrust, lift, gravity and drag). Unlike real airplanes, you'll fold your paper version symmetrically and measure the distance it travels in different ways.

- ★ **symmetry**: one side of an object looks exactly like the other
- ★ **standard units**: measuring based on a common system, e.g. inches, feet, yards.
- ★ **non-standard units**: measuring in a way that isn't commonly used, e.g. crayons, toy cars, socks.

Take Flight

- ★ Everyone gets a sheet of printer paper.
- ★ Fold each paper into an airplane as shown below (courtesy of amazingpaperairplanes.com).



- ★ Choose a starting point and launch the planes across the room one at a time.
- ★ Measure each flight distance in different ways!
 - Non-standard units: Use a household object as a measuring tool, e.g. a shoe, book, marker, etc.
 - Standard units: Use a measuring tape, ruler, or other measuring tool.
- ★ Record the flight distances on a piece of scrap paper.
- ★ Compare distances. Which plane flew the furthest and by how much? What changes could you make to your plane for it to fly farther? Try it!

Riddles and Questions

Kindergarten: If you laid down on the floor from the starting point, which is longer - you or the length your airplane flew?

1st-graders: Find 3 objects you can hold, e.g. pencil, LEGO[®] piece, book. Put them in order from shortest to longest. Where would your paper airplane fit?

2nd-graders: Use your paper airplane to estimate the lengths of other items. For example, how many paper airplanes long is the table?

3rd-graders: If your paper airplane is 1-foot long, how many inches is that?

4th-graders: Look closely at the angles on your paper airplane. Do you have more obtuse, acute, or right angles?

5th-graders: If your plane flew 8 yards, how many inches is that?

Answers:
K: Answers will vary.
1st: Answers will vary. Remember to line up the objects from the same starting point!
2nd: Answers will vary.
3rd: 12 inches!
4th: Hint: Right angles are 90 degrees, acute angles are less than 90 degrees, and obtuse angles are great than 90 degrees.
5th: Remember, 1yd = 3ft and 1ft = 12in.; 8 x 3 = 24in.; 24 x 12 = 288in