

Far Flying Variables

Estimated Time: 45 minutes

SUMMARY: In this experiment students create a paper airplane and test to see what variables impact the distance their airplane can fly. Students control the type of paper, method of creation of the airplane, amount of force used in deployment, and the size of the airplane to create the farthest flying airplane.

WHAT YOU'LL LEARN

- Recognize the difference between **dependent, independent, and controlled variables** in an experiment.
- Identify and maintain experimental controls.
- Measure impact of the independent variable on the dependent variable.

Materials Used

- Ruler
- Scissors
- Tape
- Measuring tape
- Paper (office paper, construction paper, wrapping paper, cardstock, etc.). Several sheets of whichever you choose to use.
- Pen or pencil

WHAT TO DO

1. Identify a method of creating a paper airplane. Use your favorite fold, or try one of the plane designs from here: <https://www.hgtv.com/design/make-and-celebrate/handmade/how-to-make-a-paper-airplane>.
2. Choose two or three types of paper - it can be whatever size and type of paper you want, it just has to be two or three different sheets. Record the starting size of your paper, length by width.
3. Fold a paper airplane out of each sheet of paper, using the same plane design for each paper.
4. Record your airplane's length (nose to tail) and width (widest part of the wing). Record the type of paper you used.
5. Paying close attention to how you hold the plane and how hard you throw it, launch each plane. Keep your force (how hard you throw the plane) and your height launching the same for each plane.
6. Measure the distance from your launch point to the landing point of your airplane, being careful to measure the exact same way (for example, if one of your planes landed sideways, measure the part of the plane that is the farthest from your starting line, OR just always measure where the nose lands).
7. Repeat your test at least twice more. Does one plane consistently fly farther?
8. If you have one plane that flies farther, what is different about that plane? Construct an experiment to test if the variable you identified (could it be weight of the paper? size of the paper?), and see if the impact on the distance is consistent.

TIPS

- Independent variables are what is changed in the experiment (size and type of paper in this experiment)
- Dependent variables are the result of the experiment. They will change as you change the independent variable. When you changed the size of your paper, what did it do to the distance that the plane flew?
- Controlled variables are what you maintain through your test. In this case your airplane design should remain the same for each plane, as well as how you launched it. Can you think of a few other experimental controls that are in this design?