

Activities with Paper

How To Make and Test a Paper Airplane

Art/Math

Grades K-4

One Lesson





Overview

In this lesson, students will learn how to make a paper airplane. They will then test whose airplane flies farthest and will record the outcomes on a graph. After examining the physical construction of the farthest-flying plane, students will make hypotheses about why it flew the farthest. They will then make adjustments to their planes to improve performance. Last, students will fly their planes once again. They will record the results of this second flight on their graph.

For Kindergarten students: we have provided instructions for Plane #1: a super-simple plane construction.

For students in Grade 1 and above: we have provided instructions for Plane #2: the classic “dart” plane with just a couple more steps than Plane #1.

Objectives

Students will learn:

- How to build a paper airplane for distance flying
- How to record data on a graph
- How to compare and contrast different paper airplanes and infer the reasons for their flying distances.
- How to apply what they have learned to make their paper airplane fly further.

Activities

Explain that today the class will learn how to make a paper airplane. Point out that after the paper airplanes are made, the class will have a contest to see whose plane can fly the furthest. Share “a word to the wise”: the person who follows the directions most closely stands the best chance of building the “farthest-flying” plane.

Explain that many inventors begin their invention process by building things with paper. This is because paper is light, cheap and easy to make things with. Today we will build an airplane with paper.

Use the How to Make a Paper Airplane directions to guide your students through the process.

If working with Kindergarteners, follow steps for making Plane #1.

If working with students in Grade 1 and above, follow steps for making Plane #2.

MATERIALS

- Clear instructions where all students can see them
- One sheet of paper per student
- Measuring tape
- Masking tape
- Two instruction sheets per student
- Three worksheets for flight test recording per student
- A pencil for each student

OTHER RESOURCES

Videos can be very helpful in learning how to make paper airplanes. We encourage you to look on Teacher Tube for videos that may help your students visualize the process.



Set Up Your Flight Test

1. Make sure that all students have written their names or their team's name on the wing of their planes.
2. Find an area of your classroom or hallway where there is at least ten feet of open space.
3. Use masking tape to mark the "starting line." This is where students will stand when they launch their plane.
4. Use masking tape to indicate 2 feet, 4 feet, 6 feet, 8 feet and 10 feet. Label each distance on the tape by number.
5. On a large piece of graph paper, set up your graph as seen on the Worksheet.
6. Assign two children the role of "measurers." Assign another two children the role of "recorders."
7. Explain to children that the test is for distance not for speed. They should be trying to send their plane as far forward as possible.
8. Have students launch their planes one at a time. After each plane has been launched, the measurers should use the measuring tape to get the exact distance. The measurers announce the distance. The recorders record the distance on graph paper. Be sure to supervise both for accuracy.
9. When all planes have been launched, ask students to use the graph to identify the person whose plane flew the farthest.
10. Ask to see the winning plane. Hold it up and ask students to observe its physical properties. Is it crisply folded? Are there other aspects of the plane that might explain its ability to fly a long distance?
11. Ask the winning student to demonstrate his/her launching technique. Have students copy the winning launching technique.
12. Give students five minutes to make any changes to their plane that will improve it. Students may also practice their launching technique. At this point, you may also invite students to modify their planes in any way that may help it to fly farther. This may include making additional folds to the wings or tail.
13. Assign the measuring and recorders tasks to two other pairs of students. Provide a different color marker to the recorders to signify the second flight.
14. Repeat steps 8 and 9.
15. Have students copy the graph from the board onto their worksheet. For homework or an in-class activity, have them respond to the comprehension questions on the Worksheet.

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Adaptations

You may wish to divide your class into teams of two or three with each team producing one paper airplane. This option may encourage collaboration and teamwork.

Evaluation










Evaluate whether students recorded data on their worksheet graph accurately by comparing it to the large master graph. Evaluate the inventiveness and reflection of each student by reading their responses to the worksheet. In your feedback, emphasize the importance for patience, persistence and problem-solving for all inventors.



Name: _____

Date: _____

How to Make Plane #1:

1.  Take a piece of paper. Place it on your desk so that it is in portrait orientation.
2.  Fold it in half vertically. Be sure to press down on the crease hard.
3.  Now place the paper so that it is again in portrait orientation.
4.  Fold the two top corners of the page down so that they meet the indented line in the center made by the fold.
5.  With the top corners folded inward, you should be able to see the nose of the plane.
6.  It's time to work on the wings. Fold the wings down to meet the bottom of the plane.
7.  Write your name on a wing of your plane.
8.  Lift the wings up. Your plane should now LOOK like a plane.
9.  Holding the center bottom of your plane, send it into flight!










How To Make and Test a Paper Airplane



Name: _____

Date: _____

How to Make Plane #2:

1.  Take a piece of paper. Place it on your desk so that it is in portrait orientation.
2.  Fold it in half vertically. Be sure to press down on the crease hard.
3.  Now unfold the paper so that it is again in portrait orientation. You should see an indentation of a line running down the middle of the page.
4.  Fold the two top corners of the page down so that they meet the indented line in the center made by the fold.
5.  Now fold your paper vertically again. With the top corners folded inward, you should be able to see the nose of the plane.
6.  Take the angled edge and fold it so that it meets the middle indented line. Do this on both sides.
7.  Fold the plane inward along its central vertical line.
8.  Fold the two flaps down to make the wings.
9.  Your plane is done! Send your plane into flight!



After every plane has flown, record how far each plane flew in the graph below.

[illegible]





Name: _____ Date: _____

Flight Test #1

1. How many planes flew beyond 3 feet? _____
2. How many planes flew beyond 6 feet? _____
3. What can you do to make your plane fly farther? (Think about what you observed about the winning plane and its launch) _____

Flight Test #2

1. How many planes flew farther than 3 feet? _____
2. How many planes flew farther than 6 feet? _____
3. Did any plane fly farther than 10 feet? _____
4. Compare and contrast the results of Flight Test #1 and #2. Did most students fly their planes farther the second time? _____
5. Did you fly your plane farther the first time or the second time? _____
6. What explains the difference in your flight test results? _____
7. For homework, make another paper plane. Try to do it from memory. What was it like making this paper plane from memory? Was it easier than the first time? Or harder? _____
8. Did you feel you made a better plane for homework than you did in class? Or a worse one? _____

9. Make a plane twice more at home. If you have a brother or sister you can teach, try to show them how to make the paper plane. What do you notice as you make the plane more and more often? Do you get better or worse at it? What aspects of plane making do you get better or worse at? _____

10. Inventors go through the same process that you have gone through in making and testing your plane. Inventors tend to make things over and over again until they figure out how to make them just right. Now that you have done this with paper planes, can you explain why “practice makes perfect” when it comes to making things well? _____
