

## PAPER AIRPLANE GRAVITY LESSON

Supplies: PAPER...LOTS OF PAPER, SCISSORS, PAPERCLIPS (simulate drag), TAPE (mark lines to fly beyond)

Procedure:

1. Use tape to create three lines that students will be attempting to get their paper to fly beyond.
2. Hand out a piece of paper to each student. Have students get into a line and attempt to get a flat piece of paper to fly beyond the lines.
3. Let them get back in line and this time before they have their paper fly let them crinkle it up into a ball.
4. Ask students: How did the paper fly differently between their two flight attempts? Why do they think that is?

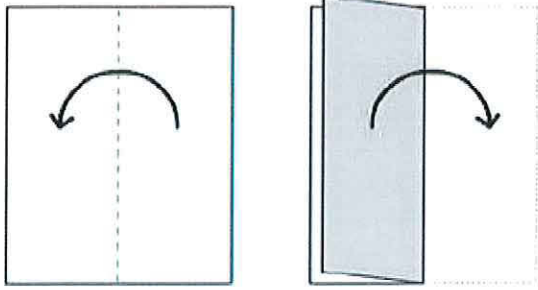
*"There is more air pressing on the surface of the flat piece of paper than on the surface of the paper ball. The crumpled up ball has less air to push out of the way as it falls than the flat piece of paper does. ... Hold up two index cards, one on edge and the other flat. Drop them both at the same time."*

5. Let them add a couple more crumpled pieces to their paper ball and attempt another flight.
6. Now the fun part. Let them start with a fresh piece of paper and create a paper airplane. They can attempt multiple flights once their paper airplane is created. Adding paper clips to impact drag and trying different folds.
7. Discuss gravity and how paper airplanes work alongside gravity to make their flight even longer than the crumpled up paper ball:

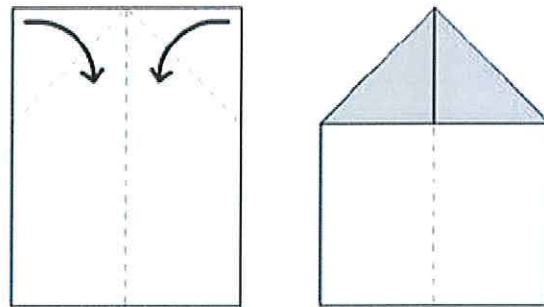
*"While the plane is flying forward, air moving over and under the wings is providing an upward lift force on the plane. At the same time, air pushing back against the plane is slowing it down, creating a drag force. The weight of the paper plane also affects its flight, as gravity pulls it down toward Earth."*

8. Have the students help clean up the paper mess before they switch to the second activity or the end of class.

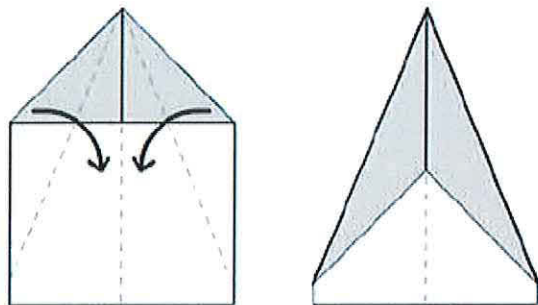
**STEP 1:** Turn your paper so the printed side is facing down. Fold the paper in half, crease the edge, and unfold.



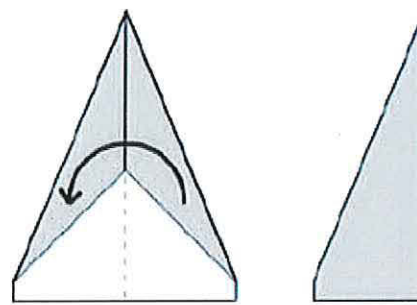
**STEP 2:** Fold the two upper corners down at a 45-degree angle. Make sure the edges line up with the center crease.



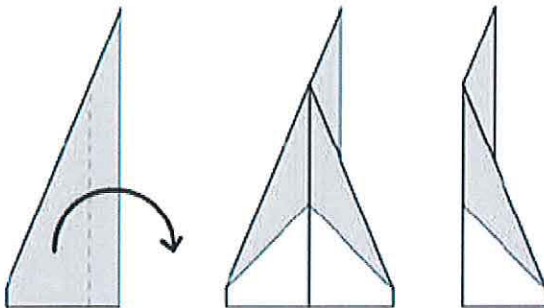
**STEP 3:** Fold each side again. Make sure the edges line up with the center crease.



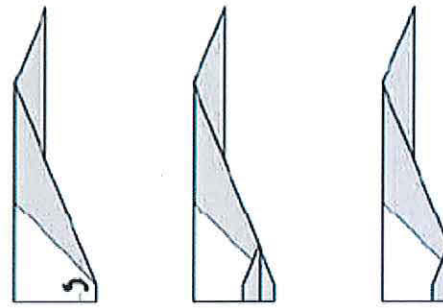
**STEP 4:** Fold the paper in half along the center crease.



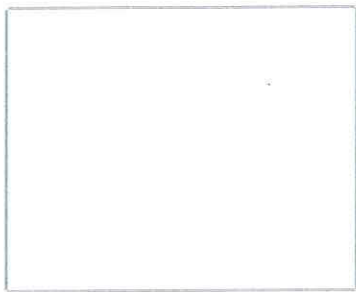
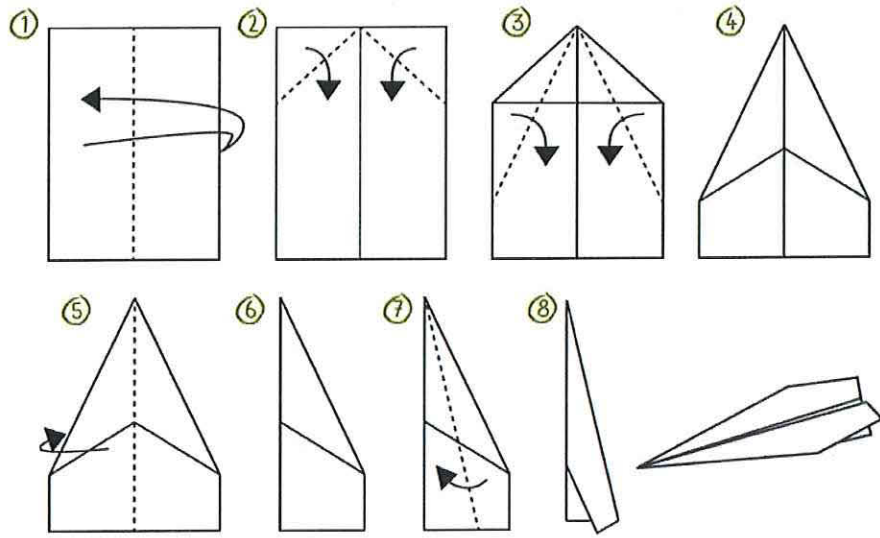
**STEP 5:** Fold the wing along the line shown. Repeat on the other side.



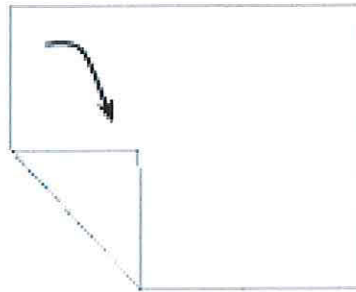
**STEP 6:** Fold the wing fin along the line shown. Repeat on the other side. Open the wings and fly!



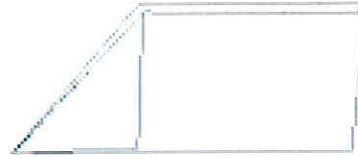
# PAPER AIRPLANE DIAGRAM



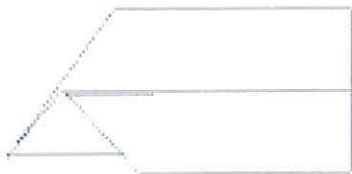
Step 1



Step 2



Step 3



Step 4



Step 5



The finished plane

