



AEROLAB

CENTER OF GRAVITY

Name _____ Class Period _____

Background: The center of gravity of the plane is the point at which it could be balanced. For example, if you were to balance a model plane on your finger, you would be balancing it on its center of gravity.

Directions: You will be working in groups to determine how changing the center of gravity affects the flight of a *JETSTREAM*. Follow the steps below.

1) Calculate the distance your plane will fly around the pylon in one revolution:

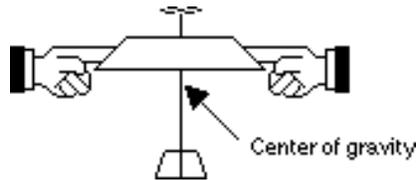
The **radius** from the pylon to the fuselage = _____ meters

One revolution = Circumference = $2\pi r$ = _____ meters



2) Move your wings forward in the slot, toward the nose of the plane.

3) Use your fingers to support your plane at the end of each wing. Please note that the center of gravity is behind the center of lift of the wings.



4) How does your plane balance when you hold it by its wings? Check one:

_____ Its nose is pointed up.

_____ The plane is level and balanced.

_____ Its nose is pointed down.

5) Make sure that your wing is still all the way forward. Wind the rubber motor with a winder and attach your plane to a pylon. Wind your rubber motor the same number of times for each trial. Release your plane and watch it fly. Repeat this procedure two more times and record your data in the table on side two of this sheet.





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6) Record your data in this table:

Wing Placement (cm)	Number of Revolutions in the Air around Pylon:			Average Number of Revolutions in the Air	Average Distance Flown (m)
	Trial 1	Trial 2	Trial 3		
Forward in the slot (0 cm back)					
0.5 cm back					
1 cm back					
1.5 cm back					
2 cm back					

7) Calculate the Average Distance your *JETSTREAM* flew:

$$\text{Average Distance} = \text{Distance in one Revolution} \times \text{Average Number of Revolutions in the Air}$$

8) How did your plane behave during its flights when the wings were near the nose? Draw and explain.

9) How did your plane behave during its flights when the wing was toward the tail? Draw and explain.

10) What wing placement resulted in the greatest average distance flown?

11) How would you position the wings to ensure a long flight? Check one:

- The wing should be closer to the nose (in front of the center of gravity).
- The wing should be positioned near the center of gravity.
- The wing should be positioned near the tail (behind the center of gravity).

