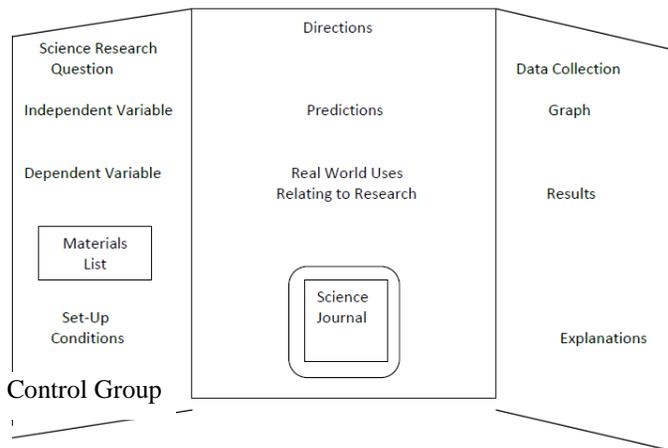


EXPERIMENT REFLECTIONS: (Write a paragraph which includes thoughts, concerns, discoveries, or further questions to explore. What might you do differently next time?)

I learned a lot from this experiment. I learned that it is possible to balance the weight of objects in order to make them travel farther. I would like to try another project with the paper airplane by changing the length of the airplane (fuselage) in order to see how far the airplane travels.

Your presentation board CAN be setup in the following format.



SCIENCE INQUIRY PROJECT GUIDE (SAMPLE RESPONSES)

Wondering:

I wonder what would make a paper airplane fly the farthest distance.....

SCIENCE RESEARCH QUESTION:

How does the weight of the nose on a paper airplane affect the distance it will travel when measured in centimeters?

PREDICTIONS: (List 3 Possible Outcomes – increase, decrease, no effect).

- 1.) Increasing the mass of the paper airplane will **INCREASE** the distance that the airplane will travel.
- 2.) Increasing the mass of the paper airplane will **DECREASE** the distance that the airplane will travel. ** (This indicates my prediction)
- 3.) Increasing the mass of the paper airplane will **result in the SAME** distance that the airplane will travel.

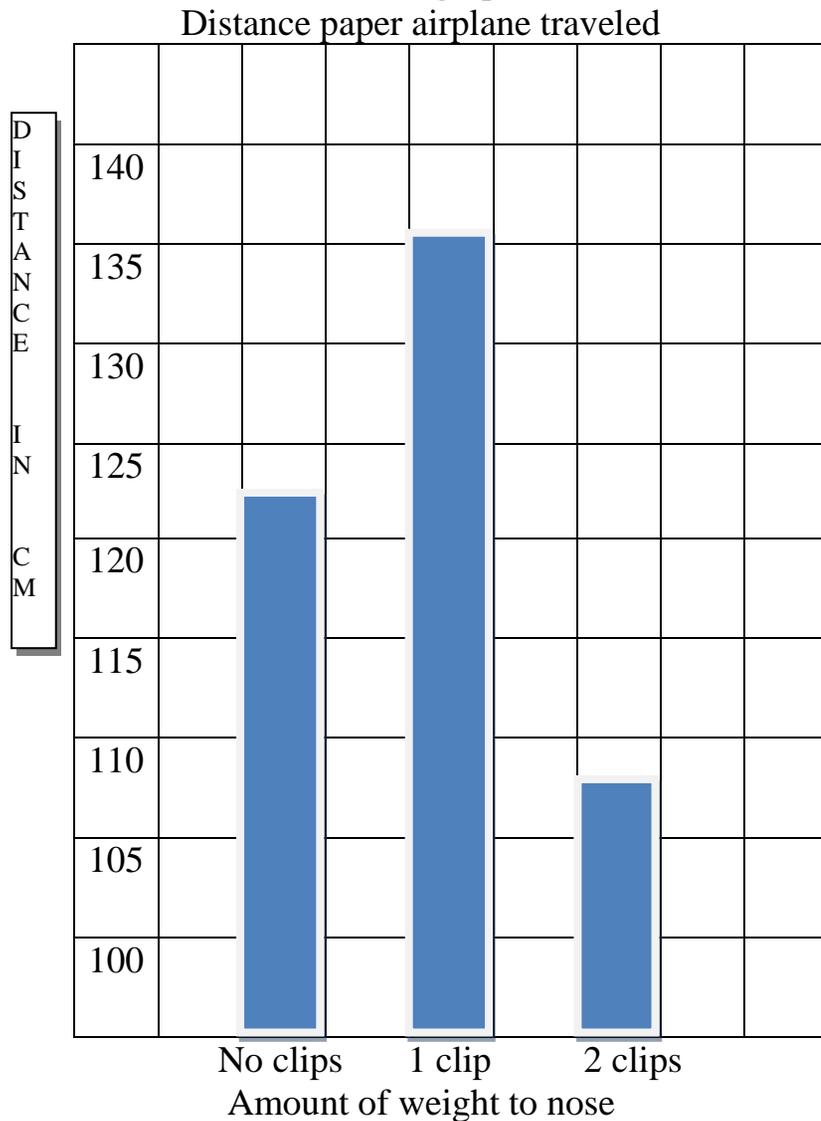
EXPLANATION: (Explain whether or not your data supports, or fails to support your identified prediction. Explain why, including facts and details!)

The distance did increase when I added 1 paper clip. However, I was surprised that the distance decreased when I added a second paper clip. I believe this happened because the nose of the plane became too heavy. When the plane was released, the nose of the plane descended much quicker. I think the plane was more balanced in weight when only 1 clip was on the nose.

REAL WORLD USES: (A description of ways, places, or situations where the information from your experiment might be useful.)

I think it is important when inventors are designing aircraft to take in consideration the weight of the parts of the airplane. I remember watching a science movie about early airplanes. Most of the early aircraft were unsuccessful because they were too heavy, especially the nose. One of the planes crashed nose first because the weight was not balanced.

GRAPH: (A mathematical picture of the data, using averages to plot data in the experiment. Remember to label the graph.)



INDEPENDENT VARIABLE: (Identify the one thing you will change in the experiment.)

I will **change** the weight of the nose by adding a paper clip (no paper clip-control group, 1 paper clip, 2 paper clips)

DEPENDENT VARIABLE: (Identify what you will be measuring (metric) and identify the tool(s) used.)

I will **measure** and record the distance the paper airplane travels measured in centimeters using a tape measure.

CONTROL GROUP: (set of data under normal conditions)

The control group will be recording the distance the paper airplane travels measured in centimeters without any paperclips.

SET-UP CONDITIONS: (List all materials and procedures that will remain constant to ensure fair testing.)

- *The same size/length and mass of paper.
- *The same fold and shape of the paper airplane.
- *The same size/mass paper clip (2g)
- *The same amount of force throwing the airplane.
- *The same angle of release.
- *The same location (throw airplane in classroom).
- *The same point of measure (point when airplane touches down)

MATERIALS: (List all materials that will be used including size, quantity, and descriptions such that others could duplicate your experiment.)

- *Regular printer paper (11x8.5) 1 piece
- *2 paper clips (2g each)
- *Taper measure (in centimeters)
- *Data collection chart
- *Pencils

PROCEDURES: (List step by step procedures in the exact order it was done.)

#1 – Take the 11x8.5 piece of printing paper and fold into desired paper airplane form.

#2 – Designate an area in the classroom to release the paper clip.

#3 – For the first 10 trials (the control group) add NO paper clips to the airplane.

#4 – Mark a starting point on the floor (tape).

#5 – Hold the paper airplane half way on the fuselage and reach back to your ear.

#6 – Using the same releasing force, launch paper airplane.

#7 – Measure and record the distance the airplane traveled in centimeters using a tape measure.

PROCEDURES: (continued.....)

#8 – Repeat steps 5-7 increasing the amount of paper clips from 1 and then to 2 for 10 trials.

#9 – Find the average distance traveled for each weight tested.

DATA COLLECTION: (Data is usually represented in a chart form. Do 10 trials and use metric measurements.)

Items tested	1	2	3	4	5
Control group No clips!	120cm	122cm	120cm	123cm	122cm
1 clip	130cm	135cm	135cm	138cm	136cm
2 clips	102cm	105cm	105cm	112cm	115cm

6	7	8	9	10	average
125cm	120cm	126cm	126cm	123cm	122.7cm
137cm	138cm	140cm	134cm	132cm	135.5cm
106cm	107cm	110cm	106cm	108cm	107.6cm

Results (Mathematical Statements from the data. What does the data show?)

*The average difference increase in distance from no clip to 1 clip was 12.8cm. The average difference decrease in distance from 1 clip to 2 clips was 27.9cm. The farthest distance traveled was 140cm with one clip on trial 8.