Name: _____

Date: _____   Block: _____

Designer Planes

Please follow the directions for this lab carefully. *An essential component of this lab assignment is following all behavioral expectations during Teacher instruction & Student Lab activities*. See the attached rubric for further details regarding how you will be graded.

Background

In this lab you will design a paper airplane and observe its flight. You will work in pairs. Each pair will create one paper airplane and observe: [1.] How far it flies in a straight line (*cm*), and [2.] its "Hang-time" (How long it stays in the air, in seconds (*s*). We will have a competition to see what plane can achieve the longest flight (cm) and longest hang-time (s).

After you have collected data for flight – **distance and hang-time for FIVE trials**, you will use class information to determine mean, median and mode.

Materials

8.5" x 11" White Copy Paper	Scissors (optional)
Meter Sticks	Stopwatch
Science Binder	Pencil or Pen

Procedure:

Part 01:

1. Select a partner to work with for this activity. Some classes may have groups of three.

2. Obtain the necessary materials to complete the assignment. You will need one piece of paper, and markers to decorate and label your plane. Each student will be responsible for submitting their own set of results.

3. Construct a paper airplane out of one piece of paper. You may use scissors to modify the design, but no additional materials are to be used.

4. With the class, proceed to the flight area. Ms. McNutt has marked off the launch line for your planes.

5. Once you are in the lab, you will pair with another group. Between the four of you, you will test your planes. **Each group will have a timer and a meter stick. You will need to collect the flight**

time AND distance for 5 different launches of your plane. <u>Record the distance traveled in centimeters!</u>

6. After you have all of your data for your plane we will return to the classroom to build graphs and work on compiling class data for mean, median and mode.

Record Initial Observations

Measure the dimensions of your airplane and draw a detailed illustration to scale in the space below. Use the diagram on the previous page to label the parts of your plane.

Scale:

Record Data

Trial #	Distance (*cm*)	Time (*s*)	*Flight Path Errors?*
1			
2			
3			
4			
5			

Part II:

1. Modify your original airplane design, making substantial changes to alter the flight path and hang time.

2. List your variables and constants (controlled) in the data table below.

3. Once you are in the lab, you will pair with another group. Between the four of you, you will test your planes. **Each group will have a timer and a metre stick. You will need to collect the flight time AND distance for 5 different launches of your plane.** Record the distance traveled in centimeters!

4. After you have all of your data for your plane we will return to discuss the relationship of your variables to your results.

Example Chart for IV, DV & Controls

Student Action	Purposely Changed Independent Variable	Response to Change Dependent Variable	Remained the Same Constant
Refolded Added Clips Added Tape	Wing Shape Center of Gravity Weight of Plane	Flight Time Total Distance Straight Travel Flight Path/Trajectory	Size of Paper Texture of Paper Weight of Paper

Essential Questions to Answer (in Complete Sentences)**:**

1.) What actions did you perform on your plane?

2.) What did you purposely change about your plane? (Independent Variable)

3.) How did you determine your plane's response? (Dependent Variable)
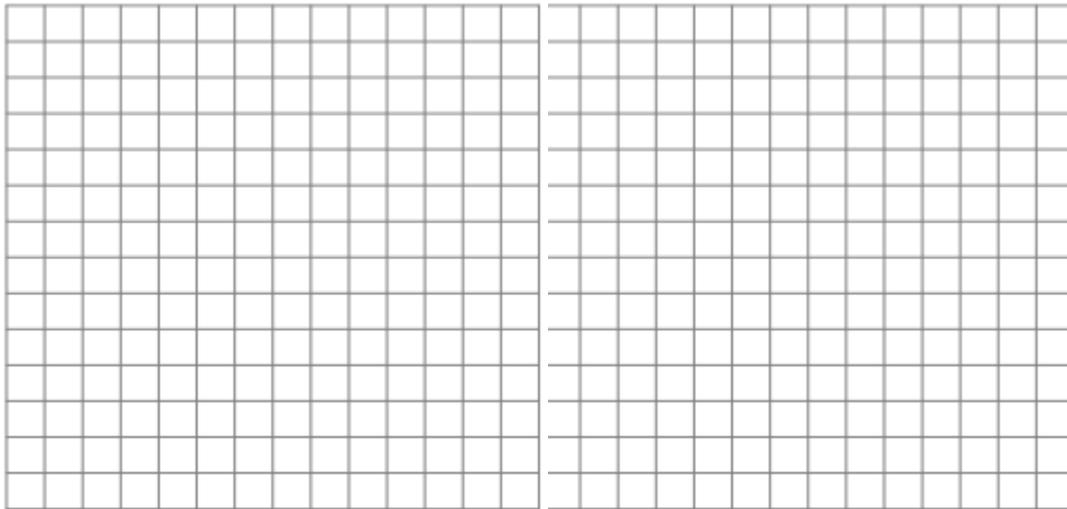

4.) What remained the same about your plane? (Control)

Record Data

Trial #	Distance (*cm*)	Time (*s*)	*Flight Path Errors?*
1			
2			
3			
4			
5			

Part III: Graphing Results

Pay attention to what variables are placed upon each axis! Use the provided graph paper and attach them to your lab for submission.

Graph 1: Create a bar graph to compare 5 trials from your flight, showing the distance of each.

Graph 2: Create a bar graph to compare 5 trials from your flight, showing the "hang time" of each.