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**Physical Science** **Paper Airplane Lab**



**OBJECTIVE**

▪         Demonstrate the principles of the scientific method using paper airplanes.

▪         Measure the distance traveled.

**MATERIALS**

▪         Three sheets of plain paper

▪         Ruler or meter stick

**ROLES**

1. You will work with a partner to design and construct your plane.
2. Two pairs (group of 4) will work together to test each design and collect data.
* In each group you must have:
	+ **Pilot** to fly the plane.
	+ **Measurer (2)** to determine distance traveled.
	+ **Recorder** to record data and observations.

**PROCEDURE**

**Part I. Observation**

1. Construct an airplane out of paper. This will be the first test plane or the control.
2. Draw a diagram of your plane. Include measurements in your diagram of the length of the plane, width of wings at widest point, etc.
3. Measure the distance, in the direction of intended flight, in meters from where you threw the plane to where it landed. Record your measurements in the data table.
4. Repeat letter B two more times so that you have three recordings. Take the average and record them in the data table.
5. On the data table, make observations about the flight. Your observations must be specific (for example: did it turn up, go down, turn right or left, glide well, take a nose dive, etc.?).
6. Discuss with your lab partner the reasons that your plane did what it did. List the possible reasons after the observations. Next, answer: What can you do to make your plane fly farther?

**Part II. Forming a Hypothesis**

Write a hypothesis to explain how your can change your plane to make it fly farther. (Remember to write your hypothesis in the formant: If…then).

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**Part III. Variables**

Independent Variable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dependent Variable \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Controls (at least 3) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Part IV. The Experiment**

A.     Design a new plane. To test your hypothesis you must *change only one aspect of your plane at a time*. Construct your new plane so that only one aspect has changed.

B.     Test your new plane to see if your hypothesis is correct. *Repeat B through F to test this plane the same way you tested your plane in Part I of this lab.*

C.     Record your measurements and observations in the data table.

**Part V. Make Observations and revise Plane**

A.     Design a new plane. To test your hypothesis you must *change only one aspect of your plane at a time*. Construct your new plane so that only one aspect has changed.

B.     Test your new plane to see if your hypothesis is correct. *Repeat B through F to test this plane the same way you tested your plane in Part I of this lab.*

C.     Record your measurements and observations in the data table.

**DATA TABLE**

|  |  |  |
| --- | --- | --- |
| **Design #1**  | **Distance Traveled** | **Observations** |
| 1 |   |   |
| 2 |   |   |
| 3 |   |   |
|  **Average**  |   |  |
| **Design #2** | **Distance Traveled** | **Observations** |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| **Average**  |  |  |
| **Design #3** | **Distance Traveled** | **Observations** |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| **Average**  |  |  |

**Part VI. Analyze Data**

Use graph paper to create a bar graph to *compare* your *average distance* traveled for *each design*. Be sure to give your graph a title and label each axis. Use a ruler for straight lines and color your graph.

**Part VII. Conclusions**

***Each student must answer the conclusion question and hand them in!***

**1.** What relationship did the size of your plane’s wings have on the distance it flew? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**2.** List what changes you made to your planes and how each change affected their flight. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**3.** Could you have had differences in the angle the plane was thrown and/or did more than one person throw the plane?
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**4.** How did you account for the differences mentioned in the previous question?

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**5.** In which step did you have a control test?

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**6.** Why is it that instructions said to change only one aspect of your plane each time?

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**Concluding Summary**

Write a paragraph summarizing your conclusions for this experiment. In your paragraph include which design gave you the longest distance. Describe the design changes that you made for each design.

|  |
| --- |
| **Diagram Design 1** |
| **Diagram Design 2** |
| **Diagram Design 3** |