

Experimental Design Test
12/2/17
Raisbeck Aviation High School

Names: _____

School: _____

Team Number: _____

Background:

The Boeing company has been commissioned to design a new glider for the United States Air Force special forces. Boeing has hired your aerospace consulting company to design a handheld prototype.

Task:

Your team is to design and conduct an experiment that explores different ways of constructing a paper glider and launcher to find the best way to make a paper glider flight last the longest and hit a target. You have 50 minutes to conduct, write up and clean up your experiment station.

Materials:

- Paper Clips
- Scissors
- Calculators
- Rubber Bands
- Extra Paper
- Graph Paper
- Meter Stick
- Glue Sticks
- Tape
- 3 sheets white printer paper
- 3 sheets notebook paper
- Stopwatch
- Ruler
- Label Tape for target

Directions:

Please use the notebook paper to write up your experimental design. Using the notebook paper in your experiment will lead to a point deduction. Please only use the label tape for making a target. Grading will be done using the attached rubric.

Do your best to not interfere with other teams in their design and operation. Interference with another team deemed inappropriate will lead to a warning. Another further interference will lead to up to a 4 point deduction and could lead to disqualification.

Good Luck!

2017 Experimental Design Checklist for B/C (rev. 10/4/15)

(Note: all tasks listed under each section are worth a maximum of 2 points unless otherwise stated)

A. Statement of problem (4 Points)

- Not a yes/no question and includes independent and dependent variables
- Problem is clearly testable and is written in a clear and concise manner

B. Hypothesis (8 points)

- Statement predicts a relationship or trend
- Statement gives specific direction to the prediction(s): A stand is taken.
- Prediction includes both independent and dependent variables
- A rationale is given for the hypothesis.

C. Variables

Independent Variable (IV) (6 Points)

- IV correctly identified
- IV operationally defined
- At least three levels of IV given

Dependent Variable (DV) (6 points)

- DV correctly identified
- DV operationally defined

Controlled Variables (CV) (8 points)

- One CV correctly identified
- Two CVs correctly identified
- Three CVs correctly identified
- Four CVs correctly identified

D. Experimental Control (Standard of Comparison-SOC) (4 points)

- SOC correctly identified and makes logical sense for the experiment
- Reason given for selection of SOC

E. Materials (6 points)

- All materials used are listed
- All materials used are listed properly (no extras)
- Materials listed separately from procedure

F. Procedure: Including Diagrams (12 points)

- (2pts) Procedure well organized
- (2pts) Procedure is in a logical sequence
- (2pts) Diagrams used
- (2pts) Repeated trials
- (4pts) Enough information is given so another could repeat procedure

G. Qualitative Observations (8 points)

- Observations about results given
- Observations about procedure/deviations
- Observations about results not directly relating to Dependent Variable or other data
- Observations given throughout the course of the experiment

H. Quantitative Data - Data Table (12 points)

- All raw data is given
- All data has units
- Condensed table containing most important data
- Table(s) labeled properly
- Example calculations are given
- All data reported using correct figures (significant figures C Division only)

I. Graphs (10 points)

- Appropriate type of graph used
- Graph has title
- Graph labeled properly (axes/series)
- Units included
- Appropriate scale used

J. Statistics Division B&C (6 points)

- Such as: average (mean), median, mode, range, line of best-fit or other appropriate statistic used

K. Analysis and interpretation of data (8 points)

- All data discussed and interpreted
- Unusual data points commented on
- Trends in data explained and interpreted
- Enough detail is given to understand data and all statements must be supported by the data.

L. Possible Experimental Errors (6 points)

- Possible reasons for errors are given
- Important info about data collection given
- Effect errors had on data discussed

M. Conclusion (8 points)

- Hypothesis is evaluated according to data
- Hypothesis is re-stated
- Reasons to accept/reject hypothesis given
- All statements are supported by the data

N. Applications and Recommendations for Further Use (8 points)

- Suggestions for improvement of specific experiment are given
- Suggestion for other ways to look at hypothesis given
- Suggestions for future experiments given
- Practical application(s) of experiment given