Paper Airplane Engineering

Student worksheet — Answer key

Name: _____

Team Name: _____

Date: _____

Directions: Answer the questions below to help define your engineering design problem.

1. Who is the "customer" for your paper airplane design?

   The teacher

2. What are the **criteria** for your design? Hint: what did the customer say they wanted?

   Fly as far as possible

   Be reliable

   Be quick to build

3. How can you measure, or prove, that your plane meets the criteria?

   Build four planes in less than five minutes

   Throw each plane three times, find the average distance

4. What **constraints** are there on your design? Hint: what did your customer tell you "you only have…"?

   Only use materials given to us by teacher (e.g. 16 pieces of paper)

   Only have five minutes to decide how we will build four copies of final design

   Only have 15 minutes to decide on a final design

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Name: _____

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Directions: Use this sheet to collect data when you test your paper airplanes.

5. Use this data table to record the results for each throw. Make sure you write down the units you used to measure distance.

Trial	Thrower	Plane Number	Distance (Unit _____)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			

6. Your teacher will help you with this step.

   To calculate an average distance for all 12 trials:

   a. Add up all the numbers in the "Distance" column.

Write that sum here: Divide that number by 12 This equals the average distance

_____ ÷ 12 = _____

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Name: _____

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Directions: Answer these questions after you have completed the activity.

7. Why is it important to have criteria for this engineering problem?

   Without criteria, we would not have known what type of plane the customer wanted us to build.

   If the criteria were not measurable, we would not know what is "good enough" and what "needs improvement."

8. Why was it important to know the constraints when working on this problem?

   If we did not know the constraints then we might have run out of time or materials.

9. Did you have any trouble doing this project because of the criteria or constraints?

   Answers could include (but are not limited to)

   - Difficulty making a plane that could consistently fly far (maybe sometimes it would go straight, other times it would nosedive or veer off to the side)
   - Trouble building four identical planes (maybe one plane worked better than the others)
   - Not having enough paper to test different designs
   - Not having enough time to test different designs or build the design they wanted

10. If we did this activity again, and you had more time or materials, what would you do differently?

    Answers could include (but are not limited to)

    - Doing background research online or at the library on good paper airplane designs
    - Taking time to practice throwing planes
    - Building and testing more designs