

Name _____ Date _____

Criteria and Constraints 4-3

Instructions: Read the engineering design scenario below. As you read, underline or highlight the *criteria for success* and *constraints*. Then, answer the questions that follow.

Rafael noticed that a lot of food gets thrown away every day at lunch in his school's cafeteria. Rafael weighs the amount of food thrown away and finds out that 20 kilograms (kg) of food are thrown away every lunch! He wants to reduce the amount of food thrown away each day by one half so that only 10 kg of food get thrown away each day.

Rafael decides to make signs to encourage his classmates not to waste food. Rafael's teacher says that he can use 5 pieces of chart paper to make the signs, and he can post the signs in the cafeteria for 3 days. Rafael cannot spend any money on the signs. To make his signs, Rafael looks up pictures of food waste on the Internet.

Rafael posts the signs in the cafeteria. Each day after lunch, the custodian helps Rafael weigh the food that is thrown away using a scale. On Monday, 17 kg of food are thrown away. On Tuesday, 14 kg of food are thrown away. On Wednesday, 12 kg of food are thrown away.

1. What is the problem that Rafael is trying to solve?

2. What were Rafael's criteria for success?

3. What were Rafael's constraints?

- a. _____
- b. _____
- c. _____

4. Was Rafael's design solution successful? Explain why or why not.

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Handout 4-3: Defining the Problem and Developing a Solution

Problem: Our school produces a large amount of plastic each day which ends up in the ocean and harms ocean animals.

Possible Criteria for Success:

Possible Constraints:

1.

2.

3.

Possible Solutions:

1. _____
2. _____
3. _____

Our Criteria for Success	Will your solution meet the criteria for success?
	☐ Yes ☐ No
	☐ Yes ☐ No
Constraints	Does your solution meet the constraints?
	☐ Yes ☐ No
	☐ Yes ☐ No
	☐ Yes ☐ No

Our Solution:

If you answered “No” to any question, how will your group refine the solution?
