

Name: \_\_\_\_\_

# Carolina™ Engineering and Design Process Worksheet

## 1. Define and Research

- a. What is the problem you are trying to solve in this activity?
- b. What do you already know about the problem?
- c. What do you know about possible solutions?
- d. What additional information do you need to solve the problem?

## 2. Specify Requirements and Brainstorm

- a. Identify the criteria to be met in order to complete the project successfully.
- b. Identify the constraints, or limits to your solution (materials you must use, size, cost, etc.).
- c. Brainstorm possible solutions. Complete the table for your top three (3) possible solutions.

| Possible Solution | Advantages | Disadvantages | Tradeoffs |
|-------------------|------------|---------------|-----------|
|                   |            |               |           |
|                   |            |               |           |
|                   |            |               |           |

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### 3. Design and Prototype

#### a. Safety:

**Read and/or review all established safety rules and guidelines. These are to be followed at all times for the remainder of this project.**

- b.** Select the solution you want to design, prototype, and test from the chart in 2.c. Write a list of the resources needed to develop and design your solution (including but not limited to materials, people, and time).

- c.** Design and create your prototype. In working through this step, have you discovered additional

information needed?      Y / N      If yes, then identify:

trade-offs?      Y / N      If yes, then identify:

constraints or limits?      Y / N      If yes, then identify:

materials needed?      Y / N      If yes, then identify:

- d.** If you decided to scrap an idea and switch to a different solution, explain why.

**Once you are satisfied with your prototype, proceed to testing.**

#### 4. Test

**a.** What are the criteria for a safe and successful test?

**b.** Does a testing protocol exist? Y / N

If so, use that protocol to run your tests.

If not, ask your teacher to provide the protocol or help you develop one.

Be sure to document your test and include any data you collect.

If the prototype will be damaged or destroyed during the test, you may want to take pictures of it and/or record the testing process. This will be helpful during redesign.

#### 5. Analyze and Refine

**a.** Identify any criteria that were not met.

**b.** Identify any performance, design, or structural flaws with your prototype.

**c.** Develop an improvement plan to refine or redesign your prototype to satisfy all criteria.  
In working through this step, have you discovered additional

information needed? Y / N If yes, then identify:

trade-offs? Y / N If yes, then identify:

constraints or limits? Y / N If yes, then identify:

materials needed? Y / N If yes, then identify:

Retest the new design. If all criteria have been met to the satisfaction of the design team, you may proceed to the next step. If not, continue to work through steps 4 and 5 until you have met the criteria or have been instructed to move on.

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## 6. Evaluate and Communicate

Using the information in this packet and the data from your final test, evaluate your final design solution.

**a.** Restate the problem, criteria for success, and constraints:

| Solution | Advantages | Disadvantages | Tradeoffs | Additional Constraints or Limits |
|----------|------------|---------------|-----------|----------------------------------|
|          |            |               |           |                                  |

**b.** Resources used in the final design:

**c.** What did you learn while designing and creating the solution?

**d.** What did you learn while testing the solution?

**e.** If there are other teams working to solve the same problem, what have you learned from other successful solutions?