

Cage Crash Project

Planet Holloway Physics

(100 points)

Objective:

Engineer a container to protect its contents (a lacrosse ball) from a two story drop onto concrete. The container should be able to open and close. The container should not break upon impact, but be reusable multiple times. This project is an introduction to engineering and documenting your ideas.

Limitations: (30 points)

Students may only use the following items: (but you do not have to use all the items)

50 craft sticks (size 4 ½" x 3/8"), standard popsicle sticks.

30 normal size rubber bands (like you would find around the newspaper).

20 standard straws (like you would get from a restaurant, no bendy or boba straws).

1 spool of thread.

Glue – the glue must be only used to connect items together, not as a building material. You may use any brand of glue you choose, but the glue should not be visible. Keep it neat and clean.

Engineering: (50 points)

Document your engineering process. Your team will write up a detailed explanation of your engineering process. I would like you to follow this format:

1. **inspiration** – describe where your idea for a section of the container came from. Were you inspired by something you saw or another similar product?
2. **Idea/plan** – how will you create your inspiration using your limited building materials. A diagram is very useful here.
3. **Build a model** – create a section of the container for testing purposes. Take pictures of your model
4. **Experiment** – describe the experiment you conduct to see if your model meets the requirements you need. List data you collect and again include a picture of the testing process
5. **Redesign** – often your model is good, but not quite right. Go back to step 2 with some new modifications or if you would like, to step 1 and pursue a different idea.
6. **Construct entire container** – after testing repeatedly (*minimum of 3 experiment sections*) photograph your container before the big drop and again after the big drop. We will drop each container twice to see if they can withstand multiple uses. Take a photo after the second drop.
7. **Analyze results from final testing** – Carefully look for “failures” and document (photograph) and discuss where the project did not perform as expected or did not meet specifications.
8. **Recommendations** – make recommendations to improve the container. Improvements should focus on using the minimum amount of materials for the container to survive. Did you see ideas from other students’ projects that you could incorporate. Ask permission, and if given, take pictures of their ideas you would incorporate and give them credit in your paper.

9. **Materials and cost** – determine and list the exact material used for this project, including the brand name of each material consumed. Calculate the cost of only the material consumed.

Testing: (20 points)

Surviving one drop - 15 points

Surviving a second drop – an additional 5 points

Good luck and have fun!