

2018 Worthington STEM Day Design Challenge

The Challenge:

Some students are interested in lightweight, recycled packaging to protect sandwiches in their lunches from being crushed while on a field trip.

Your job is to design, build, and test a container out of paper that will hold and protect four slices of bread. The container needs to be at least 5.5 cm x 12 cm x 12 cm.

Requirements:

The container must:

- The test sandwich must be completely enclosed.
- Have a top and a bottom
- Be able to be opened so that the bread may be placed in it at the beginning of testing

Materials:

- 2 pieces of paper (prototype “white”)
- 2 pieces of paper (final version “green”)
- at least 15 cm of tape (x2 on see-through ruler)
- Scissors
- See through ruler (not allowed to be used in the construction, only to measure with.)

How to Win:

When told to do so by the judges:

1. Teams will open their containers and remove the bread inside of it, then close the container.
2. One member of each team will take the empty container to the testing area and place it inside the testing device.
3. The team member will add water bottles to the top of the tester until the container is crushed. If any portion of the “crusher” board is less than 4 cm from the base, the container is considered crushed.

The team whose container can support the most weight before being crushed will win.

In the case of a tie, the containers will be weighed and the lightest container will win.

Other Rules:

- Teams will have **20 minutes** to develop a prototype and another **20 minutes** for the final design.
- When the time is up, teams must deliver their containers to the judging area and may not touch their devices until instructed to start the test by the judges.
- No outside resources are allowed, including internet access, texting, or consulting with others not participating in the event.

****Brian's Notes Are Below ****

Crush Resistant Packaging

Design must have:

- Top and a bottom
- Minimum height of:
- Maximum height of:
- Minimum footprint:
- Maximum footprint:
- Encase the volume of: (AKA: Be able to enclose ____ items.)
 - 2 sandwiches

Building Rules:

- Initial version of supplies is a different color from the final version
- Students are initially given the "white" paper to create a test version
- After the practice time (20 minutes?) the horn will blow and then we will move to the competition phase (20 minutes)
- During the competition phase green paper will be distributed for building. No white paper is allowed in the final design.
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Testing:

1. Students must show the design can hold the specified number of items:
2. Students place the design in the testing device.
3. Add the smasher board
4. Add a single water bottle at a time (500mL) until the design fails
5. After 16 bottles add another crusher board to form another layer for additional bottles

Top prizes

1. Level up award after 16 bottles on the first level
2. Most water bottle supported.