GUMMY TOWER CHALLENGE

NEVADA NATIONAL NNSS SECURITY SITES

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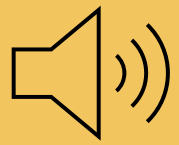
UNLV HOWARD R. HUGHES COLLEGE OF ENGINEERING

Gumdrop Tower Challenge Overview

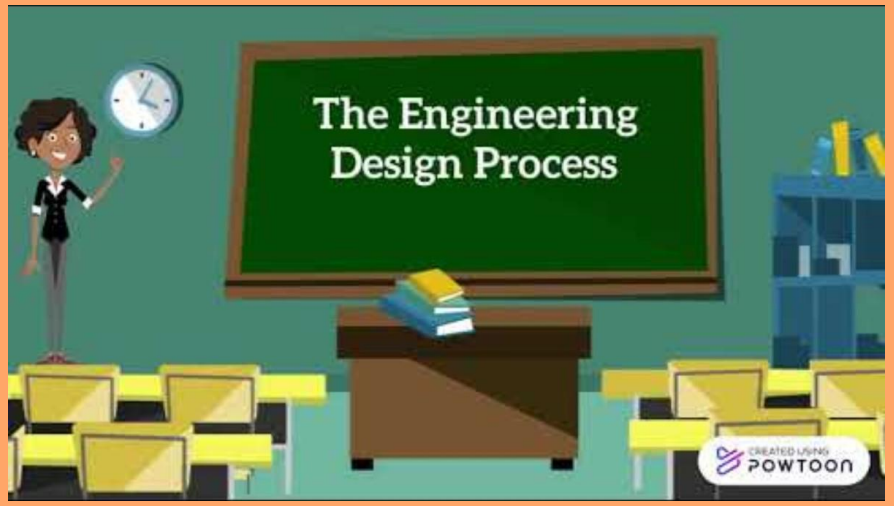
Today you will be following the engineering design process: a process that engineers use to solve real world problems. Follow the path of the pamphlet to create the best design for the Gumdrop Tower Challenge!

Click the speaker button located at the top right of each slide to hear more information!



Engineering Design Process

Before you start, watch this video about the engineering design process to get familiar with the steps of this experiment.



Materials Needed

- Toothpicks
- Gummies such as gumdrops, fruit snacks, or gummy bears
- Skateboard or any tray that can move back and forth quickly to resemble an earthquake

Step 1: Identify the Problem

Scenario: You have been contracted by a major building company to build the tallest and most stable tower in Japan.

Your goal: build the tallest tower you can that can withstand an earthquake, which are common in Japan.

Step 2: Brainstorm

In the "Brainstorm" section, write some ideas on how you can make the tallest tower you can. Your pamphlet has some questions for you to think about.

Step 3: Limitations and Constraints

You get a call from your client. They decided that they want you to use completely new materials for your tower.

You will need to use a limited amount of supplies:

- 20 gummies
- 40 toothpicks

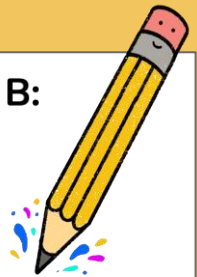
You will need to consider this material restriction when designing your tower.

Step 4: Design

In the "Design" section, sketch 3 different designs of the tower you plan to build. Make each design as detailed as possible and remember to keep in mind the limits and constraints.

Design A:

Design B:

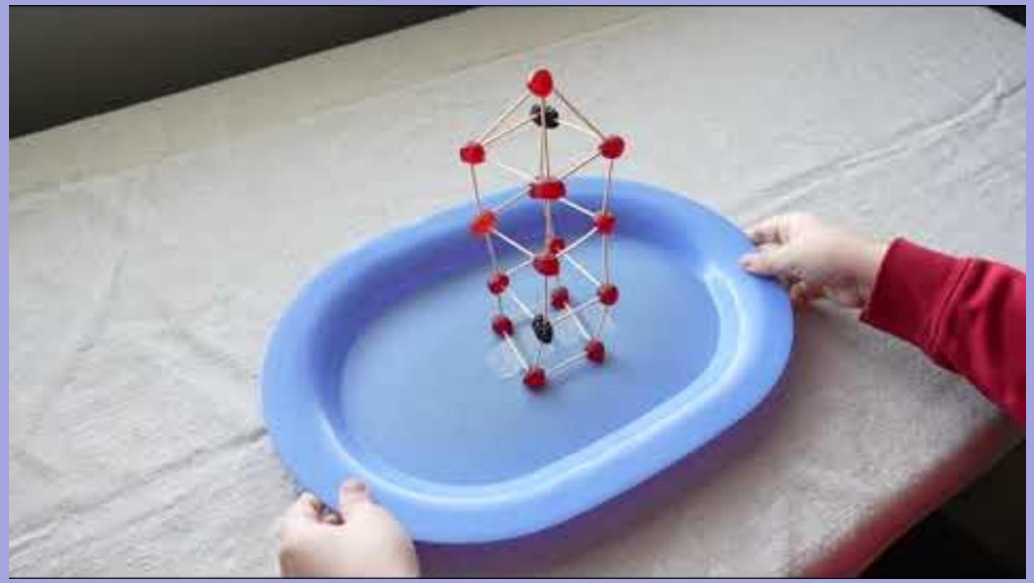


Design C:

Step 5: Build

Choose the design you think is the best and build it!

Remember your limitations and constraints!



Step 6: Test and Evaluate

Now you have a tower to test! Test your tower to see if it can withstand an earthquake. Then answer the questions provided in the "Test and Evaluate" section of your pamphlet.

Step 7: Share Your Solution

Share to your solutions with your classmates.

Discuss the following:

Why do you think your own design could or could not withstand an earthquake?

What kind of designs did you see from your classmates?

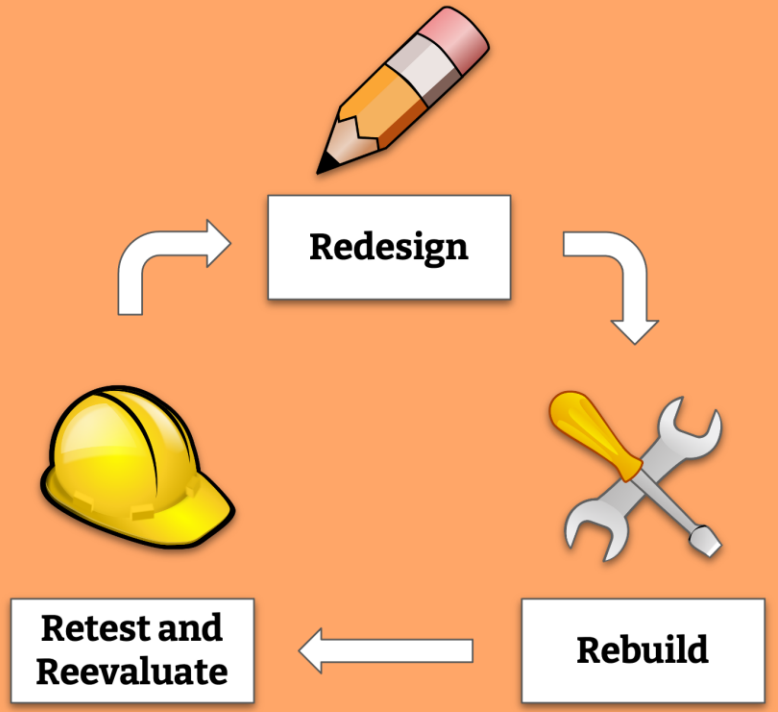
How can you improve your design?

Step 8: Redesign, Rebuild and Retest/Re-evaluate

Repeat the last 3 steps using new gummies and toothpicks:

(1) Design
(2) Build
(3) Test and Evaluate

This is your chance to improve your design!



Redesign

In the "Redesign" section of your pamphlet, sketch a design for a new and improved tower. How can you improve your previous tower? Make each design as detailed as possible and keep in mind the limits and constraints.

New and Improved Tower Design:

Rebuild

It's time to build your new tower! Using the same number of gummies/toothpicks as before, build your new tower based off your redesign. Remember that you can only use 20 gummies and 40 toothpicks!

Retest and Reevaluate

Using the same steps as before, test your new tower to see if it can withstand an earthquake. Then answer the questions provided in the "Retest and Reevaluate" section of your pamphlet.

Step 9: Share Your New Solution

Share to your solutions with your classmates.

Discuss the following:

Why do you think your own design could or could not withstand an earthquake?

What did you do differently than before? What about your classmates?

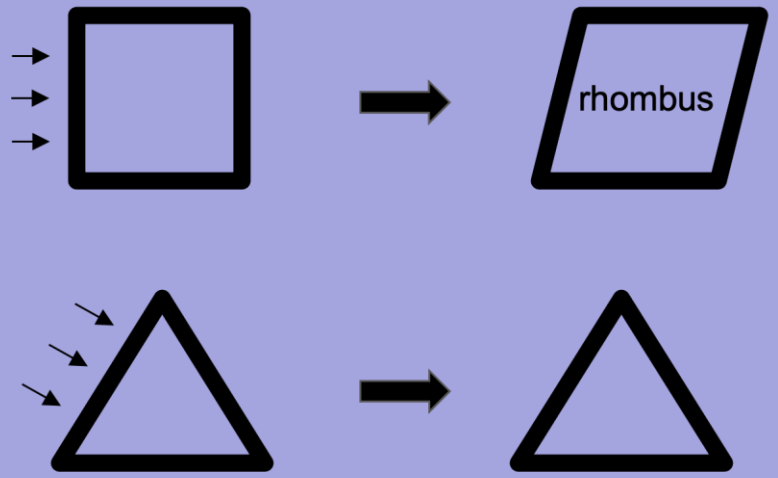
How can you improve your design?

WARNING!

The next slide will provide the explanation (solution) on what makes the best tower for this experiment. Make sure you have completed the previous steps before moving on.

Explanation

- Triangles are the most stable and rigid shapes used in construction
- If you apply pressure to a triangle, it will remain a triangle (stiff and rigid)
- Click here to see a Design Squad video explaining this concept

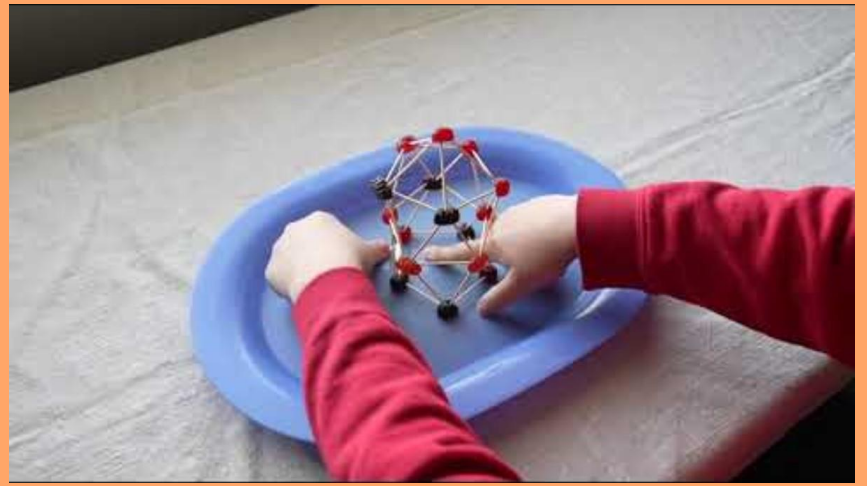


Triangles in Real Life

Solution Build and Test

Build

Test and Evaluate



Thank You!

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