GUMMY TOWER CHALLENGE!

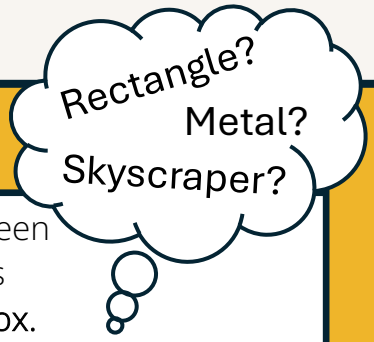
Name: _____

Materials Needed: 40 toothpicks, 20 gummies, and a skateboard or tray that can move back and forth quickly to resemble an earthquake.

Engineers design tall structures able to withstand different forces. For example, they design tall structures able to withstand strong earthquakes. How do you think engineers design these tall structures in a way that they can withstand strong earthquakes?

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

BRAINSTORM



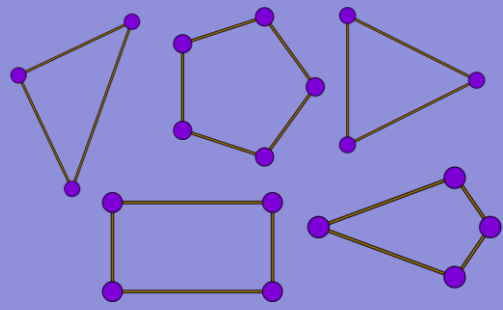
Think about the following questions: What kind of tall structures have you seen in real life or in movies? What do you think the skeletons of these structures look like? What materials are they made of? **Write down your ideas in this box.**

LIMITATIONS AND CONSTRAINTS

You get a call from your client. They decided that they want you to use completely new materials for your tower because of a new budget. You can only use 20 gummies and 40 toothpicks. Keep in mind these limits and constraints for the following steps.

DESIGN

Draw and plan out the tower that you are going to build. Come up with **3 different designs** you believe will make your tall tower the strongest it can be. Don't forget to include markings of where your toothpicks and gumdrops will go.



Design A:

Design B:

Design C:

BUILD

Now that you have designed a few different towers, choose the design you think is the best. It is time to bring your design to life. Have fun building it!

TEST AND EVALUATE

STEPS:

1. Set your tower on a platform such as a tray, skateboard, or plate.
2. Check the stability of your tower by shaking the skateboard back and forth.
3. Start off with a gentle shake and increase the intensity slowly.
4. Shake the platform for 20 seconds.

My tower was _____ inches tall before the earthquake simulation.

My tower leaned significantly or fell over:
☐ Yes ☐ No

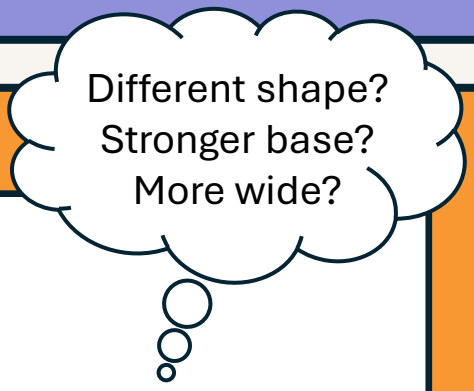
My tower stood for _____ seconds out of the 20 seconds of testing.

The main shapes I used were: _____

SHARE SOLUTION

Time to share your results with your classmates! Think about why you think their designs were able to or were not able to withstand the earthquake simulation. Additionally, think about which of your classmates made the best towers and about why their towers were the best.

REDESIGN



Think about the following questions: What were the issues with your design? How can you improve your tower to make it stronger? **Draw and mark your new design in this box.**

REBUILD, RETEST AND REEVALUATE

Build your new and improved design and then test it with the same steps as before. Have fun!

Explain what you did differently for your redesign and retest:

My tower was _____ inches tall before the retest earthquake simulation.

My tower leaned significantly or fell this time: ☐ Yes ☐ No

My tower stood for _____ seconds out of the 20 seconds of retesting.

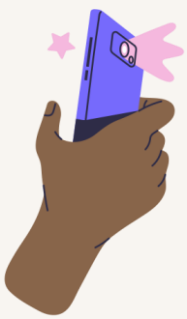
The main shapes I used this time were: _____

SHARE SOLUTION

Once again, it's time to share your results with your classmates! This time, think about what your classmates did differently than before. Which classmates made the best designs, and why do you think these designs were the strongest?

COMMUNICATE SOLUTION

Write any final thoughts or notes in this box:



EXTENSION

Next time you see a tower in real life, think about how it was designed so it could withstand an earthquake. Try to spot the differences in different ones you see. Take a picture if you can!