

## Jell-O Shakin'

**Grades:** 5-8

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**Goals/Standards:**

- National Science Standard A: Science as Inquiry
- National Science Standard B: Physical Science
- National Science Standard D: Earth and Space Science
- National Science Standard E: Science and Technology
- National Science Standard F: Science in Personal and Social Perspectives
- North Carolina Science Standards Grade 5: Goal 4
- North Carolina Science Standards Grade 6: Goal 1
- North Carolina Science Standards Grade 6: Goal 2
- North Carolina Science Standards Grade 6: Goal 3
- North Carolina Science Standards Grade 7: Goal 1
- North Carolina Science Standards Grade 7: Goal 2
- North Carolina Science Standards Grade 8: Goal 1
- North Carolina Science Standards Grade 8: Goal 2

**Objectives:**

The students will be assigned the task to design a Jell-O tower that can best withstand being shaken.

**Engagement:**

Have you ever been somewhere when all of a sudden the ground began to shake with an incredible amount of force? If so, you probably felt an earthquake? What causes Earthquakes? What type of damage do Earthquakes cause? Why do some buildings collapse while others are unaffected?

**Materials:**

- 3 Boxes of Jell-O per group
- 100 Straws per group
- Masking Tape
- Cardboard Scraps
- 1 large sheet of wood (1 meter x 2 meters)
- Refrigerator(s)
- stopwatch

**Procedure:**

1. The teacher will bring in a Jell-O tower made from three boxes of Jell-O. He/She will ask the students what they think will happen if the tower is shaken back and forth. (Students should conclude that the more force that is applied on the tower that the better chance it has of collapsing.)
2. The teacher will then ask students to share ideas they have on what we could do to make a tower that is better suitable for withstanding earthquakes.

3. Students will share their ideas with the class as the teacher records them in a chart.
4. The students will be broken into groups of three and given the task of designing a tower that can best withstand an "Earthquake". Each group will be given 3 boxes of Jell-O, 100 straws and some cardboard to create their tower mold. The students will be told that the cardboard will be removed from their tower once the Jell-O takes shape.
5. Students will be given 20 minutes to make their designs.
6. The towers will then be placed in a refrigerator to take shape.
7. The towers will be removed from the refrigerator the next day.
8. The students will then be given a chart to complete for each groups tower. (see attached student sheet)
9. The towers will be placed on the large piece of wood one at a time. The students will then shake the piece of wood at two shakes per second for a minute. After a minute if the tower is still standing the students will increase the speed that they are shaking their towers. If the tower is still standing after 4 minutes the tower will be removed and stay standing.
10. After every group is finished the class will reassemble to discuss what happened.

### **Follow Up Questions:**

1. Share what you did.
  - What structure was used on the tower(s) that stayed standing the longest?
  - What strategies did you use when building your tower?
  - How did your group come up with your design for your tower?
  - What factors did you account for when building your tower?
  - Why was it difficult or not difficult to make a structure that would withstand the force of being shaken back and forth?
2. Process what is important.
  - What forces caused the towers to collapse?
  - How did the shape of the tower affect if it collapsed or not?
  - What would happen if the force on the surviving tower was multiplied by an even larger amount?
  - How might buildings that are built on active faults be made differently from building that are not in earthquake zones?
3. Generalize to your life.
  - Is it possible to build a building that can withstand any Earthquake? Explain your answer.
  - What safety factors are important to follow when there is an earthquake?
  - How can scientists and engineers work together to design buildings that are better equipped to handle earthquakes and other disasters?

### **Extension Activities:**

1. Pasta Bridges
- 2.

### **Resources:**

- <http://www.crystal.ucsb.edu/ics/understanding/>
- <http://www.seismo.unr.edu/ftp/pub/louie/class/100/plate-tectonics.html>
- <http://earthquake.usgs.gov/>

### **Glossary:**

- force
- earthquake
- fault
- plate tectonics

