Shake Rattle and Roll

*Objective: Students will design, build and test a base isolator to withstand Earthquakes.*

You and your team of seismologists will design, build, and test a base isolation system to absorb the energy generated during an earthquake. Take a look at some ideas on line by google searching for images of base-isolation techniques. Follow the plan to build your tower and create a plan for your base isolator.

1. Get 64 toothpicks to build your tower.
2. Get two quarter size pools of white glue from your instructor. Place paper towels under your squares to avoid a mess.
3. Glue together 16 squares out of the toothpicks. (Use a protractor to get the angles at 90 degrees)
4. Once these squares are dry, glue them together into a tower that is 4 stories tall.
5. Try to make your tower as straight as possible. Each story will have four squares which will be the walls.
6. Glue your tower to a base plate which is 9.5 cm x 9.5 cm.
7. Design a base isolation system which will connect the base plate to the shaking foundation which is slightly larger. Materials can be whatever you choose for this. Your goal is to keep the tower stationary while the base absorbs all of the seismic motion. Sketch a 3-d diagram of your base isolator. This is the part where you get to design and be creative.
8. Take a look at the foundation board and the base plate to help you plan your base isolator.
9. Bring materials from home to make your base. **No tape is allowed!**
10. Build your base isolator.
11. Test your tower with the Shake Table.
12. The best tower and base isolator per period will be crowned seismologist of the year.

***Grading*** 40 points total

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| Characteristic | Exemplary 5 |
| Construction skills  X3 | * Tower follows plans and meets required dimensions. * Evidence of careful construction, tower is vertical and all angles are 90 decrees. * Tower is secured solidly to the base plate in the center. * Students used the correct number of toothpicks and amount of glue. |
| Base isolator  x3 | * Base is creative and shows thought went into the idea. * Base works as planned and absorbs seismic energy. * Base shows evidence of quality construction. * Base fits within the required dimensions. * 3d drawing of base is included. |
| Teamwork and use of class time (Individual Grade).  x2 | * Group works together as a team. * Each member contributes to the project. * Group is on task and productive with their time in class. |

***Timeline***

You will have 2 days in class to build your tower. The third day will be a day of testing.