

Unit 3 Handout 36

XPT: Earthquake Towers

Purpose: Design and build a model tower that can withstand as high of a magnitude possible of a simulated earthquake.

Guiding Questions: How do architects and engineers design and build structures that are as resistant to earthquakes?

Goal: Your goal is to design and build a a tower that is as resistant to a simulated earthquake.

Building Requirements: Your building must be built to the following specifications.

Scale: 1 inch on the tower = 10 feet. 1 story = 10 feet 1 grid square = 3mm ² (3mm x 3mm). Width/depth of the balsa wood: 3mm Tower base block: 95mm x 101mm	Each team receives: 1 foundation block, 1 connecting block, 5 floor plates, 18 pieces of balsa wood, wood glue, timber cutter, wax paper, foam board, up to 2 sheets of grid paper, and t-pins.
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1. The minimum height of the structure is 10 stories.*
2. The maximum height of the structure is 20 stories.*
3. The exact width of the structure is 40 feet.
4. The exact depth of the structure is 40 feet.
5. The base of the tower on your design shows the short side of the foundation block.
6. The number of wooden floor plates used is 5.
7. The floor plates are evenly spaced along the height of the structure with one on the top of the structure.
8. One floor plate must be on the top of the structure.
9. Each story supports 200g of mass, which includes the plate, blots, and mass plates.
10. Each section (between floor plates) is cross braced.

* Not including the connecting or foundation blocks.

Calendar

Day 1 (Thursday, May 26th)

- Discuss how the project will be graded.
- Go over project requirements.
- Look at materials used to build the tower.
- Watch how the towers are constructed.

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Day 2 (Friday, May 27th)

DUE TODAY: Cross brace argument

- Random team assignments (7 teams maximum, 8 in period 9)
- Research design ideas.
- Write a justification for your design. Explain why you believe your design will be able to withstand a simulated earthquake. This mostly focuses on your choice of design for the cross bracing.

Day 3 (Tuesday, May 31st)

- Decide on the general design of your tower.
- Draw the design for your tower following all building requirements.
- Prepare design for grading.

Days 4-6 (Wednesday, June 1st - Monday, June 6th)

DUE WEDNESDAY 6/1: Building Design Drawing

- Begin building your tower.
- Have tower graded for design and weight (whenever you're ready; must be done by Monday!)

Day 7 (Monday, June 6th)

DUE TODAY: Actual tower

DUE TODAY: Tower's ability to hold weight.

- When your tower is completed, have it graded.
- Put 200g of mass on each level.

Grading

All grades will be assigned to the group and are not on an individual basis. Each member is required to participate and complete all work. The justification for the tower's cross bracing and the design must be completed by each person. One person will randomly be selected to have their work graded.

Individuals who do not contribute will have points deducted from their individual grade.

Graded On	Points Possible	Due Date
The justification for your tower's cross bracing.	3 points	Friday, May 27th
Design drawing per building requirements.	5 points	Wednesday, June 1st
Actual tower per building requirements.	5 points	Monday, June 6th
Your structures ability of each floor to hold 200g of mass.	5 points	Monday, June 6th

You will not be graded on how well your building survives the simulated earthquake.