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Date:

Class:

## Constructing Your Model Worksheet

### Assign jobs:

Job	Description	Group Member
<b>Photographer</b>	Takes a picture of the process and the finished product before and after the shake table test.	
<b>Timekeeper</b>	Keeps everyone on task and watches when clean-up must begin.	
<b>Cost Analyst</b>	Keeps track of all materials used; is it a full noodle, or only half?	
<b>Builders</b>	Construct the model.	<b>EVERYONE</b>

### Procedure:

1. Design a model to fit inside the box, making sure to follow the constraints.
2. Assign someone to take pictures as you go along so you can add them to your final presentation.
3. Begin by looking at the website with ideas for building supports. Then sketch your idea on a worksheet.
4. Next, follow your plan and construct your building.
5. Assign one person to keep track of how many materials you use (you do not need to use all of the materials) and record this information in your cost-benefit analysis table.
6. You may use rubber bands to construct your building, **but they must be removed** before the mass is taken.
7. After you have finished building, measure the mass (cannot go over 300 g) and record it on the table.
8. Place a 2.5 lb. weight on your building; did it stay standing? If not, you must rebuild to correct mistakes.
9. Once you know your building will hold 2.5 lbs., place your building on the shake table (make sure you have a picture of your building!).
10. Measure the time it takes for your building to fall.
11. Redesign your building to make it stronger, or to make it more stable in the soil (what part of your building failed?)

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**Cost Analysis:**

Item	Cost	Number Used	Cost for Your Company
Spaghetti noodles	\$50,000/noodle		
Bendable straws	\$100,000/straw		
Toothpicks	\$10,000/toothpick		
Marshmallows	\$50,000/marshmallow		
Glue	\$200,000/glue stick		
<b>TOTAL COST</b>			

**Behavior of Building in an Earthquake**

Mass of building (g)	Building supported 2.5 lbs.	Time before building collapsed
	YES or NO	

Sketch #2: Redesign. How would you redesign the building? Where did it fail? What would you do differently? Explain what you would fix.

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**Conclusion:** Your engineering firm is trying to win the bid. Your team must present your findings to the company Bay Area Developers. Your presentation should include the following:

1. The name of your engineering firm. Who are the members of your group?
2. Picture of your original sketch and final design, with an explanation.
3. Picture of how you set up the test, with an explanation.
4. Cost-benefit analysis.
5. The mass of your building, and whether it held the 2.5 lb. weight.
6. Picture or video of your building on the shake table, and how long it lasted on the shake table.
7. Picture of your redesign sketch and the final design, with an explanation of what you changed.
8. Make sure your presentation is clear, concise, and easy to follow.

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## Rubric:

Criteria	4	3	2	1
<b>Building Design</b>	Group has a building design that was followed in the build, mass of building, and whether it held 200 g with pictures.	Building is missing one component.	Building is missing two components.	There are no sketches of the building.
<b>Cost Benefit Analysis</b>	Group showed all materials that were used, along with costs.	Group is missing one part of cost analysis.	Group is missing two parts of the cost analysis.	Group does not have a clear analysis of materials used.
<b>Building Redesign</b>	Group discusses which type of earthquake-resistant structure they attempted to use and where their building failed, as well as how they would improve the building in next build.	Group is missing one component of explanation.	Group is missing more than one component of explanation.	Rebuild is unclear.
<b>Presentation to Developers</b>	Presentation is clear and concise, with pictures of the group's work on each slide.	Presentation is missing one component.	Presentation is missing two components.	Presentation is unclear, hard to follow.
<b>Teamwork</b>	Each person contributed to the research, planning, and creating the presentation. The group divided up the work AND came together to talk about how each person contributed to the presentation.	Team members divided up the work, and worked on their part, but did NOT come back together to talk about how each part contributed to the whole project.	Team members expressed frustration AND team did not come together to talk about how each part worked to answer the question.	Team members did not work together. Collaboration was not witnessed.
<b>Presentation</b>	Each person's voice is heard in the presentation. The presentation makes sense and flows well.	Not everyone speaks OR the presentation is choppy.	Not everyone speaks AND the presentation is choppy.	More than one voice is missing AND the presentation is hard to follow.
<b>TOTAL</b>				<b>/24</b>