

The Rumble

Pasta structure challenge and scoring

This document is to be used in conjunction with the activities: *Strain some pasta* (build a pasta structure) and *Shake it up* (build a shake table). You can use the attached scoring sheet directly or use this document as a guide to make your own.

Recommended Grade Level: 6th -12th

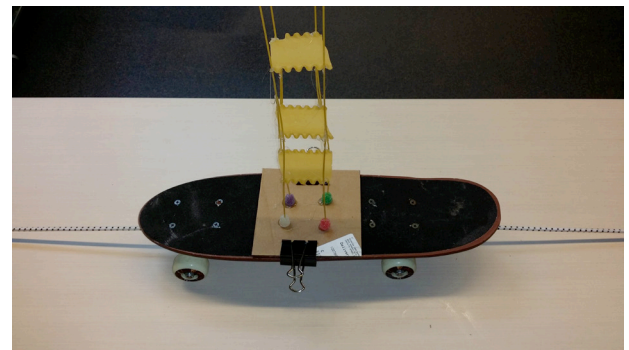
NGSS Science & Engineering Practices (grades 6th-8th)

- *Designing Solutions.* Optimize performance of a design by prioritizing criteria, making tradeoffs, testing, revising, and re- testing.
- *NGSS Science and Engineering assessments coming*

Preparation: minimal

Materials Needed (for the entire class working in groups)

- Completed pasta structures (see: [Strain some Pasta!](#))
- A Shake table (see: [Shake it up!](#))
- A blank score sheet:
 - This can be found on the next page.
 - Or...make your own scoring sheet.



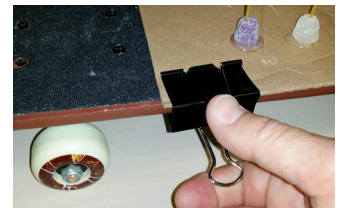
Background Information

After the shake table is completed and the pasta structures have been built, it's time to conduct some tests and inspections. In general, your group will be scored on the following basic "real world" engineering goals:

- *Is your project on time?*
- *Is your project within budget?* (Built with the proper amounts of materials)
- *Does your project meet specifications?*
- *Does it work?*

What to do:

1. Review the score sheets and attached sample sheet (or make your own).
2. Organize teams into their design groups with a score sheet and their structure.
3. Before testing, teams should check over their structures (check pasta, glued joints and attached washers).
4. The teacher and team should begin marking the score sheet where appropriate.
5. Clamp the base onto the skateboard (shake table). Use a minimum of 2 clamps on opposite sides of the base.
6. Score all pre-test criteria (i.e. was it: on time, within budget, specifications...).
7. Anyone near the testing area must wear goggles (Pasta and washers may fly off and elastic bands can snap!)
8. Pull the skateboard to the **marked** release point.
9. Let it go! **The release of the skateboard from the start position** can be done up to 3 times for extra points.
10. A sample scorecard is located below....review it to get an idea of how scoring can be done.
11. **Complete the scorecard for your group.** Total the score
12. How'd your group do?



Score Sheet for the design challenge “Straining Pasta”


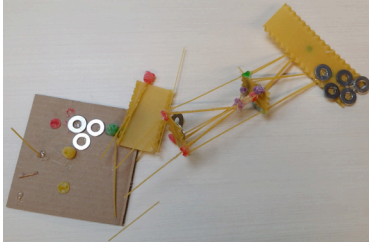

Group Score Sheet

Team members: _____, _____,
 _____, _____, _____

Was your project on time?	
+50 pts for on time delivery -10 pts each day late	pts
Was your project within budget? Built with proper amounts of materials	
- 5 pts for each extra gram of glue	pts
+2 pts for each piece of spaghetti returned	pts
+2 pts for each gumdrop returned	pts
Does your project meet specifications?	
+5 pts Nothing hang over the cardboard	pts
+5 pts Washer are glued down	pts
+5 pts Weight is recorded on the base	pts
+5 pts Did you make room for the clamps	pts
Did it work?	
+10 pts Yes it worked +0 pts No it didn't work	pts
Only if all washers stayed on your structure, continue to the steps/additional points below.	
Washer (tenant) points Washers per floor (additional points per floor)	
1 st floor #washers x 1 =	pts
2 nd floor _____ #washers x 2 =	pts
3 rd floor _____ #washers x 3 =	pts
4 th floor _____ #washers x 4 =	pts
5 th floor _____ #washers x 5 =	pts
6 th floor _____ #washers x 6 =	pts
7 th floor _____ #washers x 7 =	pts
Additional Tests on the Shake table Shaken without breakage	
+2 each time (Up to 3 times)	pts
Total	pts

Additional Comments:

Sample Score Sheet for the design challenge “Straining Pasta”

<p>Group #1 Survived 2 tests, but 1 gram extra glue</p> 	<p>Group #2 Didn't survive first test, one day late</p> 	<p>Group #3 Survived 3 tests, returned 2 pieces of spaghettis, forgot to record weight on base</p> 
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	Group #1	Group #2	Group #3
Was your project on time?			
+50 pts for on time delivery			
-10 pts each day late	50 pts	40 pts	50 pts
Was your project within budget? Built with proper amounts of materials			
- 5 pts for each extra gram of glue	-5 pts	pts	pts
+2 pts for each piece of spaghetti returned	pts	pts	4 pts
+2 pts for each gumdrop returned	pts	pts	pts
Does your project meet specifications?			
+5 pts Nothing hang over the cardboard	5 pts	5 pts	5 pts
+5 pts Washer are glued down	5 pts	5 pts	5 pts
+5 pts Weight is recorded on the base	5 pts	5 pts	0 pts
+5 pts Did you make room for the clamps	5 pts	5 pts	5 pts
Did it work?			
+10 pts Yes it worked			
+0 pts No it didn't work			
Only if <u>all</u> washers stayed on your structure, continue to the steps/additional points below			
Washer (tenant) points			
Washers per floor (additional points per floor)			
1 st floor	#washers x 1 =	4 pts	pts
2 nd floor	#washers x 2 =	4 pts	pts
3 rd floor	#washers x 3 =	6 pts	pts
4 th floor	#washers x 4 =	pts	pts
5 th floor	#washers x 5 =	pts	pts
6 th floor	#washers x 6 =	pts	pts
7 th floor	#washers x 7 =	pts	pts
Additional Tests on the Shake table: Shaken without breakage			
+2 each time (Up to 3 times)		4 pts	pts
Total		88 pts	60 pts
			106 pts