

I have seen this rubric after being assessed and discussed the results with my child.

Parent Signature: _____

Homebase:
Creative Contraptions

Name:

Date:

Creative Contraption Proposal

Team's proposed design for the creation of a prototype

OVERALL SCORE:

Novice <i>begins to approach expectations</i>	Apprentice <i>approaches expectations</i>	Proficient <i>meets expectations</i>	Distinguished <i>exceeds expectations</i>
<input type="checkbox"/>	<input type="checkbox"/>	Content <input type="checkbox"/> Effective Communication: Did your drawings clearly communicate a solution to the design task?	<input type="checkbox"/> Did you include multiple views?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> EC: Did you clearly describe in words how each subsystem will work independently and contribute to the whole, using appropriate science vocabulary?	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> EC: Did you label each part of the drawing, using science vocabulary?	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Problem-Solving: Do your drawings represent a realistic solution to the design challenge?	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PS: Did you accurately complete the Materials Selection sheet by identifying appropriate materials for your design?	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> PS: Does your entire solution meet the constraints of the problem?	<input type="checkbox"/>
		Quality & Format	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Are your drawings neat & professional? Did you follow the "Guidelines for Drawing" document?	<input type="checkbox"/>

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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Are your drawings proportional?	<input type="checkbox"/>
		<u>Process</u>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Community Membership: Did you work cooperatively with your design team when brainstorming ideas, deciding upon a solution, and creating your proposal? Did you use your team rules, as needed?	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Self-Direction: Did you manage time well? Were you focused and on-task?	<input type="checkbox"/>

Extension Ideas

- Research the life of Rube Goldberg. List your sources and write a biography.
- Make a timeline of famous inventions. List your sources.
- Look up the science vocabulary in Spanish and add labels to your drawings.

Creative Contraptions
Creative Contraption Proposal

Steps to Success

In order to do well you should follow these steps.

What?

Your design team is responsible for creating a “flag-raising machine”. You will be working with your design team to create a proposal for your contraption. You will be completing Phase 1 of the engineering design process in order to come up with a 2-D model for your contraption. You will need to create drawings of your contraption. Each drawing must be labeled with descriptions of the sub-systems of the contraption. You will also need to describe the materials that you will use to create each sub-system and explain why those materials are appropriate choices.

Why?

- To describe and explain the purpose of your prototype.
- To show different methods of representing your solution.
- To identify appropriate materials for use in your contraption.

How? Steps to Success:

Identify the need or problem.

Research the problem.

- 1. Review the constraints and goals page as a team.
- 2. Determine the role of each group member, using the Team Roles sheet. Discuss who would fit into each role best and how you can make a fair decision. Use the “Making Decisions” sheet for ideas about fair decision-making.

Develop possible solutions

- 3. Each team member will brainstorm and sketch possible solutions of the entire invention individually.

Select the best possible solution(s)

- 4: Have a team meeting, in which you choose the best solutions, perhaps combining several ideas. Again, refer to “Making Decisions” for ideas about fair decision-making. As a team, make sure everyone agrees on this design and everyone understands all of the subsystems and how it will work.
- 5: Decide how to divide the work and which team member will be responsible for which subsystems. Create drawings with descriptions to represent your solution.
 - You must include detailed drawings and written descriptions of *each* subsystem and a drawing of the entire contraption.
 - Refer to the “Drawings of Subsystems” handout and rubric for specific requirements.
- 6. Complete a final draft, if needed.

Construct a prototype

- 7: As a group, consider possible materials that could be used for each component and fill out “Materials Selection”_document.

8: Work to be turned in should be organized as follows in team folder:

- Rubrics (with names of each team members)
- Numbered drawings of subsystems (with name of team member that worked on that drawing)
- Materials Selection Document (one set per team)

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Rube Goldberg Contraption Construction Rubric

Use of the engineering design process by a design team to build a flag- raising machine

OVERALL SCORE:

<p><u>Novice</u> <i>begins to approach expectations</i></p>	<p><u>Apprentice</u> <i>approaches expectations</i></p>	<p><u>Proficient</u> <i>meets expectations</i></p>	<p><u>Distinguished</u> <i>exceeds expectations</i></p>
		<u>Content : Contraption</u>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you construct your contraption based on your prototype drawings?	<input type="checkbox"/> Contraption is sturdily built. It has a complex and clever design with more than the required number of subsystems. Contraption achieves goal of raising flag.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you use appropriate materials in your construction?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you use appropriate tools and fasteners to construct your prototype safely and securely?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you construct within the given area, including the four required subsystems?	
		<u>Content : Engineer's Report</u>	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you test your contraption and record the results of those tests?	<input type="checkbox"/> Report exceeds expectations. It includes sophisticated understanding of the science behind the machine, discussing all of the energy transformations that occur in the process, for example. Redesign solutions are clever and complete for all needed subsystems.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you evaluate test results accurately? Do you accurately explain the causes of any problems with your prototype's operation?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you clearly explain possible redesign solutions, using appropriate science vocabulary?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you create at least one redesign drawing of a subsystem, which communicated an improved solution?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Were your redesign drawings neat and professional, following guidelines on the "Drawing Guidelines" document?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you complete a self-evaluation?	
		<u>Content : Presentation</u>	

<u>Novice</u> <i>begins to approach expectations</i>	<u>Apprentice</u> <i>approaches expectations</i>	<u>Proficient</u> <i>meets expectations</i>	<u>Distinguished</u> <i>exceeds expectations</i>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you clearly explain your subsystem's role in the entire contraption and why it did or did not work? Did you explain the test results and your redesign ideas?	<input type="checkbox"/> Presentation is very clear. The function of each step is explained, simple machines involved, as well as how they are used to make a complex machine. Understanding is sophisticated. Student incorporates unexpected visuals, such as a display board of photos outlining the process or a Powerpoint presentation.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you speak loudly and clearly?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Did you use your contraption and/or other visuals (like your proposal sketches) to help explain your process to your audience?	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Is presentation well-organized with a clear format and sequence?	
Process			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Community Membership: Did you work cooperatively with your design team when building, testing, and redesigning your contraption?	<input type="checkbox"/> Student is a leader within the team, helping team to manage conflict, achieve equal participation, and feel good about working together.
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Self-Direction: Did you manage time well? Were you focused and on-task?	<input type="checkbox"/>

Rube Goldberg Contraption Construction Steps to Success

You and your design team will use the prototype drawings you created in the design phase of the engineering design process to build your contraption. Construction of your contraption will follow the plan you communicated in your prototype drawings. Once you have completed construction, you will test, evaluate and then redesign your contraption so that your system will raise a flag.

Steps:

- 1: Construct:** Build a prototype (first model) of your contraption. Be sure to build your prototype according to the plan shown in your drawings. At the start of each class, decide upon a plan that best utilizes all team members. Use appropriate materials, tools, and fasteners when constructing your contraption. Consult with your team as needed. Follow all safety guidelines.
- 2: Test:** Once your prototype is constructed, test your contraption. Record the results of your test in your Engineer's Report. You certainly can test as you are building, but remember to document changes you make as you are building as well.
- 3: Evaluate:** Decide if your contraption works as required. In your Engineer's Report, explain the reason for any problems that you encounter. Was it a problem with the materials or the process? Suggest the solution to any problems.
- 4: Redesign/Communicate the solution:** Create redesign drawings for major changes to any subsystem. Decide how to divide the work so that all subsystems that require redesign have a redesign drawing to represent the changes made. In some cases, two team members may each make a redesign drawing for the same subsystem.
- 5. Redesign/Build:** Make changes to your design to improve it.
- 6. Communicate the solution:** Plan a presentation to share the process with your classmates. See presentation guidelines for ideas.

When? Approximate Timeline

Monday	Tuesday	Wednesday	Thursday	Friday
6/4 Step 1: Build	6/5 Build	6/6 Build	6/7 Build	6/8 Build
6/11 Steps 2 & 3 Discuss redesign/Engineer Report	6/12 Evaluate & redesign: Drawings/Engineer's Report	6/13 Step 4: Redesign drawings Step 5: Redesign/build	6/14 Step 5: Redesign/build Step 6: Prepare presentation	6/15 Step 6: Prepare presentation End of quarter evaluations
6/16 Final presentations Last Day Celebration				