

Project 5.3.7 Rube Goldberg Device

Introduction

Rube Goldberg was a famous Pulitzer Prize winning cartoonist, sculptor, and author. He was famous for his depiction of extremely complicated inventions performing simple tasks, using intricate mechanical devices and outlandish components. His cartoons were examples of “man’s capacity for exerting the maximum labor to achieve minimum results and provided a humorous diversion into the wonders of technology.”

Your team will be designing and building a Rube Goldberg mechanical device. This device will be a subsystem within the larger system. It will demonstrate the principles of the six simple machines in a fun and inventive way. The transfer of energy in your device will travel a specific path from start to finish for a **minimum of 3 seconds**. The device must be **self-powered** utilizing potential energy. There is to be **no human involvement** after the device is started. Counterweights can be used but must be a part of the original design. **No batteries or electrical power** can be used. The device must be capable of repeated demonstrations without long set-up times in between. Remember, Rube would never do anything in a straightforward, easy way.

Equipment

- GTT notebook
- Pencil
- Sketch paper
- Hand tools (Scissors, pliers, files, hole punch, etc.)
- Materials provided by your teacher
- Stopwatch
- 12 in. x 12 in. x $\frac{3}{4}$ in. wood footprint

Procedure

Meet with your team and select a person to be responsible for the following areas. Each team member is responsible for their own engineering notebook and the documentation that is to be placed in it.

- **Materials Manager** - Responsible for the acquisition, organization, and storage of all materials and equipment used on the project.
- **Documentation Manager** - Responsible for the final design, material cost,

and materials list submitted to the teacher prior to construction.

- **Communications Manager** - Responsible for the communication between your team, the teacher, and the teams directly before and after yours.
1. Begin brainstorming possible solutions for your grid block. In your engineering notebook, each team member must restate the problem in their own words and sketch two possible solutions. Label the simple machines being used. Don't forget to consider the requirements and limitations listed below.
 2. With your team, reach a consensus on the best solution from the available sketched options. Don't forget to collaborate with the teams before and after yours. List the construction methods that will be used to build your team's device and the materials needed. **Remember, you must bring in supplies from home.**
 3. After your teacher has given the instruction on tool usage and materials, you may begin to build your team's device.
 4. Troubleshoot the device after it is completed. Evaluate your device using the grading rubric. Changes and adjustments must be made before the final run.
 5. Place your grid in its place and conduct the final run.

Requirements and Limitations:

- Your team must meet the criteria stated in the Rube Goldberg Grading Rubric. Be sure to carefully review this rubric prior to starting this activity.
- Energy should take at least 3 seconds to travel through your machine. (The longer the model operates the better.). **Hint: Make gravity your friend.**
- Model height is unlimited, but model must stay within the 12 in. x 12 in. footprint for length and width. That means **NOTHING** can hang off the board!
- All subsystems should pass the energy at 3 in. above the board and centered or 6 in. from the side. Therefore, all subsystems will also receive the energy at 3 in. above the board (not the floor) and 6 in. from the side.
- You may use available materials found in the lab – **WITH APPROVAL**. You may bring materials from home.

Remember: Use your creativity, problem-solving ability, and the skills you have learned in class to make the best design possible.

