TO: Potential laboratories in the Augusta area
SUBJECT: Rube Goldberg marble challenge

Hello. My name is Ms. Noshom and I am on a search committee as a founding member of the Rube Goldberg Society. We are attempting to break the Guinness Book of World Records for the largest Rube Goldberg invention, containing 245 steps. We are assembling a team to compete next year.

We are examining laboratories in the area in order to integrate their members into our team, and we have heard that WSA APS Labs has potential. You must pass a test for us to consider inviting you to join our elite team. As you know, Rube Goldberg inventions consist of many small steps to accomplish a single task. Your test is to set up an apparatus so that a marble rolls off the end of a lab table and lands directly in a beaker sitting on the floor. You must determine where the beaker needs to be placed in order to have it land in the beaker. The catch is that you cannot let the marble drop off the end of the table and see where it lands to determine the beaker's placement on the floor. You must use your scientific skills and cooperation to determine this placement. The rules are as follows:

- You can use any or all of the equipment on the cart.
- You can add equipment to the given equipment as long as you ask permission from your instructor.
- You may not allow the marble to fall to the floor as a trial to see where it lands. You can roll the marble off the end of the table as many times as you want but it must be caught mid-air. A chair will be placed near the end of the table to prevent cheating.
- Rube Goldberg inventions are always based on principles of physics and thus, you must base your design on the principles of motion, projectile motion, and free fall. We will want to see all calculations and equations used to determine the placement of the beaker.
- At the end of your work session, a document should be submitted with the exact specifications for your marble launch. It should be complete with diagrams, written instructions, and all calculations shown. It should show all trials and measurements and we should clearly be able to observe your process for determining where the beaker should be placed on the floor.

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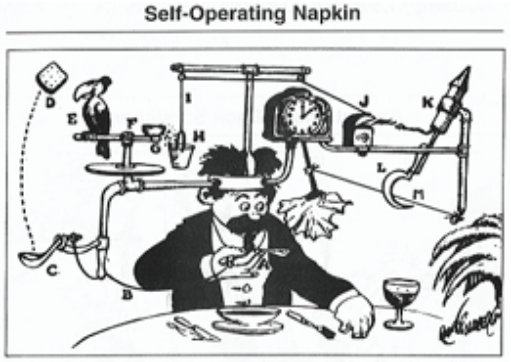
- To see if you have accomplished the task, your instructor will closely follow the instructions on the document – no verbal help from your team – and your launch will be recreated according to the directions and diagrams given. The beaker will be placed in the specific location that you have determined according to your calculations. Please be clear in all your written communication.

- Your instructor is available for questions but may or may not choose to answer them.

- Assume no friction between the table and a rolling marble.

- Good luck! We at the Rube Goldberg Society hope you will soon join our winning team!

Ms. Noshom
President
Rube Goldberg Society



By Rube Goldberg [Public domain] via Wikimedia Commons

Suggestions for leaders:

You have a lot to accomplish. The most important component for success is good planning. Have a plan! You may need to get help from class members on what is needed to complete this challenge – maybe ask for assistance from someone who understands the physics involved. Draw a diagram on the board and figure out what variables are in need of being measured.

Figure out how to utilize everyone, assigning them to areas they are good at and willing to serve in. Divide the class into groups, each with a specific task. Your job is to use the knowledge the class possesses to figure out what groups are needed, get everyone divided up and working to accomplish all aspects of this challenge.

Don't forget to remind the class that past labs may be a resource, and you may also have suggestions written in your lab book from the last group challenge.

Remember, your instructor is available for questions. Good luck!

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