

Rube Goldberg Device Project

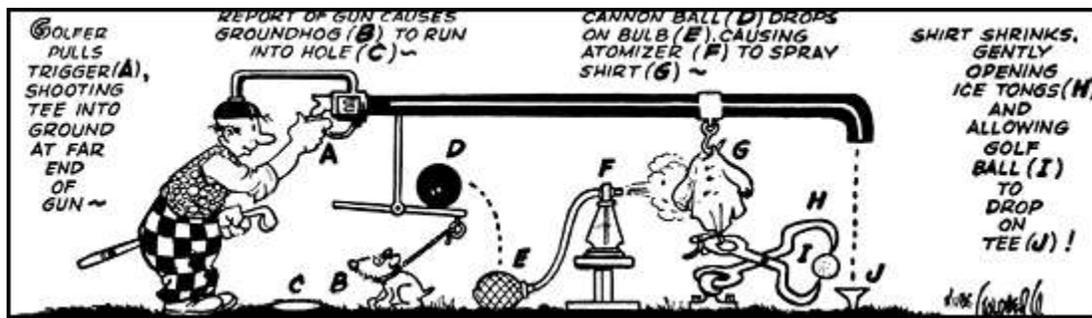
Purpose:

In this project, you will demonstrate your knowledge of principles in physics by designing, creating, and explaining a Rube Goldberg device.

Directions:

1. Blueprint of Rube Goldberg Device (10 Points)

- Brainstorm some ideas about what type of goals you wish to accomplish with this sort of device (e.g., ring a bell, turn on a light, raise a flag, etc.). In the example below, a golfer shows how to Tee up a Golf Ball Without Bending Over.



- List many of the ways in which energy can be transformed from one form to another.
- Determine some machines that can be used to make these transformations and that can be physically assembled.
- Decide on a Rube Goldberg device that will achieve one of your goals through the use of technology/machines that transforms energy from one form to another.
- Draw a blueprint of your device with short descriptions of how each part of the device will work. There should be at least 6 transformations involved in your machine.

2. Explanation of Rube Goldberg Device (20 points)

Submit a formally written, word-processed lab report. The lab report should include the following sections:

- Purpose:** Describe the purpose of your project. In a few sentences, describe the scenario, which you are trying to model and identify the goal, which you will be attempting to accomplish. The statement should be a purpose statement (procedural steps should not be discussed).
- Description of the Model:** The different parts of the device should be described in detail as to how they function. A discussion as to the ability of the individual machines in the device to perform their duties is recommended.

- c. **Theoretical Background:** Describe the type of energy each part of the device is using and how that energy is transferred to the next part of the Rube Goldberg Device.
- d. **Data Section:** This should include a record of variable changes that had to be made as the design process unfolded with specific results included. For example, if the launch velocity of a projectile to reach a certain point is too high for the launch device, what will be altered and how? Make sure your data and observations are put into an organized format.
- e. **Discussion of Results:** Describe the final successful (we hope) version of the model you have constructed. Describe in detail any problems or difficulties this device might have in completing the goal. Discuss its reliability (i.e., can it get repeatable results?). Discuss the possible energy losses or machine malfunctions, which might take place over time.

3. Creation of Rube Goldberg Device (Product) (30 points)

Using actual hardware, build your Rube Goldberg device and package it in a manner that makes it presentable to *the public*. If necessary, consider the need for re-design and re-building. You will explain how your device works in front of the class and demonstrate a successful operation of the machine.

Rube Goldberg Device Regulations

1. The machine must work on its own from start to finish.
2. The machine must be no larger than 5'H x 6'W x 3'D.
3. The machine must have a minimum of 6 steps.
4. There are no maximum number of steps.
5. No live animals may be used in the machine.
6. The machine must not imply profane, indecent or lewd expressions.
7. Any loose or flying objects must remain within the set boundaries of the machine. This includes, but is not limited to, drops of water, slivers of balloon, and other "small" objects. Steam and other gasses are exempt from this rule.
8. No open flames may be used on the machine.
9. No hazardous materials or explosives can be used on the machine.
10. Students may work in pairs on the project. Each team only has to turn in one paper and one device. Each member of the team will receive the same grade.

Due Dates:

Blueprint of Design of Rube Goldberg Device	Tuesday December 16 th , 2008
Rough draft of Explanation (Only parts a, b, c)	Tuesday January 6 th , 2009
Final Draft of Explanation	Wednesday January 21 st , 2009
Rube Goldberg Device	Wednesday January 21 st , 2009

Rube Goldberg (rōōb gōld'berg) n. a comically involved, complicated invention, laboriously contrived to perform a simple operation — *Webster's New World Dictionary*

Helpful Tips

1. Decide on a goal for your machine. The goal is the last step of your machine. It may be something useful, like how to turn off the alarm clock, or something wacky, such as how to swat a fly. Use your imagination!
2. Gather a few things from around the house, in your toy box, junk drawer, or garage. Balls, marbles, dominoes, string, toy cars, mousetraps (never use a rat trap - it could break the bones in your hand), magnets, cardboard or tubes, etc. Don't worry, you can collect more later.
3. Now play with the things! What can the car bump into or knock down? Can the string pull something up? What can push the ball down the cardboard ramp? Try it out!
4. Once you get a few good ideas for your machine, make a list, in order, of the steps, or draw a simple picture of the steps.
5. Plan on making quite a few changes to your machine as you build it. It may look different from your original drawing. Try not to get frustrated, this is part of learning what works best.
6. If you get stuck at a certain step of your machine, why not try to work your way backwards? Start at the last step, and connect the part to it that triggers it. Or take a break away from the machine. Sometimes you'll come back with a fresh solution to the problem.
7. As someone once said "Gravity is your friend". Use it!
8. Make your machine sturdy from wood, nails, etc.
9. Your machine may only "run" for 5 seconds, but plan on testing each step over and over, before you continue.
10. Maybe you've overlooked the most important element of an outstanding Rube Goldberg machine: WACKINESS! Rube saw the humor in every situation. His ludicrous cartoons were a satire on the American public for their complicated methods for solving a problem. Be sure to follow your teachers guidelines if you are required to have a certain number of pulleys, ramps, levers, etc. but then, GO CRAZY! A true Rube Golberg machine would be boring without some common household items (old toys, toilet plunger, egg beater, mousetrap, typewriter...)
11. Thought for the day: It's better to have 6 steps that work well, then 15 steps that don't work at all!