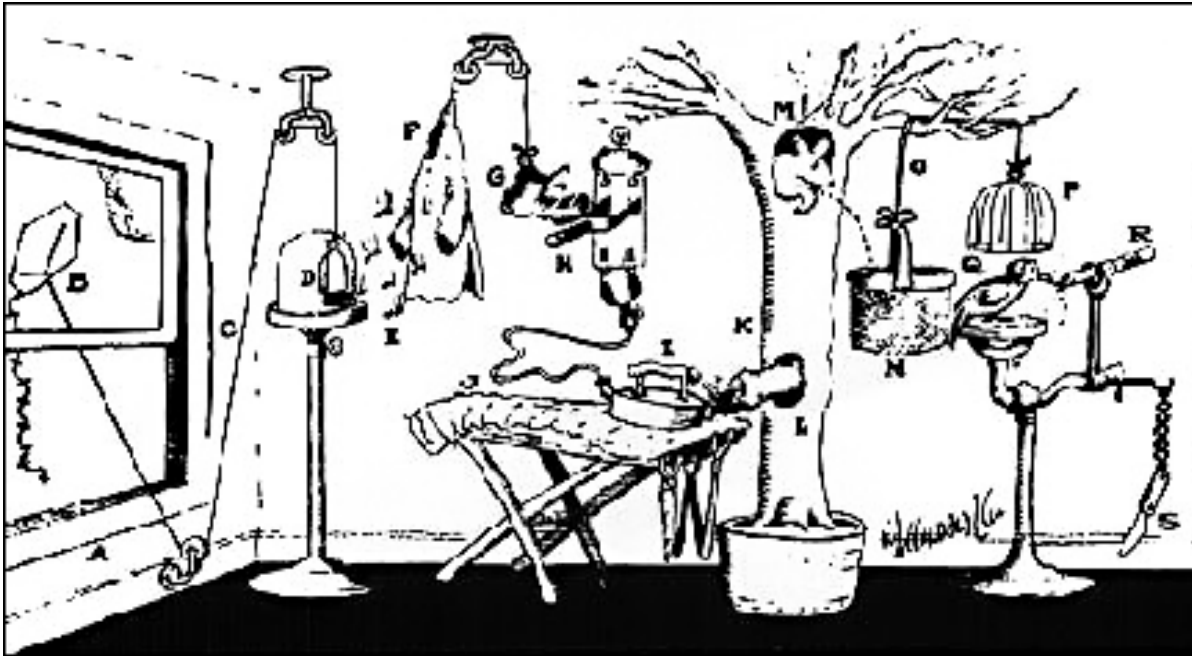


Rube Goldberg Project

Physics

Overview:

In this project, you will demonstrate your knowledge of principles in physics by designing, creating, and explaining a Rube Goldberg device. This project is to pay homage to Goldberg, a satirical cartoonist best known for his designs of ridiculously complicated gadgets that performed the simplest tasks in whimsical, roundabout ways.



Sample: Simplified Pencil Sharpener

Open window (A) and fly kite (B). String (C) lifts small door (D) allowing moths (E) to escape and eat red flannel shirt (F). As weight of shirt becomes less, shoe (G) steps on switch (H) which heats electric iron (I) and burns hole in pants (J). Smoke (K) enters hole in tree (L), smoking out opossum (M) which jumps into basket (N), pulling rope (O) and lifting cage (P), allowing woodpecker (Q) to chew wood from pencil (R), exposing lead. Emergency knife (S) is always handy in case opossum or the woodpecker gets sick and can't work.

Directions:

1. Design of Rube Goldberg Device

- Brainstorm some ideas about what type of task that you wish to accomplish with this sort of device.
- Decide on a Rube Goldberg device that will achieve a goal through the use of technology/simple machines. There should be at least 6 simple machines and energy transfers in your final product that start and end with a golfball rolling onto and off of your board. The golfballs allow us to link the various machines together making one large Rube Goldberg device.

1. Explanation of Rube Goldberg Device (Paper)

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

- a. **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).
- b. **Description of the Model** – The different parts of the device should be described in detail as to how they function. References to information from the literature search should be included here. A discussion as to the ability of the individual machines in the device to perform their duties is recommended
- c. **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? Organize your data in a meaningful way using a tabular format.
- d. **Discussion of Results** – Describe the successful final (we hope) version of the model you have constructed. Describe in detail any problems or difficulties this device had in completing the goal. Discuss its reliability (example, can it get repeatable results?) Discuss the possible energy losses or machine malfunctions, which might take place over time.
- e. **Paper Format** -
 - Typed (12 font and double spaced)
 - Correct grammar and spelling
 - Clear organization
 - Appropriate use of illustrations and tables/charts

2. Creation of Rube Goldberg Device (Product)

- a. Using actual hardware, design your Rube Goldberg device and package it in a manner that makes it presentable to the public.
- b. Your Rube Goldberg device needs to include a minimum of 15 steps from start to finish, each step utilizing some principle of physics. Must have 6 different simple machines that can be used several times in your final product.
- c. The maximum dimensions are 0.36 m x 0.50 m x 0.50 m
(the measurement of 0.36 m for the height is especially critical since you are limited by the height of your table shelf.)
- d. For safety reasons, you may not use flames or chemicals or other hazardous materials. Your design should not include any offensive materials or themes. Your device cannot be plugged into an electrical socket to operate, nor can it include live animals.
- e. Your Rube Goldberg device needs to illustrate principles of physics. Principles of physics include mechanics, sound, light, waves, electricity, and magnetism.

- f. Your device should be constructed from materials that you scrounge from home or family or friends or work. The total cost for your device should not exceed \$10.00. You should plan to put the pieces together with nails, screws, brackets, wood glue, hot glue, or some other fasteners besides tapes! In other words, the final product should be sturdy and transportable and professional looking. (HINT – Be sure to change things quickly if pieces break like rubber bands, especially mouse traps)
- g. Your device needs to be reliable. In other words, once you start the first step, the remaining steps should follow without any human intervention. In addition, you should be able to reset the machine quickly for another run. Your device should have two complete run-throughs.

3. Due Date:

The completed Rube Goldberg machine needs to be fully operational by class on _____.

Here's the catch, we will put all of the Rube Goldberg Devices together to form one large Super Duper Rube Goldberg machine. To do this your machine must first start by having a Golfball roll onto your board in the middle and activate it. Finally, your rube Goldberg has to end by having a golfball roll off of the middle of your board thus starting the next machine. In between those two actions everything else is up to you and there should be some purpose to the device in other words a series of energy transfers end up doing some task.