

# Rube Goldberg Design Challenge

Due: Thursday, May 21

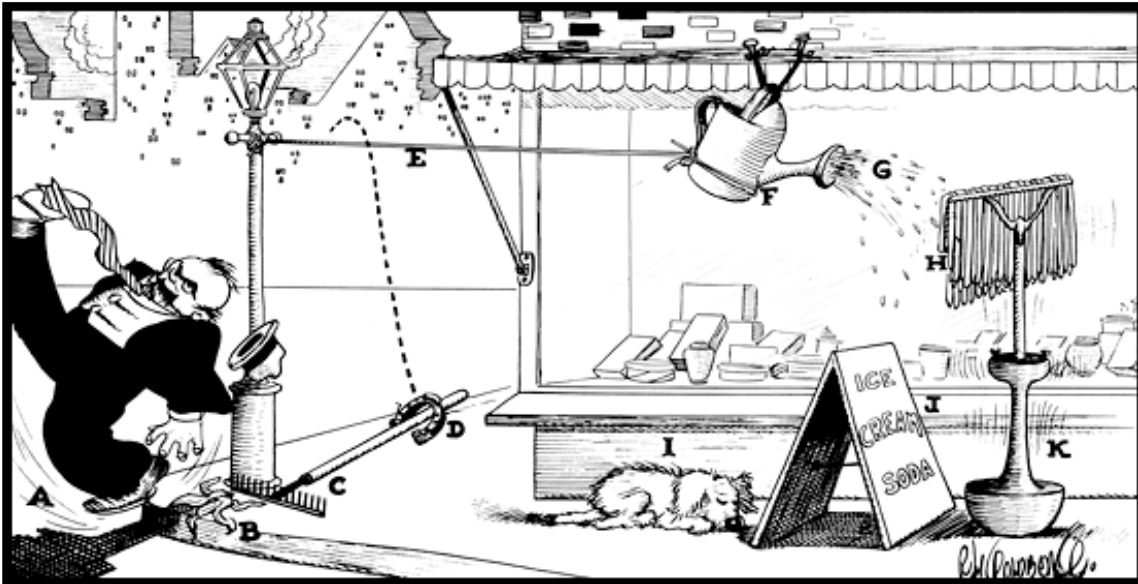
## Design Teams:

Sienna, Brooke, Ava  
Zach, Michael, Christian  
Toby, Chris, Alex, Owen

*“To invent, you need a good imagination and a pile of junk.”*

## Albert Einstein

### How to Keep Shop Windows Clean



Passing man (A) slips on banana peel (B) causing him to fall on rake (C). As handle of rake rises it throws horseshoe (D) onto rope (E) which sags, thereby tilting sprinkling can (F). Water (G) saturates mop (H). Pickle terrier (I) thinks it is raining, gets up to run into house and upsets sign (J) throwing it against non-tipping cigar ash receiver (K) which causes it to swing back and forth and swish the mop against window pane, wiping it clean. If man breaks his neck by fall move away before cop arrives.

**Rube Goldberg (1883-1970) was a Pulitzer Prize winning cartoonist, sculptor, and author.**

Reuben Lucius Goldberg (Rube Goldberg) was born in San Francisco on July 4th, 1883. After graduating University of California Berkeley with a degree in engineering, Rube went on to work as an engineer for the City of San Francisco Water and Sewers Department.

After six months Rube shifted gears and left the Sewers Department to become an office boy in the sports department of a San Francisco newspaper. While there he began to submit drawings and cartoons to the editor until he was finally published. Rube soon moved from San Francisco to New York to work for the Evening Mail drawing daily cartoons. This led to syndication and a national presence – and the rest is history.



A founding member of the National Cartoonist Society, a political cartoonist and a Pulitzer Prize winner, Rube was a beloved national figure as well as an often-quoted radio and television personality during his sixty-year professional career.

Best known for his “inventions”, Rube’s early years as an engineer informed his most acclaimed work. A Rube Goldberg contraption – an elaborate set of arms, wheels, gears, handles, cups, and rods, put in motion by balls, canary cages, pails, boots, bathtubs, paddles, and live animals – takes a simple task and makes it extraordinarily complicated. He had solutions for How To Get The Cotton Out Of An Aspirin Bottle, imagined a Self-Operating Napkin, and created a Simple Alarm Clock – to name just a few of his hilariously depicted drawings.

# Rube Goldberg Project Instructions

## *Design, Build, and Present an Incredible Contraption.*

1. A Rube Goldberg machine is a contraption used to perform a certain task. It is your design team's job to create a device that requires ***eight steps*** (minimum) to complete the task.
2. The working contraption should include at least ***four different simple machines*** (wedge, fixed or movable pulley, gears, pendulum, inclined plane, screw, wheel and axle, or 1st, 2nd, or 3rd degree lever).
3. ***Each member of your design team must draw their own concept sketch*** of your Rube Goldberg contraption. The concept sketch must include the minimum of eight steps and the minimum of four different simple machines.
4. ***Each member of your design team must create a working virtual 3D computer model in Fusion of at least four of the simple machines*** in your contraption.
5. Your group must ***fabricate at least four of the simple machines in your contraption using the fabrication equipment in GCAD.***
6. ***Fifty percent of the contraption should be constructed using the fabrication equipment in GCAD.***
7. Your group must ***assemble/build the contraption.***
8. Your group must ***demonstrate your working contraption to the class.*** The machine cannot be touched once it has started.
9. All machines must meet safety requirements:
  - No launching, shooting, or catapulting anything harmful or dangerous from the device toward people, walls, or the ceiling
  - No mouse traps or rat traps
  - No hazards/dangers (flames, acids, broken glass, etc.)
  - No violence
  - In addition, you must clean up any and all messes created by your machine!

1. **Decide on a goal/task for your machine.** The goal/task 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.

**Task Ideas:**

Fold a napkin, open a pop can, screw a lid on a plastic jar, raise a flag, turn on a radio, set off a party popper, blow up a balloon, prepare a bowl of cereal, turn on a light, turn a page in a book, smash a grape, pour a drink in a cup, put toothpaste on a toothbrush, put a golf ball into a hole, turn on a flashlight, pop a balloon.

2. **Incorporate items from around campus** (balls, marbles, dominoes, string, magnets, cardboard, tubes, etc.).
3. **Brainstorm ideas and write them down on paper.** No matter how crazy the idea seems, just write it down for later. Even if you don't use it, it may help you come up with more ideas.
4. **Experiment!**
5. Once you get a few good ideas for your machine, **each member of the group must draw a concept sketch that includes the minimum of eight steps and the minimum of four different simple machines.**
6. **Each member of the group must create a working virtual 3D computer model in Fusion of at least four of the simple machines in your contraption.**
7. **Fabricate at least four of the simple machines in your contraption using the fabrication equipment in GCAD.**
8. **Fabricate fifty percent of the contraption using the fabrication equipment in GCAD.**
9. **Assemble/build the contraption. Embrace failure.** 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 the design process.
10. **Each member of the group must document the groups process on their individual blog page. Your blog page should show the specific work you completed in the project.**

***Be creative and have fun!*** Rube Goldberg saw the humor in every situation. His ludicrous cartoons were a satire on the American public for its use of complicated methods for solving problems. A true Rube Goldberg machine would be boring without some common household items (old toys, toilet plunger, egg beater, typewriter, etc.).