Rube Goldberg Project

5th Grade Design Challenge

Here's your chance to be creative, and a little wacky too. In this design challenge you will follow in the footsteps of Rube Goldberg™, an American cartoonist with a unique and popular style. His best known works were cartoons that depicted spectacularly complex machines designed to perform very simple tasks. Often a task would require several unrelated, and often bizarre and humorous events to accomplish a goal. First, you'll use your creativity to dream up some fantastic machines. Then you'll get to put your building skills, and your machine, to the test!

Challenge: Your team will design and build a device capable of performing a task, to be determined, through a series of self-driven interactions.

Task: Transport produce down a mountainside and across a river. Your system must allow for the largest amount of produce to be transported without being damaged and in the shortest amount of time.

Guidelines:

- Students may work in teams of up to three people (see specifics below)
- No external power sources are permitted. Everything must be part of your design.
- The operator may initiate the chain of events; any further interaction with the device will result in a reduction of score.
- No combustible fluids, explosives, open flames, or hazardous materials are permitted.
- Each team is responsible for the security, transport, and construction of their machine.
- The device must not make a mess (i.e. spill sand or water on the floor)
- Events may branch off, but the line of action must contribute to the final task
- No two processes should be identical
- An event is defined by the existence of a distinctly different "cause and effect" relationship.

# of students in group	# of steps
1	8
2	12
3	16

Documentation: (to be handed in with project)

- A cartoon drawing of your design
- An outline of the chain of events with a qualitative analysis of all work/energy transformations involved in the operation of your device. This should be a step by step list or table.
- An *individual* quantitative analysis of 2 different energy transformations

Criteria	Points Possible	Points Earned
Successfully accomplishing the task within the established guidelines (3 pt. penalty for each event short)	15	
Operator Interaction (2.5 pts. penalty for each human intervention beyond start)	5	
Cartoon	5	
Event outline with qualitative analysis of energy transformations	10	
Individual quantitative analysis of energy transformations	15	
TOTAL	50	

Who is Rube Goldberg?

Taken from www.rube-goldberg.com :

Rube Goldberg Biography

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

Reuben Lucius Goldberg (Rube Goldberg) was born in San Francisco. His father, a practical man, insisted he go to college to become an engineer. After graduating from University of California Berkeley, Rube went to work as an engineer with the City of San Francisco Water and Sewers Department.

He continued drawing, and after six months convinced his father that he had to work as an artist. He soon got a job as an office boy in the sports department of a San Francisco newspaper. He kept submitting drawings and cartoons to his editor, until he was finally published. An outstanding success, he moved from San Francisco to New York drawing daily cartoons for the *Evening Mail*. 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.

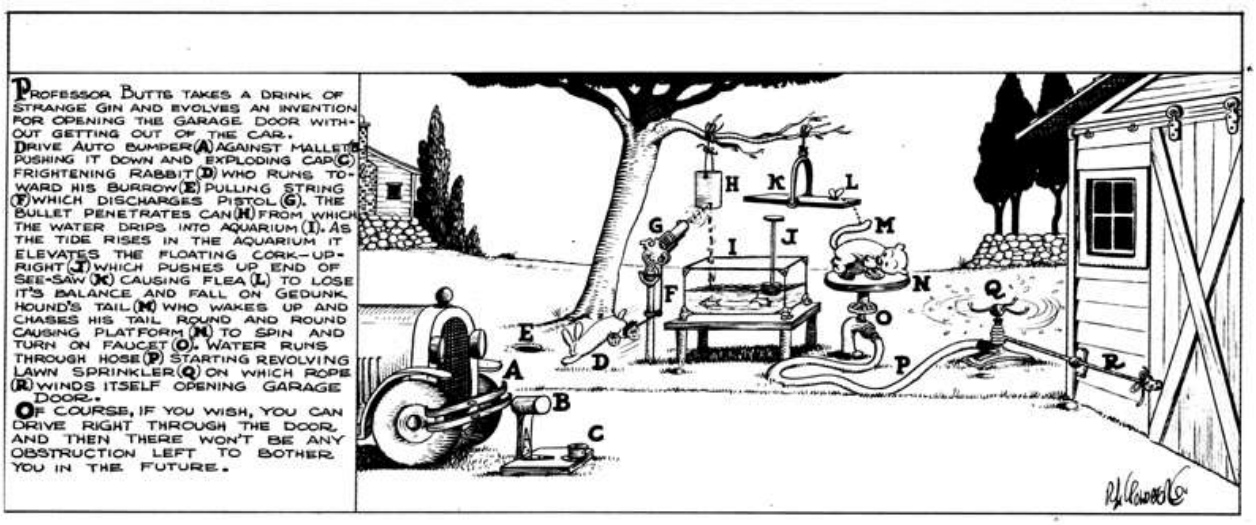
Through his "INVENTIONS", Rube Goldberg discovered difficult ways to achieve easy results. His cartoons were, as he said, symbols of man's capacity for exerting maximum effort to accomplish minimal results. Rube believed that there were two ways to do things: the simple way and the hard way, and that a surprisingly number of people preferred doing things the hard way.

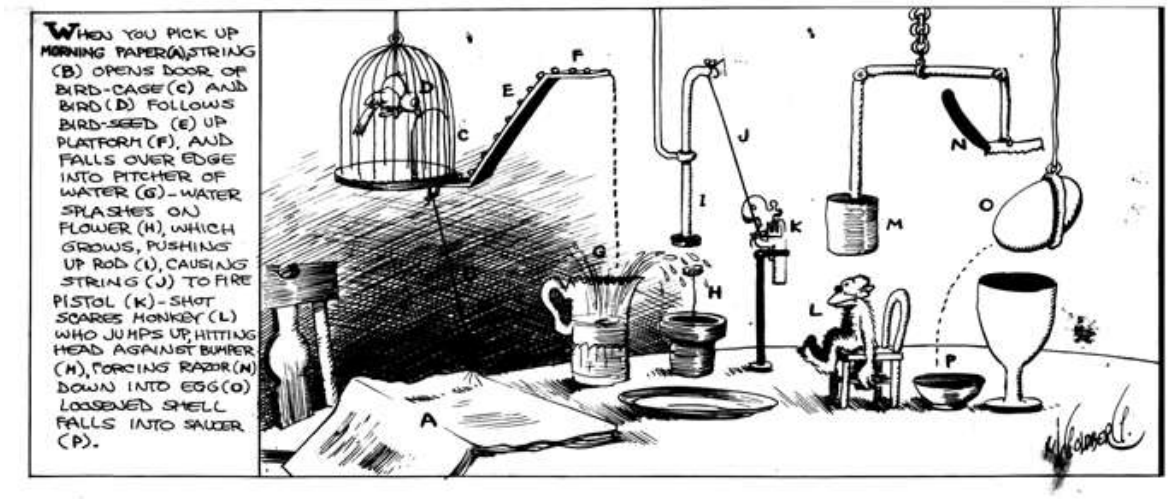
Rube Goldberg's work will endure because he gave priority to simple human needs and treasured basic human values. He was sometimes skeptical about technology, which contributed to making his own mechanical inventions primitive and full of human, plant, and animal parts. While most machines work to make difficult tasks simple, his inventions made simple tasks amazingly complex. Dozens of arms, wheels, gears, handles, cups, and rods were put in motion by balls, canary cages, pails, boots, bathtubs, paddles, and live animals for simple tasks like squeezing an orange for juice or closing a window in case it should start to rain before one gets home.

Rube's drawings depict absurdly-connected machines functioning in extremely complex and roundabout ways to produce a simple end result; because of this RUBE GOLDBERG has become associated with any convoluted system of achieving a basic task.

Rube's inventions are a unique commentary on life's complexities. They provide a humorous diversion into the absurd that lampoons the wonders of technology. Rube's hilarious send-ups of man's ingenuity strike a deep and lasting chord with today's audience through caught in a high-tech revolution are still seeking simplicity.
Hardly a day goes by without *The New York Times*, *National Public Radio*, *The Wall Street Journal* or some other major media invoking the name Rube Goldberg to describe a wildly complex program, system or set of rules such as our "Rube Goldberg-like tax system". The annual National Rube Goldberg Machine Contest at Purdue University, which is covered widely by the national media, brings Rube's comic inventions to life for millions of fans.
The work of Rube Goldberg continues to connect with both an adult audience well versed in the promise and pitfalls of modern technology (can anyone over 40 program their VCR?) as well as younger fans intrigued by the creativity and possibility of invention.

Some examples of Rube's work:





Simple way to open an egg without dropping it in your

This isn't just a physics project...

Machine Contest History

The Rube Goldberg Machine Contest (RGMC) is named after the late cartoonist Reuben Lucius Goldberg. Having died in 1970, he lives on in the RGMC as puzzling machines with crazy mechanisms are built in the spirit of his illustrations.

For 55 years the award-winning engineer turned cartoonist drew machines and contraptions that satirized the new machines and gadgets being built. His drawings, using simple gadgets and household items already in use, were incredibly complex and wacky, but had an ingenious, logical progression to them. Goldberg's inventions became so widely known that Webster Dictionary added the term "Rube Goldberg" to its listings, defining it as "accomplishing by extremely complex, roundabout means what seemingly could be done simply."

In the words of the inventor, the machines were a "symbol of man's capacity for exerting maximum effort to achieve minimal results." He believed that most people preferred doing things the hard way than using a more simple and direct path to accomplish a goal.

In 1949, at the peak of the Goldberg era, the two engineering fraternities at Purdue University, Phi Chapter of Theta Tau Fraternity and Triangle Fraternity, developed their own version of the Rube Goldberg Machine Contest. The contest was held as part of the Engineer's Ball, also sponsored by the two fraternities. The contest died out with the Engineer's Ball in 1955, when the two fraternities no longer sponsored the event.

In 1983, some members of the Phi Chapter of Theta Tau Fraternity became interested in an old trophy that they found while cleaning one day. It was the original traveling trophy from Purdue's first RGMC. After diligently searching out information on the contest, they resurrected the event. They also made it a point to produce a guide for others to follow in order to successfully start a competition.

All the attention finally paid off in 1988 when the first National Rube Goldberg Machine Contest was launched. Nationwide television, radio and printed media attention promotes the growth of the contest to make it bigger and better each year. In 1992, the first contest appeared on television when Beyond 2000 came to Purdue to film the contest.

The popularity of the machine contest grows with each year that Phi Chapter of Theta Tau hosts it. Past national contest winners have been featured on Newton's Apple, The History Channel, The Tonight Show Starring Johnny Carson, Late Night With David Letterman, ABC's Jimmy Kimmel Live!, NBC's Today Show, CBS's This Morning, The CBS Evening News, CNN, and Good Morning America.

The RGMC now has the honor of being Purdue's largest non-sports media event. Because of the dedication of the Phi Chapter of Theta Tau, the Purdue faculty and staff, and sponsors, the contest continues to grow.

The RGMC contest was expanded to the High School level three years ago with the support of the US Department of Energy's Argonne National Laboratory and the University of Illinois, Urbana-Champaign.

For videos go to : https://www.teachingchannel.org/videos/rube-goldberg-contraptions