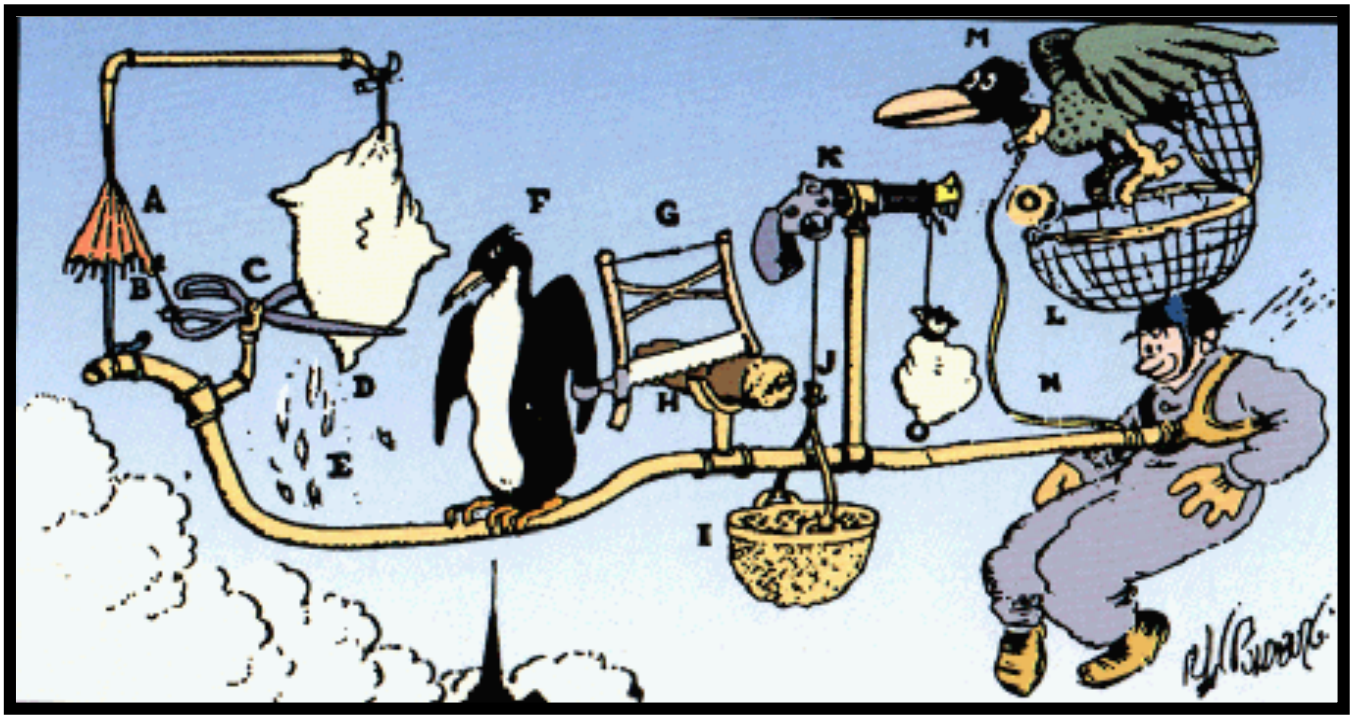
Name _____ Core _____

Rube Goldberg Machine Project

"To invent, you need a good imagination and a pile of junk." **Albert Einstein**



Automatic Parachute Opener

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.

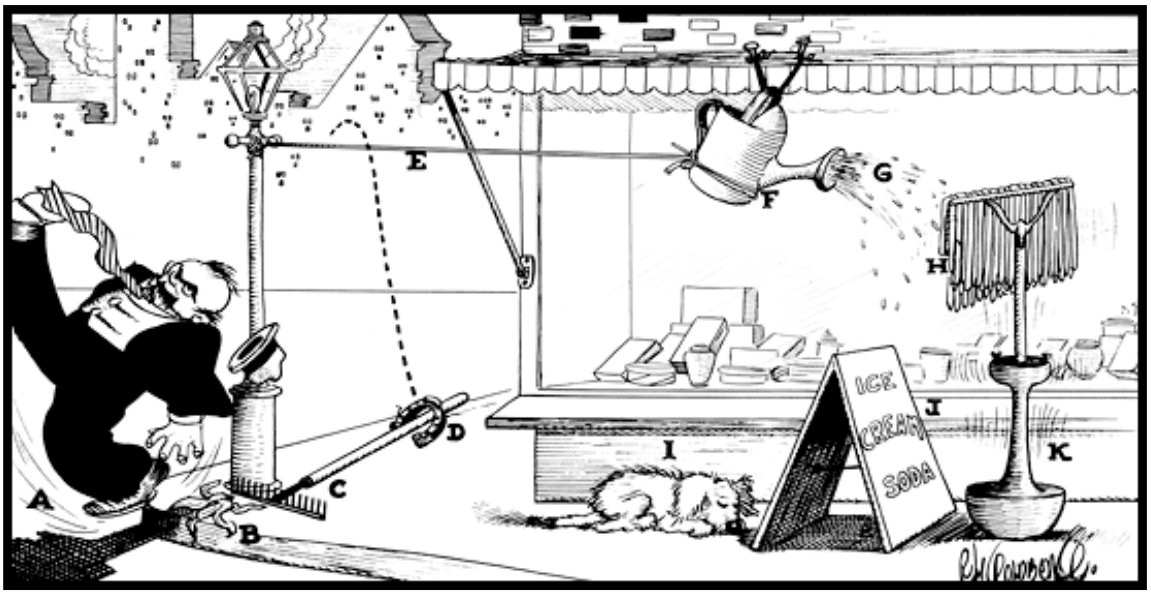
After six months Rube shifted gears and left the Sewers Department to become an office boy in the sports department of a San Francisco newspaper. While there he began to submit drawings and cartoons to the editor until he was finally published. Rube soon moved from San Francisco to New York to work for 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.

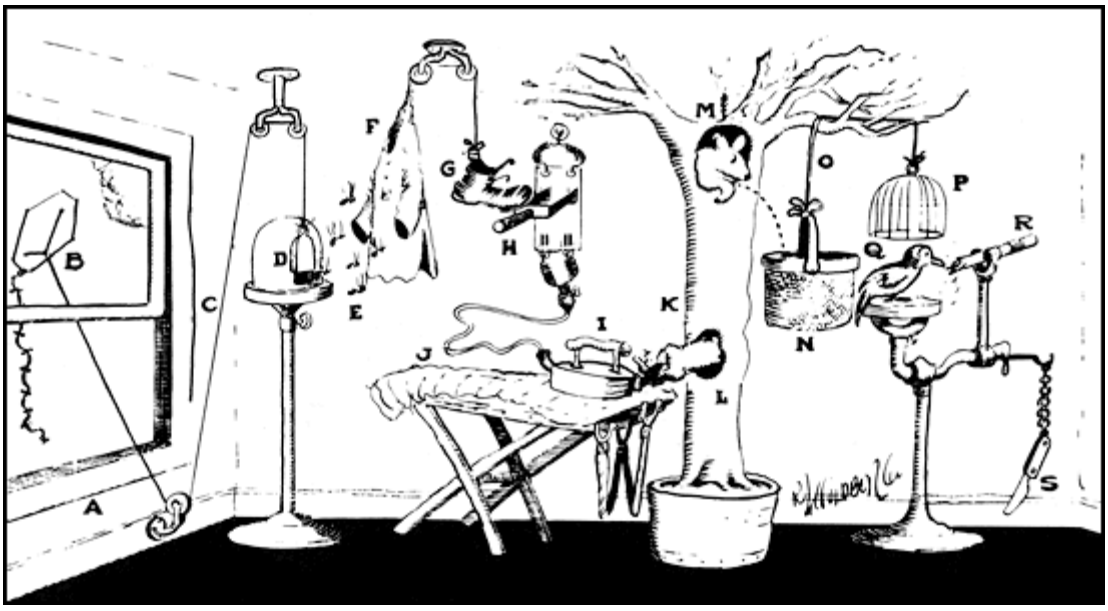
Rube Goldberg (rōōb gōld'berg) n. a comically involved, complicated invention, laboriously contrived to perform a simple operation — *Webster's New World Dictionary*

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.

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.

Rube Goldberg Project Instructions

Design, Build, and Present an Incredible Contraption of Your Own.

1. A Rube Goldberg machine is a device used to perform a certain task. It is your job to create a ***5 – step*** (minimum) simple machine device to perform any task that you wish.

2. Like an architect, you must make a "blueprint" drawing of your Rube Goldberg machine listing all five (5) steps with the proper names of the different simple machines.

3. You must **build** your device and bring it to class. Your project must fit through the door. The working device should **include at least three different simple machines** (wedge, fixed or moveable pulley, pendulum, 1st, 2nd or 3rd degree lever, inclined plane, screw, wheel and axle, or gears).

4. You must present your device in class using the proper terms to identify the different simple machines. You will then physically demonstrate your device to the class.

5. All machines must meet safety requirements:

    - You may not launch, shoot or catapult anything harmful or dangerous from the device toward people, the walls, or the ceiling.
    - You **MAY NOT** use a mouse or rat trap.
    - Any and all messes created by your machine will be cleaned up by you!
    - No hazards/danger can be involved.
    - No violence can be involved.
    - No open flames.
    - No animals can be used.

6. You must complete the Project Reflection Paper.

This project is not as difficult as one may first think. This is a great project that can be very inexpensive if you use materials around the house. Building toys like Lego, Tinker Toys, or construction kits may help you with the construction of this device.

Your own imagination and creativity are all you need to build a super Rube Goldberg machine. But if you're having trouble getting started, here are a few tips to help you.

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.

   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.

   - The above are only **ideas.** Any other ideas must be cleared with your teacher **first!** It's OK to be unique and creative!

2. Gather a few things from around the house, in your toy box, junk drawer, or garage. Balls, marbles, dominoes, string, toy cars, 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. Get a piece of paper and start writing down any idea that pops into your head. This is called brainstorming. No matter how crazy the idea seems, just write it down for later. Even if you don't use it, it may help you think of more things.

5. 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.

6. 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.

7. 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.

8. 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. GO CRAZY! A true Rube Goldberg machine would be boring without some common household items (old toys, toilet plunger, egg beater, typewriter...)

9. Still having trouble? Look up the inspiration for this project and all things related to Rube Goldberg: his original "invention cartoons". While you may not open your garage door by pouring water on a daisy seed and waiting for the flower to start a chain reaction, you'll laugh at his originality and will surely get some ideas.

Examples of Common Items Typically Used

Kitchen Items	Work Shop/Garage Items	Kids Items	Office/School Items	Other Items
plastic jars	wood scraps	toys	rubber bands	sand
lids	PVC pipe	old trophies	paper clips	water
juice cans	tools	pet cage parts	scissors	clay
utensils	wire	aquarium tubing	binder clips	play-doh
bowls	chain	building blocks	pens	caulk
food containers	tape (all kinds)	balls	pencils	dough
plastic bags	old parts of junk	gloves	paper	yarn
plastic silverware	nails	pucks	cardboard	boxes
canned food	screws, nuts, bolts	shoes	books	
fridge magnets	belts	rackets	glue	
pots & pans	hose	golf tees	stapler/staples	
beans	string	stuffed animals	old telephone parts	
rice	old yard tools	action figures	old computer parts	
brooms	old camping gear	marbles	erasers	
funnels	old car parts	dominoes	thumb tacks	

Sketch your Rube Goldberg Machine below and letter each step in order. Describe the action of each step on the lines and label the simple machine used for each.

Name of Machine_____

What is the ultimate goal for your machine?_____

_____

Step:	Simple Machine:
A)	
B)	
C)	
D)	
E)	

Self Reflection of my Project

1. How did you come up with the idea for your project?

2. What do you see as the strengths of your device?

3. What was particularly important to you while you were completing your device?

4. What things did you struggle with while you were completing your project?

5. What was the most important thing you learned from completing this project?

6. What was the best thing that happened while you were working on this project?

7. What were some reactions your received from those who saw your project?

8. What advice would you give to someone just beginning this project?

9. What would your do differently, knowing what you now know about the project?

10. If you were given two weeks to improve on your project, what modifications or extensions would you make?

Rube Goldberg Project Grading Sheet

	Possible Points	Points Earned
Drawing is complete and neat, with the simple machines and steps labeled	20	
Student gives machine a creative name	5	
Student uses at least three (3) different simple machines	10	
Student correctly identifies simple machines	10	
Machine works to completion without intervention	5	
Student describes construction of device in a knowledgeable manner	10	
Device construction shows quality construction	10	
Device is unique and creative in design	10	
Device is completed on time	10	
Student speaks clearly and presentation is focused	5	
Student completes Project Reflection Paper	5	
Comments:	100	