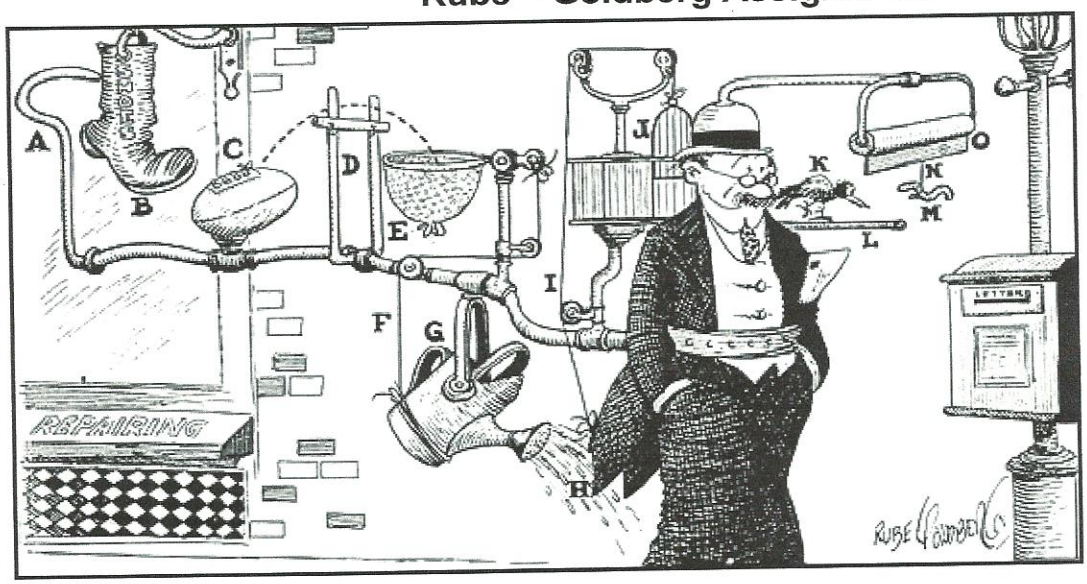
Rube – Goldberg Assignment



Background: Rube Goldberg was a cartoonist (New York Post) that became famous for drawing very complicated machines that performed very simple tasks. A typical Rube Goldberg device could not perform a job as straightforward as turning on a faucet without the assistance of pulleys, fulcrums, mousetraps, cables, and gears. By the time the cartoonist retired, the term "Rube Goldbergian" had been enshrined in the language to describe anything characterized by excess complexity. For more information, check out the Official Rube Goldberg site.

You will design a Rube-Goldberg Machine that uses multiple steps to complete a simple task. This assignment will be graded as test grade.

Part A: Cartoon Drawing of Machine

- You must provide a sketch of your machine that shows the step-by-step operation of your machine.
- Drawing must include all six simple machines, show 6 different energy transfers, and show different forms of energy being used.
- Label each of the 6 simple machines in your cartoon.
- Label each of energy transfers in your cartoon (must be 6 different energy transfers, in other words – they cannot all be potential to kinetic energy).
- Before beginning your drawing, decide on a culminating task you want to complete at the end of the machine.

Part B: Written Assignment:

I. Step-by-step explanation

- Provide a written explanation of each step. (A ball rolls down a ram and knocks down a block which then falls over and starts a car rolling down a ramp). Each step should be labeled A, B, C etc.
- Example: A. A ball rolls down a ramp
  B. Ball knocks down a domino
  C. Domino falls down and starts a car rolling
- Must have at least 10 steps in cartoon.

II. Simple Machines, Work, and Mechanical Advantage

- Define the terms: simple machine, work, and mechanical advantage.
- List and explain each simple machine used in the cartoon. Must use all six simple machines at least once. May use each simple machine more than once.
- Describe the work being done by each machine.
- Use the formula: work = force x distance to demonstrate that work is being done.
- Explain the mechanical advantage for each of the simple machines.
- Complete the necessary calculations to demonstrate the mechanical advantage of each simple machine.
    - Pulley: count the rope segments that are supporting the load
    - Lever: Effort Arm / Resistance Arm
    - Wedge: Length of Slope / Thickness of big end
    - Wheel and Axle: Radius of Wheel / Radius of Axle
    - Inclined Plane: Length of Slope / Height
    - Screw: Circumference of Screw / Pitch of Screw

III. Energy Transformations

- Define the Law of Conservation of Energy.
- Identify and explain at least six different energy conversions
- Example: The ball at the top of the ramp has potential energy. As the ball moves down the ramp, potential energy is converted into kinetic energy. When the ball hits the domino, kinetic energy is transferred to the domino.

GRADING RUBRIC

PART A: CARTOON DRAWING	
Originality	10 points
Neatness and Readability	10 points
Six Simple Machines Included and Identified	20 points
Six Energy Conversions Included and Identified	20 points
PART B: WRITTEN EXPLANATIONS	
Neatness and Readability	5 points
A,B, C Steps listed	10 points
Simple Machine Descriptions	5 points
Work Calculations and Explanations	5 points
Mechanical Advantage Calculations and Explanations	5 points
Energy Conversions Identified and Explained	10 points
TOTAL	100 points

RUBE GOLDBERG ROUGH DRAFT

ROUGH SKETCH OF DRAWING

I. Step-by-Step Directions

A. _____

B. _____

C. _____

D. _____

E. _____

F. _____

G. _____

H. _____

I. _____

J. _____

(Must have at least 10 – may have more. Use the back of the paper if you need to add more steps)