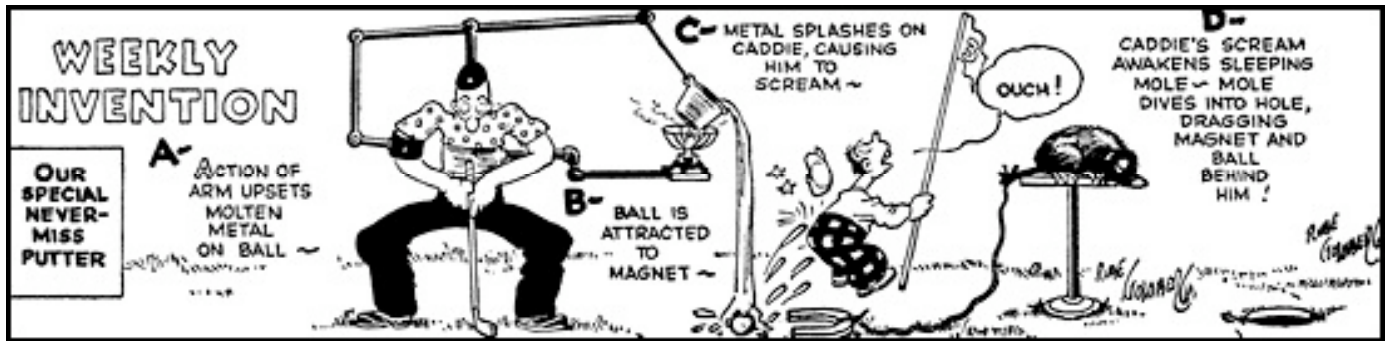


Your Rube Goldberg!

A first semester culminating project



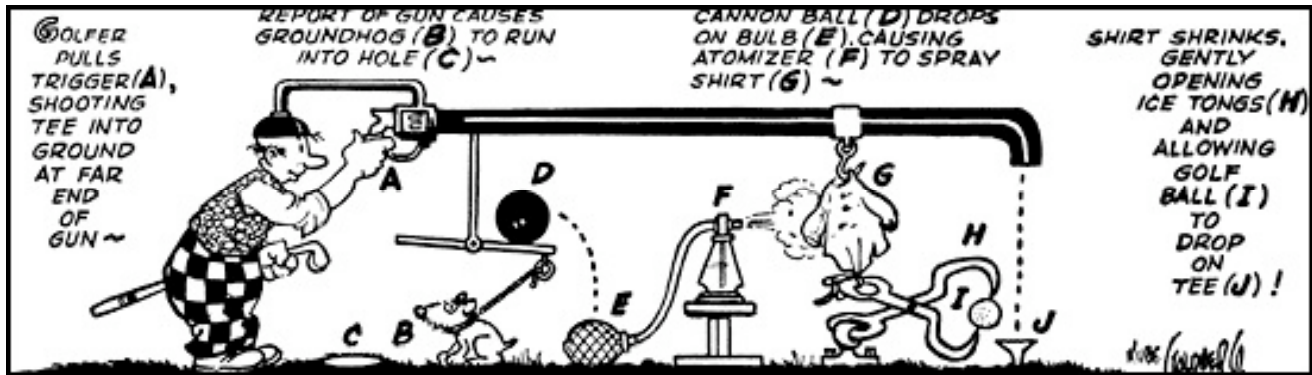
Project Introduction

Every time something in the Universe moves, heats, cools or explodes, some form of energy is transferred from one piece of matter to another. Since there are many different forms of energy, there are also a large number of ways to transfer it. This project is designed to let you demonstrate your understanding of those transfers by creating some of your own.

Rube Goldberg was a cartoonist who is famous for his drawings of marvelous inventions that did simple things. You are going to create a marvelous invention that uses many transfers of energy to do one simple thing. The webquest will give you the specific guidelines you must follow to complete your machine, a calendar of deadlines and in-class workdays for the project and a rubric for how it will be graded.

All images on the webquest from: "Rube Goldberg", The Official Site of Rube Goldberg. <http://www.rube-goldberg.com/>. (Accessed 09/15/06).

How do I make a Rube Goldberg Machine?



Group Task

Your task is to design and construct a Rube Goldberg machine using six simple machines, one chemical reaction, and at least two energy transfers to successfully complete an “end task”. For example, your machine can:

- 1) Pour water into a cup, or
- 2) Shut off an alarm clock, or
- 3) Put toothpaste on a toothbrush, or
- 4) Hit play on your iPod, or
- 5) Put coins into a bank, or
- 6) Sharpen a pencil, or
- 7) Any number of things you can think of on your own.

You will be working in groups of 2-3 students to complete this machine.

Individual Task

Each student will also complete an written assessment as a conclusion to the project.

The Components of Your Machine

Six Simple Machines, One Chemical Reaction

The first unit of study in IPS is physics in which you will be introduced to 6 simple machines. It is up to you and your partner/s to incorporate all of these simple machines in your Rube Goldberg Machine. In addition, you must include one chemical reaction, which you will learn about in the chemistry unit starting in November. As a group, you will decide which chemical reaction to use.

Two Energy Transfers

At least two energy transfers should be identified in your machine. You must calculate potential energy for each of these transfers and deduce kinetic energy for each transfer.

Design Submissions/Proposals

You will be expected to submit 3 different sketches of your machine throughout the project.

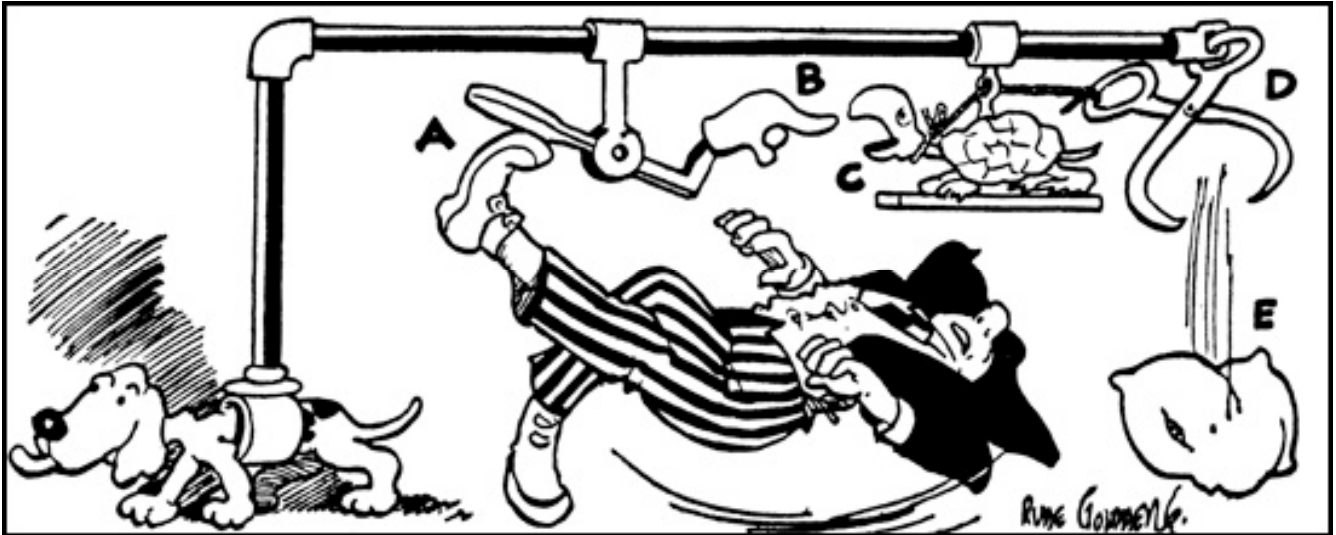
- 1) The first proposal includes the 6 simple machines and the 2 energy transfers. There will be a sketch of how the machines are connected, labeled with explanations, and a written description of how it should work. The energy transfer locations will be labeled and potential and kinetic energies will be quantified for each energy transfer. This proposal serves as your first rough draft.
 - 2) The second proposal includes and 6 simple machines, 2 energy transfers, and 1 chemical reaction. There will be a sketch of how the machines & chemical reaction are connected, labeled with explanations, and a written description of how it should work. Energy transfers will be, once again, labeled and quantified. This proposal serves as your second rough draft.
 - 3) The third proposal is a final sketch that will be submitted the day before the machines are presented and must include everything that was required for your second proposal. This sketch will be identical to the machine presented in class the next day and complete with labels and explanations.
-

Final Presentation

Your group will be presenting your final Rube Goldberg machine to the class. Each student will be expected to explain the simple machines used, the chemical reaction used, and the energy transfers. Your machine should successfully complete the “end task”.

What can and can't I do?

a.k.a. "the rules"



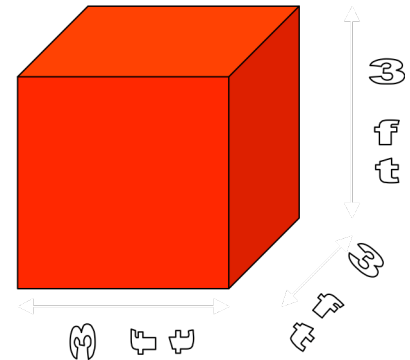
When you slip on ice, your foot kicks paddle (A), lowering finger (B), snapping turtle (C) extends neck to bite finger, opening ice tongs (D) and dropping pillow (E), thus allowing you to fall on something soft

Size

The size of your machine must not exceed 3ft x 3ft x 3ft.

Building Parameters

- Project must be self contained.
- The machine must complete the task as described in the challenge.
- The machine must contain at least 6 simple machines, 2 energy transfers, and one chemical reaction.
- There is no maximum number of steps.
- The machine must run a minimum of 15 seconds and a maximum of 2 minutes. The clock does not stop for restarts.
- There can be no pre-fabricated items. For example, no erector pulley sets or k'nex buggie and chains.
- No live animals may be used in the machine.
- The machine must not imply profane, indecent or lewd expressions, or any illegal items.
- Any loose or flying objects must remain within the set boundaries of the machine.
- No hazardous materials or explosives can be used on the machine.

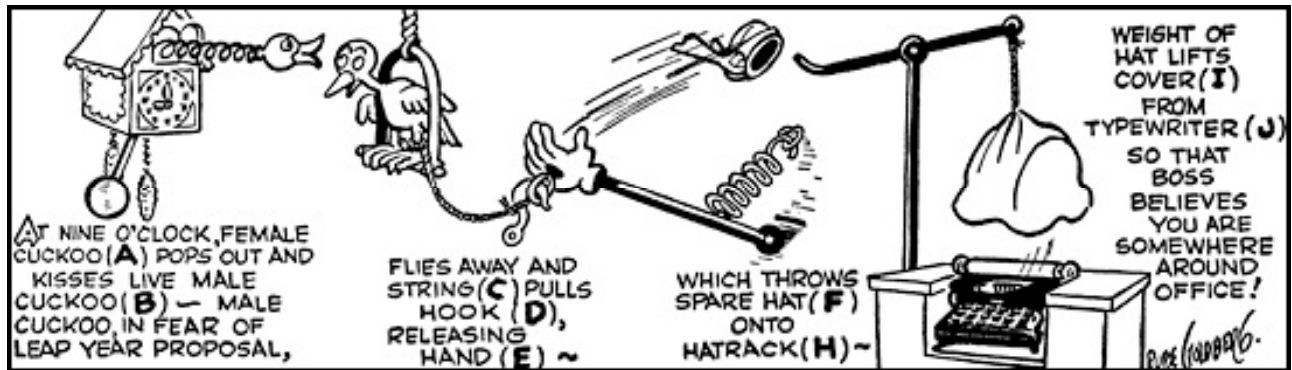


General Information

- Use whatever you can find from your house. Old toys, scarp wood, anything, so long as it is appropriate per the rules above.
- If you question anything you use or steps you intend to take, ASK YOUR TEACHER.

- Remember you have to bring this school, so do not make it too heavy.
- Draw out your plans first and think them through before you start gluing and taping.
- Talk with your partners so you know that each one of your steps works together.

When is everything due?



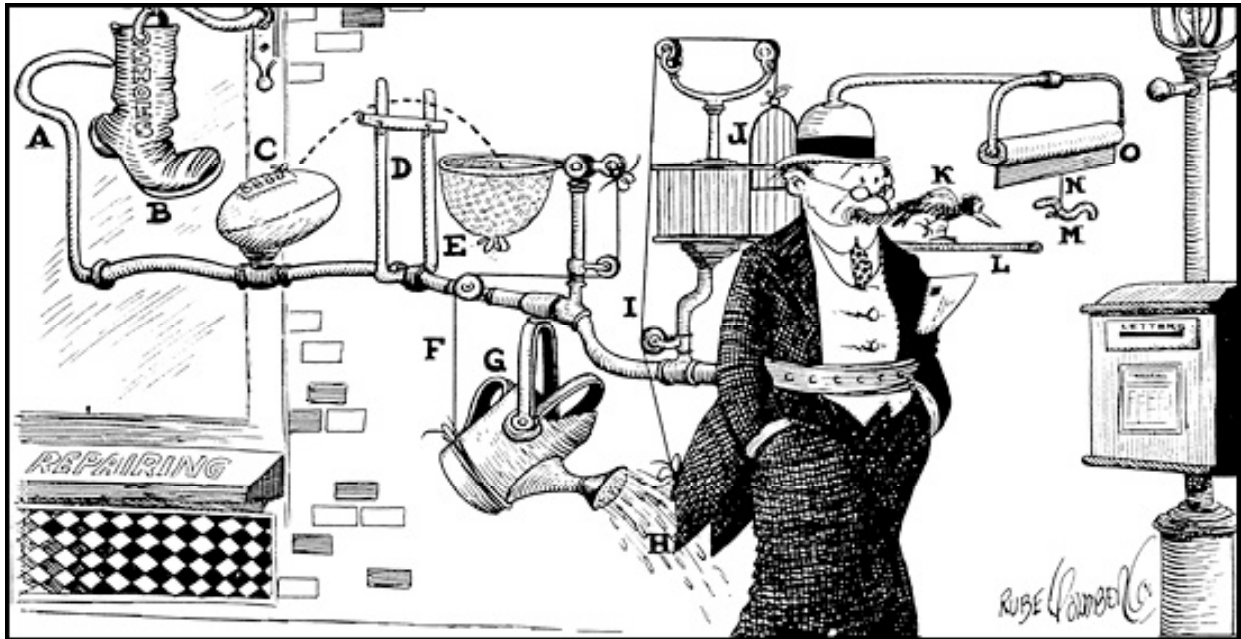
Deadlines

This is a long-term project that is going to take a lot of time outside of class. You and your partners must cooperate, plan ahead, and use your time wisely in order to have a successful project turned in on time.

Each IPS teacher will have slightly different deadlines for the following components. Ask your teacher about the exact deadlines for your class and add those dates to your calendar.

- _____ Project introduction
- _____ Project day
- _____ 1st design submission due
- _____ Project day
- _____ 2nd design submission due
- _____ Final design submission due
- _____ Present project
- _____ Assessment

How is this graded?



Rube Goldberg gets caught in a revolving door and becomes dizzy enough to dope out an idea to keep you from forgetting to mail your wife's letter.

Project Scoring

This is a large-scale project that can significantly impact your grade. Group points and individual points are assigned to different components of the project. Specific point totals will be provided by your teacher.

Design Submissions

Group grade

Specific guidelines and blueprint pages will be distributed in class.

Rube Goldberg Machine

Group grade

A detailed rubric will be provided in class and posted online at a later date.

Written Assessment

Individual grade

Throughout this project you, as an individual, will become an expert in simple machines, energy transfers, and a chemical reaction. The written assessment will consist of you explaining exactly how the simple machines and chemical reaction functions. You will have to demonstrate how you quantified potential and kinetic energies. This will also include a reflection on your learning. A detailed rubric will be provided in class and posted online at a later date.