

RUBE GOLDBERG LAB

Background:

Best known for his invention cartoons which use a string of outlandish tools, people, plants, and steps to accomplish everyday simple tasks in the most complicated way, Pulitzer Prize winning cartoonist Rube Goldberg's (1883-1970) drawings showed difficult ways to achieve easy results. While most machines work to make difficult tasks simple, his invention made simple tasks amazingly complex. Dozens of arms, wheels, gears, handles, cups, and rods were put in motion by balls, canary cages, pail boots, bathtubs, paddles, and even live animals for simple tasks like squeezing an orange juice or closing a window in case it should start to rain before one gets home.

CHALLENGE:

The challenge is to get a simple ping pong ball into a cup.

MATERIALS:

- Ping pong ball
- 3 cups
- masking tape (shared)
- string
- 20 dominos (shared)
- 1 hot wheels car
- 2 ring stands (shared)
- 10 paper clips
- 4 race car tracks (shared)
- 1 sheet of tin foil
- 1 piece of plastic silverware (spoon, fork, or knife)
- 2 coffee filters
- 2 pulleys (shared)
- 1 straw
- 1 cork or rubber stopper
- 1 tongue depressor
- 1 balloon

***Shared items are shared between all classes**

***You may bring safe items from home, but they must be stored in your locker.**

RULES:

1. The machine must complete the task as described in the challenge.
2. The machine must be contained within a 6 ft. x 6 ft. area.
3. The machine must be deconstructed at the end of each class period.
4. The machine must have a minimum of 5 energy transfers. There is no maximum number of steps.
5. The machine must function for at least 5 seconds. There is no maximum time limit.
6. Any loose or flying objects must remain within the set boundaries of the machine. This includes, but is not limited to, drops of water, slivers of balloon, and other “small” objects.
7. No hazardous materials or explosives can be used on or within the machine.
8. Each team member must submit a concise copy of a step-by-step description of their machine and a diagram. In each step description the team must identify the specific type of energy transfer that is occurring in that step.
9. A step in the machine should be considered a transfer in energy from one action to another action. Identical transfers of energy in succession will be considered one step.

RUBRIC:

Designers have an invention	20 points	_____
Motion includes 5 energy transfers	20 points	_____
Motion lasts for 5 seconds at least	20 points	_____
Quality workmanship is clear	10 points	_____
Student submits a detailed sketch and description of inventions	10 points	_____
Student identifies each energy transfer in an interview.	20 points	_____