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Rube Goldberg Machine: A Rube Goldberg machine or device is a deliberately over-engineered machine that performs a very simple task in a very complex fashion, usually including a chain reaction.

Note: This type of machine is named after Reuben Lucius Goldberg (July 4, 1883 – December 7, 1970) who was an American cartoonist, sculptor, author, engineer and inventor.

Challenge:
Build a machine that can accomplish one or more of the following tasks as the end result:

crack an egg,
make a bell ring
fill a glass of water.

A.Your machine will consist of::

1. ONE 24" x 48" (2ft x 4 ft) pegboard,
2. The 24" x 48" area of floor directly in front of that pegboard.
3. A selection of zip ties and hooks
4. Whatever materials you bring from home

(remember: no balloons, elastics, or latex-products)

<u>Suggested 'loose parts' to scavenge:</u>
Golf balls, rulers, marbles, cardboard tubes, Thomas Train tracks, car tracks, straws, Popsicle sticks, wooden mouse traps, Index cards, Dominoes, Magnets, Blocks, 1 inch wooden cubes, Tin cans (smooth edge), Shoe boxes, Paper towel rolls, Tape, Pegboard accessories, toy cars, String, small plastic cups, ping pong balls, pulleys, wooden spools, ribbon, etc.

B. Machine must accomplish the stated final task (2 times in a row - time to reset will be provided)

C. Machine must include at least 4 simple machines in the design. (You may have more than 4 if you wish, but if you use a ramp three times that only counts as one simple machine but may be counted as 3 steps.)

D. Machine must have at least 8 steps before the final step, the starting point is considered a step. You may have more than 8 steps if you wish.

E. Completed blueprint diagram;

- drawn clearly in pencil, using good drafting technique (ruler, compass, etc)
- **drawn to scale**, with scale noted on the page
- each simple machine should be labeled:
  - type of machine
  - **mechanical advantage (MA)**
- includes the name of all group members
- has a list of all used materials listed on the back of the diagram.

MARKING CRITERIA

Outcome: Develops skills for inquiry and communication

	Grade-Level Expectation (75%)	Above Grade-Level (80%+)
Diagram of device:	❑ **Matches** constructed device ❑ drawn to **correct scale** ❑ all machines **labeled** ❑ **mechanical advantage** calculated	
Accomplishing task:	❑ 1st time successful ❑ 2nd time successful	
Meets all design requirements:	❑ 4 simple machines: _____ ❑ 8 steps _____	
Creativity and Innovation	❑ finds unique ways to solve problems ❑ builds **visual interest** into project	
Self-Regulation & Initiative	❑ **Used class time** effectively ❑ Participated **appropriately** ❑ **Individual** Contribution ❑ **Material** contribution ❑ **Collaborated** appropriately ❑ **Personal Engagement** evident	

Randomly Chosen Groups:

1:
Dorian
Jasin
Yousif
Michelle
June
Disha

2.
Malik
Nicholas
Tae Young
Amanda
Aziz
Fatma
Shreya

3.
Ayona
Anne
Abby
Eric
Aaron
Erin

4.
Jasmyn
Anthony
Pakhi
Khaled
Mark
Ethan

Ways to transfer NRG: Input Output Effect (all 3 make 1 energy transfer, or 'one step')

First class lever: Input Fulc. Output --- drop a mass onto the input side, to (make the others side go up,) = allowing something to fall somewhere else

Second class lever:

Third class lever:

Inclined plane (ascending)

Inclined plane (descending)

Wedge (falling)

Single fixed pulley

Single moveable pulley

Screw (or a spiral of some kind)

Wheel and axle (as a lever or as a vehicle)