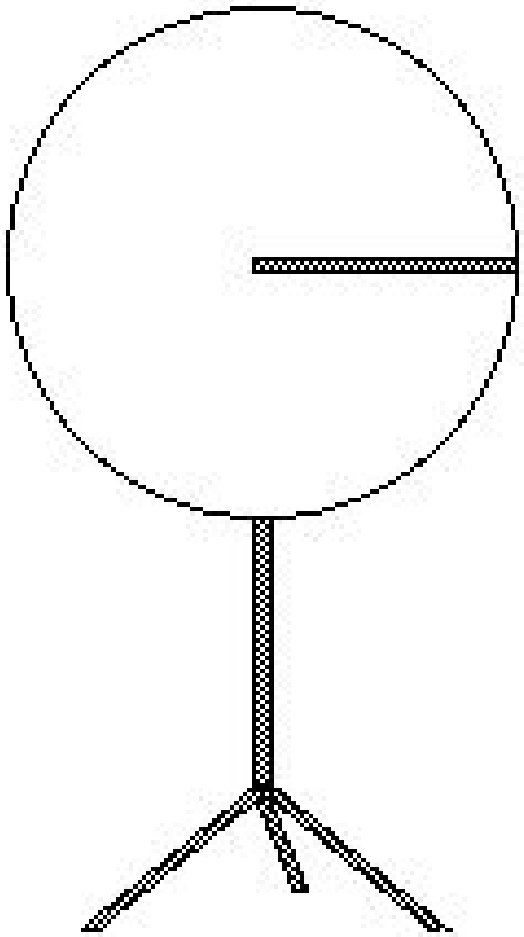
Math Topics

RADIAN

Disc 05-12

- Show a string with length of one radius
- Mark off the radii on the circumference of the large white board disk



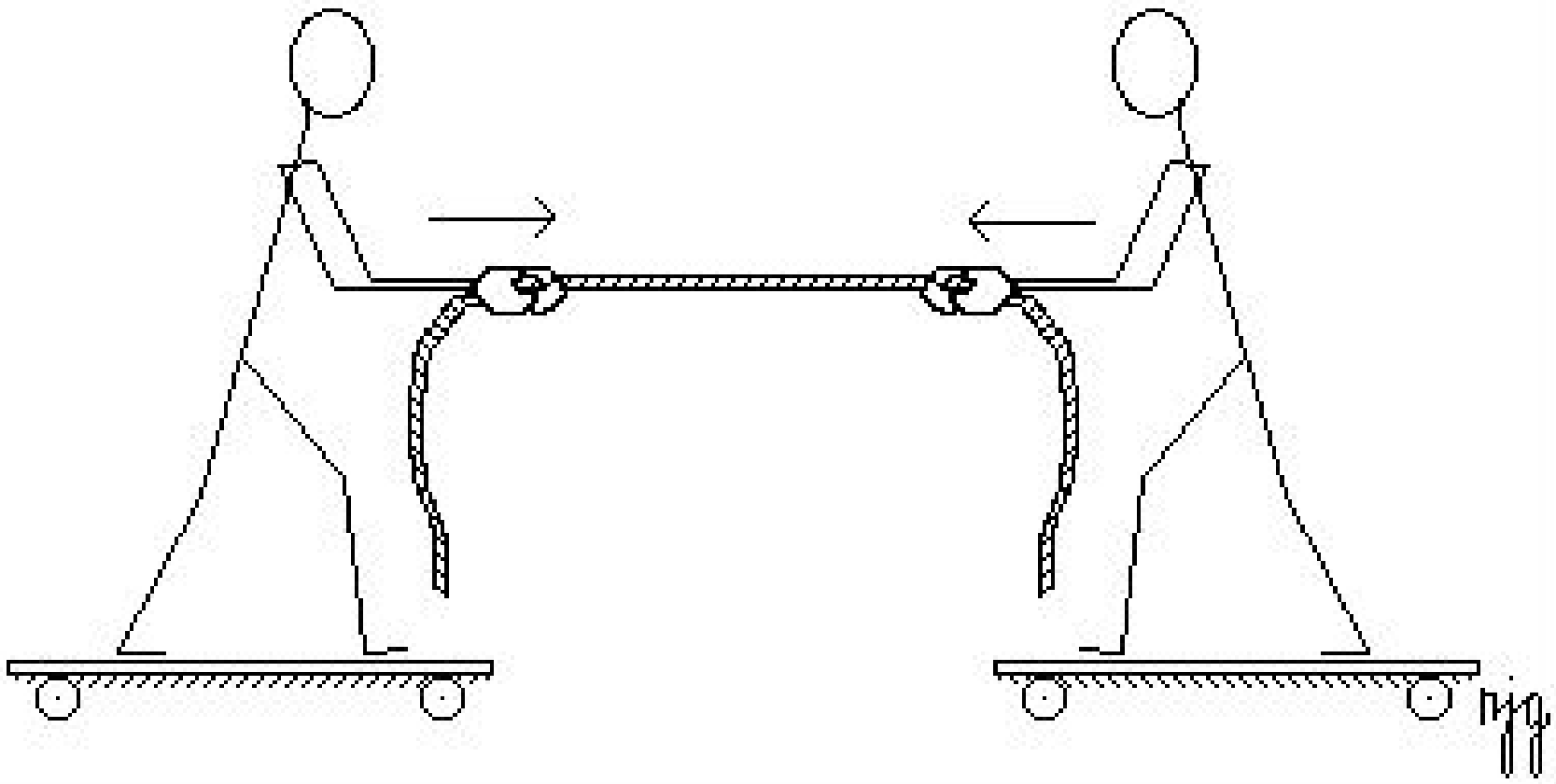
Flexiboard

R.N.

Action and Reaction

PUSH ME PULL ME CARTS

- Have two students stand on the carts and grasp the ends of the rope.
- Have only one student at a time pull on the rope. Observe that they both move.
- Use a long stick for pushing

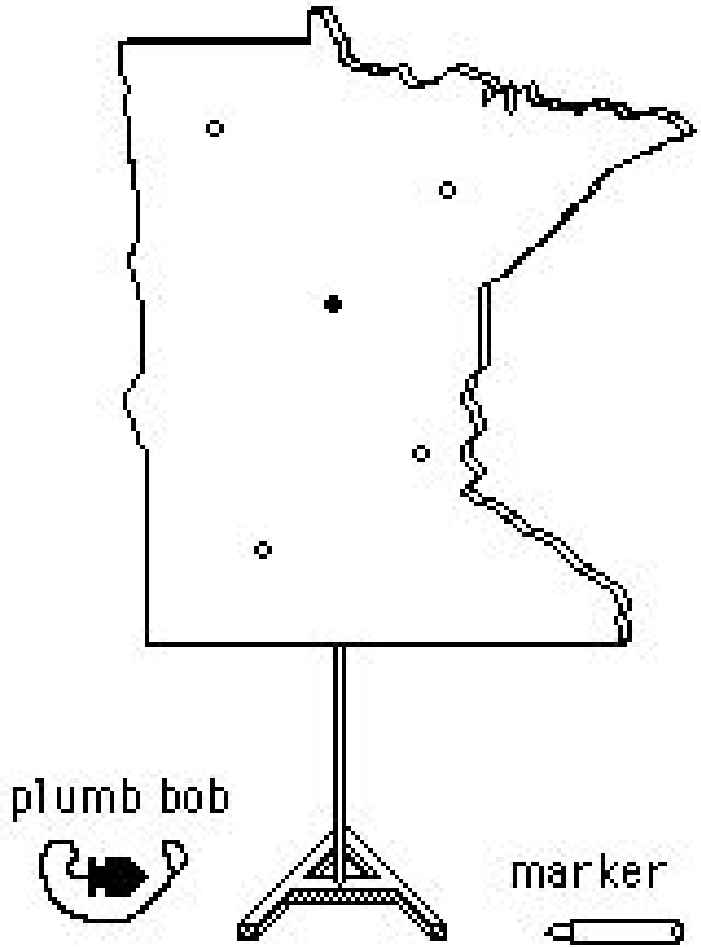


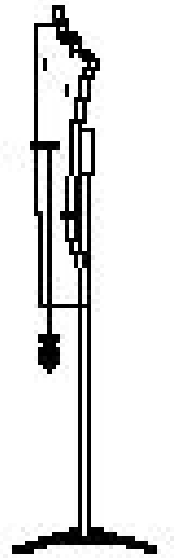
Finding Center of Gravity

MAP OF STATE

Disc 03-20

- Hang map of MN on peg through desired hole.
- Hang plumb bob in front.
- Mark plumb line with marker.
- Repeat with another hole to find center of gravity.





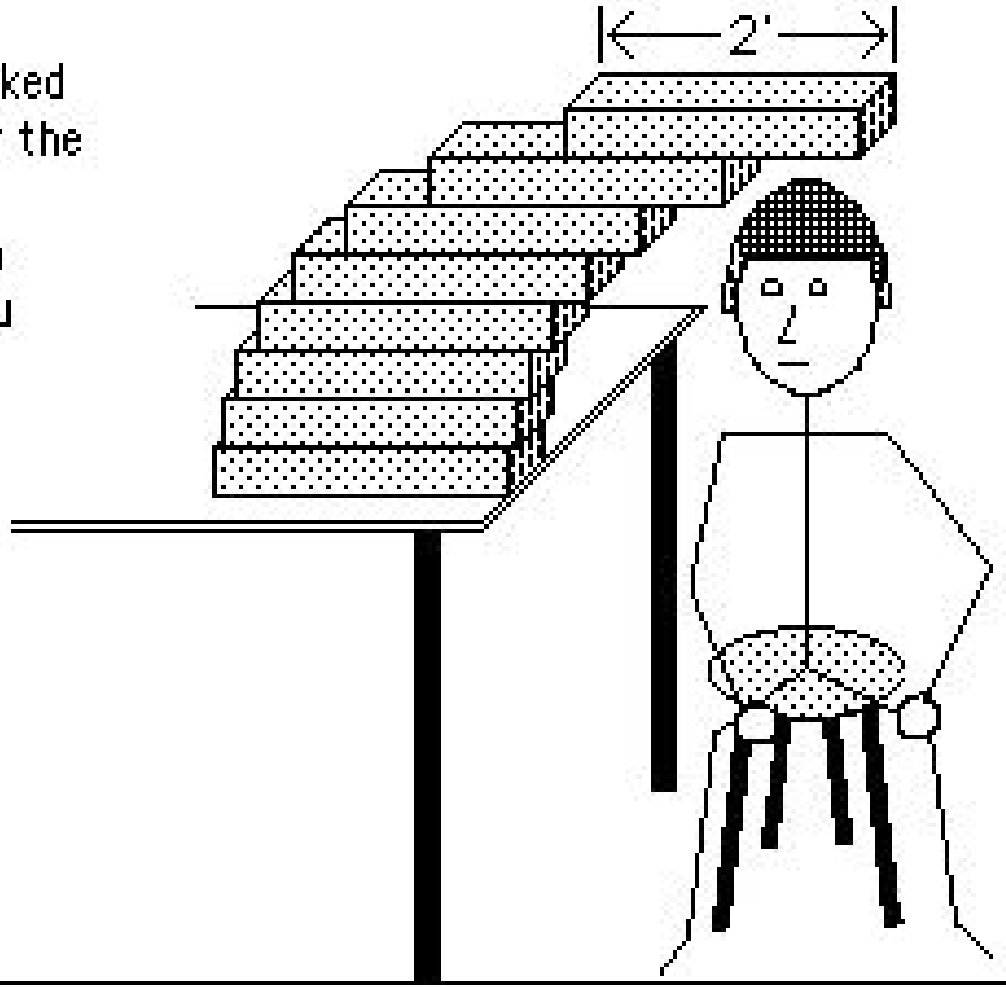
side view

Exceeding Center of Gravity

TOWER OF LIRE

AJP 23(4), 240; AJP 41(5), 715

- A set of eight wood blocks is stacked so the top block is completely over the edge of the table.
- The demo staff will be more than willing to build this stack with you sitting underneath
- Step lengths go as L/2n

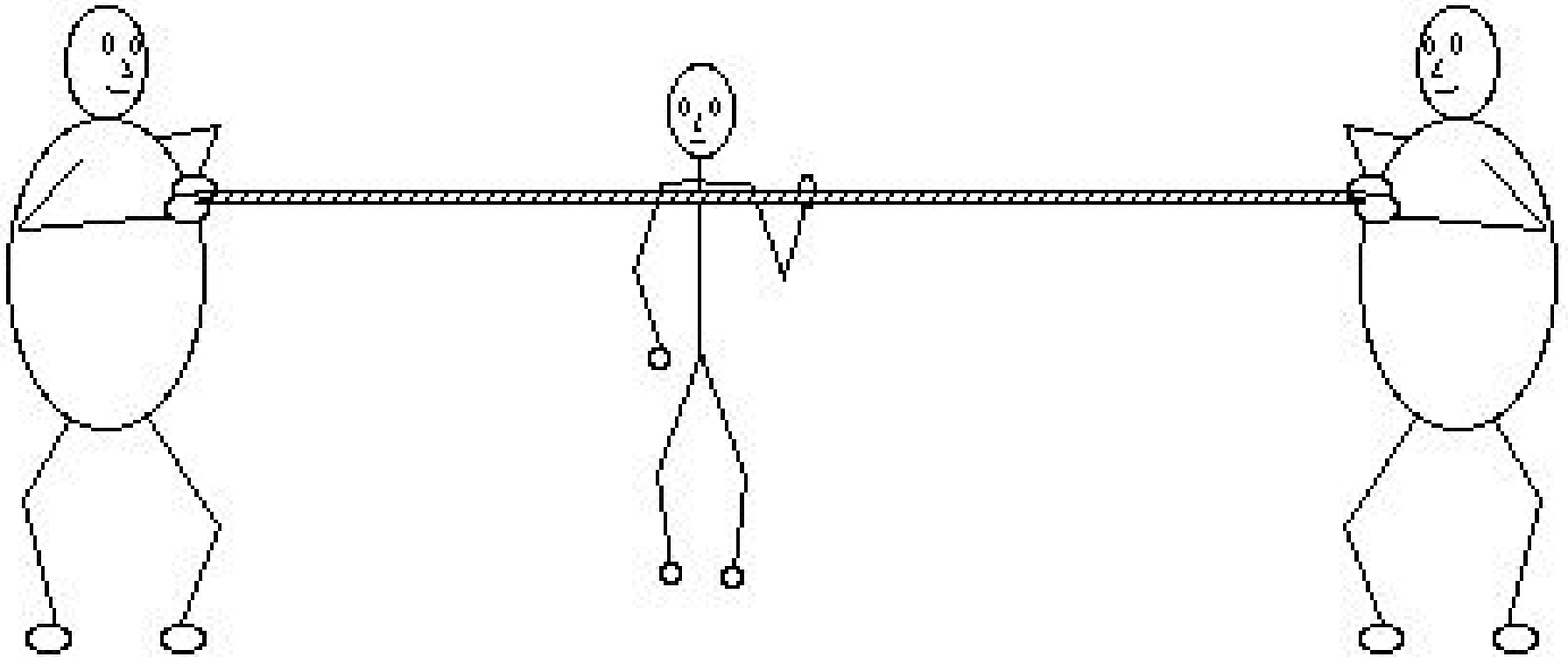


R.N.

Resolution of Forces

ROPE AND THREE STUDENTS

- Have the two largest students pull on the ends of the rope
- Have the smallest student deflect the rope



R.N.

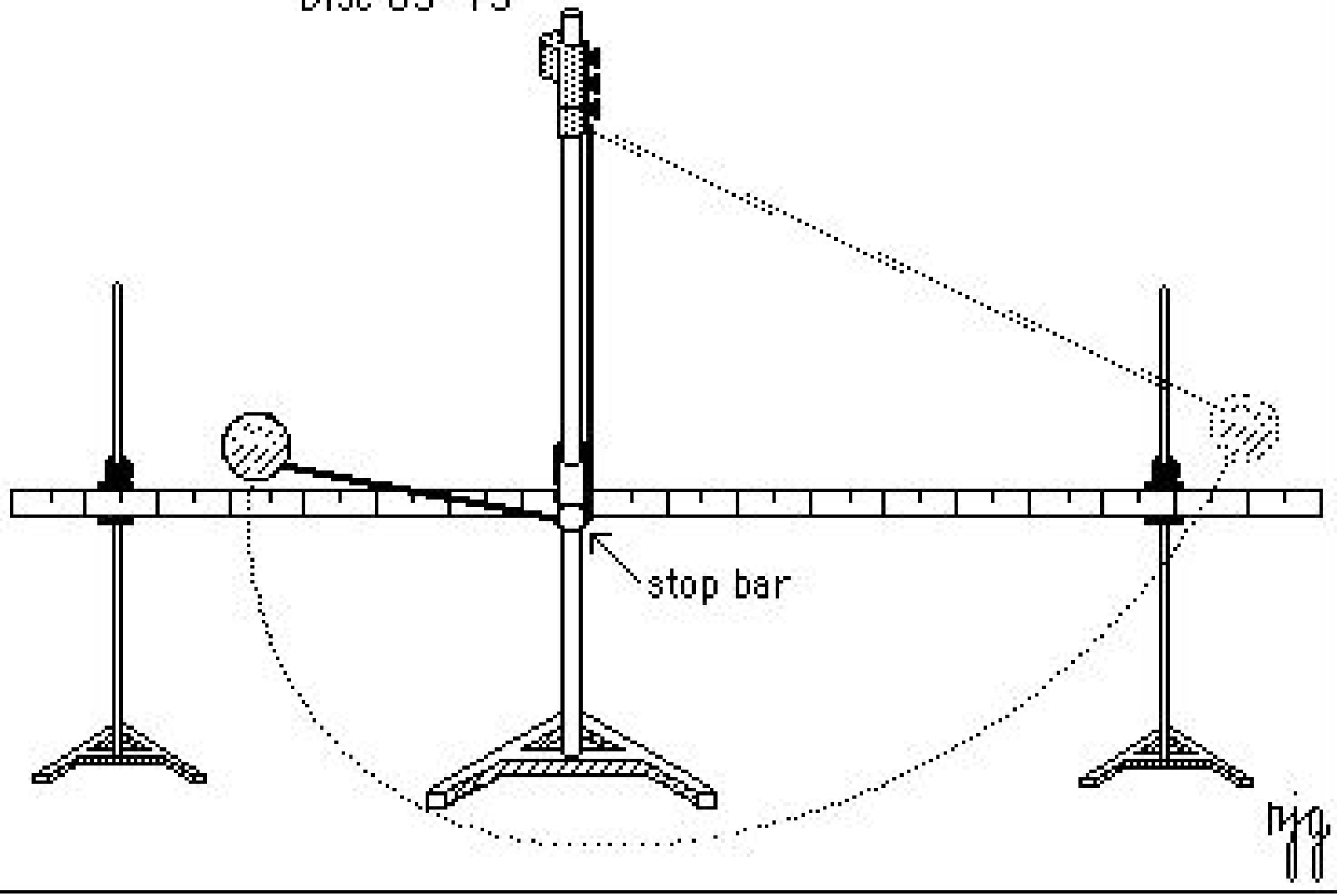
Conservation of Energy

STOPPED PENDULUM

Disc 03-13

- Raise the pendulum to one side and release it.

- The pendulum reaches almost the same maximum height at both ends of its swing. Some energy is lost.
- The 2-meter stick serves as a reference for the height of the pendulum.

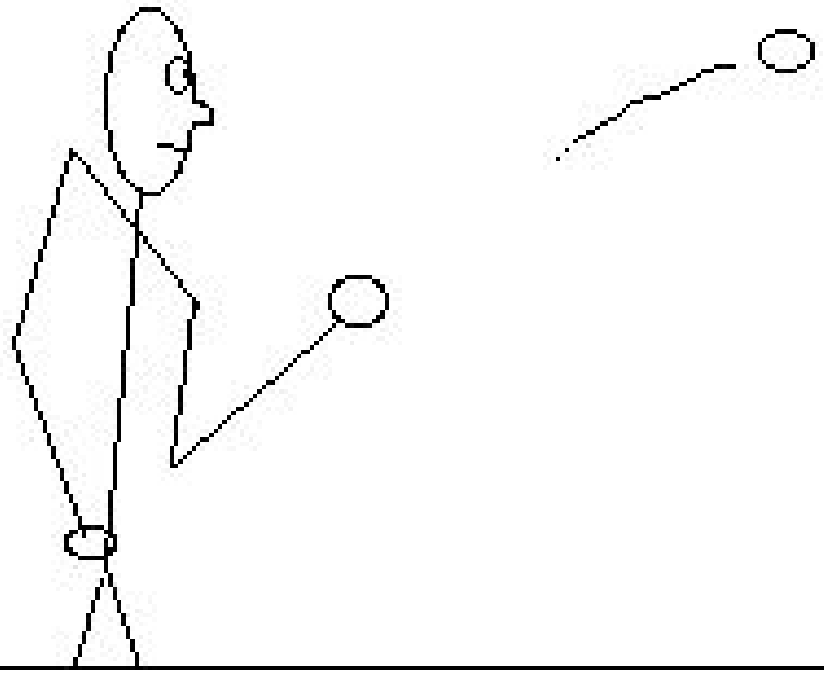


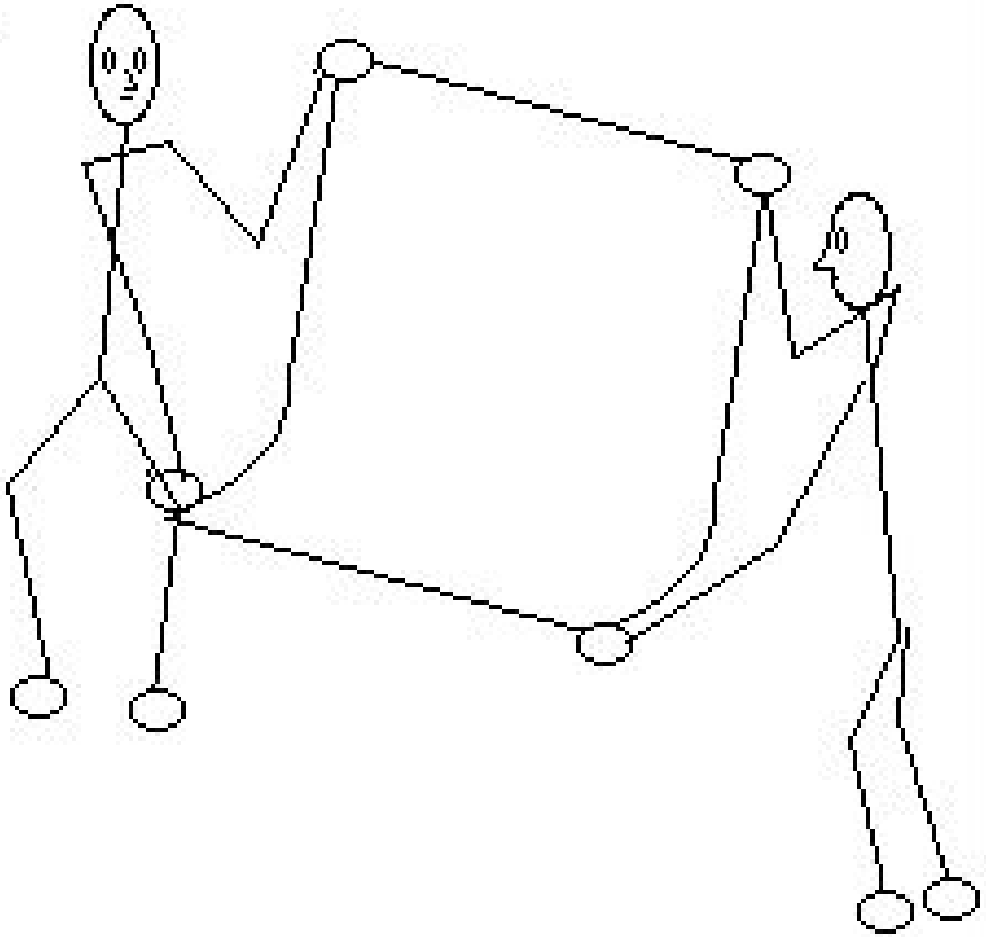
Impulse and Thrust

EGG IN SHEET

Disc 05-09

- BRING YOUR OWN EGGS
- Have two students hold a sheet as shown
- Toss an egg into the sheet
- REMOVE THE EGG BEFORE THROWING ANOTHER





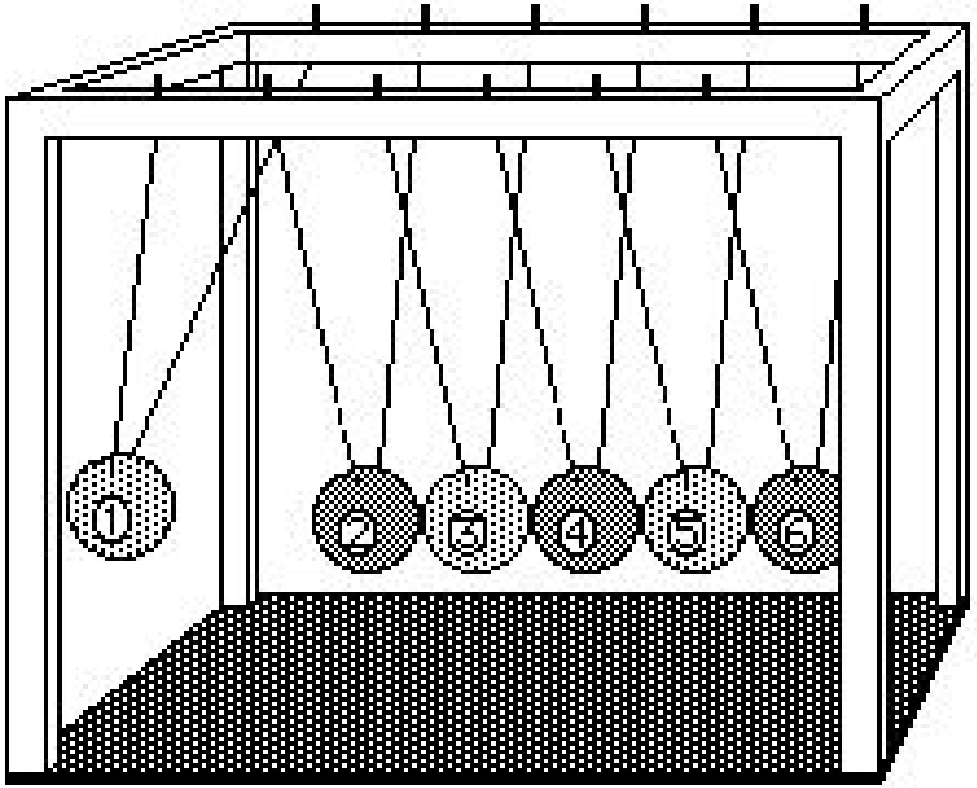
R.N.

Collisions in One Dimension

COLLISION BALLS

Disc 05-01

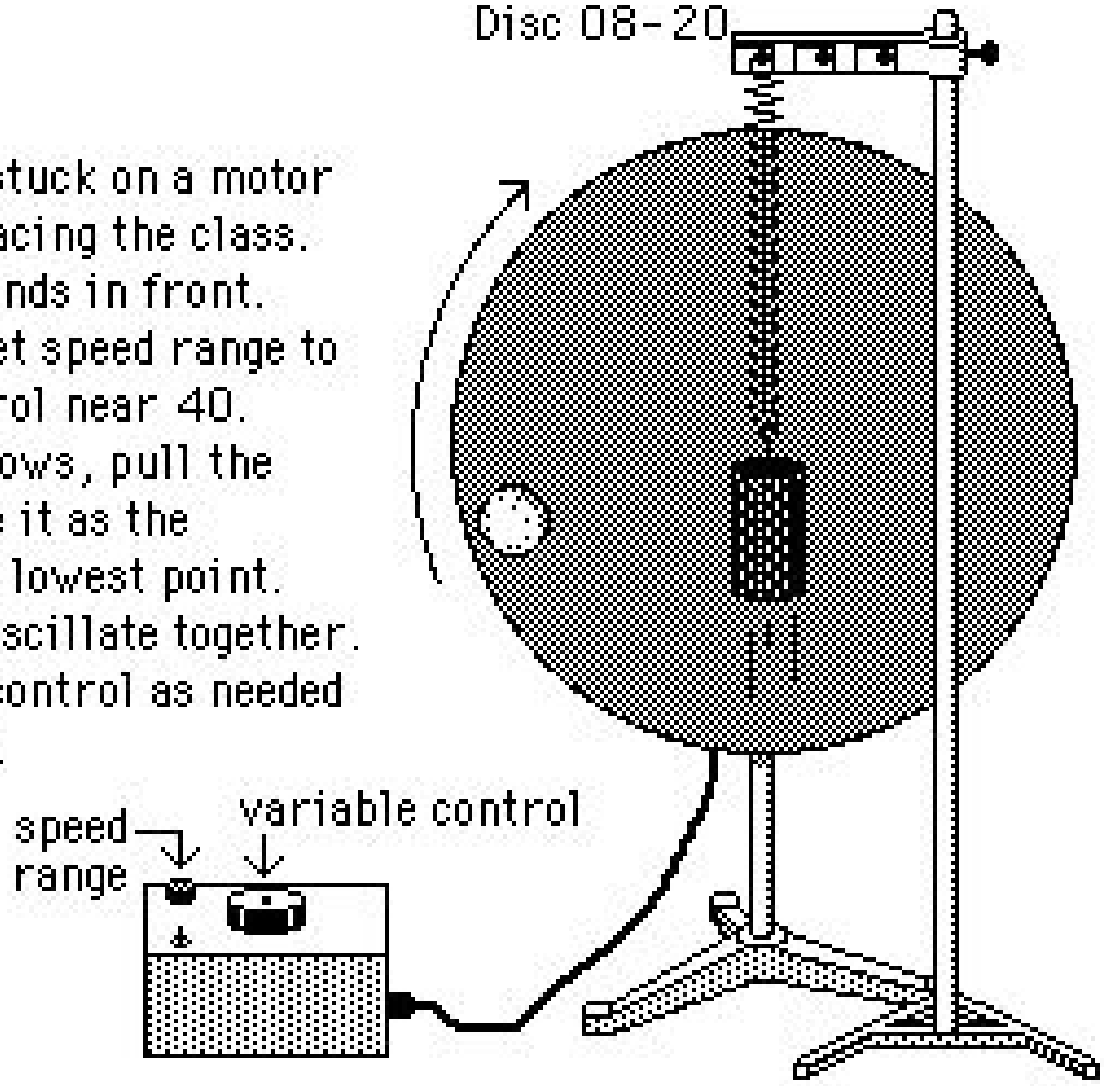
-Observe the effects of displacing different numbers of balls. Try one ball first, then two and so on up to five balls at once.
-If this does not work well there may be a misalignment problem. First check that the wires are hanging straight, then try adjusting the length.

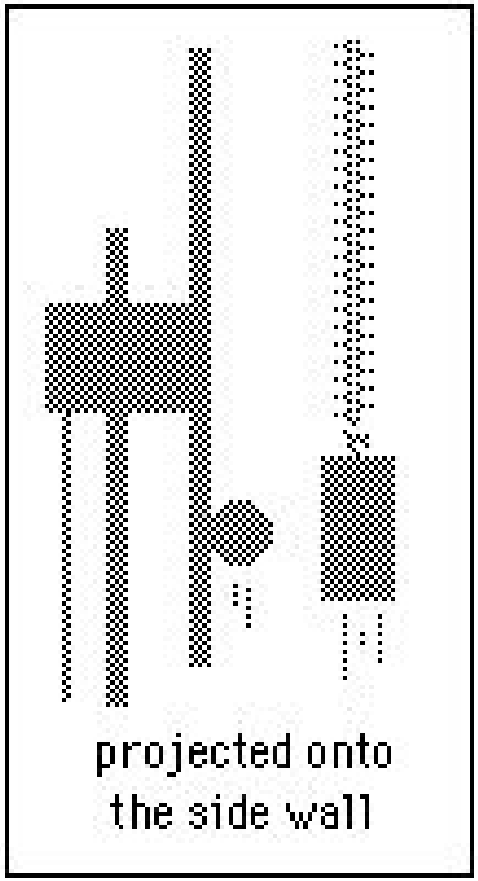


Simple Harmonic Motion

CIRCULAR MOTION VS. MASS ON SPRING

-A ping-pong ball is stuck on a motor driven rotating disk facing the class. A mass on a spring stands in front.
-Turn motor on and set speed range to low and variable control near 40.
-While watching shadows, pull the mass down and release it as the ping-pong reaches its lowest point.
-Their shadows will oscillate together.
-Adjust the variable control as needed to synchronize speeds.

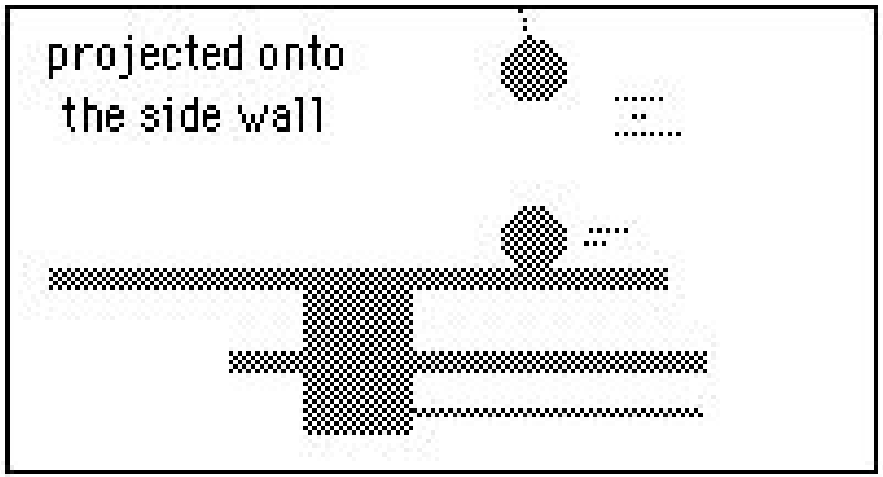


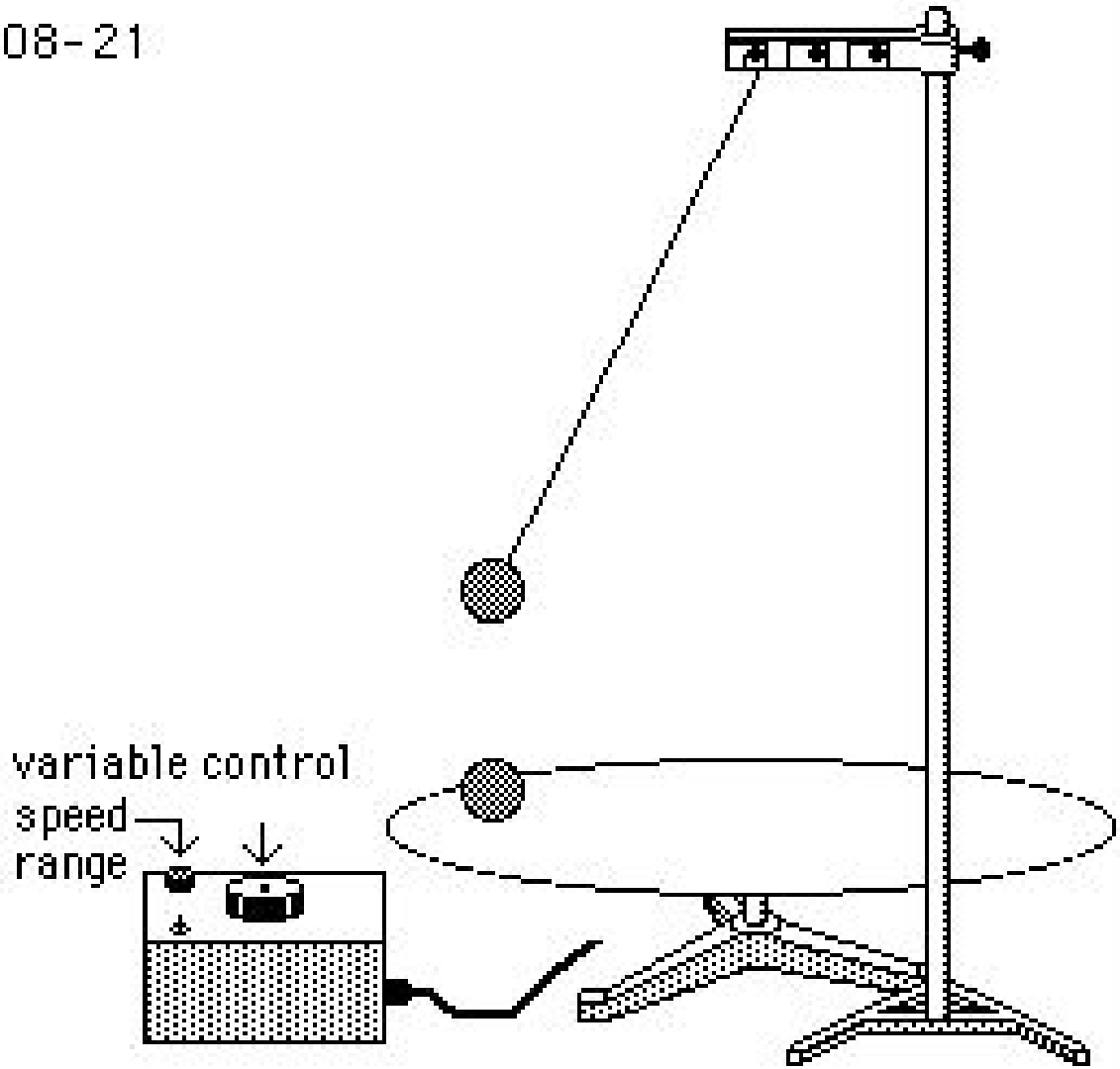


Simple Harmonic Motion

CIRCULAR MOTION vs. PENDULUM

Disc 08-21



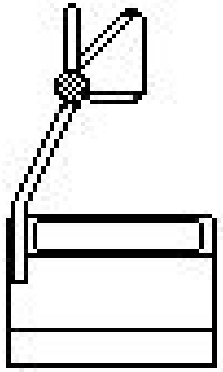


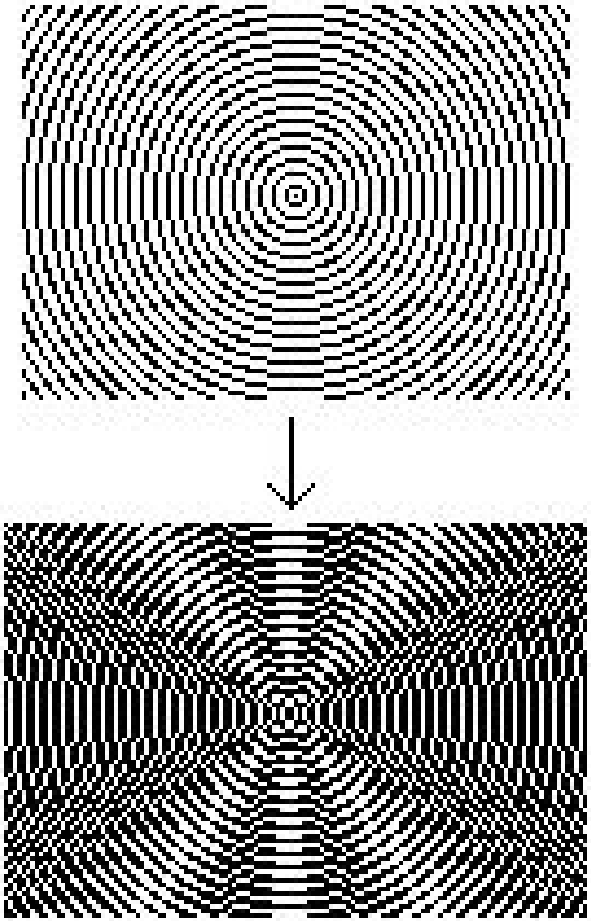
Interference and Diffraction

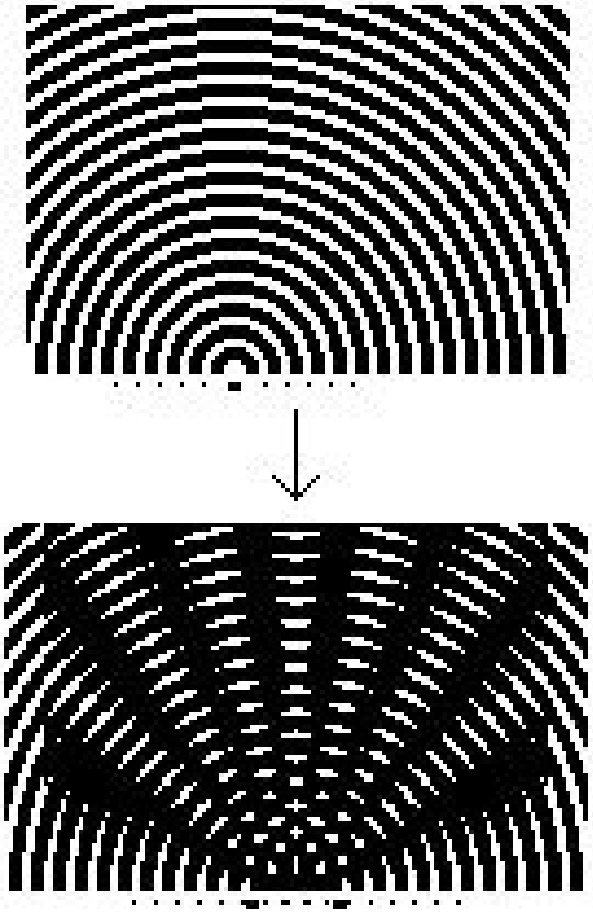
MOIRÉ PATTERN TRANSPARENCIES

Disc 09-23

- Pairs of identical transparencies have circular wave patterns of different wave lengths.
- Place transparencies on the overhead projector.
- Vary their relative positions to produce different interference patterns.



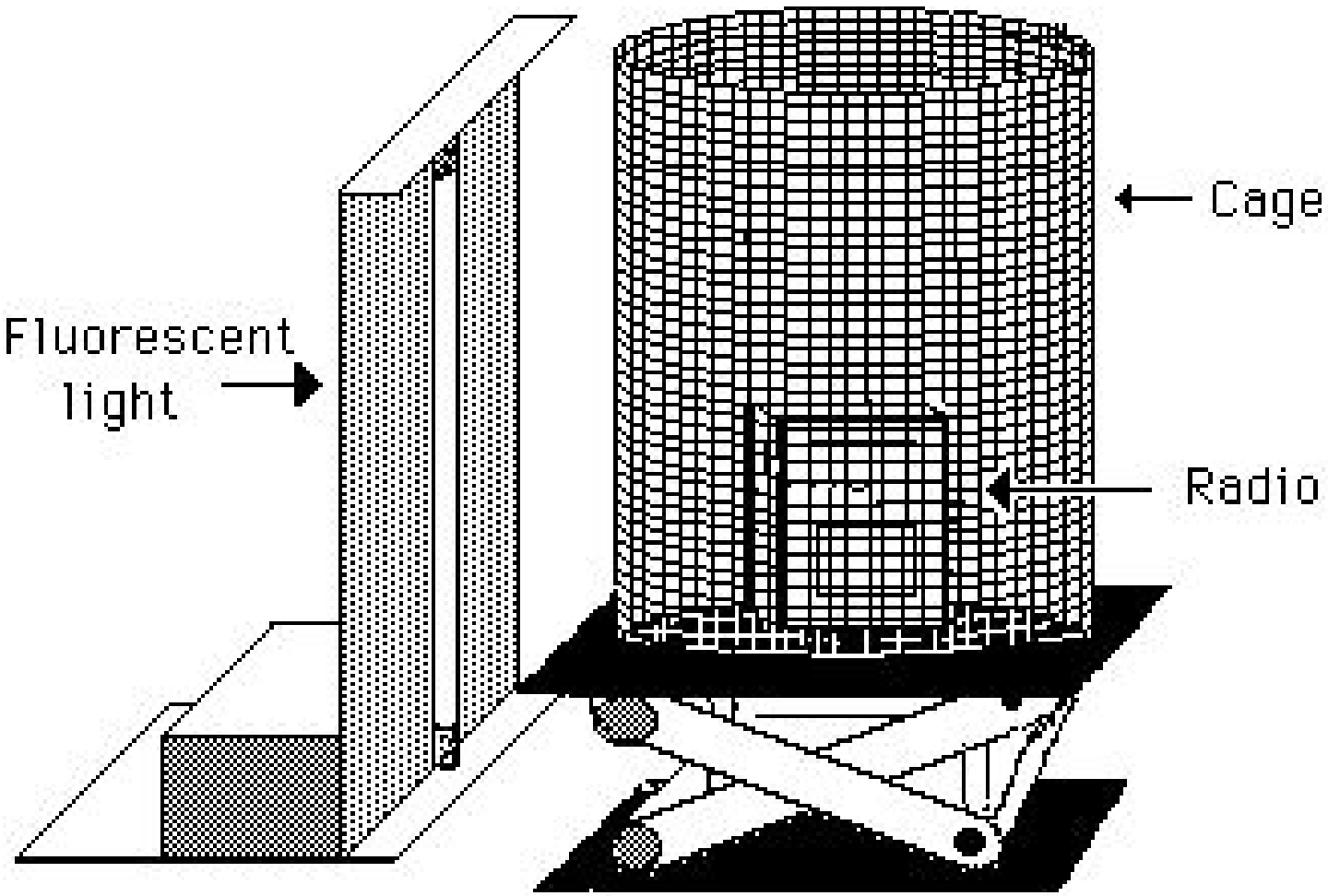




Gauss' Law

RADIO IN A CAGE

- Turn on the light and the radio (do not have the Faraday cage over the radio at this point).
- You should hear static which the radio picks up from the fluorescent light source.
- Place the Faraday cage over the radio and you hear nothing.

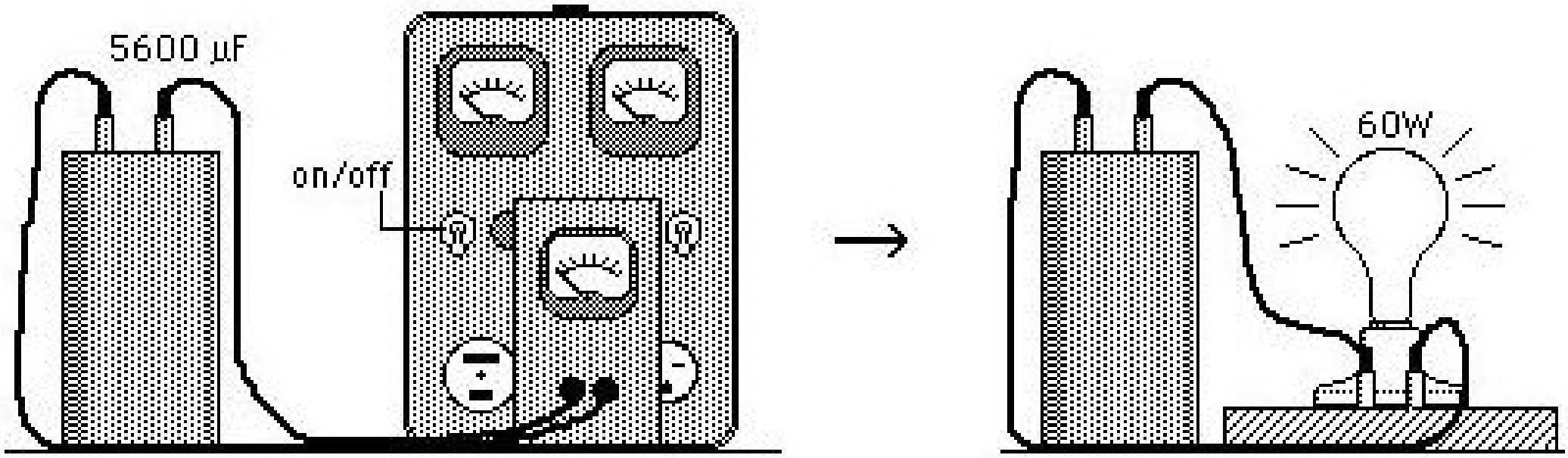


DJ

Energy Stored in a Capacitor

LIGHT THE BULB

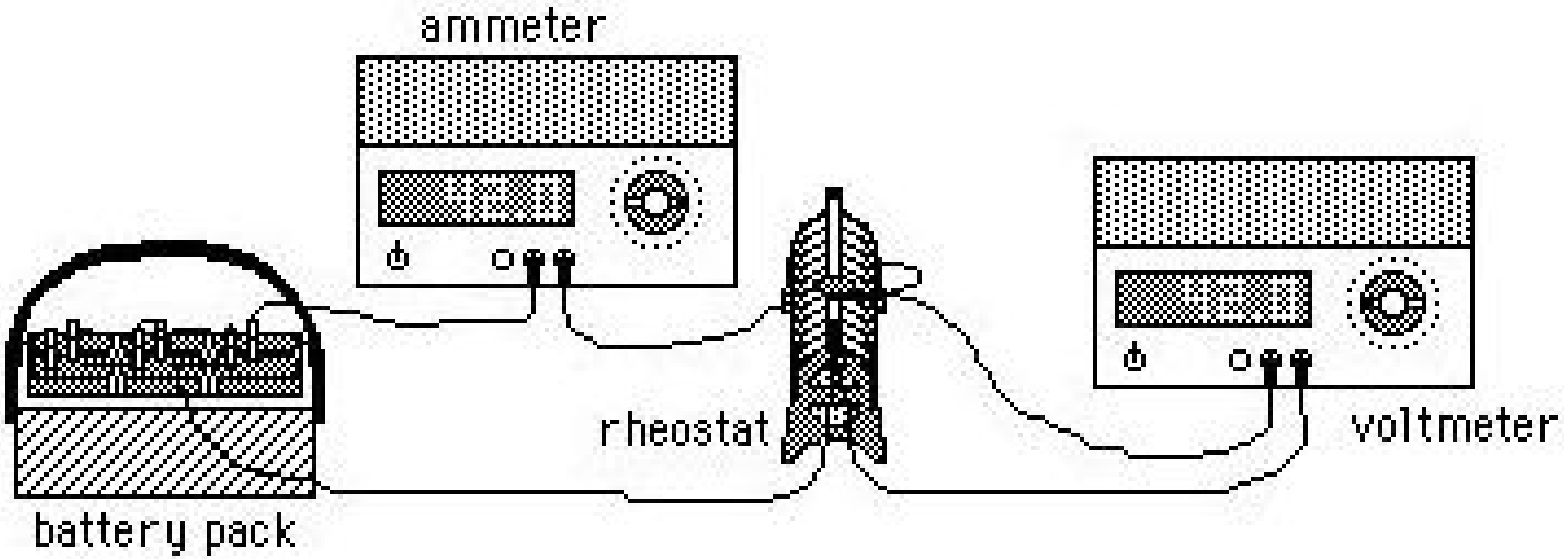
- Turn on the power supply to charge the 5600 µF capacitor through the power resistor.
- Turn off the power and disconnect the power supply.
- To discharge capacitor, connect to the light bulb only. DO NOT SHORT CAPACITOR.
- The 60W bulb lights for about 3 seconds. A 7-1/2W bulb lights for about 20 seconds.



Ohm's Law

OHM'S LAW

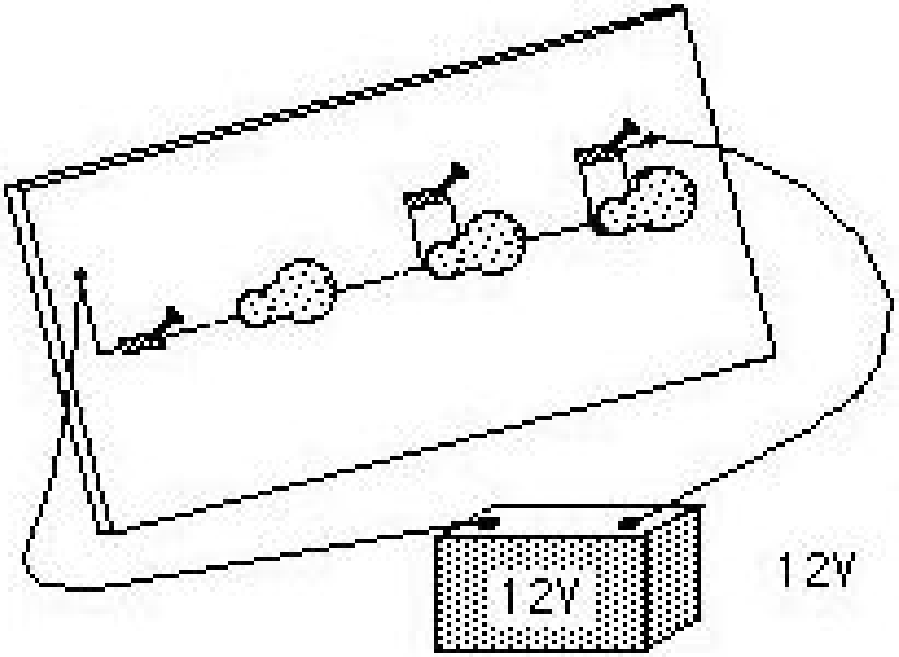
- Digital meters measure the current and voltage in a simple circuit of a battery and resistor.
- The rheostat is adjusted so that the meters read the same, differing only by a factor of 1000.
- The battery pack contains six 1.5 volt batteries connected in series.
- Change the number of batteries in the circuits and observe that the meters changes proportionally.
- OR Change the resistance.



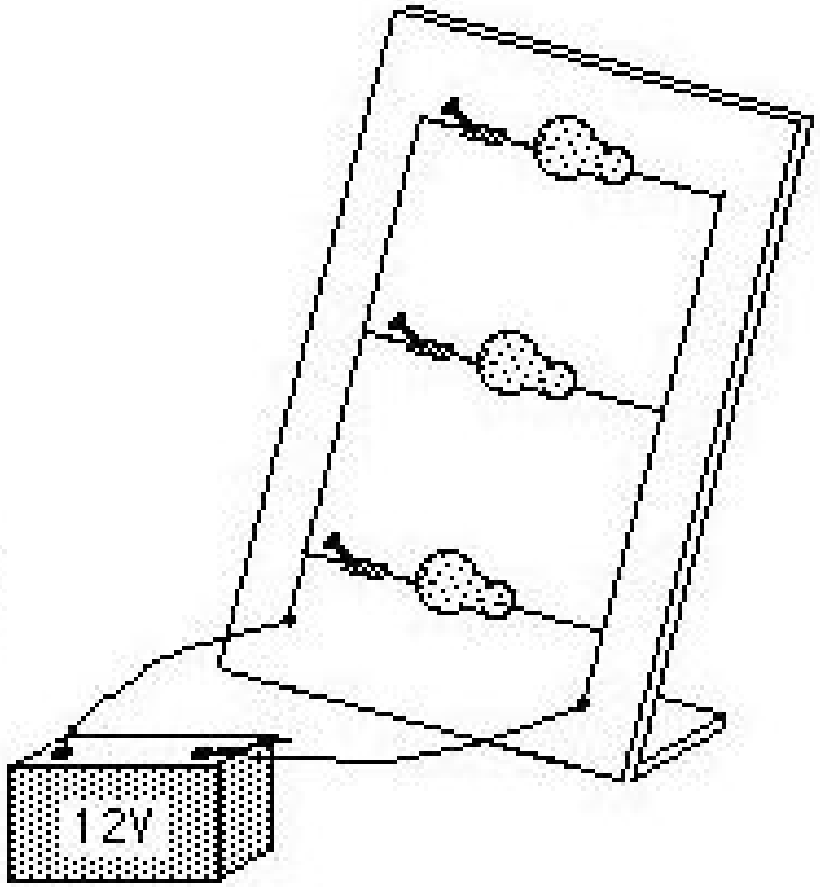
Circuit Analysis

SERIES AND PARALLEL LIGHT BULBS

- If the combined series and parllel boards are confusing, try the separate boards



12V



R.N.