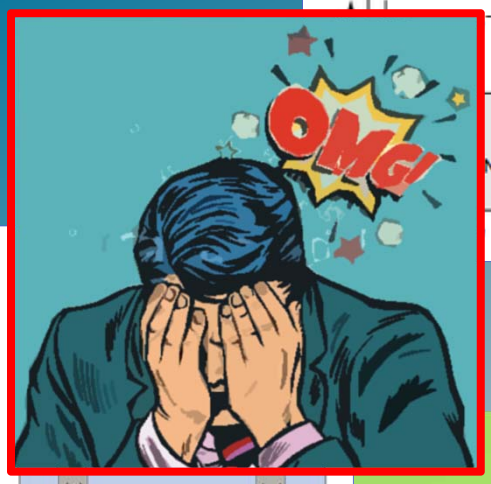
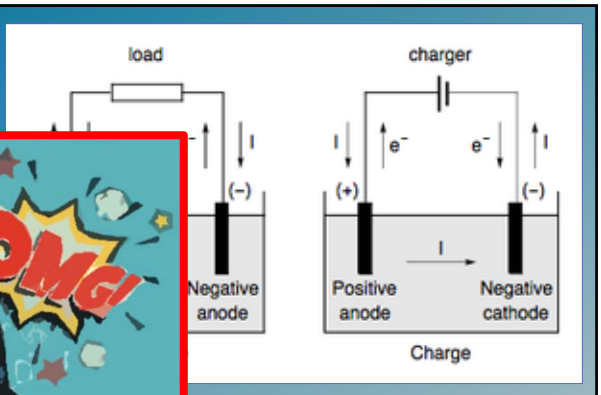
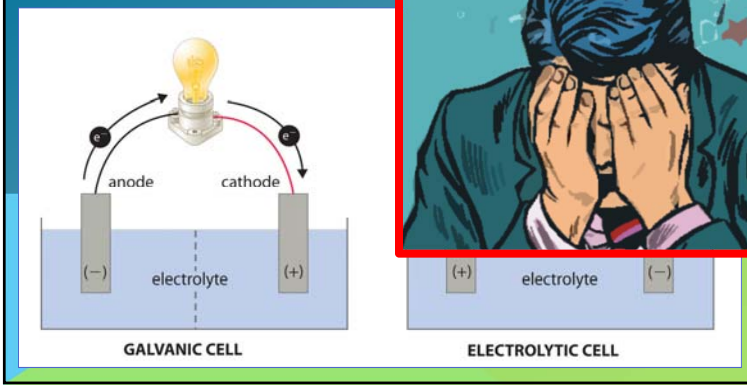
PHYS 210 - General Physics I

- Energy!
- Conservation of Mechanical Energy

BUT FIRST ...







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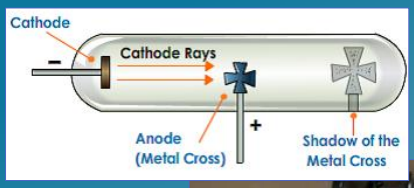
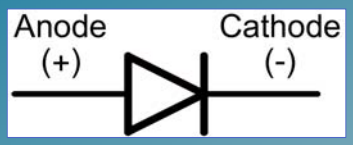
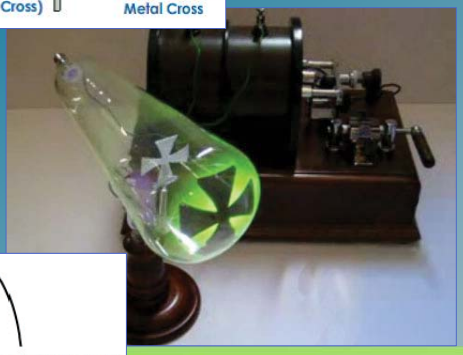
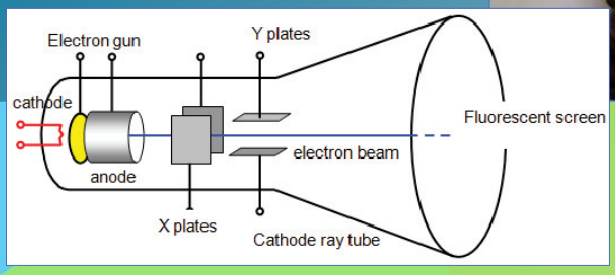
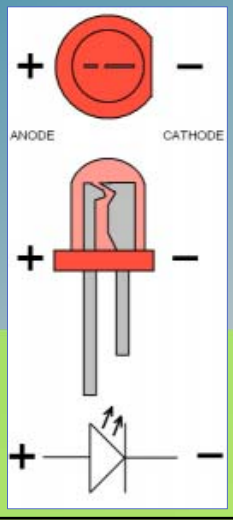




Cathode rays (electron beam or e-beam) are streams of electrons observed in vacuum tubes.







ENERGY

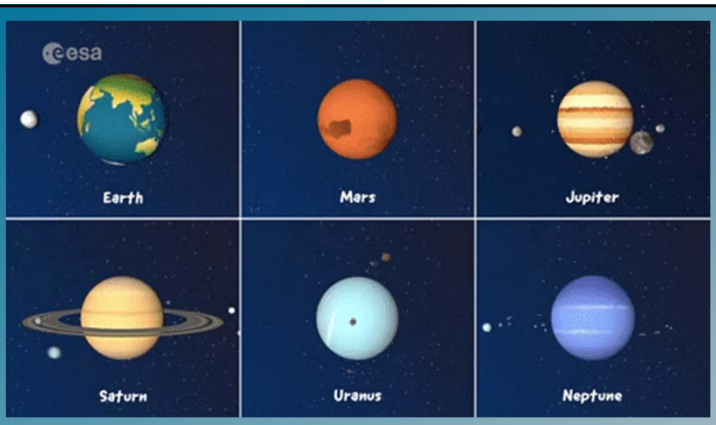
Loosely, energy is "what makes it go!"

Energy is an abstract, mathematical concept that reflects the condition of an object or system.

- It can be changed when the object/system interacts with something
- It comes in many different *forms*
- All energies are scalars

First, consider the energies associated with motion and position:

Kinetic Energy	$K = \frac{1}{2}mv^2$	Gravitational Potential Energy	$U_g = mgy$



DOES A ROTATING SPHERE HAVE KINETIC ENERGY?

Yes!! $K = \frac{1}{2} I \omega^2$

where I = rotational inertia

and ω = angular velocity

LAW OF CONSERVATION OF MECHANICAL ENERGY

- The total mechanical energy of an isolated system is constant.
- The total mechanical energy of a system can change only by amounts of energy transferred to or from the system.
- For interactions involving only conservative forces, the total mechanical energy of an isolated system is constant.

Conserving energy vs. the Law of Conservation of Energy?
Ask me !

MECHANICAL ENERGY CONSERVATION

Two equivalent perspectives on conservation of mechanical energy (of isolated system with only "conservative" force interactions):

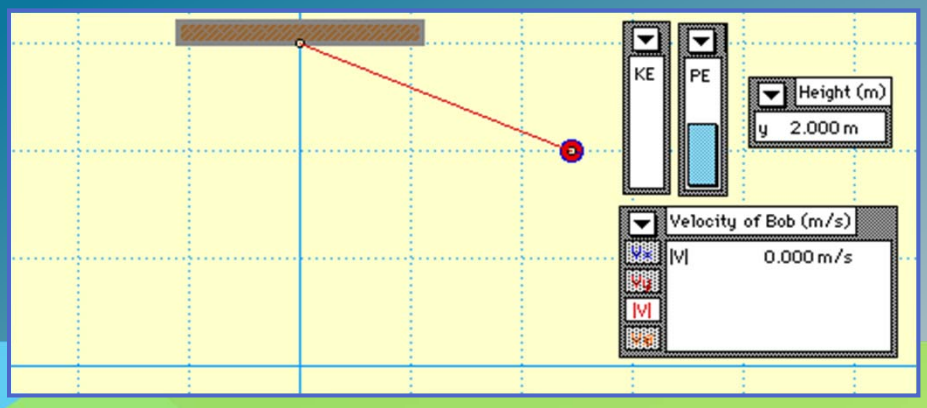
$$E_{mech1} = K_1 + U_1 = E_{mech2} = K_2 + U_2$$

or

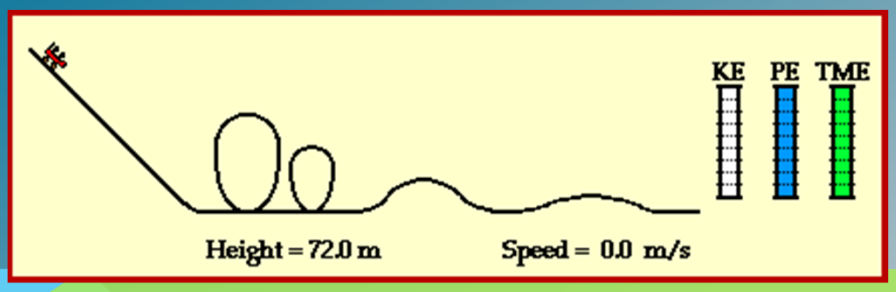
$$\Delta E_{mech} = \Delta K + \Delta U = 0$$

What is it?

ENERGY AND THE PENDULUM



Energy and the Roller Coaster



Wanna Exceed Eleventh Elk!