U_g Gravitational Potential Energy

Definition: Stored energy that depends on the **mass (m)** and the **height (h)** of an object

Measured in Joules (J)

Example: A cat has greater **potential energy** on a higher tree branch than on a lower branch

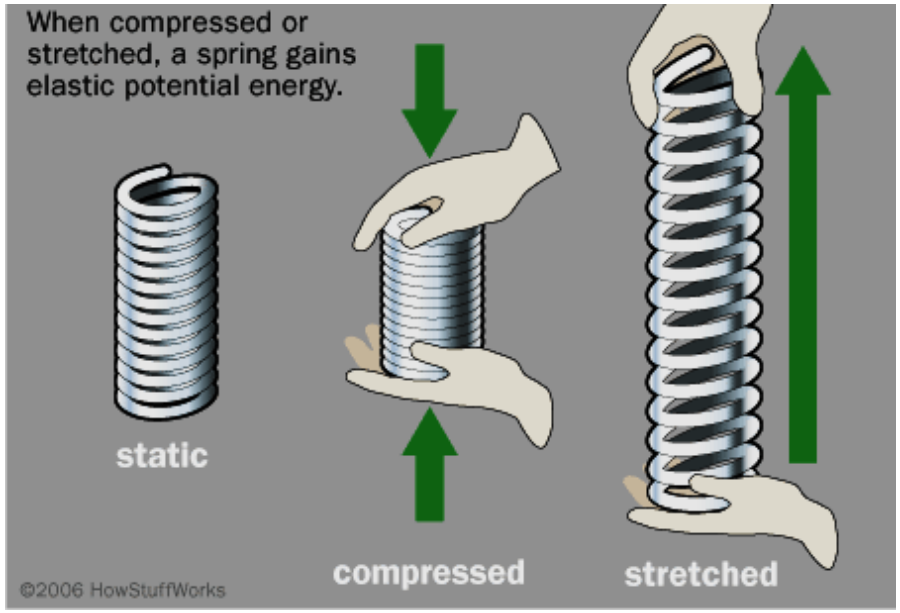
Gravitational Potential Energy

$$U_g = mgh$$

U_s Elastic Potential Energy

Definition: Energy stored in elastic materials as a result of their *compressing* or *stretching*

Measured in Joules (J)



U_s

Elastic Potential Energy

Example:

Stretching (pulling back) the slingshot *further* **increases** the <u>elastic potential energy</u> of the angry bird.

KE Kinetic Energy

Definition: If an object is *moving*, it has kinetic energy. Kinetic energy depends upon an object's **mass (m)** and **velocity** (**v)**.

Measured in Joules (J)

Example: The **kinetic energy** of the angry birds increase as they fall to the ground.

Elastic Potential Energy

$$U_s = \frac{1}{2}kx^2$$

100% Elastic Potential Energy

Kinetic Energy

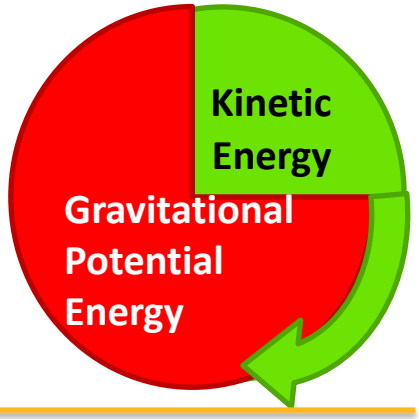
$$KE = \frac{1}{2}mv^2$$

100% Kinetic Energy

Right before Wile E Coyote falls, he has…

100% Gravitational Potential Energy

On the way down, his kinetic energy Increases as his gravitational potential energy decreases.



Right before he hits the ground, he has…

100% Kinetic Energy

Right before Wile E Coyote falls, he has…

?

On the way down, his kinetic energy _____, as his gravitational potential energy _____.

?

Right before he hits the ground, he has…

?

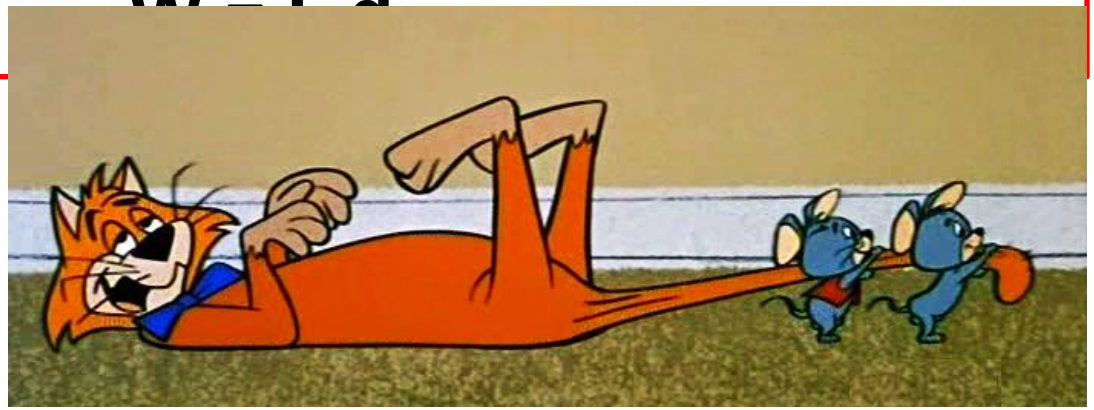
W

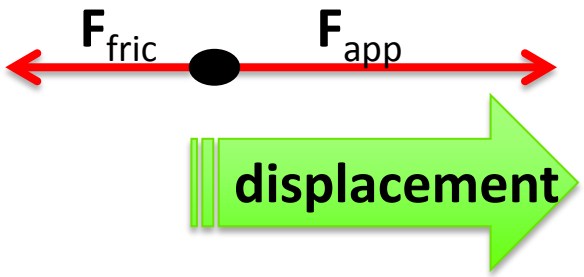
Work

Definition: The **force (F)** on an object multiplied by the **displacement (d)** it moves parallel to that force.

Measured in Joules (J)

Example: It takes a lot of **work** for the mice to drag the cat across the room.

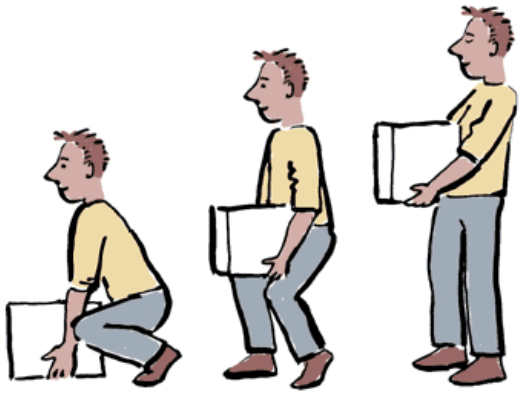


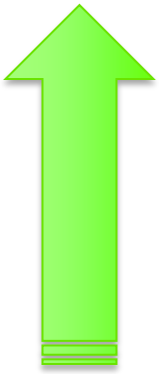


W = F x d

Direction of Forces

Direction of Movement





WORK IS DONE

NO WORK IS DONE

P

Power

Definition: The **rate** at which **work** gets done.

$$P = W/t$$

Measured in watts (W) or kilowatts (kW)

Example: The person on the left has more **power,** as he runs up the stairs faster than the person on the right.