The work-energy theorem, part 1

Units for energy

- The SI unit of energy is the Joule (J).

$$1 \text{ Joule } = 1 \text{ Newton } \cdot \text{meter}$$

- A common unit of energy in chemistry is the calorie (cal).

$$1 \text{ calorie } = 4.184 \text{ J}$$

- A common unit of energy in food science is the Calorie = 1 kcal

$$1 \text{ Calorie } = 4184 \text{ J}$$

The work-energy theorem

- This statement is similar to Newton's 2nd law of motion:

$$K_f - K_i = W_{tot}$$

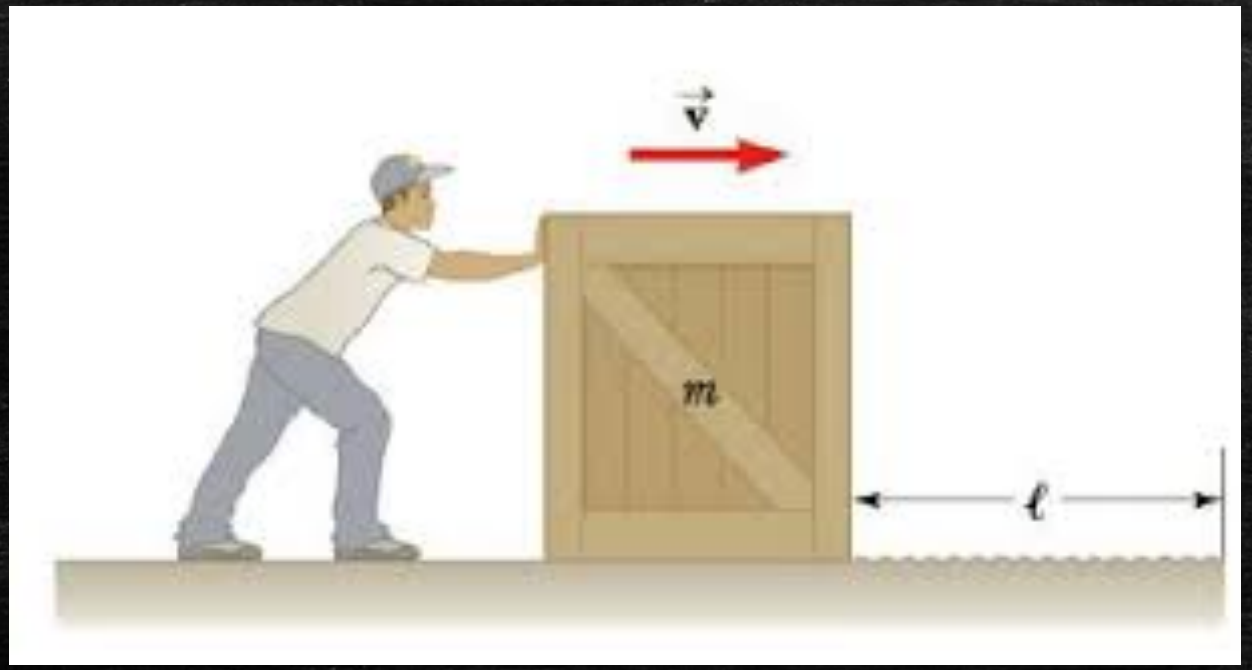
$$K = \frac{1}{2}mv^2$$

$$W_{tot} = W_1 + W_2 + \ldots$$

$$W_1 = \vec{F}_1 \cdot \Delta\vec{r}$$

Person pushing a crate

- Calculate the work (in units of kJ) done by a person pushing a crate of turkeys (m=200kg) if the person applies a 200 N force in the same direction as the displacement of L=22 meters.



The falling apple

- What work is done by gravity on an apple (m=0.2 kg) that falls from a branch of a tree at a height of 2.6 meters above the ground?