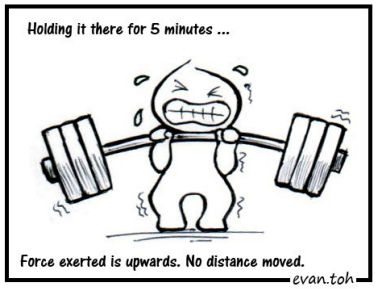
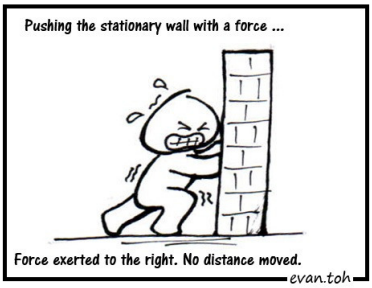
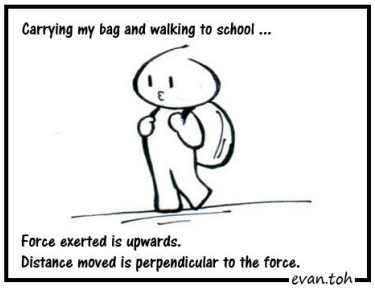
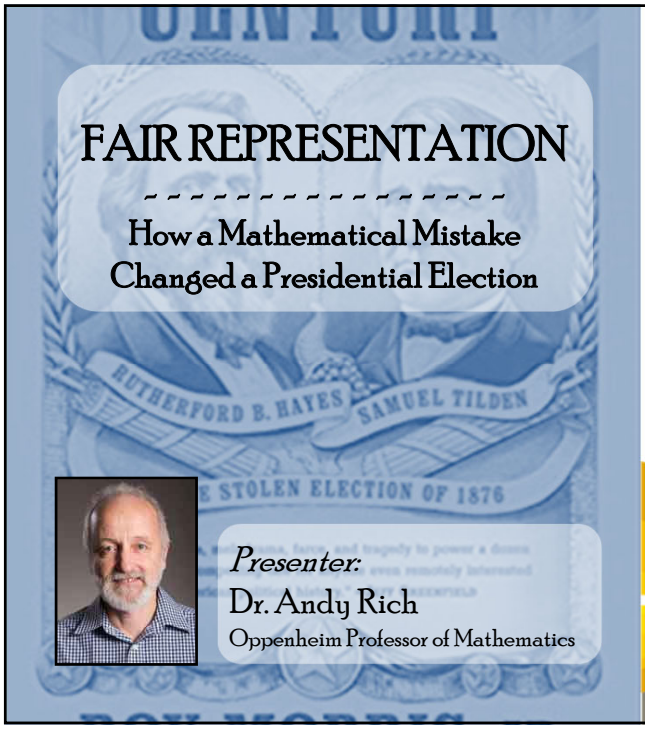
PHYS 210 - General Physics I







- Base Groups
- Work
- Work – energy theorem



Science Seminar

hosted by
Natural and Health Sciences

December 2, 2019
Department of Mathematics & Computer Science
4:00 – 5:00 PM
Flory Auditorium (SCIC 203)

EVERYONE is welcome!
ALL MAJORS, ALL YEARS
Snack Provided

Manchester University

Base Groups!

- BGDG – What is your favorite thing to do over long holiday breaks? What's the most exciting thing you will do before the year is over?
- BGWS
- Last RQ!

- The Work done by a conservative force is independent of the path taken; it depends only on the beginning & end points. So, the work done on a closed path is zero.
- Such forces can be written in terms of a potential energy function, U, such that

$$\Delta U = -W = -\int_{x_o}^{x} F(x)dx$$

IN GENERAL, WORK IS PATH DEPENDENT

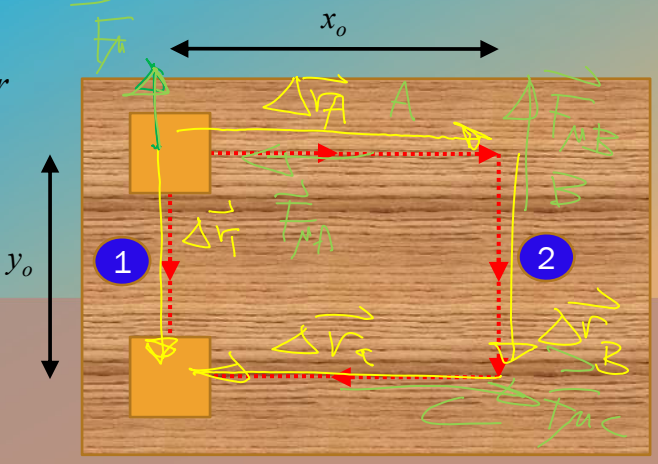
E.g., the force of friction is non-conservative

Bird's-eye view of sliding a block on a table along two different paths:

$$W = \vec{F} \cdot \Delta\vec{r} = -\mu_k N \Delta r = -\mu_k mg \Delta r$$

$$W_1 \neq W_2$$

(work done by frictional force)



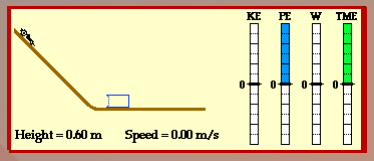
Work – Kinetic Energy Theorem

The work done by the NET FORCE *on an object* equals the change in kinetic energy

$$W_{net} = \Delta K = K_f - K_i$$

where

$$\Delta K = K_f - K_i \quad \text{and} \quad W_{net} = \sum_i W_i$$



Example:

A cave rescue team lifts an injured spelunker directly upward and out of a sinkhole by means of a motor-driven cable. The lift is performed in three stages, each requiring a vertical distance of 10.0 meters:

(a) the initially stationary spelunker is accelerated to a speed of 5.00 m/s,

(b) she is then lifted at the constant speed of 5.00 m/s,

(c) finally, she is decelerated to zero speed.

How much work is done on the 80.0 kg rescuee by the force lifting her during each stage?

Last seminar of the year! Go!