# Mini Lesson on ENERGY

# What is Energy?

**Energy**: the capacity for doing work

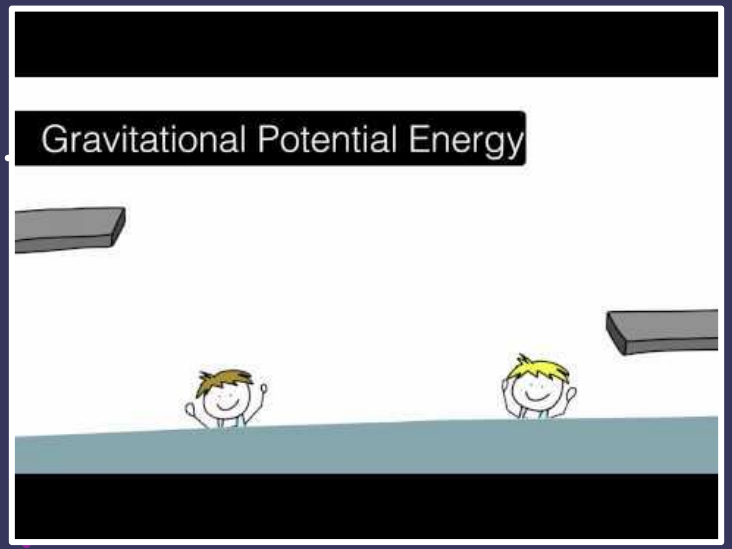
- **Work**: measure of energy transfer that occurs when an object is moved over a distance parallel to and by an external force

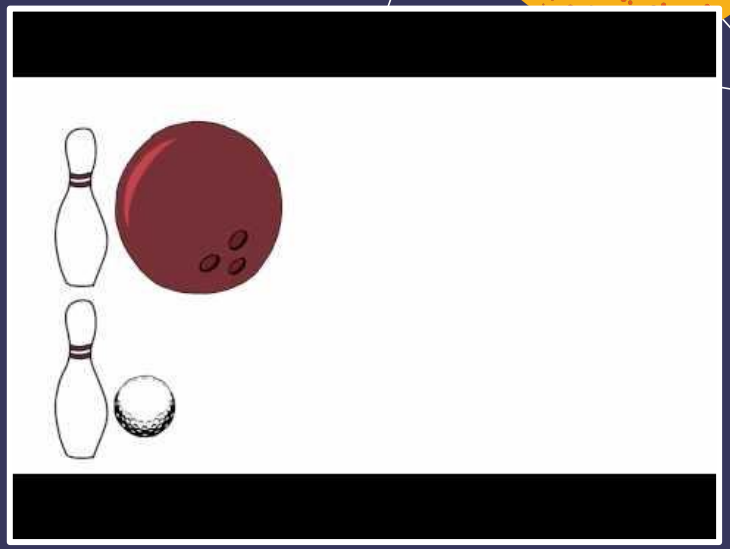
# Basic Info

Unit: **Joule (J)**

Energy is a **scalar**!!

# Videos



# POTENTIAL ENERGY

Definition: the stored energy of position possessed by an object

- ex. a drawn bow
- ex. a diver standing on a diving board

## Gravitational Potential Energy

- energy stored in an object as the result of its vertical position or height
- Dependent on **mass**, **gravitational acceleration**, and **height**

$$PE_{grav} = m \cdot g \cdot h$$

## Elastic Potential Energy

- Energy stored in elastic materials as the result of their stretching or compressing
- Dependent on the **capacity of stretch** and **distance stretched** of the object

$$PE_{elastic} = \frac{1}{2} \cdot k \cdot x^2$$

# KINETIC ENERGY

Definition: the energy of motion

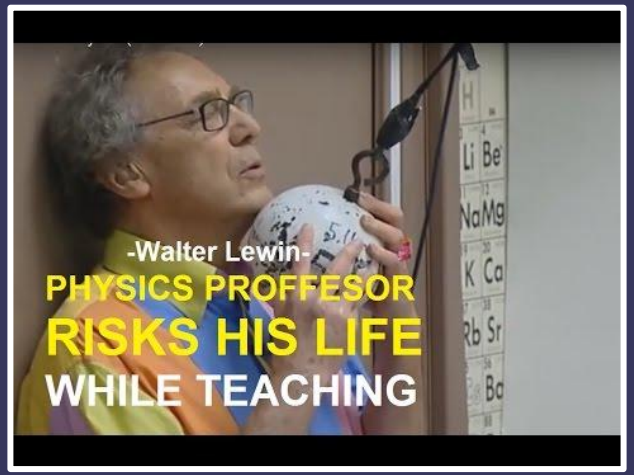
- Any object with motion (whether that be vertical, horizontal, etc.) has kinetic energy
- The amount of KE in an object depends on **mass** and **velocity** of the object

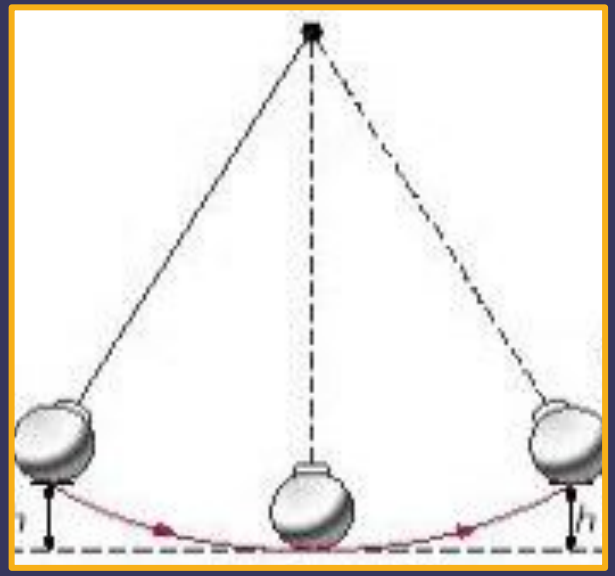
$$KE = \frac{1}{2} \cdot m \cdot v^2$$

# The Conservation of Energy

States that: **energy can neither be created nor destroyed; energy can only be transferred or changed from one form to another**

- Ex. Turning on a light (electrical → light energy)
- Ex. Rollercoaster (potential energy → kinetic energy → potential energy)



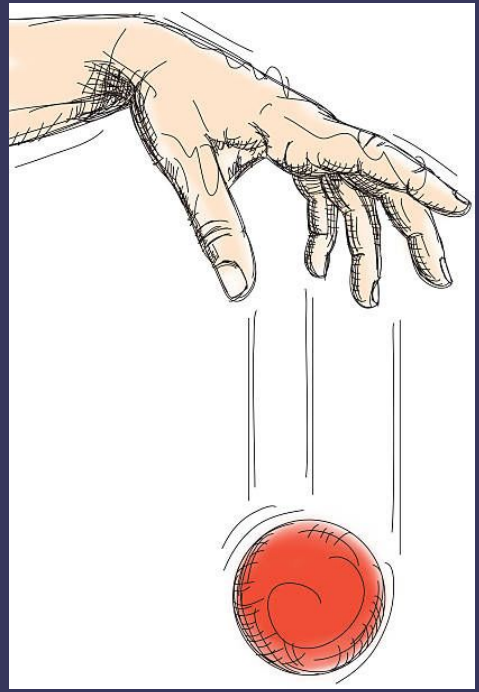


# So Why Isn't Energy Perfectly Conserved?

- Ex. Dropping a ball and it doesn't bounce to the same height that it was bounced at

Transferred into other types of energy:

- Acoustic (sound) Energy
- Thermal (heat) Energy
- Elastic Energy



# Simulation Time!