Physics

Fall Semester 2026

Weeks 13 - 14

Wednesday, November 4th

- T:**5A** - analyze different types of motion by generating and interpreting position versus time, velocity versus time, and acceleration versus time using hand graphing and real-time technology such as motion detectors, photogates, or digital applications
- **5E** - explain and apply the concepts of equilibrium and inertia as represented by Newton's first law of motion using relevant real-world examples such as rockets, satellites, and automobile safety devices
- O: I will continue working with my group on a multi-day research project
- D: by completing the research and Google slide for our group presentation.

Journal 3.1

- What is your favorite Season or Month and why?

Friday, November 6th (C-day)

- T:5A - analyze different types of motion by generating and interpreting position versus time, velocity versus time, and acceleration versus time using hand graphing and real-time technology such as motion detectors, photogates, or digital applications
- 5E - explain and apply the concepts of equilibrium and inertia as represented by Newton's first law of motion using relevant real-world examples such as rockets, satellites, and automobile safety devices

O: I will continue working with my group and prepare presentation notes and practice my presentation at least twice to ensure that my understanding of the material and the length of my presentation is within the requirements.

Monday November 9th

- T:**5A** - analyze different types of motion by generating and interpreting position versus time, velocity versus time, and acceleration versus time using hand graphing and real-time technology such as motion detectors, photogates, or digital applications
- **5E** - explain and apply the concepts of equilibrium and inertia as represented by Newton's first law of motion using relevant real-world examples such as rockets, satellites, and automobile safety devices
- O: I will make an amazing grade on my presentation
- D: by assuring I speak loudly and clearly and demonstrate my understanding of the material I am presenting.

Wednesday, November 11

- Veterans' Day
- Substitute
- T: **7A** - calculate and explain work and power in one dimension and identify when work is and is not being done by or on a system

7B - investigate and calculate mechanical, kinetic, and potential energy of a system

- O: I will be able to explore energy transfers
- D: by completing a PhET simulation (Skate Park)

Friday, November 13

- T:7A - calculate and explain work and power in one dimension and identify when work is and is not being done by or on a system

7B - investigate and calculate mechanical, kinetic, and potential energy of a system

- O: I will be able to understand work, gpe, and KE
- D: by taking notes and completing a worksheet about these topics.

Work

- The product of distance and the force in the direction an object moves.

- Work = Force x Distance

Definition of Energy…

The ability or capacity to do work.

Measured by the capability of doing work:
potential energy
or
the conversion of this capability to motion:
kinetic energy.



WHAT IS ENERGY?

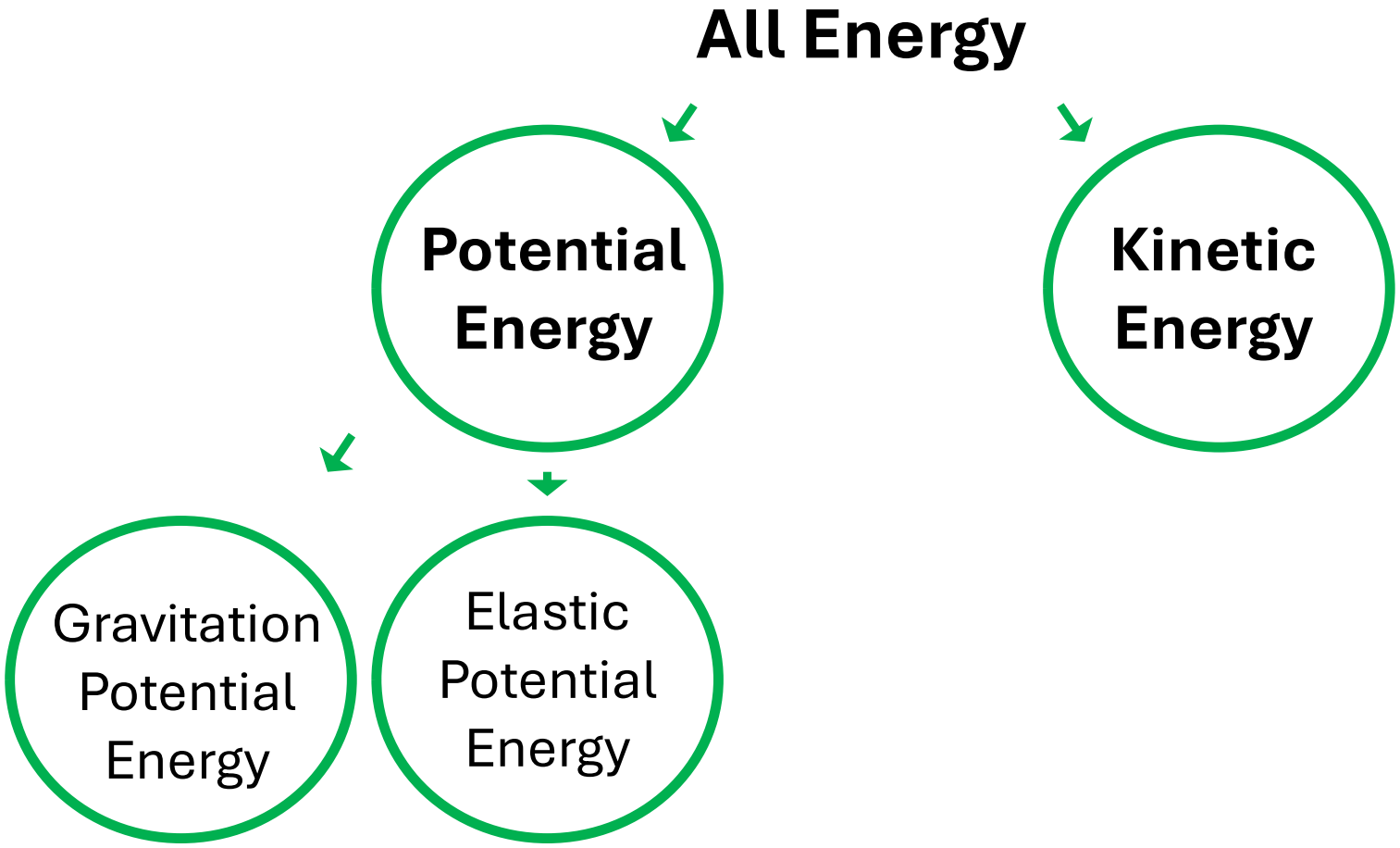
- The ability to cause change
  - Think about things that have energy “in them”…
  - All those things can make something DO something!
- It’s what causes change in everything!
  - Nothing changes without some energy causing it.

2 types of energy

Kinetic and Potential Energy



How is all energy divided?



Potential Energy

- Energy that is stored due to position or shape. It is *stored energy*.



<u>There are 2 types of Potential Energy</u>

- 1) Gravitational Potential Energy (GPE)
- 2) Elastic Potential Energy

Gravitational Potential Energy (GPE)

- Potential Energy that depends upon an objects height above a reference point

Formula:

PE = mgh

Potential energy is calculated by:

The object's mass (m), multiplied by the earth's gravitational pull (g) (9.8 m/sec/sec), multiplied by the height (h) the object can fall.

Formula Representation

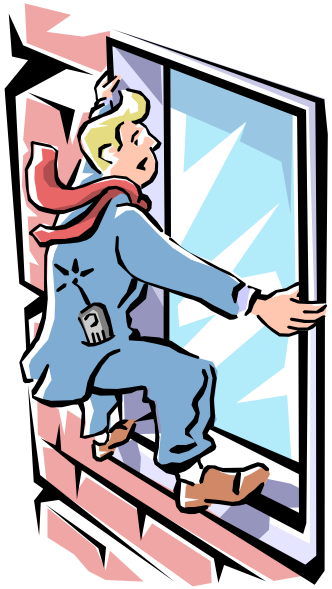
Formula	Represents	Units
PE = mgh	m = mass	Kilogram (kg)
	g = acceleration due to gravity	m/s/s
	h = height	Meter (m)

Gravitational Potential Energy



- Books on a shelf have Gravitational Potential Energy.
- Which books have the most Gravitational Potential Energy? Why?

Gravitational Potential Energy



- A man and his cell phone are on a ledge outside a very tall building.
- Which object (the man or his cell phone) has the most Gravitational Potential Energy? Why?

What does Potential Energy depend on and how does it affect potential energy?

- Height – The higher the object, the more potential energy.
- Mass – The greater the mass of the object, the more potential energy it has.
- Potential energy depends on both mass and height.

Potential Energy Converted to Kinetic Energy…

When stored energy begins to move, the object now transfers from potential energy into kinetic energy.



Standing still





Running

Kinetic Energy Preview

- Kinetic Energy is the energy of motion or energy in use
- Any matter in motion has Kinetic Energy
- There are many forms of Kinetic Energy
- Some forms include: electromagnetic (light - radiant), thermal (heat), electrical, and mechanical (sound – acoustic)

Kinetic Energy Definition and Formula

- The energy an object has due to its motion

Formula:

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



Kinetic energy is calculated by:
Squaring the velocity (v), multiply by the object's mass (m), than divided by 2.

Formula Representation

Formula	Represents	Units
$KE = \frac{1}{2}mv^2$	KE = Kinetic Energy	Joules (J)
	m = mass	kilogram (kg)
	v = velocity	Meter/second (m/s)

Work into Power

$$\text{Power} = \frac{\text{Work}}{\text{Time}} = \frac{\text{Force} \cdot \text{Displacement}}{\text{Time}}$$

$$\text{Power} = \text{Force} \cdot \frac{\text{Displacement}}{\text{Time}}$$

$$\boxed{\text{Power} = \text{Force} \cdot \text{Velocity}}$$

Monday, November 16th

- T:7A - calculate and explain work and power in one dimension and identify when work is and is not being done by or on a system

7B - investigate and calculate mechanical, kinetic, and potential energy of a system

- O: I will be able to expand my understanding of work
- D: by going over the problems from last class and practicing more problems.

Journal 3.2

- What is a holiday tradition you always look forward to?

Wednesday, November 18th

- T: 7A - calculate and explain work and power in one dimension and identify when work is and is not being done by or on a system

7B - investigate and calculate mechanical, kinetic, and potential energy of a system

- O: I will apply my knowledge of work and power
- D: to a lab in which I will collect and analyze data and write a CER.