NAME: Mrs. Sjuts | **DATE:** Wed, Oct 13, 2021

TOPIC: Energy & E Conservation Ch 15.1-2

ESSENTIAL QUESTION: Obj 1: Differentiate between KE & PE & describe the ways E can be stored. Obj 2: Examine the conservation & transformation of E within systems.

QUESTIONS AND CONNECTIONS:

What is ENERGY?

How do you calc KE?

What are ex of KE?

What are the 2 categories of E?

How calc GPE?

What are ex of PE?

NOTES:

What do you think of when you hear the word ENERGY?

Energy – ability to do work or cause change (JOULE or J)

A. Kinetic – energy in the form of motion

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

$J = kg \left(\frac{m}{s}\right)^2$ → same as $(kg \cdot \frac{m}{s^2}) \cdot m$ → same as $N \cdot m$

EX: ball rolling, wheel spinning

↑ mass = ↑ KE ↑ v = ↑ KE

* if you double v ⇒ KE x 4!

($2^2 = 4$ but $4^2 = 16$)

B. Potential – energy stored due to position or composition

① Elastic – rubber band, spring

② Chemical – stored in chem. bonds, gas or food

③ Nuclear

④ Gravitational – stored above Earth's surface

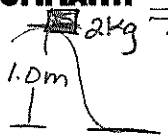
$GPE = m g h$ Remember $W = mg$

$J = N \cdot m$ ($kg \cdot \frac{m}{s^2}$) $N = kg \cdot \frac{m}{s^2}$

EX: Apple on tree, swing, throw ball in air

QUESTIONS AND CONNECTIONS:	NOTES:
What is the relationship between E, W & F?	E - ability to do work or cause change (J) Work - transfer of E (J) $W = F \times x$ (F: force, x: displacement) → When work is done on an obj, E is transferred to that obj. → When a F causes the obj to be displaced work has been done on obj.
What is Mechanical E?	Mechanical E = KE + PE *If only internal F are doing work (think gravity acting on obj), there is no change in Total ME. It is conserved.
more on this....	Law of Conservation of E: E cannot be created or destroyed but it can be converted from one form to another
What eq. can we use to calculate E or W w/ law of C of E?	$KE_i + PE_i + W_{ext} = KE_f + PE_f$ * When work is done upon the obj by an external or non-conservative force, there will be a change in total ME. (see in calcs assign) → this "work done" could be from any kind of force as $W = F \times x$ -- Think friction or any applied F.

SUMMARY: Revisit QOD...



$KE_i + PE_i + \cancel{W_{ext}}^{\text{frictionless}} = KE_f + \cancel{PE_f}$

$(2kg)(9.8m/s^2)(1.0m) = \frac{1}{2}(2kg)v^2$

$\sqrt{19.6\ J} = \sqrt{(1)v^2}$

$4.4\ m/s = v$