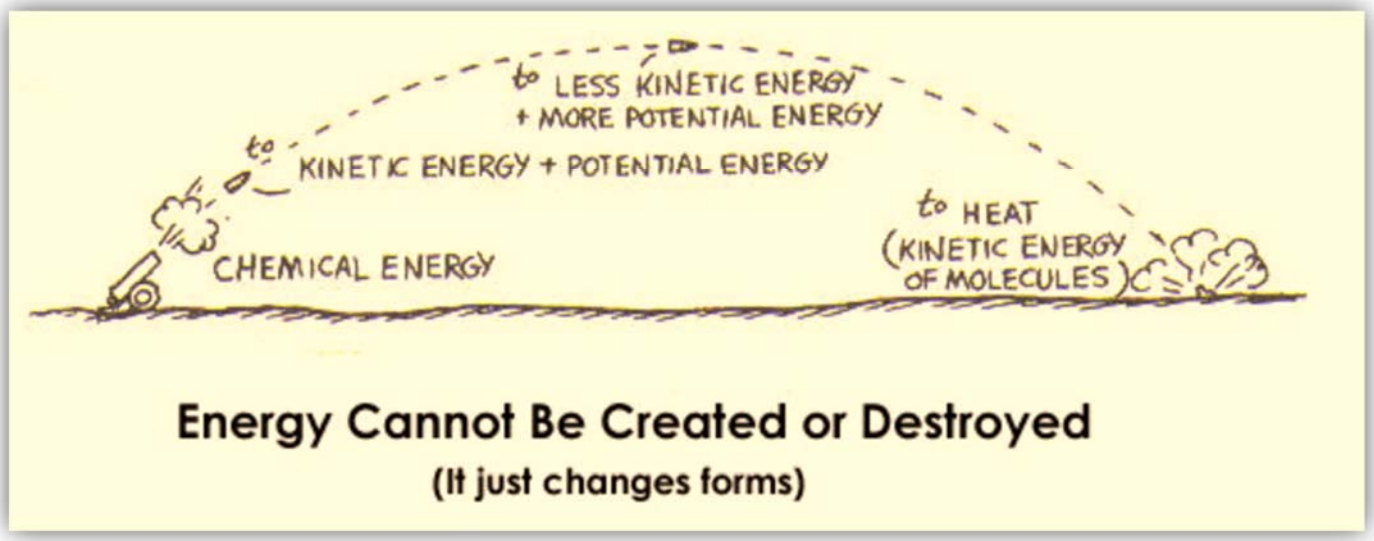
CONSERVATION OF ENERGY



Unit Overview

The focus of this unit is on the law of conservation of energy and its applications in simple mechanics problems. You will revisit the concepts of potential and kinetic energy as you solve problems relating to the conservation of energy.

Law of Conservation of Energy

The ***law of conservation of energy*** states that the total energy in a closed system stays the same. New energy is not created, nor is energy destroyed, but it can transform from one form of energy to another. In the problems for this unit, you will use the formula $KE_{(initial)} + PE_{(initial)} = KE_{(final)} + PE_{(final)}$. In other words, the sum of the initial amounts of kinetic energy and potential energy in an isolated system is equal to the sum of the final amounts of kinetic energy and potential energy in that system.

$$KE_{(initial)} + PE_{(initial)} = KE_{(final)} + PE_{(final)}$$

Recall from the previous unit that kinetic energy (KE) = $1/2mv^2$ and potential energy (PE) = mgh. Both of these equations result in units of Joules (J). You will encounter problems where you need to use these equations, both on their own and in a larger context, in order to show the conservation of energy.

Read the following information to further explore the concept of the conservation of energy:

https://www.khanacademy.org/science/physics/work-and-energy/work-and-energy-tutorial/a/what-is-conservation-of-energy

Potential Energy – Applications

The type of potential energy known as gravitational potential energy is what we will focus on in this unit, similarly to the last unit. Recall that this is the energy of position. So what factors are involved? The object in question's mass, height above a given surface, and the force of gravity are used to calculate that object's gravitational potential energy. Read through the following lesson on gravitational potential energy:

https://www.khanacademy.org/science/physics/work-and-energy/work-and-energy-tutorial/a/what-is-gravitational-potential-energy

$$(PE) = mgh$$

Kinetic Energy – Applications

You may remember from the previous unit that kinetic energy is the energy of motion. So because an object is moving, its kinetic energy can be measured. Kinetic energy can be calculated if you know the object's mass and its velocity. Learn more from the following lesson on kinetic energy:

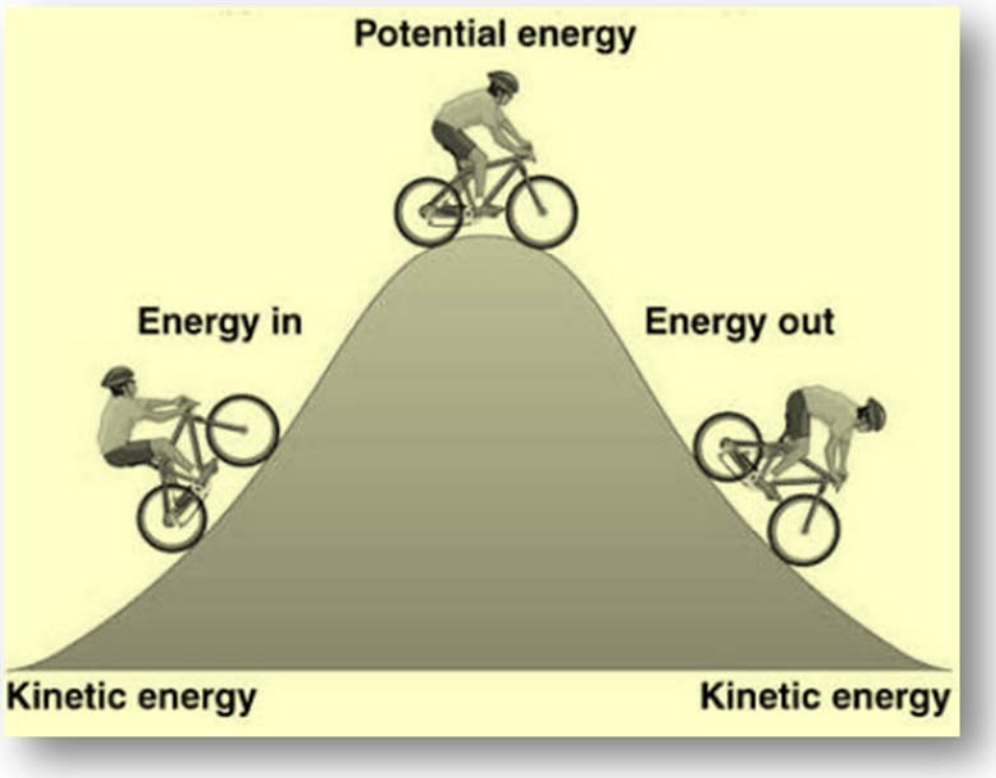
https://www.khanacademy.org/science/physics/work-and-energy/work-and-energy-tutorial/a/what-is-kinetic-energy

$$(KE) = 1/2mv^2$$

Glencoe Potential Energy and Kinetic Energy Virtual Lab

What are the relationships between kinetic energy and potential energy? Complete this virtual lab to learn more. Read the lesson on the left-hand side of the page. Use the journal (clipboard icon) and data table (data table icon) to record your answers. When you are finished, click "print" and then change the destination to save your work as a PDF file to submit to your teacher.

http://www.glencoe.com/sites/common_assets/science/virtual_labs/PS05/PS05.html



SAS VLab: Kinetic & Potential Energy

https://www.sascurriculumpathways.com/portal/#info/1322

Click on the link above and enter login information (username vlastudent, no password), then click “launch resource.” Complete the activity and record your answers in the online journal. When you are finished, save your work and submit to your teacher.

Practice Problems

Complete the practice problems at the following website and check your answers to see how you did.

http://www.physicsclassroom.com/class/energy/Lesson-2/Application-and-Practice-Questions

Now answer questions 1 through 9.