

Energy & Power

This module introduces the basic concepts of energy and power as a purposeful activity that employs a broad range of tools and methodologies. Students will be introduced to basic principles of physics and will have the opportunity to explore the technology of electrical energy generation.

Unit One - Big Ideas

- ✦ Topic 1: Mass and Force
- ✦ Topic 2: Work Energy and Power
- ✦ Topic 3: Sources, Forms, Conversions and Transmission of Energy
- ✦ Topic 4: Sources of Energy for Electrical Generation
- ✦ Topic 5: Career Connections

Unit 1

This unit introduces the basic concepts of energy and power as a purposeful activity that employs a broad range of tools and methodologies. Specific tools and methods will be introduced as examples. In particular, students will be introduced to basic principles of physics and will have the opportunity to explore the technology of electrical energy generation.



Topic 1 - Mass and Force

Students will be expected to:

- 1.01 define the term mass and state the unit of measurement for mass.
- 1.02 define the term force and state the unit of measurement for force (weight).
- 1.03 explain the historical context for the unit measurement of force.

Mass and force are related. They are both fundamental measurements.

Mass

- ✚ Mass is a measure of the amount of energy in an object.
- ✚ Mass stays the same no matter what force is acting on the object.

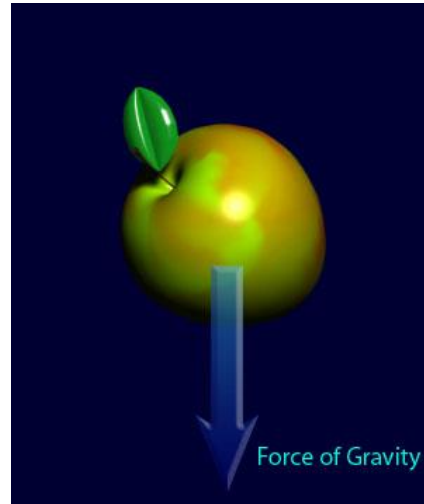


- It is measured in kilograms.
- We use a balance to measure mass where an object's mass is compared to another object whose mass has been defined.
- Sometimes people confuse weight and mass. When someone asks you how much do you weigh, they really are asking you what your mass is.
- A spring scale is used for measuring weight because a spring scale measures the force of gravity pulling objects downward.



Force

- ✚ Force is the measurement of influences that change the direction of an object.
- ✚ It is measured in Newtons and may be explained through Newton's Second Law.
- ✚ Newton's Second Law states $F = ma$ (Force equals mass times acceleration).
- ✚ The most dominant of the forces is gravity. On each kg of mass the earth exerts a force of 9.8 N pointing downwards (towards the center of the earth). This force accelerates an apple when it falls from the tree.
- ✚ Two objects with the same mass will weigh differently depending on the measure of gravitational force on that object.
- ✚ If an object has a mass of 1 kg on Earth, it would have a mass of 1 kg on the moon, even though it would weigh less.
- ✚ The force of gravity on the moon is less than on Earth; therefore, the object will weigh less on the moon.



Assignment

Many of the units of measurement that we use in science are directly related to the name of the scientist who was instrumental in their discovery. For each scientist listed below:

- ✚ find when they were born and died.
- ✚ where they lived.
- ✚ what unit of measurement was named after them.

Scientists:

- ✚ Farraday
- ✚ Joule
- ✚ Newton
- ✚ Kelvin
- ✚ Hertz
- ✚ Volta

Assignment:

- ✚ Choice of:
 - ✚ Word/Word Perfect
 - ✚ PowerPoint Presentation
 - ✚ New page in your digital portfolio
- ✚ Include a graphic of each scientist.
- ✚ Keep your presentation brief.
- ✚ You will have one class to complete this assignment.
- ✚ Save the assignment as *Scientist* in your digital portfolio.