



Standard #: SC.912.P.10.10

This document was generated on CPALMS - www.cpalms.org

Compare the magnitude and range of the four fundamental forces (gravitational, electromagnetic, weak nuclear, strong nuclear).

General Information

Subject Area: Science

Grade: 912

Body of Knowledge: Physical Science

Idea: Level 2: Basic Application of Skills & Concepts

Standard: [Energy](#) -

Date Adopted or Revised: 02/08

A. Energy is involved in all physical and chemical processes. It is conserved, and can be transformed from one form to another and into work. At the atomic and nuclear levels energy is not continuous but exists in discrete amounts. Energy and mass are related through Einstein's equation $E=mc^2$.

B. The properties of atomic nuclei are responsible for energy-related phenomena such as radioactivity, fission and fusion.

C. Changes in entropy and energy that accompany chemical reactions influence reaction paths. Chemical reactions result in the release or absorption of energy.

D. The theory of electromagnetism explains that electricity and magnetism are closely related. Electric charges are the source of electric fields. Moving charges generate magnetic fields.

E. Waves are the propagation of a disturbance. They transport energy and momentum but do not transport matter.

Content Complexity Rating: [Level 2: Basic Application of Skills & Concepts](#) - [More Information](#)

Date of Last Rating: 05/08

Status: State Board Approved

Related Courses

Course Number	Course Title
2020910:	Astronomy Solar/Galactic Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003350:	Chemistry 1 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2001310:	Earth/Space Science (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2001320:	Earth/Space Science Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2002420:	Integrated Science 2 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2002430:	Integrated Science 2 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2002450:	Integrated Science 3 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003400:	Nuclear Radiation (Specifically in versions: 2014 - 2015, 2015 - 2018 (course terminated))
2020710:	Nuclear Radiation Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003310:	Physical Science (Specifically in versions: 2015 - 2022 (current), 2022 and beyond)
2003320:	Physical Science Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003380:	Physics 1 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003390:	Physics 1 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003410:	Physics 2 Honors (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003600:	Principles of Technology 1 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
2003610:	Principles of Technology 2 (Specifically in versions: 2014 - 2015, 2015 - 2018 (course terminated))
7920020:	Access Earth/Space Science (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
2002425:	Integrated Science 2 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
2003385:	Physics 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
2003836:	Florida's Preinternational Baccalaureate Physics 1 (Specifically in versions: 2015 - 2022 (current), 2022 and beyond)
2003838:	Florida's Preinternational Baccalaureate Physics 2 (Specifically in versions: 2015 and beyond (current))
7920022:	Access Physical Science (Specifically in versions: 2016 - 2018, 2018 and beyond (current))

Related Access Points

Access Points Number	Access Points Title
SC.912.P.10.In.5:	Identify fundamental forces, including gravitational and electromagnetic.
SC.912.P.10.Su.6:	Recognize fundamental forces, such as gravitational.
SC.912.P.10.Pa.6:	Recognize that an object falls unless stopped (gravity).

Related Resources

Lesson Plan

Name	Description
Life of the Party:	This activity teaches students how to determine the age of an atom using an onion, cabbage, and Brussels sprouts. Aliens from another planet left these items on our planet and need our assistance determining their age. Based on the number of layers or half lives of the "elements," the students will be able to determine their age. The students will also be able to differentiate between the three types of radioactive decay and understand why radioactive elements are harmful.

Teaching Idea

Name	Description
Island of Stability:	A video and supporting activities about the Periodic Table. The context is man's quest to create elements. The focus is atomic structure and atomic theory.

Text Resources

Name	Description
Where Do Chemical Elements Come From? :	This informational text resource is intended to support reading in the content area. What is that extremely bright light in the sky? It's a supernova: the result of a massive star collapsing in on itself. This explosion is more than just a pretty sight; it is the main source of the elements that make up our planets and all the other objects in the night sky.
Are There Mysterious Forces Lurking in Our Atoms and Galaxies?:	This informational text resource is intended to support reading in the content area. This article discusses a physicist's search for a new universal force, along with details regarding the four fundamental/universal forces (gravity, electromagnetism, strong nuclear force and weak nuclear force).
Magnetism:	This site presents the basic ideas of magnetism and applies these ideas to the earth's magnetic field. There are several useful diagrams and pictures interspersed throughout this lesson, as well as links to more detailed subjects. This is an introduction to a larger collection on exploring the Earth's magnetosphere. A Spanish translation is available.

Student Resources

Text Resource

Name	Description
Magnetism:	This site presents the basic ideas of magnetism and applies these ideas to the earth's magnetic field. There are several useful diagrams and pictures interspersed throughout this lesson, as well as links to more detailed subjects. This is an introduction to a larger collection on exploring the Earth's magnetosphere. A Spanish translation is available.