

Standard #: SC.912.P.10.6

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Create and interpret potential energy diagrams, for example: chemical reactions, orbits around a central body, motion of a pendulum.

General Information

Subject Area: Science

Grade: 912

Body of Knowledge: Physical Science

Idea: Level 3: Strategic Thinking & Complex Reasoning

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 3: Strategic Thinking & Complex Reasoning](#) - [More Information](#)

Date of Last Rating: 05/08

Status: State Board Approved

Related Courses

Course Number	Course Title
2003340:	Chemistry 1 (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)
2003360:	Chemistry 2 Honors (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)
2002440:	Integrated Science 3 (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)
2003320:	Physical Science Honors (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))
2003800:	Florida's Preinternational Baccalaureate Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
7920011:	Access Chemistry 1 (Specifically in versions: 2014 - 2015, 2015 - 2018, 2018 and beyond (current))
2002445:	Integrated Science 3 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2020 (course terminated))
2003345:	Chemistry 1 for Credit Recovery (Specifically in versions: 2014 - 2015, 2015 - 2022 (current), 2022 and beyond)
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))

Related Access Points

Access Points Number	Access Points Title
SC.912.P.10.In.1:	Identify examples of energy being transformed from one form to another (conserved quantity).
SC.912.P.10.Su.1:	Recognize energy transformations that occur in everyday life, such as solar energy to electricity.
SC.912.P.10.Pa.4:	Identify materials that provide protection (insulation) from heat.

Related Resources

Lesson Plans

Name	Description
Ramp It Up:	Using inquiry techniques, students, working in groups, are asked to design and conduct experiments to test the Law of Conservation of Energy and the Law of Conservation of Momentum. Upon being provided with textbooks, rulers, measuring tapes, stopwatches, mini-storage containers, golf balls, marbles, rubber balls, steel balls, and pennies, they work cooperatively to implement and revise their hypotheses. With limited guidance from the teacher, students are able to visualize the relationships between mass, velocity, height, gravitational potential energy, kinetic energy, and total energy as well as the relationships between mass, velocity, and momentum.
Riding the Roller Coaster of Success:	Students compete with one another to design and build a roller coaster from insulation tubing and tape that will allow a marble to travel from start to finish with the lowest average velocity. In so doing, students learn about differences between distance and displacement, speed and velocity, and potential and kinetic energy. They also examine the Law of Conservation of Energy and concepts related to force and motion.
Amusement Park Physics:	Students will research various types of amusement park rides and use their findings to design a feasible ride of their own. They will summarize their findings and present their ride design to the class. Each student will then write a persuasive letter to a local amusement park describing the reasons their ride design is the best.

Perspectives Video: Expert

Name	Description
Pendulums and Energy Transformations:	Explore how pendulums show the transformation of gravitational potential energy to kinetic energy and back with Dr. Simon Capstick in this engaging video. Don't miss his broken-nose defying test of the physics with a bowling ball pendulum. Download the CPALMS Perspectives video student note taking guide .

Virtual Manipulatives

Name	Description
Pendulum Lab:	Play with one or two pendulums and discover how the period of a simple pendulum depends on the length of the string, the mass of the pendulum bob, and the amplitude of the swing. It's easy to measure the period using the photogate timer. Students can vary friction and the strength of gravity. <ul style="list-style-type: none">• Design experiments to describe how variables affect the motion of a pendulum• Use a photogate timer to determine quantitatively how the period of a pendulum depends on the variables you described• Determine the gravitational acceleration of planet X• Explain the conservation of Mechanical energy concept using kinetic energy and gravitational potential energy• Describe energy chart from position or selected speeds
Potential/Kinetic Energy Simulation:	Learn about conservation of energy with a skater! Build tracks, ramps and jumps for the skater and view the kinetic energy, potential energy, thermal energy as he moves. You can adjust the amount of friction and mass. Measurement and graphing tools are built in.

Student Resources

Perspectives Video: Expert

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Parent Resources

Virtual Manipulative

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