Physics with Labs

Edgenuity, Inc ()

Submitted: Apr 27, 2017

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Pending

Submission Feedback

APPROVED

Basic Course Information

School(s) Offering This Course:

School Name	Course Learning Environment	Transcript Code(s)	
		Abbreviation	Course Code
Edgenuity, Inc ()	Online		

Title:	Physics with Labs
Transcript abbreviations:	
Length of course:	Full Year
Subject area:	Laboratory Science (D) / Physics
UC honors designation?	No
Non-honors equivalent course:	{{ getNonHonorsEquivalentDisplayValue() }}
Non-honors exemption details:	
Prerequisites:	Algebra I (Required) Pre-Calculus (Recommended) None
Co-requisites:	None

Integrated (Academics / CTE)?	No
Does your course include lab activities in your course description?	Yes
Grade levels:	11th, 12th
Course learning environment:	Online

Online course self assessment

A. Content (13)

B. Instructional Design (11)

C. Student Assessment (7)

D. Technology (11)

E. Course Evaluation and Support (10)

Course Description

Course overview:

This Course Overview is not available on the A-G Course Management Portal. For more information about this course, you need to contact the institution that authored this course.

This laboratory science course is aligned to the Next Generation Science Standards for California Public Schools, and is designed to introduce students to the fundamental principles and concepts of Physics, as well as prepare them for collegiate-level science coursework. Concepts discussed include motion and forces, momentum, energy and matter, thermodynamics, waves, electricity, magnetism,

and nuclear physics. Students also conduct a variety of laboratory activities that develop skills in observation, use of scientific tools and techniques, data collection and analysis, and mathematical applications.

Course content:

This Course Content is not available on the A-G Course Management Portal. For more information about this course, users should directly contact the institution that authored this course.

One-Dimensional Motion

Please note that this is not a course update. According to the system the course is approved through the 2017-2018 school year but an update to the self-assessment was required. In order to submit the self-assessment, lab descriptions had to be moved from the original unit descriptions into the new boxes provided specifically for lab descriptions.

Each unit in this rigorous laboratory science course contains lessons which include a warm-up activity to review background knowledge and introduce new scientific concepts that will be discussed, direct instruction, assignments, and a summary. Integrated laboratory activities and projects provide students with the opportunity to demonstrate knowledge of scientific concepts and habits of mind important for university-level studies. Scientific texts are also incorporated throughout the course, providing opportunities for development of writing and literacy skills.

The course includes a variety of laboratory activities. These include wet labs that account for at least 20% of the course, virtual labs, and online tools called Gizmos (powered by Explore Learning). Wet labs are completed in a lab setting and are teacher-supervised, hands-on activities. Students are required to conduct the labs according to the lab procedures provided in the Student Guide and the Teacher Guide for the labs, to analyze outcomes, and to formally write about their findings and possible improvements.

Additionally, students regularly engage in higher-order thinking and discussion in a threaded discussion format. The discussion, which is open only to students in each class, is monitored by the teacher, who can ask questions of the group or of individual students. This provides students the opportunity to communicate with each other in order to share understanding, insight, and ideas.

In this unit, students investigate various aspects of one-dimensional motion, including concepts of speed, velocity, and acceleration. Students apply mathematical concepts such as slope, averages, graph analysis, and appropriate use of significant figures. Students will also complete a laboratory activity to gain a comprehensive understanding of the relationships between position, velocity, and acceleration of an object, and further develop scientific literacy skills through the completion of a scientific lab report for the activity.

🧪 Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Motion with Constant Acceleration

In the Lab: Motion with Constant Acceleration lesson, students utilize a virtual fan cart or a dynamics track in order to explore aspects of motion including the relationship between position, time, velocity, and acceleration. Students utilizing the virtual activity are able to adjust factors such as fan speed, mass, and the surface on which the fan cart travels in order to investigate how they impact the overall motion of the cart, and specifically, the cart's acceleration. Students will also perform mathematical and graphical analysis of the data obtained, including determination of average velocity and comparing cart acceleration in different scenarios.

Two-Dimensional Motion

In this unit, students investigate how two-dimensional motion is graphed and analyzed. Students apply the mathematical concept of vectors in order to determine specific components of an object's displacement, as well as overall displacement. Students will then apply vectors to determine initial and resultant velocities for objects in projectile motion, as well as the relationships between velocity and distance in projectile motion.

Throughout the course students can access an online digital notebook, or eNotes. They have a full menu of text formatting tools and can return to their notes or print them at any time for review.

Summary of Assignment: Lesson: Projectile Motion

In this assignment, students apply the concept of projectile motion to a variety of real-world scenarios in order to determine the effects of factors such as changes in velocity and initial angle of projection on the distance a projectile travels. Students also determine horizontal and vertical vector components of projectile motion from initial velocity and angle values, as well as distance traveled and time spent in motion. In completing this assignment, students apply knowledge of significant figures when calculating values.

🧪 Unit Lab Activities:

Labs appear throughout the course focusing on the major concepts presented in the course. Some units include additional labs while other units, such as this one, are shorter and do not contain any labs, but instead focus on activities such as extended reading to explore additional perspectives and real world application of concepts.

Forces

In this unit, students investigate various aspects of force, including types of forces and how Newton's Laws of Motion relate to forces. Students apply graphical and mathematical analysis to determine the net forces and frictional forces acting on various objects, as well as investigate the relationships between forces and changes in motion. Students will also complete a laboratory activity to gain a comprehensive understanding of the overall impact of force and mass on an object's acceleration and further develop scientific literacy skills through the completion of a scientific lab report for the activity.

Lab reports are completed in the eWriting environment, which is designed to scaffold students through the writing process from pre-writing to the final draft. Students may also access the rubric and checklist. A research tab allows students to gather information about their topic.

Summary of Assignment: Lesson: Newton's Second Law

In this assignment, students apply Newton's second law to real-world scenarios in order to calculate values related to the factors of force, mass, and acceleration and analyze how these factors impact overall motion. In completing this assignment, students apply knowledge of significant figures when calculating values.

🧪 Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Newton's Second Law

In the Lab: Newton's Second Law lesson, students utilize a virtual fan cart or a dynamics track to explore Newton's Second Law and the impacts of force and mass on an object's acceleration. Students utilizing the virtual activity are able to adjust fan speed and overall cart mass in order to investigate how each of these factors impact the cart's acceleration. Students then perform mathematical and graphical analysis to compare how changes in force and changes in mass impact acceleration differently, such as determining the type of relationships shown by the data (i.e., direct vs. inverse).

Momentum

In this unit, students investigate the dynamics of elastic and inelastic collisions in order to gain an understanding of momentum and its conservation. Students apply graphical and mathematical concepts to calculate overall momentum in changing systems. Students will also complete a laboratory activity to gain a comprehensive understanding of the relationships between mass, position, and velocity of colliding objects and further develop scientific literacy skills through the completion of a scientific lab report for the activity.

Additionally, the unique direct instruction video presentations embedded in every lesson throughout the courses feature highly qualified, certified instructors presenting instructional content via recorded video. Instructors guide students through concepts and skills with clear and engaging audio and visual supports that include white board demonstrations, bulleted key points, highlighted vocabulary, diagrams and photography. The video tool allows students to pause, go back, and repeat instruction as-needed. They stop at intervals throughout instruction to complete interactive tasks, self-assessing their learning progress and keeping students engaged.

Summary of Assignment: Lesson: Impulse and Momentum

In this assignment, students apply the concept of impulse and momentum to a variety of real-world scenarios in order to determine how collisions and motion are affected by these factors. Students also utilize the impulse momentum theorem to examine the mathematical relationship between forces, time, and changes in momentum. In completing this assignment, students apply knowledge of significant figures when calculating values. Students also develop their perception of engineering within this lesson as they design and create a device to protect an egg on impact.

Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Conservation of Linear Momentum

In the Lab: Conservation of Linear Momentum lesson, students utilize a dynamics track to explore the impact of changes in mass on the final velocity and momentum of objects undergoing inelastic collisions. Students utilizing the virtual activity are able to adjust the mass and initial velocity of each glider in order to investigate how each of these factors impact the momentum and velocity of the gliders post-collision. Students will also apply knowledge from the laboratory activity to analyze conservation of momentum in real-world scenarios.

Circular Motion and Gravitation

In this unit, students utilize mathematical and graphical analysis to determine the impact of various factors such as mass, distance, and inertia on gravitational force, centripetal acceleration, and circular motion. Students will also utilize specific mathematical formulas and laws to calculate factors involved in circular motion such as tangential speed, centripetal acceleration, and effects of centripetal forces on motion. Students will also complete a laboratory activity to evaluate the relationships between mass, velocity, radius, and centripetal force, and further develop scientific literacy skills through the completion of a scientific lab report for the activity.

Summary of Assignment: Lesson: Centripetal Acceleration

In this assignment, students apply the concepts of centripetal acceleration and circular motion to mathematically and graphically examine how they affect the motion of objects. Students describe how objects look when travelling in uniform circular motion, as well as the differences between rotation and revolution. Students also analyze how tangential speed is affected by circular measurements. In addition, students utilize centripetal acceleration and tangential speed equations to mathematically analyze real-world scenarios.

Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Circular Motion

In the Lab: Circular Motion lesson, students examine the relationship between centripetal force, mass, radius, and velocity in situations involving uniform circular motion by performing a series of three experiments. Students initially examine the effects of centripetal force on the velocity of an object undergoing uniform circular motion. They then examine how changing the mass of the moving object affects its velocity. Finally, students investigate the impact of the circle's radius on the object's velocity. Students also perform graphical and mathematical analysis of the collected data in order to derive the formula $F_c = mv^2/r$.

Motion in Space

In this unit, students investigate factors that impact movement of objects in space. Students apply mathematical concepts to determine how gravitation and other forces impact the speed and period of motion in space. Students will also analyze the relationships between objects such as planets and satellites in space and how they impact each other's motion.

Summary of Assignment: Lesson: Earth-Moon-Sun System

In this assignment, students apply scientific literacy skills to read and analyze a scientific text discussing the historical development of planetary motion laws. Students then present an argument regarding the founders of planetary motion laws, utilizing supporting information from the text. Students also mathematically apply Kepler's laws of planetary motion to specific real-world scenarios to investigate how mass and distance impact motion in space.

Within reading assignments, a text mark-up toolset helps students of all reading levels engage with grade-level text. Because students can access the tools they need for any activity, students can adapt the level of scaffolding for content that they find more challenging or less challenging. These tools include:

- Read-aloud: Students can hear any section of text read aloud.
- Translation: Students can have on-screen text translated into their home languages. Supported languages include Arabic, Armenian, Chinese, French, German, Haitian Creole, Hindi, Italian, Japanese, Korean, Filipino, Polish, Portuguese, Russian, Spanish, Thai, and Vietnamese.
- Word Look-up: Students can look up any word on the page. They can read the definitions themselves or hear the definitions read aloud.
- Highlighters: Students are encouraged to highlight on-screen text as they read. Highlighting tools allow students to highlight in up to four different colors. Once students are finished reading, they can collect all their highlighted text by color and insert it into their notes or into any other document.

Digital Sticky Notes: Students use digital sticky notes to annotate text as they read. These notes allow students to capture thoughts, insights, and questions for later use.

🧪 Unit Lab Activities:

Labs appear throughout the course focusing on the major concepts presented in the course. Some units include additional labs while other units, such as this one, are shorter and do not contain any labs, but instead focus on activities such as extended reading to explore additional perspectives and real world application of concepts.

Understanding Energy

In this unit, students investigate applications of energy to various everyday scenarios. Students will differentiate between potential and kinetic energy and utilize graphical and mathematical analysis to gain a comprehensive understanding of the concepts of work, power, and energy. Students will also complete a laboratory activity to evaluate the relationships between mass, speed, and kinetic energy of an object, and further develop scientific literacy skills through the completion of a scientific lab report for the activity.

Summary of Assignment: Lesson: Kinetic Energy

In this assignment, students explain the work-energy theorem and its relationship to positive and negative work. Students will then utilize work and kinetic energy concepts to mathematically analyze real-world scenarios and determine how factors such as mass and velocity impact the amount of kinetic energy found in an object, as well as work output. In completing this assignment, students apply knowledge of significant figures when calculating values.

🧪 Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Kinetic Energy

In this assignment, students launch a beanbag into the air from a lever utilizing a counterweight. Students adjust the amount of counterweight and the height from which the weight is dropped in order to investigate the effects of speed and mass on kinetic energy, as well as how the kinetic energy affects the height reached by the beanbag. Students then apply experimental knowledge to analyze kinetic energy graphs.

Transforming and Conserving Energy

In this unit, students investigate how energy is conserved as it changes between various forms, as well as how energy is transferred between forms. Students also analyze energy changes and conservation through graphical and mathematical analysis of energy transfers in various scenarios. Students also conduct graphical analysis of energy transfer diagrams to confirm the law of conservation of energy. Students will also complete a laboratory activity to verify the law of conservation of energy through examination of the relationships between kinetic energy, gravitational potential energy, and friction, and further develop scientific literacy skills through the completion of a scientific lab report for the activity.

Summary of Assignment: Lesson: Energy Transformations

In this assignment, students apply an understanding of energy transfer and conservation to examine the energy transformations that occur in various real-world scenarios. Students also apply graphical and mathematical analysis to determine relationships between various factors in energy transformations, such as mechanical energy, mass, and velocity.

🧪 Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Conservation of Energy

In the Lab: Conservation of Energy lesson, students utilize friction ramps and a marble to examine the relationship between kinetic energy, gravitational potential energy, and heat due to friction in order to verify the law of conservation of energy. Students initially perform the experiment using a low friction ramp and a marble, then perform it again using a higher friction ramp. Students apply potential energy, kinetic energy, distance, and velocity formulas to predict the marble's landing position after it rolls down each ramp and off the end of a table. They then perform additional mathematical analysis to determine the amount of energy converted to heat due to friction in the second experiment.

Thermal Energy

In this unit, students investigate the relationships between thermal energy, heat, and temperature, as well as how kinetic energy is demonstrated by changes in temperature. Students also analyze graphical models to gain a comprehensive understanding of the various methods of heat transfer, including convection, conduction, and radiation. Students will also complete a laboratory activity to gain a comprehensive understanding of how energy is converted to heat within a mechanical system, and further develop scientific literacy skills through the completion of a scientific lab report for the activity.

🧪 Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Mechanical Equivalent of Heat

In the Lab: Mechanical Equivalent of Heat lesson, students will conduct an in-depth investigation of the relationship between gravitational potential energy (GPE) and its conversion to thermal energy. Students examine this relationship using a system composed of a falling cylinder attached to a propeller in a water bath. Students adjust either the height or mass of the cylinder during the experiment, and then use quantitative observation and mathematical analysis to determine how these factors impact the movement of the propeller and the change in temperature of the water bath, as well as use graphical analysis to determine the type of relationship that exists between GPE and change in temperature.

Thermodynamics

In this unit, students evaluate the first and second laws of thermodynamics and apply them to everyday scenarios involving technology. Students also apply mathematical analysis to gain a comprehensive understanding of how the laws of thermodynamics relate to the concepts of conservation of energy and entropy. When students finish this unit, they complete a cumulative exam.

Summary of Assignment: Lesson: Second Law of Thermodynamics

In this assignment, students utilize graphical and mathematical analysis to investigate the relationship between entropy and the second law of thermodynamics. Students will evaluate graphical depictions of the second law of thermodynamics to determine accuracy. Students will also utilize scientific formulas to mathematically analyze the efficiency of heat engines. In completing this assignment, students apply knowledge of significant figures when calculating values.

Unit Lab Activities:

Labs appear throughout the course focusing on the major concepts presented in the course. Some units include additional labs while other units, such as this one, are shorter and do not contain any labs, but instead focus on activities such as extended reading to explore additional perspectives and real world application of concepts.

Thermal Energy and Matter

In this unit, students investigate matter and its relationship to thermal energy. Students evaluate states of matter and how thermal energy is involved in changes between states utilizing graphical analysis of heating curves. Students will also complete a laboratory activity to gain a comprehensive understanding of the transfer of thermal energy between different materials and factors that impact thermal energy transfer, as well as further develop scientific literacy skills through the completion of a scientific lab report for the activity.

Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Thermal Energy Transfer

In the Lab: Thermal Energy Transfer lesson, students use water, wet sand, and dry sand to investigate how thermal energy transfer is affected by factors such as mass and material type. Students also learn how to create and utilize a coffee cup calorimeter in order to measure the specific heat of metal, specifically aluminum, steel, and lead. Students then conduct mathematical and graphical analysis to determine how each of these factors impacts overall thermal energy transfer, as well as examine the relationships between mass and thermal energy transfer and material type and thermal energy transfer. Students also have the option to plan their own scientific inquiry to determine the effects of these different factors on thermal energy transfer.

Waves and Wave Behavior

In this unit, students investigate the relationship between simple harmonic motion and waves. Students conduct mathematical and graphical analysis to differentiate between wave types and properties such as wavelength, frequency, and speed. Students also investigate factors affected by harmonic motion and mathematically analyze the relationship between Hooke's law and harmonic motion. Students also evaluate various wave interactions and identify everyday examples of these phenomena.

Summary of Assignment: Lesson: Simple Harmonic Motion

In this assignment, students apply the concept of simple harmonic motion to conduct graphical and mathematical analysis of real-world examples of this phenomenon. Students compare and contrast situations involving pendulum motion in order to determine differences in their graphs. Students also apply mathematical equations to calculate spring constants and forces.

Unit Lab Activities:

Labs appear throughout the course focusing on the major concepts presented in the course. Some units include additional labs while other units, such as this one, are shorter and do not contain any labs, but instead focus on activities such as extended reading to explore additional perspectives and real world application of concepts.

Sound Waves

In this unit, students analyze the properties and applications of sound waves in everyday scenarios, including the use of radio waves in technology. Students will identify properties of sound waves, as well as evaluate factors that can impact the intensity of sound. Students will also investigate the relationship between sound and the Doppler effect.

Summary of Assignment: Lesson: Sound Waves

In this assignment, students investigate sound waves and their applications to everyday technology. Students apply scientific literacy skills to read and analyze a scientific text discussing the properties of sound waves. Students then discuss the benefits and disadvantages of different methods of music storage, utilizing supporting information from the text. Students also graphically analyze properties of sound waves, such as wavelength and how factors such as medium and temperature affect travel of sound waves.

🧪 Unit Lab Activities:

Labs appear throughout the course focusing on the major concepts presented in the course. Some units include additional labs while other units, such as this one, are shorter and do not contain any labs, but instead focus on activities such as extended reading to explore additional perspectives and real world application of concepts.

Electromagnetic Waves

In this unit, students differentiate between the wave and particle models of light, as well as the regions of the electromagnetic spectrum. Students will also investigate the relationships between properties of electromagnetic waves such as frequency, wavelength, and wave speed. In addition, students evaluate applications of electromagnetic waves and how waves relate to Einstein's postulates of special relativity and the photoelectric effect. In addition, students complete a laboratory activity to gain a comprehensive understanding of the phenomena of polarization of light and the factors that impact it. In this investigation, students will also further develop scientific literacy skills through the completion of a scientific lab report for the activity.

Summary of Assignment: Lesson: Special Relativity

In this assignment, students evaluate Einstein's theory of special relativity and its relationship to factors such as motion and speed of light. Students also utilize mathematical analysis to examine real-world scenarios involving relative motion, relative speed, and the length contraction principle. Students also investigate and apply the time dilation principle to real-world examples.

Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Refraction of Light

In the Lab: Refraction of Light lesson, students explore the relationship between the angle of incidence and the angle of refraction for a beam of light traveling through a clear liquid. Students use a laser beam and a refraction ray diagram in order to measure the angle of incidence and determine the angle of refraction. Students also perform mathematical analysis of the angles using ratios and geometric concepts in order to determine the index of refraction for the given media.

Reflection, Refraction, and Diffraction of Light

In this unit, students investigate various phenomena of light, including reflection, refraction, and diffraction. Students conduct graphical and mathematical analysis to predict image formation by mirrors and lenses. Students will also use graphical models to investigate how Snell's law and the law of reflection can be used to predict the reflection and refraction of light rays. In addition, students complete a laboratory activity to gain a comprehensive understanding of the phenomena of diffraction and how it is affected by wavelength and gap width in a diffraction grating. In this investigation, students will also further develop scientific literacy skills through the completion of a scientific lab report for the activity.

Summary of Assignment: Lesson: Lenses

In this assignment, students investigate different types of lenses and their everyday applications. Students apply scientific literacy skills to read and analyze a scientific text discussing the properties of various lens types and optical phenomena and applications associated with lenses. Students then utilize information from the text and the lesson to analyze and evaluate graphical models and examples. Students also conduct mathematical analysis to determine specific values related to image formation by lenses. In completing this assignment, students apply knowledge of significant figures when calculating values.

Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Waves and Diffraction

In the Lab: Waves and Diffraction lesson, students utilize a ripple tank and a gap barrier to gain a better understanding of how and why wave diffraction occurs. Students are able to adjust various factors within the ripple tank, such as wave type and wavelength, as well as the barrier type and size of gap the waves will be traveling toward/through. They then use quantitative and qualitative

observation, as well as mathematical analysis to determine the overall impact of changing wavelength on diffraction angles. Students will also apply knowledge from the laboratory activity to analyze wave diffraction in real-world scenarios.

Electric Charge

In this unit, students investigate the relationship between electric charge, electric force, and electric fields. Students will compare electric force to other fundamental forces and evaluate various factors that can impact electric forces and fields. Students will also utilize mathematical analysis to gain a comprehensive understanding of Coulomb's law and how it applies to electric forces. Students will also utilize graphical analysis to describe electric fields and field lines. In addition, students complete a laboratory activity to gain a comprehensive understanding of Coulomb's law and factors that affect static electricity. In this investigation, students will also further develop scientific literacy skills through the completion of a scientific lab report for the activity.

Summary of Assignment: Lesson: Electric Fields

In this assignment, students utilize graphical and mathematical models to analyze electric fields. Students evaluate specific scenarios to determine the appropriate methods for diagramming electric field lines in each. Students also apply mathematical analysis to investigate the relationships between charge, force, and distance in electrical fields, as well as to determine how different factors affect electric field strength. In completing this assignment, students apply knowledge of significant figures when calculating values.

Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Coulomb's Law

In the Lab: Coulomb's Law lesson, students explore the transfer of electrons to a balloon using generated static electricity. Students perform electrostatic transfer to balloons using different materials. They then use vector diagrams, fundamental forces, and concepts from trigonometry and algebra to examine the impact of each set of conditions on the overall number of electrons transferred to the balloon.

Electric Currents and Circuits

In this unit, students investigate the impact of various factors in electric circuits. Students utilize mathematical and graphical analysis, including Ohm's Law, to differentiate between the role of current, voltage, transistors, and resistance in series and parallel circuits. Students will also plan and complete a laboratory activity to gain a comprehensive understanding of the structure of series and parallel circuits, as well as how circuit type impacts power output. Students will also further develop scientific literacy skills through the completion of a scientific lab report for the activity.

🧪 Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Circuit Design

In the Lab: Circuit Design lesson, students plan a scientific inquiry utilizing either a virtual circuit building simulation or circuits created with batteries, flashlight bulbs, test leads, an ammeter, and various resistors to examine the impact of changes in voltage and/or resistance on overall current flow. They then use mathematical and graphical analysis to compare the effects of changing voltage or resistance on the current through a series circuit and a parallel circuit, as well as to examine the relationships between current, resistance, and voltage shown by the data collected.

Magnetism

In this unit, students evaluate the properties of magnets and how they affect magnetic forces and fields. Students will also conduct graphical and mathematical analysis to gain a comprehensive understanding of the right-hand rule and how it applies to magnetism. In addition, students will complete a laboratory activity to analyze the relationships between magnetic and electric fields, as well as develop scientific literacy skills through the completion of a scientific lab report for the activity.

Summary of Assignment: Lesson: Magnets and Magnetism

In the Magnets and Magnetism lesson, students will analyze the properties of temporary and permanent magnets, such as magnetic domains and how they affect magnetic fields. In addition, students will also describe the interaction between magnetic poles in the Earth and other objects. Students apply scientific literacy skills to read and analyze a scientific text discussing the properties of Earth's magnetic field. Students then create a written argument defending the concept of swapping magnetic poles using supporting information from the text.

Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Magnetic and Electric Fields

In this assignment, students examine electric and magnetic fields and how they can be demonstrated utilizing different materials. In the first part of this experiment, students use bar magnets, magnetic filings, and a compass in order to map a magnetic field. In the second part of this experiment, students investigate how an observable electric field can be created by placing an inflated balloon charged with static electricity next to a stream of water. In the third part of this experiment, students use a coil, bar magnet, and a galvanometer to create a simple electromagnet to investigate the relationship between magnetic fields and electric current. Finally, students create a simple circuit using wire, a battery, and a light bulb and measure the presence of magnetic fields along the circuit using a compass.

Electromagnetism

In this unit, students analyze the relationships between electricity and magnetism and how each impacts the other. Students will also complete a laboratory activity to gain a comprehensive understanding of the impact of magnetic polarity on induced current and further develop scientific literacy skills through the completion of a scientific lab report for the activity.

Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Electromagnetic Induction

In the Lab: Electromagnetic Induction lesson, students will investigate the relationship between magnetic polarity and induced current in a wire loop carrying electricity, as well as determine how a moving magnet can induce an electric field and create current flow in a wire loop. In the investigation, students will use either a virtual electromagnetic induction simulation or an electromagnet created with a Faraday Magnetic Field Induction kit. They will then use qualitative and quantitative observation to compare the impact of normal magnet polarity vs. reversed magnet polarity on overall current strength and flow direction.

Nuclear Physics

In this unit, students gain a comprehensive understanding of various concepts related to nuclear physics, including radioactivity, half-life, fission, fusion, and applications of nuclear phenomena in everyday scenarios, as well as differentiate between the stages of scientific investigation and technological design. Students conduct and present an analysis of advantages and disadvantages related to the use of nuclear energy as a resource. Students will also complete a laboratory activity to graphically analyze the process of half-life and further develop scientific literacy skills through the completion of a scientific lab report for the activity. When students finish this unit, they complete cumulative exam.

Summary of Assignment: Lesson: Nuclear Energy

In the Nuclear Energy lesson, students apply scientific literacy skills to create a written argument establishing their position on the use of nuclear power. They will defend this argument by utilizing supporting information from the lesson on the benefits and disadvantages of nuclear power as an energy source. Students will also identify issues related to disposing of nuclear waste and compare the use of nuclear energy to other resource options.

Unit Lab Activities:

Summary of Assignment: Lesson: Lab: Half-Life Model

In the Lab: Half-Life Model lesson, students will utilize either a virtual radioactive decay simulation or an activity involving pennies and a shoebox in order to investigate the impact of half-life on the radioactivity of a sample element over a period of time. Within the virtual simulation, students are able to adjust factors such as type of radioactive decay, initial number of atoms, and half-life time. They then conduct mathematical and graphical analysis to determine how radioactive decay affects the overall amount of radioactive material remaining and the number of stable atoms created from an initial sample over time or after a certain number of half-lives.

Course Materials

Multimedia

Title	Author	Director	Name of video series	Date	Website	Medium of Publication
Edgenuity Course Map	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource
Edgenuity Instructional Videos	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource
Edgenuity eNotes	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource
Edgenuity eWriter Tool	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource
Edgenuity Student Support for Text-based Assignments: Literacy Scaffolds and Supports	Edgenuity Inc.	[empty]	[empty]	[empty]	[empty]	Online Interactive Resource

Other

Title	Authors	Date	Course material type	Website
The History of Planetary Motion	Edgenuity Inc.	2014	Informational Text	[empty]
The Ups and Downs of Wave Technology	Edgenuity Inc.	2014	Informational Text	[empty]
Designer Lenses	Edgenuity Inc.	2014	Informational Text	[empty]
Earth's Magnetic Field	Edgenuity Inc.	2014	Informational Text	[empty]
Great Minds Think Alike	Edgenuity Inc.	2014	Informational Text	[empty]

Supplemental Materials

Title	Content

No course materials have been added to this course.

Additional Information

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