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Curriculum Development Timeline

School: Ocean Township High School

Course: Physics

Department: Science

Board Approval	Supervisor	Notes
July 2008	Patrick Sullivan	Born Date
January 2009	Patrick Sullivan	Revisions
August 2011	Patrick Sullivan	Revisions
July 2016	Patrick Sullivan	Revisions
March 2019	Patrick Sullivan	Review

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Pacing Guide			
Week	Marking Period 1-2	**Week**	Marking Period 3-4
1	Forces & Motion (Nature of Science)	11	Fundamental Forces
2	Forces & Motion (Language of Physics)	12	Fundamental Forces
3	Forces & Motion (Scalars/Vectors; 1-D Motion)	13	Circular Motion & Orbital Mechanics
4	Forces & Motion (Kinematics; 2-D Motion)	14	Energy
5	Forces & Motion (Free-Fall; Projectiles)	15	Energy
6	Forces & Motion (Newton's Laws)	16	Wave Properties
7	Forces & Motion (Newton's Laws)	17	Wave Properties
8	Forces & Motion (Friction)	18	EM Radiation
9	Forces & Motion (Momentum)	19	Electricity & Magnetism
10	Forces & Motion (Momentum)	20	Electricity & Magnetism

Core Instructional & Supplemental Materials including various levels of Texts

Physics: Principles with Applications - (Giancoli) - AP Physics 1 (Honors) & 2
Physics : Principles and Problems - (Glencoe) - Advanced Physics
Conceptual Physics (Hewitt) - College Prep Physics
Digital Resources Across All Levels: (D=differentiated)
Edpuzzle (D)
Gizmo (D)
Youtube videos
New York Times Articles
PhET Interactive Simulations (D)
Science News Articles

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Time Frame	10 weeks

Topic

Forces and Motion

Essential Questions

- What is the Language of Physics and what is the Nature of Science? Metric System? Powers of Ten? Unit Conversions? Scientific Method?
- What are scalars and vectors and how can they be incorporated to solve problems?
- How can motion be described and predicted mathematically/graphically in 1-D & 2-D?
- How can uniform and accelerated linear & projectile motion be described and analyzed?
- How are kinematic equations/graphs used to describe an object's motion?
- What is free-fall and what are the laws governing projectiles?
- What is force and how does it cause a change in motion?
- How can Newton's laws be utilized to describe an object's motion?
- How are free-body diagrams used and analyzed to explain motion?
- What are the differences between mass and weight?
- How are friction and the coefficient of friction important in our everyday lives?
- How do mass and velocity play a role in collisions?
- What is the Impulse-Momentum Theorem and how does the time over which a collision takes place affect the force applied?
- How is momentum conserved in interactions and collisions?
- What is an object's center of mass and how can it be determined?

Enduring Understandings

In this unit of study, students are expected to *plan and conduct investigations*, *analyze data and using math to support claims*, and *apply scientific ideas to solve design problems* students in order to develop an understanding of ideas related to why some objects keep moving and some objects fall to the ground. Students will also build an understanding of forces and Newton's second law. Finally, they will develop an understanding that the total momentum of a system of objects is conserved when there is no net force on the system.

Alignment to Standards

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HS-PS2-1, HS-PS2-2, HS-PS2-3, HS-ETS1-2, and HS-ETS1-3

Learning Activities & Key Concepts and Skills

Activities

- Introduction to Measurement lab
- Graphical Analysis of Motion lab
- Vector Scavenger Hunt
- Instantaneous Velocity lab
- Free fall lab (reaction time, hang time)
- Newton's Second Law lab (Atwood's machine)
- Friction & Coefficient of Friction Experiment
- Mass versus Weight lab
- Egg-Drop Activity (Momentum and Impulse)
- Collisions and Explosions lab (Conservation of Momentum)
- Center of Mass Activity

Concepts & Skills

- Perform dimensional analysis.
- Draw and use motion diagrams to describe motion.
- Differentiate between scalar and vector quantities.
- Define velocity and acceleration operationally.
- Interpret graphs of position, velocity, and acceleration as functions of time.
- Use kinematic equations to solve problems involving motion with constant velocity or constant acceleration, including free fall.
- Describe and apply Newton's 2nd Law of Motion and the relationship between force, mass, and acceleration.
- Describe the effect of air resistance on a falling object.
- State Newton's third law of motion, and identify action and reaction forces.
- Define momentum and impulse, and explain the impulse-momentum relationship.
- State the law of conservation of momentum.
- Analyze collisions using the law of conservation of momentum.

Assessments

Formative:

- Do Now / Warm-up: Kinematic equations, Newton's second law, Conservation of momentum
- Strategic Questioning
- Post Lab Analysis Questions

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Summative:

- Chapter Tests (Multiple Choice and Free Response)
- Chapter Quizzes (Free Response)

Benchmark:

- A pre and post test will be given to measure skills and knowledge with core course concepts.

Alternative:

- Students apply physics concepts and problem-solving techniques to solve problems involving free fall, mechanical equilibrium, and projectile motion and then test their solutions using lab equipment.
- Concept Builders from PhysicsClassroom.com: Kinematics, Newton's Laws, Vectors and Projectiles, Momentum and Collisions.

Career Education

- CRP-2 – Students use knowledge and skills through their lab work.
- CRP-12 – Students work productively in collaborative groups using culturally global competence.

21st Century Skills

- 9.3.ST-SM.2 Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
- 9.3.ST.2 Use technology to acquire, manipulate, analyze and report data.
- 9.3.ST-SM.3 Analyze the impact that science and mathematics has on society.

Interdisciplinary Connections

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- **LA.11-12.WHST.11-12.4** (Scientific Autobiography)
- **LA.11-12.RST.11-12.7** (Kinematics Lab Report Write-up: Tennis Ball Drop)
- **LA.11-12.WHST.11-12.7** (Bridge-Building Project)
- **LA.11-12.WHST.11-12.10** (Egg-Drop Activity)
- **RST.11-12.2. Determine the central ideas, themes, or conclusions of a text; summarize complex concepts, processes, or information presented in a text by paraphrasing them in simpler but still accurate terms.**
- **RST.11-12.4. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.**

Technology Integration

- TECH.8.1.12.F.CS3 - Students will use technology in the collection and analysis of data to identify solutions and/or make informed decisions.
- TECH.8.1.12.A.4 - Students will construct a spreadsheet workbook with multiple worksheets, rename tabs to reflect the data on the worksheet, and use mathematical or logical functions, charts and data from all worksheets to convey the results.
- TECH.8.1.12.C. – Students will use google docs to formulate and submit lab reports to google classroom.
- TECH.8.1.12.D.5 – Demonstrate personal responsibility for life-long learning by researching the internet to apply skills to new content.

Time Frame	2 weeks

Topic

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Fundamental Forces

Essential Questions

- How does Newton's Law of Universal Gravitation provide a mathematical model that will describe and predict the effects of the gravitational forces between objects?
- How does Coulomb's Law provide a mathematical model that will describe and predict the effects of electrostatic forces between objects?
- What is charge?
- How do objects accumulate charge?
- What are fields described as, and how are they used?
- What is the Inverse-Square Law?
- What are the strong and weak nuclear forces?

Enduring Understandings

In this unit of study, students plan and conduct investigations and apply scientific ideas to make sense of Newton's law of gravitation and Coulomb's Law. They apply these laws to describe and predict the gravitational and electrostatic forces between objects. The crosscutting concept of *patterns* is called out as an organizing concept for this disciplinary core idea.

Alignment To Standards

HS-PS2-4, HS-PS2-6

s**Learning Activities & Key Concepts and Skills**ls

Activities

- Gizmos: Coulomb's Law
- Electrostatics Lab
- Inertial Balance Lab
- Phet Gravity Simulated Lab

Concepts & Skills

- Describe the method Cavendish used to measure G and their results of knowing G.
- Describe gravitational fields.
- Distinguish between inertial mass and gravitational mass

- Contrast Newton's and Einstein's views about gravitation.
- There are fundamental forces in nature other than gravity.
- Protons and electrons can exert forces and transfer energy.
- Recognize that objects that are charged exert forces, both attractive and repulsive.
- Describe/explain conservation of charge.
- Describe the differences between conductors and insulators.
- Summarize the relationship between forces and charges.
- Describe how an electroscope detects electric charge.
- Explain how to charge by conduction and induction.
- Use Coulomb's law to solve problems relating to electrical force.
- Develop a model of how charged objects can attract a neutral object.
- Define and measure an electric field.
- Solve problems relating to charge, electric fields, and forces.
- Diagram electric field lines.
- Define and calculate electric potential difference

Assessments

Formative:

- Do Now / Warm-up: Gravitation, Coulomb's law
- Strategic Questioning
- Post Lab Analysis Questions

Summative:

- Chapter Tests (Multiple Choice and Free Response)
- Chapter Quizzes (Free Response)

Benchmark:

-

Alternative:

- Concept Builders from PhysicsClassroom.com: Newton's law of gravity, Name That Charge

sCareer Education

- CRP-2 – Students use knowledge and skills through their lab work.
- CRP-12 – Students work productively in collaborative groups using culturally global

competence.

21st Century Skills

- 9.3.ST-SM.2 Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
- 9.3.ST.2 Use technology to acquire, manipulate, analyze and report data.
- 9.3.ST-SM.3 Analyze the impact that science and mathematics has on society.

Interdisciplinary Connections Interdisciplinary Connections

- LA.11-12.WHST.11-12.2.B (Journal Entry: The Elegant Universe Part 1)

Technology Integration

- TECH.8.1.12.C. – Students will use google docs to formulate and submit lab reports to google classroom.
- TECH.8.1.12.D.5 – Demonstrate personal responsibility for life-long learning by researching the internet to apply skills to new content.

Time Frame	1 week

s**Topic**

Circular Motion & Orbital Mechanics

Essential Questions

- What is uniform circular motion?
- What are centripetal forces and centripetal accelerations?
- How can orbital motion be described mathematically?
- How can Newton's Universal Law of Gravitation and Kepler's Laws be applied to describe/predict motions of orbiting objects?

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Enduring Understandings
In this unit, students will develop an understanding of Kepler's laws, which describe common features of the motions of orbiting objects, including their elliptical paths around the sun. They will also learn how orbits may change due to the gravitational effect from, or collisions with, other objects in the solar system. They will also use algebraic thinking and mathematical and computational representations to examine data and predict the motion of orbiting objects, including moons in our solar system and human-made satellites.
Alignment To Standards
HS-ESS1-4
Learning Activities & Key Concepts and Skills
• Uniform Circular Motion Lab • Mercury Orbit Activity • Space Station Design Project • Relate Kepler's laws of planetary motion to Newton's law of universal gravitation. • Calculate the periods and speeds of orbiting objects. • Solve problems involving orbital speed and period.
s**Assessments**
Formative: • Do Now / Warm-up: Centripetal Acceleration, Speed of a Satellite, Kepler's Third Law • Strategic Questioning • Post Lab Analysis Questions **Summative:** • Chapter Tests (Multiple Choice and Free Response) • Chapter Quizzes (Free Response) **Benchmark:** • **Alternative:** • Concept Builders from PhysicsClassroom.com : Circular Logic, Case Studies in

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Circular Motion
Career Education
• CRP-2 – Students use knowledge and skills through their lab work. • CRP-12 – Students work productively in collaborative groups using culturally global competence.
s**21st Century Skills**
• 9.3.ST-SM.2 Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems. • 9.3.ST.2 Use technology to acquire, manipulate, analyze and report data. • 9.3.ST-SM.3 Analyze the impact that science and mathematics has on society.
Interdisciplinary Connections **Interdisciplinary Connections**l
• LA.11-12.WHST.11-12.1.D (Space Station Design Project) • LA.11-12.WHST.11-12.2.A (Historical Physicist/Space Scientist Project) • RST.11-12.5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
Technology Integration
• TECH.8.1.12.C. – Students will use google docs to formulate and submit lab reports to google classroom. • TECH.8.1.12.D.5 – Demonstrate personal responsibility for life-long learning by researching the internet to apply skills to new content. • TECH.8.1.12.A.4 - Perform orbital motion calculations using a spreadsheet.

Time Frame	2 weeks
i**Topic**	
Energy	

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sEssential Questions
• What are Work and Power and how are they related to everyday activities? • What is Energy and how is it transferred and conserved? • What is the Work-Energy Theorem and how can it be applied? • What are the types of Mechanical Energy and how are they described conceptually/mathematically/graphically? • How can Energy concepts be applied to describe and predict motion?
Enduring Understandings
Energy is understood as a quantitative property of a system that depends on the motion and interactions of matter, and the total change of energy in any system is equal to the total energy transferred into and out of the system.
Alignment To Standards
HS-PS3-2, HS-PS3-1, HS-PS3-3, HS-PS3-4, HS-ETS1-1, HS-ETS1-2, HS-ETS1-3, and HS-ETS1-4
Learning Activities & Key Concepts And Skills
Activities • Energy Transfer Lab (Marble on Incline Plane) • Energy Transfer Lab 2 (Swinging Pendulum) • Energy Transfer Lab 3 (Springs - Elastic Potential Energy) • Online Lab Simulation (Energy transfer during elastic/inelastic collisions) • Roller Coaster Design Project • Simple Machines Labs (Pulley & Ramp) **Concepts & Skills** • Describe the relationship between work and energy. • Display an ability to calculate work done by a force. • Differentiate between work and power and correctly calculate power used. • Demonstrate knowledge of why simple machines are useful. • Calculate the kinetic energy of a moving object. • Determine how to find the gravitational potential energy of a system. • Identify ways in which elastic potential energy is stored in a system. • Solve problems using the law of conservation of energy.

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Assessments
Formative: ● Do Now / Warm-up: Work & Power, Horsepower, Conservation of Energy ● Strategic Questioning ● Post Lab Analysis Questions ● Google Questions **Summative:** ● Chapter Tests (Multiple Choice and Free Response) ● Chapter Quizzes (Free Response) **Benchmark:** ● **Alternative:** ● Concept Builders from PhysicsClassroom.com : Energy Ranking Tasks, Energy Bar Charts
Career Education=
● CRP-2 – Students use knowledge and skills through their lab work. ● CRP-12 – Students work productively in collaborative groups using culturally global competence.
21st Century Skills
● 9.3.ST-SM.2 Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems. ● 9.3.ST.2 Use technology to acquire, manipulate, analyze and report data. ● 9.3.ST-SM.3 Analyze the impact that science and mathematics has on society.
Interdisciplinary Connections**Interdisciplinary Connections**
● LA.11-12.WHST.11-12.2.A (Conservation of Energy Project: Roller Coaster Design) ● LA.11-12.WHST.11-12.1.E (Conservation of Energy Lab: Swinging Pendulums) ● RST.11-12.6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.

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Technology Integration
e
• TECH.8.1.12.C. – Students will use google docs to formulate and submit lab reports to google classroom. • TECH.8.1.12.D.5 – Demonstrate personal responsibility for life-long learning by researching the internet to apply skills to new content.

Time Frame	2 weeks
Topic	
Wave Properties	
Essential Questions	
• What is a wave? • How are wave properties modeled conceptually/mathematically/graphically? • What is the relationship between wave velocity, frequency, and wavelength? • How are waves categorized and what types of waves are found in nature? • What is sound and how can the wave model be used to explain the properties of sound?	
Enduring Understandings	
Students apply their understanding of how wave properties can be used to transfer information across long distances, store information, and investigate nature on many scales. The crosscutting concept of *cause and effect* is highlighted as an organizing concept for these disciplinary core ideas. Students are expected to demonstrate proficiency in *using mathematical thinking*, and to use this practice to demonstrate understanding of the core idea.	
Alignment To Standards	
HS-PS4-1	

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Learning Activities & Key Concepts And Skills

Activities

- Period of a simple pendulum lab
- Wave on a string lab
- Speed of sound lab

Concepts & Skills

- Identify how waves transfer energy without transferring matter.
- Compare/Contrast transverse and longitudinal waves.
- Relate wave speed, wavelength, and frequency.
- Describe reflection, diffraction, and superposition properties of waves.
- Demonstrate knowledge of the nature of sound waves and the properties sound shares with other waves.
- Solve problems relating the frequency, wavelength and velocity of sound.
- Define the Doppler shift and identify some of its applications.
- Demonstrate an understanding of resonance, especially as applied to air columns.
- Explain why there is a variation among instruments and among voices using the terms timbre, resonance, fundamental and harmonic.
- Determine why beats occur.

Assessments

Formative:

- Do Now / Warm-up: Work & Power, Horsepower, Conservation of Energy
- Strategic Questioning
- Post Lab Analysis Questions

Summative:

- Chapter Tests (Multiple Choice and Free Response)
- Chapter Quizes (Free Response)

Benchmark:

-

Alternative:

- Waves & Sound Presentation Project

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Career Education
• CRP-2 – Students use knowledge and skills through their lab work. • CRP-12 – Students work productively in collaborative groups using culturally global competence.
21st Century Skills (CTE)
• 9.3.12.ED.2 Demonstrate effective oral, written and multimedia communication in multiple formats and contexts. (*Waves & Sound Project*) • 9.3.12.ED.5 Demonstrate group collaboration skills to enhance professional education and training practice. (*Waves & Sound Project*) • 9.3.ST.2 Use technology to acquire, manipulate, analyze and report data. (*Waves & Sound Project*) • 9.3.ST.4 Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy. (*Waves & Sound Project*)
Interdisciplinary ConnectionsIn**Interdisciplinary Connections**
• LA.11-12.WHST.11-12.2.A (Waves & Sound Project) • LA.11-12.WHST.11-12.2.E (Resonance Lab) • RST.11-12.8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information
Technology Integration
• TECH.8.1.12.A-1 – Students will use google slides to synthesize and present information for the Waves & Sound presentation project. • TECH.8.1.12.C. – Students will use google docs to formulate and submit lab reports to google classroom. • TECH.8.1.12.D.5 – Demonstrate personal responsibility for life-long learning by researching the internet to apply skills to new content.

Time Frame	1 week

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Topic
Electromagnetic Radiation
sEssential Questions
• How and why do we see what we see? • What categories is the electromagnetic spectrum broken up into, and what are the properties of these categories? • How are light waves used to transfer energy and send and store information? • What are the physical properties of light? • How is the electromagnetic spectrum used to learn more about the universe? • What is optics? What are ray diagrams? • How can Snell's Law of Refraction be described mathematically/conceptually and how can it be applied to describe real-world phenomena?
Enduring Understandings
Students are able to apply their understanding of wave properties to make sense of how electromagnetic radiation can be used to transfer information across long distances, store information, and be used to investigate nature on many scales. Models of electromagnetic radiation as both a wave of changing electrical and magnetic fields or as particles are developed and used. Students also demonstrate their understanding of engineering ideas by presenting information about how technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. The crosscutting concepts of *systems and system models*; *stability and change*; *interdependence of science*, *engineering, and technology; and influence of engineering, technology, and science on society and the natural world* are highlighted as organizing concepts.
Alignment To Standards
HS-PS4-3, HS-PS4-4, HS-PS4-5, HS-ETS1-1, HS-ETS1-3, and HS-PS4-2, HS-ESS1-1, HS-ESS1-2, HS-ESS1-3, HS-ESS1-4
Learning Activities & Key Concepts And Skills
Activities • Ray tracing lab (plane mirror)

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- Refraction of Light/Speed of Light in Glass lab
- Converging lens lab
- Index of Refraction for Water/Unknown Liquids

Concepts & Skills

- Trace and define the historical development of light.
- Describe how the speed of light is measured.
- Identify the source of all light relative to electromagnetic radiation.
- Calculate speeds, frequencies, and velocities of light waves.
- Explain the particle-wave duality model of light.

Assessments

Formative:

- Do Now/Warm-Ups: frequency, wavelength, and energy ranking tasks.
- Strategic Questioning
- Post-Lab Analysis Questions

Summative:

- Chapter Tests (Multiple Choice and Free Response)
- Chapter Quizzes (Free Response)

Benchmark:

-

Alternative:

- Light & Optics Presentation Project
- SETI Assignment

Career Education

- CRP-2 – Students use knowledge and skills through their lab work.
- CRP-12 – Students work productively in collaborative groups using culturally global competence.

21st Century Skills (CTE)

- 9.3.12.ED.2 Demonstrate effective oral, written and multimedia communication in

multiple formats and contexts. (*Light & Optics Project*)

- 9.3.12.ED.5 Demonstrate group collaboration skills to enhance professional education and training practice. (*Light & Optics Project*)
- 9.3.ST.2 Use technology to acquire, manipulate, analyze and report data. (*Light & Optics Project*)
- 9.3.ST.4 Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy. (*Light & Optics Project*)

Interdisciplinary Connections

- LA.11-12.RH.11-12.3 (SETI Research Project)
- LA.11-12.WHST.11-12.9 (Light and Optics Project)

Technology Integration

- TECH.8.1.12.A-1 – Students will use google slides to synthesize and present information for the Light & Optics presentation project.
- TECH.8.1.12.C. – Students will use google docs to formulate and submit lab reports to google classroom.
- TECH.8.1.12.D.5 – Demonstrate personal responsibility for life-long learning by researching the internet to apply skills to new content.

Time Frame	2 weeks

Topic

Electricity and Magnetism

Essential Questions

- What is current?
- How do magnets or electric currents cause magnetic fields?
- How do electric charges or changing magnetic fields cause electric fields?
- What are the properties and components of electric circuits?
- What is the relationship between voltage, current, and resistance?
- How can energy be transmitted by electric currents?

- What are the properties of magnets and magnetic fields?
- What phenomena in nature and in modern-day technologies can be described with magnetism concepts?

sEnduring Understandings

Students' understanding of how forces at a distance can be explained by fields, why some materials are attracted to each other while other are not, how magnets or electric currents cause magnetic fields, and how charges or changing magnetic fields cause electric fields. Students are expected to understand how current electricity is created and how to build and describe the physical properties of simple circuits. The crosscutting concept of cause and effect is called out as an organizing concept. Students are expected to demonstrate proficiency in planning and conducting investigations and developing and using models.

Alignment To Standards

HS-PS2-5 and HS-PS3-5

Learning Activities & Key Concepts And Skills

Activities

- Series & Parallel Circuit Lab
- Lemon Battery Lab
- Magnetic Observation Activity
- Build an Electromagnet Activity

Concepts and Skills

- Define the electric current and the ampere.
- Describe conditions that create current in an electric circuit.
- Draw circuits and recognize they are closed loops.
- Define resistance and describe Ohm's law.
- Describe both a series connection and a parallel connection and state the important characteristics of each.
- Calculate current, voltage drops, and equivalent resistance for devices connected in series and in parallel.

Assessments

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Formative:

- Do Now/Warm-Ups : Circuit Diagrams, Magnetic Force Lines
- Strategic Questioning
- Google Questions

Summative:

- Chapter Tests (Multiple Choice and Free Response)
- Chapter Quizzes (Free Response)

Benchmark:

-

Alternative:

- Lemon Battery Project
- Electromagnet Project

Career Education

- CRP-2 – Students use knowledge and skills through their lab work.
- CRP-12 – Students work productively in collaborative groups using culturally global competence.

21st Century Skills

- 9.3.ST-SM.2 Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.
- 9.3.ST.2 Use technology to acquire, manipulate, analyze and report data.
- 9.3.ST-SM.3 Analyze the impact that science and mathematics has on society.

Interdisciplinary Connections**Interdisciplinary Connections**

- LA.11-12.RH.11-12.9 (Electricity Essay)
- LA.11-12.WHST.11-12.1.A (Lemon Battery Activity)
- RST.11-12.9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- RST.11-12.10. By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

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Technology Integration
• TECH.8.1.12.C. – Students will use google docs to formulate and submit lab reports to google classroom. • TECH.8.1.12.D.5 – Demonstrate personal responsibility for life-long learning by researching the internet to apply skills to new content.

Modifications (ELL, Special Education, At-Risk Students, Gifted & Talented, & 504 Plans)
ELL: • Work toward longer passages as skills in English increase • Use visuals • Introduce key vocabulary before lesson • Teacher models reading aloud daily • Provide peer tutoring • Use of Bilingual Dictionary • Guided notes and/or scaffold outline for written assignments • Provide students with English Learner leveled readers. ***Supports for Students With IEPs***: • Allow extra time to complete assignments or tests • Guided notes and/or scaffold outline for written assignments • Work in a small group • Allow answers to be given orally or dictated • Use large print books, Braille, or books on CD (digital text) • Follow all IEP modifications ***At-Risk Students***: • Guided notes and/or scaffold outline for written assignments • Introduce key vocabulary before lesson • Work in a small group • Lesson taught again using a differentiated approach • Allow answers to be given orally or dictated • Use visuals / Anchor Charts • Leveled texts according to ability

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Gifted and Talented:

- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Organize and offer flexible small group learning activities
- Provide whole group enrichment explorations
- Teach cognitive and methodological skills
- Use center, stations, or contracts
- Organize integrated problem-solving simulations
- Propose interest-based extension activities
- Expose students to beyond level texts.

Supports for Students With 504 Plans:

- Follow all the 504 plan modifications
- Text to speech/audio recorded selections
- Amplification system as needed
- Leveled texts according to ability
- Fine motor skill stations embedded in rotation as needed
- Modified or constrained spelling word lists
- Provide anchor charts with high frequency words and phonemic patterns