

Hesperia Community Schools
Course: Physical Science
Grade Level: 9th Grade

Timeline	HSCE's/ GLCE's and CCSS	Content—the "WHAT" of teaching. Specific themes, units & topics.	Essential Skills: the "Important Details/Essential Questions" you are teaching (How & essential of What)	Content Vocabulary	Assessment: the products & performances of learning	Resources
<p>Unit: Introduction to Physics A</p> <p># of Weeks: on going</p> <p>Physical Science, Holt © 2008 Reference: CH 1</p>	<p>P1.1A: Generate new questions that can be investigated in the laboratory or field.</p> <p>P1.1B: Evaluate the uncertainties or validity of scientific conclusions using an understanding of sources of measurement error, the challenges of controlling variables, accuracy of data analysis, logic of argument, logic of experimental design, and/or the dependence on underlying assumptions.</p> <p>P1.1C: Conduct scientific investigations using appropriate tools and techniques (e.g., selecting an instrument that measures the desired quantity—length, volume, weight, time interval, temperature—with the appropriate level of precision).</p> <p>P1.1D: Identify patterns in data and relate them to theoretical models.</p> <p>P1.1E: Describe a reason for a given conclusion using evidence from an investigation.</p> <p>P1.1f: Predict what would happen if the</p>	<ul style="list-style-type: none"> • The Nature of Science (Section 1) • The Way Science Works (Section 2) • Organizing Data (Section 3) 	<ul style="list-style-type: none"> • How Science Takes Place (CH 1, Sect. 1) • The Branches of Science (CH 1, Sect. 1) • Scientific Laws & Theories (CH 1, Sect. 1) • Science Skills (CH 1, Sect. 2) • Units of Measurement (CH 1, Sect. 2) • Presenting Scientific Data (CH 1, Sect.3) • Writing Numbers in Scientific Notation (CH 1, Sect. 3) • Using Significant Figures (CH 1, Sect. 3) 	<p>Scientific notation, significant figures, graphic, accuracy, precision, dimensional analysis</p>	<p>"Who Am I?" Pie Performance Assessment</p> <p>Wildlife Refuge (Conversions) Activity</p> <p>Conversion Quiz</p>	<p>Accuracy vs. Precision Illustration</p> <p>Accuracy vs. Precision Demo</p> <p>BrainPop: Science 1. Accuracy vs. Precision 2. Science Projects 3. Scientific Notation</p> <p>Sig Fig Notes</p> <p>Sig Fig Calculation Website Practice</p> <p>Sig Fig Around-the-Room- Problems</p> <p>Conversion Notes</p> <p>Daily Life Organizer (Pie Chart by hand and Excel)</p>

Hesperia Community Schools

	<p>variables, methods, or timing of an investigation were changed.</p> <p>P1.1g: Based on empirical evidence, explain and critique the reasoning used to draw a scientific conclusion or explanation.</p> <p>P1.1h: Design and conduct a systematic scientific investigation that tests a hypothesis. Draw conclusions from data presented in charts or tables.</p> <p>P1.2B: Identify and critique arguments about personal or societal issues based on scientific evidence.</p> <p>P1.2C: Develop an understanding of a scientific concept by accessing information from multiple sources. Evaluate the scientific accuracy and significance of the information.</p> <p>P1.2f: Critique solutions to problems, given criteria and scientific constraints.</p> <p>P1.2g: Identify scientific tradeoffs in design decisions and choose among alternative solutions.</p> <p>NOTE: The HSCE's above will not only be incorporated in the initial "Introduction" Unit but will also be addressed throughout multiple other units.</p>					
<p>Unit: Motion</p>	<p>P3.1A: Identify the force(s) acting between objects in</p>	<ul style="list-style-type: none"> Measuring Motion (CH 11, Section 1) 	<ul style="list-style-type: none"> Observing Motion (CH 11, Sect. 1) Speed & Velocity 	<p>Motion, frame of reference, speed, velocity,</p>	<p>Calculating the Speed of Falling</p>	<p>CH 10-1 Guided Reading Packet</p>

Hesperia Community Schools

<p>& Forces</p> <p>Weeks: 2 – 5</p> <p>Physical Science, Holt © 2008 Reference: CH 11 & 12</p>	<p>“direct contact” or at a distance.</p> <p>P3.2A: Identify the magnitude and direction of everyday forces (e.g., wind, tension in ropes, pushes and pulls, weight).</p> <p>P3.2C: Calculate the net force acting on an object.</p> <p>P3.2d: Calculate all the forces on an object on an inclined plane and describe the object’s motion based on the forces using free-body diagrams.</p> <p>P3.3A: Identify the action and reaction force from examples of forces in everyday situations (e.g., book on a table, walking across the floor, pushing open a door).</p> <p>P3.3b: Predict how the change in velocity of a small mass compares to the change in velocity of a large mass when the objects interact (e.g., collide).</p> <p>P3.4A: Predict the change in motion of an object acted on by several forces.</p> <p>P3.4B: Identify forces acting on objects moving with constant velocity (e.g., cars on a highway).</p> <p>P3.4C: Solve problems involving force, mass, and acceleration in linear motion (Newton’s second law).</p> <p>P3.4D: Identify the</p>	<ul style="list-style-type: none"> • Accelerations (CH 11, Section 2) • Motion & Force (CH 11, Section 3) • Newton’s First & Second Laws (CH 12, Section 1) • Gravity (CH 12, Section 2) • Newton’s Third Law (CH 12, Section 3) 	<ul style="list-style-type: none"> • (CH 11, Sect. 1) • Calculating Speed (CH 11, Sect. 1) • Graphic Motion (CH 11, Sect. 1) • Acceleration & Motion (CH 11, Sect. 2) • Calculating Acceleration (CH 11, Sect. 2) • Graphic Accelerated Motion (CH 11, Sect. 2) • Fundamental Forces (CH 11, Sect. 2) • Balanced & Unbalanced Forces (CH 11, Sect. 3) • The Force of Friction (CH 11, Sect. 3) • Friction & Motion (CH 11, Sect. 3) • Newton’s 1st Law (CH 12, Sect. 1) • Newton’s 2nd Law (CH 12, Sect. 1) • Weight & Mass (CH 12, Sect. 2) • Law of Universal Gravitation (CH 12, Sect. 2) • Free Fall (CH 12, Sect. 2) • Projectile Motion (CH 12, Sect. 2) • Action & Reaction Forces (CH 12, Sect. 3) • Momentum (CH 12, Sect. 3) • Conservation of Momentum (CH 12, Sect. 3) 	<p>acceleration, displacement, force, friction, inertia, weight, free fall, terminal velocity, projectile motion, momentum</p>	<p>Dominos Lab</p> <p>Graphing Your Motion (Probeware) Lab</p> <p>CH 11 Test: Motion</p> <p>CH 11 & 12 Test: Force</p> <p>Graph Matching Performance Assessment</p>	<p>Observing Motion Demo</p> <p>Speed WS</p> <p>CH 11-1 Guided Reading Packet</p> <p>The Story About a Girl & Her Dog Writing Response</p> <p>Velocity A/B Problems</p> <p>ESPN Video: Tracking Speed</p> <p>Acceleration Demo (walking 1 ft/s, 1ft/s/s, -1 ft/s/s)</p> <p>Acceleration Notes</p> <p>Acceleration WS</p> <p>Acceleration A/B Problems</p> <p>BrainPoP Video: 1. Gravity, 2. Newton’s Laws of Motion, 3. Force</p> <p>Projectile Motion Demo (2 pennies)</p> <p>Accelerated Motion Notes</p> <p>Inertia Demos</p> <p>Newton’s Laws of Motion Notes</p> <p>Modern Marvels Video: Satellites</p> <p>Momentum Notes</p> <p>Momentum A/B Problems</p> <p>Newton’s Cradle Demo</p> <p>Bill Nye Video: Momentum</p>
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Hesperia Community Schools

	<p>force(s) acting on objects moving with uniform circular motion (e.g., a car on a circular track, satellites in orbit).</p> <p>P3.5a: Apply conservation of momentum to solve simple collision problems.</p> <p>P3.6B: Predict how the gravitational force between objects changes when the distance between them changes.</p> <p>P3.6C: Explain how your weight on Earth could be different from your weight on another planet.</p>					
<p>Unit: Work, Power & Machines</p> <p>Weeks: 6 – 8</p> <p>Physical Science, Holt © 2008 Reference: CH 13</p>	<p>P3.2B: Compare work done in different situations.</p> <p>P4.1d: Calculate the amount of work done on an object that is moved from one position to another.</p> <p>P4.1e: Using the formula for work, derive a formula for change in potential energy of an object lifted a distance h.</p> <p>P4.2A: Account for and represent energy transfer and transformation in complex processes (interactions).</p> <p>P4.2C: Explain how energy is conserved in common systems (e.g., light incident on a transparent material, light incident on a leaf, mechanical energy in a collision).</p> <p>P4.2f: Identify and label the energy inputs, transformations, and</p>	<ul style="list-style-type: none"> • Work, Power & Machines (Section 1) • Simple Machines (Section 2) • What is Energy? (Section 3) • Conservation of Energy (Section 4) 	<ul style="list-style-type: none"> • What is Work? (CH 13, Sect. 1) • Power (CH 13, Sect. 1) • Machines & Mechanical Advantage (CH 13, Sect. 1) • What Are Simple Machines? (CH 13, Sect. 2) • The Lever Family (CH 13, Sect. 2) • The Inclined Plane Family (CH 13, Sect. 2) • Compound Machines (CH 13, Sect. 2) • Energy & Work (CH 13, Sect. 2) • Potential Energy (CH 13, Sect. 2) • Kinetic Energy (CH 13, Sect. 2) • Other Forms of Energy (CH 13, Sect. 2) • Energy Transformations (CH 13, Sect. 3) • The Law of Conservation of Energy (CH 13, Sect. 3) • Efficiency of Machines (CH 13, 	<p>Work, power, simple machines, compound machine, mechanical advantage, energy, potential energy, kinetic energy, mechanical energy, efficiency, conservation of energy</p>	<p>Stair Climbing (Power) Lab</p> <p>Work, Power, & Simple Machines Quiz</p> <p>CH 13 Unit Test: Work, Power, Machines</p>	<p>Work/Power Notes</p> <p>Work/Power WS</p> <p>Simple Machines Concept Map</p> <p>“Pop the Balloon” Activity</p> <p>Compound Pulley Demo</p> <p>M.A. Notes</p> <p>Using Machines WS</p> <p>Storing Energy Demo w/ Bball (pg 453)</p> <p>BrainPoP: 1. Forms of Energy, 2. Kinetic Energy, 3. Potential Energy</p> <p>Energy Transfer Demo (pg 445)</p>

Hesperia Community Schools

	<p>outputs using qualitative or quantitative representations in simple technological systems (e.g., toaster, motor, hair dryer) to show energy conservation.</p> <p>P4.3A: Identify the form of energy in given situations (e.g., moving objects, stretched springs, rocks on cliffs, energy in food).</p> <p>P4.3B: Describe the transformation between potential and kinetic energy in simple mechanical systems (e.g., pendulums, roller coasters, ski lifts).</p> <p>P4.3C: Explain why all mechanical systems require an external energy source to maintain their motion.</p>		Sect. 3)			
<p>Unit: Waves, Sound & Light</p> <p>Weeks: 9 – 12</p> <p>Physical Science, Holt © 2008</p> <p>Reference: CH 15 & 16</p>	<p>P4.4A: Describe specific mechanical waves (e.g., on a demonstration spring, on the ocean) in terms of wavelength, amplitude, frequency, and speed.</p> <p>P4.4B: Identify everyday examples of transverse and compression (longitudinal) waves.</p> <p>P4.4C: Compare and contrast transverse and compression (longitudinal) waves in terms of wavelength, amplitude, and frequency.</p> <p>P4.4e: Calculate the amount of energy transferred by transverse or compression waves</p>	<ul style="list-style-type: none"> • Types of Waves (CH 15, Section 1) • Characteristics of Waves (CH 15, Section 2) • Wave Interactions (CH 15, Section 3) • Sound (CH 16, Section 1) • The Nature of Light (CH 16, Section 2) • Reflection & Color (CH 16, Section 3) • Refraction, Lenses & Prisms (CH 16, Section 4) 	<ul style="list-style-type: none"> • What is a Wave? (CH 15, Sect. 1) • Vibrations & Waves (CH 15, Sect. 1) • Transverse & Longitudinal Waves (CH 15, Sect. 1) • Surface Waves (CH 15, Sect. 1) • Wave Properties (CH 15, Sect. 2) • Wave Speed (CH 15, Sect. 2) • The Doppler Effect (CH 15, Sect. 2) • Reflection, Diffraction, & Refraction (CH 15, Sect. 3) • Interference (CH 15, Sect. 3) • Standing Waves (CH 15, Sect. 3) • Properties of Sound (CH 16, Sect. 1) • Musical 	<p>Medium, mechanical wave, electromagnetic wave, transverse wave, longitudinal wave, crest, trough, amplitude, wavelength, period, frequency, wave velocity, Doppler effective, refraction, diffraction, refraction, interference, constructive interference, destructive interference, standing wave.</p> <p>Sound wave, pitch, infrasound, ultrasound, resonance, sonar, photon, intensity, radar, light ray, virtual image, real image, lens, magnification, prism, dispersion.</p>	<p>Wave Quiz</p> <p>CH 15 & 16 Unit Test: Waves, Sound & Light</p>	<p>Wave Characteristics WS</p> <p>ESPN Video: Waves</p> <p>Slinky Demo</p> <p>BrainPoP Video: Waves</p> <p>Tooth Tunes Demo</p> <p>Standing Wave Demo</p> <p>Wave A/B Problems</p> <p>Ghost Crystals Demo</p> <p>“Donut” Resonance Demo w/ string & washers</p> <p>CH 16 Vocab Wheels, Section 1 and 2</p> <p>Reflection & Refraction Demo (pg 526)</p> <p>Electromagnetic Spectrum Drawing</p>

Hesperia Community Schools

of different amplitudes and frequencies (e.g., seismic waves).

P4.5C: Provide evidence to support the claim that sound is energy transferred by a wave, not energy transferred by particles.

P4.5E: Explain why everyone in a classroom can hear one person speaking, but why an amplification system is often used in the rear of a large concert auditorium.

P4.6D: Explain why we see a distant event before we hear it (e.g., lightning before thunder, exploding fireworks before the boom).

P4.6f: Explain how radio waves are modified to send information in radio and television programs, radio-control cars, cell phone conversations, and GPS systems.

P4.8A: Draw ray diagrams to indicate how light reflects off objects or refracts into transparent media.

P4.8B: Predict the path of reflected light from flat, curved, or rough surfaces (e.g., flat and curved mirrors, painted walls, paper).

P4.8c: Describe how two wave pulses propagated from opposite ends of a demonstration spring interact as they meet.

- Instruments (CH 16, Sect. 1)
- Hearing and the Ear (CH 16, Sect. 1)
 - Ultrasound & Sonar (CH 16, Sect. 1)
 - Waves & Particles (CH 16, Sect. 2)
 - The Electromagnetic Spectrum (CH 16, Sect. 2)
 - Reflection of Light (CH 16, Sect. 3)
 - Mirrors (CH 16, Sect. 3)
 - Seeing Colors (CH 16, Sect. 3)
 - Refraction of Light (CH 16, Sect. 4)
 - Lenses (CH 16, Sect. 4)
 - Dispersion & Prisms (CH 16, Sect. 4)

Optics of Mirrors/Lenses Notes

Ray Diagram Model

Polarizing Filters Demo

Waves, Light & Sound Search & Rescue

MindPoint Quiz Review Game

Hesperia Community Schools

	<p>P4.9A: Identify the principle involved when you see a transparent object (e.g., straw, a piece of glass) in a clear liquid.</p> <p>P4.9B: Explain how various materials reflect, absorb, or transmit light in different ways</p> <p>P4.9C: Explain why the image of the Sun appears reddish at sunrise and sunset.</p>					
<p>Unit: Electricity & Magnetism</p> <p>Weeks: 13 – 15</p> <p>Physical Science, Holt © 2008 Reference: CH 17 & 18</p>	<p>P3.7A: Predict how the electric force between charged objects varies when the distance between them and/or the magnitude of charges change.</p> <p>P3.7B: Explain why acquiring a large excess static charge (e.g., pulling off a wool cap, touching a Van de Graaff generator, combing) affects your hair.</p> <p>P3.7e: Explain why an attractive force results from bringing a charged object near a neutral object.</p> <p>P3.8b: Explain how the interaction of electric and magnetic forces is the basis for electric motors, generators, and the production of electromagnetic waves.</p> <p>P3.p8A: Create a representation of magnetic field lines around a bar magnet and qualitatively describe how the relative strength and direction of the magnetic force changes at various</p>	<ul style="list-style-type: none"> • Electric Charge and Force (CH 17, Section 1) • Current (CH 17, Section 2) • Circuits (CH 17, Section 3) • Magnets & Magnetic Fields (CH 18, Section 1) • Magnetism (CH 18, Section 2) • Electric Currents from Magnetism (CH 18, Section 3) 	<ul style="list-style-type: none"> • Electric Charge (CH 17, Sect. 1) • Transfer of Electric Charge (CH 17, Sect. 1) • Electric Force (CH 17, Sect. 1) • Voltage & Current (CH 17, Sect. 2) • Electrical Resistance (CH 17, Sect. 2) • What are Circuits? (CH 17, Sect. 3) • Series & Parallel Circuits (CH 17, Sect. 3) • Electrical Energy & Power (CH 17, Sect. 3) • Fuses & Circuit Breakers (CH 17, Sect. 3) • Magnets (CH 18, Sect. 1) • Magnetic Fields (CH 18, Sect. 1) • Earth's Magnetic Field (CH 18, Sect. 1) • Electromagnetism (CH 18, Sect. 2) • Electromagnetic Devices (CH 18, Sect. 2) • Electromagnetic Induction (CH 18, Sect. 3) • The Electromagnetic Force (CH 18, Sect. 3) 	<p>Electrical charge, electrical conductor, electrical insulator, electric force, electric field, electrical potential energy, potential difference, cell, electrical current, electrical resistance, electric circuit, schematic diagram, series circuit, parallel circuit, electric power, fuse, circuit breaker</p> <p>Magnetic pole, magnetic field, solenoid, electromagnet, electric motor, galvanometer, electromagnetic induction, generator, alternating current, transformer</p>	<p>Open/Short Circuit Lab</p> <p>Electricity Quiz</p> <p>CH 17 & 18 Unit Test: Electricity & Magnetism</p>	<p>Move and Empty Pop Can Demo (w/ a balloon and static electricity)</p> <p>Vandegraaf Generator Demo</p> <p>Electric Current Notes</p> <p>Tesla Coil Demo</p> <p>BrainPoP: 1. Static Electricity, 2. Electric Current, 3. Electromagnets, 4. Batteries, 5. Circuits</p> <p>Electric Current WS</p> <p>Lemon Cell Battery Demo</p> <p>Understanding Electricity Video and WS</p> <p>Fuses & Circuit Breakers Demo</p> <p>“Up in the Air” Demo</p> <p>3–D Magnetic Fields Demo w/ Cow Magnet</p> <p>Characteristics of Magnets WS</p>

Hesperia Community Schools

	<p>places in the field. (prerequisite)</p> <p>P4.10A: Describe the energy transformations when electrical energy is produced and transferred to homes and businesses.</p> <p>P4.10C: Given diagrams of many different possible connections of electric circuit elements, identify complete circuits, open circuits, and short circuits and explain the reasons for the classification.</p> <p>P4.10D: Discriminate between voltage, resistance, and current as they apply to an electric circuit.</p> <p>P4.10g: Compare the currents, voltages, and power in parallel and series circuits.</p>		<ul style="list-style-type: none"> Transformers (CH 18, Sect. 3) 			
<p>Unit: Heat & Temperature</p> <p>Weeks: 16 – 18</p> <p>Physical Science, Holt © 2008 Reference: CH 14</p>	<p>P4.11a: Calculate the energy lost to surroundings when water in a home water heater is heated from room temperature to the temperature necessary to use in a dishwasher, given the efficiency of the home hot water heater.</p> <p>P4.1A: Account for and represent energy into and out of systems using energy transfer diagrams.</p> <p>P4.1B: Explain instances of energy transfer by waves and objects in everyday activities (e.g., why the ground gets warm during the day, how you hear a distant sound, why it</p>	<ul style="list-style-type: none"> Temperature (CH 14, Section 1) Energy Transfer (CH 14, Section 2) Using Heat (CH 14, Section 3) 	<ul style="list-style-type: none"> Temperature & Energy (CH 14, Sect. 1) Temperature Scales (CH 14, Sect. 1) Relating Temperature to Energy Transfer (CH 14, Sect. 1) Methods of Energy Transfer (CH 14, Sect. 2) Conductors & Insulators (CH 14, Sect. 2) Specific Heat (CH 14, Sect. 2) 	<p>Heat, temperature, thermometer, absolute zero, thermal conduction, convection, convection current, radiation, specific heat</p>	<p>Convection Current Lab</p> <p>CH 14 Unit Test: Heat & Temperature</p>	<p>Sensing Hot and Cold Activity</p> <p>Bimetal Strip Demo</p> <p>Ball and Ring Demo</p> <p>Convection/Conduction WS</p> <p>Robots Video & Simple Machines WS</p> <p>Heat Capacity & Titanic Video</p> <p>Exploding Hydrogen Bubbles Activity</p> <p>Around-the-Room Problems</p>

Hesperia Community Schools

	hurts when you are hit by a baseball).					
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