



<i>Timeline -></i>	<u><i>Quarter Three (12 lessons)</i></u>
<p>Guiding Questions</p>	<p><u>Science:</u> What are atoms composed of? How do charges of the particles in an atom “balance”? How is static electricity produced?</p> <p><u>Language Arts:</u> What can we learn about atoms and static electricity by reading? How can we write to show the steps we have used in the scientific method? How can adjectives help our written science descriptions?</p> <p><u>Math:</u> How can Venn diagrams help sort items that are the same or different? How is a bar graph drawn to show totals with provided data? What conclusions can we draw from the data portrayed by the graph? How can we use mathematics processes to solve problems? How are ratios used to solve problems?</p> <p><u>Art:</u> How can we draw/illustrate and label sketches for a science notebook? How can we create 3-D models to showcase different atomic models?</p>
<p>General Learner Outcomes</p>	<p><u>GLO#1: Self-Directed Learner:</u> Students will use a variety of resources to develop an understanding of the components of atoms, the characteristics of atomic particles and static electricity.</p> <p><u>GLO#2: Community Contributor:</u> Students will share their resources to conduct various activities related to atoms and electric charges.</p> <p><u>GLO#3: Complex Thinker:</u> Students will use their problem solving, math and writing skills to investigate the characteristics of atoms, atomic particles and static electricity.</p> <p><u>GLO#5: Effective Communicator:</u> Students will listen, discuss and record information from their different lessons through oral, written and math pieces that illustrate concepts they have learned about. Students will orally share with younger students their final products.</p>



Assessments	<p>Formative and summative textbook assessments. Constructed response (math, language arts, science) that is based on the unit ideas and concepts</p> <p>A summative product rubric will be used to assess the final science poster/diorama/model that each student produces.</p> <p>The rubric criteria will include assessment of the presentation of concepts learned, as well as the written and drawn presentation quality. Oral communication of final project</p>
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Standards and Benchmarks

Big Idea(s) / Major Understanding(s): *Students will understand that...*

Atoms are the building blocks of matter and make up all elements, therefore all substances.

All objects and substances are made of matter.

Matter has distinguishing properties.

Materials may be combined to form new substances.

Electrical devices (e.g., radio, TV, lamp) attached to a circuit enable the electrical energy to travel through and produce light or sound.

Technological advances are influenced by the basic circuit and chemical changes that occur to make life easier and safer. Force can set an object in motion, change the speed and/or direction it's moving in, or change the shape of an object.

HCPS III Benchmarks:

◇ 4.1.1 Scientific Inquiry

Describe a testable hypothesis and an experimental procedure

◇ 4.1.2 Scientific Knowledge

Differentiate between an observation and an inference

◇ 4.2.1 Science, Technology, and Society

Describe how the use of technology has influenced the economy, demography, and environment of Hawaii

· 4.6.1 Nature of Matter

Describe how some materials may be combined to form new substances

· 6.6.6 Nature of Matter

Describe and compare the physical and chemical properties of different substances

· 4.6.2 Energy and its Transformation

Explain what is needed for electricity to flow in a circuit to create light and sound

· 6.6.9 Nature of Matter

Describe matter using the atomic model



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WORKING DRAFT COHORT I & II

Ka'ūmana, EB DeSilva, Kapiolani, Kalaniana'ole, and Ha'aheo Elementary Schools

Content Area: Interdisciplinary/Science

Grade Level: 4

Sample Performance Rubrics

Topic	Scientific Inquiry		
Benchmark SC.4.1.1	Describe a testable hypothesis and an experimental procedure		
Sample Performance Assessment (SPA)	The student: Describes a testable hypothesis (e.g., if, then, because statement) and an experimental procedure to test it.		
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Create a testable hypothesis and an experimental procedure to test it	Describe a testable hypothesis and an experimental procedure	Identify, with assistance, a testable hypothesis and an experimental procedure	Recognize, with assistance, a testable hypothesis or an experimental procedure

Topic	Scientific Knowledge		
Benchmark SC.4.1.2	Differentiate between an observation and an inference		
Sample Performance Assessment (SPA)	The student: Observes an object or situation and makes an inference from the observation, describing how they differ		
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Explain the difference between an observation and an inference and give examples	Differentiate between an observation and an inference	Provide examples of observations and inferences	Define an observation and an inference

Topic	Science, Technology, and Society		
Benchmark SC.4.2.1	Describe how the use of technology has influenced the economy, demography, and environment of Hawaii		
Sample Performance Assessment (SPA)	The student: Describes how a specific technology (e.g., farming, manufacturing, or communication) has influenced the economy, demography, and environment of Hawaii and describes a plan to improve the conditions in the natural environment.		
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Explain how the use of technology has influenced the economy, demography, and environment of Hawaii and suggest ways to conserve the environment	Describe how the use of technology has influenced the economy, demography, and environment of Hawaii	Give examples of how the use of technology has influenced the economy, demography, and environment of Hawaii	Recognize that the use of technology has influenced the economy, demography, and environment of Hawaii

Topic	Nature of Matter		
Benchmark SC.4.6.1	Describe how some materials may be combined to form new substances		
Sample Performance Assessment (SPA)	The student: Describes and gives examples of new substances formed by mixing different materials (e.g., vinegar and baking soda produce a gas when mixed together).		
Advanced	Proficient	Partially Proficient	Novice
Predict the new substances that will be formed when some materials are combined	Describe how some materials may be combined to form new substances	Provide examples of how some materials may be combined to form new substances	Recognize that some materials may be combined to form new substances



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Topic	Energy and its Transformation		
Benchmark SC.4.6.2	Explain what is needed for electricity to flow in a circuit to create light and sound		
Sample Performance Assessment (SPA)	The student: Explains and constructs an open and closed circuit (e.g., using batteries, bulbs, buzzers, and wires)		
Rubric			
Advanced	Proficient	Partially Proficient	Novice
Explain why a conductor, a closed circuit, and a power source are needed for electricity to flow in a circuit	Explain what is needed for electricity to flow in a circuit to create light and sound	List the materials needed for electricity to flow in a circuit	Recognize that electricity flows through a circuit

Lessons Summary

Lesson Title	What students will be able to know, do & understand
Harcourt Text Chapter 10: Matter and Its Properties	Lesson 1: How Can Physical Properties Be Used to Identify Matter Lesson 2: How Does Matter Change States? Lesson 3: What are Mixtures & Solutions?
Chapter 11: Changes in Matter	Lesson 1: What is Matter Made of? Lesson 2: What are Physical Changes in Matter? Lesson 3: How Does Matter React Chemically?
AIMS	Product Testing – Determining the “Best” Formula for Glubber (several days but MAJOR connection for inquiry skills AND chemical change)
Atoms	Model of the parts of an atom (proton, neutron, electron) Instead of marshmallows, could use cereal or beads but need 3 different colors and two different sizes. Key points: the nucleus of the atom contains the protons and neutrons (big parts) and thus the Atomic MASS of the atom is because of the nucleus. <ul style="list-style-type: none"> electrons are very small and in the “shells” on the outside of the nucleus. IF the atom has a “balanced” amount of electrons in the outermost ring, electrons basically don’t want to move anywhere else. HOWEVER, if the amount of electrons in the outmost ring are not balanced (odd amount), they will want to move to become balanced. (combine or free electrons move – static elec.) END OF Lesson – Use Connected learning questions and have students record responses/wonderings in their science notebook.
Video OPTIONAL or use right before HSA	Show: Magic School Bus Gets Charged (can be downloaded from www.discoveryeducation.com - check which download type under the thumbnail)
Static Electricity (Rubber Band Book)	Put together the booklet - read together as a class Good precursor to the Static Strokes lesson OPTIONAL Part I – use balloons to reinforce the conversation about what is happening with like and unlike charges (opposite charges attract – like charges repel) Also try



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Different Strokes	<p>moving a thin stream of water with the charged balloon.</p> <p>Part II: Hand out the Static Stokes experiment log sheet – have students predict (two different types of Styrofoam, size matters, chemical composition)</p> <p>Vocabulary: saltation (leaping or jumping – geology: bouncing movements of particles due to air/wind, biology: jump in evolutionary development due to genetic mutation)</p> <p>END with the connected learning questions in science notebook</p>
Static Extensions	Optional – water idea – static electricity pulls thin stream of water
Balance Your Charge Account OPTIONAL	Start with key question and learning goals – move to describing the rules of the game, then have students cut out their negative charges. Make a paper clip spinner and play game
HARCOURT TEXT	Chapter 14 PRETEST
Lightning and Lightning Sequencing OPTIONAL	Use this one – reading and then organize the sequence cards – good review or intro to lightning.
St. Elmo's Fire (Rubber Band Book) OPTIONAL	St. Elmo's fire video – check out Discovery ED and Science.HowStuffWorks.com
Nature's Light & Sound Show OPTIONAL	Optional but important to reinforce lighting flash (light) travels faster than sound...
HARCOURT TEXT Chapter 14	Lesson 1
AIMS – Sparky's Light Kit	Use the TRANSPARENCY IS44 – Record Data as a formative assessment Then do “sparky's” Pinner notes on light bulb and flow of energy through and out of a battery and light bulb
ELECTRICITY INQUIRY LESSON	Go over the first page of the lesson together as a class, then the students develop their experiment, conduct and record (COLLEEN PAU – HILO UNION).
AIMS	Path Finders – OPTIONAL use if you don't do the inquiry lesson above
Video OPTIONAL or use right before HSA	Show: Magic School Bus Gets A Bright Idea (can be downloaded from www.discoveryeducation.com - check which download type under the thumbnail)
Conductors & Insulators	Use simple items to let students explore what will and will not conduct electricity – students then make generalizations about characteristics of electricity (wire covered/insulated, need to touch the metal part, plastic doesn't conduct)



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	If students get an item that lights the bulb weakly, they have a “semi-conductor” which can conduct a weak current of electricity (bulb will be very dim)
AIMS	Electric Circuits (series/parallel circuits) – OPTIONAL USE ONLY IF YOU DID NOT DO THE INQUIRY LESSON ABOVE start with the idea of using the one battery and one bulb to make sure they work and then add in a second bulb and battery. Finish with the third bulb (which may be really dim)
Lesson 3	What are some Sources of Electricity
Lesson 4	How Do People Use Energy Resources
Harcourt TEXT	Chapter 14 – post test