



2008-2009
Correlation Documentation

California

Released 8-20-2008

Welcome to OdysseyWare®!

We are excited that you are including OdysseyWare as part of your program of instruction, and we look forward to serving you and your students.

This OdysseyWare Correlation Report provides a quick-reference overview of our course materials, together with corresponding state standards. The report may be helpful in planning instruction using OdysseyWare course materials.

As always, we welcome your feedback.

Thanks for choosing us!

OdysseyWare Curriculum Development Team

Using the Correlation Report

The Correlation Report lists OdysseyWare lessons that target your state standards and has been formatted for ease of use.

Section	Description	OW Lesson ID	Title
State:	MA		
Subject:	Science and Technology/Engineering		
Standard:	Curriculum Frameworks		
Grade:	3-5		
SCT.3-5.1.1	Give a simple explanation of what a mineral is and some examples, e.g., quartz, mica.	SCI05U06C01L03D SCI05U08C01L06D	Igneous Structures Rocks on the Earth's Surface

- 1 Displays the state, subject, standard, and grade.
- 2 Displays the state index code for a particular lesson. Each state assigns its own index code.
- 3 Displays the actual verbiage from the state standards document
- 4 Displays the corresponding OdysseyWare lesson identification code. This unique ID number indicates the following:

Subject and Grade	Unit	Chapter	Lesson	Type
SCI05	U06	C01	L03	D (default lesson) A (alternate assignment)

- 5 Displays the OdysseyWare lesson title.

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Correlations Report



Section	Description	OW Lesson ID	Title
State:	CA		
Subject:	Science		
Standard:	Content Standards for CAPA and Star CAPA Blueprints		
Grade:	K-3		
SCI.K-3.LS.1.2b.1	Identify animals.	SCI03U03C01P05D SCI03U03C04P14D	Project: Aquarium Project: Marsupials
SCI.K-3.LS.1.2b.2	Identify plants.	SCI03U02C03L07D	Plant Changes
SCI.K-3.LS.1.2b.3	Sort animals from plants.	SCI03U03C04P14D	Project: Marsupials
SCI.K-3.LS.K.2.c.2	Identify animal body parts.	SCI03U03C01P05D SCI03U03C02L07D SCI03U03C02L09D SCI03U03C04P14D SCI03U10C01L03D	Project: Aquarium Amphibians Birds Project: Marsupials Animals
Standard:	Content Standards		
Grade:	3		
SCI.3.ES.4.a	Students know the patterns of stars stay the same, although they appear to move across the sky nightly, and different stars can be seen in different seasons.	SCI03U07C02L08D SCI03U10C02L07D	Why Seasons Change Seasons and Times
SCI.3.ES.4.c	Students know telescopes magnify the appearance of some distant objects in the sky, including the Moon and the planets. The number of stars that can be seen through telescopes is dramatically greater than the number that can	SCI03U07C01P04D	Experiment: Rotation

Section	Description	OW Lesson ID	Title
SCI.3.ES.4.c	be seen by the unaided eye.		Experiment: Rotation
SCI.3.ES.4.e	Students know the position of the Sun in the sky changes during the course of the day and from season to season.	SCI03U07C02L08D	Why Seasons Change
		SCI03U10C02L07D	Seasons and Times
SCI.3.IE.5.b	Differentiate evidence from opinion and know that scientists do not rely on claims or conclusions unless they are backed by observations that can be confirmed.	SCI07U01C01L01D	What is Science?
SCI.3.IE.5.d	Predict the outcome of a simple investigation and compare the result with the prediction.	SCI03U01C02P06D	Experiment: Taste Test
		SCI03U02C03P08A1	Experiment: Plant a Piece of Potato
		SCI03U02C03P08A2	Experiment: Bean Plant
		SCI03U02C03P08D	Experiment: Watch the Seeds Grow
		SCI03U03C01P03D	Project: Metamorphosis
		SCI03U06C01P02D	Experiment: Vibrations
		SCI03U06C01P05D	Experiment: Sound Patterns
		SCI07U01C01L01D	What is Science?
SCI.3.IE.5.e	Collect data in an investigation and analyze those data to develop a logical conclusion.	SCI03U03C02P10D	Project: Vertebrates
		SCI03U06C01P07D	Experiment: Pitch
		SCI03U09C01P03D	Experiment: Water Molecules
		SCI03U10C03P10D	Experiment: How Sound Travels
		SCI03U10C03P11D	Experiment: Temperature Comparisons
SCI.3.LS.3.a	Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.	SCI03U02C02L04D	Plant Growth
		SCI03U02C03L07D	Plant Changes
		SCI03U03C02L07D	Amphibians
		SCI03U03C02L09D	Birds

Section	Description	OW Lesson ID	Title
SCI.3.PS.1.a	Students know energy comes from the Sun to Earth in the form of light.	SCI03U09C02L09D	Electricity and the Sun
		SCI03U09C03L12D	Problems with Heat Energy
		SCI03U10C03L09D	Sounds and Energy
SCI.3.PS.1.b	Students know sources of stored energy take many forms, such as food, fuel, and batteries.	SCI03U04C01L01D	Healthy Foods
		SCI03U04C01L02D	Unhealthy Foods
SCI.3.PS.1.c	Students know machines and living things convert stored energy to motion and heat.	SCI03U09C01L02D	Movement of Heat Energy
SCI.3.PS.1.d	Students know energy can be carried from one place to another by waves, such as water waves and sound waves, by electric current, and by moving objects.	SCI03U06C01L04D	Properties of Sound
		SCI03U06C01P05D	Experiment: Sound Patterns
		SCI03U10C03L09D	Sounds and Energy
		SCI03U10C03P10D	Experiment: How Sound Travels
SCI.3.PS.1.e	Students know matter has three forms: solid, liquid, and gas.	SCI03U05C01P04A1	Experiment: Is Air Matter?
		SCI03U05C01P04A2	Project: Matter
		SCI03U09C01P04D	Experiment: Changing Liquid to a Gas
SCI.3.PS.1.g	Students know that when two or more substances are combined, a new substance may be formed with properties that are different from those of the original materials.	SCI03U05C01P02D	Experiment: Be a Chemist
		SCI03U05C01P04A3	Experiment: Is Water Matter?
		SCI03U05C02L06D	Physical Changes
		SCI03U05C02P07A	Experiment: Melting Ice Cubes
SCI.3.PS.1.i	Students know people once thought that earth, wind, fire, and water were the basic elements that made up all matter.	SCI07U02C01L02D	Elements

Section	Description	OW Lesson ID	Title
SCI.3.PS.1.i	Science experiments show that there are more than 100 different types of atoms, which are presented on the periodic table of the elements.		Elements
SCI.3.PS.2.b	Students know light is reflected from mirrors and other surfaces.	SCI03U09C01L02D	Movement of Heat Energy
Grade: 4			
SCI.4.ES.5.a	Students know some changes in the earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.	SCI04U09C03L12D	Earth's Land Formations
SCI.4.IE.6.a	Differentiate observation from inference (interpretation) and know scientists' explanations come partly from what they observe and partly from how they interpret their observations.	SCI04U03C02P13A	Experiment: Still Water Life
		SCI04U04C01P02A1	Project: Galileo
		SCI04U05C01P07D	Project: Fuses
		SCI07U01C01L01D	What is Science?
SCI.4.IE.6.b	Measure and estimate the weight, length, or volume of objects.	SCI04U06C01P02A	Experiment: Ice Volume
		SCI04U06C01P04A	Experiment: Potato
		SCI04U06C02L10D	Matter
SCI.4.IE.6.f	Follow a set of written instructions for a scientific investigation.	SCI07U01C01L01D	What is Science?
SCI.4.LS.2.a	Students know plants are the primary source of matter and energy entering most food chains.	SCI04U03C01L04D	Ecosystem Communities
		SCI04U03C01L07D	Food Chain
SCI.4.LS.2.b	Students know producers and consumers (herbivores, carnivores, omnivores, and decomposers) are related in food	SCI04U03C01L04D	Ecosystem Communities

Section	Description	OW Lesson ID	Title
SCI.4.LS.2.b	chains and food webs and may compete with each other for resources in an ecosystem.		Ecosystem Communities
		SCI04U03C01L05D	Consumers
		SCI04U03C01L06D	Decomposers
		SCI04U03C01L07D	Food Chain
SCI.4.LS.2.c	Students know decomposers, including many fungi, insects, and microorganisms, recycle matter from dead plants and animals.	SCI04U02C01P03D	Project: Insects
		SCI04U03C01L04D	Ecosystem Communities
		SCI04U03C01L06D	Decomposers
SCI.4.LS.3.a	Students know ecosystems can be characterized by their living and nonliving components.	SCI04U03C01L03D	Resources
SCI.4.LS.3.c	Students know many plants depend on animals for pollination and seed dispersal, and animals depend on plants for food and shelter.	SCI04U03C01L09D	Balance of Nature
		SCI04U03C02L12D	Water Communities
SCI.4.LS.3.d	Students know that most microorganisms do not cause disease and that many are beneficial.	SCI04U03C01L06D	Decomposers
SCI.4.PS.1.b	Students know how to build a simple compass and use it to detect magnetic effects, including Earth's magnetic field.	SCI04U05C02P11A2	Experiment: Testing a Magnet
		SCI04U10C03L09D	Electricity and Magnetism
SCI.4.PS.1.c	Students know electric currents produce magnetic fields and know how to build a simple electromagnet.	SCI04U05C01L06D	Electrical Use and Safety
		SCI04U05C02P11A3	Experiment: Generate Electricity
		SCI04U05C02P11A4	Experiment: Electromagnet
		SCI04U10C03L09D	Electricity and Magnetism
SCI.4.PS.1.d	Students know the role of electromagnets in the construction	SCI04U05C02P11A4	Experiment: Electromagnet

Section	Description	OW Lesson ID	Title
SCI.4.PS.1.d	of electric motors, electric generators, and simple devices, such as doorbells and earphones.		Experiment: Electromagnet
SCI.4.PS.1.f	Students know that magnets have two poles (north and south) and that like poles repel each other while unlike poles attract each other.	SCI04U05C02L09D	Magnetism
		SCI04U05C02P11A1	Experiment: Magnetic Poles
		SCI04U05C02P11A2	Experiment: Testing a Magnet
		SCI04U05C02P11D	Experiment: Make a Magnet
		SCI04U10C03L09D	Electricity and Magnetism

Standard: Content Standards for CAPA and Star CAPA Blueprints

Grade: 4-5

SCI.4-5.ES.4.4a.1	Know properties of various rocks (e.g., color, shiny, dull, rough, smooth).	SCI05U08C01L09D	Identifying Rocks
		SCI05U08C01P10A1	Project: Rocks and Minerals
		SCI05U08C01P10A2	Project: Go on a Rock Hunt
		SCI05U10C02L12D	The Earth: Records of Rock
SCI.4-5.ES.5.3c.1	Know that water vapor can form fog or clouds.	SCI04U06C01L07D	The Water Cycle
		SCI04U06C01P08D	Experiment: Make a Cloud
		SCI04U09C01L03D	Gases in the Atmosphere
SCI.4-5.ES.5.3d.1	Know where fresh water is located (e.g., rivers, lakes).	SCI04U03C02L12D	Water Communities
		SCI05U06C02L09D	Oceans
SCI.4-5.ES.5.5a.1	Know that the Sun produces heat and light.	SCI04U08C02L05D	The Sun
		SCI04U08C02L07D	Gravity and Motion
SCI.4-5.IE.4.6a.1	Make inferences based on observations.	SCI04U03C02P13A	Experiment: Still Water Life

Section	Description	OW Lesson ID	Title
		SCI04U04C01P02A1	Project: Galileo
		SCI04U05C01P07D	Project: Fuses
		SCI05U01C02P06A2	Experiment: Onion Cells
		SCI05U02C01P03A1	Project: Draw Flowers
		SCI05U07C02L12D	Reading Fossils: Difficulties
		SCI05U07C02L14D	Reading Fossils: Reconstruction
		SCI05U07C02P13A	Project: Fossil Clues
		SCI05U08C01P03A	Experiment: Orange
		SCI07U01C01L01D	What is Science?
SCI.4-5.IE.4.6d.1	Repeat observations to improve accuracy.	SCI04U03C02P13A	Experiment: Still Water Life
		SCI04U05C01P07D	Project: Fuses
		SCI05U01C02P06A2	Experiment: Onion Cells
		SCI07U01C01L01D	What is Science?
SCI.4-5.IE.4.6d.2	Predict the outcome of a simple investigation.	SCI07U01C01L01D	What is Science?
SCI.4-5.IE.5.6f.1	Select appropriate tools (e.g., ruler, scale, measuring cup) and make quantitative observations.	SCI04U03C02P13A	Experiment: Still Water Life
		SCI04U05C01P07D	Project: Fuses
		SCI05U01C02P06A2	Experiment: Onion Cells
		SCI05U07C01P02A	Experiment: Cast Fossil
		SCI05U08C01P03A	Experiment: Orange
SCI.4-5.LS.4.2b.1	Know that plants (producers) are a source of food.	SCI04U03C01L04D	Ecosystem Communities
		SCI04U10C01L02D	Plants and Animals
		SCI05U04C01L06D	Balance of Nature: Dependence
		SCI05U04C02L09D	The Prairie Web of Life
		SCI05U10C01L08D	Living Things: Balance of Life

Section	Description	OW Lesson ID	Title
SCI.4-5.LS.4.2b.2	Know that animals (consumers) eat plants and other animals for food.	SCI03U03C04P14D	Project: Marsupials
		SCI04U03C01L04D	Ecosystem Communities
		SCI04U03C01L05D	Consumers
		SCI04U03C01L09D	Balance of Nature
		SCI04U03C02L12D	Water Communities
		SCI04U10C01L02D	Plants and Animals
		SCI05U04C01L06D	Balance of Nature: Dependence
		SCI05U04C02L11D	The Prairie Web of Life (Part 2)
		SCI05U10C01L08D	Living Things: Balance of Life
		SCI05U10C01P07A	Project: Organism Report
SCI.4-5.LS.4.3b.1	Know that animals inhabit and can survive in different kinds of environments.	SCI03U03C04P14D	Project: Marsupials
		SCI04U10C01L02D	Plants and Animals
		SCI05U10C01P07A	Project: Organism Report
SCI.4-5.LS.4.3c.1	Know that animals use plants for shelter.	SCI03U03C04P14D	Project: Marsupials
		SCI04U01C01L02D	Plants: Food and Shelter
		SCI04U10C01L02D	Plants and Animals
		SCI05U10C01P07A	Project: Organism Report
SCI.4-5.LS.5.2b.2	Know that oxygen is inhaled and carbon dioxide is exhaled.	SCI04U06C02L13D	Elements
SCI.4-5.PS.4.1f.1	Know that some objects are attracted to magnets.	SCI04U05C02L09D	Magnetism
		SCI04U05C02P10D	Experiment: Use a Magnet
		SCI04U05C02P11A2	Experiment: Testing a Magnet
		SCI04U05C02P11D	Experiment: Make a Magnet
		SCI04U10C03L09D	Electricity and Magnetism

Section	Description	OW Lesson ID	Title
SCI.4-5.PS.5.1c.1	Know that metals conduct heat.	SCI05U05C02L05D	Work From Energy
SCI.4-5.PS.5.1g.1	Know properties of matter: solid, liquid, gas.	SCI04U06C01L03D	Water as a Liquid
		SCI04U06C02L10D	Matter
		SCI04U10C02L04D	Matter
		SCI05U09C01L01D	Matter: Properties of Matter
		SCI05U09C01P05A1	Experiment: Water Container
		SCI05U10C03L19D	Order: Matter

Standard: Content Standards

Grade: 5

SCI.5.ES.3.d	Students know that the amount of fresh water located in rivers, lakes, under-ground sources, and glaciers is limited and that its availability can be extended by recycling and decreasing the use of water.	SCI05U06C02L08D	Erosion and Sediment
		SCI05U06C02L09D	Oceans
SCI.5.ES.4.b	Students know the influence that the ocean has on the weather and the role that the water cycle plays in weather patterns.	SCI05U09C02L16D	Other Natural Cycles: Water Cycle
SCI.5.ES.5.b	Students know the solar system includes the planet Earth, the Moon, the Sun, eight other planets and their satellites, and smaller objects, such as asteroids and comets.	SCI05U09C02L13D	Other Natural Cycles: Comets
		SCI05U09C02L14D	Other Natural Cycles: Comets (part 2)
SCI.5.IE.6.a	Classify objects (e.g., rocks, plants, leaves) in accordance with appropriate criteria.	SCI05U08C01P10A1	Project: Rocks and Minerals
		SCI05U08C01P10A2	Project: Go on a Rock Hunt

Section	Description	OW Lesson ID	Title
SCI.5.IE.6.e	Identify a single independent variable in a scientific investigation and explain how this variable can be used to collect information to answer a question about the results of the experiment.	SCI05U01C02P06A1	Experiment: Beans
		SCI05U04C01P07A2	Project: Build a Terrarium
		SCI05U05C04P17A2	Experiment: Sunlight
		SCI05U07C02L16D	Scientific Inquiry
SCI.5.IE.6.g	Record data by using appropriate graphic representations (including charts, graphs, and labeled diagrams) and make inferences based on those data.	SCI05U07C02L12D	Reading Fossils: Difficulties
		SCI05U07C02L14D	Reading Fossils: Reconstruction
		SCI05U07C02P13A	Project: Fossil Clues
		SCI05U07C02P15A1	Project: Label the Skeleton
SCI.5.IE.6.i	Write a report of an investigation that includes conducting tests, collecting data or examining evidence, and drawing conclusions.	SCI05U01C02P06A1	Experiment: Beans
		SCI05U01C02P11A2	Essay: Explain Cells
		SCI05U01C03P15A2	Experiment: Stem
		SCI05U02C01P05A1	Experiment: Cones
		SCI05U02C02P09A	Project: Walking Fern
		SCI05U02C02P11A1	Experiment: Mold
		SCI05U02C02P11A2	Project: Uses of Fungi
		SCI05U03C01P03A	Report: Protozoa
		SCI05U03C01P05A1	Experiment: Mealworm
		SCI05U03C01P05A3	Report: Insect Study
		SCI05U03C02P12A	Experiment: Chicken Egg
		SCI05U05C02P07A1	Experiment: Paperclip
		SCI05U05C02P07A2	Experiment: Heat Energy
		SCI05U05C02P09A	Experiment: Chemical Energy
SCI05U05C04P17A2	Experiment: Sunlight		

Section	Description	OW Lesson ID	Title
		SCI05U06C01P04A	Essay: Volcanic Eruptions
		SCI05U08C02P14A	Experiment: Erosion
		SCI05U09C01P03D	Experiment: Volume
		SCI05U09C01P05A1	Experiment: Water Container
		SCI05U09C01P08A1	Experiment: Conservation of Matter
		SCI05U09C02P17A	Experiment: Evaporation
		SCI05U10C01P05A	Project: Organs and Tissues
		SCI07U01C01L01D	What is Science?
SCI.5.LS.2.a	Students know many multicellular organisms have specialized structures to support the transport of materials.	SCI05U01C02L08D	Structure and Function of Cells: Animals
SCI.5.LS.2.e	Students know how sugar, water, and minerals are transported in a vascular plant.	SCI05U02C02L08D	Spore Bearing Plants: Ferns
SCI.5.LS.2.f	Students know plants use carbon dioxide (CO ₂) and energy from sunlight to build molecules of sugar and release oxygen.	SCI05U01C03L13D	Energy of Cells
SCI.5.LS.2.g	Students know plant and animal cells break down sugar to obtain energy, a process resulting in carbon dioxide (CO ₂) and water (respiration).	SCI05U01C03L13D	Energy of Cells
SCI.5.PS.1.d	Students know that each element is made of one kind of atom and that the elements are organized in the periodic table by their chemical properties.	SCI07U02C01L02D	Elements
SCI.5.PS.1.g	Students know properties of solid, liquid, and gaseous substances, such as sugar (C ₆ H ₁₂ O ₆), water (H ₂ O), helium (He), oxygen (O ₂), nitrogen (N ₂), and carbon dioxide (CO ₂).	SCI05U09C01L01D	Matter: Properties of Matter
		SCI05U10C03L19D	Order: Matter
SCI.5.PS.1.h	Students know living organisms and most materials are composed of just a few elements.	SCI07U02C01L02D	Elements

Section	Description	OW Lesson ID	Title
Grade: 6			
SCI.6.ES.1.a	Students know evidence of plate tectonics is derived from the fit of the continents; the location of earthquakes, volcanoes, and midocean ridges; and the distribution of fossils, rock types, and ancient climatic zones.	SCI06U08C01L03D	Earth's Surface
SCI.6.ES.1.b	Students know Earth is composed of several layers: a cold, brittle lithosphere; a hot, convecting mantle; and a dense, metallic core.	SCI06U08C01L03D	Earth's Surface
SCI.6.ES.1.e	Students know major geologic events, such as earthquakes, volcanic eruptions, and mountain building, result from plate motions.	SCI06U08C01L03D	Earth's Surface
SCI.6.ES.1.f	Students know how to explain major features of California geology (including mountains, faults, volcanoes) in terms of plate tectonics.	SCI06U08C01L03D	Earth's Surface
SCI.6.ES.3.a	Students know energy can be carried from one place to another by heat flow or by waves, including water, light and sound waves, or by moving objects.	SCI06U09C02L08D	Energy Conversion
SCI.6.ES.3.b	Students know that when fuel is consumed, most of the energy released becomes heat energy.	SCI06U09C02L08D	Energy Conversion
SCI.6.ES.3.c	Students know heat flows in solids by conduction (which involves no flow of matter) and in fluids by conduction and by convection (which involves flow of matter).	SCI06U09C01L02D	Heat Energy (Part 1)
		SCI06U09C01L03D	Heat Energy (Part 2)
SCI.6.ES.3.d	Students know heat energy is also transferred between objects by radiation (radiation can travel through space).	SCI06U06C01L02D	Atmospheric Layers
		SCI06U09C01L02D	Heat Energy (Part 1)
		SCI06U09C01L03D	Heat Energy (Part 2)

Section	Description	OW Lesson ID	Title
SCI.6.ES.4.a	Students know the sun is the major source of energy for phenomena on Earth's surface; it powers winds, ocean currents, and the water cycle.	SCI06U06C02L08D	Water Cycle
SCI.6.ES.4.b	Students know solar energy reaches Earth through radiation, mostly in the form of visible light.	SCI06U06C01L02D	Atmospheric Layers
		SCI06U09C01L02D	Heat Energy (Part 1)
SCI.6.ES.4.c	Students know heat from Earth's interior reaches the surface primarily through convection.	SCI06U09C01L02D	Heat Energy (Part 1)
		SCI06U09C01L03D	Heat Energy (Part 2)
SCI.6.ES.5.a	Students know energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis and then from organism to organism through food webs.	SCI06U01C01L01D	Photosynthesis
		SCI06U01C01L03D	The Leaf Factory
		SCI06U01C01P02D	Experiment: Anacharis
		SCI06U03C03L14D	Nature: Balance
		SCI06U06C01L02D	Atmospheric Layers
SCI.6.ES.5.d	Students know different kinds of organisms may play similar ecological roles in similar biomes.	SCI06U10C01L01D	Photosynthesis
		SCI06U03C03L11D	Nature: Biomes (Part 1)
		SCI06U10C02L09D	Ecological Systems
SCI.6.ES.6.b	Students know different natural energy and material resources, including air, soil, rocks, minerals, petroleum, fresh water, wildlife, and forests, and know how to classify them as renewable or nonrenewable.	SCI06U10C02P10A	Project: Biomes
		SCI06U03C03L11D	Nature: Biomes (Part 1)
SCI.6.ESIE.7.b	Select and use appropriate tools and technology (including calculators, computers, balances, spring scales, microscopes, and binoculars) to perform tests, collect data,	SCI06U03C01P06D	Experiment: Trial and Error

Section	Description	OW Lesson ID	Title
SCI.6.ESIE.7.b	and display data.	SCI06U07C01P04D	Experiment: Trial and Error Experiment: Work
SCI.6.ESIE.7.d	Communicate the steps and results from an investigation in written reports and oral presentations.	SCI06U05C03P16A	Project: Cause and Effect
Grade: 7			
SCI.7.LS.1.b	Students know the characteristics that distinguish plant cells from animal cells, including chloroplasts and cell walls.	SCI07U04C01L03D SCI07U04C01L04D SCI07U04C04L17D	Animal Organelles Plant Organelles Review
SCI.7.LS.1.c	Students know the nucleus is the repository for genetic information in plant and animal cells.	SCI07U04C01L03D SCI07U04C01L04D SCI07U04C04L17D SCI07U06C01L01D SCI07U06C02L06D	Animal Organelles Plant Organelles Review Genetic Basics Mendelian Genetics
SCI.7.LS.1.d	Students know that mitochondria liberate energy for the work that cells do and that chloroplasts capture sunlight energy for photosynthesis.	SCI07U04C01L03D SCI07U04C01L04D	Animal Organelles Plant Organelles
SCI.7.LS.1.e	Students know cells divide to increase their numbers through a process of mitosis, which results in two daughter cells with identical sets of chromosomes.	SCI07U06C01L01D SCI07U06C01L03D SCI07U06C04L17D	Genetic Basics Asexual Reproduction Review
SCI.7.LS.1.f	Students know that as multicellular organisms develop, their cells differentiate.	SCI07U04C01L01D SCI07U04C01L02D	Living Organisms Cells

Section	Description	OW Lesson ID	Title
		SCI07U04C04L17D	Review
SCI.7.LS.2.a	Students know the differences between the life cycles and reproduction methods of sexual and asexual organisms.	SCI07U04C04L17D	Review
		SCI07U06C01L03D	Asexual Reproduction
		SCI07U06C01L04D	Sexual Reproduction
		SCI07U06C04L17D	Review
SCI.7.LS.2.b	Students know sexual reproduction produces offspring that inherit half their genes from each parent.	SCI07U04C04L17D	Review
		SCI07U06C01L01D	Genetic Basics
		SCI07U06C01L04D	Sexual Reproduction
		SCI07U06C04L17D	Review
SCI.7.LS.2.c	Students know an inherited trait can be determined by one or more genes.	SCI07U06C01L01D	Genetic Basics
		SCI07U06C02L09D	Patterns of Inheritance
		SCI07U06C04L17D	Review
SCI.7.LS.2.d	Students know plant and animal cells contain many thousands of different genes and typically have two copies of every gene. The two copies (or alleles) of the gene may or may not be identical, and one may be dominant in determining the phenotype while the other is recessive.	SCI07U04C01L03D	Animal Organelles
		SCI07U04C01L04D	Plant Organelles
		SCI07U04C04L17D	Review
		SCI07U06C01L01D	Genetic Basics
		SCI07U06C02L06D	Mendelian Genetics
		SCI07U06C02L09D	Patterns of Inheritance
		SCI07U06C04L17D	Review
SCI.7.LS.2.e	Students know DNA (deoxyribonucleic acid) is the genetic material of living organisms and is located in the	SCI07U06C01L01D	Genetic Basics

Section	Description	OW Lesson ID	Title
SCI.7.LS.2.e	chromosomes of each cell.		Genetic Basics
		SCI07U06C03L14D	Forensic DNA
		SCI07U06C03P15D	Project: Solve the Case
		SCI07U06C04L17D	Review
SCI.7.LS.3.a	Students know both genetic variation and environmental factors are causes of evolution and diversity of organisms.	SCI07U10C01L01D	Evolution
		SCI07U10C01L02D	Evidence of Evolution
		SCI07U10C04L17D	Review
SCI.7.LS.3.b	Students know the reasoning used by Charles Darwin in reaching his conclusion that natural selection is the mechanism of evolution.	SCI07U10C01L01D	Evolution
		SCI07U10C01L02D	Evidence of Evolution
		SCI07U10C02L07D	Other Methods of Evolution
		SCI07U10C02P08D	Project: Natural Selection
		SCI07U10C04L17D	Review
SCI.7.LS.3.c	Students know how independent lines of evidence from geology, fossils, and comparative anatomy provide the bases for the theory of evolution.	SCI07U10C01L01D	Evolution
		SCI07U10C01L02D	Evidence of Evolution
		SCI07U10C04L17D	Review
SCI.7.LS.3.d	Students know how to construct a simple branching diagram to classify living groups of organisms by shared derived characteristics and how to expand the diagram to include fossil organisms.	SCI07U10C01L02D	Evidence of Evolution
SCI.7.LS.3.e	Students know that extinction of a species occurs when the environment changes and that the adaptive characteristics of a species are insufficient for its survival.	SCI07U04C01L01D	Living Organisms
		SCI07U04C04L17D	Review

Section	Description	OW Lesson ID	Title
		SCI07U10C01L04D	Mutation
		SCI07U10C02L09D	Extinction
		SCI07U10C04L17D	Review
SCI.7.LS.4.c	Students know that the rock cycle includes the formation of new sediment and rocks and that rocks are often found in layers, with the oldest generally on the bottom.	SCI07U08C01L03D	The Rock Cycle
		SCI07U08C01P04D	Project: The Rock Cycle
SCI.7.LS.4.e	Students know fossils provide evidence of how life and environmental conditions have changed.	SCI07U08C03L16D	Fossils
		SCI07U08C04L18D	Review
		SCI07U10C01L02D	Evidence of Evolution
SCI.7.LS.4.g	Students know how to explain significant developments and extinctions of plant and animal life on the geologic time scale.	SCI07U10C02L09D	Extinction
		SCI07U10C04L17D	Review
SCI.7.LS.5.a	Students know plants and animals have levels of organization for structure and function, including cells, tissues, organs, organ systems, and the whole organism.	SCI07U04C02L07D	Plant Tissue
		SCI07U04C02L08D	Animal Tissue
		SCI07U04C02L09D	Organs
		SCI07U04C03L12D	Organ Systems (Part 1)
		SCI07U04C04L17D	Review
SCI.7.LS.5.b	Students know organ systems function because of the contributions of individual organs, tissues, and cells. The failure of any part can affect the entire system.	SCI07U04C02L08D	Animal Tissue
		SCI07U04C02L09D	Organs
		SCI07U04C03L12D	Organ Systems (Part 1)
		SCI07U04C03P14D	Project: Systems

Section	Description	OW Lesson ID	Title
		SCI07U04C04L17D	Review
SCI.7.LS.5.d	Students know how the reproductive organs of the human female and male generate eggs and sperm and how sexual activity may lead to fertilization and pregnancy.	SCI07U06C01L04D	Sexual Reproduction
SCI.7.LS.5.f	Students know the structures and processes by which flowering plants generate pollen, ovules, seeds, and fruit.	SCI07U06C01L03D	Asexual Reproduction
SCI.7.LS.5.g	Students know how to relate the structures of the eye and ear to their functions.	SCI07U03C02L06D	Sound
SCI.7.LS.6.a	Students know visible light is a small band within a very broad electromagnetic spectrum.	SCI07U03C01L04D SCI07U03C04L19D	Light Review
SCI.7.LS.6.b	Students know that for an object to be seen, light emitted by or scattered from it must be detected by the eye.	SCI07U03C01L04D SCI07U03C04L19D	Light Review
SCI.7.LS.6.e	Students know that white light is a mixture of many wavelengths (colors) and that retinal cells react differently to different wavelengths.	SCI07U03C01L04D SCI07U03C04L19D	Light Review
SCI.7.LS.6.f	Students know light can be reflected, refracted, transmitted, and absorbed by matter.	SCI07U03C01L04D	Light
SCI.7.LS.6.i	Students know how levers confer mechanical advantage and how the application of this principle applies to the musculoskeletal system.	SCI07U04C03L12D	Organ Systems (Part 1)
SCI.7.LS.6.j	Students know that contractions of the heart generate blood pressure and that heart valves prevent backflow of blood in the circulatory system.	SCI07U04C02L09D	Organs

Section	Description	OW Lesson ID	Title
SCI.7.LSIE.7.b	Use a variety of print and electronic resources (including the World Wide Web) to collect information and evidence as part of a research project.	SCI07U04C02P10D	Project: Organ Transplants
		SCI07U05C01P03D	Project: Lupus
		SCI07U05C02P07D	Project: Radiation Therapy
		SCI07U06C01P02D	Project: Karyotype
		SCI07U07C03P13D	Project: Environmental Policies
		SCI07U10C01P03D	Project: Morphology
		SCI07U10C01P05D	Project: Sickle Cell Anemia
SCI.7.LSIE.7.c	Communicate the logical connection among hypotheses, science concepts, tests conducted, data collected, and conclusions drawn from the scientific evidence.	SCI07U01C01L04D	Observation and Questioning
SCI.7.LSIE.7.d	Construct scale models, maps, and appropriately labeled diagrams to communicate scientific knowledge (e.g., motion of Earth's plates and cell structure).	SCI07U01C01L05D	Data Collection, Analysis, and Communication
		SCI07U08C01L02D	The Lithosphere
SCI.7.LSIE.7.e	Communicate the steps and results from an investigation in written reports and oral presentations.	SCI07U01C01L05D	Data Collection, Analysis, and Communication
Grade: 8			
SCI.8.PC.2.d	Students know how to identify separately the two or more forces that are acting on a single static object, including gravity, elastic forces due to tension or compression in matter, and friction.	ESCU01C02L09D	Ability To Orbit
SCI.8.PC.2.f	Students know the greater the mass of an object, the more force is needed to achieve the same rate of change in motion.	ESCU01C02L09D	Ability To Orbit
		ESCU01C02P10D	Project: Newton's Law
SCI.8.PC.2.g	Students know the role of gravity in forming and maintaining	ESCU01C02L07D	A Sequence Of Events

Section	Description	OW Lesson ID	Title
SCI.8.PC.2.g	the shapes of planets, stars, and the solar system.	ESCU01C02L09D	A Sequence Of Events
		SCI08U09C01L02D	Ability To Orbit
		SCI08U09C01L03D	Astronomy and Measurement
		SCI08U10C03L09D	Stars
SCI08U10C03L09D	Science and Space		
SCI.8.PC.3.a	Students know the structure of the atom and know it is composed of protons, neutrons, and electrons.	SCI08U01C03L05D	Atomic Nuclei
SCI.8.PC.3.b	Students know that compounds are formed by combining two or more different elements and that compounds have properties that are different from their constituent elements.	SCI07U02C01L02D	Elements
SCI.8.PC.3.c	Students know atoms and molecules form solids by building up repeating patterns, such as the crystal structure of NaCl or long-chain polymers.	SCI08U01C01L01D	Structure of Matter
		SCI08U03C01L01D	Volume
SCI.8.PC.3.d	Students know the states of matter (solid, liquid, gas) depend on molecular motion.	SCI08U01C01L01D	Structure of Matter
		SCI08U03C01L01D	Volume
		SCI08U03C02P05D	Experiment: Mass of Gas
SCI.8.PC.3.e	Students know that in solids the atoms are closely locked in position and can only vibrate; in liquids the atoms and molecules are more loosely connected and can collide with and move past one another; and in gases the atoms and molecules are free to move independently, colliding frequently.	SCI08U01C01L01D	Structure of Matter
		SCI08U03C01L01D	Volume
		SCI08U03C02P05D	Experiment: Mass of Gas
SCI.8.PC.3.f	Students know how to use the periodic table to identify elements in simple compounds.	SCI07U02C01L02D	Elements

Section	Description	OW Lesson ID	Title
		SCI08U01C01L01D	Structure of Matter
SCI.8.PC.4.a	Students know galaxies are clusters of billions of stars and may have different shapes.	ESCU11C03L11D	Galaxies
		ESCU11C03P12D	Project: Identifying Galaxies
		SCI08U09C01L03D	Stars
SCI.8.PC.4.b	Students know that the Sun is one of many stars in the Milky Way galaxy and that stars may differ in size, temperature, and color.	ESCU11C02L06D	Characteristics of Stars
		ESCU11C02L07D	Structure of the Sun
		ESCU11C02L08D	Stellar Evolution
		SCI08U09C01L03D	Stars
		SCI08U10C03L09D	Science and Space
SCI.8.PC.4.c	Students know how to use astronomical units and light years as measures of distances between the Sun, stars, and Earth.	ESCU11C01L01D	The Earth's Place in the Solar System
		SCI08U09C01L02D	Astronomy and Measurement
		SCI08U09C01L03D	Stars
		SCI08U10C03L09D	Science and Space
SCI.8.PC.4.d	Students know that stars are the source of light for all bright objects in outer space and that the Moon and planets shine by reflected sunlight, not by their own light.	SCI08U06C01P04D	Project: The Moon and Tides
		SCI08U09C01L03D	Stars
		SCI08U10C03L09D	Science and Space
SCI.8.PC.4.e	Students know the appearance, general composition, relative position and size, and motion of objects in the solar system, including planets, planetary satellites, comets, and asteroids.	ESCU01C02L07D	A Sequence Of Events
		ESCU01C02L08D	Planetary Motion
		ESCU01C02L09D	Ability To Orbit
		ESCU11C01L01D	The Earth's Place in the Solar System

Section	Description	OW Lesson ID	Title
		ESCU11C01P03D	Project: Scale of the Solar System
		ESCU11C02L06D	Characteristics of Stars
		SCI08U06C01P04D	Project: The Moon and Tides
		SCI08U09C01L02D	Astronomy and Measurement
		SCI08U10C03L09D	Science and Space
SCI.8.PC.5.d	Students know physical processes include freezing and boiling, in which a material changes form with no chemical reaction.	SCI08U01C01L01D	Structure of Matter
SCI.8.PC.6.b	Students know that living organisms are made of molecules consisting largely of carbon, hydrogen, nitrogen, oxygen, phosphorus, and sulfur.	SCI08U07C01L01D	Photosynthesis and Food
SCI.8.PC.7.b	Students know each element has a specific number of protons in the nucleus (the atomic number) and each isotope of the element has a different but specific number of neutrons in the nucleus.	SCI07U02C01L02D	Elements
		SCI08U01C01L01D	Structure of Matter
		SCI08U01C03L05D	Atomic Nuclei
SCI.8.PC.7.c	Students know substances can be classified by their properties, including their melting temperature, density, hardness, and thermal and electrical conductivity.	SCI08U03C03L07D	Density
SCI.8.PC.8.a	Students know density is mass per unit volume.	SCI08U03C03L07D	Density
SCI.8.PC.8.b	Students know how to calculate the density of substances (regular and irregular solids and liquids) from measurements of mass and volume.	SCI08U02C01L04D	Measurement: Volume
		SCI08U02C01L05D	Measurement: Mass
		SCI08U03C01L01D	Volume
		SCI08U03C01P02D	Experiment: Determining Volume
		SCI08U03C03L07D	Density

Section	Description	OW Lesson ID	Title
		SCI08U10C01L02D	Measurement
		SCI08U10C02L04D	Weight, Mass, and Density
SCI.8.PC.8.c	Students know the buoyant force on an object in a fluid is an upward force equal to the weight of the fluid the object has displaced.	SCI08U03C03L08D	Buoyancy and Specific Gravity
		SCI08U10C02L04D	Weight, Mass, and Density
SCI.8.PC.8.d	Students know how to predict whether an object will float or sink.	SCI08U03C03L07D	Density
		SCI08U03C03L08D	Buoyancy and Specific Gravity
SCI.8.PCIE.9.a	Plan and conduct a scientific investigation to test a hypothesis.	SCI08U03C02P05D	Experiment: Mass of Gas
SCI.8.PCIE.9.d	Recognize the slope of the linear graph as the constant in the relationship $y = kx$ and apply this principle in interpreting graphs constructed from data.	SCI08U02C02L07D	Graphs: Uses, Bar, and Line
		SCI08U02C02L08D	Graphs: Pictographs and Pie Charts
		SCI08U02C02L09D	Project: Making Graphs
		SCI08U03C03L07D	Density
SCI.8.PCIE.9.e	Construct appropriate graphs from data and develop quantitative statements about the relationships between variables.	SCI08U02C02L07D	Graphs: Uses, Bar, and Line
		SCI08U02C02L08D	Graphs: Pictographs and Pie Charts
		SCI08U02C02L09D	Project: Making Graphs
		SCI08U03C01P02D	Experiment: Determining Volume
		SCI08U03C02P05D	Experiment: Mass of Gas
		SCI08U03C03L07D	Density
		SCI08U04C03P12D	Experiment: Specific Gravity
		SCI08U04C03P13D	Experiment: Gravity

Section	Description	OW Lesson ID	Title		
SCI.8.PCIE.9.f	Apply simple mathematic relationships to determine a missing quantity in a mathematic expression, given the two remaining terms (including speed = distance/time, density = mass/volume, force = pressure x area, volume = area x height).	SCI08U02C01L04D	Measurement: Volume		
		SCI08U02C01L05D	Measurement: Mass		
		SCI08U03C01L01D	Volume		
		SCI08U03C01P02D	Experiment: Determining Volume		
		SCI08U03C02L04D	Mass		
		SCI08U03C03L07D	Density		
		SCI08U10C01L02D	Measurement		
SCI.8.PCIE.9.g	Distinguish between linear and nonlinear relationships on a graph of data.	SCI08U10C02L04D	Weight, Mass, and Density		
		SCI08U02C02L07D	Graphs: Uses, Bar, and Line		
		SCI08U02C02L08D	Graphs: Pictographs and Pie Charts		
		SCI08U02C02L09D	Project: Making Graphs		
		SCI08U03C03L07D	Density		
		Standard: Content Standards for CAPA and Star CAPA Blueprints			
		Grade: 8			
SCI.8.2d.1	Know that forces that act on an object include gravity and friction.	ESCU01C02L09D	Ability To Orbit		
		SCI08U04C03P12D	Experiment: Specific Gravity		
		SCI08U04C03P13D	Experiment: Gravity		
SCI.8.2f.1	Know that the greater mass of an object, the more force is needed to move the object.	SCI08U02C01L05D	Measurement: Mass		
		SCI08U10C02L04D	Weight, Mass, and Density		
SCI.8.3f.1	Know that the periodic table is used to identify elements.	SCI07U02C01L02D	Elements		

Section	Description	OW Lesson ID	Title
		SCI08U01C01L01D	Structure of Matter
SCI.8.4b.1	Know that the Sun is an average star that provides heat and light to Earth.	ESCU01C03L12D ESCU11C02L07D	A Unique Planet Structure of the Sun
SCI.8.4e.1	Know that the Earth is one planet that orbits the Sun.	ESCU01C02L08D ESCU01C02L09D ESCU01C03L12D ESCU11C01L01D ESCU11C01P03D SCI08U10C03L09D	Planetary Motion Ability To Orbit A Unique Planet The Earth's Place in the Solar System Project: Scale of the Solar System Science and Space
SCI.8.4e.2	Know that the Moon orbits the Earth.	ESCU01C03L12D ESCU11C01L04D SCI08U06C01P04D	A Unique Planet The Moon Project: The Moon and Tides
SCI.8.5d.1	Know the physical changes for a liquid when it changes from one state to another (freezing, melting, boiling).	SCI08U01C01L01D	Structure of Matter
SCI.8.7c.1	Know that substances can be classified by their physical properties (e.g., hardness, flexibility, density, and thermal conductivity).	SCI08U03C03L07D SCI08U10C02L04D	Density Weight, Mass, and Density
SCI.8.8d.1	Know that some objects float or sink.	SCI08U03C03L08D	Buoyancy and Specific Gravity
SCI.8.9a.1	Make a hypothesis based on prior knowledge.	SCI08U03C02P05D	Experiment: Mass of Gas
SCI.8.9a.2	Conduct a scientific investigation to test a hypothesis.	SCI07U01C01L01D	What is Science?

Section	Description	OW Lesson ID	Title
		SCI08U03C02P05D	Experiment: Mass of Gas
SCI.8.9e.1	Construct appropriate graphs from data (e.g., bar, pictograph, pie graph).	SCI08U02C02L07D	Graphs: Uses, Bar, and Line
		SCI08U02C02L08D	Graphs: Pictographs and Pie Charts
		SCI08U02C02L09D	Project: Making Graphs
SCI.8.9e.2	Interpret relationships between variables (e.g., time vs. temperature; time vs. population).	SCI08U03C03L07D	Density

Standard: Content Standards

Grade: 9-12

SCI.9-12.BI.10.a	Students know the role of the skin in providing nonspecific defenses against infection.	BIOU06C03L15D	Sensory Systems: Hearing, Taste, Touch
		SCI09U07C02L07D	Respiratory Infections
		SCI09U07C02L08D	Nervous System Infections
		SCI09U07C03L10D	Common Viral Infections
		SCI09U07C03L11D	Childhood Viral Infections
		SCI09U07C03L12D	Serious Viral Infections
		SCI09U07C04L14D	Protozoan Infections
		SCI09U07C04L15D	Rickettsial Infections
		SCI09U07C04L16D	Fungal Infections
		SCI09U10C03L07D	Infectious Diseases
SCI.9-12.BI.10.b	Students know the role of antibodies in the body's response to infection.	SCI09U07C02L06D	Digestive Infections
		SCI09U07C02L07D	Respiratory Infections
		SCI09U07C02L08D	Nervous System Infections
		SCI09U07C03L10D	Common Viral Infections
		SCI09U07C03L11D	Childhood Viral Infections

Section	Description	OW Lesson ID	Title
		SCI09U07C03L12D	Serious Viral Infections
		SCI09U07C04L14D	Protozoan Infections
		SCI09U07C04L15D	Rickettsial Infections
		SCI09U07C04L16D	Fungal Infections
		SCI09U10C03L07D	Infectious Diseases
SCI.9-12.BI.10.c	Students know how vaccination protects an individual from infectious diseases.	BIOU06C03L17D	Immune System and Disease
		SCI09U07C01L03D	Characteristics of Infectious Diseases
		SCI09U07C02L06D	Digestive Infections
		SCI09U07C02L07D	Respiratory Infections
		SCI09U07C02L08D	Nervous System Infections
		SCI09U07C03L10D	Common Viral Infections
		SCI09U07C03L11D	Childhood Viral Infections
		SCI09U07C03L12D	Serious Viral Infections
		SCI09U07C04L14D	Protozoan Infections
		SCI09U07C04L15D	Rickettsial Infections
		SCI09U07C04L16D	Fungal Infections
		SCI09U08C01L01D	Body Defense Mechanisms
		SCI09U08C01L04D	Environmental Conditions
		SCI09U08C02L07D	18th and 19th Century Medicine
		SCI09U10C03L07D	Infectious Diseases
SCI.9-12.BI.10.d	Students know there are important differences between bacteria and viruses with respect to their requirements for growth and replication, the body's primary defenses against bacterial and viral infections, and effective treatments of these infections.	BIOU06C03L17D	Immune System and Disease
		SCI09U07C02L07D	Respiratory Infections
		SCI09U07C02L08D	Nervous System Infections
		SCI09U07C03L10D	Common Viral Infections

Section	Description	OW Lesson ID	Title
		SCI09U07C03L11D	Childhood Viral Infections
		SCI09U07C03L12D	Serious Viral Infections
		SCI09U07C04L14D	Protozoan Infections
		SCI09U07C04L15D	Rickettsial Infections
		SCI09U07C04L16D	Fungal Infections
		SCI09U10C03L07D	Infectious Diseases
SCI.9-12.BI.10.e	Students know why an individual with a compromised immune system (for example, a person with AIDS) may be unable to fight off and survive infections by microorganisms that are usually benign.	BIOU06C03L17D	Immune System and Disease
		BIOU06C03P18D	Essay: Cancer and the Immune System
		BIOU10C03L08D	Applications of Biology
		SCI09U07C02L07D	Respiratory Infections
		SCI09U07C02L08D	Nervous System Infections
		SCI09U07C03L10D	Common Viral Infections
		SCI09U07C03L11D	Childhood Viral Infections
		SCI09U07C03L12D	Serious Viral Infections
		SCI09U07C04L14D	Protozoan Infections
		SCI09U07C04L15D	Rickettsial Infections
		SCI09U07C04L16D	Fungal Infections
		SCI09U08C01L01D	Body Defense Mechanisms
		SCI09U10C03L07D	Infectious Diseases
		SCI09U10C03L08D	Medicine and Health
SCI.9-12.BI.10.f	Students know the roles of phagocytes, B-lymphocytes, and T-lymphocytes in the immune system.	BIOU06C03L17D	Immune System and Disease
		BIOU06C03P18D	Essay: Cancer and the Immune System
		BIOU10C03L08D	Applications of Biology
		SCI09U10C03L08D	Medicine and Health

Section	Description	OW Lesson ID	Title
SCI.9-12.BI.1.a	Students know cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.	BIOU04C01L01D	The Cell-An Introduction
		BIOU04C01P02D	Experiment: Human Cheek Cells
		BIOU04C01P03A	Experiment: The Onion Cells
		BIOU04C02L05D	Cell Design
		BIOU04C02L06D	Cell Membrane Function
		BIOU05C03L12D	Respiration
SCI.9-12.BI.1.b	Students know enzymes are proteins that catalyze biochemical reactions without altering the reaction equilibrium and the activities of enzymes depend on the temperature, ionic conditions, and the pH of the surroundings.	BIOU02C04L16D	Lipids
		BIOU02C05L19D	Enzymes
		CHMU06C02L10D	Factors that Affect Reaction Rate: Temperature, Catalysts, Concentration of Reactants
		CHMU07C04L19D	pH Calculations
SCI.9-12.BI.1.c	Students know how prokaryotic cells, eukaryotic cells (including those from plants and animals), and viruses differ in complexity and general structure.	BIOU03C04L20D	The Rickettsias
		BIOU04C01L01D	The Cell-An Introduction
		BIOU04C01P02D	Experiment: Human Cheek Cells
		BIOU04C01P03A	Experiment: The Onion Cells
		BIOU04C02L09D	Production of Needed Materials
		BIOU05C01L01D	Plant Basics
		BIOU05C01L02D	Parts of the Plant Cell
		BIOU05C01L03D	Anatomy and Morphology of the Plant
SCI.9-12.BI.1.d	Students know the central dogma of molecular biology outlines the flow of information from transcription of ribonucleic acid (RNA) in the nucleus to translation of proteins on ribosomes in the cytoplasm.	BIOU02C04L17D	Nucleic Acids

Section	Description	OW Lesson ID	Title
		BIOU05C01L02D	Parts of the Plant Cell
		BIOU07C03L11D	Molecular Genetics
SCI.9-12.BI.1.e	Students know the role of the endoplasmic reticulum and Golgi apparatus in the secretion of proteins.	BIOU05C03L10D	Photosynthesis: A Closer Look
SCI.9-12.BI.1.f	Students know usable energy is captured from sunlight by chloroplasts and is stored through the synthesis of sugar from carbon dioxide.	BIOU03C03L12D	Protista: The Algae
		BIOU04C02L08D	Organelles
		BIOU05C03L09D	How do Plants Work?
		BIOU05C03L10D	Photosynthesis: A Closer Look
		BIOU05C03P11A	Experiment: Terrarium
		BIOU09C04L15D	Energy Affects Ecology
		ESCU03C02L14D	Flow of Energy in Ecosystems
SCI.9-12.BI.1.g	Students know the role of the mitochondria in making stored chemical-bond energy available to cells by completing the breakdown of glucose to carbon dioxide.	BIOU04C02L08D	Organelles
SCI.9-12.BI.1.h	Students know most macromolecules (polysaccharides, nucleic acids, proteins, lipids) in cells and organisms are synthesized from a small collection of simple precursors.	BIOU02C04L16D	Lipids
		BIOU02C04L17D	Nucleic Acids
SCI.9-12.BI.1.i	Students know how chemiosmotic gradients in the mitochondria and chloroplast store energy for ATP production.	BIOU04C02L08D	Organelles
SCI.9-12.BI.1.j	Students know how eukaryotic cells are given shape and internal organization by a cytoskeleton or cell wall or both.	BIOU04C01L01D	The Cell-An Introduction
		BIOU04C01P02D	Experiment: Human Cheek Cells
		BIOU04C01P03A	Experiment: The Onion Cells

Section	Description	OW Lesson ID	Title
SCI.9-12.BI.2.a	Students know meiosis is an early step in sexual reproduction in which the pairs of chromosomes separate and segregate randomly during cell division to produce gametes containing one chromosome of each type.	BIOU06C02L11D	Reproductive System
		BIOU07C02L08D	Chromosomes in Meiosis
		BIOU08C01L02D	Meiosis
		BIOU08C03L13D	Sexual Reproduction
		BIOU08C03P15A	Experiment: Sexual Reproduction
		BIOU08C04L17D	Sexual Reproduction in Animals
		BIOU10C01L02D	Definition of Life
SCI.9-12.BI.2.b	Students know only certain cells in a multicellular organism undergo meiosis.	BIOU07C02L08D	Chromosomes in Meiosis
		BIOU08C01L02D	Meiosis
SCI.9-12.BI.2.c	Students know how random chromosome segregation explains the probability that a particular allele will be in a gamete.	BIOU07C01L05D	Application of Mendelian Genetics
		BIOU07C02L07D	Chromosome Basis of Heredity
		BIOU08C01L02D	Meiosis
		BIOU08C03L13D	Sexual Reproduction
SCI.9-12.BI.2.d	Students know new combinations of alleles may be generated in a zygote through the fusion of male and female gametes (fertilization).	BIOU07C01L05D	Application of Mendelian Genetics
		BIOU08C01L02D	Meiosis
		BIOU08C03L13D	Sexual Reproduction
		BIOU08C03L14D	Fertilization
		BIOU08C04L17D	Sexual Reproduction in Animals
SCI.9-12.BI.2.e	Students know why approximately half of an individual's DNA sequence comes from each parent.	BIOU02C04L17D	Nucleic Acids

Section	Description	OW Lesson ID	Title
		BIOU04C02L09D	Production of Needed Materials
		BIOU06C02L11D	Reproductive System
		BIOU07C03L11D	Molecular Genetics
		BIOU08C03L13D	Sexual Reproduction
		BIOU08C03P15A	Experiment: Sexual Reproduction
		BIOU08C04L17D	Sexual Reproduction in Animals
		BIOU10C01L02D	Definition of Life
		BIOU10C02L05D	Control System
SCI.9-12.BI.2.f	Students know the role of chromosomes in determining an individual's sex.	BIOU07C02L07D	Chromosome Basis of Heredity
		BIOU08C01L02D	Meiosis
SCI.9-12.BI.2.g	Students know how to predict possible combinations of alleles in a zygote from the genetic makeup of the parents.	BIOU07C01L05D	Application of Mendelian Genetics
SCI.9-12.BI.3.a	Students know how to predict the probable outcome of phenotypes in a genetic cross from the genotypes of the parents and mode of inheritance (autosomal or X-linked, dominant or recessive).	BIOU07C01L01D	Genetics: Plan of Inheritance
		BIOU07C01L05D	Application of Mendelian Genetics
		BIOU08C05L21D	Sexual Reproduction in Plants
SCI.9-12.BI.3.b	Students know the genetic basis for Mendel's laws of segregation and independent assortment.	BIOU07C01L01D	Genetics: Plan of Inheritance
SCI.9-12.BI.3.d	Students know how to use data on frequency of recombination at meiosis to estimate genetic distances between loci and to interpret genetic maps of chromosomes.	BIOU07C02L07D	Chromosome Basis of Heredity
		BIOU07C02L08D	Chromosomes in Meiosis
		BIOU08C01L02D	Meiosis
SCI.9-12.BI.4.a	Students know the general pathway by which ribosomes	BIOU02C04L17D	Nucleic Acids

Section	Description	OW Lesson ID	Title
SCI.9-12.BI.4.a	synthesize proteins, using tRNAs to translate genetic information in mRNA.	BIOU05C03L10D	Nucleic Acids Photosynthesis: A Closer Look
		BIOU07C03L11D	Molecular Genetics
SCI.9-12.BI.4.b	Students know how to apply the genetic coding rules to predict the sequence of amino acids from a sequence of codons in RNA.	BIOU02C04L17D	Nucleic Acids
		BIOU07C03L11D	Molecular Genetics
SCI.9-12.BI.4.c	Students know how mutations in the DNA sequence of a gene may or may not affect the expression of the gene or the sequence of amino acids in an encoded protein.	BIOU02C04L17D	Nucleic Acids
		BIOU04C02L09D	Production of Needed Materials
		BIOU07C03L11D	Molecular Genetics
SCI.9-12.BI.4.d	Students know specialization of cells in multicellular organisms is usually due to different patterns of gene expression rather than to differences of the genes themselves.	BIOU10C02L05D	Control System
		BIOU05C02L07D	Developmental Anatomy
		BIOU08C04L17D	Sexual Reproduction in Animals
SCI.9-12.BI.4.f	Students know why proteins having different amino acid sequences typically have different shapes and chemical properties.	BIOU10C02L05D	Control System
		CHMU02C01L01D	The Basic Ingredient: Chemical Elements
SCI.9-12.BI.5.a	Students know the general structures and functions of DNA, RNA, and protein.	CHMU02C02L03D	Using Chemical and Physical Properties to Identify Substances
		BIOU02C04L17D	Nucleic Acids
SCI.9-12.BI.5.a	Students know the general structures and functions of DNA, RNA, and protein.	BIOU04C02L09D	Production of Needed Materials
		BIOU07C03L11D	Molecular Genetics
		BIOU10C02L05D	Control System
		BIOU02C04L17D	Nucleic Acids

Section	Description	OW Lesson ID	Title
SCI.9-12.BI.5.b	Students know how to apply base-pairing rules to explain precise copying of DNA during semiconservative replication and transcription of information from DNA into mRNA.	BIOU02C04L17D	Nucleic Acids
		BIOU04C02L09D	Production of Needed Materials
		BIOU07C03L11D	Molecular Genetics
		BIOU10C02L05D	Control System
SCI.9-12.BI.5.c	Students know how genetic engineering (biotechnology) is used to produce novel biomedical and agricultural products.	SCI09U08C02L08D	Modern Medicine
SCI.9-12.BI.5.d	Students know how basic DNA technology (restriction digestion by endonucleases, gel electrophoresis, ligation, and transformation) is used to construct recombinant DNA molecules.	BIOU02C04L17D	Nucleic Acids
		BIOU04C02L09D	Production of Needed Materials
		BIOU07C03L11D	Molecular Genetics
		BIOU08C01L02D	Meiosis
BIOU10C02L05D	Control System		
SCI.9-12.BI.5.e	Students know how exogenous DNA can be inserted into bacterial cells to alter their genetic makeup and support expression of new protein products.	BIOU05C03L10D	Photosynthesis: A Closer Look
SCI.9-12.BI.6.b	Students know how to analyze changes in an ecosystem resulting from changes in climate, human activity, introduction of nonnative species, or changes in population size.	BIOU09C01L01D	Principles of Ecology
		SCI09U09C02L07D	Industry and Transportation
		SCI09U10C03L09D	Population and Environment
SCI.9-12.BI.6.d	Students know how water, carbon, and nitrogen cycle between abiotic resources and organic matter in the ecosystem and how oxygen cycles through photosynthesis and respiration.	BIOU03C03L12D	Protista: The Algae

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		BIOU04C02L05D	Cell Design
		BIOU04C02L08D	Organelles
		BIOU05C03L09D	How do Plants Work?
		BIOU05C03L10D	Photosynthesis: A Closer Look
		BIOU05C03L12D	Respiration
		BIOU05C03P11A	Experiment: Terrarium
		BIOU06C01L03D	Respiratory System
SCI.9-12.BI.6.e	Students know a vital part of an ecosystem is the stability of its producers and decomposers.	BIOU09C01L01D	Principles of Ecology
		BIOU09C04P16D	Activity: Make a Pyramid
SCI.9-12.BI.6.f	Students know at each link in a food web some energy is stored in newly made structures but much energy is dissipated into the environment as heat. This dissipation may be represented in an energy pyramid.	BIOU10C02L06D	Environment of Life
		ESCU03C02P15D	Project: Flow of Energy
		SCI09U05C03L09D	Commercial Fishing
SCI.9-12.BI.7.b	Students know why alleles that are lethal in a homozygous individual may be carried in a heterozygote and thus maintained in a gene pool.	BIOU07C01L05D	Application of Mendelian Genetics
SCI.9-12.BI.7.c	Students know new mutations are constantly being generated in a gene pool.	BIOU07C02L07D	Chromosome Basis of Heredity
		BIOU07C03L11D	Molecular Genetics
SCI.9-12.BI.7.d	Students know variation within a species increases the likelihood that at least some members of a species will survive under changed environmental conditions.	BIOU08C01L02D	Meiosis
SCI.9-12.BI.7.e	Students know the conditions for Hardy-Weinberg equilibrium in a population and why these conditions are not likely to appear in nature.	BIOU09C01L01D	Principles of Ecology

Section	Description	OW Lesson ID	Title
SCI.9-12.BI.7.f	Students know how to solve the Hardy-Weinberg equation to predict the frequency of genotypes in a population, given the frequency of phenotypes.	BIOU09C01L01D	Principles of Ecology
SCI.9-12.BI.8.b	Students know a great diversity of species increases the chance that at least some organisms survive major changes in the environment.	BIOU10C02L04D	Basic Principles of Life
SCI.9-12.BI.8.c	Students know the effects of genetic drift on the diversity of organisms in a population.	BIOU10C02L04D	Basic Principles of Life
SCI.9-12.BI.8.e	Students know how to analyze fossil evidence with regard to biological diversity, episodic speciation, and mass extinction.	ESCU02C02L08D ESCU02C02P07D ESCU02C02P09D	Mass Extinctions Project: The Clock of Eons Project: Before, During, and After a Mass Extinction
SCI.9-12.BI.8.f	Students know how to use comparative embryology, DNA or protein sequence comparisons, and other independent sources of data to create a branching diagram (cladogram) that shows probable evolutionary relationships.	BIOU02C04L17D BIOU04C02L09D BIOU07C03L11D BIOU10C02L05D	Nucleic Acids Production of Needed Materials Molecular Genetics Control System
SCI.9-12.BI.9.b	Students know how the nervous system mediates communication between different parts of the body and the body's interactions with the environment.	BIOU06C03L13D	Environmental Interaction
SCI.9-12.BI.9.c	Students know how feedback loops in the nervous and endocrine systems regulate conditions in the body.	BIOU06C03L13D	Environmental Interaction
SCI.9-12.BI.9.d	Students know the functions of the nervous system and the role of neurons in transmitting electrochemical impulses.	BIOU06C03L13D	Environmental Interaction

Section	Description	OW Lesson ID	Title
SCI.9-12.BI.9.e	Students know the roles of sensory neurons, interneurons, and motor neurons in sensation, thought, and response.	BIOU06C03L15D	Sensory Systems: Hearing, Taste, Touch
SCI.9-12.BI.9.f	Students know the individual functions and sites of secretion of digestive enzymes (amylases, proteases, nucleases, lipases), stomach acid, and bile salts.	BIOU02C05L19D	Enzymes
		BIOU02C05P20A	Experiment: Digestion
SCI.9-12.BI.9.h	Students know the cellular and molecular basis of muscle contraction, including the roles of actin, myosin, Ca ²⁺ , and ATP.	BIOU04C02L08D	Organelles
		BIOU06C02L09D	Muscular System
SCI.9-12.BI.9.i	Students know how hormones (including digestive, reproductive, osmoregulatory) provide internal feedback mechanisms for homeostasis at the cellular level and in whole organisms.	BIOU10C02L04D	Basic Principles of Life
SCI.9-12.CH.10.a	Students know large molecules (polymers), such as proteins, nucleic acids, and starch, are formed by repetitive combinations of simple subunits.	BIOU02C04L17D	Nucleic Acids
		BIOU02C04P15A	Experiment: Starch
		CHMU09C03P10D	Experiment: Preparation of a Polymer
SCI.9-12.CH.10.b	Students know the bonding characteristics of carbon that result in the formation of a large variety of structures ranging from simple hydrocarbons to complex polymers and biological molecules.	CHMU08C01L01D	Organic Compounds
		CHMU08C02L05D	A Closer Look at the Carbon Atom
		CHMU08C03L08D	Alkanes: Saturated Hydrocarbons
		CHMU08C03L09D	Unsaturated Hydrocarbons
		CHMU09C01L01D	Common Reactions of Saturated Hydrocarbons
		CHMU09C01L02D	Reactions of Unsaturated Hydrocarbons
		CHMU09C03P10D	Experiment: Preparation of a Polymer
CHMU10C03L15D	Organic Compounds		

Section	Description	OW Lesson ID	Title
		CHMU10C03L16D	Hydrocarbon Chemistry
SCI.9-12.CH.10.d	Students know the system for naming the ten simplest linear hydrocarbons and isomers that contain single bonds, simple hydrocarbons with double and triple bonds, and simple molecules that contain a benzene ring.	CHMU08C03L08D	Alkanes: Saturated Hydrocarbons
		CHMU08C03L09D	Unsaturated Hydrocarbons
		CHMU09C01L01D	Common Reactions of Saturated Hydrocarbons
		CHMU09C01L02D	Reactions of Unsaturated Hydrocarbons
		CHMU10C03L15D	Organic Compounds
		CHMU10C03L16D	Hydrocarbon Chemistry
SCI.9-12.CH.10.e	Students know how to identify the functional groups that form the basis of alcohols, ketones, ethers, amines, esters, aldehydes, and organic acids.	CHMU09C02L04D	Alcohols
		CHMU09C02L05D	Aldehydes, Acids, and Ketones
		CHMU09C02L06D	Esters
		CHMU09C03L08D	Nitrogen Functional Groups
		CHMU10C03L16D	Hydrocarbon Chemistry
SCI.9-12.CH.11.a	Students know protons and neutrons in the nucleus are held together by nuclear forces that overcome the electromagnetic repulsion between the protons.	BIOU02C01L01D	Molecular Basis of Life
		CHMU10C02L06D	Atomic Structure and Nuclear Reactions
		PHYU09C02L07	Nuclear Theory
		PHYU10C04L15	Nuclear Energy
		SCI09U01C03L05D	Atomic Nuclei
SCI.9-12.CH.11.b	Students know the energy release per gram of material is much larger in nuclear fusion or fission reactions than in chemical reactions. The change in mass (calculated by $E = mc^2$) is small but significant in nuclear reactions.	BIOU02C02L03D	Properties of Compounds
		BIOU02C03L11D	Chemical Reactions

Section	Description	OW Lesson ID	Title
		CHMU04C05L12D	A Closer Look Inside: Nuclear Reactions
		CHMU04C05P13A	Report: Fission Reactors
		CHMU10C02L06D	Atomic Structure and Nuclear Reactions
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		IPCU03C03L17D	Nuclear Energy
		PHYU09C03L09	Nuclear Reactions
		PHYU09C03L10	Fusion and Applications of Nuclear Energy
		PHYU10C04L15	Nuclear Energy
		SCI09U01C04L07D	Nuclear Energy
		SCI09U01C04P08D	Project: Reactors
		SCI09U10C01L01D	Atoms and Nuclear Energy
SCI.9-12.CH.11.c	Students know some naturally occurring isotopes of elements are radioactive, as are isotopes formed in nuclear reactions.	CHMU04C05L12D	A Closer Look Inside: Nuclear Reactions
		CHMU10C02L06D	Atomic Structure and Nuclear Reactions
		IPCU03C03L14D	Radioactivity
		IPCU03C03L15D	Nuclear Reactions
		IPCU03C03L17D	Nuclear Energy
		PHYU09C02L07	Nuclear Theory
		PHYU10C04L15	Nuclear Energy
		SCI09U01C04L07D	Nuclear Energy
		SCI09U01C04P08D	Project: Reactors
SCI.9-12.CH.11.d	Students know the three most common forms of radioactive decay (alpha, beta, and gamma) and know how the nucleus changes in each type of decay.	IPCU03C03L14D	Radioactivity
		IPCU03C03L15D	Nuclear Reactions
		PHYU09C02L07	Nuclear Theory
		SCI09U01C02L03D	Radioactivity

Section	Description	OW Lesson ID	Title
SCI.9-12.CH.11.e	Students know alpha, beta, and gamma radiation produce different amounts and kinds of damage in matter and have different penetrations.	CHMU04C05L12D	A Closer Look Inside: Nuclear Reactions
		CHMU10C02L06D	Atomic Structure and Nuclear Reactions
		PHYU09C02L07	Nuclear Theory
		PHYU10C04L15	Nuclear Energy
		SCI09U01C02L03D	Radioactivity
SCI.9-12.CH.11.f	Students know how to calculate the amount of a radioactive substance remaining after an integral number of half lives have passed.	CHMU04C05L12D	A Closer Look Inside: Nuclear Reactions
		CHMU10C02L06D	Atomic Structure and Nuclear Reactions
		ESCU02C01L04D	Absolute Dating
		IPCU03C03L15D	Nuclear Reactions
		PHYU09C02L07	Nuclear Theory
		PHYU10C04L15	Nuclear Energy
SCI.9-12.CH.11.g	Students know protons and neutrons have substructures and consist of particles called quarks.	BIOU02C01L01D	Molecular Basis of Life
		CHMU10C02L06D	Atomic Structure and Nuclear Reactions
		IPCU02C01L03D	The Atomic Model
		PHYU09C02L07	Nuclear Theory
		PHYU10C04L15	Nuclear Energy
		SCI09U01C03L05D	Atomic Nuclei
SCI.9-12.CH.1.a	Students know how to relate the position of an element in the periodic table to its atomic number and atomic mass.	CHMU03C05L13D	Counting Gas Particles: The Measure of the Mole
		CHMU04C02L06D	Designing an Organizational Map: The Periodic Table
		CHMU10C01L03D	Elements, Compounds, and Mixtures
		CHMU10C02L06D	Atomic Structure and Nuclear Reactions
		CHMU10C02L07D	The Periodic Law

Section	Description	OW Lesson ID	Title
		IPCU02C02L06D	The Periodic Table
		SCI07U02C01L02D	Elements
		SCI09U01C01L01D	Structure of Matter
		SCI09U01C03L05D	Atomic Nuclei
		SCI09U10C01L01D	Atoms and Nuclear Energy
SCI.9-12.CH.1.b	Students know how to use the periodic table to identify metals, semimetals, non-metals, and halogens.	CHMU04C01P03A	Experiment: Chemical Properties of Some Metals
		CHMU04C04L10D	Charging Up: Ionization of Atoms
SCI.9-12.CH.1.c	Students know how to use the periodic table to identify alkali metals, alkaline earth metals and transition metals, trends in ionization energy, electronegativity, and the relative sizes of ions and atoms.	CHMU05C02L05D	Electron Availability: Prelude to Bonding
		CHMU10C02L08D	Molecular Structure
SCI.9-12.CH.1.d	Students know how to use the periodic table to determine the number of electrons available for bonding.	CHMU04C02L06D	Designing an Organizational Map: The Periodic Table
		CHMU04C04L10D	Charging Up: Ionization of Atoms
		CHMU10C01L03D	Elements, Compounds, and Mixtures
		CHMU10C02L07D	The Periodic Law
		SCI07U02C01L02D	Elements
SCI.9-12.CH.1.e	Students know the nucleus of the atom is much smaller than the atom yet contains most of its mass.	BIOU02C01L01D	Molecular Basis of Life
		CHMU03C05L13D	Counting Gas Particles: The Measure of the Mole
		IPCU02C01L01D	The History of Atomic Theory
		IPCU02C01L03D	The Atomic Model
		PHYU09C02L07	Nuclear Theory
		SCI09U01C01L01D	Structure of Matter
		SCI09U01C03L05D	Atomic Nuclei
		SCI09U10C01L01D	Atoms and Nuclear Energy

Section	Description	OW Lesson ID	Title
SCI.9-12.CH.1.g	Students know how to relate the position of an element in the periodic table to its quantum electron configuration and to its reactivity with other elements in the table.	CHMU04C02L06D	Designing an Organizational Map: The Periodic Table
		CHMU10C01L03D	Elements, Compounds, and Mixtures
		CHMU10C02L07D	The Periodic Law
		IPCU02C02L07D	Trends on the Periodic Table
		SCI07U02C01L02D	Elements
SCI.9-12.CH.1.h	Students know the experimental basis for Thomson's discovery of the electron, Rutherford's nuclear atom, Millikan's oil drop experiment, and Einstein's explanation of the photoelectric effect.	CHMU03C05P16A	Essay: Biography
		CHMU04C01L01D	The Golden Years of Chemistry
		CHMU04C01L04D	Masters of Classic Atomic Theory
		IPCU02C01L01D	The History of Atomic Theory
		IPCU02C01L03D	The Atomic Model
		PHYU09C01L01	Quantum Theory
		PHYU09C02P05	Report: Early Atomic Physics
		PHYU10C02L06	Light and Sound
		PHYU10C04L12	Modern Physics
		SCI09U01C01L01D	Structure of Matter
SCI.9-12.CH.1.i	Students know the experimental basis for the development of the quantum theory of atomic structure and the historical importance of the Bohr model of the atom.	CHMU04C01L04D	Masters of Classic Atomic Theory
		CHMU04C03L08D	The Bohr Model Revisited
		CHMU10C02L07D	The Periodic Law
		IPCU02C01L01D	The History of Atomic Theory
		IPCU02C01L03D	The Atomic Model
		PHYU09C02L06	Bohr Model
		PHYU09C02P05	Report: Early Atomic Physics

Section	Description	OW Lesson ID	Title
		PHYU10C04L13	The Bohr Atom
		SCI09U01C01L01D	Structure of Matter
		SCI09U01C03L05D	Atomic Nuclei
SCI.9-12.CH.1.j	Students know that spectral lines are the result of transitions of electrons between energy levels and that these lines correspond to photons with a frequency related to the energy spacing between levels by using Planck's relationship ($E = hv$).	IPCU02C01L03D	The Atomic Model
		PHYU09C01L01	Quantum Theory
		PHYU10C04L12	Modern Physics
SCI.9-12.CH.2.a	Students know atoms combine to form molecules by sharing electrons to form covalent or metallic bonds or by exchanging electrons to form ionic bonds.	BIOU02C02L03D	Properties of Compounds
		BIOU02C02L05D	Covalent Bonding
		CHMU05C03L07D	Types of Chemical Bonds
		CHMU10C02L08D	Molecular Structure
SCI.9-12.CH.2.b	Students know chemical bonds between atoms in molecules such as H ₂ , CH ₄ , NH ₃ , H ₂ CCH ₂ , N ₂ , Cl ₂ , and many large biological molecules are covalent.	BIOU02C02L03D	Properties of Compounds
		BIOU02C02L05D	Covalent Bonding
		CHMU05C03L07D	Types of Chemical Bonds
		CHMU08C02L06D	Bonding in Organic Compounds
		CHMU10C02L08D	Molecular Structure
		IPCU03C02L09D	Atomic Structure and Bonding
		SCI09U01C01L01D	Structure of Matter
SCI.9-12.CH.2.c	Students know salt crystals, such as NaCl, are repeating patterns of positive and negative ions held together by electrostatic attraction.	BIOU02C02L03D	Properties of Compounds
		CHMU04C04L10D	Charging Up: Ionization of Atoms

Section	Description	OW Lesson ID	Title
		CHMU05C03L07D	Types of Chemical Bonds
		CHMU07C01L05D	Solubility
		CHMU10C02L07D	The Periodic Law
		CHMU10C02L08D	Molecular Structure
SCI.9-12.CH.2.d	Students know the atoms and molecules in liquids move in a random pattern relative to one another because the intermolecular forces are too weak to hold the atoms or molecules in a solid form.	CHMU03C01L02D	Gases and Kinetic Molecular Theory
		IPCU04C02L06D	Characteristics of Liquids
		SCI09U01C01L01D	Structure of Matter
SCI.9-12.CH.2.e	Students know how to draw Lewis dot structures.	CHMU05C03L08D	Polar Covalent Molecules and Dot Structures
SCI.9-12.CH.2.f	Students know how to predict the shape of simple molecules and their polarity from Lewis dot structures.	CHMU05C03L08D	Polar Covalent Molecules and Dot Structures
		CHMU05C03P09D	Experiment: Demonstrating Polar Properties
SCI.9-12.CH.2.g	Students know how electronegativity and ionization energy relate to bond formation.	BIOU02C02L03D	Properties of Compounds
		CHMU05C02L05D	Electron Availability: Prelude to Bonding
		CHMU08C02L06D	Bonding in Organic Compounds
		CHMU10C02L08D	Molecular Structure
SCI.9-12.CH.2.h	Students know how to identify solids and liquids held together by Van der Waals forces or hydrogen bonding and relate these forces to volatility and boiling/melting point temperatures.	IPCU04C02L06D	Characteristics of Liquids
		SCI09U01C01L01D	Structure of Matter
SCI.9-12.CH.3.a	Students know how to describe chemical reactions by writing balanced equations.	BIOU02C03L11D	Chemical Reactions
		CHMU03C05L15D	Demonstrating Conservation of Mass with Balanced

Section	Description	OW Lesson ID	Title
			Equations
		CHMU06C01P03A	Experiment: Chemical Reactions
		CHMU07C01L01D	Chemist's Toolbox
		CHMU10C01L04D	Gases and Moles
		CHMU10C02L08D	Molecular Structure
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		CHMU10C03L13D	Solubility Equilibrium
		IPCU03C02L11D	Chemical Reactions and Conservation of Mass
		IPCU03C02L12D	Types of Chemical Reactions
SCI.9-12.CH.3.b	Students know the quantity one mole is set by defining one mole of carbon 12 atoms to have a mass of exactly 12 grams.	CHMU03C05L13D	Counting Gas Particles: The Measure of the Mole
		CHMU03C05L14D	How Big Is a Mole? Avogadro's Number
		CHMU07C01L01D	Chemist's Toolbox
		CHMU10C01L04D	Gases and Moles
		CHMU10C03L13D	Solubility Equilibrium
SCI.9-12.CH.3.c	Students know one mole equals 6.02×10^{23} particles (atoms or molecules).	CHMU03C05L13D	Counting Gas Particles: The Measure of the Mole
		CHMU03C05L14D	How Big Is a Mole? Avogadro's Number
		CHMU07C01L01D	Chemist's Toolbox
		CHMU10C01L04D	Gases and Moles
		CHMU10C03L13D	Solubility Equilibrium
SCI.9-12.CH.3.d	Students know how to determine the molar mass of a molecule from its chemical formula and a table of atomic masses and how to convert the mass of a molecular substance to moles, number of particles, or volume of gas at standard temperature and pressure.	CHMU03C02L05D	Pressure: Volume Relationships in Gases (Boyle's Law)
		CHMU03C03L07D	Temperature: Volume Relationships in Gases (Charles' Law)
		CHMU03C05L13D	Counting Gas Particles: The Measure of the Mole

Section	Description	OW Lesson ID	Title
		CHMU03C05L14D	How Big Is a Mole? Avogadro's Number
		CHMU05C02L04D	Determining Chemical Formulas
		CHMU07C01L01D	Chemist's Toolbox
		CHMU10C01L04D	Gases and Moles
		CHMU10C03L13D	Solubility Equilibrium
		SCI09U01C01L01D	Structure of Matter
		SCI09U10C01L01D	Atoms and Nuclear Energy
SCI.9-12.CH.3.e	Students know how to calculate the masses of reactants and products in a chemical reaction from the mass of one of the reactants or products and the relevant atomic masses.	CHMU05C01L01D	Chemical Accounting: Stoichiometry
		CHMU10C01L04D	Gases and Moles
SCI.9-12.CH.3.f	Students know how to calculate percent yield in a chemical reaction.	BIOU02C02L03D	Properties of Compounds
		BIOU02C03L11D	Chemical Reactions
		CHMU06C01P03A	Experiment: Chemical Reactions
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
SCI.9-12.CH.3.g	Students know how to identify reactions that involve oxidation and reduction and how to balance oxidation-reduction reactions.	CHMU03C05L15D	Demonstrating Conservation of Mass with Balanced Equations
		CHMU07C01L01D	Chemist's Toolbox
		CHMU07C04L16D	Redox Equilibria
		CHMU07C04L17D	Redox and Oxidation Potentials
		CHMU10C01L04D	Gases and Moles
		CHMU10C02L08D	Molecular Structure
		CHMU10C03L13D	Solubility Equilibrium
		CHMU10C03L14D	Neutralization
SCI.9-12.CH.4.a	Students know the random motion of molecules and their collisions with a surface create the observable pressure on	CHMU03C01L01D	Nothing Stays Put: The Basis for Diffusion and Pressure

Section	Description	OW Lesson ID	Title
SCI.9-12.CH.4.a	that surface.	CHMU03C01L02D	Nothing Stays Put: The Basis for Diffusion and Pressure
		CHMU03C02L05D	Gases and Kinetic Molecular Theory Pressure: Volume Relationships in Gases (Boyle's Law)
SCI.9-12.CH.4.b	Students know the random motion of molecules explains the diffusion of gases.	CHMU03C01L02D	Gases and Kinetic Molecular Theory
		IPCU04C03L12D	General Characteristics of Gases
SCI.9-12.CH.4.c	Students know how to apply the gas laws to relations between the pressure, temperature, and volume of any amount of an ideal gas or any mixture of ideal gases.	CHMU01C01L03D	Measuring Volume in the Chemistry Laboratory
		CHMU03C02L05D	Pressure: Volume Relationships in Gases (Boyle's Law)
		CHMU03C05L17D	Examining the Use of Certain Gases as Propellants
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		IPCU04C03L13D	Pressure and Volume in Gases
SCI.9-12.CH.4.d	Students know the values and meanings of standard temperature and pressure (STP).	IPCU04C03L15D	Temperature and Volume Changes in Gases
		CHMU03C02L05D	Pressure: Volume Relationships in Gases (Boyle's Law)
		CHMU03C03L07D	Temperature: Volume Relationships in Gases (Charles' Law)
SCI.9-12.CH.4.g	Students know the kinetic theory of gases relates the absolute temperature of a gas to the average kinetic energy of its molecules or atoms.	CHMU03C03P09A	Project: Absolute Zero: Real or Theoretical?
		CHMU03C01L02D	Gases and Kinetic Molecular Theory
SCI.9-12.CH.4.g	Students know the kinetic theory of gases relates the absolute temperature of a gas to the average kinetic energy of its molecules or atoms.	CHMU03C01P03A	Project: Graphing Kinetic Energy
		CHMU10C01L04D	Gases and Moles
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		IPCU04C03L12D	General Characteristics of Gases
		PHYU03C01L01D	Work, Kinetic, and Potential Energy
		PHYU10C01L03	Energy

Section	Description	OW Lesson ID	Title
SCI.9-12.CH.4.i	Students know how to apply Dalton's law of partial pressures to describe the composition of gases and Graham's law to predict diffusion of gases.	CHMU03C02L05D	Pressure: Volume Relationships in Gases (Boyle's Law)
		CHMU04C01L01D	The Golden Years of Chemistry
		SCI09U01C01L01D	Structure of Matter
SCI.9-12.CH.5.a	Students know the observable properties of acids, bases, and salt solutions.	BIOU02C02L07D	Importance of Inorganic Compounds
		CHMU07C03L14D	Titration of Acids and Bases
		CHMU07C03P12A	Experiment: Acid Strength
		CHMU10C03L14D	Neutralization
		IPCU03C01L05D	Acids and Bases
		IPCU11C01P04D	Experiment: Water Acidity and the Environment
SCI.9-12.CH.5.b	Students know acids are hydrogen-ion-donating and bases are hydrogen-ion-accepting substances.	BIOU02C02L07D	Importance of Inorganic Compounds
		CHMU07C03L14D	Titration of Acids and Bases
		IPCU03C01L05D	Acids and Bases
SCI.9-12.CH.5.c	Students know strong acids and bases fully dissociate and weak acids and bases partially dissociate.	BIOU02C02L07D	Importance of Inorganic Compounds
		CHMU07C03L14D	Titration of Acids and Bases
SCI.9-12.CH.5.d	Students know how to use the pH scale to characterize acid and base solutions.	BIOU02C02L07D	Importance of Inorganic Compounds
		CHMU07C03L13D	pH Scale
		CHMU07C03L14D	Titration of Acids and Bases
		CHMU07C03P12A	Experiment: Acid Strength
		CHMU07C04L19D	pH Calculations
		IPCU03C01L05D	Acids and Bases
		IPCU11C01L03D	Fossil Fuels, Acid Rain and Ocean Acidification

Section	Description	OW Lesson ID	Title
SCI.9-12.CH.5.f	Students know how to calculate pH from the hydrogen-ion concentration.	CHMU07C04L19D	pH Calculations
SCI.9-12.CH.5.g	Students know buffers stabilize pH in acid-base reactions.	CHMU07C04L19D	pH Calculations
SCI.9-12.CH.6.a	Students know the definitions of solute and solvent.	BIOU02C02L07D CHMU06C02L08D CHMU07C01L05D	Importance of Inorganic Compounds Factors that Affect Reaction Rates: Solution Concentration Solubility
SCI.9-12.CH.6.b	Students know how to describe the dissolving process at the molecular level by using the concept of random molecular motion.	CHMU03C01L02D CHMU07C02L07D IPCU03C01L04D	Gases and Kinetic Molecular Theory The Dissolving Process Solutions - The Dissolving Process
SCI.9-12.CH.6.c	Students know temperature, pressure, and surface area affect the dissolving process.	CHMU07C02L07D CHMU10C02L09D IPCU03C01L04D	The Dissolving Process Chemical Reactions, Rates, and Equilibrium Solutions - The Dissolving Process
SCI.9-12.CH.6.d	Students know how to calculate the concentration of a solute in terms of grams per liter, molarity, parts per million, and percent composition.	CHMU06C02L08D CHMU06C02P09D CHMU07C01L03D CHMU07C01L05D CHMU07C04L18D CHMU10C02L10D CHMU10C03L13D	Factors that Affect Reaction Rates: Solution Concentration Experiment: Affect of Solution Concentration on Reaction Rate Solution Concentration: Molarity Solubility Activity: Solution Concentration vs. Conductivity Reaction Dynamics Solubility Equilibrium

Section	Description	OW Lesson ID	Title
SCI.9-12.CH.6.e	Students know the relationship between the molality of a solute in a solution and the solution's depressed freezing point or elevated boiling point.	CHMU06C02L08D	Factors that Affect Reaction Rates: Solution Concentration
		CHMU07C01L05D	Solubility
		CHMU10C02L10D	Reaction Dynamics
SCI.9-12.CH.6.f	Students know how molecules in a solution are separated or purified by the methods of chromatography and distillation.	IPCU02C03L12D	Separating Mixtures
SCI.9-12.CH.7.a	Students know how to describe temperature and heat flow in terms of the motion of molecules (or atoms).	CHMU03C01L02D	Gases and Kinetic Molecular Theory
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		IPCU08C01L02D	Specific Heat Capacity
SCI.9-12.CH.7.b	Students know chemical processes can either release (exothermic) or absorb (endothermic) thermal energy.	CHMU06C01L01D	Evidence for Chemical Change
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
SCI.9-12.CH.7.c	Students know energy is released when a material condenses or freezes and is absorbed when a material evaporates or melts.	PHYU03C03L09D	Latent Heat
SCI.9-12.CH.7.d	Students know how to solve problems involving heat flow and temperature changes, using known values of specific heat and latent heat of phase change.	CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		PHYU03C03L08D	Heat Energy
		PHYU03C03L09D	Latent Heat
		PHYU03C03P10A	Experiment: Latent Heat
SCI.9-12.CH.7.e	Students know how to apply Hess's law to calculate enthalpy change in a reaction.	CHMU06C01L01D	Evidence for Chemical Change
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
SCI.9-12.CH.7.f	Students know how to use the Gibbs free energy equation to determine whether a reaction would be spontaneous.	CHMU06C01L06D	Using Gibbs Free Energy to Predict Spontaneous Reactions

Section	Description	OW Lesson ID	Title
SCI.9-12.CH.8.a	Students know the rate of reaction is the decrease in concentration of reactants or the increase in concentration of products with time.	CHMU06C02L10D	Factors that Affect Reaction Rate: Temperature, Catalysts, Concentration of Reactants
		CHMU06C02P09D	Experiment: Affect of Solution Concentration on Reaction Rate
		CHMU10C01L04D	Gases and Moles
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
SCI.9-12.CH.8.b	Students know how reaction rates depend on such factors as concentration, temperature, and pressure.	CHMU06C02L08D	Factors that Affect Reaction Rates: Solution Concentration
		CHMU06C02L10D	Factors that Affect Reaction Rate: Temperature, Catalysts, Concentration of Reactants
		CHMU06C02P09D	Experiment: Affect of Solution Concentration on Reaction Rate
		CHMU07C01L03D	Solution Concentration: Molarity
		CHMU07C01L05D	Solubility
		CHMU07C04L18D	Activity: Solution Concentration vs. Conductivity
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		CHMU10C02L10D	Reaction Dynamics
		CHMU10C03L13D	Solubility Equilibrium
IPCU08C01L02D	Specific Heat Capacity		
SCI.9-12.CH.8.c	Students know the role a catalyst plays in increasing the reaction rate.	CHMU06C02L10D	Factors that Affect Reaction Rate: Temperature, Catalysts, Concentration of Reactants
		CHMU06C02P09D	Experiment: Affect of Solution Concentration on Reaction Rate
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		CHMU10C02L10D	Reaction Dynamics
SCI.9-12.CH.8.d	Students know the definition and role of activation energy in a chemical reaction.	BIOU02C02L03D	Properties of Compounds
		BIOU02C03L11D	Chemical Reactions
		CHMU06C01P03A	Experiment: Chemical Reactions

Section	Description	OW Lesson ID	Title
		CHMU06C02L10D	Factors that Affect Reaction Rate: Temperature, Catalysts, Concentration of Reactants
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		CHMU10C02L10D	Reaction Dynamics
		IPCU03C02L09D	Atomic Structure and Bonding
SCI.9-12.CH.9.a	Students know how to use LeChatelier's principle to predict the effect of changes in concentration, temperature, and pressure.	CHMU06C02L08D	Factors that Affect Reaction Rates: Solution Concentration
		CHMU07C01L05D	Solubility
		CHMU07C04L18D	Activity: Solution Concentration vs. Conductivity
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		CHMU10C02L10D	Reaction Dynamics
		CHMU10C03L13D	Solubility Equilibrium
SCI.9-12.CH.9.b	Students know equilibrium is established when forward and reverse reaction rates are equal.	BIOU02C03L11D	Chemical Reactions
		CHMU06C01P03A	Experiment: Chemical Reactions
		CHMU06C02L10D	Factors that Affect Reaction Rate: Temperature, Catalysts, Concentration of Reactants
		CHMU06C02P09D	Experiment: Affect of Solution Concentration on Reaction Rate
		CHMU06C03L12D	Reaction Equilibriums and Equilibrium Constants
		CHMU06C03L14D	Conditions Affecting Equilibrium
		CHMU06C03P13D	Activity: Exploring Factors that Affect Equilibrium
		CHMU07C03L11D	Acid-Base Equilibria
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		CHMU10C02L10D	Reaction Dynamics
SCI.9-12.CH.9.c	Students know how to write and calculate an equilibrium constant expression for a reaction.	CHMU06C03L12D	Reaction Equilibriums and Equilibrium Constants
		CHMU06C03L14D	Conditions Affecting Equilibrium
		CHMU06C03P13D	Activity: Exploring Factors that Affect Equilibrium

Section	Description	OW Lesson ID	Title
		CHMU07C03L11D	Acid-Base Equilibria
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		CHMU10C02L10D	Reaction Dynamics
SCI.9-12.ES.1.a	Students know how the differences and similarities among the sun, the terrestrial planets, and the gas planets may have been established during the formation of the solar system.	ESCU01C02L07D	A Sequence Of Events
SCI.9-12.ES.1.b	Students know the evidence from Earth and moon rocks indicates that the solar system was formed from a nebular cloud of dust and gas approximately 4.6 billion years ago.	ESCU01C02L07D	A Sequence Of Events
SCI.9-12.ES.1.c	Students know the evidence from geological studies of Earth and other planets suggest that the early Earth was very different from Earth today.	ESCU02C01L01D	Determining Earth's Age
		ESCU02C02L06D	Geologic Time
SCI.9-12.ES.1.d	Students know the evidence indicating that the planets are much closer to Earth than the stars are.	ESCU11C01L01D	The Earth's Place in the Solar System
		ESCU11C02L06D	Characteristics of Stars
		SCI09U06C01L01D	History of Astronomy
		SCI09U06C01L03D	Stars
SCI.9-12.ES.1.e	Students know the Sun is a typical star and is powered by nuclear reactions, primarily the fusion of hydrogen to form helium.	ESCU01C02L07D	A Sequence Of Events
		ESCU11C02L06D	Characteristics of Stars
		ESCU11C02L08D	Stellar Evolution
		IPCU03C03L17D	Nuclear Energy
		SCI09U06C01L03D	Stars
SCI.9-12.ES.1.f	Students know the evidence for the dramatic effects that asteroid impacts have had in shaping the surface of planets and their moons and in mass extinctions of life on Earth.	ESCU02C02L08D	Mass Extinctions

Section	Description	OW Lesson ID	Title
SCI.9-12.ES.1.g	Students know the evidence for the existence of planets orbiting other stars.	ESCU01C02L07D	A Sequence Of Events
		ESCU11C02L06D	Characteristics of Stars
		SCI09U06C01L01D	History of Astronomy
		SCI09U06C01L03D	Stars
		SCI09U06C03L10D	Space Explorations
SCI.9-12.ES.2.a	Students know the solar system is located in an outer edge of the disc-shaped Milky Way galaxy, which spans 100,000 light years.	ESCU11C02L06D	Characteristics of Stars
		ESCU11C03L11D	Galaxies
		SCI09U06C01L02D	Astronomy and Measurement
SCI.9-12.ES.2.b	Students know galaxies are made of billions of stars and comprise most of the visible mass of the universe.	ESCU11C03L11D	Galaxies
		ESCU11C03P12D	Project: Identifying Galaxies
		SCI09U06C01L03D	Stars
SCI.9-12.ES.2.c	Students know the evidence indicating that all elements with an atomic number greater than that of lithium have been formed by nuclear fusion in stars.	BIOU02C01L01D	Molecular Basis of Life
		CHMU02C01L01D	The Basic Ingredient: Chemical Elements
		CHMU04C05L12D	A Closer Look Inside: Nuclear Reactions
		CHMU10C02L06D	Atomic Structure and Nuclear Reactions
		PHYU09C03L09	Nuclear Reactions
		PHYU09C03L10	Fusion and Applications of Nuclear Energy
		PHYU10C04L15	Nuclear Energy
		SCI07U02C01L02D	Elements
		SCI09U10C01L01D	Atoms and Nuclear Energy
SCI.9-12.ES.2.d	Students know that stars differ in their life cycles and that	ESCU11C02L08D	Stellar Evolution

Section	Description	OW Lesson ID	Title
SCI.9-12.ES.2.d	visual, radio, and X-ray telescopes may be used to collect data that reveal those differences.	ESCU11C02P09D	Stellar Evolution
		SCI09U06C02L06D	Project: Life Histories of Stars
		SCI09U06C02L07D	Gathering Light with Telescopes Other Types of Telescopes
SCI.9-12.ES.2.e	Students know accelerators boost subatomic particles to energy levels that simulate conditions in the stars and in the early history of the universe before stars formed.	SCI09U06C01L03D	Stars
SCI.9-12.ES.2.f	Students know the evidence indicating that the color, brightness, and evolution of a star are determined by a balance between gravitational collapse and nuclear fusion.	ESCU01C02L07D	A Sequence Of Events
		ESCU11C02L08D	Stellar Evolution
SCI.9-12.ES.2.g	Students know how the red-shift from distant galaxies and the cosmic background radiation provide evidence for the "big bang" model that suggests that the universe has been expanding for 10 to 20 billion years.	ESCU01C01L04D	Science Weighs In
		SCI09U06C01L04D	Measuring the Universe
SCI.9-12.ES.3.a	Students know features of the ocean floor (magnetic patterns, age, and sea-floor topography) provide evidence of plate tectonics.	ESCU03C01L04D	Plate Tectonics
		ESCU03C01L06D	Plate Boundaries
		SCI09U03C03L14D	Plate Tectonics
		SCI09U05C02L06D	Geology of the Ocean
SCI.9-12.ES.3.b	Students know the principal structures that form at the three different kinds of plate boundaries.	SCI09U10C02L05D	Oceans and Continents
		ESCU03C01L06D	Plate Boundaries
		ESCU03C01P07D	Project: Plate Boundaries
		ESCU03C02P13D	Project: Story of the Spheres

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SCI.9-12.ES.3.c	Students know how to explain the properties of rocks based on the physical and chemical conditions in which they formed, including plate tectonic processes.	SCI09U03C03L14D	Plate Tectonics
		SCI09U05C02L06D	Geology of the Ocean
		SCI09U10C02L05D	Oceans and Continents
SCI.9-12.ES.3.d	Students know why and how earthquakes occur and the scales used to measure their intensity and magnitude.	ESCU04C01L01D	Force of Earthquakes
		ESCU04C01L02D	Measuring The Force of Earthquakes
SCI.9-12.ES.3.e	Students know there are two kinds of volcanoes: one kind with violent eruptions producing steep slopes and the other kind with voluminous lava flows producing gentle slopes.	ESCU04C02L06D	Force of Volcanoes
		ESCU04C02L09D	Features of Volcanoes
		ESCU04C02P10D	Project: Volcanic Features Lab
		SCI09U03C01L03D	Igneous Structures
		SCI09U03C01P04D	Project: Volcanos
SCI.9-12.ES.3.f	Students know the explanation for the location and properties of volcanoes that are due to hot spots and the explanation for those that are due to subduction.	ESCU04C02L06D	Force of Volcanoes
		SCI09U03C01L03D	Igneous Structures
		SCI09U03C01P04D	Project: Volcanos
		SCI09U03C03L14D	Plate Tectonics
SCI.9-12.ES.4.a	Students know the relative amount of incoming solar energy compared with Earth's internal energy and the energy used by society.	BIOU09C04L15D	Energy Affects Ecology
		ESCU10C02L07D	Solar Power
		SCI09U09C02L05D	Energy Sources
SCI.9-12.ES.4.b	Students know the fate of incoming solar radiation in terms of reflection, absorption, and photosynthesis.	BIOU03C03L12D	Protista: The Algae
		BIOU04C02L08D	Organelles

Section	Description	OW Lesson ID	Title
		BIOU05C03L09D	How do Plants Work?
		BIOU05C03L10D	Photosynthesis: A Closer Look
		BIOU05C03P11A	Experiment: Terrarium
		ESCU09C02L07D	Solar Interaction
		ESCU09C02P08D	Project: Solar Energy
		PHYU04C02L04D	Wave Phenomena
		PHYU10C02L05	Wave Motion
		PHYU10C02L06	Light and Sound
SCI.9-12.ES.4.c	Students know the different atmospheric gases that absorb the Earth's thermal radiation and the mechanism and significance of the greenhouse effect.	BIOU09C03L12D	Pollution Affects Ecology
		BIOU09C03L13D	Pollution Problems
		ESCU02C02P11D	Project: Greenhouse Effect
		ESCU09C03L12D	Air Pollution
		ESCU09C03P13D	Project: Greenhouse Effect
		IPCU11C01L01D	Carbon Dioxide and Global Warming
SCI.9-12.ES.4.d	Students know the differing greenhouse conditions on Earth, Mars, and Venus; the origins of those conditions; and the climatic consequences of each.	BIOU09C03L12D	Pollution Affects Ecology
		ESCU01C03L12D	A Unique Planet
		ESCU02C02P11D	Project: Greenhouse Effect
SCI.9-12.ES.5.a	Students know how differential heating of Earth results in circulation patterns in the atmosphere and oceans that globally distribute the heat.	ESCU08C03L15D	Currents
		SCI09U05C02L07D	Turbidity, Sedimentation, and Currents
SCI.9-12.ES.5.b	Students know the relationship between the rotation of Earth and the circular motions of ocean currents and air in pressure centers.	ESCU08C03L15D	Currents

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		ESCU09C02L09D	Air Pressure and Winds
		SCI09U05C02L07D	Turbidity, Sedimentation, and Currents
SCI.9-12.ES.5.d	Students know properties of ocean water, such as temperature and salinity, can be used to explain the layered structure of the oceans, the generation of horizontal and vertical ocean currents, and the geographic distribution of marine organisms.	ESCU08C03L12D	Ocean Water
		ESCU08C03L15D	Currents
		SCI09U05C01L01D	History of Oceanography
		SCI09U05C02L07D	Turbidity, Sedimentation, and Currents
		SCI09U05C03L10D	Chemistry of the Ocean
		SCI09U05C03P12D	Project: Marine Report
		SCI09U10C02L05D	Oceans and Continents
SCI.9-12.ES.5.f	Students know the interaction of wind patterns, ocean currents, and mountain ranges results in the global pattern of latitudinal bands of rain forests and deserts.	ESCU10C02L09D	Geographical Effects
		ESCU10C02L10D	Climate Regulation and Change
		SCI09U05C02L07D	Turbidity, Sedimentation, and Currents
SCI.9-12.ES.6.a	Students know weather (in the short run) and climate (in the long run) involve the transfer of energy into and out of the atmosphere.	ESCU09C02L07D	Solar Interaction
		ESCU10C01L01D	Weather and Climate
		ESCU10C02L07D	Solar Power
		IPCU11C01L01D	Carbon Dioxide and Global Warming
SCI.9-12.ES.6.b	Students know the effects on climate of latitude, elevation, topography, and proximity to large bodies of water and cold or warm ocean currents.	ESCU10C02L09D	Geographical Effects
		ESCU10C02L10D	Climate Regulation and Change
		SCI09U05C02L07D	Turbidity, Sedimentation, and Currents

Section	Description	OW Lesson ID	Title
SCI.9-12.ES.6.c	Students know how Earth's climate has changed over time, corresponding to changes in Earth's geography, atmospheric composition, and other factors, such as solar radiation and plate movement.	ESCU10C02L10D	Climate Regulation and Change
		SCI09U03C02L07D	Earth Changes
		SCI09U03C02L08D	Erosion and Sediment
		SCI09U03C03L14D	Plate Tectonics
		SCI09U05C02L06D	Geology of the Ocean
		SCI09U10C02L05D	Oceans and Continents
SCI.9-12.ES.6.d	Students know how computer models are used to predict the effects of the increase in greenhouse gases on climate for the planet as a whole and for specific regions.	BIOU09C03L12D	Pollution Affects Ecology
SCI.9-12.ES.7.a	Students know the carbon cycle of photosynthesis and respiration and the nitrogen cycle.	BIOU03C03L12D	Protista: The Algae
		BIOU04C02L05D	Cell Design
		BIOU04C02L08D	Organelles
		BIOU05C03L09D	How do Plants Work?
		BIOU05C03L10D	Photosynthesis: A Closer Look
		BIOU05C03L12D	Respiration
		BIOU05C03P11A	Experiment: Terrarium
SCI.9-12.ES.7.b	Students know the global carbon cycle: the different physical and chemical forms of carbon in the atmosphere, oceans, biomass, fossil fuels, and the movement of carbon among these reservoirs.	CHMU08C01L01D	Organic Compounds
		CHMU08C02L05D	A Closer Look at the Carbon Atom
		ESCU09C02L06D	Atmospheric Cycles
		IPCU11C01L01D	Carbon Dioxide and Global Warming
		SCI09U05C03P12D	Project: Marine Report

Section	Description	OW Lesson ID	Title
SCI.9-12.ES.7.c	Students know the movement of matter among reservoirs is driven by Earth's internal and external sources of energy.	BIOU09C04L15D	Energy Affects Ecology
SCI.9-12.ES.8.a	Students know the thermal structure and chemical composition of the atmosphere.	ESCU09C01L03D	Structure of the Atmosphere
		ESCU09C01P04D	Project: Layers of the Atmosphere
SCI.9-12.ES.8.b	Students know how the composition of Earth's atmosphere has evolved over geologic time and know the effect of outgassing, the variations of carbon dioxide concentration, and the origin of atmospheric oxygen.	ESCU02C02L10D	Paleoclimatic Changes
		ESCU09C01L01D	Evolution of the Atmosphere
		ESCU09C01P02D	Project: Evolution of the Atmosphere
SCI.9-12.ES.8.c	Students know the location of the ozone layer in the upper atmosphere, its role in absorbing ultraviolet radiation, and the way in which this layer varies both naturally and in response to human activities.	BIOU09C03L13D	Pollution Problems
SCI.9-12.IE.1.a	Select and use appropriate tools and technology (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.	BIOU03C01P03D	Experiment: Using the Microscope
		BIOU03C02P06D	Experiment: A Protozoan Culture
		BIOU03C02P07A	Experiment: The Amoeba
		BIOU03C02P09A	Experiment: The Euglena
		BIOU03C03P13A	Experiment: Algae
		BIOU03C04P21A	Experiment: Algae Observations
		BIOU04C01P02D	Experiment: Human Cheek Cells
		BIOU04C01P03A	Experiment: The Onion Cells
		BIOU04C03P12A	Experiment: Tissues
		BIOU06C02P10A	Experiment: Muscle Types
		BIOU08C01P04D	Experiment: Mitosis
BIOU08C03P15A	Experiment: Sexual Reproduction		

Section	Description	OW Lesson ID	Title
		BIOU08C04P18D	Experiment: Tissue Structure
SCI.9-12.IE.1.b	Identify and communicate sources of unavoidable experimental error.	BIOU01C03P07D	Experiment: Classifying Fruit
		BIOU02C02P04D	Experiment: Static Electricity
		BIOU02C02P06A	Experiment: Temperature Control
		BIOU02C02P08D	Experiment: Water Properties
		BIOU02C02P09A	Experiment: Indicators
		BIOU02C04P15A	Experiment: Starch
		BIOU02C05P20A	Experiment: Digestion
		BIOU03C01P03D	Experiment: Using the Microscope
		BIOU03C02P06D	Experiment: A Protozoan Culture
		BIOU03C02P07A	Experiment: The Amoeba
		BIOU03C02P09A	Experiment: The Euglena
		BIOU03C03P13A	Experiment: Algae
		BIOU03C04P18D	Experiment: Fungi
		BIOU03C04P21A	Experiment: Algae Observations
		BIOU04C01P02D	Experiment: Human Cheek Cells
		BIOU04C01P03A	Experiment: The Onion Cells
		BIOU04C02P07D	Experiment: Osmosis
		BIOU04C03P12A	Experiment: Tissues
		BIOU05C03P11A	Experiment: Terrarium
		BIOU06C01P06D	Experiment: Heart Rate
		BIOU06C02P10A	Experiment: Muscle Types
		BIOU07C03P12D	Experiment: Molecular Genetics
		BIOU08C01P04D	Experiment: Mitosis
		BIOU08C02P07A	Experiment: Fragmentation
		BIOU08C02P11A	Experiment: Cuttings
		BIOU08C03P15A	Experiment: Sexual Reproduction

Section	Description	OW Lesson ID	Title
		BIOU08C04P18D	Experiment: Tissue Structure
		BIOU08C05P23A	Experiment: Ferns and Pines
		BIOU08C05P24A	Experiment: Flowers
		BIOU09C02P07D	Experiment: Habitats
		BIOU09C02P08A	Experiment: Biomes
		BIOU09C02P09A	Experiment: Quadrats
		BIOU09C02P10A	Experiment: Inventory
		BIOU10C01L01D	Study of Life
		SCI09U02C02P05D	Experiment: Mass of Gas
		SCI09U03C03L12D	Experiment: Specific Gravity
		SCI09U03C03P13D	Experiment: Gravity
SCI.9-12.IE.1.c	Identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions.	BIOU01C03P07D	Experiment: Classifying Fruit
		BIOU02C02P04D	Experiment: Static Electricity
		BIOU02C02P06A	Experiment: Temperature Control
		BIOU02C02P08D	Experiment: Water Properties
		BIOU02C02P09A	Experiment: Indicators
		BIOU02C04P15A	Experiment: Starch
		BIOU02C05P20A	Experiment: Digestion
		BIOU03C01P03D	Experiment: Using the Microscope
		BIOU03C02P06D	Experiment: A Protozoan Culture
		BIOU03C02P07A	Experiment: The Amoeba
		BIOU03C02P09A	Experiment: The Euglena
		BIOU03C03P13A	Experiment: Algae
		BIOU03C04P18D	Experiment: Fungi
		BIOU03C04P21A	Experiment: Algae Observations
		BIOU04C01P02D	Experiment: Human Cheek Cells
		BIOU04C01P03A	Experiment: The Onion Cells

Section	Description	OW Lesson ID	Title
		BIOU04C02P07D	Experiment: Osmosis
		BIOU04C03P12A	Experiment: Tissues
		BIOU05C02P06D	Experiment: Seeds
		BIOU05C03P11A	Experiment: Terrarium
		BIOU06C01P06D	Experiment: Heart Rate
		BIOU06C02P10A	Experiment: Muscle Types
		BIOU07C01P03D	Experiment: Probability
		BIOU07C03P12D	Experiment: Molecular Genetics
		BIOU08C01P04D	Experiment: Mitosis
		BIOU08C02P07A	Experiment: Fragmentation
		BIOU08C02P11A	Experiment: Cuttings
		BIOU08C03P15A	Experiment: Sexual Reproduction
		BIOU08C04P18D	Experiment: Tissue Structure
		BIOU08C05P23A	Experiment: Ferns and Pines
		BIOU08C05P24A	Experiment: Flowers
		BIOU09C02P07D	Experiment: Habitats
		BIOU09C02P08A	Experiment: Biomes
		BIOU09C02P09A	Experiment: Quadrats
		BIOU09C02P10A	Experiment: Inventory
		PHYU01C01P02D	Experiment: Making a Soda Straw Balance
		PHYU01C02P05A	Experiment: Oleic Acid
		SCI09U02C01P02D	Experiment: Determining Volume
		SCI09U02C02P05D	Experiment: Mass of Gas
		SCI09U03C03L12D	Experiment: Specific Gravity
		SCI09U03C03P13D	Experiment: Gravity
SCI.9-12.IE.1.f	Distinguish between hypothesis and theory as scientific terms.	BIOU06C01P06D	Experiment: Heart Rate
		BIOU07C03P12D	Experiment: Molecular Genetics

Section	Description	OW Lesson ID	Title
		BIOU08C01P04D	Experiment: Mitosis
		BIOU08C04P18D	Experiment: Tissue Structure
		BIOU08C05P24A	Experiment: Flowers
		BIOU10C01L01D	Study of Life
		CHMU01C03L10D	Observation and Hypothesizing
		CHMU10C01L02D	Scientific Analysis and Significant Figures
		SCI09U02C02P05D	Experiment: Mass of Gas
SCI.9-12.IE.1.h	Read and interpret topographic and geologic maps.	ESCU04C03L12D	Using Geologic Maps
		ESCU04C03L13D	Using Topographic Maps
		ESCU04C03P14D	Project: Mapping
SCI.9-12.IE.1.i	Analyze the locations, sequences, or time intervals that are characteristic of natural phenomena (e.g., relative ages of rocks, locations of planets over time, and succession of species in an ecosystem).	ESCU02C01L02D	Relative Dating
		SCI09U04C02L06D	Geography and Time (Part 1)
		SCI09U04C02L07D	Geography and Time (Part 2)
		SCI09U06C01L01D	History of Astronomy
SCI.9-12.IE.1.m	Investigate a science-based societal issue by researching the literature, analyzing data, and communicating the findings. Examples of issues include irradiation of food, cloning of animals by somatic cell nuclear transfer, choice of energy sources, and land and water use decisions in California.	SCI09U09C02L05D	Energy Sources
SCI.9-12.IE.1.n	Know that when an observation does not agree with an accepted scientific theory, the observation is sometimes mistaken or fraudulent (e.g., the Piltdown Man fossil or unidentified flying objects) and that the theory is sometimes wrong (e.g., the Ptolemaic model of the movement of the Sun, Moon, and planets).	BIOU01C03P08A	Activity: Keying Plants
		BIOU03C04P21A	Experiment: Algae Observations

Section	Description	OW Lesson ID	Title
		BIOU05C03P11A	Experiment: Terrarium
		BIOU06C02P10A	Experiment: Muscle Types
		BIOU07C03P12D	Experiment: Molecular Genetics
		BIOU08C02P07A	Experiment: Fragmentation
		BIOU08C02P11A	Experiment: Cuttings
		BIOU08C05P23A	Experiment: Ferns and Pines
		BIOU09C02P07D	Experiment: Habitats
		BIOU09C02P10A	Experiment: Inventory
		CHMU01C05L18A	Learning to Make Useful and Detailed Observations
		CHMU02C02P04D	Experiment: Observations of a Phase Change
		SCI07U01C01L01D	What is Science?
		SCI09U04C01L01D	An Observational Science
SCI.9-12.PH.1.b	Students know that when forces are balanced, no acceleration occurs; thus an object continues to move at a constant speed or stays at rest (Newton's first law).	ESCU01C02L09D	Ability To Orbit
		ESCU01C02P10D	Project: Newton's Law
		PHYU01C04L11D	Rate of Velocity Change
		PHYU02C01L01D	Newton's First and Second Laws
		PHYU10C01L01	Mechanics
SCI.9-12.PH.1.c	Students know how to apply the law $F = ma$ to solve one-dimensional motion problems that involve constant forces (Newton's second law).	IPCU05C02L12D	Centripetal Force
		PHYU02C01L01D	Newton's First and Second Laws
		PHYU10C01L02	Dynamics
SCI.9-12.PH.1.d	Students know that when one object exerts a force on a second object, the second object always exerts a force of equal magnitude and in the opposite direction (Newton's third law).	ESCU01C02L09D	Ability To Orbit
		ESCU01C02P10D	Project: Newton's Law

Section	Description	OW Lesson ID	Title
		IPCU05C02P11D	Experiment: Propulsion
		PHYU02C04L09D	Newton's Third Law and Conservation of Momentum
SCI.9-12.PH.1.e	Students know the relationship between the universal law of gravitation and the effect of gravity on an object at the surface of Earth.	ESCU01C02L09D	Ability To Orbit
		ESCU01C02P10D	Project: Newton's Law
SCI.9-12.PH.1.f	Students know applying a force to an object perpendicular to the direction of its motion causes the object to change direction but not speed (e.g., Earth's gravitational force causes a satellite in a circular orbit to change direction but not speed).	PHYU02C03L06D	Uniform Circular Motion
		PHYU02C03P07D	Experiment: Circular Motion
SCI.9-12.PH.1.g	Students know circular motion requires the application of a constant force directed toward the center of the circle.	PHYU02C03L06D	Uniform Circular Motion
		PHYU02C03P07D	Experiment: Circular Motion
SCI.9-12.PH.1.h	Students know Newton's laws are not exact but provide very good approximations unless an object is moving close to the speed of light or is small enough that quantum effects are important.	PHYU05C01L01D	Speed of Light: Historical Calculations
		PHYU10C02L06	Light and Sound
SCI.9-12.PH.1.j	Students know how to resolve two-dimensional vectors into their components and calculate the magnitude and direction of a vector from its components.	IPCU05C02L08D	Forces
SCI.9-12.PH.1.k	Students know how to solve two-dimensional problems involving balanced forces (statics).	PHYU01C02L04D	Measurement of Length
SCI.9-12.PH.1.l	Students know how to solve problems in circular motion by using the formula for centripetal acceleration in the following form: $a = v/r$.	IPCU05C01L03D	Acceleration
		IPCU05C02L12D	Centripetal Force

Section	Description	OW Lesson ID	Title
		PHYU01C04L11D	Rate of Velocity Change
		PHYU02C03L06D	Uniform Circular Motion
		PHYU02C03P07D	Experiment: Circular Motion
		PHYU10C01L01	Mechanics
SCI.9-12.PH.1.m	Students know how to solve problems involving the forces between two electric charges at a distance (Coulomb's law) or the forces between two masses at a distance (universal gravitation).	ESCU01C02L09D	Ability To Orbit
		PHYU06C01L02	Coulomb's Law
SCI.9-12.PH.2.a	Students know how to calculate kinetic energy by using the formula $E = (1/2)mv$.	IPCU07C01L03D	Mechanical Energy
		IPCU07C01L04D	Conservation of Energy
		PHYU03C01L01D	Work, Kinetic, and Potential Energy
		PHYU10C01L03	Energy
SCI.9-12.PH.2.b	Students know how to calculate changes in gravitational potential energy near Earth by using the formula (change in potential energy) = mgh (h is the change in the elevation).	IPCU07C01L04D	Conservation of Energy
SCI.9-12.PH.2.c	Students know how to solve problems involving conservation of energy in simple systems, such as falling objects.	IPCU07C01L04D	Conservation of Energy
		IPCU07C01P05D	Experiment: Conservation of Energy
		PHYU03C02L04D	Conservation of Energy
		PHYU10C03L10	Circuits
SCI.9-12.PH.2.d	Students know how to calculate momentum as the product mv .	IPCU05C01L06D	Momentum
		PHYU10C01L02	Dynamics
SCI.9-12.PH.2.e	Students know momentum is a separately conserved quantity different from energy.	PHYU02C04L09D	Newton's Third Law and Conservation of Momentum

Section	Description	OW Lesson ID	Title
		PHYU02C04P10A	Experiment: Explosion
		PHYU03C02L04D	Conservation of Energy
		PHYU10C01L02	Dynamics
		PHYU10C03L10	Circuits
SCI.9-12.PH.2.f	Students know an unbalanced force on an object produces a change in its momentum.	PHYU10C01L02	Dynamics
SCI.9-12.PH.2.g	Students know how to solve problems involving elastic and inelastic collisions in one dimension by using the principles of conservation of momentum and energy.	PHYU02C04L09D	Newton's Third Law and Conservation of Momentum
		PHYU02C04P10A	Experiment: Explosion
		PHYU03C02L04D	Conservation of Energy
		PHYU10C03L10	Circuits
SCI.9-12.PH.2.h	Students know how to solve problems involving conservation of energy in simple systems with various sources of potential energy, such as capacitors and springs.	PHYU03C01L01D	Work, Kinetic, and Potential Energy
		PHYU03C02L04D	Conservation of Energy
		PHYU06C03L09	Potential and Energy
		PHYU10C01L03	Energy
		PHYU10C03L10	Circuits
SCI.9-12.PH.3.a	Students know heat flow and work are two forms of energy transfer between systems.	IPCU08C01L03D	Heat Flow
SCI.9-12.PH.3.b	Students know that the work done by a heat engine that is working in a cycle is the difference between the heat flow into the engine at high temperature and the heat flow out at a lower temperature (first law of thermodynamics) and that this is an example of the law of conservation of energy.	CHMU06C01L06D	Using Gibbs Free Energy to Predict Spontaneous Reactions
		IPCU08C02L09D	Heat Engines
		PHYU03C02L04D	Conservation of Energy

Section	Description	OW Lesson ID	Title
		PHYU03C03L11D	Laws of Thermodynamics
		PHYU10C03L10	Circuits
SCI.9-12.PH.3.c	Students know the internal energy of an object includes the energy of random motion of the object's atoms and molecules, often referred to as thermal energy. The greater the temperature of the object, the greater the energy of motion of the atoms and molecules that make up the object.	CHMU03C01L02D	Gases and Kinetic Molecular Theory
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		IPCU08C01L01D	Thermodynamics and Entropy
		IPCU08C01L02D	Specific Heat Capacity
		SCI09U01C01L01D	Structure of Matter
		SCI09U01C03L05D	Atomic Nuclei
SCI.9-12.PH.3.d	Students know that most processes tend to decrease the order of a system over time and that energy levels are eventually distributed uniformly.	CHMU06C01L06D	Using Gibbs Free Energy to Predict Spontaneous Reactions
		IPCU08C01L01D	Thermodynamics and Entropy
SCI.9-12.PH.3.e	Students know that entropy is a quantity that measures the order or disorder of a system and that this quantity is larger for a more disordered system.	CHMU06C01L06D	Using Gibbs Free Energy to Predict Spontaneous Reactions
		IPCU08C01L01D	Thermodynamics and Entropy
SCI.9-12.PH.3.f	Students know the statement "Entropy tends to increase" is a law of statistical probability that governs all closed systems (second law of thermodynamics).	CHMU06C01L06D	Using Gibbs Free Energy to Predict Spontaneous Reactions
SCI.9-12.PH.3.g	Students know how to solve problems involving heat flow, work, and efficiency in a heat engine and know that all real engines lose some heat to their surroundings.	IPCU08C02L09D	Heat Engines
		PHYU03C02L05D	Power and Efficiency
		PHYU03C03L11D	Laws of Thermodynamics
		PHYU10C01L03	Energy

Section	Description	OW Lesson ID	Title
SCI.9-12.PH.4.a	Students know waves carry energy from one place to another.	IPCU10C01L03D	Properties of Waves
		PHYU04C01L01D	Characteristics of Waves
SCI.9-12.PH.4.b	Students know how to identify transverse and longitudinal waves in mechanical media, such as springs and ropes, and on the earth (seismic waves).	IPCU10C01L02D	Types of Waves
		PHYU04C01L01D	Characteristics of Waves
		PHYU10C02L05	Wave Motion
SCI.9-12.PH.4.c	Students know how to solve problems involving wavelength, frequency, and wave speed.	IPCU10C01L03D	Properties of Waves
		PHYU04C01P02D	Experiment: Wave Speeds
SCI.9-12.PH.4.d	Students know sound is a longitudinal wave whose speed depends on the properties of the medium in which it propagates.	IPCU10C01L02D	Types of Waves
		IPCU10C01L03D	Properties of Waves
		IPCU10C01P04D	Experiment: Changing the Speed of a Wave
		IPCU10C02L07D	Sound Vibrations
		PHYU04C01L01D	Characteristics of Waves
		PHYU04C01P02D	Experiment: Wave Speeds
		PHYU04C03L07D	Sound Waves
		PHYU10C02L05	Wave Motion
SCI.9-12.PH.4.e	Students know radio waves, light, and X-rays are different wavelength bands in the spectrum of electromagnetic waves whose speed in a vacuum is approximately 3×10^8 m/s (186,000 miles/second).	IPCU10C03L13D	Light and the Electromagnetic Spectrum
		PHYU04C01P02D	Experiment: Wave Speeds
		PHYU05C01L01D	Speed of Light: Historical Calculations

Section	Description	OW Lesson ID	Title
		PHYU09C01L02	X-Rays, Matter Waves, and the Uncertainty Principle
		PHYU10C02L06	Light and Sound
		PHYU10C04L14	Duality
SCI.9-12.PH.4.f	Students know how to identify the characteristic properties of waves: interference (beats), diffraction, refraction, Doppler effect, and polarization.	ESCU01C01P05D	Project: Doppler Effect
		IPCU10C01L05D	The Behavior of Waves
		IPCU10C02L10D	Doppler Effect
		IPCU10C02L11D	Beats, Resonance, and Harmonics
		IPCU10C03L14D	Properties of Light
		IPCU10C03L17D	Lenses
		IPCU11C02L06D	Atomic Spectra and Moving Stars
		PHYU04C02L04D	Wave Phenomena
		PHYU04C03L07D	Sound Waves
		PHYU04C03P08A	Experiment: Doppler Effect
		PHYU05C01L01D	Speed of Light: Historical Calculations
		PHYU05C01L02D	Properties of Light
		PHYU05C01P03A	Experiment: Water Refraction
		PHYU05C03L10	Light Phenomena and Models of Light
		PHYU10C02L05	Wave Motion
		PHYU10C02L06	Light and Sound
SCI.9-12.PH.5.a	Students know how to predict the voltage or current in simple direct current (DC) electric circuits constructed from batteries, wires, resistors, and capacitors.	PHYU06C03L09	Potential and Energy
		PHYU07C01L01	Sources of EMF
		PHYU07C02L05	Resistance
SCI.9-12.PH.5.b	Students know how to solve problems involving Ohm's law.	IPCU09C01L05D	Circuits

Section	Description	OW Lesson ID	Title
		PHYU06C02L06	Electric Fields
		PHYU07C03L07	Ohm's Law
		PHYU07C03L08	Circuits
SCI.9-12.PH.5.c	Students know any resistive element in a DC circuit dissipates energy, which heats the resistor. Students can calculate the power (rate of energy dissipation) in any resistive circuit element by using the formula Power = IR (potential difference) x I (current) = 1 R.	IPCU09C01L06D	Electrical Energy and Power
		PHYU07C02L05	Resistance
SCI.9-12.PH.5.e	Students know charged particles are sources of electric fields and are subject to the forces of the electric fields from other charges.	IPCU09C01L02D	Static Electricity
		PHYU06C02L06	Electric Fields
SCI.9-12.PH.5.f	Students know magnetic materials and electric currents (moving electric charges) are sources of magnetic fields and are subject to forces arising from the magnetic fields of other sources.	IPCU09C02L08D	Magnetism
		PHYU07C01L01	Sources of EMF
		PHYU08C01L01	Fields and Forces
		PHYU08C01P02	Experiment: Magnetic Fields
		PHYU08C02P06	Experiment: Magnetic Fields
		PHYU10C03L09	Fields and Forces
SCI.9-12.PH.5.g	Students know how to determine the direction of a magnetic field produced by a current flowing in a straight wire or in a coil.	PHYU07C01L01	Sources of EMF
		PHYU08C01L01	Fields and Forces
		PHYU08C01P02	Experiment: Magnetic Fields
		PHYU08C02P06	Experiment: Magnetic Fields
		PHYU10C03L09	Fields and Forces

Section	Description	OW Lesson ID	Title
SCI.9-12.PH.5.h	Students know changing magnetic fields produce electric fields, thereby inducing currents in nearby conductors.	PHYU06C01L01	Electric Charges
		PHYU06C01L04	The Transfer of Charges
		PHYU06C02L06	Electric Fields
		PHYU07C01L01	Sources of EMF
		PHYU07C02L05	Resistance
		PHYU08C01L01	Fields and Forces
		PHYU08C01P02	Experiment: Magnetic Fields
		PHYU08C02P06	Experiment: Magnetic Fields
SCI.9-12.PH.5.i	Students know plasmas, the fourth state of matter, contain ions or free electrons or both and conduct electricity.	PHYU10C03L09	Fields and Forces
		CHMU04C04L10D	Charging Up: Ionization of Atoms
		CHMU07C01L05D	Solubility
		CHMU10C02L07D	The Periodic Law
		PHYU06C01L01	Electric Charges
SCI.9-12.PH.5.j	Students know electric and magnetic fields contain energy and act as vector force fields.	SCI09U01C01L01D	Structure of Matter
		PHYU06C02L06	Electric Fields
		PHYU08C01L01	Fields and Forces
		PHYU08C01P02	Experiment: Magnetic Fields
		PHYU08C02P06	Experiment: Magnetic Fields
SCI.9-12.PH.5.k	Students know electric and magnetic fields contain energy and act as vector force fields.	PHYU10C03L09	Fields and Forces
		PHYU06C02L06	Electric Fields
		PHYU08C01L01	Fields and Forces
		PHYU08C01P02	Experiment: Magnetic Fields
SCI.9-12.PH.5.l	Students know how to calculate the electric field resulting from a point charge.	PHYU08C02P06	Experiment: Magnetic Fields
		IPCU09C01L02D	Static Electricity
		PHYU06C02L06	Electric Fields

Section	Description	OW Lesson ID	Title
SCI.9-12.PH.5.m	Students know static electric fields have as their source some arrangement of electric charges.	BIOU02C02P04D	Experiment: Static Electricity
		IPCU09C01L02D	Static Electricity
		IPCU09C01P03D	Experiment: Electrostatic Investigations
		PHYU06C01P03	Experiment: Static Electricity
		PHYU06C02L06	Electric Fields
SCI.9-12.PH.5.n	Students know the magnitude of the force on a moving particle (with charge q) in a magnetic field is $qvB \sin(a)$, where a is the angle between v and B (v and B are the magnitudes of vectors v and B , respectively), and students use the right-hand rule to find the direction of this force.	PHYU01C02L04D	Measurement of Length
		PHYU08C01L01	Fields and Forces
		PHYU08C01P02	Experiment: Magnetic Fields
		PHYU08C02P06	Experiment: Magnetic Fields
		PHYU10C03L09	Fields and Forces
SCI.9-12.PH.5.o	Students know how to apply the concepts of electrical and gravitational potential energy to solve problems involving conservation of energy.	PHYU03C02L04D	Conservation of Energy
		PHYU10C03L10	Circuits

Standard: Content Standards for CAPA and Star CAPA Blueprints

Grade: 9-12

SCI.9-12.AB.5d.1	Know that the pH scale is used to identify acid and base solutions.	BIOU02C02L07D	Importance of Inorganic Compounds
		CHMU07C01L01D	Chemist's Toolbox
		CHMU07C03L13D	pH Scale
		CHMU07C03L14D	Titration of Acids and Bases
		CHMU07C03P12A	Experiment: Acid Strength
		CHMU07C04L19D	pH Calculations

Section	Description	OW Lesson ID	Title
		CHMU10C03L12D	Solutions
		CHMU10C03L13D	Solubility Equilibrium
		IPCU03C01L05D	Acids and Bases
		IPCU03C01P06D	Experiment: The Cabbage Indicator
		IPCU11C01L03D	Fossil Fuels, Acid Rain and Ocean Acidification
SCI.9-12.AMS.1b.1	Know that elements on the periodic table are classified as metals, non-metals, and inert gases.	CHMU02C01L01D	The Basic Ingredient: Chemical Elements
		CHMU04C02L06D	Designing an Organizational Map: The Periodic Table
		CHMU04C04L10D	Charging Up: Ionization of Atoms
		CHMU10C01L03D	Elements, Compounds, and Mixtures
		CHMU10C02L07D	The Periodic Law
		IPCU02C02L05D	Elements and Their Properties
		IPCU02C02L06D	The Periodic Table
		IPCU02C02L07D	Trends on the Periodic Table
		SCI07U02C01L02D	Elements
		SCI09U01C01L01D	Structure of Matter
SCI.9-12.CG.9b.1	Know different kinds of natural hazards (e.g., earthquakes, volcanoes, landslides).	ESCU04C01L01D	Force of Earthquakes
		ESCU04C02L06D	Force of Volcanoes
		ESCU04C02L07D	Impact of Volcanoes
		ESCU04C02P10D	Project: Volcanic Features Lab
		SCI09U03C01P04D	Project: Volcanos
SCI.9-12.DEP.3d.1	Know the general characteristics of an earthquake.	ESCU04C01L01D	Force of Earthquakes
		ESCU04C01L02D	Measuring The Force of Earthquakes
SCI.9-12.DEP.3d.2	Know that earthquakes can be the result of sudden motions along breaks in the crust called faults.	ESCU04C01L01D	Force of Earthquakes

Section	Description	OW Lesson ID	Title
		SCI09U03C01L02D	Internal Structures
		SCI09U03C01L05D	Mountains
		SCI09U04C01L04D	Crustal Changes
		SCI09U10C02L05D	Oceans and Continents
SCI.9-12.DEP.3e.1	Know the general characteristics of a volcano.	ESCU04C02L06D	Force of Volcanoes
		ESCU04C02L08D	Prediction of Volcanoes
		ESCU04C02P10D	Project: Volcanic Features Lab
		SCI09U03C01L03D	Igneous Structures
		SCI09U03C01P04D	Project: Volcanos
SCI.9-12.EC.6b.1	Know that changes in ecosystems may be due to climate changes, impact of human activity, and changes in population size.	BIOU09C01L01D	Principles of Ecology
		ESCU10C01L01D	Weather and Climate
		ESCU10C02L10D	Climate Regulation and Change
		SCI09U09C02L07D	Industry and Transportation
		SCI09U10C03L09D	Population and Environment
SCI.9-12.EC.6e.1	Know the role of producers and decomposers in an ecosystem.	BIOU09C01L01D	Principles of Ecology
		BIOU09C04P16D	Activity: Make a Pyramid
SCI.9-12.EC.6f.1	Know levels of the energy pyramid (e.g., producers, consumers).	BIOU09C04P16D	Activity: Make a Pyramid
SCI.9-12.EC.6f.2	Know the role of an organism in a simple food web.	BIOU10C02L06D	Environment of Life
		ESCU03C02P15D	Project: Flow of Energy
		SCI09U05C03L09D	Commercial Fishing

Section	Description	OW Lesson ID	Title
SCI.9-12.EES.6a.1	Know the general characteristics of weather.	ESCU10C01L01D	Weather and Climate
		ESCU10C01P02D	Project: Weather or Climate?
		ESCU10C01P04D	Project: Clouds and Weather
		ESCU10C02L07D	Solar Power
		ESCU10C02L09D	Geographical Effects
		ESCU10C02P08D	Project: Control the Weather
SCI.9-12.EES.6a.2	Know the general characteristics of climate.	ESCU10C01L01D	Weather and Climate
		ESCU10C01P02D	Project: Weather or Climate?
		ESCU10C02L07D	Solar Power
		ESCU10C02L09D	Geographical Effects
		ESCU10C02L10D	Climate Regulation and Change
		ESCU10C02P11D	Project: Research Your Climate
SCI.9-12.EES.6b.1	Know the climate of specific biomes.	BIOU09C02L05D	Ecological Relationships
		BIOU09C02P08A	Experiment: Biomes
		ESCU10C02P11D	Project: Research Your Climate
SCI.9-12.EV.8e.1	Know that fossil evidence can be analyzed with regard to species change over time and mass extinction.	BIOU09C02L06D	Communities and Habitats
		CHMU01C01L04D	Measuring Mass in the Chemistry Laboratory
		ESCU02C02L08D	Mass Extinctions
		ESCU02C02P07D	Project: The Clock of Eons
		ESCU02C02P09D	Project: Before, During, and After a Mass Extinction
		SCI09U02C02L04D	Mass
		SCI09U02C02P05D	Experiment: Mass of Gas
		SCI09U04C01L03D	Fossils
SCI09U10C01L02D	Weight, Mass, and Density		

Section	Description	OW Lesson ID	Title
SCI.9-12.IE.1a.1	Select and use appropriate tools and technology (e.g., calculators, balances, magnifying lens, binoculars) to perform tests.	CHMU01C02P08A	Experiment: Masses
		PHYU01C01P02D	Experiment: Making a Soda Straw Balance
		SCI09U03C03L12D	Experiment: Specific Gravity
SCI.9-12.IE.1c.1	Identify possible sources of error in an experiment.	BIOU01C03P07D	Experiment: Classifying Fruit
		BIOU02C02P04D	Experiment: Static Electricity
		BIOU02C02P06A	Experiment: Temperature Control
		BIOU02C02P08D	Experiment: Water Properties
		BIOU02C02P09A	Experiment: Indicators
		BIOU02C04P15A	Experiment: Starch
		BIOU02C05P20A	Experiment: Digestion
		BIOU03C01P03D	Experiment: Using the Microscope
		BIOU03C02P06D	Experiment: A Protozoan Culture
		BIOU03C02P07A	Experiment: The Amoeba
		BIOU03C02P09A	Experiment: The Euglena
		BIOU03C03P13A	Experiment: Algae
		BIOU03C04P18D	Experiment: Fungi
		BIOU03C04P21A	Experiment: Algae Observations
		BIOU04C01P02D	Experiment: Human Cheek Cells
		BIOU04C01P03A	Experiment: The Onion Cells
		BIOU04C02P07D	Experiment: Osmosis
		BIOU04C03P12A	Experiment: Tissues
		BIOU05C03P11A	Experiment: Terrarium
		BIOU06C01P06D	Experiment: Heart Rate
BIOU06C02P10A	Experiment: Muscle Types		
BIOU07C03P12D	Experiment: Molecular Genetics		
BIOU08C01P04D	Experiment: Mitosis		
BIOU08C02P07A	Experiment: Fragmentation		

Section	Description	OW Lesson ID	Title
		BIOU08C02P11A	Experiment: Cuttings
		BIOU08C03P15A	Experiment: Sexual Reproduction
		BIOU08C04P18D	Experiment: Tissue Structure
		BIOU08C05P23A	Experiment: Ferns and Pines
		BIOU08C05P24A	Experiment: Flowers
		BIOU09C02P07D	Experiment: Habitats
		BIOU09C02P08A	Experiment: Biomes
		BIOU09C02P09A	Experiment: Quadrats
		BIOU09C02P10A	Experiment: Inventory
		BIOU10C01L01D	Study of Life
		SCI09U02C02P05D	Experiment: Mass of Gas
		SCI09U03C03L12D	Experiment: Specific Gravity
		SCI09U03C03P13D	Experiment: Gravity

SCI.9-12.IE.1f.1

Form a simple hypothesis based on observations.

BIOU01C03P08A	Activity: Keying Plants
BIOU03C04P21A	Experiment: Algae Observations
BIOU05C03P11A	Experiment: Terrarium
BIOU06C01P06D	Experiment: Heart Rate
BIOU06C02P10A	Experiment: Muscle Types
BIOU07C03P12D	Experiment: Molecular Genetics
BIOU08C01P04D	Experiment: Mitosis
BIOU08C02P07A	Experiment: Fragmentation
BIOU08C02P11A	Experiment: Cuttings
BIOU08C04P18D	Experiment: Tissue Structure
BIOU08C05P23A	Experiment: Ferns and Pines
BIOU08C05P24A	Experiment: Flowers
BIOU09C02P07D	Experiment: Habitats
BIOU09C02P10A	Experiment: Inventory
BIOU10C01L01D	Study of Life

Section	Description	OW Lesson ID	Title
		CHMU01C03L10D	Observation and Hypothesizing
		CHMU01C05L18A	Learning to Make Useful and Detailed Observations
		CHMU02C02P04D	Experiment: Observations of a Phase Change
		CHMU10C01L02D	Scientific Analysis and Significant Figures
		SCI07U01C01L01D	What is Science?
		SCI09U02C02P05D	Experiment: Mass of Gas
		SCI09U04C01L01D	An Observational Science
SCI.9-12.IE.1h.1	Interpret scale models, maps, and diagrams.	BIOU03C02P07A	Experiment: The Amoeba
		BIOU03C02P09A	Experiment: The Euglena
		BIOU03C03P13A	Experiment: Algae
		BIOU03C04P18D	Experiment: Fungi
		BIOU03C04P21A	Experiment: Algae Observations
		BIOU04C01P02D	Experiment: Human Cheek Cells
		BIOU04C01P03A	Experiment: The Onion Cells
		BIOU05C02P06D	Experiment: Seeds
		BIOU08C01P04D	Experiment: Mitosis
		BIOU08C03P15A	Experiment: Sexual Reproduction
		BIOU08C05P23A	Experiment: Ferns and Pines
		BIOU08C05P24A	Experiment: Flowers
		ESCU04C03L12D	Using Geologic Maps
		ESCU04C03L13D	Using Topographic Maps
		ESCU04C03P14D	Project: Mapping
SCI.9-12.MF.1c.1	Know that the greater the mass of an object, the more force is needed to achieve the same rate of change in motion.	CHMU01C01L04D	Measuring Mass in the Chemistry Laboratory
		CHMU10C01L01D	Measurement and Analysis
		PHYU10C01L02	Dynamics
		SCI09U02C02L04D	Mass

Section	Description	OW Lesson ID	Title
		SCI09U02C02P05D	Experiment: Mass of Gas
		SCI09U10C01L02D	Weight, Mass, and Density
SCI.9-12.MF.1e.1	Know that gravity is a force that acts on an object on Earth.	ESCU01C02L09D	Ability To Orbit
		ESCU01C02P10D	Project: Newton's Law
		IPCU05C02L08D	Forces
		PHYU10C01L02	Dynamics
		SCI09U03C03P13D	Experiment: Gravity
SCI.9-12.PH.9a.1	Know that the circulatory system moves nutrients and oxygen in blood through the body.	BIOU06C01L04D	Circulatory System
SCI.9-12.PH.9a.2	Know that the excretory system removes waste from the body.	BIOU06C01L02D	Excretory System
SCI.9-12.PH.9b.1	Know that sensory organs (e.g., by allowing for touch, taste, smell, hearing,) provide information about the environment (e.g. temperature, light, and sound).	BIOU02C02P06A	Experiment: Temperature Control
		BIOU09C01L01D	Principles of Ecology
SCI.9-12.PII.10a.1	Know that the skin protects the body from infections.	BIOU06C03L15D	Sensory Systems: Hearing, Taste, Touch
		SCI09U07C02L07D	Respiratory Infections
		SCI09U07C02L08D	Nervous System Infections
		SCI09U07C03L10D	Common Viral Infections
		SCI09U07C03L11D	Childhood Viral Infections
		SCI09U07C03L12D	Serious Viral Infections
		SCI09U07C04L14D	Protozoan Infections
		SCI09U07C04L15D	Rickettsial Infections
		SCI09U07C04L16D	Fungal Infections
		SCI09U10C03L07D	Infectious Diseases

Section	Description	OW Lesson ID	Title
SCI.9-12.PII.10c.1	Know that vaccination protects an individual from infectious disease.	BIOU06C03L17D	Immune System and Disease
		BIOU10C03L08D	Applications of Biology
		SCI09U07C01L01D	History of Microbiology
		SCI09U07C01L03D	Characteristics of Infectious Diseases
		SCI09U08C01L01D	Body Defense Mechanisms
		SCI09U08C01L04D	Environmental Conditions
		SCI09U08C02L07D	18th and 19th Century Medicine
SCI.9-12.S.6c.1	Know how stirring, temperature, and surface area of a substance can affect the dissolving process.	BIOU02C02P06A	Experiment: Temperature Control
		CHMU07C02L07D	The Dissolving Process
		CHMU10C02L09D	Chemical Reactions, Rates, and Equilibrium
		IPCU03C01L04D	Solutions - The Dissolving Process