Secondary Curriculum Maps

Cumberland Valley School District

Soaring to Greatness, Committed to Excellence

Middle School Science (6-8)

CVSD Secondary Curriculum Map ~ PA Core Standards with Eligible Content

Common Core State Standard	PA Core Standard
S8.A.1.1	Reference: 3.2.7.A, 3.2.7.B

Taught in Unit(s)

Unit 1, grades 6 through 8.

Explanation/Example of Standard

Scientific knowledge is based upon a systematic approach to problem solving in which ideas are proposed and then tested, and data is shared into a common pool of knowledge fed by the publication of rigorously-tested hypothesis.

A hypothesis is often called an "educated guess" since it is based upon previous observations or data, but has not yet been supported by significant evidence generated in a controlled environment.

In this system, ideas move through a continuum of certainty such that hypothesis help to generate data-driven conclusions, and related conclusions are used to build scientific theories.

Common Misconceptions

Not all questions can be investigated scientifically, in that if something cannot be proven wrong (falsifiability), it can never be proven correct.

A theory is NOT a guess, but rather a well-established and widely accepted explanation for a broad range of natural phenomena. While it is possible that scientific theories may be revised, once an idea has risen to this level of certainty, we do not expect it to be disproven and count on it to generate testable hypothesis.

Big Idea(s)	Essential Question(s)
Asking questions and defining problems is essential to developing scientific habits of mind. Scientists and engineers plan and investigate the world to systematically describe it and to develop and test theories and explanations about how the world works.	Why are some questions off limits to science? How does the scientific method result in reliable conclusions and help to build productive scientific theories?

Assessments

- Distinguish between scientific and non-scientific questions
- Explain how a scientific theory differs from a guess, hypothesis, conclusion, etc.

Assessment Anchor		Eligible Content	
S8.A.1.1	**Explain, interpret, and apply** scientific, environmental, or technological knowledge presented in a variety of formats (e.g., **visuals**, scenarios, **graphs**).	S8.A.1.1.1	Distinguish between a scientific **theory and an opinion**, explaining how a theory is supported with evidence, or how new data/information may change existing theories and practices.

		S8.A.1.1.2	Explain how **certain questions** can be answered through scientific inquiry and/or technological design.
		S8.A.1.1.3	Use **evidence**, such as observations or experimental results, to **support inferences** about a relationship.
		S8.A.1.1.4	Develop descriptions, explanations, predictions, and models using **evidence**.

Concepts (what students need to know)	**Skills** (what students must be able to do)
● The scientific method ● Scientific certainty	● Determine whether a hypothesis is testable ● Use a theory to generate a testable hypothesis ● Use observations to a make inferences ● Use a data set to make a conclusion ● Evaluate a theory on the merits of its evidence

CVSD Secondary Curriculum Map ~ PA Core Standards with Eligible Content

Common Core State Standard	PA Core Standard
S8.A.2.1	Reference: 3.2.7.B, 3.2.7.D, 3.1.7.C, 3.1.7.D

Taught in Unit(s)

Unit 1, grades 6 through 8.

Explanation/Example of Standard

The scientific method is not a linear process, but rather calls for scientists to continually make observations, collect data and troubleshoot problems that may require a re-thinking of proposed experimental protocols.

In order to effectively manage a controlled investigation, scientists and engineers must make quantitative measurements and record objective statements that are free from inferences and subjectivity..

An understanding of the relationships between variables is essential in understanding a system, especially as a scientist devises an experiment in which the manipulation of one variable (independent) can be seen to cause a response in another (dependent).

Common Misconceptions

Students often work too quickly in an investigation to realize that their experimental design or data collection was flawed, which can lead to costly errors or the need to repeat an entire investigation.

Students often believe that conducting an investigation is about being "correct"; however, a scientist should not fear a data set that refutes their hypothesis, as the honest and accurate reporting of their conclusions helps to move science forward by establishing work that can be built upon by other researchers.

Students often believe that they can pick whichever graph style they like, but it's important for a scientist to select a figure that matches the data set they are working with, and one that clearly shows the key variables involved in an investigations.

Big Idea(s)	Essential Question(s)
● Scientists construct mental and conceptual models of phenomena to represent current understandings, aid in developing questions and experiments, and to communicate ideas to others. ● Data must be presented in a form that can reveal any patterns and relationships and that allows results to be communicated to others.	● How do scientists develop and use models? ● How do scientists and engineers communicate to others in order to advance science and engineering?

Assessments

- Choose the proper graph style for a given data set
- Construct a properly formatted and captioned graph from raw data
- Make a conclusion based upon a properly formatted and captioned graph
- Design a controlled experiment with appropriate independent (manipulated) and dependent (responding) variables
- Write the following sections of a scientific paper: Introduction, Methods, Results, Discussion

Assessment Anchor	Eligible Content

S8.A.2.1	**Apply knowledge** of scientific investigation or technological **design** in different contexts to **make inferences to solve problem**s.	S8.A.2.1.1	Use **evidence**, **observations**, or a variety of **scales** (e.g., mass, distance, volume, temperature) to describe relationships.
		S8.A.2.1.2	Use **space/time relationships**, define concepts operationally, raise **testable** questions, or **formulate** hypotheses.
		S8.A.2.1.3	Design a **controlled experiment** by specifying how the **independent variables** will be **manipulated**, how the **dependent variable** will be **measured**, and which variables will be held **constant**.
		S8.A.2.1.4	**Interpret** data/observations; **develop relationships** among variables based on data/observations to **design models** as solutions.
		S8.A.2.1.5	Use evidence from investigations to **clearly communicate** and **support conclusions**.
		S8.A.2.1.6	**Identify a design flaw** in a simple technological system and **devise possible working solutions**.

Concepts (what students need to know)	**Skills** (what students must be able to do)
● Variables (manipulated and responding) ● Control ● Presentation of data ● Data-driven conclusions ● Direct versus indirect relationships ● Correlation versus causation	● Write a realistic hypothesis based upon available background information ● Design a controlled investigation, and identify the key variables in the system ● Produce a properly captioned table and use it to collect raw data ● Use data presented in a table to generate a properly captioned graph ● Use a properly captioned graph to generate a data-driven conclusion ● Discuss a conclusion thoroughly, giving time to the importance of the work, sources of error, and opportunities for continued study

CVSD Secondary Curriculum Map ~ PA Core Standards with Eligible Content

Common Core State Standard	PA Core Standard
S8.A.2.2	Reference: 3.3.7.A, 3.7.7.B, 3.1.7.D

Taught in Unit(s)

Unit 1, grades 6 through 8.

Explanation/Example of Standard

Scientific instruments enhance the human ability to observe the natural world, but to make effective use of these tools, a scientist must match them to their intended purpose and accurately report numbers.

Each instrument has a specific level of certainty that corresponds with the decimal places that can be generated.

Scientific tools must be used carefully in order to make measurements in a safe and accurate manner.

Common Misconceptions

Students often believe that a reader will know which units correspond to a particular value, but it is never appropriate to present data without proper units or significant figures.

Students often attempt to use the most convenient technology available, without regard for its utility during a given measurement.

Big Idea(s)	Essential Question(s)
Technology can enhance the abilities of an observer	Why are some instruments more appropriate for a measurement than others?
Units and scales must correspond to the type of measurement being made	How does a scientist determine how many decimals to report?

Assessments

- Record an accurate measurement with appropriate units, using the following instruments: triple-beam balance, electronic balance, graduated cylinder, metric ruler, celsius thermometer, stopwatch
- Compare measurements made with various instruments and units, and determine their appropriateness for specific situations
- Express a number with the appropriate number of significant figures

Assessment Anchor		Eligible Content	
S8.A.2.2	Apply appropriate **instruments** for a specific purpose and describe the information the instrument can provide.	S8.A.2.2.1	**Describe** the appropriate use of **instruments and scales to accurately and safely measure** time, mass, distance, volume, or temperature under a variety of conditions.
		S8.A.2.2.2	Apply appropriate measurement systems (e.g., time, mass, distance, volume, temperature) to **record and interpret observations**

			under varying conditions.
		S8.A.2.2.3	**Describe** ways technology (e.g., microscope, telescope, micrometer, hydraulics, barometer) **extends and enhances human abilities** for specific purposes.

Concepts (what students need to know)	**Skills** (what students must be able to do)
● Instruments required for making various measurements ● Scale (e.g. scale models, scale ratio) ● Significant Figures	● Make measurements with laboratory instruments for length, mass, volume and temperature ● Select the proper instrument and unit for a particular measurement ● Convert units from one form to another using dimensional analysis

CVSD Secondary Curriculum Map ~ PA Core Standards with Eligible Content

Common Core State Standard	PA Core Standard
S8.B.1	***Reference: 3.3.7.A, 3.3.7.B, 4.6.7.A, 4.7.7.B***

Taught in Unit(s)

Characteristics of Life & Cell Basics (6th); Classification of Living Things (7th)

Explanation/Example of Standard

Identify living things and compare and contrast their structures, functions and adaptations. Students will be able to understand the relationship between structure & function.

Common Misconceptions

Difficulty identifying living vs. nonliving things.

Difficulty understanding how adaptations/features help living things better function effectively. Ex: Birds have wings because they need to fly, rather than the reverse.

Big Idea(s)	Essential Question(s)
All organisms are made of cells and can be characterized by common aspects of their structure and functioning. Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through interdependent relationships with other organisms and the physical environment.	How do scientists determine whether something is living or nonliving? How are plant cells similar & different to animal cells? How can there be so many similarities among organisms yet so many different kinds of plants, animals and microorganisms?

Assessments

1. Identify key organelles (and their function) and differentiate between plant & animal cells.
2. Explain the levels of organization in living things.

Assessment Anchor		Eligible Content	
S8.B.1	Describe and compare structural and functional similarities and differences that characterize diverse living things.	**S8.B.1.1.1**	Describe the structures of living things that help them function effectively in specific ways (e.g., adaptations, characteristics).
		S8.B.1.1.2	Compare similarities and differences in internal structures of organisms (e.g., invertebrate/vertebrate, vascular/nonvascular, single-celled/multi-celled) and external structures (e.g., appendages, body segments, type of covering, size, shape).

		S8.B.1.1.3	Apply knowledge of characteristic structures to identify or categorize organisms (i.e., plants, animals, fungi, bacteria, and protista).
	.	**S8.B.1.1.4**	Identify the levels of organization from cell to organism and describe how specific structures (parts), which underlie larger systems, enable the system to function as a whole.

Concepts (what students need to know)	**Skills** (what students must be able to do)
1. Six characteristics of life. 2. Levels of organization. ~~3. Taxonomic classification~~ 4. Prokaryotic vs. eukaryotic cells. ~~5. Binomial nomenclature~~	1. Compare and contrast the structure and function of living things. ~~2. Use a dichotomous key to identify organisms.~~ 3. Identify living vs. nonliving things. 4. List and explain the levels of organization.

CVSD Secondary Curriculum Map ~ PA Core Standards with Eligible Content

Common Core State Standard	PA Core Standard
S8.B.2.2, **S8.B.2.1**	Reference: 3.3.7.C

Taught in Unit(s)

Introduction to Heredity (6th), DNA & Heredity (8th)

Explanation/Example of Standard

The traits of an organism are passed from one generation to the next. DNA is a molecule that contains segments of code called genes that affect protein production within cells. The inheritance of genes can be predicted.

Common Misconceptions

Traits can skip a generation and that 50% of their genes come from mom and 50% come from dad. Mutations are not unusual.

Big Idea(s)	Essential Question(s)
Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, offspring resemble, but are not identical to their parents because of the interactions of these genes.	How are the characteristics of one generation passed to the next? How can individuals of the same species and even siblings have different characteristics?

Assessments

Identify the structural components of DNA.
Explain how a sequence of nitrogen bases serves as the coded instructions for protein production.
Describe the role of mutations in the formation of new alleles.
Describe how a gene controls a trait through protein production.
Identify dominant and recessive genes. Identify factors that affect gene expression.
Use a Punnett Square to predict the probability of an inherited trait.
Construct an organism based on the traits coded by their genes.
Discuss the roles of cloning, genetic engineering, and biotechnology as they relate to meeting current and future human needs.

Assessment Anchor		Eligible Content	
S8.B.2.2	Explain how a set of genetic instructions determines inherited traits of organisms.	S8.B.2.2.1	Identify and explain differences between inherited and acquired traits.
S8.B.2.1.4	Describe how selective breeding or biotechnology can change the genetic make-up of organisms?	S8.B.2.2.2	Recognize that the gene is the basic unit of inheritance, that there are dominant and recessive genes, and that traits are inherited.

Concepts (what students need to know)	**Skills** (what students must be able to do)
1. **Dominant and recessive genes.** 2. **Equal number of genes are inherited.** 3. Traits are determined by chromosomes within our DNA. 4. **Differentiate between inherited and acquired traits.** 5. Genes are segments of DNA that code for protein production. 6. Non Mendelian genetics (incomplete dominance, codominance, multiple alleles)	1. **Complete and interpret a Punnett Square.** 2. Build a DNA model. 3. Use a Punnett square to predict the outcome when traits are inherited by incomplete or codominance or multiple alleles. 4.

CVSD Secondary Curriculum Map ~ PA Core Standards with Eligible Content

Common Core State Standard	PA Core Standard
S8.B.3.1	Reference: 4.4.7.B, 4.6.7.A, 4.1.7.C, 4.1.7.D

Taught in Unit(s)

Ecology (6th), Ecology (8th)

Explanation/Example of Standard

Different types of relationships exist in ecosystems. Biotic and abiotic factors influence an ecosystem.

Common Misconceptions

Students believe water and soil are alive.
Students don't realize that energy moves through an ecosystem.
Students struggle with understanding how plants and animals can adapt to their environments.

Big Idea(s)	Essential Question(s)
Living and nonliving things interact to form a working system in an ecosystem. Limiting factors, human impact and/or natural disasters can move an ecosystem out of balance.	How are ecosystems organized? How does energy flow through an ecosystem? What happens if animals and plants are not adapted to their environment?

Assessments

Show how energy flows through an ecosystem.
Identify biotic and abiotic factors within specific biomes.
Identify relationships within a model ecosystem (predator/prey, symbiosis, producer/consumer
Define symbiosis, mutualism, parasitism, commensalism, predation, & competition.

Assessment Anchor		Eligible Content	
S8.B.3.1	Explain the **relationships** among and between organisms in different ecosystems and their abiotic and biotic components.	S8.B.3.1.1	Explain the **flow of energy** through an ecosystem. (e.g. food chains, food webs.)
.		S8.B.3.1.2	Identify major biomes and describe **abiotic and biotic components** (e.g. abiotic, different soil types, air, water, sunlight; biotic: soil microbes, decomposers.).
.		S8.B.3.1.3	Explain **relationships** among organisms (e.g. **producers/consumers**,

			predator/prey) in an ecosystem.

Concepts (what students need to know)	Skills (what students must be able to do)
1. Biotic and abiotic factors 2. Types of relationships between organisms.	1. Create a food web that demonstrates an understanding of feeding relationships. 2. Classify inter-species interactions.

CVSD Secondary Curriculum Map ~ PA Core Standards with Eligible Content

Common Core State Standard	PA Core Standard
S8.D.1.1	Reference: 3.5.7.A, 4.4.7.B

Taught in Unit(s)

Geology (6th)

Explanation/Example of Standard

Students will learn how geologic processes shape the earth (volcanic eruptions, earthquakes, plate tectonics, mountain building, etc)

Common Misconceptions

Students don't realize that the earth has varying layers that differ in consistency and temperature.
Students don't realize that motion within our earth causes plate tectonics, volcanic eruptions & earthquakes.
Students believe rocks and minerals are the same.

Big Idea(s)	Essential Question(s)
Describe constructive and destructive natural processes that form different geologic structures and resources.	How do geologists learn about Earth's interior? How Earth's layer differ both compositionally and physically? How is heat transferred throughout the earth (supporting standard S8.C.2.1.2)? How does plate tectonics change the surface of the Earth? What's the difference between a rock and a mineral? How do rocks change over time through the rock cycle?

Assessments

Students will be able to create and explain the rock cycle.
Students will be able to compare and contrast different types of changes in the earth's surface (volcanic eruptions, earthquakes, mountain building, new land being formed)

Assessment Anchor		Eligible Content	
S8.D.1.1	Describe constructive and destructive natural processes that form different geologic structures and resources.	S8.D.1.1.1	Explain the rock cycle as changes in the solid earth and rock types (igneous-granite, basalt, obsidian, pumice;, metamorphic-slate, quartzite, marble, gneiss; & sedimentary-limestone,

			sandstone, shale, coal)
		S8.D.1.1.2	Describe natural processes that change Earth's surface (e.g. landslides, volcanic eruptions, earthquakes, mountain building, new land being formed, weathering, erosion, sedimentation, soil formation).

Concepts **(what students need to know)**	**Skills** **(what students must be able to do)**
1. Understand how plate tectonics shapes the earth (sea floor spreading, subduction, mountain formation, volcanoes, earthquakes). 2. Know the difference between rocks and minerals.	1. Create and explain the rock cycle. 2. Identify specific rock examples within each rock type. See S8.D.1.1.2 3. Explain how plate movement impacts earth's surface.

CVSD Secondary Curriculum Map ~ PA Academic with Eligible Content

CV Priority Standard/PA Academic Standard
S8.D.2.1 reference: 3.5.7.C

Taught in Unit(s)
Grade 8

Explanation/Example of Standard

Explain how pressure, temperature, moisture, and wind are used to describe atmospheric conditions that affect regional weather or climate.

Common Misconceptions

High pressure systems indicate clear weather, not high temperatures. Low pressure systems indicate unsettled weather not low temperatures. Wind direction is described using the direction from which the wind originates.

Big Idea(s)	Essential Question(s)
Earth is a complex and dynamic set of interconnected systems (e.g. geosphere, hydrosphere, atmosphere, biosphere) that interact over a wide range of temporal and spatial scales.	How and why is Earth constantly changing?

Assessments

Classify clouds by type
Identify and describe layers of the atmosphere
Predict weather conditions based on pressure systems, fronts and wind patterns
Apply knowledge of atmospheric conditions to explain the greenhouse effect.

Assessment Anchor		Eligible Content	
S8.D.1.3	Describe the characteristic features of Earth's water systems or their impact on resources.	S8.D.1.3.1	Describe the water cycle and the physical processes on which it depends (i.e., evaporation, condensation, precipitation, transpiration, runoff, infiltration, energy inputs and phase changes)
S8.D.2	Explain how pressure, temperature, moisture, and wind are used to describe atmospheric conditions that affect regional weather or climate	S8.D.2.1.1.	Explain the impact of water systems on the local weather or the climate of a region (e.g lake effect snow, land/ocean breezes)
		S8.D.2.1.2	Identify how global patterns of atmospheric movement influence regional weather and climate.

		S8.D.2.1.3	Identify how cloud types, wind directions, and barometric pressure changes are associated with weather patterns in different regions of the country.

Concepts (what students need to know)	**Skills** (what students must be able to do)
● Pressure systems and fronts ● Wind patterns ● Weather maps ● Precipitation ● Clouds ● Atmosphere (i.e. layers and greenhouse effect)	● Using a weather map, predict upcoming weather conditions ● Predict the weather based on cloud type, pressure systems and wind patterns

CVSD Secondary Curriculum Map ~ PA Academic with Eligible Content

CV Priority Standard/PA Academic Standard

S8.B.2.1; reference 3.3.7.D, 4.7.7.A, 4.7.7.B

Taught in Unit(s)

8th Grade Evolution; 8th Grade Evolution; Unit 5

Explanation/Example of Standard

- The process of evolution by natural selection leads to speciation and adaptation
- Evolution is the effect of random mutation and changes in environmental pressures.
- Evidence of evolution (fossils, genetic evidence, embryology, homologous and vestigial structures) is used to understand the relationships among extant species and their evolutionary pathways.
- The phylogenetic models and cladograms show the relationships of extant and extinct species and common ancestry.
- Environmental changes cause extinctions and mass extinctions.
- A mass extinction is the dying off of many species at one time.

Common Misconceptions

Evolution is a certain concept that does not remains open to debate. Extant species do not evolve from other extant species. For example, humans did not evolve from chimpanzees but rather both species evolved from a common ancestor. The age of the Earth is 4.5 billion years. Life has existed on Earth for about 3.5 billion years. Dinosaurs and humans did not co-exist.

Big Idea(s)	Essential Question(s)
Biological evidence explains both the unity and diversity of species and provides a unifying theory for the presence of life on Earth.	How can there be so many similarities among organisms yet so many different kinds of plants, animals, and microorganisms?

Assessments

- Identify the adaptations of a species and explain how the adaptations contribute to the survival of the species in its unique environment.
- Differentiate between extinction and mass extinction.
- Identify the causes of extinction.
- Explain the Theory of Evolution by Natural Selection and apply the principles of this theory to explain how adaptations have developed in extant species such as horses, whales, giraffes, or humans.
- Apply the principles of Theory of Evolution by Natural Selection to explain how it leads to speciation.
- Discuss the roles of mutation and environmental change in the evolution of species.
- Interpret and draw conclusions based upon different types of evidence of evolution (fossils, genetic evidence, embryology, homologous and vestigial structures).
- Differentiate between absolute and relative dating of fossils.
- Interpret a phylogenetic model or cladogram and discuss how evidence is interpreted to develop these models.
- Interpret a Geologic Timeline for life on Earth.

Assessment Anchor		Eligible Content	
S8.B.2.1	Explain the basic concepts of natural selection.	S8.B.2.1.1	Explain how inherited structures or behaviors help organisms survive and reproduce in different environments.

		S8.B.2.1.2	Explain how different adaptations in individuals of the same species may affect survivability or reproduction success.
		S8.B.2.1.3	Explain that mutations can alter a gene and are the original source of new variations.
		S8.B.2.1.4 (Genetics 8)	Describe how selective breeding or biotechnology can change the genetic makeup of organisms.
		S8.B.2.1.5.	Explain that adaptations are developed over long periods of time and are passed from one generation to another.
S.8.A.1.3	Identify and analyze evidence that certain variables may have caused measurable changes in natural or human-made systems.	S.8.A.1.3.2	Use evidence, observations, or explanations to make inferences about change in systems over time (e.g. carrying capacity, succession, population dynamics, loss of mass in chemical reaction, indicator fossils in geologic time scale) and the variable affecting these changes.
		S.8.A.1.3.4	Given a scenario explain how a dynamically changing environment provides for the sustainability of a living system.

Concepts (what students need to know)	**Skills** (what students must be able to do)
● Geologic Time ● Natural selection ● Evidence of Evolution ● Extinction	- Interpret phylogenetic models and cladograms. - Predict the effects of environmental changes. - Use the Theory of Evolution by Natural Selection to develop a hypothesis on the appearance of an adaption. - Use the evidence of evolution to tell the story of the appearance of a species. - Interpret a geologic time line.

CVSD Secondary Curriculum Map ~ PA Academic with Eligible Content

CV Priority Standard/PA Academic Standard
S8.B.3.2 - reference 3.6.7.A, 4.4.7.A, 4.6.7.C, 4.8.7.D, 3.1.7.E, 4.3.7.C
Taught in Unit(s)
Grade 8 - Unit 2
Explanation/Example of Standard
Changes may affect natural or human-made systems.
Common Misconceptions
Small changes to an environment have large effects. Damaged environments can be restored. Ecosystems can heal through succession.

Big Idea(s)	Essential Question(s)
Organisms grow, reproduce, and perpetuate their species by obtaining necessary resources through relationships with other organisms and the physical environment.	How can we restore and preserve balance in the ecosystems of Earth while meeting the needs of a rapidly growing human population?

Assessments

- Define limiting factor & carrying capacity.
- Given a graph showing changes in a population over time, identify the carrying capacity and hypothesize environmental factors that might drive the change shown on the graph (limiting factors).
- Identify primary & secondary succession. Identify the composition of pioneer and climax communities.
- Use observations to determine an ecosystem's stage of succession.
- Identify strategies to protect and repair impaired ecosystems.

Assessment Anchor		Eligible Content	
S8.B.3.2	Identify evidence of change to infer and explain the ways different variables may affect change in natural or human-made systems.	S8.B.3.2.1 .	Use evidence to explain factors that affect changes in populations (e.g., deforestation, disease, land use, natural disaster, invasive species).
		S8.B.3.2.2	Use evidence to explain how diversity affects the ecological integrity of natural systems.
		S8.B.3.2.3 .	Describe the response of organisms to environmental changes (e.g., changes in climate, hibernation, migration, coloration) and how those changes affect survival.
S8.A.1.3	Identify and analyze evidence that certain variables may have caused measurable changes in natural or human-made systems.	S8.A.1.3.2	Use evidence, observations, or explanations to make inferences about change in systems over time (e.g., carrying capacity, succession, population dynamics, loss of mass in chemical reactions, indicator fossils in geologic time scale) and the variables affecting these changes.
		S8.A.1.3.3	Examine systems changing over

			time, identifying the possible variables causing this change, and drawing inferences about how these variables affect this change.
		S8.A.1.3.4	Given a scenario, explain how a dynamically changing environment provides for the sustainability of living systems.

Concepts (what students need to know)	**Skills** (what students must be able to do)
• Limiting Factors & Carrying Capacity • Ecological Succession • Endangered and threatened species • Environmental changes affect survival of organisms.	• Given a graph showing changes in a population over time, identify the carrying capacity and hypothesize environmental factors that might drive the change shown on the graph (limiting factors). • Use observations to determine an ecosystem's stage of succession. • Use data to draw conclusions about the quality of a freshwater or estuarine ecosystem. • Identify strategies to protect and repair impaired bodies of water.

CVSD Secondary Curriculum Map ~ PA Academic with Eligible Content

CV Priority Standard/PA Academic Standard	
S.8.C.3.1	Reference 3.4.7.C, 3.6.7.C

Taught in Unit(s)

Grade 7, Unit 6,7,8
Grade 8, Unit 3

Explanation/Example of Standard

Describe the effect of multiple forces on the movement, speed, or direction of an object.

Common Misconceptions

More massive objects do not accelerate at a greater rate when falling.
Simple machines do not make objects 'lighter' or reduce the amount of work needed to move the object.

Big Idea(s)	Essential Question(s)
• Interactions between any two objects can cause changes in one or both of them. • Interactions of objects or systems of objects can be predicted and explained using the concept of energy transfer and conservation.	• How can one explain and predict interactions between objects within systems? • How is energy transferred and conserved?

Assessments

- Calculate speed, velocity, and acceleration.
- Use a graph to interpret the motion of an object.
- Calculate force and pressure.
- Classify friction by type.
- Predict the motion of an object when acted upon within a system (e.g. simple machines, hydraulic systems)
- Calculate mechanical energy, kinetic energy, and potential energy,
- Calculate work & power.
- Calculate mechanical efficiency, ideal and actual mechanical advantage.
- Classify simple machines by type.
- Discuss the advantages and disadvantages of each type of simple machine.
- Apply the use of Newton's Laws, Pascal's Law, Bernoulli's Principle, and Archimedes's Principle to predict the motion of objects within a system.

Assessment Anchor		Eligible Content	
S8.C.3.1	Describe the effect of multiple forces on the movement, speed, and direction of an object.	S8.C.3.1.1	Describe forces acting on objects (e.g. friction, gravity, balanced versus unbalanced)
		S8.C.3.1.2	Distinguish between kinetic and potential energy.
		S8.C.3.1.3	Explain that mechanical advantage helps to do work (physics) by either changing a

			force or changing the direction of applied force (e.g. simples machines, hydraulic systems).
S.8.A.1.3	Identify and analyze evidence that certain variables may have caused measurable changes in natural or human-made systems.	S.8.A.1.3.1	Use ratio to describe change (e.g. percentage, parts per million, grams per cubic cm, and mechanical advantage).
		S.8.A.1.3.3	Examine systems changing over time, identifying the possible variables causing this change, and drawing inferences about how these variables affect this change.

Concepts (what students need to know)	**Skills** (what students must be able to do)
● Forces, Pressure, & Motion (Newton's Laws, Pascal's Law, Bernoulli's Principle) ● Fluids ● Kinetic and Potential energy (conservation of energy) ● Work & Power ● Simple Machines	● Calculate speed, velocity, and acceleration. ● Use a graph to interpret the motion of an object. ● Calculate force and pressure. ● Classify friction by type. ● Predict the motion of an object when acted upon within a system (e.g. simple machines, hydraulic systems) ● Calculate mechanical energy, kinetic energy, potential energy, mechanical efficiency, ideal and actual mechanical advantage. ● Calculate work & power. ● Classify simple machines by type.

CVSD Secondary Curriculum Map ~ PA Core Standards with Eligible Content

Common Core State Standard	PA Core Standard
S8.C.11	Reference: 3.4.7.A, 4.2.7.B

Taught in Unit(s)

Chemistry Unit (6th & 7th Grade)

Explanation/Example of Standard

Explain differences among elements, compounds, and mixtures.
Use the characteristic physical or chemical properties to distinguish one substance from another.
Identify and describe reactants and products of simple chemical reactions.

Common Misconceptions

Atoms cannot be divided into smaller pieces of matter
Matter is lost during a chemical reaction
Solutions have a set pH

Big Idea(s)	Essential Question(s)
Matter can be understood in terms of the types of atoms present and the interactions both between and within atoms.	How can one explain the structure, properties, and interactions of matter?

Assessments

Identify and differentiate physical and chemical properties
Diagram an atom and its parts
Identify elements on the periodic table
Identify elements' properties using the periodic table
Poster demonstrating the four chemical reactions
Describe Fusion and Fission
Identify solutions as an acid, base, or neutral solution based on pH readings

Assessment Anchor		Eligible Content	
S8.C.1.1	Explain concepts about the structure and properties (physical or chemical) of matter	S8.C.1.1.1	Differences among elements, compounds, and mixtures.
		S8.C.1.1.3	Use the characteristic physical or chemical properties to distinguish one substance from another (e.g., density, thermal expansion/contraction, freezing/melting points).
		S8.C.1.1.3	Identify and describe reactants and products of simple chemical reactions.

Concepts (what students need to know)	Skills (what students must be able to do)
Atoms and Elements	Differentiate between chemical and physical properties (6th Grade) Differentiate between expansion and contraction Create a diagram of an atom and its parts

	Students will be able to use a periodic table to describe individual elements and their properties Students will be able to explain a chemical compound and mixture
Chemical Reactions	Students will be able to identify and explain the reactants and products of a chemical equation Students will be able to explain the four types of chemical reactions Students will have an understanding of a solution's pH and identify it as an acid, base, or neutral Students will be able to describe Fusion and Fission and the positive and negative effects of each

CVSD Secondary Curriculum Map ~ PA Core Standards with Eligible Content

Common Core State Standard	PA Core Standard
S8.C.2.2 *Supports S8.A.1.2, S8.D.1.2, S8.B.3.3	Reference: 3.4.7.B,4.3.7.B

Taught in Unit(s)

Environmental Unit (7th Grade & 8th Grade)
*8th grade touches on the Sun as an energy source with Photosynthesis

Explanation/Example of Standard

Describe the Sun as the major source of energy that impacts the environment
Describe the importance and impact of nonrenewable and renewable resources
Describe how waste management affects the environment (e.g., recycling, composting, landfills, incineration, sewage treatment)

Common Misconceptions

The sun does not contribute to life on Earth
The Earth has unlimited resources to support life forever
Using nonrenewable resources does not impact the environment
Managing waste is not a local or global issue

Big Idea(s)	Essential Question(s)
The use and management of both renewable and nonrenewable resources can greatly impact the environment	How do different energy sources used to support human endeavors impact the environment?

Assessments

Students will be able to explain photosynthesis and cellular respiration
Students will describe human's impact on Earth's air, water, and organisms
Students will be able to identify energy sources and their pros and cons
Students will explain how waste can negatively impact the environment

Assessment Anchor		Eligible Content	
S8.C.2.2	Compare the environmental impact of different energy sources chosen to support human endeavors.	S8.C.2.2.1	Describe the Sun as the major source of energy that impacts the environment (some 8th grade)
		S8.A.1.2.2	Identify environmental issues and explain their long-term health effects (e.g. pollution, pest control)
		S8.D.1.2.1	Describe a product's transportation process from production to consumption and explain the process's potential impact on Earth's resources
		S8.D.1.2.2	Describe potential impacts of human-made processes on Earth's resources, both nonliving and living
		S8.B.3.3.3	Describe how waste management affects the environment (e.g., recycling, composting, landfills, incineration, sewage treatment)
		S8.B.3.3(2)	Describe the importance and impact

			of <u>nonrenewable</u> and <u>renewable resources</u>

Concepts (what students need to know)	**Skills** (what students must be able to do)
Energy from the Sun [illegible]	[illegible] [illegible] Identify solar energy as a renewable energy source (ex; solar panels)
Fossil fuels role on the environment	Identify renewable and nonrenewable sources of energy Identify different fossil fuels and the pros and cons of each
Waste management	Discuss the impacts of human-made processes (manufacturing, agriculture, pest control, transportation) and their impact on the environment (living & nonliving components) Describe the environmental consequences of waste from different energy sources Identify ways to recycle and reuse products to limit waste and protect the environment

CVSD Secondary Curriculum Map ~ PA Core Standards with Eligible Content

Common Core State Standard	PA Core Standard
S8.D.3.1	Reference: 3.4.7.D

Taught in Unit(s)

Astronomy Unit (7th Grade)

Explanation/Example of Standard

Describe patterns of earth's movement (i.e., rotation and revolution) in relation to the moon and sun (i.e., phases, eclipses, and tides)
Describe the role of gravity as the force that governs the movement of the solar system and universe.
Compare and contrast characteristics of celestial bodies found in the solar system (e.g.. moons, asteroids, comets, meteors, inner and outer planets).

Common Misconceptions

The sun revolves around the Earth.
The Sun is the largest and hottest star
The seasons are a result of the distance from the sun.
Pluto is a planet.

Big Idea(s)	Essential Question(s)
The universe is composed of a variety of different objects, which are organized into systems, each of which develops according to accepted physical processes and laws.	What is Earth's place in the universe? How does Earth compare to other bodies in our solar system Why does gravity not cause the universe to collapse?

Assessments

Students will explain how gravity as a force governs the solar system and the universe
Students will identify the moon phases
Students will be able to explain the relationship between the Moon's location and the tides on Earth
Students will explain how seasons are established on different parts of the Earth
Students will identify celestial objects based on their characteristics
Students will graph the characteristics of stars
Students will create a map using astronomical units

Assessment Anchor		Eligible Content	
S8.D.3.1	Explain the relationships between and among the objects of our solar system.	S8.D.3.1.1	Describe patterns of earth's movement (i.e., rotation and revolution) in relation to the moon and sun (i.e., phases, eclipses, and tides)
		S8.D.3.1.2	Describe the role of gravity as the force that governs the movement of the solar system and universe.
		S8.D.3.1.3	Compare and contrast characteristics of celestial bodies found in the solar system (e.g.. moons, asteroids, comets, meteors, inner and outer planets).

Concepts (what students need to know)	**Skills** (what students must be able to do)
Astronomy & the Universe	Explain what is meant by the use of 'Universe'? Summarize the movement of objects within the universe.
Star characteristics	Identify stars by their physical characteristics Identify the importance of the Sun on the solar system Explain how gravity plays a vital role in our solar system and the universe
Planet characteristics	Identify the conditions needed for an object to be classified as a planet Identify and describe the inner and outer planets Discuss Earth's role in the solar system
Earth & Our Moon (Role & Rotation/Revolution)	Explain how the Earth's rotation and revolution cause seasonal change as a result of sunlight amounts. Explain the relationship of the moon and earth creating eclipses and tidal changes Identify the moon phases
Other celestial objects	Discuss the difference between moons, comets, meteors, and asteroids Use astronomical measurements detailing distance between objects

Grade: 6			SUBJECT
Unit	**Timeline**	**Topics**	**Priority Anchors**
Scientific Inquiry	25-30 days	Scientific Method	S8.A.1.1.1
		Science Process Skillls	S8.A.1.1.2, S8.A.1.1.1.3
		Metric System	S8.A.1.1.4
Intro to Matter	30-35 days	Atoms/Periodic Table	S8.C.1.1
		Physical/Chemical Changes	S8.C.1.1
		States/Changes of Matter	S8.C.1.1
Geology - Earth Structure	30-35 days	Earth Stucture	S8.D.1.1
		Plate Tectonics	S8.D.1.1
		Earthquakes	S8.D.1.1
		Volcanoes	S8.D.1.1
Geolgoy Rock & Mineral	25-30 days	Minerals	S8.D.1.1
		Rocks	S8.D.1.1
		Rock cycle	S8.D.1.1
Characteristics of Life and Cell Basics	15 days	Cell Basics	S8 B.1.1
		Levels of Organization	S8 B.1.1
Heredity	15 days	Inherited traits	S8 B.2.2
Ecology	20-25 days	Ecosystems	S8.B.3
		Adaptations	S8.B.3

Grade: 7			SUBJECT
Unit	**Timeline**	**Topics**	**Priority Standards**
1	20 Days	Scientific Method	S8.A.1.1
		Observations	S8.A.2.1
		Measurement	S8.A.2.2
2	15 Days	Basic Atomic Structure	S8.C.1.1
		Periodic Table, Atomic #, AMU	S8.C.2.1
		Istopes	
		Fission & Fusion	
3	15 Days	Valence Electrons	S8.C.1.1
		Compounds and Ionic Bonds	S8.C.2.1
		Covalent & Metallic Bonds	
4	15 Days	Chemical Reactions	S8.C.1.1
		Balancing Equations	S8.C.2.1
5	20 Days	Astronomy & the Universe	S8.D.3.1
		Star Characterisitcs	
		Planet Characteristics	
		Earth & Our Moon	
		Celesital Bodies	
6	20 days	Distance & Displacement	S8.C.3.1
		Speed & Velocity	
		Acceleration	
7	15 Days	Forces & Gravity	S8.C.3.1
		Newton's Laws	
8	15 Days	Pressure	S8.C.3.1
		Fluid Motion	
9	20 Days	Environmental	S8.2.1.1
		Sun's Role on Energy	S8.B.3.3
		(Non)renewable Energy, Alt, Fuels	
		Waste Management, Sewage, Landfills, Recycling	
10	10 Days	Biology	S8.B.1.1
		Classification	
		Dichotomous Key	

Grade: 8			SUBJECT
Unit	**Timeline**	**Topics**	**Priority Anchors**
Scientific Methods	20	Variables	S8.A.1.1, S8.A.1.2, S8.A.1.3, S8.A.1.4
		Experimental Design	S8.A.1.1, S8.A.1.2, S8.A.1.3, S8.A.1.4
		Evaluation of Research	S8.A.1.1, S8.A.1.2, S8.A.1.3, S8.A.1.4
		Analysis of Data	S8.A.1.1, S8.A.1.2, S8.A.1.3, S8.A.1.4
Ecology	25	Interactions	S8.B.3.1
		Population Dynamics	S8.B.3.1, S8.B.3.2
		Ecological Succession	S8.B.3.2
		Watershed & Wetlands	S8.B.3.2
Physics	25	Types of Energy (KE & GPE)	S8.C.3.1
		Work, Power, & Forces	S8.C.3.1
		Simple Machines	S8.C.3.1
Chemistry	25	Solutions	S8.C.1.1
		Acids & Bases	S8.C.1.1
		Photosynthesis & CR	S8.C.1.1
Genetics	25	Inheritance	S8.B.2.2
		DNA Structure & Genes	S8.B.2.2
		Predicting Inheritance	S8.B.2.2
		Genetic Engineering & BioTechnology	S8.B.2.2
Evolution	25	Adaptations	S8.B.2.1
		Natural Selection	S8.B.2.1
		Geologic Time/ Mass Extinc	S8.B.2.1
		Evidence of Evolution	S8.B.2.1
Weather	25	Atmosphere	S8.D.2.1
		Clouds	S8.D.2.1
		Wind Patterns	S8.D.2.1
		Predicting Weather	S8.D.2.1