Curriculum Scope & Sequence

School: Pike Creek Charter School **Grade or Course: 6th Grade Science** **Teacher _____**

Unit Order By unit title and/or time frame	**Learning Targets** Content Standards, Grade Level Expectations, Proficiency Level Expectations, or Grade Cluster Benchmarks	**Theme/Big Idea/Concept**	**Enduring Understandings and/or Essential Questions**
Unit 1: Earth's Structure	**Science Standard 5** **Earth's Dynamic Systems** Earth's dynamic systems are made up of the solid earth (geosphere), the oceans, lakes, rivers, glaciers and ice sheets (hydrosphere), the atmosphere, and organisms (biosphere). Interactions among these spheres have resulted in ongoing changes to the system. Some of these changes can be measured on a human time scale, but others occur so slowly, that they must be inferred from geological evidence. ***Components of Earth*** C. The formation of sediment and soil requires a long period of time as rocks are weathered, eroded and deposited. ***Interactions Throughout Earth's Systems*** E. Some Earth events such as El Nino, volcanism and global warming can affect the entire Earth system and are likely the result of complex interactions among Earth spheres. L. The fit of continental coastlines, the similarity of rock types and fossilized remains provide evidence that today's continents were once a single land mass. The continents moved to their current positions on plates driven by energy from Earth's interior.	**Introduction to Earth** **Minerals and Rocks** **Plate Tectonics** **Earthquakes** **Volcanoes**	**Enduring Understanding:** **Earth's systems can be broken down into individual components, which have observable measurable properties.** **Essential Question:** **How does understanding the properties of Earth materials and the physical laws that govern their behavior lead to prediction of Earth events?** **Enduring Understanding:** **Earth's components form systems. These systems continually interact at different rates of time, affecting the Earth locally and globally.** **Essential Question:** **How do changes in one part of the Earth system affect other parts of the system?** **Essential Question:** **In what ways can Earth processes be explained as interactions among spheres?**

Curriculum Scope & Sequence

School: Pike Creek Charter School **Grade or Course: 6th Grade Science** **Teacher _____**

Unit Order By unit title and/or time frame	**Learning Targets** Content Standards, Grade Level Expectations, Proficiency Level Expectations, or Grade Cluster Benchmarks	**Theme/Big Idea/Concept**	**Enduring Understandings and/or Essential Questions**
Unit 2: Earth's Surface	**Science Standard 5** **Earth's Dynamic Systems** Earth's dynamic systems are made up of the solid earth (geosphere), the oceans, lakes, rivers, glaciers and ice sheets (hydrosphere), the atmosphere, and organisms (biosphere). Interactions among these spheres have resulted in ongoing changes to the system. Some of these changes can be measured on a human time scale, but others occur so slowly, that they must be inferred from geological evidence. ***Components of Earth*** C. The formation of sediment and soil requires a long period of time as rocks are weathered, eroded and deposited. ***Interactions Throughout Earth's Systems*** D. Constructive processes that build up the land and the destructive processes of weathering and erosion shape and reshape the land surface. The height of Earth's landforms are a result of the difference between the rate of uplift and the rate of erosion at a particular location. K. Past geological events and environments can be reconstructed by interpreting fossilized remains and successive layering of sedimentary rocks.	**Mapping Earth's Surface** **Weathering and Soil** **Erosion and Deposition** **Trip through Geological Time**	**Enduring Understanding:** **Earth's systems can be broken down into individual components, which have observable measurable properties.** **Essential Question:** **How does understanding the properties of Earth materials and the physical laws that govern their behavior lead to prediction of Earth events?** **Enduring Understanding:** **Earth's components form systems. These systems continually interact at different rates of time, affecting the Earth locally and globally.** **Essential Question:** **How do changes in one part of the Earth system affect other parts of the system?** **Essential Question:** **In what ways can Earth processes be explained as interactions among spheres?**

Curriculum Scope & Sequence

School: Pike Creek Charter School **Grade or Course: 6th Grade Science** **Teacher _____**

Unit Order By unit title and/or time frame	Learning Targets Content Standards, Grade Level Expectations, Proficiency Level Expectations, or Grade Cluster Benchmarks	Theme/Big Idea/Concept	Enduring Understandings and/or Essential Questions
Unit 3: Weather and The Atmosphere	**Science Standard 5** **Earth's Dynamic Systems** Earth's dynamic systems are made up of the solid earth (geosphere), the oceans, lakes, rivers, glaciers and ice sheets (hydrosphere), the atmosphere, and organisms (biosphere). Interactions among these spheres have resulted in ongoing changes to the system. Some of these changes can be measured on a human time scale, but others occur so slowly, that they must be inferred from geological evidence. ***Earth's Components*** A. Water exists on the Earth in reservoirs (on or within the Earth's surface and atmosphere). The total amount of water in these reservoirs does not change, however, the ratio of water in solid, liquid, or gaseous form varies over time and location. B. The movement of water among the geosphere, hydrosphere and atmosphere affects such things as weather systems, ocean currents, and global climate. D. The atmosphere is a mixture having as its principle components a fixed ratio of nitrogen and oxygen and, depending on the location, variable amounts of carbon dioxide, water vapor, and dust particles. ***Interactions Throughout the Earth's Systems*** A. Water cycles from one reservoir to another through the processes of evaporation, transpiration, condensation and precipitation. Energy transfers and/or transformations are associated with each of these processes. B. Water within a watershed travels over and through the land at various speeds based on the rate of change in elevation and the permeability and porosity of the soil. Water carries with it products of human activity. . Surface water always flows downhill. Areas of higher elevation separate	**Fresh Water** **Oceans** **Atmosphere** **Weather** **Climate/Climate Change**	**Enduring Understanding:** **Earth's systems can be broken down into individual components, which have observable measurable properties.** **Essential Question:** **How does understanding the properties of Earth materials and the physical laws that govern their behavior lead to prediction of Earth events?** **Enduring Understanding:** **Earth's components form systems. These systems continually interact at different rates of time, affecting the Earth locally and globally.** **Essential Question:** **How do changes in one part of the Earth system affect other parts of the system?** **Essential Question:** **In what ways can Earth processes be explained as interactions among spheres?** **Enduring Understanding: Technology enables us to better understand Earth's systems. It also allows us to analyze the impact of human activities on Earth's systems and the impact of Earth's systems on human activity.** **Essential Question:** **How does technology extend human senses and understanding?**

	watersheds. In Delaware, this water eventually reaches the Delaware River, the Delaware Bay, the Atlantic Ocean or the Chesapeake Bay. F. The atmosphere has properties that can be observed, measured, and used to predict changes in weather and to identify climatic patterns. . The climate at a location on Earth is the result of several interacting variables such as latitude, altitude and/or proximity to water. H. Energy from the Sun heats the Earth unevenly causing pressure differences and air movements (convection currents) resulting in changing weather patterns. I. Ocean currents, global winds, and storm systems, redistribute heat energy on Earth's surface and therefore affect weather and long-term climatic patterns of a region. J. Uneven heating and cooling of the Earth's surface produce air masses that differ in density, humidity and temperature. The interaction of these air masses results in significant weather changes. M. Heat energy stored in the oceans and transferred by currents influence climate. A disruption of the circulation and temperature of the world's oceans would foster climate change and have environmental and economic consequences. ***Technology and Applications*** A. Global weather data from ground measurements, satellites and radar are recorded on maps, analyzed, and used to predict local weather. . Water from some natural sources is unfit to drink and requires the use of specialized technology to analyze and purify it.		

Curriculum Scope & Sequence

School: Pike Creek Charter School Grade or Course: 6th Grade Science Teacher _____

Unit Order By unit title and/or time frame	**Learning Targets** Content Standards, Grade Level Expectations, Proficiency Level Expectations, or Grade Cluster Benchmarks	**Theme/Big Idea/Concept**	**Enduring Understandings and/or Essential Questions**
Unit 4: Astronomy and Space	**Science Standard 4** **Earth in Space** Our Solar System is a collection of gravitationally interacting bodies that include Earth and the Moon. Universal principles of gravitation allow predictions regarding the motions of objects within the Galaxy and beyond. Earth's motion, position, and posture account for a variety of cyclic events observable from Earth. While the composition of planets varies considerably, their components and the applicable laws of science are universal. The motions and interactions of objects within the Solar System are consistent with the hypothesis that it emerged from a large disk of gas and dust. Our Solar System is part of the Milky Way Galaxy, which, in turn, is one of many galaxies in the known Universe. ***The Earth/Moon/Sun System*** A. The Sun is a star that gives off radiant energy that drives Earth systems and is essential for life. The amount of radiant energy Earth receives from the Sun throughout the year is nearly constant. B. The tilt of Earth's axis of rotation as it orbits the Sun points in the same direction with respect to the stars. The tilt and the orbital motion of Earth around the Sun cause variation in the amount of solar radiation striking a location on the Earth's surface, which results in variation in the length of day/night and seasons. C. Moon phases occur because the relative positions of Earth, Moon, and Sun change, thereby enabling us to see different amounts of the Moon's surface. D. The Moon is a natural satellite of Earth and is different than the	**Earth, Moon and Sun** **Exploring Space** **The Solar System** **Stars, Galaxies and the Universe**	**Enduring Understanding:** **There are observable, predictable patterns of movement in the Sun, Earth, and Moon system that account for day/night.** **Enduring Understanding for Grades 6-12:** **Observable, predictable patterns of movement in the Sun, Earth, and Moon system occur because of gravitational interaction and energy from the Sun.** **Essential Question:** **Grades 4-12: What causes these patterns?** **Enduring Understanding:** **Most objects in the Solar System orbit the Sun and have distinctive physical characteristics and orderly motion** **Essential Question:** **Grades 6-8: How does Earth's physical characteristics and motion compare to other bodies in the Solar System?** **Enduring Understandings:** **Grades 6-8: Technology expands our knowledge of the Solar System.** **Essential Questions:** **Grades 6-8: How has technology expanded our**

	Earth in size, atmosphere, gravity, and surface features. E. Tides are caused by the gravitational interactions of the Sun, Moon and Earth. The Moon has a greater impact on tides because of its proximity to Earth. ***<u>The Solar System</u>*** A. The Sun is by far the most massive object in the Solar System, therefore gravitationally dominating all other members of the Solar System. B. The Solar System consists of comets, asteroids, planets, and their respective satellites, most of which orbit the Sun on a plane called the ecliptic. The planets in our Solar System revolve in the same direction around the Sun in elliptical orbits that are very close to being in the same plane. Most planets rotate in the same direction with respect to the Sun. C. Planets can be categorized as inner or outer planets according to density, diameter and surface features. D. Planets and their moons have been shaped over time by common processes such as cratering, volcanism, erosion, and tectonics. The presence of life on a planet can contribute to its unique development. ***<u>Technology and Applications</u>*** A. Technology, including humans landing on the Moon, robot landers and other space probes, satellites, and radio telescopes, allow scientists to investigate conditions on Earth and on other objects in the Solar System. B. The technology used in space exploration expands our knowledge of the Universe and has many spin-offs related to everyday applications		**knowledge of the Solar System?**

Curriculum Scope & Sequence

School: Pike Creek Charter School Grade or Course: 7th Grade Science Teacher _____

Unit Order By unit title and/or time frame	**Learning Targets** Content Standards, Grade Level Expectations, Proficiency Level Expectations, or Grade Cluster Benchmarks	**Theme/Big Idea/Concept**	**Enduring Understandings and/or Essential Questions**
Unit 1: Human Body Systems	**Science Standard 6** **Life Processes** The natural world is defined by organisms and life processes which conform to principles regarding conservation and transformation of matter and energy. Living organisms use matter and energy to build their structures and conduct their life processes, have mechanisms and behaviors to regulate their internal environments and to respond to changes in their surroundings. Knowledge about life processes can be applied to improving human health and well-being. ***Structure/Function Relationship*** The human body has systems that perform functions necessary for life. Major systems of the human body include the digestive, respiratory, reproductive, and circulatory systems. ***Life Processes and Technology Application*** A. Technological advances in medicine and improvements in hygiene have helped in the prevention and treatment of illness. B. The functioning and health of organisms are influenced by many factors (i.e., heredity, diet, lifestyle, bacteria, viruses, parasites, and the environment). Certain body structures and systems function to protect against disease and injury. ***Regulation and Behavior*** Regulation of an organism's internal environment involves sensing external changes in the environment and responding physiologically to keep conditions within the range required for survival (e.g., increasing heart rate with exertion).	**Human Body** **Bones, Muscles and Skin** **Digestion** **Circulation** **Respiration** **Fighting Disease** **Nervous System** **Endocrine and Reproduction**	**Enduring Understanding:** **Living systems, from the organism to the cellular level, demonstrate the complementary nature of structure and function.** **Essential Question:** **How does structure relate to function in living systems from the cellular to the organism level?** **Enduring Understanding: Grades K-8:** **The life processes of organisms are affected by their interactions with each other and their environment, and may be altered by human manipulation.** **Essential Question:** **What can we do to benefit the health of humans and other organisms?** **Enduring Understanding: Organisms respond to internal and external cues, which allow them to survive.** **Essential Question: How do responses to internal and external cues aid in an organism's survival?**

Curriculum Scope & Sequence

School: Pike Creek Charter School **Grade or Course: 7th Grade Science** **Teacher _____**

Unit Order By unit title and/or time frame	Learning Targets Content Standards, Grade Level Expectations, Proficiency Level Expectations, or Grade Cluster Benchmarks	Theme/Big Idea/Concept	Enduring Understandings and/or Essential Questions
Unit 2: Ecology and The Environment	**Science Standard 8** **Ecology** The flow of energy and the cycling of materials link organisms to one another in an ecosystem. Humans are an integral part of the natural system and human activities can alter the stability of ecosystems. ***Interactions within the Environment*** A. All populations living together (biotic factors) and the physical factors with which they interact (a biotic factors) compose an ecosystem. B. Ecosystems do not have precise boundaries. All ecosystems ultimately exchange materials with one another and all influence one another. C. The Delaware Estuary is a semi-enclosed tidal body of water with a free connection to the ocean. This richly productive system, including the associated marshes, provides a variety of habitats for diverse species. This system is biologically and economically important. D. A population consists of all individuals of a species that occur together at a given place and time. A species is a distinct biological grouping of organisms whose members interbreed in nature and produce fertile offspring. E. The size of populations may change as a result of the interrelationships among organisms. These may include predator/prey ratios, availability of resources, and habitat changes.	**Populations and Communities** **Ecosystems and Biomes** **Resources and Living Things** **Land, Air and Water Resources** **Energy Resources**	**Enduring Understanding: Organisms and their environments are interconnected. Changes in one part of the system will affect other parts of the system.** **Essential Question:** **How can change in one part of an ecosystem affect change in other parts of the ecosystem?** **Enduring Understandings:** **Matter needed to sustain life is continually recycled among and between organisms and the environment.** **Energy from the Sun flows irreversibly through ecosystems and is conserved as organisms use and transform it.** **Essential Questions:** **How do matter and energy link organisms to each other and their environments?** **Why is sunlight essential to life on Earth?** **Enduring Understanding: Humans can alter the living and non-living factors within an ecosystem, thereby creating changes to the overall system.** **Essential Question:** **How do humans have an impact on the**

	F. In all environments organisms with similar needs may compete with one another for resources including food, water, air, space and shelter. This competition results in natural population fluctuations. G. Overpopulation can lead to depletion of resources and potential extinction of species. H. Organisms within an ecosystem may interact symbiotically through mutualism, parasitism, and commensalism. ***Energy Flow and Material Cycles in the Environment*** A. In most ecosystems, energy enters as sunlight and is transformed by producers into a biologically usable form of matter through photosynthesis. That matter and energy then passes from organism to organism through food webs. Some energy is released from the system as heat. B. Over time, matter is transferred repeatedly from one organism to another and between organisms and their physical environment. As in all material systems, the total amount of matter remains constant, even though its form and location change. C. All organisms, including humans, are part of and depend on food webs. Food webs recycle matter continuously as organisms are decomposed after death to return food materials to the environment where it re-enters a food web. ***Human Impact*** A. Humans can alter the biotic and biotic factors within an ecosystem thereby creating changes to the overall system. B. The introduction of competing species, removal of natural habitat, alteration of native landscapes due to urban, industrial and agricultural activities, over-harvesting of species, alteration of waterways and removal of natural		**diversity and stability of ecosystems?**

	predators, etc., are actions that have a lasting impact on ecosystems. C. Individuals and policymakers make decisions regarding the use of resources based on estimated personal and societal benefits and risks. Impacts on environmental systems result from these decisions. **Science Standard 6** **Life Processes** The natural world is defined by organisms and life processes which conform to principles regarding conservation and transformation of matter and energy. Living organisms use matter and energy to build their structures and conduct their life processes, have mechanisms and behaviors to regulate their internal environments and to respond to changes in their surroundings. Knowledge about life processes can be applied to improving human health and well-being. ***Life Processes and Technology Application*** C. The environment may contain dangerous levels of substances in the water and soil that are harmful to organisms. Careful monitoring of these is important for healthy life processes		

Curriculum Scope & Sequence

School: Pike Creek Charter School Grade or Course: 7th Grade Science Teacher _____

Unit Order By unit title and/or time frame	Learning Targets Content Standards, Grade Level Expectations, Proficiency Level Expectations, or Grade Cluster Benchmarks	Theme/Big Idea/Concept	Enduring Understandings and/or Essential Questions
Unit 3:Cells and Heredity	**Science Standard 6** **Life Processes** The natural world is defined by organisms and life processes which conform to principles regarding conservation and transformation of matter and energy. Living organisms use matter and energy to build their structures and conduct their life processes, have mechanisms and behaviors to regulate their internal environments and to respond to changes in their surroundings. Knowledge about life processes can be applied to improving human health and well being. ***Matter and Energy Transformations*** A. All organisms require energy. A general distinction among organisms is that plants use solar energy to make their own food (sugar) and animals acquire energy directly or indirectly from plants. C. Most living things use sugar (from food) and oxygen to release the energy needed to carry out life processes (cellular respiration). Other materials from food are used for building and repairing cell parts. ***Structure/Function Relationship*** C. Most organisms are single celled while others are multi-cellular. Multi-cellular organisms consist of individual cells that cannot survive independently, while single-celled organisms are composed of one cell that can survive independently. D. The cell is the fundamental unit of life. Cells have basic needs for survival. They use energy, consume materials, require water, eliminate waste, and reproduce. E. Most cells contain a set of observable structures called organelles which allow them to carry out life processes. Major organelles include vacuoles, cell membrane, nucleus, and mitochondria. Plant cells have a cell wall and chloroplasts.	**Introduction to Cells** **Cell Processes and Energy** **Genetics: The Science of Heredity** **DNA: The Code of Life** **Human Genetics and Genetic Technology** **Change Over Time**	**Enduring Understanding:** **All organisms transfer matter and convert energy from one form to another. Both matter and energy are necessary to build and maintain structures within the organism.** **Essential Question:** **How is matter transferred and energy transferred/transformed in living systems?** **Enduring Understanding:** **Living systems, from the organismic to the cellular level, demonstrate the complementary nature of structure and function.** **Essential Question:** **How does structure relate to function in living systems from the cellular to the organismic level?** **Enduring Understanding: Organisms reproduce, develop, have predictable life cycles, and pass on heritable traits to their offspring.** **Essential Questions:** **Grades K-5: Why do offspring resemble their parents?**

Attachment 4: Scope and Sequence, 7th Grade Science

	Science Standard 7 **Diversity and Continuity of Living Things** The natural world consists of a diversity of organisms that transmit their characteristics to future generations. Living things reproduce, develop, and transmit traits, and theories of evolution explain the unity and diversity of species found on Earth. Knowledge of genetics, reproduction, and development is applied to improve agriculture and human health. ***Reproduction, Heredity and Development*** C. Some organisms reproduce sexually involving two parents. Sexual reproduction results in offspring that have greater genetic diversity than those resulting from asexual reproduction. One-half of the offspring's genetic information comes from the "male" parent and one-half comes from the "female" parent. These genetic differences help to ensure the survival of offspring in varied environments. D. In sexual reproduction after the egg is fertilized, each of the new cells in the developing organism receives an exact copy of the genetic information contained in the nucleus of a fertilized egg. E. Organisms have different reproductive strategies to ensure their offspring's survival. Some organisms produce many offspring and provide little parental care. Other organisms produce few offspring and invest much time and energy in care of their offspring. F. Chromosomes are found in the nucleus of the cell and contain genes that are made of DNA. Inherited traits of individuals are controlled by genes. G. Chromosomes can be arranged in pairs (one-half of each pair from each parent). These pairs are approximately the same size and shape, and have similar sequences of genes. Humans have 23 pairs (46) of chromosomes. Other organisms may have different numbers of chromosomes. H. In humans, gender is determined by a pair of sex chromosomes. Females possess two X chromosomes; males an X and a Y-chromosome. The sex of an embryo is determined by the sex chromosome found in the sperm cell. I. Alternative versions of genes (different alleles) account for variations in inherited characteristics (i.e., flower color). Pairs of chromosomes that have the same allele present on both chromosomes are homozygous. Pairs of chromosomes with different alleles are heterozygous.		**Grades 6-8: What are the advantages and disadvantages of different reproductive strategies?** **Grades K-12: How do organisms change as they go through their life cycles?** **Enduring Understanding:** **The diversity and changing of life forms over many generations is the result of natural selection, in which organisms with advantageous traits survive, reproduce, and pass those traits to offspring.** **Essential Questions:** **Grades 6-12: How does natural selection encourage inter and intra-specific diversity over time?** **Enduring Understanding:** **The development of technology has allowed us to apply our knowledge of genetics, reproduction, development and evolution to meet human needs and wants.** **Essential Question:** **How does the understanding and manipulation of genetics, reproduction, development and evolution affect the quality of human life?**

	J. A dominant trait will be expressed if the organism is heterozygous or homozygous for the trait. A recessive trait will only be expressed if the organism is homozygous for the trait. K. Mendelian genetics can be used to predict genotypes and phenotypes of offspring resulting from sexual reproduction. ***<u>Diversity and Evolution</u>*** A. The Earth's present day species evolved from earlier, distinctly different species. Many thousands of layers of sedimentary rock provide evidence for the long history of the Earth and for the long history of changing life forms whose remains are found in the rocks. More recently deposited rock layers are more likely to contain fossils resembling existing species. B. Natural selection is the process by which some individuals with certain traits are more likely to survive and produce greater numbers of offspring than other organisms of the same species. Competition for resources and mates and conditions in the environment can affect which individuals survive, reproduce and pass their traits on to future generations. C. Small genetic differences between parents and offspring accumulate over many generations, and ultimately new species may arise. D. Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival. Most of the species that have lived on Earth no longer exist. E. There is a wide diversity of organisms on Earth. These organisms may be classified in a number of ways. One classification system places organisms into five kingdoms (monera, protista, fungi, plantae, animalia) based on similarities in structure. F. The great variety of body forms and structures found in different species enable organisms to survive in diverse environments. ***<u>Technology Applications</u>*** A. Selective breeding is used to cultivate plants and domesticated animals with desirable traits. B. Knowledge gained from research in genetics is being applied to areas of human health. Geneticists and genetic counselors may use pedigrees and Punnett squares to help predict the possibility of genetic disorders in future generations.		

Curriculum Scope & Sequence

School: Pike Creek Charter School Grade or Course: 7th Grade Science Teacher _____

Unit Order By unit title and/or time frame	**Learning Targets** Content Standards, Grade Level Expectations, Proficiency Level Expectations, or Grade Cluster Benchmarks	**Theme/Big Idea/Concept**	**Enduring Understandings and/or Essential Questions**
Unit 4: Diversity of Life	**Science Standard 6** **Life Processes** The natural world is defined by organisms and life processes which conform to principles regarding conservation and transformation of matter and energy. Living organisms use matter and energy to build their structures and conduct their life processes, have mechanisms and behaviors to regulate their internal environments and to respond to changes in their surroundings. Knowledge about life processes can be applied to improving human health and well being. ***Matter and Energy Transformations*** B. Plants use the energy from sunlight, carbon dioxide, and water to produce sugars (photosynthesis). Plants can use the food (sugar) immediately or store it for later use. ***Structure/Function Relationship*** A. Living organisms share common characteristics that distinguish them from non-living, dead, and dormant things. They grow, consume nutrients, exchange gases, respond to stimuli, reproduce, need water, eliminate waste, and are composed of cell(s). B. Living systems in all kingdoms demonstrate the complementary nature of structure and function. Important levels of organization for structure and function include cells, tissues, organs, organ systems, and organisms. E. Most cells contain a set of observable structures called organelles which allow them to carry out life processes. Major organelles include vacuoles, cell membrane, nucleus, and mitochondria. Plant cells have a cell wall and chloroplasts	**Introduction to Living Things** **Viruses, Bacteria, Protists and Fungi** **Plants** **Introduction to Animals** **Getting Around** **Obtaining Energy** **Animal Reproduction and Behavior**	Enduring Understanding: All organisms transfer matter and convert energy from one form to another. Both matter and energy are necessary to build and maintain structures within the organism. Essential Question: How is matter transferred and energy transferred/transformed in living systems? Enduring Understanding: Living systems, from the organismic to the cellular level, demonstrate the complementary nature of structure and function. Essential Question: How does structure relate to function in living systems from the cellular to the organismic level?

Curriculum Scope & Sequence

School: Pike Creek Charter School **Grade or Course: 8th Grade Science** **Teacher _____**

Unit Order By unit title and/or time frame	Learning Targets Content Standards, Grade Level Expectations, Proficiency Level Expectations, or Grade Cluster Benchmarks	Theme/Big Idea/Concept	Enduring Understandings and/or Essential Questions
Unit 1: Forces and Energy	**Science Standard 3** **Energy and Its Effects** The flow of energy drives processes of change in all biological, chemical, physical, and geological systems. Energy stored in a variety of sources can be transformed into other energy forms, which influence many facets of our daily lives. The forms of energy involved and the properties of the materials involved influence the nature of the energy transformations and the mechanisms by which energy is transferred. The conservation of energy is a law that can be used to analyze and build understandings of diverse physical and biological systems. ***Forces and the Transfer of Energy*** A. When the forces acting on an object are balanced, its motion will not change. Unbalanced forces will cause the object's motion to change. Changes in motion depend upon the size and direction of the total unbalanced force exerted on the object. B. Gravity is a force that acts between masses over very large distances. Near the Earth's surface, gravity pulls objects and substances vertically downward. C. Forces can be used to transfer energy from one object to another. Simple machines are used to transfer energy in order to simplify difficult tasks. D. When energy from the sun is transferred to objects and substances, it can be transformed into a variety of energy forms. F. The addition or removal of heat energy from a material changes its temperature or its physical state. G. Heat energy is transported by conduction, convection, and radiation.	**Motion** **Forces** **Work and Machines** **Energy** **Thermal Energy and Heat** **Electricity** **Magnetism and Electromagnetism**	**Enduring Understanding: Changes take place because of the transfer of energy. Energy is transferred to matter through the action of forces. Different forces are responsible for the transfer of the different forms of energy.** **Essential Question:** **How can energy be transferred from one material to another? What happens to a material when energy is transferred to it?** **Enduring Understanding:** **Energy takes many forms. These forms can be grouped into types of energy that are associated with the motion of mass (kinetic energy), and types of energy associated with the position of mass and with energy fields (potential energy).** **Essential Question:** **How do we know that things have energy?** **Enduring Understanding:** **Energy readily transforms from one form to another, but these transformations are not always**

	Heat energy transfers from warmer substances to cooler substances until they reach the same temperature. H. Electrical systems can be designed to perform a variety of tasks. Series or parallel circuits can be used to transfer electrical energy to devices. Electrical circuits require a complete loop through which the electrical charges can pass. I. Moving electric charges produce magnetic fields. ***The Forms and Sources of Energy*** B. Mechanical energy comes from the motion (kinetic energy) and position (potential energy) of objects. Gravitational potential energy and elastic potential energy are important forms of potential energy that contribute to the mechanical energy of objects. D. Heat energy comes from the random motion of the particles in an object or substance. Temperature is a measure of the motion of the particles. E. Electrical energy is a form of energy that can be transferred by moving charges through a complete circuit. ***Energy Interacting With Materials; the Transformation and Conservation of Energy*** A. Energy can be transformed from one form into another. Energy transformations often take place while energy is being transferred to another object or substance. Energy transformations and energy transfers can be used to explain how energy flows through a physical system (e.g., photosynthesis, weathering, electrical circuits). B. When a substance absorbs heat energy, or when a different form of energy is absorbed by the substance and is transformed into heat energy, the substance usually expands. The particles within the substance do not expand but the space between the particles increases. ***The Production, Consumption and Application of Energy*** A. Energy sources can be renewable or finite. Most energy used by industrial societies is derived from fossil fuel sources. Such sources are inherently limited on the Earth and are unevenly distributed		**reversible. The details of these transformations depend upon the initial form of the energy and the properties of the materials involved. Energy may transfer into or out of a system and it may change forms, but the total energy cannot change.** **Essential Question:** **What happens to the energy in a system — where does this energy come from, how is it changed within the system, and where does it ultimately go? How does the flow of energy affect the materials in the system?** **Enduring Understanding:** **People utilize a variety of resources to meet the basic and specific needs of life. Some of these resources cannot be replaced. Other resources can be replenished or exist in such vast quantities they are in no danger of becoming depleted. Often the energy stored in resources must be transformed into more useful forms and transported over great distances before it can be helpful to us.** **Essential Question:** **What is a "responsible" use of energy? Are there alternative forms of energy that will serve our needs, or better ways of using traditional forms of energy?**

	geographically. Renewable energy sources vary in their availability and ease of use. B. Technological advances throughout history have led to the discovery and use of different forms of energy, and to more efficient use of all forms of energy. These technological advances have led to increased demand for energy and have had both beneficial and detrimental effects on society. C. Responsible use of energy requires consideration of energy availability, efficiency of its use, the environmental impact, and possible alternate sources.		

Curriculum Scope & Sequence

School: Pike Creek Charter School Grade or Course: 8th Grade Science Teacher _____

Unit Order By unit title and/or time frame	**Learning Targets** Content Standards, Grade Level Expectations, Proficiency Level Expectations, or Grade Cluster Benchmarks	**Theme/Big Idea/Concept**	**Enduring Understandings and/or Essential Questions**
Unit 2:Sound and Light	Science Standard 3 Energy and Its Effects The flow of energy drives processes of change in all biological, chemical, physical, and geological systems. Energy stored in a variety of sources can be transformed into other energy forms, which influence many facets of our daily lives. The forms of energy involved and the properties of the materials involved influence the nature of the energy transformations and the mechanisms by which energy is transferred. The conservation of energy is a law that can be used to analyze and build understandings of diverse physical and biological systems. *Forces and the Transfer of Energy* E. Light energy radiates from a source and travels in straight lines. Light is reflected, refracted, transmitted, and absorbed differently by different materials. To see an object, light energy emitted or reflected from the object must enter the eye. *The Forms and Sources of Energy* A. Energy from the Sun takes the form of electromagnetic waves such as infrared, visible, and ultraviolet electromagnetic waves. The radiation from the sun consists of a range of energies in the electromagnetic spectrum. C. Sound energy is the energy that takes the form of mechanical waves passing through objects or substances. The energy delivered by a wave in a given unit of time is determined by the amplitude and frequency of the wave. *Energy Interacting With Materials; the Transformation and Conservation of Energy*	Characteristics of Waves Sound Electromagnetic Waves Light	**Enduring Understanding: Changes take place because of the transfer of energy. Energy is transferred to matter through the action of forces. Different forces are responsible for the transfer of the different forms of energy.** **Essential Question:** **How can energy be transferred from one material to another? What happens to a material when energy is transferred to it?** **Enduring Understanding:** **Energy takes many forms. These forms can be grouped into types of energy that are associated with the motion of mass (kinetic energy), and types of energy associated with the position of mass and with energy fields (potential energy).** **Essential Question:** **How do we know that things have energy?** **Enduring Understanding:** **Energy readily transforms from one form to another, but these transformations are not always reversible. The details of these**

	C. Materials may absorb some frequencies of light but not others. The selective absorption of different wavelengths of white light determines the color of most objects		**transformations depend upon the initial form of the energy and the properties of the materials involved. Energy may transfer into or out of a system and it may change forms, but the total energy cannot change.** **Essential Question:** **What happens to the energy in a system — where does this energy come from, how is it changed within the system, and where does it ultimately go? How does the flow of energy affect the materials in the system?**

Curriculum Scope & Sequence

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Unit 3: Introduction into Chemistry	Science Standard 2 Materials and Their Properties Materials exist throughout our physical world. The structures of materials influence their physical properties, chemical reactivity and use. *Properties and Structure of Materials* A. All matter consists of particles too small to be seen with the naked eye. The arrangement, motion, and interaction of these particles determine the three states of matter (solid, liquid, and gas). Particles in all three states are in constant motion. In the solid state, tightly packed particles have a limited range of motion. In the liquid state, particles are loosely packed and move past each other. In the gaseous state, particles are free to move. B. A phase change may occur when a material absorbs or releases heat energy. Changes in phase do not change the particles but do change how they are arranged. C. Some physical properties, such as mass and volume, depend upon the amount of material. Other physical properties, such as density and melting point, are independent of the quantity of material. Density and melting point are unique physical properties for a material. Tools such as microscopes, scales, beakers, graduated cylinders, Celsius thermometers, and metric rulers are used to measure physical properties. D. An important property of materials is their ability to conduct heat. Some materials, such as certain metals, are excellent conductors of heat while other materials, such as glass, are poor conductors (good thermal	Introduction into Matter Solids, Liquids and Gases Elements and the Periodic Table Atoms and Bonding Chemical Reactions Acids, Bases and Solutions	**Enduring Understanding:** **The structures of materials determine their properties.** **Essential Question:** **How do the properties of materials determine their use?** **(Grades K-8)** **Enduring Understanding:** **The properties of a mixture are based on the properties of its components.** **Essential Questions:** **How can the properties of the components of a mixture be used to separate the mixture?** **How do the components determine the properties of mixtures?** **Enduring Understanding:** **When materials interact within a closed system, the total mass of the system remains the same.** **Essential Questions:** **How does conservation of mass apply to**

	insulators). E. Exposure to energy, such as light and heat, may change the physical properties of materials. *Mixtures and Solutions* A. Mixtures can be homogeneous or heterogeneous. Mixtures may be solids, liquids, and/or gases. Most materials are physical mixtures consisting of different components in varying concentrations. The individual components can be separated using the components' unique physical properties. B. Solutions are homogenous mixtures of two or more components. The properties of a solution depend on the nature and concentration of the solute(s) and the nature of the solvent(s). C. The rate of solubility is influenced by temperature and the surface area of the solute. D. Temperature of the solvent can affect the saturation point of the solution. E. In mixtures, individual components move from areas of higher concentration to areas of lower concentration to eliminate concentration differences. Diffusion is the movement of individual components. *Conservation of Matter* A. The total mass of the mixture is equal to the sum of the masses of the components. Total mass is conserved when different substances are mixed. *Material Technology* A. Synthetic materials and/or modified natural materials are produced to make products used in everyday life. B. The production of new materials has social, environmental, and other implications that require analyses of the risks and benefits.		**the interaction of materials in a closed system?** **Enduring Understanding:** **People develop new materials as a response to the needs of society and the pursuit of knowledge. This development may have risks and benefits to humans and the environment.** **Essential Questions:** **How do you know which material is best for a particular product or need?** **What determines if new materials need to be developed?** **Why should people consider the risks and benefits before the production of new materials and/or the implementation of a new process?**

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Unit 4: Research and Critical Thinking	**Science Standard 1** **Nature and Application of Science and Technology** Science is a human endeavor involving knowledge learned through inquiring about the natural world. Scientific claims are evaluated and knowledge changes as a result of using the abilities and understandings of inquiry. The pursuit of scientific knowledge is a continuous process involving diverse people throughout history. The practice of science and the development of technology are critical pursuits of our society. ***Understandings and Abilities of Scientific Inquiry*** A. Understand that: Scientific investigations involve asking testable questions. Different kinds of questions suggest different scientific investigations. The current body of scientific knowledge guides the investigation. Be able to: Frame and refine questions that can be investigated scientifically, and generate testable hypotheses. B. Understand that: A valid investigation controls variables. Different experimental designs and strategies can be developed to answer the same question. Be able to: Design and conduct investigations with controlled variables to test hypotheses. C. Understand that: In a scientific investigation, data collection involves making precise measurements and keeping accurate records so that others can replicate the experiment. Be able to: Accurately collect data through the selection and use of tools and techniques appropriate to the investigation construct tables, diagrams and graphs, showing relationships between two variables, to display and facilitate analysis of data. Compare and question results with and from other students. D. Understand that: There is much experimental and observational evidence that supports a large body of knowledge. The scientific community supports known information until new experimental evidence arises that does not match existing explanations. This leads to the evolution of the scientific body of knowledge.	**What is Science?** **Science, Society and You** **The Tools of Science** **Technology and Engineering**	**Enduring Understanding: Scientific inquiry involves asking scientifically oriented questions, collecting evidence, forming explanations, connecting explanations to scientific knowledge and theory, and communicating and justifying the explanation.** **Essential Questions:** **What makes a question scientific? What constitutes evidence? When do you know you have enough evidence?** **Why is it necessary to justify and communicate an explanation?** **Enduring Understanding: The development of technology and advancement in science influence and drive each other forward.** **Essential Question: How do science and technology influence each other?** **Enduring Understanding: Understanding past processes and contributions is essential in building scientific knowledge.** **Essential Question: How have past**

	Be able to: Form explanations based on accurate and logical analysis of evidence. Revise the explanation using alternative descriptions, predictions, models and knowledge from other sources as well as results of further investigation. E. Understand that: Evaluating the explanations proposed by others involves examining and comparing evidence, identifying faulty reasoning, pointing out statements that go beyond the evidence, and suggesting alternative explanations for the same observations. Conflicting data or conflicting interpretations of the same data suggest the need for further investigation. Continued investigation can lead to greater understanding and resolution of the conflict. Be able to: Communicate scientific procedures, data, and explanations to enable the replication of results. Use computer technology to assist in communicating these results. Critical review is important in the analysis of these results. F. Understand that: Scientific habits of mind and other sources of knowledge and skills are essential to scientific inquiry. Habits of mind include tolerance of ambiguity, skepticism, and openness to new ideas, and objectivity. Other knowledge and skills include mathematics, reading, writing, and technology. Be able to: Use mathematics, reading, writing, and technology when conducting scientific inquiries. ***Science, Technology, and Society*** A. Advances in technology can expand the body of scientific knowledge. Technological tools allow people to observe objects and phenomena that otherwise would not be possible. Technology enhances the quality, accuracy, speed and analysis of data gathered. B. Science and technology in society are driven by the following factors: economical, political, cultural, social, and environmental. Increased scientific knowledge and technology create changes that can be beneficial or detrimental to individuals or society through impact on human health and the environment. ***History and Context of Science*** A. Over the course of human history, contributions to science have been made by different people from different cultures. Studying some of these contributions and how they came about provides insight into the expansion of scientific knowledge.		**scientific contributions influenced current scientific understanding of the world?** **What do we mean in science when we say that we stand on the shoulders of giants?**