Middle School Science Scope and Sequence

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Grade	CS	PE	Life Science	CS	PE	Physical Science	CS	PE	Earth Science	CS	PE	Science in Context
6	6.2	C4 C5 C6	Biomes/Ecosystems	7.1	C12 C13 C14	Work and Force Potential and Kinetic Energy	6.3	C7 C8 C9	Weather and Climate	6.4	C10 C11	Water Quality
7	7.2	C15	Cells	6.1	C1 C2 C3	Matter Atomic Structure Periodic Table and Elements	7.3	C18 C19 C20	Structure of Earth Earth's Crust in Motion	7.4	C21	Food Technology
8	7.2 8.2	C16 C17	Levels of Organization (cells to systems) Human Body Systems Genetics Nutrition (Optional)	8.1	C22 C23 C24	Force and Motion	8.3	C28 C29	The Solar System: What Forces Govern Its Motion	8.4	C30	Building Bridges

CS = Content Standards PE = Performance Expectations

Middle School Science Curriculum
Grade 6

Grade: 6 **Domain:** Life Science **Unit Title:** **6BE** Biomes and Ecosystems (1 of 4)

State Standard

6.2 - An ecosystem is composed of all the populations that are living in a certain space and the physical factors with which they interact.

Matter and Energy in Ecosystems - How do matter and energy flow through ecosystems?

- ***Populations in ecosystems are affected by biotic factors, such as other populations, and abiotic factors, such as soil and water supply.***
- ***Populations in ecosystems can be categorized as producers, consumers and decomposers of organic matter.***

CAPT Strands

Students understand there is a one-way flow of energy in ecosystems.

LIA2 Describe the transfer of energy from the sun to the environment and back to space, through food webs consisting of producers, consumers and decomposers.

Students understand how the number and variety of organisms and populations are dependent on the resources and physical factors of their environment.

LIB1 Explain how changes in resources, predation and climate can affect the growth of different populations.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Ecology is the study of the interactions of organisms with one another and the environment Biotic factors describe living factors in the environment	**C 4. Describe how abiotic factors, such as temperature, water and sunlight, affect the ability of plants to create their own food through photosynthesis.** **6BE1** Define ecology **6BE2** Observe and categorize abiotic factors **6BE3 Draw** a map of biotic and abiotic factors **6BE4 Observe** and categorize biotic factors	Brine Shrimp Lab (See Appendix C)
Plants use photosynthesis to make their own food	**6BE5** Interpret a diagram of a plant making its own food **6BE6** Observe how plants use the sun's light to make their own food	*Products of Photosynthesis (See Appendix C)

Grade: 6 **Domain:** Life Science **Unit Title:** **6BE** Biomes and Ecosystems (2 of 4)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Ecosystems consist of communities	**C 5. Explain how populations are affected by predator-prey relationships.** **6BE9** Classify communities into ecosystems	*Discovering Mini Ecosystems (Holt-E p135)
Communities are made up of different populations	**6BE10** Classify populations into communities **6BE11** Interpret and compare graphs of different populations in a community **(CINQ.7 Identify and present relationships between variables in appropriate graphs.)**	
Populations are made up of one type of organism	**6BE12** Classify organisms into populations **6BE13** Estimate the size of a population **(CINQ.6 Use mathematical operations to analyze and interpret data.)** **6BE14** Calculate the difference between estimates and actual data **(CINQ.6 Use mathematical operations to analyze and interpret data.)**	
Everything in the environment affects every other thing as demonstrated by mutualism, commensalism, and parasitism	**6BE15** Provide examples of mutualism, commensalism and parasitism **6BE16** Compare and contrast mutualism, commensalism and parasitism	
Organisms are grouped based on how they get energy (producers, consumers, decomposers)	**6BE17** Observe and record the role of decomposers	Moldy Bread (See Appendix C)

Grade: 6 **Domain:** Life Science **Unit Title:** **6BE** Biomes and Ecosystems (3 of 4)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Three cycles of matter are the water cycle, the carbon dioxide cycle, and the nitrogen cycle	**6BE18** Construct and interpret diagrams of each cycle of matter	*Nitrogen Needs (Holt-E p40) Create a Terrarium (See Appendix C) Where Does Water Come From (See Appendix C) Table Top Water Cycle (See Appendix C) *Water Cycle–What goes Up (Holt-H p28)
Limiting factors prevent population growth	**6BE19** Demonstrate how humans limit population growth	Crowded Plants (See Appendix C)
Three cycles of matter are the water cycle, the carbon dioxide cycle, and the nitrogen cycle	**6BE20** Construct and interpret diagrams of each cycle of matter	*Nitrogen Needs (Holt-E p40) Create a Terrarium (See Appendix C) Where Does Water Come From (See Appendix C) Table Top Water Cycle (See Appendix C) *Water Cycle–What goes Up (Holt-H p28)

Grade: 6 **Domain:** Life Science **Unit Title:** **6BE** Biomes and Ecosystems (4 of 4)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Limiting factors prevent population growth	**6BE21** Demonstrate how humans limit population growth **C 6. Describe the common food webs in different Connecticut ecosystems.**	Crowded Plants (See Appendix C)
There is a one-way flow of energy among the levels of organization in ecosystems	**6BE22** Describe the one-way flow of energy among the levels of organization in ecosystems **6BE23** Design a diagram of the one-way flow of energy in ecosystem	
Food webs show interlocking food chains within a community	**6BE24** Interpret food webs	
Biomes are regions characterized by specific climates and certain types of plants and animals	**6BE25** Interpret a map showing Earth's biomes **6BE26** Construct a map of the Earth's biomes	

Grade: 6 **Domain:** Physical Science **Unit Title:** **6FW** Forces and Work (1 of 3)

State Standard

7. 1 - Energy provides the ability to do work and can exist in many forms.

Energy Transfer and Transformations - What is the role of energy in our world?

- ***Work is the process of making objects move through the application of force.***
- ***Energy can be stored in many forms and can be transformed into the energy of motion.***

CAPT Strand

Students understand that energy and matter interact through forces that result in changes in the motions of objects.

PIIA3 Describe the effects of gravitation on the motion and weight of masses.

Students understand the nature of various forms of energy.

PIVA3 Describe simple machines, including ramps, levers and pulleys and explain their use in terms of work and forces.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
A force is a push or a pull. Forces have size and direction and are expressed in Newtons	**C 12. Explain the relationship among force, distance and work, and use the relationship (W=F x D) to calculate work done in lifting heavy objects.**	
	6FW1 Describe forces and give examples of different forces	Bridge Over Cardboard Water (See Appendix C)
Force is always exerted by one object on another object	**6FW2** Explain how forces act on objects	*Quite a Reaction (Holt-F p198)
Net force is determined by combining forces. Forces in the same direction are added. Forces in opposite directions are subtracted	**6FW3** Determine the net force when more than one force is acting on an object	
Balanced forces produce no change in motion. Unbalanced forces produce a change in motion	**6FW4** Compare balanced and unbalanced forces	
Friction is a force that opposes motion between two surfaces that are touching	**6FW5** Explain why friction occurs	*Science Friction (Holt-F p194)
Friction can be increased by making surfaces rougher and by increasing the force pushing the objects together	**6FW6** Explain and demonstrate how friction can be increased	

Grade: 6 **Domain:** Physical Science **Unit Title:** **6FW** Forces and Work (2 of 3)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
The major types of friction are sliding, rolling, fluid, and static	**6FW7** List the types of friction and give examples of each	Dirtmeister's Science Reporters: Friction (See Appendix C)
Friction can be harmful or helpful	**6FW8** Provide examples of how friction can be harmful and helpful	Sticky Sneakers (See Appendix C)
Gravity is a force of attraction between objects that is due to their masses	**6FW9** Define gravity	*Marshmallow Catapult (Holt-F p196)
The law of universal gravitation states that all objects in the universe attract one another through gravitational force Gravitational force increases as mass increases and decreases as distance increases	**6FW10** State the law of universal gravitation	
Work is done when a force causes an object to move over a distance	**6FW11** Determine when work is being done an object	*A Powerful Workout (Holt-F p114)
Work is calculated as force times distance. The unit of work is the joule	**6FW12** Calculate the amount of work done by an object **(CINQ.6 Use mathematical operations to analyze and interpret data.)** **C 13. Explain how simple machines, such as inclined planes, pulleys and levers, are used to create mechanical advantage.**	Seesaw Science (See Appendix C)
A machine makes work easier by changing the size or direction (or both) of a force	**6FW13** Explain how a machine works easier	

Grade: 6 **Domain:** Physical Science **Unit Title:** **6FW** Forces and Work (3 of 3)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
A machine can increase force or distance, but not both	**6FW14** Describe and give examples of the force-distance trade-off that occurs when a machine is used	
Mechanical advantage tells how many times a machine multiplies force	**6FW15** Describe the importance of using machines **6FW16**Calculate mechanical advantage	Angling for Success (See Appendix C)
Mechanical efficiency is a comparison of a machine's work output with work input	**6FW17** Identify the work output and work input in situations involving different machines	
Machines are not 100% efficient because some of the work done is used to overcome friction	**6FW18** Explain why machines are not 100% efficient **(CINQ.8 Draw conclusions and identify sources of error.)**	
The basic simple machines are the inclined plane, wedge, screw, lever, wheel and axle, pulley	**6FW19** Identify the six basic simple machines **6FW20** Describe how each simple machine does work	*Building Machines (Holt-F p204) *Inclined to Move (Holt-F p201) *Wheeling and Dealing (Holt-F p202) Pulleys as Simple Machines (See Appendix C)

Grade: 6 Domain: Physical Science Unit Title: **6PE** Potential and Kinetic Energy

State Standard

7.1 - Energy provides the ability to do work and can exist in many forms.

Energy Transfer and Transformations - What is the role of energy in our world?

- ***Work is the process of making objects move through the application of force.***
- ***Energy can be stored in many forms and can be transformed into the energy of motion.***

CAPT Strand

Students understand the nature of various forms of energy.

PIVA2 Describe various forms of energy, including light, heat, chemical, electrical and mechanical energy, and identify them in various physical settings.

PIVA3 Describe kinetic and potential energy transformations in biological, chemical, mechanical and electrical systems.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 12. Explain the relationship among force, distance and work, and use the relationship (W=F x D) to calculate work done in lifting heavy objects.	
Energy is the ability to do work	**6PK1** Explain the relationship between energy and work	
Kinetic energy is energy of motion and depends on speed and mass	**6PK2** Identify the two factors of kinetic energy	*Finding Energy (Holt-F p148)
	C 14. Describe how different types of stored (potential) energy can be used to make objects move.	
Potential energy is energy in position	**6PK3** Compare and contrast kinetic and potential energy	*Energy of a Pendulum (Holt-F p205)
Mechanical energy is the sum of kinetic and potential energy	**6PK4** Describe mechanical energy in terms of kinetic and potential energy	
Thermal energy and sound energy can be considered forms of kinetic energy	**6PK5** Describe thermal and sound energy in terms of kinetic energy	
Chemical energy, electrical energy, and nuclear energy can be considered forms of potential energy	**6PK6** Describe chemical, electrical, and nuclear energy in terms of potential energy	

Grade: 6 **Domain:** Earth Science **Unit Title:** **6WC** Weather and Climate (1 of 2)

State Standard
6.3 - Variation in the amount of the sun's energy hitting the Earth's surface affect daily and seasonal weather patterns.
Energy in the Earth's Systems - How do external and internal sources of energy affect the Earth's systems?

- ***Local and regional weather are affected by the amount of solar energy these areas receive and by their proximity to a large body of water.***

CAPT Strand
Students understand that our atmosphere is dynamic & has patterns of weather systems.
EIIIA1 Explain how winds originate & are affected by the unequal heating of the Earth's surface, the rotation of the Earth, and the distribution of land & water surfaces.
EIIIA3 Explain how meteorologists collect & interpret meteorological data from various sources.
EIIIB2 Explain the possible causes & effects of global phenomena including El Nino, global warming, and ozone depletion.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 7. Describe the effect of heating on the movement of molecules in solids, liquids and gases.	
Air pressure is the measure of the force with which air molecules push on a surface	**6WC6** Define air pressure	Air Pressure Experiment (See Appendix C)
Air pressure decreases as altitude increases	**6WC7** Explain why air pressure changes with altitude	What's Your Angle (See Appendix C)
The composition of atmospheric layers affects their temperature	**6WC9** Explain how air temperature changes as altitude increases	Building Hot Air Balloons (See Appendix C)
	C 8. Explain how local weather conditions are related to the temperature, pressure and water content of the atmosphere and the proximity to a large body of water.	
Climate is the condition of the atmosphere over a given time	**6WC2** Explain and identify different types of climate	
Latitude is the distance measured in degrees from the equator moving north or south	**6WC3** Illustrate a given diagram using latitude and longitude	

Grade: 6 **Domain:** Earth Science **Unit Title:** **6WC** Weather and Climate (2 of 2)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Longitude is the distance measured in degrees from the prime meridian moving east or west		
Topography is the representation of surface features of a region	**6WC4** Illustrate the topography of a given area	Shoebox Topography (See Appendix C)
Atmosphere is a mixture of gases that surrounds the Earth	**6WC5** Describe the composition of Earth's atmosphere	*Under Pressure (Holt-I p28)
The troposphere, the layer in which we live, is the lowest atmospheric layer	**6WC10** Define & describe the troposphere layer of the atmosphere	
The stratosphere contains the ozone layer, which protects use from harmful UV radiation	**6WC11** Define & describe the stratosphere layer of the atmosphere **6WC12** Describe and explain how the layers act as protective shields for the Earth	
Coriolis effect is the apparent curving of the path of a moving object from an otherwise straight path due to the Earth's rotation	**6WC13** Describe and explain global wind patterns	*Coriolis Lab (Holt-I Teacher Edition p16) Global Impact (Holt-I p114) Invention Convention –NSTA website (See Appendix C)
	C 9. Explain how the uneven heating of the Earth's surface causes winds.	
When temperature increases air pressure increases and when temperature decreases air pressure decreases.	**6WC8** Explain the relationship between temperature and air pressure and its impact on climate	

Grade: 6 **Domain:** Science in Context **Unit Title:** **6WH** Water and Human Activities

State Standard

6.4 - Water moving across and through earth materials carries with it the products of human activities.

Science and Technology in Society - How do science and technology affect the quality of our lives?

- ***Most precipitation that falls on Connecticut eventually reaches Long Island Sound.***

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Humans generate wastewater which affects the quality of the environment Technology can minimize the adverse impact of wastewater on the environment Water has the ability to transport pollutants	**C 10. Explain the role of septic and sewage systems on the quality of surface and ground water.** **6WH1** Describe effluent and identify sources of effluent **6WH2** Draw and label the three general phases of sewage treatment **6WH3 Compare** and contrast septic and municipal sewage treatment facilities. **6WH4** Identify the impacts on the environment from both septic and municipal sewage treatment effluent	
Human activity impacts water quality in Connecticut Impacts on water quality can move from one water system to another	**C 11. Explain how human activity may impact water resources in Connecticut, such as ponds, rivers and the Long Island Sound ecosystem.** **6WH5** Describe a watershed **6WH6** Identify Connecticut's nine major drainage basins in the Long Island Sound Watershed **6WH7** Explain the causes and consequences of erosion **6WH8** Identify both point and non-point source pollution **6WH9** Describe hypoxia in the Long Island Sound	

Middle School Science Curriculum
Grade 7

Grade: 7 **Domain:** Life Science **Unit Title:** **7CCP** Cells and Cell Processes

State Standard

7.2 - Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Structure and Function - How are organisms structured to ensure efficiency and survival?

- ***All organisms are composed of one or more cells; each cell carries on life-sustaining functions.***
- ***Multicellular organisms need specialized structures and systems to perform basic life functions.***

CAPT Strands

Students understand the basic structures and functions of living things.

LIIIA1 Describe the basic similarities and differences found in the structures of plant, animal, and bacterial cells.

LIIIA3 Explain how the cell membrane helps the cell to maintain its unique internal composition.

LIIIB1 Describe the process of cell division (mitosis) and explain how the process is important in growth of organization and repair of tissues.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 15. Describe the basic structures of an animal cell, including nucleus, cytoplasm, mitochondria and cell membrane, and how they function to support life.	
	7CCP1 Identifying the parts of a microscope and their functions **(CINQ.5 Use appropriate tools and techniques to make observations and gather data.)**	*The Letter "e" (See Appendix C)
The cell is the basic unit of life (cell theory)	**7CCP2** Explain the cell theory	
There are basic differences between the plant and animal cell in structure and function	**7CCP3** Identify, compare and contrast differences between plant and animal cells	Prepared Animal Slide vs. Elodea (See Appendix C)
	7CCP4 Identify the 10 major parts of the cell and their functions	*Pond Water vs. Onion Cell (See Appendix C)
Cells undergo various processes to sustain life	**7CCP5** Describing the three methods by which materials move into and out of cells	*Respiration in Yeast Cells (See Appendix C)
	7CCP6 Compare and contrast osmosis and diffusion	Play-Doh (See Appendix C)
	7CCP7 Identify the effects of diffusion and osmosis	
	7CCP8 Draw, label and identify the phases of mitosis	

Grade: 7 **Domain:** Physical Science **Unit Title:** Matter (1 of 2)

State Standard

6.1 - Materials can be classified as pure substances or mixtures, depending on their chemical and physical properties.

Properties of Matter - How does the structure of matter affect the properties and uses of materials?

- ***Mixtures are made of combinations of elements and/or compounds, and they can be separated by using a variety of physical means.***
- ***Pure substances can be either elements or compounds, and they cannot be broken down by physical means.***

CAPT Strands

Students understand the differences between physical and chemical changes of matter.

PIIA1 Describe the physical states of matter (solids, liquids, and gases) in terms of the arrangement and motion of particles and explain how heat is Required to changes in the physical state of matter.

PIIA2 Describe the differences between chemical and physical changes of matter and explain how chemical changes involve the rearrangement of molecules, atoms or ions to form new substances.

Students understand that materials interact with each other in various forms.

PIB3 Explain the differences among atoms, elements, molecules, compounds, and mixtures and give examples of each using common materials.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 1. Describe the properties of common elements, such as oxygen, hydrogen, carbon, iron and aluminum.	
Matter is anything that has mass and takes up space	**7M1** Define and give examples of matter	
Matter exists in four phases	**7M2** Create a chart to compare/contrast the four phases of matter	
	7M3 Differentiate between crystalline and amorphous solids	*Ooblick Lab (See Appendix C)
All matter has physical and chemical properties	**7M4** Define physical and chemical properties	*Mystery Powders (See Appendix C)
	7M5 Differentiate between physical and chemical properties and changes	or *White Before Your Eyes (Holt-K p22)

Grade: 7 **Domain:** Physical Science **Unit Title:** Matter (2 of 2)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Mass is the amount of material in an object	**7M6** Define mass	Determining the Masses of Given Objects
Weight is a measure of the force of gravity on an object	**7M7** Compare and contrast weight and mass	*Mass and Weight (See Appendix C)
Volume is the amount of space an object occupies	**7M8** Define volume	*P&P Block (See Appendix C) Displacement (See Appendix C) *Grow Beast (See Appendix C)
Density is the measurement of how much mass of a substance is contained in a given volume	**7M9** Define density **7M10** Calculate density using the formula D=m/v **((CINQ.6 Use mathematical operations to analyze and interpret data.)**	Density Cylinder *Determining Density (Holt-K p132)
The gas laws explain the relationships among temperature, pressure, and volume	**7M11** Define Boyle's Law (Optional) **7M12** Define Charles's Law (Optional) **7M13** Graph and illustrate gas behaviors (Optional) **C 3. Explain how mixtures can be separated by using the properties of the substances from which they are made, such as particle size, density, solubility and boiling point.**	Graphing Gas Behavior (See Appendix C)
Mixtures are composed of two or more substances that are mixed together but not chemically combined	**7M14** Define mixture	

Grade: 7 **Domain:** Physical Science **Unit Title:** **7AS** Atomic Structure (1 of 2)

State Standard

6.1 - Materials can be classified as pure substances or mixtures, depending on their chemical and physical properties.

Properties of Matter - How does the structure of matter affect the properties and uses of materials?

- ***Mixtures are made of combinations of elements and/or compounds, and they can be separated by using a variety of physical means.***
- ***Pure substances can be either elements or compounds, and they cannot be broken down by physical means.***

CAPT Strands

Students understand the basic structure of atoms and the properties of elements.

PIA1 Describe the basic structure of atoms (including protons, electrons, and neutrons) and how the atoms of one element are alike and different from each other.

Students understand the use of physical and chemical properties to classify and describe matter.

PIB3 Explain the differences among atoms, elements, molecules, compounds and mixtures and give examples of each using common materials.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 1. Describe the properties of common elements, such as oxygen, hydrogen, carbon, iron and aluminum.	
The atom is the smallest piece of matter	**7AS1** Define atom	
Development of the atomic theory from Democritus to the electron cloud	**7AS2** Compare and Contrast the models of the atom from ancient Greek times through the present. (Democritus, Dalton, J.J. Thompson, Rutherford, Bohr, Electron Cloud)	
Atomic structure center nucleus • Protons and neutrons in nucleus • Electrons revolve around the nucleus in shells (energy levels)	**7AS3** Describe the atomic structure of an atom **7AS4** Construct a chart showing the three subatomic particles with their charges, locations, and mass (Optional) **7AS5** Construct a Bohr model of an element	Made to Order (Holt-K p96) Build a model of an atom (See Appendix C)

Grade: 7 **Domain:** Physical Science **Unit Title:** **7AS** Atomic Structure (2 of 2)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 2. Describe how the properties of simple compounds, such as water and table salt, are different from the properties of the elements of which they are made.	
Elements are made up of one kind of atom	**7AS6** Classify elements by their properties **7AS7** Construct a graphic organizer showing how elements are grouped into three basic categories	Use of element in poster form (See Appendix C)
Molecules are made of two or more atoms that are chemically combined	**7AS8** Define molecule	
Compounds are made up of two or more elements that are chemically combined	**7AS9** Describe the properties of a compound **7AS10** Give examples of common compounds	Flame Test (Holt-K p72) Separating a mixture by properties (boiling point, density, and solubility) (See Appendix C)
The Law of the Conservation of Mass states that matter cannot be created nor destroyed	**7AS11** Explain the Law of Conservation of Mass	

Grade: 7 **Domain:** Physical Science **Unit Title:** **7PT** Periodic Table (1 of 2)

State Standard

6.1 – Materials can be classified as pure substances or mixtures, depending on their chemical and physical properties.

Properties of Matter – How does the structure of matter affect the properties and uses of materials?

- ***Mixtures are made of combinations of elements and/or compounds, and they can be separated by using a variety of physical means.***
- ***Pure substances can be either elements or compounds, and they cannot be broken down by physical means.***

CAPT Strands

Students understand the basic structure of atoms and the properties of elements.

PIA1 Describe the basic structure of atoms (including protons, electrons, and neutrons) and how the atoms of one element are alike and different from each other.

PIA2 Describe the organization of the elements in the periodic table including the properties and the electronic arrangements of elements in the first three periods.

Students understand the use of physical and chemical properties to classify and describe matter.

PIB2 Explain that new substances are formed when atoms combine by transferring or sharing electrons (i.e., ionic and covalent bonding.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 2. Describe how the properties of simple compounds, such as water and table salt, are different from the properties of the elements of which they re made.	
Mendeleev developed the first periodic table	**7PT1** Describe how Mendeleev arranged elements in the first periodic table	
A horizontal row of elements is called a period. A vertical column of elements is called a group or family	**7PT2** Describe the difference between a period and a group **7PT3** Explain how elements are arranged in the modern periodic table	*Alien Periodic Table (See Appendix C) or *Create a Periodic Table (Holt-K p122)
Elements in the Period Table are also classified as metals, nonmetals, and metalloids	**7PT4** Compare metals, nonmetals, and metalloids based on their properties and location in the periodic table	

Grade: 7 **Domain:** Physical Science **Unit Title:** **7PT** Periodic Table (2 of 2)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
The atomic number is equal to the number of protons	**7PT5** Explain how to find the atomic number	
The mass number (atomic weight) is the sum of the atom's protons and neutrons	**7PT6** Describe the relationship between numbers of protons and neutrons and atomic number **7PT7** Calculate atomic masses **(CINQ.6 Use mathematical operations to analyze and interpret data.)**	
As isotope of an element has the same number of protons but a different number of neutrons	**7PT8** State how isotopes differ **7PT9** Draw a diagram of an element and three of it isotopes (ex. hydrogen)	
An ion is an atom with a charge.	**7PT10** Compare and contrast how positive and negative ions are formed	
An ionic bond is a bond that forms when electrons are transferred from one atom to another	**7PT11** Explain how ionic bonds form **7PT12** Explain why ionic compounds are neutral **7PT13** Draw compounds that illustrate ionic bonding	
A covalent bond forms when atoms share one or more pairs of electrons	**7PT14** Explain how covalent bonds form (Optional) **7PT15** Using the electron-dot diagram illustrate a covalent bond (Optional)	Covalent Marshmallows (Holt-L p18)

Grade: 7 **Domain:** Earth Science **Unit Title:** **7SE** Structure of the Earth

State Standard

7.3 - Landforms are the result of the interaction of constructive and destructive forces over time.

Energy in the Earth's Systems - How do external and internal sources of energy affect the Earth's systems?

- ***Volcanic activity and the folding and faulting of rocks layers during the shifting of the Earth's crust affect the formation of mountains, ridges and valleys.***
- ***Glaciation, weathering and erosion change the Earth's surface by moving earth materials from place to place.***

CAPT Strands

Students understand the interactions among the Earth's lithosphere, hydrosphere, atmosphere, and biosphere.

EIVA1 Describe how plate tectonics is Required to the interior composition of the Earth, including its core mantle, and crust and relate to it major geological events including earthquakes, volcanic eruptions, and mountain building.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 20. Explain how the boundaries of tectonic plates can be inferred from the location of earthquakes and volcanoes.	
The Earth is composed of an inner and outer core, mantle, and crust	**7SE1** Compare and contrast the four layers of the Earth	*Apple or Peach Lab (See Appendix C)
The Earth is constantly changing	**7SE2** Construct a model representing the layers of the interior of the Earth	
There are three types of heat transfer: radiation, conduction, and convection	**7SE3** Define radiation, conduction, and convection	
The Earth's crust is composed of tectonic plates	**7SE4** List the major tectonic plates	*Jigsaw Puzzle (See Appendix C)
Wegener's theory states that the continents once formed a single landmass called Pangea, and have since drifted apart	**7SE5** State Wegener's theory	

Grade: 7 **Domain**: Earth Science **Unit Title**: **7EC** Earth's Crust in Motion (1 of 3)

State Standard

7.3 - Landforms are the result of the interaction of constructive and destructive forces over time.

Energy in the Earth's Systems - How do external and internal sources of energy affect the Earth's systems?

- ***Volcanic activity and the folding and faulting of rocks layers during the shifting of the Earth's crust affect the formation of mountains, ridges and valleys.***
- ***Glaciation, weathering and erosion change the Earth's surface by moving earth materials from place to place.***

CAPT Strand

Students understand the interactions among the Earth's lithosphere, hydrosphere, atmosphere, and biosphere.

EIVA1 Describe how plate tectonics is Required to the interior composition of the Earth, including its core, mantle, and crust and relate it to major geological events including earthquakes, volcanic eruptions, and mountain building.

EIVA2 Explain how the formation, weathering, sedimentation, and reformation or rock constitute a continuing rock cycle.

EIVA3 Describe how waves, wind, water and ice shape the Earth's land surface.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
The bending of rock layers, because of stress in the Earth's crust, is called folding When tectonic plates undergo compression or tension they can form mountains in several ways	**C 18. Describe how folded and faulted rocks layers provide evidence of the gradual up and down motion of the Earth's crust.** **7EC1** Describe the different types of folds **7EC2** Contrast anticlines and synclines **7EC3** Explain how mountains can be formed	
The rock cycle is the continual process by which new rock forms from old rock material	**7EC4** Identify samples of rocks based on their physical and chemical properties **7EC5** Describe how each type of rock changes into another type as it moves through the rock cycle **7EC6** Illustrate the rock cycle	Physical properties of rocks and minerals (See Appendix C)
The three types of mountains are folded, fault-block, and volcanic	**7EC7** Identify the most common types of mountains **7EC8** Draw and locate major mountain ranges on the jigsaw puzzle	Continuation of Jigsaw Puzzle

Grade: 7 **Domain**: Earth Science **Unit Title**: **7EC** Earth's Crust in Motion (2 of 3)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 19. Explain how glaciation, weathering and erosion create and shape valleys and floodplains.	
Chemical and mechanical weathering is the breakdown of the Earth's surface via agents of erosion	**7EC9** Compare and contrast chemical and mechanical weathering **7EC10** List the agents of erosion	Weathering – observe forces: temperature, rain, wind, stream table, atmosphere (See Appendix C)
	7EC11 Construct a model showing wind or water erosion	
Erosion is the moving or transporting of materials broken down through weathering	**7EC12** Explain how erosion can wear away the Earth's crust	Examine forces that wear away the land – storms, hurricanes, tornados (See Appendix C)
Soil is formed from the weathering of bedrock	**7EC13** Describe the source of soil	
	C 20. Explain how the boundaries of tectonic plates can be inferred from the location of earthquakes and volcanoes.	
The theory of plate tectonics explains the formation, movement and subduction of Earth's plates	**7EC14** State the theory of plate tectonics	
A convergent boundary is formed when two tectonic plates collide	**7EC15** Compare and contrast the three boundaries	
A divergent boundary is formed when two tectonic plates separate	**7EC16** Construct a map of which shows the plates and the three boundaries	
Three major types of faults are normal, reverse, and strike-slip	**7EC18** Describe how earthquakes occur **7EC19** Identify the three types of faults that occur at plate boundaries.	*Modeling Strike and Slip Faults (See Appendix C)
Earthquake energy travels as waves through the Earth's interior or as surface waves along the surface of the Earth	**7EC20** Describe how energy from earthquakes travels through the Earth	

Grade: 7 **Domain**: Earth Science **Unit Title**: **7EC** Earth's Crust in Motion (3 of 3)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Scientists use seismometers to measure seismic waves Scientists use the Richter scale to measure the strength of an Earthquake Scientists use the Mercalli scale to measure an earthquake's intensity Volcanoes are opening in the Earth's surface through which magma and volcanic gas pass There are explosive and quiet volcanic eruptions Lava is liquid magma that reaches the surface of the Earth.	**7EC21** Explain how earthquakes are detected **7EC22** Explain how the strength of an Earthquake is measured **7EC23** Construct a simulation of a seismometer in use **(CINQ.5 Use appropriate tools and techniques to make observations and gather data.)** **7EC24** Explain how the intensity of an earthquake is measured **(CINQ.5 Use appropriate tools and techniques to make observations and gather data.)** **7EC25** Compare and contrast the Richter and Mercalli scales **7EC26** Identify features of a volcano **7EC27** Distinguish between explosive and quiet volcanic eruptions **7EC28** Describe the types of lava	Recording Seismic Waves (See Appendix C)
Magma is molten rock deep underground that feeds a volcano Most volcanoes form at tectonic boundaries The three types of volcanoes are shield, cinder, and composite	**7EC29** Describe magma **7EC30** Compare and contrast lava and magma **7EC31** Identify where most volcanoes are formed **7EC32** Locate and label major volcanoes **7EC33** Identify and compare different types of volcanoes **7EC34** Build a model of one type of volcano	Baking Soda/Vinegar Volcano (See Appendix C)

Grade: 7 **Domain:** Science in Context **Unit Title:** **7ID** Food Technology

State Standard
7.4 - Technology allows us to improve food production and preservation, thus improving our ability to meet the nutritional needs of growing populations.
Science and Technology in Society - How do science and technology affect the quality of our lives?

- ***Various microbes compete with humans for the same sources of food.***

CAPT Strands
Students understand the structure of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.
LIVA3 Explain the human body's defense system against infectious diseases and the role of antibiotics and vaccinations.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 21. Describe how freezing, dehydration, pickling and irradiation prevent food spoilage caused by microbes.	
For many centuries, most food was consumed or marketed within a few dozen miles of where it was grown. Technology has revolutionized agricultural markets through transportation and communications.	**7FT1** Describe heating, salting, drying, cooling and airtight packaging as ways to slow down the spoiling of food by microscopic organisms.	Food Preservation Activity (Science Net Links)
Pasteurization is a process of quickly heating the liquid to kill bacteria and immediately cooling it.	**7FT2** Provide examples of foods that need to be specially handled to avoid spoiling.	
	7FT3 Explain why sealing of cans is important.	Microbes 2: Louis Pasteur (Science Netlinks)
	7FT4 Describe the link between microbes and disease.	

Middle School Science Curriculum
Grade 8

Grade 8 **Domain** Life Science **Unit Title** **8LO** Level of Organization (Cells to Body Systems)

CAPT Strands
Students understand the basic structures and functions of living cells.
LIIIA2 Describe the structure and explain the main functions of skin, nerve, muscle and blood cells.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
There are five levels of organization in the human body	**8LO1** Identify and give examples of the division of labor within the 5 levels	*Looking at Tissues Under the Microscope (See Appendix C)

Grade 8 **Domain** Life Science **Unit Title** **8HBC** The Human Body –Cardiovascular System (1 of 2)

State Standard

7.2 - Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Structure and Function - How are organisms structured to ensure efficiency and survival?

- ***All organisms are composed of one or more cells; each cell carries on life-sustaining functions.***
- ***Multicellular organisms need specialized structures and systems to perform basic life functions.***

CAPT Strands

Students understand the structure of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.

LIVA1 Describe the structure and function of the major human organ systems.

LIVA2 Explain the role of nutrients and physical activity in the functioning of the human body.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 16. Describe the structures of the human digestive, respiratory and circulatory systems, and explain how they function to bring oxygen and nutrients to the cells and expel waste materials.	
The cardiovascular system carries needed substances to the cells and removes waste from the cells	**8HBC1** Describe the function of the cardiovascular system	
Blood moves through the pulmonary system and the systemic systems as it moves through the body	**8HBC2** Explain the difference between the pulmonary system and the systemic system	
	8HBC3 Identify the path of blood through the heart and body	
The 3 types of blood vessels are veins, arteries, and capillaries	**8HBC4** Compare and contrast the different blood vessels	
The 4 types of blood are A, B, AB, and O	**8HBC5** Identify which blood types can receive from and donate to other blood types	Blood Type Lab (simulated) (See Appendix C)
Blood is made up of red blood cells, white blood cells, plasma, and platelets	**8HBC6** List the components of blood and their functions	

Grade 8 **Domain** Life Science **Unit Title** **8HBC** The Human Body –Cardiovascular System (2 of 2)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Poor eating habits or health can lead to various cardiovascular diseases Blood pressure is the measurement of force against the arterial walls	**8HBC7** Research and describe cardiovascular diseases **8HBC8** Identify what causes blood pressure **8HBC9** Measuring the pulse/blood pressure and interpret results **(CINQ.8 Draw conclusions and identify sources of error.)**	Cardiovascular Disease Report (See Appendix C) *Pulse Rate (Appendix C) Blood Pressure (See Appendix C)

Grade 8 **Domain** Life Science **Unit Title** **8HBD**The Human Body – Digestive System

State Standard

7.2 - Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Structure and Function - How are organisms structured to ensure efficiency and survival?

- ***All organisms are composed of one or more cells; each cell carries on life-sustaining functions.***
- ***Multicellular organisms need specialized structures and systems to perform basic life functions.***

CAPT Strands

Students understand the structure of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.

LIVA1 Describe the structure and function of the major human organ systems.

LIVA2 Explain the role of nutrients and physical activity in the functioning of the human body.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
The parts of the human digestive system function to break down food physically and chemically to fuel the body.	**C 16. Describe the structures of the human digestive, respiratory and circulatory systems, and explain how they function to bring oxygen and nutrients to the cells and expel waste materials.** **8HBD1**Describe the general functions carried out by the digestive system	
	8HBD2 Describe the specific functions of the mouth, esophagus, stomach, small intestine and large intestine **8HBD3**Construct a model of the digestive system with labels	
	8HBD4 Explain the role of the liver, gall bladder and pancreas	
	8HBD5 Explain the difference between physical and chemical digestion	*Chewed Cracker (See Appendix C) or *Enzymes in Action (Holt-D p182)

Grade 8 **Domain** Life Science **Unit Title** **8HBEN** The Human Body –Endocrine System (Optional)

State Standard

7.2 - Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Structure and Function - How are organisms structured to ensure efficiency and survival?

- ***All organisms are composed of one or more cells; each cell carries on life-sustaining functions.***
- ***Multicellular organisms need specialized structures and systems to perform basic life functions.***

CAPT Strands

Students understand the structure of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.

LIVA1 Describe the structure and function of the major human organ systems.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
The parts of the endocrine system function to control the production and release of hormones that control the body's daily activities and development	**C 16. Describe the structures of the human digestive, respiratory and circulatory systems, and explain how they function to bring oxygen and nutrients to the cells and expel waste materials.** **8HBEN1**Describe the function of the endocrine system **8HBEN2**Explain the functions of some of the endocrine glands	

Grade 8 **Domain** Life Science **Unit Title** **8HBEX** The Human Body – Excretory System

State Standard

7.2 - Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Structure and Function - How are organisms structured to ensure efficiency and survival?

- ***All organisms are composed of one or more cells; each cell carries on life-sustaining functions.***
- ***Multicellular organisms need specialized structures and systems to perform basic life functions.***

CAPT Strands

Students understand the structure of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.

LIVA1 Describe the structure and function of the major human organ systems.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 16. Describe the structures of the human digestive, respiratory and circulatory systems, and explain how they function to bring oxygen and nutrients to the cells and expel waste materials.	
The parts of the excretory system function to collect wastes and remove them from the body.	**8HBEX1** Identify the function of the excretory system **8HBEX2** Describe the functions of the parts of the excretory system	Perspiration Lab (See Appendix C)

Grade 8 **Domain** Life Science **Unit Title** **8HBM** The Human Body – Muscular System (1 of 2)

State Standard

7.2 - Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Structure and Function - How are organisms structured to ensure efficiency and survival?

- ***All organisms are composed of one or more cells; each cell carries on life-sustaining functions.***
- ***Multicellular organisms need specialized structures and systems to perform basic life functions.***

CAPT Strands

Students understand the structure of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.

LIVA1 Describe the structure and function of the major human organ systems.

LIVA2 Explain the role of nutrients and physical activity in the functioning of the human body.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 17. Explain how the human musculo-skeletal system supports the body and allows movement.	
The human muscular system has three types of muscle types – skeletal, smooth, and cardiac	**8HBM1** Identify the 3 types of muscles found in the body	Examine slides of muscle tissue (See Appendix C)
	8HBM2 Describe the functions of each type of muscle tissue	
The function of the muscular system is to move the bones of the skeletal system	**8HBM3** Explain how skeletal muscles work in pairs	
	8HBM4 Build a model of a moving arm	
	8HBM5 Describe how the muscular system works with the skeletal system	*Clothes-pin Activity (See Appendix C)
	8HBM6 Demonstrate the motion of various joints in the muscular system	Chicken Wings (See Appendix C)

Grade 8 **Domain** Life Science **Unit Title** **8HBM** The Human Body – Muscular System (2 of 2)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
The muscles are categorized as voluntary or involuntary Voluntary are muscles are under conscious control Involuntary muscles are work on their own Proper diet, exercising and stretching are some ways to keep your muscles healthy	**8HBM7** Describe where in the body voluntary and involuntary muscles can be found **8HBM8** List ways in which people can keep their muscles healthy **(CINQ.9 Provide explanations to investigated problems or questions.)**	

Grade 8 Domain Life Science Unit Title 8HBN The Human Body – Nervous System (OPTIONAL)

State Standard

7.2 - Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Structure and Function - How are organisms structured to ensure efficiency and survival?

- ***All organisms are composed of one or more cells; each cell carries on life-sustaining functions.***
- ***Multicellular organisms need specialized structures and systems to perform basic life functions.***

CAPT Strands

Students understand the structure of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.

LIVA1 Describe the structure and function of the major human organ systems.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 17. Explain how the human musculo-skeletal system supports the body and allows movement.	
The parts of the central and peripheral nervous systems function to direct the way the body responds to internal and external stimuli	**8HBN1** Identify the functions of nervous system **8HBN2** Differentiate between the central and peripheral nervous system	
The three types of neurons are sensory, inter neuron, and motor	**8HBN3** List the three types of neurons and describe how a nerve impulse travels	
	8HBN4 Draw and interpret the reflex arc as demonstrated by the knee jerk reflex	Reflexes (See Appendix C)
Reaction time is the elapsed time from stimulus to response	**8HBN5** Explain reaction time **8HBN6** Measure and calculate reaction time and graph results **(CINQ.7 Identify and present relationships between variables in appropriate graphs.)**	*Reaction Time (See Appendix C)

Grade 8 **Domain** Life Science **Unit Title** **8HBRP** The Human Body – Reproductive Systems

State Standard

8.2 - Reproduction is a characteristic of living systems and it is essential for the continuation of every species.

Heredity and Evolution - What processes are responsible for life's unity and diversity?

- ***Heredity is the passage of genetic information from one generation to another.***
- ***Some of the characteristics of an organism are inherited and some result from interactions with the environment.***

CAPT Strands

Students understand the structure of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.

LIVA1 Describe the structure and function of the major human organ systems.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 26. Describe the structure and function of the male and female human reproductive systems, including the process of egg and sperm production.	
The parts of the male reproductive system function to produce sperm and the hormone testosterone	**8HBRP1** Describe the function of the male reproductive system	
	8HBRP2 Identify the organs of the male reproductive system and identify its functions	*Observe human sperm cell slide (See Appendix C)
The parts of the female reproductive system function to produce eggs and estrogen	**8HBRP3** Describe the function of the female reproductive system	
	8HBRP4 Identify the organs of the female reproductive system and identify its functions	*Observe human egg cell slide (See Appendix C)
	8HBRP5 Graph and interpret the menstrual cycle chart **(CINQ.7 Identify and present relationships between variables in appropriate graphs.)**	
Fertilization is the union of sperm and egg	**8HBRP6** List the stages of human development that occur before birth	Fetal Development (See Appendix C)
Once fertilization has taken place, the female reproductive system provides proper environment for fetal development	**8HBRP7** Measure and interpret diagrams of fetal development stages **(CINQ.7 Identify and present relationships between variables in appropriate graphs.)**	

Grade 8 Domain Life Science Unit Title 8HBRE The Human Body – Respiratory System

State Standard

7.2 - Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Structure and Function - How are organisms structured to ensure efficiency and survival?

- ***All organisms are composed of one or more cells; each cell carries on life-sustaining functions.***
- ***Multicellular organisms need specialized structures and systems to perform basic life functions.***

CAPT Strands

Students understand the structure of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.

LIVA1 Describe the structure and function of the major human organ systems.

LIVA2 Explain the role of nutrients and physical activity in the functioning of the human body.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 16. Describe the structures of the human digestive, respiratory and circulatory systems, and explain how they function to bring oxygen and nutrients to the cells and expel waste materials.	
The human respiratory system obtains oxygen and removes carbon dioxide and water waste in the process of cellular respiration	**8HBR1** Describe the function of the respiratory system	
Breathing is the mechanical action of moving air in and out of the lungs Cellular respiration is the process of using oxygen and glucose to produce carbon dioxide, water and energy	**8HBR2** Compare and contrast breathing and cellular respiration	
The parts of the respiratory system function to obtain oxygen and remove carbon dioxide	**8HBR3** Identify the organs and functions of the respiratory system and follow its path through the body	*Build a model of lungs to demonstrate breathing (Holt-D p181)
Lung capacity is amount of air the lungs can hold	**8HBR4** Explain lung capacity **(CINQ.4 Identify independent and dependent variables, and those variables that are kept in constant, when designing an experiment.)**	Lung Capacity Lab (See Appendix C)
Smoking can affect the organs of the respiratory system and cause various diseases and problems.	**8HBR5** Explain how smoking can effect the respiratory system	Research respiratory system diseases caused by smoking (See Appendix C)

Grade 8 **Domain** Life Science **Unit Title** **8HBS** The Human Body – Skeletal System

State Standard

7.2 - Many organisms, including humans, have specialized organ systems that interact with each other to maintain dynamic internal balance.

Structure and Function - How are organisms structured to ensure efficiency and survival?

- ***All organisms are composed of one or more cells; each cell carries on life-sustaining functions.***
- ***Multicellular organisms need specialized structures and systems to perform basic life functions.***

CAPT Strands

Students understand the structure of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.

LIVA1 Describe the structure and function of the major human organ systems.

LIVA2 Explain the role of nutrients and physical activity in the functioning of the human body.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 17. Explain how the human musculo-skeletal system supports the body and allows movement.	
The human skeletal system provides shape, allows movement, protects organs, produces blood, and stores minerals	**8HBS1**Identify the functions of the skeletal system **8HBS2** Construct a model of a skeleton and label the bones	
Joints are where 2 or more bones meet	**8HBS3** Define a joint	
There are three types of joints: moveable, partially moveable and immovable or fixed	**8HBS4** Explain the role that moveable joints play in the body	
The four types of movable joints are hinge, ball and socket, pivot, and gliding	**8HBS5** Demonstrate, physically and verbally, the motion of various joints in the skeletal system	
All bones consist of spongy bones, marrow, compact bone, blood vessels, nerves, and periosteum	**8HBS6** Describe the structure of bones **8HBS7** Examine the structure of a bone	*Bone Strength (Appendix C)
The major types of injuries for the skeletal system are fractures, dislocations, and sprains	**8HBS8** List and describe common skeletal system injuries **8HBS9** Examine X-rays	

Grade 8 **Domain** Life Science **Unit Title** **8N** Nutrition **(OPTIONAL)**

CAPT Strands
Students understand the structure of the human body and how environmental conditions, nutrition, physical activity and pathogens affect its functioning.
LIVA1 Describe the structure and function of the major human organ systems.
LIVA2 Explain the role of nutrients and physical activity in the functioning of the human body.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Nutrients are substances in food that provide the raw materials and energy the body needs to carry out all the essential life processes	**8N1** Describe what nutrients are and what they do for the body **8N2** List and describe the functions of each of the 6 nutrients needed by the body	
A food guide shows what a person should eat in one day for each food group	**8N3** State how a food guide can be used to plan a healthy diet	Food and Activity Log (See Appendix C)
Nutrition labels contains the information about nutrients for a food item	**8N4** Read and interpret information that is included on nutrition labels **(CINQ.2 Read, interpret and examine the credibility of scientific claims in different sources of information.)**	*Cereal Check (See Appendix C)

Grade 8 **Domain** Life Science **Unit Title** **8G** Genetics

State Standard

8.2 - Reproduction is a characteristic of living systems and it is essential for the continuation of every species.

Heredity and Evolution - What processes are responsible for life's unity and diversity?

- ***Heredity is the passage of genetic information from one generation to another.***
- ***Some of the characteristics of an organism are inherited and some result from interactions with the environment.***

CAPT Strands

Students understand how each organism carries a set of instructions (genes).

LIIAI Describe how genetic materials are organized in genes and chromosomes in the cells of living organisms.

LIIA2 Explain how genetic information from both parents is mixed in the fertilized egg to produce an individual with new combinations of genes and traits.

LIIA3 Explain how genes are Required to inherited traits and how genes can be manipulated by modern technologies.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 27. Describe how genetic information is organized in genes on chromosomes, and explain sex determination in humans.	
Genetics is the study of passing traits from parent to offspring which can occur asexually or sexually	**8G1** Compare and contrast sexual and asexual reproduction **8G2** Explain how sexual reproduction results in genetically different offspring	
Sexual reproduction allows for genetic variability	**8G3** Compare and contrast genotype and phenotype **8G4** Compare and contrast dominant and recessive genes **8G5** Explore sex determination **8G6** Construct a pedigree chart **(CINQ.7 Identify and present relationships between variables in appropriate graphs.)**	Tracing Traits (Holt-C p187)

Grade 8 **Domain** Physical Science **Unit Title** **8FM** Forces and Motion (1 of 2)

State Standard

8.1 - An object's inertia causes it to continue moving the way it is moving unless it is acted upon by a force to change its motion.

Forces and Motion - What makes objects move the way they do?

- ***The motion of an object can be described by its position, direction of motion and speed.***
- ***An unbalanced force acting on an object changes its speed and/or direction of motion.***
- ***Objects moving in circles must experience force acting toward the center.***

CAPT Strands

Students understand that energy and matter interact through forces that result in changes in the motions of objects.

PIIIA1 Explain the relationships among distance, time, and speed, interpret graphs of motion, perform calculations using the equation Distance=Speed x Time.

PIIIA2 Describe Newton's three laws of motion, apply them to everyday phenomena, and perform calculations using the equation Force= Mass x Acceleration.

PIIIA3 Describe the effects of gravitation on the motion and weight of masses.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Relative motion is the idea that the observation of motion depends on the observer	**C 22. Calculate the average speed of a moving object and illustrate the motion of objects in graphs of distance over time.** **8FM1** Define relative motion and give an example	
Speed is a measure of how fast something moves through a particular distance over a definite period of time	**8FM2** Explain the difference between speed and velocity	*Built for Speed (Holt-M p192)
Velocity is speed in a specific direction		
The motion of an object can be described by its position, direction, and speed.	**8FM3** Explain when an object is in motion and how motion is relative to a reference point. **8FM4** Calculate an object's speed and velocity using metric (SI) units of distance	

Grade 8 **Domain** Physical Science **Unit Title** **8FM** Forces and Motion (2 of 2)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Unbalanced forces cause change in the speed and/or direction of an object's motion	**8FM5** Describe how to measure the speed of objects in motion **8FM6** Find average speed **8FM7** Illustrate the motion of objects in graphs of distance over time	
Newton's Laws of Motion effect everyday phenomena	**8FM8** Describe how Newton's laws of motion influence everyday activities **C 23. Describe the qualitative relationships among force, mass and changes in motion.**	*Blast Off (Holt-M p193)
A reference point is a location to which another location is compared	**8FM9** Describe the location based on a reference point **8FM10** Explain how forces speed up, slow down, stop, or change the direction of a moving object.	*Relating Mass and Weight (Holt-M p193)
An object in motion will remain in motion unless acted upon by an outside force. An object at rest will remain at rest unless acted upon by an outside force	**8FM11** Graph motion showing changes in distance as a function of time **C 24. Describe the forces acting on an object moving in a circular path.**	
Objects moving in circles must experience force acting toward the enter.	**8FM12** Describe the forces on an object moving in a circular path	

Grade: 8 **Domain:** Earth Science **Unit Title:** **8SS** The Solar System: What Forces Govern Its Motion (1 of 2)

State Standard

8.3 - The solar system is composed of planets and other objects that orbit the sun.

Earth in the Solar System - How does the position of Earth in the solar system affect conditions on our planet?

- ***Gravity is the force that governs the motions of objects in the solar system.***
- ***The motion of the Earth and moon relative to the sun causes daily, monthly and yearly cycles on Earth.***

CAPT Strands

Students understand the structure, motion, and composition of stars, planets, and other bodies with an emphasis on out solar system.

EIA1 Describe the orientation, direction and duration of the movement of the Earth around its axis and around the sun and relate these to day/night cycles and the seasons.

EIA2 Explain how the changes in the relative positions of the sun, moon and Earth affect the phases of the moon and eclipses and describe tidal variations.

EIA3 Describe our solar system including the estimated size, composition and surface features of the sun, planets, and lesser members.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 28. Explain the effect of gravity on the orbital movement of planets in the solar system.	
The Solar System consists of the sun, planets, moons, comets, asteroids, and meteoroids	**8SS1** Create a model and identify the sun, planets, moons, comets, asteroids, and meteoroids	*How Far is the Sun (Holt-J p84)
The Solar System was formed from a nebula by the action of gravity	**8SS2** Describe how the Solar System was formed	Orbital Lab (See Appendix C)
Gravity governs the orbital movement of planets in the solar system	**8SS3** Demonstrate the effects of gravity on the planets' orbital movement	*Communicate/Consult with Planetarium Director, arrange visit to Planetarium
The motion of the Sun, Earth, and Moon explains the day, year, and phases of the moon and eclipses	**8SS4** Compare and contrast the characteristics of the planets in the solar system	*Phases of the Moon (Holt-J p171)

Grade: 8 **Domain:** Earth Science **Unit Title:** **8SS** The Solar System: What Forces Govern Its Motion (2 of 2)

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
	C 29. Explain how the regular motion and relative position of the sun, Earth and moon affect the seasons, phases of the moon and eclipses.	
	8SS5 Demonstrate the phenomena of day and night, and concept of a year	*Create a Calendar (Holt-J p124)
	8SS6 Illustrate the phases of the moon	
	8SS7 Model and demonstrate lunar and solar eclipses	*Eclipses (Holt-J p170
The gravity of the sun and moon influences tides on Earth (OPTIONAL)	**8SS8** Illustrate the conditions causing high and low tide	*Tide Clock (See Appendix C)
	8SS9 Create a pictorial representation of tides	
	8SS10 Illustrate the conditions of neap and spring tides	
	8SS11 Interpret tide charts from local newspaper **(CINQ.8 Draw conclusions and identify sources of error.)**	

Grade: 8 **Domain:** Earth Science **Unit Title:** **8SE** Science Explorations: What Are They Good For? (OPTIONAL)

State Standard
8.7 Space Explorations provide information about the solar system, the universe and the possibility of life beyond Earth.

CAPT Strands
Students understand the structure, motion, and composition of stars, planets, and other bodies with an emphasis on out solar system.
EIA4 Explain how astronomers collect and interpret information to determine the motion, structure and composition of stars.

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
The space program provides new information about the Solar System	**8SE1**Describe how satellites/space probes has given us a better understanding of the Earth as a global system. **8SS2** Build a model of a spacecraft	Reach for the stars (Holt-J p172)
Space program uses manned and unmanned exploration	**8SE3** Describe and give examples of manned and unmanned exploration **8SE4** Describe the advantages and disadvantages of having manned space exploration versus unmanned space exploration	
Life can be sustained in space by using space suits, packaged foods, and exercise	**8SE5** Explain how basic life needs are met during space travel	Survival Kit Activity (See Appendix C)

Grade 8 Domain Science in Context Unit Title 8BB Building Bridges

State Standard

8.4 - I the design of structures there is a need to consider factors such as function, materials, safety, cost and appearance.

Science and Technology in Society - How do science and technology affect the quality of our lives?

- ***Bridges can be designed in different ways to withstand certain loads and potentially destructive forces.***

Key Concepts	Student Outcomes and Skills	Hands-On Activities/Labs *Required
Stress, strain, elastic limit, tension, compression, stability and beam and suspension bridges.	**C 30. Explain how beam, truss and suspension bridges are designed to withstand the forces that act on them.**	
	8BB1 Describe how you can make a weak material like newspaper strong enough to stand up.	What is the tallest tower you can build with just two sheets of newspaper?
	8BB2 Compare different shapes (squares, triangles, arches) as to their stability and strength.	
	8BB3 Distinguish the following forces: compression, tension, torsion and shearing.	Use KNEX materials to experiment with different bridge structures.
	8BB4 Explain why simple beam bridges are subjected to bending forces due to tension and compression.	