

Sheridan County School District #3
7-12 Science Priority Standards

| WY-TOPP Standard | Power School Priority Standard | Science Grade 7 - Includes Life Science, Earth Science and Physical Science |
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| 8.1.4 | Life Science | LS.2 Ecosystems: Interactions, Energy, and Dynamics |
| Diversity of Organisms: Students investigate the interconnectedness of organisms, identifying similarity and diversity of organisms through a classification system of hierarchical relationships and structural homologies. 8.1.6 Interrelationships of Populations and Ecosystems: Students illustrate populations of organisms and their interconnection within an ecosystem, identifying relationships among producers, consumers, and decomposers. | MSLS.2.1 | Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. |
| | MSLS.2.3 | Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem. |
| | MSLS.2.4 | Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations. |
| | MSLS.2.5 | Evaluate competing design solutions for maintaining biodiversity and ecosystem services. |
| 8.1.3 | | LS.4 Biological Evolution: Unity and Diversity |
| Evolution as a Theory: Students explain evolution as a theory and apply the theory to the diversity of species, which results from natural selection and the acquisition of unique characteristics through biological adaptation 8.1.5 Behavior and Adaptation: Students recognize behavior as a response of an organism to an internal or environmental stimulus and connect the characteristics and behaviors of an organism to biological adaptation. | MSLS.4.1 | Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past. |
| | MSLS.4.4 | Construct an explanation based on evidence that describes how genetic variations of traits in a population affects individuals' probability of surviving and reproducing in a specific environment. |
| | MSLS.4.6 | Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time. |
| 8.1.14 | Physical Science | PHY.2 Motion and Stability: Forces and Interactions |
| Effects of Motions and Forces: Students describe motion of an object by position, direction, and speed, and identify the effects of force and inertia on an object. | MSPHY.2.1 | Apply Newton's third law to design a solution to a problem involving the motion of two colliding objects |
| | MSPHY.2.2 | Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object |

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| | MSPHY.2.4 | Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects. |
| <p>8.1.12 Forms and Uses of Energy: Students investigate energy as a property of substances in a variety of forms with a range of uses.</p> | | <i>PHY.3 Energy</i> |
| | MSPHY.3.1 | Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. |
| <p>8.1.13 The Conservation of Matter and Energy: Students identify supporting evidence to explain conservation of matter and energy, indicating that matter or energy cannot be created or destroyed but is transferred from one object to another..</p> | MSPHY.3.4 | Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample. |
| | MSPHY.3.5 | Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object. |
| <p>8.1.8 The Structure of the Earth System: Students examine the structure of the Earth, identifying layers of the Earth, considering plate movement and its effect, and recognizing landforms resulting from constructive and destructive forces</p> | <i>Earth Science</i> | <i>ESS.1 Earth's Place in the Universe</i> |
| | MSESS.1.4 | Construct a scientific explanation based on evidence from rocks and rock strata for how the geologic time scale is used to organize Earth's 4.6 billion year old history. |
| <p>8.1.9 The Earth's History: Students systematize the Earth's history in terms of geologic evidence, comparing past and present Earth processes and identifying catastrophic events and fossil evidence.</p> <p>8.1.8 The Structure of the Earth System: Students examine the structure of the Earth, identifying layers of the Earth, considering plate movement and its effect, and recognizing landforms resulting from constructive and destructive forces.</p> | | <i>ESS.2 Earth's Systems</i> |
| | MSESS.2.1 | Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process. |
| | MSESS.2.3 | Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions. |
| | MSESS.2.4 | Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity |
| | MSESS.2.6 | Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of Atmospheric and oceanic circulation that determine regional climates. |

| <i>WY-TOPP Standard</i> | <i>Power School Priority Standard</i> | <i>Science Grade 8 - includes Earth Science, Life Science, and Physical Science</i> |
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| <p>8.1.1 Levels of Organization in Living Systems: Students model the cell as the basic unit of a living system. They realize that all functions that sustain life act within a single cell and cells differentiate into specialized cells, tissues, organs, and organ systems.</p> | <i>Life Science</i> | <i>LS.1 From Molecules to Organisms: Structure and Processes</i> |
| | MSLS.1.1 | Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells. |
| | MSLS.1.2 | Develop and use models to describe the parts, functions, and basic processes of cells. |
| | MSLS.1.5 | Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms. |
| | MSLS.1.6 | Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms. |
| <p>8.1.2 Reproduction and Heredity: Students describe reproduction as a characteristic of all living systems, which is essential to the continuation of species, and identify and interpret traits, patterns of inheritance, and the interaction between genetics and environment.</p> | <i>Life Science</i> | <i>LS.3 Heredity: Inheritance and Variation of Traits</i> |
| | MSLS.3.1 | Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism. |
| | MSLS.3.2 | Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. |
| <p>8.1.7 The Earth in the Solar System: Students describe Earth as the third planet in the Solar System and understand the effects of the sun as a major source of energy, gravitational forces, and motions of objects in the Solar System.</p> | <i>Earth Science</i> | <i>ESS.1 Earth's Place in the Universe</i> |
| | MSESS.1.1 | Develop and use a model of the earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons |
| | MSESS.1.2 | Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. |
| <p>8.1.8 The Structure of the Earth System: Students examine the structure of the Earth, identifying layers of the Earth, considering plate movement and its effect, and recognizing landforms resulting from constructive and destructive forces.</p> | | <i>ESS.3 Earth and Human Activity</i> |
| | MSESS.3.1 | Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes. |
| | MSESS.3.2 | Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. |
| | MSESS.3.3 | Apply scientific principles to design a method for monitoring, evaluating, and managing a human impact on the environment. |

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| <p>8.1.10 The Structure and Properties of Matter: Students identify characteristic properties of matter such as density, solubility, and boiling point and understand that elements are the basic components of matter.</p> <p>8.1.11 Physical and Chemical Changes in Matter: Students evaluate chemical and physical changes, recognizing that chemical change forms compounds with different properties and that physical change alters the appearance but not the composition of a substance.</p> | <i>Physical Science</i> | <i>PHY.1 Matter and its Interactions</i> |
| | MSPHY.1.1 | Develop models to describe the atomic composition of simple molecules and extended structures. |
| | MSPHY.1.2 | Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. |
| | MSPHY.1.4 | Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed. |
| | MSPHY.1.5 | Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved. |
| | | <i>PHY.3 Energy</i> |
| | MSPHY.3.1 | Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object. |
| WY-TOPP Standard | Next Gen. Science Standard | Grades 7 & 8 Science - Engineering, Technology and Applications of Science |
| <p>WyTopp 8.2 standards are for <i>Science as Inquiry</i>. <i>ETS.1.1</i> falls most accurately under these standards. These 8.2 standards are embedded in the assessment of concepts and processes on the <i>WyTopp</i>.</p> | <i>Power School Priority Standard</i> | <i>ETS.1.1 Define a simple design reflecting a simple need or want that includes specified criteria for success and constraints on materials, time or cost.</i> |
| | MSETS.1.1 | Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time or cost. |

| WY-TOPP Standard | Next Gen. Science Standard | 9th Grade Science (9th grade is mostly physical science with some earth science.) |
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| <p>11.1.10 Describe the atomic structure of matter, including subatomic particles, their properties, and interactions. Recognize that elements are organized into groups in the periodic table based on their outermost electrons and these groups have similar properties. Explain chemical bonding in terms of the transfer or sharing of electrons between atoms. Describe physical states of matter and phase changes. Differentiate between chemical and physical properties, and chemical and physical changes.</p> <p>11.1.10 Describe the atomic structure of matter, including subatomic particles, their properties, and interactions. Recognize that elements are organized into groups in the periodic table based on their outermost electrons and these groups have similar properties. Explain chemical bonding in terms of the transfer or sharing of electrons between atoms. Describe physical states of matter and phase changes. Differentiate between chemical and physical properties, and chemical and physical changes.</p> <p>11.1.11 Recognize that chemical reactions take place all around us. Realize that chemical reactions may release or consume energy, occur at different rates. Identify the factors that affect reaction rates and result in the formation of different substances.</p> <p>11.1.12 Conservation of Energy and Increase in Disorder: Demonstrate an understanding of the laws of conservation of mass and energy within the context of physical and chemical changes. Realize the tendency for systems to increase in disorder.</p> <p>11.1.13 Energy and matter: Demonstrate an understanding of types of energy, energy transfer and transformations, and the relationship between mass and energy.</p> | Power School Priority Standard | PHY.1A Matter and its Interactions: Structure and Properties of Matter (PHY.1.1,1.2; WyTOPP 11.1.10) |
| | HSPHY.1.1 | Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. |
| | HSPHY.1.2 | Construct an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms,trends in the periodic table, and knowledge of the patterns of chemical properties, and revise, as needAZSDF” ed. |
| | HSPHY.1.5 | Apply scientific principles and use evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. |
| | HSPHY.1.6 | Evaluate the design of a chemical system by changing conditions to produce increased amounts of products at equilibrium, and refine the design, as needed. |
| | HSPHY.1.7 | Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. |
| | HSPHY.1.8 | Develop models to illustrate the changes in the composition of the nucleus of the atom and the energy released during the processes of fission, fusion, and radioactive decay. |

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| <p>11.1.14 Develop a conceptual understanding of Newton's Laws of Motion, gravity, electricity, and magnetism</p> | <i>Physical Science</i> | PHY.2 Motion and Stability: Forces and Interactions |
| | HSPHY.2.1 | Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. |
| | HSPHY.2.2 | Use mathematical representations to support the claim that the total momentum of a system of objects is conserved when there is no net force on the system. |
| <p>11.1.13 Energy and matter: Demonstrate an understanding of types of energy, energy transfer and transformations, and the relationship between mass and energy.</p> | HSPHY.2.3 | Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. |
| <p>11.1.14 Develop a conceptual understanding of Newton's Laws of Motion, gravity, electricity, and magnetism.</p> | HSPHY.2.5 | Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that changing magnetic field can produce an electric current. |
| | HSPHY.2.6 | Communicate scientific and technical information about why the molecular-level structure is important in the functioning of materials. |
| <p>11.1.13 Energy and matter: Demonstrate an understanding of types of energy, energy transfer and transformations, and the relationship between mass and energy.</p> | <i>Physical Science</i> | PHY.3 Energy |
| | HSPHY.3.1 | Create or apply a computational model to calculate the change in the energy of one component in a system when the change in energy of the other component(s) and energy flows in and out of the system are known. |
| <p>11.1.14 Develop a conceptual understanding of Newton's Laws of Motion, gravity, electricity, and magnetism.</p> | HSPHY.3.3 | Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy. |
| | <i>Physical Science</i> | PHY.4 Waves and their applications in technologies for information transfer |
| | HSPHY.4.1 | Use mathematical representations to support a claim regarding relationships among the frequency, wavelength, and speed of waves traveling in various media. |
| | HSPHY.4.5 | Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy. |

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| | <i>Earth Science</i> | <i>ESS.1 Earth's Place in the Universe</i> |
| | HSESS.1.2 | Construct an explanation of the Big Bang theory based on astronomical evidence of light spectra, motion of distant galaxies, and composition of matter in the universe. |
| | HSESS.1.3 | Communicate scientific ideas about the way stars, over their life cycle, produce elements. |
| | <i>Earth Science</i> | <i>ESS.2 Earth's Systems</i> |
| | HSESS.2.2 | Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. |
| | HSESS.2.4 | Use a model to describe how variations in the flow of energy into and out of Earth's systems result in changes in climate. |
| | HSESS.2.7 | Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. |
| | <i>Earth Science</i> | <i>ESS.3 Earth and Human Activity</i> |
| | HSESS.3.5 | Analyze data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth's systems. |

| WY-TOPP Standard | Priority Standard | 10th Grade Science - Biology (Biology is mostly life science standards with some earth science.) |
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| | Life Science | LS.11.1 From Molecules to Organisms: Structures and Processes |
| 11.1.1 | HSL.S.1.1 | Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. |
| 11.1.2 | HSL.S.1.2 | Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. |
| 11.1.1 | HSL.S.1.3 | Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. |
| 11.1.4 | HSL.S.1.4 | Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. |
| 11.1.5 | HSL.S.1.5 | Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. |
| 11.1.6 | HSL.S.1.6 | Construct explanations and revise, as needed, based on evidence for: 1) how carbon, hydrogen, and oxygen may combine with other elements to form amino acids and/or other large carbon-based molecules, and 2) how other hydrocarbons may also combine to form large carbon-based molecules. |
| | HSL.S.1.7 | Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of sugar molecules are broken and the bonds in new compounds are formed resulting in a net transfer of energy. |
| | Life Science | LS.11.2 Ecosystems: Interactions, Energy, and Dynamics |
| | HSL.S.2.1 | Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. |
| | HSL.S.2.2 | Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity. |
| | HSL.S.2.3 | Construct an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions and revise as needed. |
| | HSL.S.2.4 | Use mathematical and/or computational representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem. |

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| | HSL.S.2.5 | Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. |
| | HSL.S.2.6 | Evaluate the claims, evidence, and reasoning that the complex biotic and abiotic interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a modified ecosystem. |
| | HSL.S.2.7 | Evaluate and assess impacts on the environment and biodiversity in order to refine or design a solution for detrimental impacts or enhancement for positive impacts. |
| 11.1.2 | <i>Life Science</i> | <i>LS.11.3 Heredity: Inheritance and Variation of Traits</i> |
| | HSL.S.3.1 | Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. |
| | HSL.S.3.2 | Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. |
| | HSL.S.3.3 | Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population. |
| 11.1.3 | <i>Life Science</i> | <i>LS.11.4 Biological Evolution: Unity and Diversity</i> |
| | HSL.S.4.1 | Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. |
| | HSL.S.4.2 | Construct an explanation based on evidence that the process of evolution primarily results from four factors. |
| | HSL.S.4.3 | Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. |
| | HSL.S.4.4 | Construct an explanation based on evidence for how natural selection leads to adaptation of populations. |
| | <i>Earth Science</i> | <i>ESS.1 Earth's Place in the Universe</i> |

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| | HSESS.1.5 | Evaluate evidence of the past and current movements of continental and oceanic crust and the theory of plate tectonics to explain the ages of crustal rocks. |
| | HSESS.1.6 | Apply scientific reasoning and evidence from ancient Earth materials, meteorites, and other planetary surfaces to construct an account of Earth's formation and early history. |
| | <i>Earth Science</i> | <i>ESS.3 Earth and Human Activity</i> |
| | HSESS.3.1 | Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. |
| | HSESS.3.2 | Evaluate competing design solutions for developing, managing, and using energy and mineral resources based on cost-benefit ratios. |
| | HSESS.3.3 | Use computational tools to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. |
| | HSESS.3.4 | Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. |
| <i>WY-TOPP Standard</i> | <i>Priority Standards</i> | <i>High School Science 11th,12th Grade - Biology II</i> |
| | <i>Life Science</i> | <i>LS.11.1 From Molecules to Organisms: Structures and Processes</i> |
| | HLSL.1.1 | Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. |
| | HLSL.1.2 | Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multi-cellular organisms. |
| | HLSL.1.3 | Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. |
| | HLSL.1.4 | Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. |
| | HLSL.1.5 | Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. |
| | HLSL.1.6 | Construct explanations and revise, as needed, based on evidence for: 1) how carbon, hydrogen, and oxygen may combine with other elements to form amino acids and/or |

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| | | other large carbon-based molecules, and 2) how other hydrocarbons may also combine to form large carbon-based molecules. |
| | Earth Science | ESS.3 Earth and Human Activity |
| | HSESS.3.1 | Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. |
| WY-TOPP Standard | Priority Standards | High School Science 11th,12th Grade - Chemistry |
| | Physical Science | PHY.1 |
| | HSPHY.1.1 | Use the periodic table as a model to predict the relative properties of elements based on the patterns of electrons in the outermost energy level of atoms. |
| | HSPHY.1.2 | Construct an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties, and revise, as needed. |
| | HSPHY.1.4 | Develop a model to illustrate that the release or absorption of energy from a chemical reaction system depends upon the changes in total bond energy. |
| | HSPHY.1.5 | Apply scientific principles and use evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs. |
| | HSPHY.1.6 | Evaluate the design of a chemical system by changing conditions to produce increased amounts of products at equilibrium, and refine the design, as needed. |
| | HSPHY.1.7 | Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. |
| | Physical Science | PHY.2 Motion and Stability: Forces and Interactions |
| | HSPHY.2.5 | Plan and conduct an investigation to provide evidence that an electric current can produce a magnetic field and that changing magnetic field can produce an electric current. |
| | HSPHY.2.6 | Communicate scientific and technical information about why the molecular-level structure is important in the functioning of materials. |

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| | <i>ETS</i> | <i>Engineering, Technology, and Applications of Science (embedded in all domains of science)</i> |
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