

Campbellsport School District

Science Performance Standards and Benchmarks

CSD Performance Standards for Science describe what Campbellsport School District students will know and be able to do within this subject area. Each CSD performance standard is aligned to a corresponding content standard within the Wisconsin Model Academic Standards (WMAS) for Science.

Each grade level has a set of skill and information benchmarks based on these fifteen performance standards in Science. As students progress through the district's curriculum, their performance of skills and their demonstration of knowledge within the content area will become more complex and sophisticated.

**CSD Performance Standard 1—Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)**

**CSD Performance Standard 2—Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)**

**CSD Performance Standard 3—Understands the composition and structure of the universe and the Earth's place in it.
(WMAS Science—Earth and Space Science)**

**CSD Performance Standard 4—Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)**

**CSD Performance Standard 5—Understands the concepts of genetics and how it applies to heredity, and other related concepts.
(WMAS Science—Life and Environmental Science)**

**CSD Performance Standard 6—Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)**

**CSD Performance Standard 7—Understands the relationships among organisms and their physical environment.
(WMAS Science—Life and Environmental Science)**

**CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.
(WMAS Science—Physical Science)**

**CSD Performance Standard 9—Understands the principles of forces and motion.
(WMAS Science—Physical Science)**

**CSD Performance Standard 10—Understands energy types and conversion sources and their relationship to heat and temperature.
(WMAS Science—Physical Science)**

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CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

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Science Performance Standards and Benchmarks

Key to this Document:

CSD Performance Standards (in bold) describe what students should know and be able to do within a subject area. Each CSD performance standard is aligned to a corresponding content standard within the Wisconsin Model Academic Standards (WMAS) for that subject area.

- Benchmarks (with ID label) describe information and skills targeted for a specific grade level within that Performance standard.

Kindergarten

CSD Performance Standard 1—Understands atmospheric processes and the water cycle.

(WMAS Science—Physical Science)

- SC.K.1es.1 Knows that the short-term weather conditions (e.g., temperature, rain, snow) can change daily, and weather patterns change over the seasons
- SC.K.1es.2 Knows that water can be a liquid or a solid and can be made to change from one form to the other, but the amount of water stays the same

CSD Performance Standard 2—Understands Earth's composition and structure.

(WMAS Science—Earth and Space Science)

- SC.K.2es.1 Knows that changes on the earth can be observed (night/day, daily weather, seasons)
- SC.K.2es.2 Knows that Earth materials consist of solid rocks, soils, liquid water

CSD Performance Standard 3—Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- Not addressed in Kindergarten

CSD Performance Standard 4—Understands biological evolution and the diversity of life.

(WMAS Science—Life and Environmental Science)

- SC.K.4le.1 Knows that plants and animals have features that help them live in different environments
- SC.K.4le.2 Knows that some kinds of organisms that once lived on Earth have completely disappeared (e.g., dinosaurs, mammoths)

CSD Performance Standard 5—Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- SC.K.5le.1 Understands that plants and animals closely resemble their parents when fully grown

CSD Performance Standard 6—Understands the structure and function of cells and organisms.

(WMAS Science—Life and Environmental Science)

- SC.K.6le.1 Knows that animals require air, water, food, and shelter; plants require air, water, nutrients, and light

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CSD Performance Standard 7—Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- SC.K.7le.1 Understands that plants and animals have characteristics that enable them to live in different environments

CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- SC.K.8le.2 Understands environmental problems, issues, and the value of stewardship

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- SC.K.9ps.1 Knows that things move in different ways

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- SC.K.10ps.1 Knows that the sun supplies heat and light to the Earth

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.K.11ps.1 Knows that objects can be described and classified by their composition (wood, metal, etc.) and by their physical properties (color, size, shape, etc.)

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in Kindergarten

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.K.13si.1 Asks questions about objects, organisms, and events in the environment
- SC.K.13si.2 Uses simple equipment and tools (e.g., thermometers, magnifiers, rulers, balances) to gather scientific data and extend the use of the senses
- SC.K.13si.3 Knows that learning can come from careful observations and simple experiments

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- Not addressed in Kindergarten

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- Not addressed in Kindergarten

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CSD Performance Standards (in bold) describe what students should know and be able to do within a subject area. Each CSD performance standard is aligned to a corresponding content standard within the Wisconsin Model Academic Standards (WMAS) for that subject area.

- Benchmarks (with ID label) describe knowledge and skills targeted for a specific grade level within that Performance standard.

First Grade

CSD Performance Standard 1—Understands atmospheric processes and the water cycle. **(WMAS Science—Physical Science)**

- SC.1.1es.1 Knows that water can be a liquid (e.g. rain) or a solid (e.g. ice) and can be made to go back and forth from one form to the other
- SC.1.1es.2 Knows that weather changes some from day to day and weather patterns change over the seasons

CSD Performance Standard 2—Understands Earth's composition and structure. **(WMAS Science—Earth and Space Science)**

- SC.1.2es.1 Knows that Earth's materials consist of solid rocks, soils, and liquid water
- SC.1.2es.2 Knows that rocks come in many different shapes and sizes (e.g. boulders, pebbles, and sand)
- SC.1.2es.3 Knows that fossils teach us about the past

CSD Performance Standard 3—Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- SC.1.3es.1 Knows the causes of day and night

CSD Performance Standard 4—Understands biological evolution and the diversity of life. **(WMAS Science—Life and Environmental Science)**

- SC.1.4le.1 Understands the life cycle of certain organisms (frog, butterfly)
- SC.1.4le.2 Knows that plants have parts that enable them to grow and survive

CSD Performance Standard 5—Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- Not addressed in First Grade

CSD Performance Standard 6—Understands the structure and function of cells and organisms. **(WMAS Science—Life and Environmental Science)**

- SC.1.6le.1 Knows that plants require air, water, and light

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CSD Performance Standard 7—Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- Not addressed in First Grade

CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- Not addressed in First Grade

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- Not addressed in First Grade

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- Not addressed in First Grade

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- Not addressed in First Grade

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in First Grade

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.1.13si.1 Knows that learning can come from careful observations and simple experiments
- SC.1.13si.2 Knows that tools (e.g. thermometers, rulers, balances) can be used to gather information and extend the senses

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- Not addressed in First Grade

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- Not addressed in First Grade

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Science Performance Standards and Benchmarks

Key to this Document:

CSD Performance Standards (in bold) describe what students should know and be able to do within a subject area. Each CSD performance standard is aligned to a corresponding content standard within the Wisconsin Model Academic Standards (WMAS) for that subject area.

- Benchmarks (with ID label) describe knowledge and skills targeted for a specific grade level within that Performance standard.

Second Grade

CSD Performance Standard 1— Understands atmospheric processes and the water cycle. (WMAS Science—Physical Science)

- **SC.2.1es.1** Knows the water cycle and it's stages, precipitation, evaporation, and condensation
- **SC.2.1es.2** Knows the sun provides the light and heat necessary to maintain the temperature of the Earth
- **SC.2.1es.3** Knows how to identify short term weather conditions (rain, snow, temperature changes) and long term weather conditions (changing of the seasons)

CSD Performance Standard 2— Understands Earth's composition and structure. (WMAS Science—Earth and Space Science)

- Not addressed in Second Grade

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- **SC.2.3es.1** Knows that night and day are caused by the Earth's rotation on its axis
- **SC.2.3es.2** Knows that the stars are innumerable and the sun is the closest star
- **SC.2.3es.3** Knows that the Earth is one of several planets that orbit the Sun and that the Moon orbits the Earth
- **SC.2.3es.4** Identifies the planets in our solar system
- **SC.2.3es.5** Knows that astronomical objects in space are massive in size and are separated from one another by vast distances

CSD Performance Standard 4— Understands biological evolution and the diversity of life. (WMAS Science—Life and Environmental Science)

- Not addressed in Second Grade

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- **SC.2.5le.1** Understands that animals closely resemble their parents when fully grown
- **SC.2.5le.2** Knows that differences exist among individual animals

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**CSD Performance Standard 6— Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)**

- Not addressed in *Second Grade*

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- SC.2.7le.1 Knows that some animals are plant eaters and some are meat eaters and the environment supports both populations
- SC.2.7le.2 Understands that animals have characteristics that enable them to live in different environments
- SC.2.7le.3 Identifies an environmental problem and is able to analyze, and problem solve solutions. (rain forest, pollution)
- SC.2.7le.4 Understands basic food chains

CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- SC.2.8le.1 Knows that animals need certain resources for energy and growth. (Food, water, air, space)

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- Not addressed in *Second Grade*

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- SC.2.10ps.1 Identifies types of electricity

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- Not addressed in *Second Grade*

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in *Second Grade*

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.2.13si.1 Knows that learning can come from careful observations and simple experiments
- SC.2.13si.2 Knows that tools can be used to gather information

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CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- Not addressed in *Second Grade*

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- *SC.2.15si.1* Knows that in science it is helpful to work with a team and share findings with others

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Third Grade

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- Not addressed in Third Grade

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- SC.3.2es.1 Identifies the ocean's resources
- SC.3.2es.2 Knows the major differences between fresh and ocean waters
- SC.3.2es.3 Knows the characteristics of the ocean zones
- SC.3.2es.4 Knows the importance of ocean exploration

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- Not addressed in Third Grade

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- SC.3.4le.1 Identifies animal life forms found in the ocean, desert, rain forest, and woodlands
- SC.3.4le.2 Knows different ways in which plants can be grouped and purposes of different groupings
- SC.3.4le.3 Knows that animals progress through life cycles which vary by organism
- SC.3.4le.4 Knows that plants progress through life cycles which vary by organism

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- Not addressed in Third Grade

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CSD Performance Standard 6— Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)

- SC.3.6le.1 Knows that plants have distinct structures and body systems that serve specific functions in growth, survival, and reproduction (plant parts and cells)

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Science Performance Standards and Benchmarks

CSD Performance Standard 7—Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- SC.3.7le.1 Knows that plants survive in different environments
- SC.3.7le.2 Knows that changes in the environment can have different effects on plants

CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- Not addressed in Third Grade

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- SC.3.9ps.1 Knows that vibrating objects produce sound
- SC.3.9ps.2 Understands how sound waves move

CSD Performance Standard 10—Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- SC.3.10ps.1 Knows that electricity in circuits can produce light
- SC.3.10ps.2 Knows that electricity can move from one object to another and that some materials conduct electricity better than others
- SC.3.10ps.3 Knows the organization of a simple electrical circuit
- SC.3.10ps.4 Knows the uses of an electromagnet

CSD Performance Standard 11—Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.3.11ps.1 Knows that matter has different states

CSD Performance Standard 12—Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- SC.3.12ps.1 Knows that electrically charged material pulls on all other materials and can attract or repel other charged materials
- SC.3.12ps.2 Knows that magnets attract and repel each other and attract certain kinds of other materials (e.g. iron, steel)
- SC.3.12ps.3 Knows that magnets can be used to make some things move without being touched

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.3.13si.1 Knows that scientific investigations involve asking and answering a question
- SC.3.13si.2 Knows that scientific investigations compare results to what scientists already know about the world

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- SC.3.13si.3 Asks questions about objects, organisms, and events in the environment in order to gain information
- SC.3.13si.4 Plans and conducts simple investigations
- SC.3.13si.5 Uses appropriate tools and simple equipment to gather scientific data and extend the senses
- SC.3.13si.6 Knows that people may interpret the same set of observations differently

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- SC.3.14si.1 Knows that people of all ages, backgrounds, and groups have made contributions to science and technology throughout history
- SC.3.14si.2 Knows that science is an ongoing process and will never be finished
- SC.3.14si.3 Knows that scientists and engineers often work in teams to accomplish a task
- SC.3.14si.4 Identifies a simple problem and proposes a solution

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- SC.3.15si.1 Knows that general evidence collected from an investigation should be replicable by others
- SC.3.15si.2 Knows that scientists review and ask questions about the results of other scientists' work

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Fourth Grade

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- SC.4.1es.1 Knows that water can change from one state to another (solid, liquid, gas) through various processes (water cycle)

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- SC.4.2es.1 Knows that fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time
- SC.4.2es.2 Knows fossils provide evidence of life and the environment of the past
- SC.4.2es.3 Knows how features on the Earth's surface are constantly changed by a combination of slow and rapid processes (waves, wind)
- SC.4.2es.4 Knows that rock is composed of different combinations of minerals
- SC.4.2es.5 Knows that smaller rocks come from the breakage and weathering of larger rocks and bedrock

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- Not addressed in Fourth Grade

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- SC.4.4le.1 Knows that some kinds of organisms that once lived on Earth have completely disappeared
- SC.4.4le.2 Knows plant and animal structures and their functions for survival

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- Not addressed in Fourth Grade

CSD Performance Standard 6— Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)

- Not addressed in Fourth Grade

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Science Performance Standards and Benchmarks

CSD Performance Standard 7—Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- SC.4.7le.1 Knows that the transfer of energy is essential to plants (photosynthesis)
- SC.4.7le.2 Knows that all organisms (including humans) cause changes in their environments, and these changes can be beneficial or detrimental
- SC.4.7le.3 Knows the value of protecting our natural resources

CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- Not addressed in Fourth Grade

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- Not addressed in Fourth Grade

CSD Performance Standard 10—Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- Not addressed in Fourth Grade

CSD Performance Standard 11—Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.4.11ps.1 Knows that objects can be classified according to their properties (e.g., size, texture, anything observed)

CSD Performance Standard 12—Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in Fourth Grade

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.4.13si.1 Knows that scientific investigations involve asking and answering a question
- SC.4.13si.2 Knows that scientific investigations compare results to what scientists already know about the world
- SC.4.13si.3 Knows that different kinds of investigations are used, depending on the questions they are trying to answer
- SC.4.13si.4 Plans and conducts simple investigations
- SC.4.13si.5 Uses simple equipment and tools to gather scientific data and extend the senses
- SC.4.13si.6 Knows that good scientific explanations are based on evidence
- SC.4.13si.7 Knows that people may interpret the same set of observations differently

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CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- SC.4.14si.1 Identifies, proposes, and implements a solution to a given problem

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- SC.4.15si.1 Knows that people of all ages, backgrounds, and groups have made contributions to science and technology throughout history
- SC.4.15si.2 Knows that science is an ongoing process and will never be finished

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- Benchmarks (with ID label) describe knowledge and skills targeted for a specific grade level within that Performance standard.

Fifth Grade

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- SC.5.1es.1 Knows properties of air

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- Not addressed in Fifth Grade

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.
(WMAS Science—Earth and Space Science)

- Not addressed in Fifth Grade

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- SC.5.4le.1 Knows ways to classify living things
- SC.5.4le.2 Knows different ways to group living things and purposes of different groupings
- SC.5.4le.3 Knows different ways in which animals can be grouped and purposes of different groupings (e.g. vertebrate/invertebrate, warm/cold blooded)

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- SC.5.5le.1 Knows basic concepts of reproduction
- SC.5.5le.2 Knows reproduction is an important component for continuation of all species
- SC.5.5le.3 Understands sexual and asexual reproduction

CSD Performance Standard 6— Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)

- SC.5.6le.1 Knows that animals have different structures which serve different functions in growth, and survival (e.g. adaptations)
- SC.5.6le.2 Knows that animals require air, water, food, and shelter
- SC.5.6le.3 Knows different life cycles of plants and animals
- SC.5.6le.4 Knows structures and body systems of living organisms
- SC.5.6le.5 Knows behavior of organisms is influenced by cues detected by senses

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Science Performance Standards and Benchmarks

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- SC.5.7le.1 Knows that the behavior of individual organisms is influenced by internal cues(e.g. hunger) and external cues (e.g. changes to the environment)
- SC.5.7le.2 Knows an organism's behavior is related to its environment
- SC.5.7le.3 Knows that environment changes effect various organisms differently
- SC.5.7le.4 Knows all organisms cause beneficial and/or detrimental environmental changes
- SC.5.7le.5 Knows components of a population and an ecosystem
- SC.5.7le.6 Knows species interaction and dependence in an ecosystem
- SC.5.7le.7 Knows factors that affects populations in an ecosystem
- SC.5.7le.8 Knows humans change the environment disrupting cycles

CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- SC.5.8le.1 Knows the organization of simple food chains and food webs
- SC.5.8le.2 Knows the transfer of energy is essential to all living organisms (energy pyramid)
- SC.5.8le.3 Knows how energy flows through ecosystem food webs
- SC.5.8le.4 Knows how matter is recycled within ecosystems

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- SC.5.9ps.1 Knows the forces in nature
- SC.5.9ps.2 Knows simple machines and their mechanical advantages

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- Not addressed in Fifth Grade

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.5.11ps.1 Knows that materials may be composed of parts that are too small to be seen without magnification
- SC.5.11ps.2 Knows the basic structure of the atom
- SC.5.11ps.3 Knows how atoms group to form molecules
- SC.5.11ps.4 Knows how the periodic table is organized
- SC.5.11ps.5 Knows the states of matter, the properties of each, and how changes take place

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Science Performance Standards and Benchmarks

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- SC.5.12ps.1 Knows the charges of subatomic particles and how they affect atomic structure

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.5.13si.1 Knows components of scientific investigation
- SC.5.13si.2 Knows scientists use different kinds of investigations
- SC.5.13si.3 Plans and conducts simple investigations
- SC.5.13si.4 Uses appropriate tools and equipment to gather scientific data
- SC.5.13si.5 Knows the basic parts and functions of microscopes and slides
- SC.5.13si.6 Knows different people may interpret observations differently

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- SC.5.14si.1 Know a variety of people have made science contributions throughout history
- SC.5.14si.2 Know science is an ongoing process and will never be finished

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- SC.5.15si.1 Knows collected evidence from investigations should be replicable by others
- SC.5.15si.2 Knows scientists publish results of investigations so they can be replicated
- SC.5.15si.3 Knows scientists review and question results of other scientists' work

Campbellsport School District

Science Performance Standards and Benchmarks

Key to this Document:

CSD Performance Standards (in bold) describe what students should know and be able to do within a subject area. Each CSD performance standard is aligned to a corresponding content standard within the Wisconsin Model Academic Standards (WMAS) for that subject area.

- Benchmarks (with ID label) describe knowledge and skills targeted for a specific grade level within that Performance standard.

Sixth Grade

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- SC.6.1es.1 Knows properties of air

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- SC.6.2es.1 Knows processes that change landforms
- SC.6.2es.2 Knows what causes mountains, volcanoes, and earthquakes
- SC.6.2es.3 Knows the lithosphere structure, features, and movement

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- SC.6.3es.1 Knows composition and movement patterns of the sun and planets
- SC.6.3es.2 Knows the effects of gravitational force in the solar system
- SC.6.3es.3 Knows that numbers of galaxies and distances in space are extremely large
- SC.6.3es.4 Knows effects of the Earth's tilt and movement through space
- SC.6.3es.5 Knows the stages in the life cycle of stars
- SC.6.3es.6 Knows Earth, one of several planets, orbits the sun and the moon orbits Earth
- SC.6.3es.7 Knows constellations and their movement within the universe
- SC.6.3es.8 Knows planets appear like stars but seem to wander among constellations
- SC.6.3es.9 Knows of astronomical objects and distances in space

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- Not addressed in Sixth Grade

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- SC.6.5le.1 Knows that many characteristics of humans are inherited from their parents (health connection)
- SC.6.5le.2 Knows many characteristics of plants and animals are inherited from its parents

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Science Performance Standards and Benchmarks

CSD Performance Standard 6— Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)

- SC.6.6le.1 Knows how to differentiate between plant and animal cells
- SC.6.6le.2 Knows simple cell structures and their functions

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- Not addressed in Sixth Grade

CSD Performance Standard 8— Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- Not addressed in Sixth Grade

CSD Performance Standard 9— Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- SC.6.9ps.1 Knows the different kinds of forces and how they interact
- SC.6.9ps.2 Knows the three laws of motion

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- SC.6.10ps.1 Understands the law of conservation of energy
- SC.6.10ps.2 Knows how thermal energy and heat are related
- SC.6.10ps.3 Knows heat is a byproduct of energy from conversion
- SC.6.10ps.4 Knows heat is conducted at different rates in different substances
- SC.6.10ps.5 Knows heat is moved by convection and radiation
- SC.6.10ps.6 Knows different energy forms and how they are related

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.6.11ps.1 Knows states of matter and the changes of states of matter
- SC.6.11ps.2 Knows atomic and molecular structure
- SC.6.11ps.3 Knows elements and the periodic table
- SC.6.11ps.4 Knows physical and chemical properties and changes of substances

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- SC.6.12ps.1 Knows that chemical energy is stored in the bonds of molecules
- SC.6.12ps.2 Knows that nuclear forces and energy exist

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Science Performance Standards and Benchmarks

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.6.13si.1 Uses appropriate tools and techniques to gather, analyze, and interpret data
- SC.6.13si.2 Knows scientific explanations are based on evidence and knowledge
- SC.6.13si.3 Knows different people may interpret observations differently
- SC.6.13si.4 Knows the components of developing hypotheses and explanations
- SC.6.13si.5 Designs and conducts scientific investigations

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- SC.6.14si.1 Knows that people in scientific fields communicate extensively
- SC.6.14si.2 Knows that science is an ongoing process
- SC.6.14si.3 Knows how science and society interact

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- SC.6.15si.1 Understands the importance of open communication in the process of science
- SC.6.15si.2 Knows the importance of experiment repetition before accepting results

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Science Performance Standards and Benchmarks

Key to this Document:

CSD Performance Standards (in bold) describe what students should know and be able to do within a subject area. Each CSD performance standard is aligned to a corresponding content standard within the Wisconsin Model Academic Standards (WMAS) for that subject area.

- Benchmarks (with ID label) describe knowledge and skills targeted for a specific grade level within that Performance standard.

Seventh Grade (Life Science)

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- Not addressed in Seventh Grade (Life Science)

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- Not addressed in Seventh Grade (Life Science)

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- Not addressed in Seventh Grade (Life Science)

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- SC.7.4le.1 Understands basic ideas related to the theory of biological evolution (e.g., diversity of species is developed through gradual processes over many generations; biological adaptations, such as changes in structure, behavior, or physiology, allow some species to enhance their reproductive success and survival in a particular environment)
- SC.7.4le.2 Understands the concept of extinction and its importance in biological evolution (e.g., when the environment changes, the adaptive characteristics of some species are insufficient to allow their survival; extinction is common; most of the species that have lived on the Earth no longer exist)
- SC.7.4le.3 Understands evidence that supports the idea that there is unity among organisms despite the fact that some species look very different (e.g., similarity of internal structures in different organisms, similarity of chemical processes in different organisms, evidence of common ancestry)
- SC.7.4le.4 Understands ways in which living things can be classified (e.g., taxonomic groups of plants, animals, and fungi; groups based on the details of organisms' internal and external features; groups based on functions served within an ecosystem such as producers, consumers, and decomposers)
- SC.7.4le.5 Understands that organisms have a great variety of body plans and internal structures that serve specific functions for survival (e.g., digestive structures in vertebrates, invertebrates, unicellular organisms, and plants)

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Science Performance Standards and Benchmarks

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- SC.7.5le.1 Understands that reproduction is a characteristic of all living things and is essential to the continuation of a species
- SC.7.5le.2 Understands that for sexually reproducing organisms, a species comprises all organisms that can mate with one another to produce fertile offspring
- SC.7.5le.3 Understands that chromosomes, genes and DNA play a major role in understanding the principles of heredity and related concepts(e.g., DNA molecule, DNA and protein synthesis, probability of genes occurring in organisms, physical traits and genetic traits passing from generation to generation)

CSD Performance Standard 6— Understands the structure and function of cells and organisms.

(WMAS Science—Life and Environmental Science)

- SC.7.6le.1 Understands that all organisms are composed of cells, which are the fundamental units of life; most organisms are single cells, but other organisms (including humans) are multicellular
- SC.7.6le.2 Understands that the nucleus of the cell contains all of the information for cell maintenance and reproduction(e.g., cell contains nucleus, chromosomes, genes, DNA, and each have a structure of their own)
- SC.7.6le.3 Understands that cells convert energy obtained from food to carry on the many functions needed to sustain life (e.g., diffusion and osmosis, cell growth and division, production of materials that the cell or organism needs,)
- SC.7.6le.4 Understands the levels of organization in living systems, including cells, tissues, organs, organ systems, whole organisms, ecosystems, and the complementary nature of structure and function at each level
- SC.7.6le.5 Understands that multicellular organisms have a variety of specialized cells, tissues, organs, and organ systems that perform specialized functions (e.g., digestion, respiration, reproduction, circulation, excretion, movement, control and coordination, protection from disease)
- SC.7.6le.6 Understands how an organism's ability to regulate its internal environment enables the organism to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment
- SC.7.6le.7 Understands that organisms can react to internal and environmental stimuli through behavioral response (e.g., plants have tissues and organs that react to light, water, and other stimuli; animals have nervous systems that process and store information from the environment), which may be determined by heredity or from past experience
- SC.7.6le.8 Understands that disease in organisms can be caused by intrinsic failures of the system or infection by other organisms

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- SC.7.7le.1 Understands the importance of collecting and preserving species for identification and future study

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Science Performance Standards and Benchmarks

CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- **SC.7.8le.1** Understands how energy is transferred through food webs in an ecosystem (e.g., energy enters ecosystems as sunlight, and green plants transfer this energy into chemical energy through photosynthesis; this chemical energy is passed from organism to organism; animals get energy from oxidizing their food, releasing some of this energy as heat)
- **SC.7.8le.2** Understands how matter is recycled within ecosystems (e.g., matter is transferred from one organism to another repeatedly, and between organisms and their physical environment; the total amount of matter remains constant, even though its form and location change)

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- Not addressed in *Seventh Grade (Life Science)*

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- Not addressed in *Seventh Grade (Life Science)*

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- Not addressed in *Seventh Grade (Life Science)*

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in *Seventh Grade (Life Science)*

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- **SC.7.13si.1** Understands that there is no fixed procedure called the scientific method, but that investigations involve systematic observations, carefully collected, relevant evidence, logical reasoning, and some imagination in developing hypotheses and explanations
- **SC.7.13si.2** Understands that questioning, response to criticism, and open communication are integral to the process of science (e.g., scientists often differ with one another about the interpretation of evidence or theory in areas where there is not a great deal of understanding; scientists acknowledge conflicting interpretations and work towards finding evidence that will resolve the disagreement)
- **SC.7.13si.3** Designs and conducts a scientific investigation (e.g., formulates hypotheses, designs and executes investigations, interprets data, synthesizes evidence into explanations, proposes alternative explanations for observations, critiques explanations and procedures)

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Science Performance Standards and Benchmarks

- SC.7.13si.4 Understands that observations can be affected by bias (e.g., strong beliefs about what should happen in particular circumstances can prevent the detection of other results)
- SC.7.13si.5 Uses appropriate tools (including computer hardware and software) and techniques to gather, analyze, and interpret scientific data
- SC.7.13si.6 Establishes relationships based on evidence and logical argument (e.g., provides causes for effects)
- SC.7.13si.7 Understands that scientific inquiry includes evaluating results of scientific investigations, experiments, observations, theoretical and mathematical models, and explanations proposed by other scientists (e.g., reviewing experimental procedures, examining evidence, identifying faulty reasoning, identifying statements that go beyond the evidence, suggesting alternative explanations)
- SC.7.13si.8 Understands possible outcomes of scientific investigations (e.g., some may result in new ideas and phenomena for study; some may generate new methods or procedures for an investigation; some may result in the development of new technologies to improve the collection of data; some may lead to new investigations)

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- SC.7.14si.1 Understands that people of all backgrounds and with diverse interests, talents, qualities, and motivations engage in fields of science and engineering; some of these people work in teams and others work alone, but all communicate extensively with others
- SC.7.14si.2 Understands that the work of science requires a variety of human abilities, qualities, and habits of mind (e.g., reasoning, insight, energy, skill, creativity, intellectual honesty, tolerance of ambiguity, skepticism, openness to new ideas)
- SC.7.14si.3 Understands various settings in which scientists and engineers may work (e.g., colleges and universities, businesses and industries, research institutes, government agencies)
- SC.7.14si.4 Understands ethics associated with scientific study (e.g., potential subjects must be fully informed of the risks and benefits associated with the research and their right to refuse to participate; potential subjects must be fully informed of possible risks to community and property)
- SC.7.14si.5 Understands that throughout history, many scientific innovators have had difficulty breaking through accepted ideas of their time to reach conclusions that are now considered to be common knowledge
- SC.7.14si.6 Understands ways in which science and society influence one another (e.g., scientific knowledge and the procedures used by scientists influence the way many individuals think about themselves, others, and the environment; societal challenges often inspire questions for scientific research; social and economic forces strongly influence which science research programs are pursued and funded)

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Science Performance Standards and Benchmarks

**CSD Performance Standard 15— Understands the history and nature of scientific knowledge.
(WMAS Science—Nature of Science)**

- SC.7.15si.1 Understands that an experiment must be repeated many times and yield consistent results before the results are accepted as correct
- SC.7.15si.2 Understands the nature of scientific explanations (e.g., use of logically consistent arguments; emphasis on evidence; use of scientific principles, models, and theories; acceptance or displacement of explanations based on new scientific evidence)
- SC.7.15si.3 Understands that all scientific ideas are tentative and subject to change and improvement in principle, but for most core ideas in science, there is much experimental and observational confirmation

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Science Performance Standards and Benchmarks

Key to this Document:

CSD Performance Standards (in bold) describe what students should know and be able to do within a subject area. Each **CSD performance standard** is aligned to a corresponding content standard within the **Wisconsin Model Academic Standards (WMAS)** for that subject area.

- **Benchmarks** (with ID label) describe knowledge and skills targeted for a specific grade level within that Performance standard.

Eighth Grade (Physical Science)

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- Not addressed in Eighth Grade (Physical Science)

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- Not addressed in Eighth Grade (Physical Science)

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.
(WMAS Science—Earth and Space Science)

- Not addressed in Eighth Grade (Physical Science)

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- Not addressed in Eighth Grade (Physical Science)

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.
(WMAS Science—Life and Environmental Science)

- Not addressed in Eighth Grade (Physical Science)

CSD Performance Standard 6— Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)

- Not addressed in Eighth Grade (Physical Science)

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.
(WMAS Science—Life and Environmental Science)

- Not addressed in Eighth Grade (Physical Science)

CSD Performance Standard 8— Understands the cycling of matter and energy flow through the environment.
(WMAS Science—Physical Science)

- Not addressed in Eighth Grade (Physical Science)

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Science Performance Standards and Benchmarks

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- SC.8.9ps.1 Understands general concepts related to gravitational force (e.g., every object exerts gravitational force on every other object; this force depends on the mass of the objects and their distance from one another; gravitational force is hard to detect unless at least one of the objects, such as the Earth, has a lot of mass)
- SC.8.9ps.2 Knows that laws of motion can be used to determine the effects of forces on the motion of objects
- SC.8.9ps.3 Knows that an object's motion can be described and represented graphically according to its position, direction of motion, and speed
- SC.8.9ps.4 Knows that an object that is not being subjected to a force will continue to move at a constant speed and in a straight line

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- SC.8.10ps.1 Knows that energy can be converted from one form to another
- SC.8.10ps.2 Knows that electrical circuits provide a means of transferring electrical energy to produce heat, light, sound, and chemical changes, magnetism, and electromagnetic waves
- SC.8.10ps.3 Knows that only a narrow range of wavelengths of electromagnetic radiation can be seen by the human eye; differences of wavelength within that range of visible light are perceived as differences in color(e.g., electromagnetic spectrum)
- SC.8.10ps.4 Knows that heat energy flows from warmer materials or regions to cooler ones through conduction, convection, and radiation
- SC.8.10ps.5 Knows that vibrations (e.g., sounds, ocean waves, earthquakes) move at different speeds in different materials, have different wavelengths, and set up wave-like disturbances that spread away from the source

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.8.11ps.1 Knows the structure of an atom
- SC.8.11ps.2 Understands how elements are arranged in the periodic table
- SC.8.11ps.3 Knows that states of matter depend on molecular arrangement and motion (e.g., molecules in solids are packed tightly together and their movement is restricted to vibrations; molecules in liquids are loosely packed and move easily past each other; molecules in gases are quite far apart and move about freely)

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- SC.8.12ps.1 Knows that just as electric currents can produce magnetic forces, magnets can cause electric currents and the energy of electricity can cause the electromagnetic waves
- SC.8.12ps.2 Knows that magnetic forces are very closely related to electric forces

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Science Performance Standards and Benchmarks

- SC.8.12ps.3 Knows that electromagnetic forces exist within and between atoms

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.8.13si.1 Knows that there is no fixed procedure called the scientific method, but that investigations involve systematic observations, carefully collected, relevant evidence, logical reasoning, and some imagination in developing hypotheses and explanations
- SC.8.13si.2 Knows that scientific inquiry includes evaluating results of scientific investigations, experiments, observations, theoretical and mathematical models, and explanations proposed by other scientists (e.g., reviewing experimental procedures, examining evidence, identifying faulty reasoning, identifying statements that go beyond the evidence, suggesting alternative explanations)
- SC.8.13si.3 Designs and conducts a scientific investigation (e.g., formulates hypotheses, designs and executes investigations, interprets data, synthesizes evidence into explanations, proposes alternative explanations for observations, critiques explanations and procedures)
- SC.8.13si.4 Knows that observations can be affected by bias (e.g., strong beliefs about what should happen in particular circumstances can prevent the detection of other results)
- SC.8.13si.5 Knows that scientists conduct investigations for variety of reasons
- SC.8.13si.6 Establishes relationships based on evidence and logical argument (e.g., provides causes for effects)

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- SC.8.14si.1 Knows various settings in which scientists and engineers may work (e.g., colleges and universities, businesses and industries, research institutes, government agencies)
- SC.8.14si.2 Knows that throughout history, many scientific innovators have had difficulty breaking through accepted ideas of their time to reach conclusions that are now considered to be common knowledge
- SC.8.14si.3 Knows ways in which science and society influence one another (e.g., scientific knowledge and the procedures used by scientists influence the way many individuals think about themselves, others, and the environment; societal challenges often inspire questions for scientific research; social and economic forces strongly influence which science research programs are pursued and funded)

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- SC.8.15si.1 Knows that an experiment must be repeated many times and yield consistent results before the results are accepted as correct
- SC.8.15si.2 Understands how scientific knowledge changes over time
- SC.8.15si.3 Knows that from time to time major changes occur in the scientific view of how the world works

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Science Performance Standards and Benchmarks

- SC.8.15si.4 Understands the nature of scientific explanations (e.g., use of logically consistent arguments; emphasis on evidence; use of scientific principles, models, and theories; acceptance or displacement of explanations based on new scientific evidence)
- SC.8.15si.5 Knows that all scientific ideas are tentative and subject to change and improvement in principle, but for most core ideas in science, there is much experimental and observational confirmation

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Science Performance Standards and Benchmarks

Key to this Document:

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Ninth Grade (Earth Science)

CSD Performance Standard 1— Understands atmospheric processes and the water cycle. **(WMAS Science—Physical Science)**

- SC.ES.1es.1 Knows that the Sun is the principle energy source for phenomena on the Earth's surface (e.g., the water cycle, plant growth)
- SC.ES.1es.2 Understands how the tilt of the Earth's axis and the Earth's revolution around the Sun affect seasons and weather patterns (i.e., heat falls more intensely on one part or another of the Earth's surface during its revolution around the Sun)
- SC.ES.1es.3 Understands the properties that make water an essential component of the Earth system (e.g., its ability to act as a solvent, its ability to remain a liquid at most Earth temperatures)
- SC.ES.1es.4 Knows the composition and structure of the Earth's atmosphere (e.g., temperature and pressure in different layers of the atmosphere, circulation of air masses)
- SC.ES.1es.5 Knows the processes involved in the water cycle (e.g., evaporation, condensation, precipitation, surface run-off, percolation) and their effects on climatic patterns
- SC.ES.1es.6 Knows ways in which clouds affect weather and climate (e.g., precipitation, reflection of light from the Sun, retention of heat energy emitted from the Earth's surface)

CSD Performance Standard 2— Understands Earth's composition and structure. **(WMAS Science—Earth and Space Science)**

- SC.ES.2es.1 Knows how winds and ocean currents are produced on the Earth's surface
- SC.ES.2es.2 Understands heat and energy transfer in and out of the atmosphere and its involvement in weather and climate
- SC.ES.2es.3 Knows the major external and internal sources of energy on Earth
- SC.ES.2es.4 Understands the concept of plate tectonics
- SC.ES.2es.5 Knows how landforms are created through a combination of constructive and destructive forces
- SC.ES.2es.6 Knows the effects of the movement of crustal plates
- SC.ES.2es.7 Knows that elements exist in fixed amounts and move through the solid Earth, ocean, atmosphere, and living things as part of geo-chemical cycles
- SC.ES.2es.8 Knows that throughout the rock cycle the total amount of materials stays the same as its form changes
- SC.ES.2es.9 Knows methods used to estimate geologic time
- SC.ES.2es.10 Knows the conditions of Earth that enable it to support life

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Science Performance Standards and Benchmarks

- SC.ES.2es.11 Knows the processes involved in the water cycle
- SC.ES.2es.12 Knows the properties that make water an essential component of the Earth system
- SC.ES.2es.13 Knows factors that can impact the Earth's climate/weather.
- SC.ES.2es.14 Knows that the Earth is comprised of layers including a core, mantle, lithosphere, hydrosphere, and atmosphere
- SC.ES.2es.15 Knows the oceans and the roles it plays in, the Earth's weather and climate, food source, lithosphere, minerals resources, and energy resources
- SC.ES.2es.16 Knows how land forms are created through a combination of constructive and destructive forces (e.g., constructive forces such as crustal deformation, volcanic eruptions, and deposition of sediment; destructive forces such as weathering and erosion)
- SC.ES.2es.17 Knows processes involved in the rock cycle (e.g., old rocks at the surface gradually weather and form sediments that are buried, then compacted, heated, and often recrystallized into new rock; this new rock is eventually brought to the surface by the forces that drive plate motions, and the rock cycle continues)
- SC.ES.2es.18 Knows that sedimentary, igneous, and metamorphic rocks contain evidence of the minerals, temperatures, and forces that created them
- SC.ES.2es.19 Knows how successive layers of sedimentary rock and the fossils contained within them can be used to confirm the age, history, and changing life forms of the Earth, and how this evidence is affected by the folding, breaking, and uplifting of layers

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- SC.ES.3es.1 Knows that although the origin of the universe remains one of greatest questions in science, current scientific evidence supports the Big Bang Theory, for the creation of the universe, as we know it today
- SC.ES.3es.2 Knows that evidence suggests that our universe is expanding
- SC.ES.3es.3 Knows the ongoing processes involved in star formation and destruction
- SC.ES.3es.4 Knows common characteristics of stars in the universe
- SC.ES.3es.5 Knows ways in which technology has increased our understanding of the universe
- SC.ES.3es.6 Understand the formation of our solar system
- SC.ES.3es.7 Knows the features of our planets and planetoids in our solar system
- SC.ES.3es.8 Knows characteristics and movement patterns of the eight planets in our Solar System (e.g., Kepler's laws of planetary motion, planets differ in size, composition, and surface features; planets move around the Sun in elliptical orbits; some planets have moons, rings of particles, and other satellites orbiting them)
- SC.ES.3es.9 Knows how the regular and predictable motions of the Earth and Moon explain phenomena on Earth (e.g., the day, the year, phases of the Moon, eclipses, tides, shadows,)
- SC.ES.3es.10 Knows characteristics of the Sun and its position in the universe (e.g., the Sun is a medium-sized star; it is the closest star to Earth; it is the central and largest body in the Solar System; it is located at the edge of a disk-shaped galaxy)
- SC.ES.3es.11 Knows that gravitational force keeps planets in orbit around the Sun and moons in orbit around the planets

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Science Performance Standards and Benchmarks

- SC.ES.3es.12 Knows characteristics and movement patterns of asteroids, comets, and meteors
- SC.ES.3es.13 Knows that the universe consists of many billions of galaxies (each containing many billions of stars) and that incomprehensible distances (measured in light years) separate these galaxies and stars from one another and from the Earth

CSD Performance Standard 4— Understands biological evolution and the diversity of life. (WMAS Science—Life and Environmental Science)

- Not addressed in Ninth Grade (Earth Science)

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- Not addressed in Ninth Grade (Earth Science)

CSD Performance Standard 6— Understands the structure and function of cells and organisms.

(WMAS Science—Life and Environmental Science)

- Not addressed in Ninth Grade (Earth Science)

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- Not addressed in Ninth Grade (Earth Science)

CSD Performance Standard 8— Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- Not addressed in Ninth Grade (Earth Science)

CSD Performance Standard 9— Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- SC.ES.9ps.1 Knows that waves have energy and can transfer energy when they interact with matter
- SC.ES.9ps.2 Knows that apparent changes in wavelength can provide information about changes in motion
- SC.ES.9ps.3 Knows how the laws of motion can be used to determine the effects of forces on the motion of objects

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- SC.ES.10ps.1 Knows that the total energy of the universe remains constant, it tends to spread out uniformly
- SC.ES.10ps.2 Understands that chemical reactions either release or consume energy

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CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.ES.11ps.1 Knows the number of electrons in an atom determines whether the atom is electrically neutral or an ion
- SC.ES.11ps.2 Knows that radioactive isotopes can be used to estimate the age of materials that contain them
- SC.ES.11ps.3 Knows the structure of atoms, and the location and charge of its subatomic particles
- SC.ES.11ps.4 Knows how the electron configuration of atoms governs the chemical properties of an element by transferring or sharing electrons

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in Ninth Grade (Earth Science)

CSD Performance Standard 13— Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.ES.13si.1 Uses technology to perform accurate scientific investigations and communication
- SC.ES.13si.2 Designs and conducts scientific investigations by formulating testable hypothesis; identifying with the methods, controls and variables; organizing and displaying data; presenting results

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- SC.ES.14si.3 Uses technology and mathematics to perform accurate scientific investigations and communications

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- SC.ES.15si.1 Understands how scientific knowledge changes and accumulates over time

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Science Performance Standards and Benchmarks

Key to this Document:

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- Benchmarks (with ID label) describe knowledge and skills targeted for a specific grade level within that Performance standard.

Tenth Grade (Biology)

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- Not addressed in Tenth Grade (Biology)

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- Not addressed in Tenth Grade (Biology)

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- Not addressed in Tenth Grade (Biology)

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- SC.BIO.4le.1 Understands that the fossil record, through geologic evidence, documents the appearance, diversification, and extinction of many life forms
- SC.BIO.4le.2 Understands that evolution is the genetic change in a population or species due to the mechanism of natural selection
- SC.BIO.4le.3 Knows that heritable characteristics largely determine what capabilities an organism will have
- SC.BIO.4le.4 Knows how organisms are classified into hierarchy groups from kingdom to species
- SC.BIO.4le.5 Understands the role of sexual reproduction and how genetic change and adaptation result in biodiversity
- SC.BIO.4le.6 Understands the concept of natural selection
- SC.BIO.4le.7 Knows how variation of organisms within a species increases the chance of survival of the species

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- SC.BIO.5le.1 Knows that reproduction is a characteristic of all living things and is essential to the continuation of a species

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- SC.BIO.5le.2 Knows that for sexually reproducing organisms, a species comprises all organisms that can mate with one another to produce fertile offspring
- SC.BIO.5le.3 Knows that mitosis gives rise to asexual reproduction yielding identical genetic offspring, and meiosis gives rise to sexual reproduction forming the sperm and egg
- SC.BIO.5le.4 Knows the stages and events in the cell cycle and terminology
- SC.BIO.5le.5 Knows ways in which genes may be altered and combined to create genetic variation within a species
- SC.BIO.5le.6 Understands the concepts of Mendelian genetics
- SC.BIO.5le.7 Knows that features of human variation and transmission of genetic information to offspring occurs through the egg and sperm cell
- SC.BIO.5le.8 Understands hereditary autosomal and sex linked disorders found in humans
- SC.BIO.5le.9 Knows the chemical and structural properties of DNA and its role in protein synthesis
- SC.BIO.5le.10 Knows that new heritable characteristics can only result from new combinations of existing genes or from mutations of genes in an organism's sex cells through inversion, deletion and substitution
- SC.BIO.5le.11 Knows that viruses contain genetic DNA or RNA that can be transferred into the host and destruction of the host cells

CSD Performance Standard 6— Understands the structure and function of cells and organisms. (WMAS Science—Life and Environmental Science)

- SC.BIO.6le.1 Understands the cell theory and knows that the cell is the basic unit of structure and function for all living organisms
- SC.BIO.6le.2 Knows the structure of cellular organelles and the functions they perform
- SC.BIO.6le.3 Define metabolism and understand the role of enzymes in catalyzing chemical reactions for carbohydrates, proteins, lipids and nucleic acids molecules
- SC.BIO.6le.4 Understands the process of cellular respiration and fermentation as a mechanism of energy release and ATP storage
- SC.BIO.6le.5 Knows that organisms accommodate for active and passive transport across membranes
- SC.BIO.6le.8 Understands how infectious diseases can be transmitted to humans by fungi, bacteria, viruses, and protista
- SC.BIO.6le.9 Understands the structure and function of plant organs
- SC.BIO.6le.10 Recognizes that single cells must be microscopic and have differences that allow specialization of function

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- SC.BIO.7le.1 Knows how the interrelationships and interdependencies among organisms generate stable ecosystems that fluctuate around a state of equilibrium
- SC.BIO.7le.2 Knows that ecosystems provide for continuous interactions among organisms and with their physical environment through food chains, cycles, photosynthesis, and decomposition
- SC.BIO.7le.3 Identifies environmental problems

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- SC.BIO.7le.4 Relate the impact of human activities on ecosystems to the natural process of change, like succession, evolution, extinction, etc.

CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- SC.BIO.8le.1 Understands how plants transfer energy from the sun to living ecosystems through photosynthesis
- SC.BIO.8le.2 Knows that living systems require a continuous input of energy to maintain their chemical and physical organization

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- Not addressed in Tenth Grade (Biology)

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- Not addressed in Tenth Grade (Biology)

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.BIO.11ps.1 Knows that chemical reactions can take place at different rates and can depend on a variety of factors

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in Tenth Grade (Biology)

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.BIO.13si.1 Knows that the process of science is the common underlying theme which poses and tests hypotheses to answer questions about the natural world. Hypothesis must be measurable and testable for an experimental setup
- SC.BIO.13si.2 Designs and conducts scientific investigations where controlled experiments give reproducible results, and distinguish between facts, theories and hypotheses
- SC.BIO.13si.3 Evaluates the best procedure to test a given hypothesis and knows the importance of controlling variables
- SC.BIO.13si.4 Clearly define the problem, use a control to determine the independent and dependent variables for a given experiment and extrapolate from the data
- SC.BIO.13si.5 Learn to process and analyzes data presented in tables or charts and select appropriate graphs to present trends in data
- SC.BIO.13si.6 Explain how models help scientist to understand the natural and physical world by describing processes, events or concepts

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- SC.BIO.13si.7 Explain that because theories are models, they may be revised as more data becomes available resulting in major shifts in scientific thinking

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- SC.BIO.14si.1 Understands the importance of science to technological design as a social enterprise and the importance of being scientifically literate
- SC.BIO.14si.2 Evaluate ways in which biotechnology has expanded our ability to alter the environment and its capacity to support humans and other living organisms
- SC.BIO.14si.3 Identifies careers related to the different disciplines of science

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- SC.BIO.15si.1 Understands how scientific knowledge changes and accumulates over time
- SC.BIO.15si.2 Knows that scientific explanations to be considered valid must make accurate predictions, be logical and open to criticism, report methods and procedures and make the knowledge public
- SC.BIO.15si.3 Knows that all scientific ideas are tentative and subject to change and improvement in principle, but for most core ideas in science, there is much experimental and observational confirmation

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Science Performance Standards and Benchmarks

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- Benchmarks (with ID label) describe knowledge and skills targeted for a specific grade level within that Performance standard.

Chemistry (Elective Course)

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- Not addressed in Chemistry Elective

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- Not addressed in Chemistry Elective

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- Not addressed in Chemistry Elective

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- Not addressed in Chemistry Elective

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- Not addressed in Chemistry Elective

CSD Performance Standard 6— Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)

- Not addressed in Chemistry Elective

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- Not addressed in Chemistry Elective

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CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- SC.CH.8le.1 Knows that matter and energy flow between living systems and the physical environment, and chemical elements transform and recombine in different ways
- SC.CH.8le.2 Knows that all matter tends towards entropy, and living systems require a continuous input of energy to maintain their chemical and physical organization
- SC.CH.8le.3 Understands the properties of matter and that matter can exist in different states depending on available energy

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- Not addressed in Chemistry Elective

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- SC.CH.10ps.1 Understands the law of conservation of energy (i.e., energy cannot be created or destroyed but only changed from one form to another)
- SC.CH.10ps.2 Knows that some changes in atomic or molecular configuration requires and input of energy whereas others release energy
- SC.CH.10ps.3 Knows that fission is the splitting of a large nuclei into smaller pieces and fusion is the joining of two smaller nuclei at extremely high temperatures and pressure
- SC.CH.10ps.4 Understands the relationship between kinetic motion and that higher temperatures produce greater molecular motion
- SC.CH.10ps.5 Understands that energy can be converted to different forms
- SC.CH.10ps.6 Recognizes the properties of gases and the effect their effect on temperature, volume and pressure change
- SC.CH.10ps.7 Understand the concepts of evaporation, condensation, freezing and melting in relationship to endothermic and exothermic change
- SC.CH.10ps.8 Uses scientific models to visualize structure and concepts for better understanding. (Ex.) Quantum model

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.CH.11ps.1 Understands the importance and use of the periodic table in predicting periodic trends and properties of the elements
- SC.CH.11ps.2 Knows that atoms can bond to one another forming ionic compounds and covalent molecules
- SC.CH.11ps.3 Knows that matter and energy can neither be created or destroyed during a chemical reaction and that matter combines in fixed ratios forming compounds
- SC.CH.11ps.4 Knows how the electron configuration of atoms govern the chemical properties of an element as atoms interact between their electrons

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- SC.CH.11ps.5 Knows the structures of atoms and ions and the location and charge of their subatomic particles
- SC.CH.11ps.6 Understands the mole concept and ways in which it can be used to solve stoichiometric problems
- SC.CH.11ps.7 Knows that chemical reactions, expressed in chemical formulas and equations, can take place at vastly different rates and can depend on a variety of factors including, catalysts, temperature, and surface area
- SC.CH.11ps.8 Knows the properties of acids, bases, and salts
- SC.CH.11ps.9 Knows the difference between chemical and physical properties and uses them to predict likely chemical and physical changes
- SC.CH.11ps.10 Knows the correct nomenclature for naming compounds, writing equations and understands that chemical reactions result from mixing various compounds
- SC.CH.11ps.11 Knows that a number of the elements on the periodic table are very unstable and under go natural radioactive decay yielding a change in the nuclear composition
- SC.CH.11ps.12 Recognizes the importance of solutions in describing chemical reactions
- SC.CH.11ps.13 Understands the concepts of chemical equilibrium, solubility, and precipitation
- SC.CH.11ps.14 Describe properties of solutions, mixtures, compounds and the concept of dissociation

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in Chemistry Elective

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.CH.13si.1 Knows that the process of science is the common underlying theme which poses and tests hypotheses to answer questions about nature
- SC.CH.13si.2 Designs and conducts scientific investigations
- SC.CH.13si.3 Uses technology and mathematics to perform accurate scientific investigations, problem solving, and communications
- SC.CH.13si.4 Knows that scientists conduct investigations that produce data that is measurable
- SC.CH.13si.5 Acquire chemistry laboratory skills, while understanding the nature of experimental uncertainty
- SC.CH.13si.6 Identifies the different tools and the use of the SI system units to measure, and convert using the dimensional analysis strategies

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- SC.CH.14si.1 Understands the importance of science to technological design and the importance of being scientifically literate
- SC.CH.14si.2 Knows that science and technology are essential social enterprises giving rise to better understanding

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**CSD Performance Standard 15— Understands the history and nature of scientific knowledge.
(WMAS Science—Nature of Science)**

- *SC.CH.15si.1* Knows that throughout history scientific knowledge changes and accumulates over time
- *SC.CH.15si.2* Knows that creativity, imagination, and a good knowledge base are all required in the study of science
- *SC.CH.15si.3* Knows that laboratory work is an important part of chemistry and that proper lab technique and safety is an ongoing process that needs to be reinforced on a regular basis

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Science Performance Standards and Benchmarks

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Physics (Elective Course)

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- Not addressed in Physics Elective

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- Not addressed in Physics Elective

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- Not addressed in Physics Elective

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- Not addressed in Physics Elective

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- Not addressed in Physics Elective

CSD Performance Standard 6— Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)

- Not addressed in Physics Elective

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- Not addressed in Physics Elective

CSD Performance Standard 8— Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- Not addressed in Physics Elective

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CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- SC.PHY.9ps.1 Understands effects of balanced and unbalanced forces on an object's motion (e.g., if more than one force acts on an object along a straight line, then the forces will reinforce or cancel one another, depending on their direction and magnitude; unbalanced forces such as friction will cause changes in the speed or direction on an object's motion)
- SC.PHY.9ps.2 Understands kinematics, describing motion in one or two dimensions
- SC.PHY.9ps.3 Understands Newton's first law of motion
- SC.PHY.9ps.4 Understands Newton's second law of motion
- SC.PHY.9ps.5 Understands Newton's third law of motion
- SC.PHY.9ps.6 Understands that momentum is conserved
- SC.PHY.9ps.7 Knows that the strength of the gravitational force between two masses is proportional to the masses and inversely proportional to the square of the distance between them

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- SC.PHY.10ps.1 Knows that energy is a property of many substances (e.g., heat energy is in the disorderly motion of molecules and in radiation; chemical energy is in the arrangement of atoms; mechanical energy is in moving bodies or in elastically distorted shapes; electrical energy is in the attraction or repulsion between charges)
- SC.PHY.10ps.2 Understands the law of conservation of energy (i.e., energy cannot be created or destroyed but only changed from one form to another)
- SC.PHY.10ps.3 Knows that energy can be converted from one form to another and from one unit to another
- SC.PHY.10ps.4 Knows that heat energy flows from warmer materials or regions to cooler ones through conduction, convection, and radiation
- SC.PHY.10ps.5 Knows that vibrations (e.g., sounds, ocean waves, earthquakes) move at different speeds in different materials, have different wavelengths, and set up wave-like disturbances that spread away from the source
- SC.PHY.10ps.6 Knows ways in which light interacts with matter (e.g., transmission, including refraction; absorption; scattering, including reflection)
- SC.PHY.10ps.7 Knows that energy can be transferred by the interaction of waves

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- Not addressed in Physics Elective

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- SC.PHY.12ps.1 Knows that magnetic forces are related to electric forces
- SC.PHY.12ps.2 Knows that nuclear forces are much stronger than electromagnetic forces

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- SC.PHY.12ps.3 Knows that gravity is a universal force that each exerts on other masses
- SC.PHY.12ps.4 Knows that electric force is a universal that exists between any two charged objects
- SC.PHY.12ps.5 Knows that electromagnetic forces acting within and between atoms are stronger than the gravitational forces acting between them
- SC.PHY.12ps.6 Knows that electric force is a universal force that exists between any two charged objects

CSD Performance Standard 13—Understands the nature of scientific inquiry. **(WMAS Science—Science Inquiry)**

- SC.PHY.13si.1 Designs and conducts scientific investigations
- SC.PHY.13si.2 Communicates and defends a scientific principal
- SC.PHY.13si.3 Identifies the different tools and the use of the SI system units to measure, and convert using the dimensional analysis strategies.
- SC.PHY.13si.4 Uses appropriate tools (including computer hardware and software) and techniques to gather, analyze, and interpret scientific data

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- SC.PHY.14si.1 Demonstrates abilities of technological design

CSD Performance Standard 15— Understands the history and nature of scientific knowledge. **(WMAS Science—Nature of Science)**

- SC.PHY.15si.1 Knows science as a human endeavor
- SC.PHY.15si.2 Knows the nature of scientific knowledge

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Science Performance Standards and Benchmarks

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Anatomy and Physiology A & B (Elective Courses)

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 6— Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)

- SC.AP.6le.1 Understands the cell theory and knows that the cell is the basic unit of structure and function for all living organisms.
- SC.AP.6le.2 Knows the structure of cellular organelles and the functions they perform.
- SC.AP.6le.3 Knows the development of a human embryo.
- SC.AP.6le.4 Understands human diseases associated with each system.
- SC.AP.6le.5 Knows all the bones of the body.
- SC.AP.6le.6 Knows the functions of the different body systems.
- SC.AP.6le.7 Knows several of the muscles of each region of the body including origin, insertion, and action.
- SC.AP.6le.8 Differentiates between connective, epithelial, muscular and nervous tissues in their form and function.
- SC.AP.6le.9 Understands the interactions and interdependence of all body systems.

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CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- Not addressed in Anatomy and Physiology Electives

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- Not addressed in Anatomy and Physiology Electives

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Science Performance Standards and Benchmarks

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- **Benchmarks (with ID label)** describe knowledge and skills targeted for a specific grade level within that Performance standard.

Advanced Biology (Elective Course)

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- Not addressed in Advanced Biology Elective

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- Not addressed in Advanced Biology Elective

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- Not addressed in Advanced Biology Elective

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- **SC.AB.4le.1** Understands that the fossil record, through geologic evidence, documents the appearance, diversification, and extinction of many life forms
- **SC.AB.4le.2** Understands that evolution is the genetic change in a population or species due to the mechanism of natural selection
- **SC.AB.4le.3** Knows that heritable characteristics largely determine what capabilities an organism will have
- **SC.AB.4le.4** Knows how organisms are classified into hierarchy groups from Kingdom to species
- **SC.AB.4le.5** Understands the role of sexual reproduction and how genetic change and adaptation result in biodiversity
- **SC.AB.4le.6** Understands the concept of natural selection and how natural selection is the driving mechanism for evolution

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- **SC.AB.5le.1** Knows that mitosis gives rise to asexual reproduction yielding identical genetic offspring, and meiosis gives rise to sexual reproduction forming the sperm and egg
- **SC.AB.5le.2** Knows the stages and events in the cell cycle and terminology

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- SC.AB.5le.3 Knows ways in which genes may be altered and combined to create genetic variation within a species
- SC.AB.5le.4 Understands the concepts of Mendelian genetics
- SC.AB.5le.5 Knows that features of variation and transmission of genetic information to offspring occurs through the egg and sperm cell
- SC.AB.5le.6 Knows hereditary autosomal and sex linked disorders found in humans
- SC.AB.5le.7 Knows the chemical and structural properties of DNA and its role in protein synthesis
- SC.AB.5le.8 Knows that new heritable characteristics can only result from new combinations of existing genes or from mutations of genes in an organism's sex cells through inversion, deletion and substitution
- SC.AB.5le.9 Knows that viruses contain genetic DNA or RNA that can be transferred into the host and destruction of the host cells
- SC.AB.5le.10 Knows that "gene expression", the flow of information from genes to proteins, is subject to control, mainly by the turning on or off of genes

CSD Performance Standard 6— Understands the structure and function of cells and organisms. (WMAS Science—Life and Environmental Science)

- SC.AB.6le.1 Understands the cell theory and knows that the cell is the basic unit of structure and function for all living organisms
- SC.AB.6le.2 Knows the structure of cellular organelles and the functions they perform
- SC.AB.6le.3 Define metabolism and understand the role of enzymes in catalyzing chemical reactions for carbohydrates, proteins, lipids and nucleic acids molecules
- SC.AB.6le.4 Understands the process of cellular respiration and fermentation as a mechanism of energy release and ATP storage
- SC.AB.6le.5 Knows that organisms accommodate for obtaining, transforming, transporting, releasing, and eliminating matter and energy by active and passive transport across membranes
- SC.AB.6le.6 Knows that proteins give individual identity to each organism
- SC.AB.6le.7 Understands how infectious diseases can be transmitted to humans by fungi, bacteria, viruses, and protista
- SC.AB.6le.8 Understands the structure and function of plant organs
- SC.AB.6le.9 Recognizes that single cells must be microscopic and have differences that allow specialization of function

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- SC.AB.7le.1 Knows how the interrelationships and interdependencies among organisms generate stable ecosystems that fluctuate around a state of equilibrium
- SC.AB.7le.2 Knows that ecosystems provide for continuous interactions among organisms and with their physical environment through food chains, cycles, photosynthesis, decomposition
- SC.AB.7le.3 Identify, investigate, and evaluate environmental problems through decision making skills and proposed solutions to the problems

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- SC.AB.7le.4 Relate the impact of human activities on ecosystems to the natural process of change, like succession, evolution, extinction, etc.

CSD Performance Standard 8—Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- SC.AB.8ps.1 Understands how plants transfer energy from the sun to living ecosystems through photosynthesis
- SC.AB.8ps.2 Knows that matter and energy flow between living systems and the physical environment, and chemical elements transform and recombine in different ways
- SC.AB.8ps.3 Knows that living systems require a continuous input of energy to maintain their chemical and physical organization
- SC.AB.8ps.4 Knows that the amount of life an environment can support is limited by the availability of matter and energy and the ability of the ecosystem to conserve matter using biogeochemical cycles

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- Not addressed in Advanced Biology Elective

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- Not addressed in Advanced Biology Elective

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.AB.11ps.1 Knows that radioactive isotopes can be used to estimate the age of materials that contain them
- SC.AB.11ps.2 Knows the structure of atoms, and the location and charge of its subatomic particles
- SC.AB.11ps.3 Knows that atoms can bond to one another as molecules, chains, rings, and branching networks to form a variety of structures; (e.g., carbohydrates, proteins, lipids, nucleic acids)
- SC.AB.11ps.4 Knows how the electron configuration of atoms governs the chemical properties of an element by transferring or sharing electrons
- SC.AB.11ps.5 Knows that chemical reactions can take place at different rates and can depend on a variety of factors

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in Advanced Biology Elective

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CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.AB.13si.1 Knows that the process of science is the common underlying theme which poses and tests hypotheses to answer questions about the natural world. Hypothesis must be measurable and testable for an experimental setup
- SC.AB.13si.2 Designs and conducts scientific investigations where controlled experiments give reproducible results, and distinguish between facts, theories and hypotheses
- SC.AB.13si.3 Evaluates the best procedure to test a given hypothesis and knows the importance of controlling variables
- SC.AB.13si.4 Clearly define the problem, use a control to determine the independent and dependent variables for a given experiment and extrapolate from the data
- SC.AB.13si.5 Learn to process and analyzes data presented in tables or charts and select appropriate graphs to present trends in data
- SC.AB.13si.6 Explain how models help scientist to understand the natural and physical world by describing processes, events or concepts
- SC.AB.13si.7 Explain that because theories are models, they may be revised as more data becomes available resulting in major shifts in scientific thinking

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- SC.AB.14si.1 Understands the importance of science to technological design as a social enterprise and the importance of being scientifically literate
- SC.AB.14si.2 Evaluate ways in which biotechnology has expanded our ability to alter the environment and its capacity to support humans and other living organisms
- SC.AB.14si.3 Identify careers related to the different disciplines of science

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- SC.AB.15si.1 Understands how scientific knowledge changes and accumulates over time
- SC.AB.15si.2 Knows that scientific explanations to be considered valid must make accurate predictions, be logical and open to criticism, report methods and procedures and make the knowledge public

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Science Performance Standards and Benchmarks

Key to this Document:

CSD Performance Standards (in bold) describe what students should know and be able to do within a subject area. Each CSD performance standard is aligned to a corresponding content standard within the Wisconsin Model Academic Standards (WMAS) for that subject area.

- Benchmarks (with ID label) describe knowledge and skills targeted for a specific grade level within that Performance standard.

CAPP Chemistry I (Elective Course)

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- Not addressed in CAPP Chemistry I Elective

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- Not addressed in CAPP Chemistry I Elective

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- Not addressed in CAPP Chemistry I Elective

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- Not addressed in CAPP Chemistry I Elective

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- Not addressed in CAPP Chemistry I Elective

CSD Performance Standard 6— Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)

- Not addressed in CAPP Chemistry I Elective

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- Not addressed in CAPP Chemistry I Elective

CSD Performance Standard 8— Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- Not addressed in CAPP Chemistry I Elective

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Science Performance Standards and Benchmarks

CSD Performance Standard 9—Understands the principles of forces and motion.
(WMAS Science—Physical Science)

- Not addressed in CAPP Chemistry I Elective

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.
(WMAS Science—Physical Science)

- Not addressed in CAPP Chemistry I Elective

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.CC1.11ps.1 Uses proper nomenclature to identify ionic and molecular compounds
- SC.CC1.11ps.2 Understands how the mole concept is utilized in simple conversions, chemical formulae, and stoichiometry.
- SC.CC1.11ps.3 Predicts products of solubility reactions and writes balanced reactions and net ionic equations.
- SC.CC1.11ps.4 Classifies precipitation, redox, gas forming, and acid/base reactions.
- SC.CC1.11ps.5 Applies quantum theory and the results of atomic line spectra experiments to predict electron configurations.
- SC.CC1.11ps.6 Applies knowledge of the periodic table and atomic structure to predict trends in ionization energy, electron affinity, and reactivity.
- SC.CC1.11ps.7 Writes Lewis structures for covalent molecules.
- SC.CC1.11ps.8 Evaluates resonance structures based on consideration of electronegativity and formal charge.
- SC.CC1.11ps.9 Predicts the geometries of molecules using VSEPR theory.
- SC.CC1.11ps.10 Predicts molecular orbital hybridizations.
- SC.CC1.11ps.11 Understands common characteristics of endothermic and exothermic reactions and how enthalpy change is used to describe these reactions.
- SC.CC1.11ps.12 Understands how calorimetry concepts can be used to track energy changes.
- SC.CC1.11ps.13 Relates a gas's pressure, volume, temperature, and number of moles, and understands how changing conditions affect the gas's properties.
- SC.CC1.11ps.14 Distinguishes between effusion and diffusion and uses Graham's Law to mathematically describe them.
- SC.CC1.11ps.15 Uses balanced equations to describe the stoichiometric relationships between gases.
- SC.CC1.11ps.16 Predicts bond polarity and molecular polarity using their predicted molecular geometries.
- SC.CC1.11ps.17 Uses molecular polarity to describe the intermolecular forces acting between molecules, and how these forces affect properties of a sample.
- SC.CC1.11ps.18 Relates the three phases of matter by interpreting phase diagrams.
- SC.CC1.11ps.19 Uses molarity and molality to describe the concentrations of solutions.
- SC.CC1.11ps.20 Describes the interactions between particles in solutions and how they can be altered to affect colligative properties.

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CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in CAPP Chemistry I Elective

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- *SC.CC1.13si.1* Designs and conducts scientific experiments, and evaluates the results of their experiments.
- *SC.CC1.13si.2* Formally communicates the results of their experiments.
- *SC.CC1.13si.3* Acquires chemistry laboratory skills, while understanding the nature of experimental uncertainty.
- *SC.CC1.13si.4* Knows that creativity, imagination, and a good knowledge base are all required in the study of science.
- *SC.CC1.13si.5* Knows that laboratory work is an important part of chemistry and that proper lab technique and safety is an ongoing process that needs to be reinforced on a regular basis.

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- Not addressed in CAPP Chemistry I Elective

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- Not addressed in CAPP Chemistry I Elective

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Science Performance Standards and Benchmarks

- Key to this Document:

CSD Performance Standards (in bold) describe what students should know and be able to do within a subject area. Each CSD performance standard is aligned to a corresponding content standard within the Wisconsin Model Academic Standards (WMAS) for that subject area.

- Benchmarks (with ID label) describe knowledge and skills targeted for a specific grade level within that Performance standard.

CAPP Chemistry II (Elective Course)

CSD Performance Standard 1— Understands atmospheric processes and the water cycle.
(WMAS Science—Physical Science)

- Not addressed in CAPP Chemistry II Elective

CSD Performance Standard 2— Understands Earth's composition and structure.
(WMAS Science—Earth and Space Science)

- Not addressed in CAPP Chemistry II Elective

CSD Performance Standard 3— Understands the composition and structure of the universe and the Earth's place in it.

(WMAS Science—Earth and Space Science)

- Not addressed in CAPP Chemistry II Elective

CSD Performance Standard 4— Understands biological evolution and the diversity of life.
(WMAS Science—Life and Environmental Science)

- Not addressed in CAPP Chemistry II Elective

CSD Performance Standard 5— Understands the concepts of genetics and how it applies to heredity, and other related concepts.

(WMAS Science—Life and Environmental Science)

- Not addressed in CAPP Chemistry II Elective

CSD Performance Standard 6— Understands the structure and function of cells and organisms.
(WMAS Science—Life and Environmental Science)

- Not addressed in CAPP Chemistry II Elective

CSD Performance Standard 7— Understands the relationships among organisms and their physical environment.

(WMAS Science—Life and Environmental Science)

- Not addressed in CAPP Chemistry II Elective

CSD Performance Standard 8— Understands the cycling of matter and energy flow through the environment.

(WMAS Science—Physical Science)

- Not addressed in CAPP Chemistry II Elective

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Science Performance Standards and Benchmarks

CSD Performance Standard 9—Understands the principles of forces and motion.

(WMAS Science—Physical Science)

- Not addressed in CAPP Chemistry II Elective

CSD Performance Standard 10— Understands energy types and conversion sources and their relationship to heat and temperature.

(WMAS Science—Physical Science)

- Not addressed in CAPP Chemistry II Elective

CSD Performance Standard 11— Understands the basic concepts about structure and properties of matter.

(WMAS Science—Physical Science)

- SC.CC2.11ps.1 Understands the meaning of signs for enthalpy changes.
- SC.CC2.11ps.2 Understands how factors of enthalpy and entropy contribute to spontaneity of reactions.
- SC.CC2.11ps.3 Understands how Gibbs Free Energy is used to predict reaction spontaneity.
- SC.CC2.11ps.4 Understands how to write rate laws for reactions.
- SC.CC2.11ps.5 Mathematically describes rates of reactions using integrated rate laws.
- SC.CC2.11ps.6 Understands how the Collision Theory of Reactivity is used to describe reaction rates.
- SC.CC2.11ps.7 Understands how to write rate laws for specific reaction mechanisms and how to use their rate laws to evaluate a mechanism's validity.
- SC.CC2.11ps.8 Understands concepts of equilibrium and how the equilibrium constant expression is used to mathematically describe these concepts.
- SC.CC2.11ps.9 Predicts how a reaction will respond to an equilibrium stress using LeChatelier's Principle.
- SC.CC2.11ps.10 Extrapolates key concepts from equilibrium theory to acid/base theory.
- SC.CC2.11ps.11 Estimates the pH of salt solutions.
- SC.CC2.11ps.12 Classifies acids and bases according to Arrhenius, Bronsted, and Lewis definitions, understanding the similarities and differences among these theories.
- SC.CC2.11ps.13 Writes acid/base reactions and finds the pH of the resulting solutions.
- SC.CC2.11ps.14 Understands how the presence of a common ion affects reactivity and concentrations ions and solubilities.
- SC.CC2.11ps.15 Understands how buffer solutions function to maintain pH.
- SC.CC2.11ps.16 Interprets titration curves and understands how these curves are related to manual titrations.
- SC.CC2.11ps.17 Extrapolates key concepts from equilibrium theory to key concepts in precipitation theory and salt formation.
- SC.CC2.11ps.18 Understands that oxidation reduction reactions involve electron transfers and energy changes.
- SC.CC2.11ps.19 Draws electrochemical cells and evaluate the cell potentials for standard and non-standard cells.
- SC.CC2.11ps.20 Understands principles of electrolysis.
- SC.CC2.11ps.21 Understands how the properties of transition metals arise from their electron configurations.
- SC.CC2.11ps.22 Uses accepted nomenclature to describe transition metal complexes.

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- SC.CC2.11ps.23 Identifies properties, uses, and common reactions of main group elements.

CSD Performance Standard 12— Knows the kinds of forces that exist between objects and within atoms.

(WMAS Science—Physical Science)

- Not addressed in CAPP Chemistry II Elective

CSD Performance Standard 13—Understands the nature of scientific inquiry.

(WMAS Science—Science Inquiry)

- SC.CC2.13si.1 Designs and conducts scientific experiments, and evaluates the results of their experiments.
- SC.CC2.13si.2 Formally communicates the results of their experiments.
- SC.CC2.13si.3 Acquires chemistry laboratory skills, while understanding the nature of experimental uncertainty.
- SC.CC2.13si.4 Knows that creativity, imagination, and a good knowledge base are all required in the study of science.

CSD Performance Standard 14— Understands the interactions of science, technology, and society.

(WMAS Science—Science Applications)

- Not addressed in CAPP Chemistry II Elective

CSD Performance Standard 15— Understands the history and nature of scientific knowledge.

(WMAS Science—Nature of Science)

- SC.CC2.15si.4 Knows that laboratory work is an important part of chemistry and that proper lab technique and safety is an ongoing process that needs to be reinforced on a regular basis.