Wyoming Science Academic Content Standards
GRADE SPAN 5 - 8

<table>
<tr><th colspan="3">CONTENT STANDARD 1. <u>CONCEPTS AND PROCESSES</u>
In the context of unifying concepts and processes, students develop an understanding of scientific content through inquiry. Science is a dynamic process; concepts and content are best learned through inquiry and investigation.
ACADEMIC CONTENT STANDARD 1. <u>CONCEPTS AND PROCESSES</u>
Students learn about scientific content through inquiry.</th></tr>
<tr><th>Grade 8
Benchmark</th><th>Grade 8
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Levels of Complexity</th></tr>
<tr><td rowspan="4"><u>Life Systems</u>

1. <u>Levels of Organization in Living Systems</u>: Students model the cell as the basic unit of a living system. They realize that all functions that sustain life act within a single cell and cells differentiate into specialized cells, tissues, organs, and organ systems.</td><td rowspan="4"><u>Life Systems</u>

8.A.S.1.1 Students relate different organ systems with their specialized function.</td><td>Level IV
Students consistently and independently perform in unfamiliar settings using natural supports.
Students describe how a group of organs work together to perform a specialized function.
Ex. Students describe the heart and blood vessels as a system which carries nutrients to the body.</td></tr>
<tr><td>Level III
Students consistently perform in several familiar settings.
Students relate different organ systems with their specialized function.
Ex. Students match the muscular system to a function of the system which is to move the body.</td></tr>
<tr><td>Level II
Students require external support and multiple prompts in limited familiar settings.
Students list different parts of the human body.
Ex. Students list different parts of a human face (eyes, ears, nose, mouth).</td></tr>
<tr><td>Level I
Students require external support and multiple prompts in a structured setting.</td></tr>
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		Students respond to the stimulation and labeling of a body part.

Grade 8 Benchmark	Grade 8 Academic Benchmark	Grade 8 Levels of Complexity
Life Systems **2. Reproduction and Heredity: Students describe reproduction as a characteristic of all living systems, which is essential to the continuation of species, and identify and interpret traits, patterns of inheritance, and the interaction between genetics and environment.** **3. Evolution as a Theory: Students explain evolution as a theory and apply the theory to the diversity of species, which results from natural selection and the acquisition of unique characteristics through biological adaptation.**	**Life Systems** **8.A.S.1.2 Students describe the traits offspring inherit from their parents.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students explain a pattern of inheritance in terms of dominate and recessive traits.** Ex. Students describe how some traits may "skip a generation," but are still carried in a family pedigree.
		Level III *Students consistently perform in several familiar settings.* **Students describe the traits offspring inherit from their parents.** Ex. Students describe eye color as a trait passed down from a parent.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students identify similarities between parents and offspring.** Ex. Students identify similarities between a set of offspring to a representation of appropriate parents (i.e. puppies to dogs).
		Level I *Students require external support and multiple prompts in a structured setting.* **Students recognize parents and their offspring.** Ex. Students respond through eye movement or vocalization to a representation of puppies to indicate a match between puppies and adult dogs.

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Life Systems **4. Diversity of Organisms: Students investigate the interconnectedness of organisms, identifying similarity and diversity of organisms through a classification system of hierarchical relationships and structural homologies.** **5. Behavior and Adaptation: Students recognize behavior as a response of an organism to an internal or environmental stimulus and connect the characteristics and behaviors of an organism to biological adaptation.** **6. Interrelationships of Populations and Ecosystems: Students illustrate populations of organisms and their interconnection within an ecosystem, identifying relationships among producers, consumers, and decomposers.**	**Life Systems** **8.A.S.1.3 Students describe interconnectedness of diverse organisms within an ecosystem.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students organize diverse groups of organisms by identifying relationships within an ecosystem (producers, consumers, etc.)** Ex. Students group animals that are meat eaters as all belonging together because they are higher on the food chain than other organisms.
		Level III *Students consistently perform in several familiar settings.* **Students describe interconnectedness of diverse organisms within an ecosystem.** Ex. Students describe the order of a simple food chain diagram.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students define an organism by its role in an ecosystem.** Ex. Students match representations of plants or animals to indicate whether they are consumers or producers.
		Level I *Students require external support and multiple prompts in a structured setting.* **Students recognize differences between plants and animals.** Ex. Students respond by using eye gaze or gesticulations to plants or animal representations.

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Earth and Space Systems **7. The Earth in the Solar System: Students describe Earth as the third planet in the Solar System and understand the effects of the sun as a major source of energy, gravitational forces, and motions of objects in the Solar System.** **8. The Structure of the Earth System: Students examine the structure of the Earth, identifying layers of the Earth, considering plate movement and its effect, and recognizing landforms resulting from constructive and destructive forces.**	**Earth and Space Systems** **8.A.S.1.4 Students describe Earth's features in relation to other objects in the Solar System.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students compare Earth's features in relation to other objects in the Solar System.** Ex. Students compare relative sizes of other planets in the solar system to the size of Earth.
		Level III *Students consistently perform in several familiar settings.* **Students describe Earth's features in relation to other objects in the Solar System.** Ex. Students describe the differences between features of the Earth and features of the Moon.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students recognize features of Earth in relation to other objects in the Solar System.** Ex. Students match representations of Earth to Earth's features and representations of the Moon to the Moon's features.
		Level I *Students require external support and multiple prompts in a structured setting.* **Students recognize features of Earth.** Ex. Students respond to a representation of mountains, through eye movement or vocalization, to indicate a match between an Earth feature compared to a man-made feature such as a building.

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Earth and Space Systems **9. The Earth's History: Students systematize the Earth's history in terms of geologic evidence, comparing past and present Earth processes and identifying catastrophic events and fossil evidence.**	**Earth and Space Systems** **8.A.S.1.5 Students demonstrate processes which are evidence of the formation and development of the Earth.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students compare processes which are evidence of the formation and development of the Earth.** Ex. Students relate gradual processes (plate tectonics) to sudden changes (earthquakes).
		Level III *Students consistently perform in several familiar settings.* **Students demonstrate processes which are evidence of the formation and development of the Earth.** Ex. Students create a representation of an earth process (i.e. picture or model) such as erosion, sedimentation or volcanic eruption.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students recognize processes which led to the current features of Earth.** Ex. Students match representations of volcanic eruptions, such as Mt. St. Helens, to their current state (i.e. before and after).
		Level I *Students require external support and multiple prompts in a structured setting.* **Students respond to differences in a model of Earth.** Ex. Students respond to the shaping of modeling clay.

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Physical Systems **10. The Structure and Properties of Matter: Students identify characteristic properties of matter such as density, solubility, and boiling point and understand that elements are the basic components of matter.** **11. Physical and Chemical Changes in Matter: Students evaluate chemical and physical changes, recognizing that chemical change forms compounds with different properties and that physical change alters the appearance but not the composition of a substance.** **12. Forms and Uses of Energy: Students investigate energy as a property of substances in a variety of forms with a range of uses.**	**Physical Systems** **8.A.S.1.6 Students identify physical characteristics of a substance.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students describe that characteristic properties are independent of a given object's size or shape.** Ex. Students explain that if a small piece of wood floats in water then a large piece of wood will also float.
		Level III *Students consistently perform in several familiar settings.* **Students identify physical characteristics of a substance.** Ex. When presented with a substance, students list its observable characteristics on a teacher-provided graphic organizer (color, hardness, density).
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students recognize a physical characteristic of a group of similar substances.** Ex. When presented with a set of objects, students match an observable characteristic such as color or whether they float in water.
		Level I *Students require external support and multiple prompts in a structured setting.* **Students indicate an object based upon a physical characteristic.** Ex. Students use eye movement or vocalization to indicate a yellow ball.

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Physical Systems **13. The Conservation of Matter and Energy: Students identify supporting evidence to explain conservation of matter and energy, indicating that matter or energy cannot be created or destroyed but is transferred from one object to another.** **14. Effects of Motions and Forces: Students describe motion of an object by position, direction, and speed, and identify the effects of force and inertia on an object.**	**Physical Systems** **8.A.S.1.7 Students demonstrate that pushing and pulling can change the position, direction, and motion of objects.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students predict the change on an object's position, direction or motion as a result of pushing or pulling.** Ex. Given a set of objects (cart, ball, block), students predict the new position relative to the original position before a force (push or pull) has been applied.
		Level III *Students consistently perform in several familiar settings.* **Students demonstrate that pushing and pulling can change the position, direction, and motion of objects.** Ex. Given a situation involving a ball in motion, students demonstrate that force (push or pull) must be applied in order to stop the motion of the ball.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students identify that pushing and pulling can cause an object to move in a specific direction.** Ex. Given a set of objects (cart, ball, block), students state the direction an object moves after a force (push or pull) has been applied.
		Level I *Students require external support and multiple prompts in a structured setting.* **Students recognize an object in motion and an object standing still.**

		Ex. Students indicate through eye gaze or vocalization that an object is in motion when presented with an object that is moving.

CONTENT STANDARD 2. SCIENCE AS INQUIRY **Students demonstrate knowledge, skills, and habits of mind necessary to safely perform scientific inquiry. Inquiry is the foundation for the development of content, teaching students the use of processes of science that enable them to construct and develop their own knowledge. Inquiry requires appropriate field, classroom, and laboratory experiences with suitable facilities and equipment.** ACADEMIC CONTENT STANDARD 2. SCIENCE AS INQUIRY **Students use inquiry to better understand the world in which they live.**		
Grade 8 Benchmark	**Grade 8 Academic Benchmark**	**Grade 8 Levels of Complexity**
1. Students research scientific information and present findings through appropriate means.	**8.A.S.2.1 Students use science reference materials to answer science questions and present findings.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students use science reference materials to answer science questions and present findings with an explanation.** Ex. When asked about weather conditions, students find and explain how to interpret the meaning of the information in the newspaper, such as high and low temperatures.
		Level III *Students consistently perform in several familiar settings.* **Students use science reference materials to answer science questions and present findings.** Ex. When asked about weather conditions, students find the information in a newspaper.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students use science reference materials to match answers to science questions.** Ex. Presented with pictures of nests, students recognize the pictures of nests as a home for a bird.

		Level I *Students require external support and multiple prompts in a structured setting.* **Students recognize a picture or object as referenced within a scientific question.** Ex. When asked a question about a cat, students indicate a picture or representation of a cat as the subject.

Grade 8 Benchmark	Grade 8 Academic Benchmark	Grade 8 Levels of Complexity
2. Students use inquiry to conduct scientific investigations. ▪ **Ask questions that lead to conducting an investigation**	**2. Students use inquiry to conduct scientific investigations.** **8.A.S.2.2.a Students ask questions about objects, organisms, or events in the environment.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students ask questions about objects, organisms, or events in the environment and defend their predictions.** Ex. After observing a squirrel in a tree, students may ask where squirrels live and predict that they may have nests in trees.
		Level III *Students consistently perform in several familiar settings.* **Students ask questions about objects, organisms, or events in the environment.** Ex. After observing a squirrel in a tree, students may ask where squirrels live.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students identify given questions related to an object, organism, or event in the environment.** Ex. Given a representation of a pond, students match questions related to water or ducks to the environment.
		Level I *Students require external support and multiple prompts in a structured setting.* **Students indicate their preference for objects, organisms, or events in the environment.** Ex. Students indicate through eye movement or vocalization an interest in a duck

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Grade 8 Benchmark 2 **2. Students use inquiry to conduct scientific investigations.** ▪ **Collect, organize, and analyze and appropriately represent data.** **4. Students recognize the relationship between science and technology in meeting human needs**	**2. Students use inquiry to conduct scientific investigations.** **8.A.S.2.2.b Students conduct a simple investigation using simple technology and tools to collect and organize data.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students conduct a simple investigation and identify and use simple equipment and tools to collect data.** Ex. Students choose a stopwatch to measure how long it will take a cart to travel a given distance.
		Level III *Students consistently perform in several familiar settings.* **Students conduct a simple investigation using simple technology and tools to collect data.** Ex. Students measure the effects of changing conditions on a variable such as temperature, distance or color when provided with directions.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students follow steps to a simple investigation and use simple equipment and tools to collect data.** Ex. Students complete a task when presented with a list of directions such as: 1. Fill your cup with water. 2. Add food coloring. 3. Put flower in water.
		Level I *Students require external support and multiple prompts in a structured setting.* **Students respond to an aspect of themselves being measured.** Ex. Students attend to being on a scale, having their

		temperature taken or the measurement of a body part.

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2. Students use inquiry to conduct scientific investigations. ▪ **Draw conclusions based on evidence and make connections to applied scientific concepts.** ▪ **Clearly and accurately communicate the result of the investigation.** **3. Students clearly and accurately communicate the result of their own work, as well as information obtained from other sources.**	**2. Students use inquiry to conduct scientific investigations.** **8.A.S.2.2.c Students communicate results of an investigation and match connections to daily life.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students explain the results of an investigation and make connections to daily life.** Ex. Students conclude that when using a steep ramp, balls roll faster than balls rolled on a less steep ramp after comparing results and connect this information to trucks driving downhill.
		Level III *Students consistently perform in several familiar settings.* **Students communicate results of an investigation and match connections to daily life.** Ex. Students share that the steeper the ramp, the faster a ball rolls and match this information to trucks driving downhill.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students state the results of an investigation.** Ex. Students state the ball rolled down the ramp.
		Level I *Students require external support and multiple prompts in a structured setting.* **Students indicate attention to a presentation of the results of an investigation.** Ex. Students indicate through eye gaze, verbalizations, and/or other response attention to a ramp and ball experiment.

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5. Students properly use appropriate scientific and safety equipment, recognize hazards and safety symbols, and observe standard safety procedures.	**8.A.S.2.3 Students identify safety symbols and the associated concept.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students identify safety symbols, the associated concept, and identify a related safety procedure.** Ex. Students identify proper safety procedures to follow in case of fire.
		Level III *Students consistently perform in several familiar settings.* **Students identify safety symbols and the associated concept.** Ex. Students match fire extinguisher and fire exit to their locations in the classroom.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students match a safety symbol and its associated concept.** Ex. Students match a poison hazard symbol to the term or concept of poison.
		Level I *Students require external support and multiple prompts in a structured setting.* **Students recognize a safety symbol as a warning.** Ex. Students respond to the presentation of a poison hazard symbol.

CONTENT STANDARD 3. HISTORY AND NATURE OF SCIENCE IN PERSONAL AND SOCIAL DECISIONS Students recognize the nature of science, its history, and its connections to personal, social, economic, and political decisions. Historically, scientific events have had significant impacts on our cultural heritage. ACADEMIC CONTENT STANDARD 3. HISTORY AND NATURE OF SCIENCE IN PERSONAL AND SOCIAL DECISIONS Students use scientific knowledge to make personal decisions.		
Grade 8 Benchmark	**Grade 8 Academic Benchmark**	**Grade 8 Levels of Complexity**
1. Students explore the nature and history of science. **A. Students explore how scientific knowledge changes and grows over time, and impacts personal and social decisions.** **B. Students explore the historical use of scientific information to make personal and social decisions.**	**1. Students investigate the nature of science and how it impacts personal decisions.** **8.A.S.3.1 Students identify scientific information related to a task associated with a healthy life style choice.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students develop a personal plan connecting scientifically related information to a healthy lifestyle choice.** Ex. Students develop a plan for washing their hands relative to events during school day such as meal time.
		Level III *Students consistently perform in several familiar settings.* **Students identify scientific information related to a task associated with a healthy life style choice.** Ex. Students identify germs as the reason washing their hands or is a way to keep healthy.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students identify ways to keep healthy.** Ex. Students identify washing their hands or brushing their teeth as ways to keep healthy.

		Level I *Students require external support and multiple prompts in a structured setting.* **Students engage in a healthy practice.** Ex. Students respond to a healthy practice such as having their hands washed.

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2. Students explore how scientific information is used to make decisions. **A. The role of science in solving personal, local, and national problems.** **C. Origins and conservation of natural resources, including Wyoming examples.**	**2. Students explore how scientific information is used to make decisions.** **8.A.S.3.2.a Students identify and perform a task associated with a local problem regarding natural resources.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students identify and plan a way to perform a task associated with a local problem regarding natural resources.** Ex. Students communicate a problem, design, and solution.
		Level III *Students consistently perform in several familiar settings.* **Students identify and perform a task associated with a local problem regarding natural resources.** Ex. Students implement a proposed solution such as recycling cans.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students identify a local problem regarding natural resources.** Ex. Students identify that some man-made changes in the environment can be bad.
		Level I *Students require external support and multiple prompts in a structured setting.* **Students respond to a representation of a polluted resource.** Ex. Students respond to a representation of a polluted lake as a problem.

Grade 8 Benchmark	Grade 8 Academic Benchmark	Grade 8 Levels of Complexity
2. Students explore how scientific information is used to make decisions. **B. Interdisciplinary connections of the sciences and connections to other subject areas and careers in science or technical fields.**	**2. Students explore how scientific information is used to make decisions.** **8.A.S.3.2.b Students group science topics with careers in science.**	**Level IV** *Students consistently and independently perform in unfamiliar settings using natural supports.* **Students connect science topics to careers in science.**
		Level III *Students consistently perform in several familiar settings.* **Students group science topics with careers in science.** Ex. Students match careers such as doctors and nurses to a career in health or first aid.
		Level II *Students require external support and multiple prompts in limited familiar settings.* **Students identify a specific science topic with a job in science.** Ex. Students identify that a zookeeper must learn about animals.
		Level I *Students require external support and multiple prompts in a structured setting.* **Students respond to the presence of a school nurse.** Ex. Students identify a representation of a school nurse as the nurse.