Helena Public Schools
Science

Additional Resources

Helena Public Schools
Science

Grades K-8
Implementation Guides

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Kindergarten	
Content Standard 1	Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.
Content Standard 2	Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.
Content Standard 3	Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.
Content Standard 4	Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.
Content Standard 5	Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.
Content Standard 6	Students understand historical developments in science and technology.

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Kindergarten			
Content Standard 1 Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Develop the abilities necessary to safely conduct scientific inquiry, including (a step-by-step sequence is not implied): (a) asking questions about objects, events, and organisms in the environment, (b) planning and conducting simple investigations	• Observe/report teacher-directed scientific investigations • Develop respect for classroom equipment and safe laboratory procedures.	observe, scientist, same/different, color, size, sight, sound, touch, taste, smell, sort, record, question, experiment	7 and 8
2. Select and use appropriate tools including technology to make measurements (including metric units) and represent results of basic scientific investigations	• Explore types of measurement using different manipulatives	clock, thermometer, magnifying glass, ruler, scale, beaker	2 and 8
3. Use data to describe and communicate the results of scientific investigations	• Participate in discussions of scientific investigations		1, 3, and 9
4. Use models that illustrate simple concepts and compare those models to the actual phenomenon	• Construct a model to illustrate a simple concept (at developmentally appropriate level).		1 and 6
5. Identify a valid test in an investigation	• Report the results from a controlled experiments		4
6. Identify how observations of nature form an essential base of knowledge among the Montana American Indians	• Identify how observations of nature form an essential base of knowledge among the Montana American Indians	nature, environment	

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Kindergarten			
Content Standard 2 Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Create mixtures and separate them based on different physical properties (e.g., salt and sand, iron filings and soil, oil and water)	• Observe mixtures with different properties		
2. Examine, measure, describe, compare and classify objects in terms of common physical properties	• Sort tangible objects	Observe, measure and manipulate forms of energy: sound, light, heat, electrical, magnetic	
3. Identify the basic characteristics of light, heat, motion, magnetism, electricity, and sound	• Explore magnets	light, dark, shadow, motion, magnet, magnetism	
4. Model and explain that matter exists as solids, liquids, and gases and can change from one form to another	• Develop awareness of matter in its different forms	liquid, solid, gas	
5. Identify that the position of an object can be described by its location relative to another object and its motions described, and measured by external forces action upon it	• Observe, identify, and predict changes in matter resulting from external forces (e.g. pressure, heat, cold)		8
6. Identify, build, and describe mechanical systems and the forces acting within those systems			
7. Observe, measure and manipulate forms of energy: sound, light, heat, electrical, magnetic			

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Kindergarten			
Content Standard 3 Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction	• Observe and discuss similarities/differences of living and non-living things	plant, animal, living, nonliving, life cycle, food, energy, change, make new ones (reproduce), make waste (respire, excrete), respond	8
2. Identify, measure, and describe basic requirements of energy and nutritional needs for an organism	• Develop an awareness of the food groups and proper nutrition		
3. Describe and use models that trace the life cycles of different plants and animals and discuss how they are differ from species to species	• Observe models of the life cycles of an insect and plants		6 and 8
4. Explain cause and effect relationships between nonliving and living components with ecosystems; and explain individual response to the changes in the environment including identifying differences between inherited, instinctual, and learned behaviors	• Explore different types of habitats		3
5. Create and use a classification system to group a variety of plants and animals according to their similarities and differences	• Develop interests, respect, and appreciation for all living things • Sort according to plants/animals/non-living	classify, similar, different	

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Kindergarten			
Content Standard 4 Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Describe and give examples of earth's changing features	• Develop an awareness of planet Earth	mountain, lake, hill, valley, volcano, ocean, land, water, planet	10
2. Describe and measure the physical properties of earth's basic materials (including soil, rocks, water and gases) and the resources they provide	• Discuss the physical properties of the Earth and show examples		10
3. Investigate fossils and make inferences about life, the plants, animals, and the environment at that time	• Discuss prehistoric life		5
4. Observe and describe the water cycle and the local weather and demonstrate how weather conditions are measured	• Observe daily weather		8
5. Identify seasons and explain the difference between weather and climate	• Observe seasonal changes		8
6. Identify objects (e.g., moon, stars, meteors) in the sky and their patterns of movement and explain that light and heat comes from a star called the sun	• Name the sun, Moon and stars • Discuss what the Sun does for the Earth		10
7. Identify technology and methods used for space exploration (e.g., star patterns, space shuttles, telescopes)			

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Kindergarten			
Content Standard 5 Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Describe and discuss examples of how people use science and technology	• Explore how science and technology are used within the community	technology	9
2. Describe a scientific or technological innovation that impacts communities, cultures, and societies	• Participate in discussions about innovations that make our life easier		9
3. Simulate scientific collaboration by sharing and communicating ideas to identify and describe problems	• Share and listen in a group		
4. Use scientific knowledge to make inferences and propose solutions for simple environmental problems	• Introduce concept of recycling, reduce, reuse		2
5. Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures	• Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures.	tool	

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Kindergarten			
Content Standard 6 Students understand historical developments in science and technology.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Give historical examples of scientific and technological contributions to communities, cultures and societies, including Montana American Indian examples			
2. Describe how scientific inquiry has produced much knowledge about the world and a variety of contributions toward understanding events and phenomena within the universe	• Ask questions relating about science in their world	question, observe, knowledge	
3. Describe science as a human endeavor and an ongoing process	• Explore science as a human endeavor and an ongoing process	senses, sight, touch, taste, smell, hearing, natural world	

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 1	
Content Standard 1	Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.
Content Standard 2	Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.
Content Standard 3	Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.
Content Standard 4	Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.
Content Standard 5	Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.
Content Standard 6	Students understand historical developments in science and technology.

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 1			
Content Standard 1 Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Develop the abilities necessary to safely conduct scientific inquiry, including (a step-by-step sequence is not implied): (a) asking questions about objects, events, and organisms in the environment, (b) planning and conducting simple investigations	• Observe/tell and record scientific investigations. • Develop respect for classroom equipment and safe laboratory procedures.	procedure, question, testable, observation, investigation, experiment	7 and 8
2. Select and use appropriate tools including technology to make measurements (including metric units) and represent results of basic scientific investigations	• Identify appropriate measurement tools	metric, length, temperature, mass, volume, beaker, ruler, scale, thermometer, clock	2 and 8
3. Use data to describe and communicate the results of scientific investigations	• Participate in discussions of scientific investigations (e.g., class graphs, charts, tables)		1, 3, and 9
4. Use models that illustrate simple concepts and compare those models to the actual phenomenon	• Construct a model to illustrate a simple concept (at developmentally appropriate level.		1 and 6
5. Identify a valid test in an investigation	• Report the results from a controlled experiments		4
6. Identify how observations of nature form an essential base of knowledge among the Montana American Indians	• Identify how observations of nature form an essential base of knowledge among the Montana American Indians	natural resources, natural world	

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 1			
Content Standard 2 Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Create mixtures and separate them based on different physical properties (e.g., salt and sand, iron filings and soil, oil and water)	• Observe mixtures with different properties		
2. Examine, measure, describe, compare and classify objects in terms of common physical properties	• Sort tangible objects	texture, weight	
3. Identify the basic characteristics of light, heat, motion, magnetism, electricity, and sound	• Explore magnets	bent (refraction), bounced (reflection), shadow, mirror, prism, magnifying lens	
4. Model and explain that matter exists as solids, liquids, and gases and can change from one form to another	• Develop awareness of matter in its different forms	scale, balance, thermometer, beaker, measuring tape, ruler	
5. Identify that the position of an object can be described by its location relative to another object and its motions described, and measured by external forces action upon it	• Observe, identify, and predict changes in matter resulting from external forces (e.g. pressure, heat, cold)		8
6. Identify, build, and describe mechanical systems and the forces acting within those systems			
7. Observe, measure and manipulate forms of energy: sound, light, heat, electrical, magnetic	• Observe, measure and manipulate heat energy. (e.g., temperature higher/lower, thermometer)		8

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 1			
Content Standard 3 Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction	• Observe and discuss similarities/differences of living and non-living things		8
2. Identify, measure, and describe basic requirements of energy and nutritional needs for an organism	• Develop an awareness of the food groups and proper nutrition	food chain, herbivore, carnivore	
3. Describe and use models that trace the life cycles of different plants and animals and discuss how they are differ from species to species	• Observe models of the life cycles of an insect and plants		6 and 8
4. Explain cause and effect relationships between nonliving and living components with ecosystems; and explain individual response to the changes in the environment including identifying differences between inherited, instinctual, and learned behaviors	• Explore different types of habitats		3
5. Create and use a classification system to group a variety of plants and animals according to their similarities and differences	• Compare and identify plants and animals into groups by size, shape, needs and uses.		6

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 1			
Content Standard 4 Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Describe and give examples of earth's changing features	• Identify basic landforms (e.g., mountain, river, hill, ocean, lake, valley, volcano)	Earth, planet, star, sun, land, water, lake, pond, river, mountain, desert, valley, volcano, ocean	10
2. Describe and measure the physical properties of earth's basic materials (including soil, rocks, water and gases) and the resources they provide	• Recognize the importance of air and water to living things		10
3. Investigate fossils and make inferences about life, the plants, animals, and the environment at that time	• Introduce prehistoric life through investigation of fossils.		
4. Observe and describe the water cycle and the local weather and demonstrate how weather conditions are measured	• Observe, discuss and record weather • Observe the water cycle	weather, temperature, wind, rain, snow, clouds	8 and 10
5. Identify seasons and explain the difference between weather and climate	• Observe and record physical changes due to the seasons		8
6. Identify objects (e.g., moon, stars, meteors) in the sky and their patterns of movement and explain that light and heat comes from a star called the sun	• Explore the relationship between the Sun, Moon and Earth and include evidence of the Sun as a source of light and heat. • Explore the differences between night and day.	star, moon, planet, day, night, rotate, light, dark, sky, Earth, sun, star, constellation, pattern, Big Dipper, North Star	10
7. Identify technology and methods used for space exploration (e.g., star patterns, space shuttles, telescopes)	• Identify types of technology to observe objects in space (e.g., telescopes)	telescope, satellite, space shuttle, star chart	9

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 1			
Content Standard 5 Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Describe and discuss examples of how people use science and technology	• Explore how science and technology are used within the community	technology	 9
2. Describe a scientific or technological innovation that impacts communities, cultures, and societies	• Discuss a scientific or technological innovation that has benefited the community		 9
3. Simulate scientific collaboration by sharing and communicating ideas to identify and describe problems	• Collaborate in a group to perform a simple investigation.		 4
4. Use scientific knowledge to make inferences and propose solutions for simple environmental problems	• Describe the need for conservation of the environment.	environment, issue, problem	 2
5. Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures	• Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures.	process, technology	 5

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 1			
Content Standard 6 Students understand historical developments in science and technology.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Give historical examples of scientific and technological contributions to communities, cultures and societies, including Montana American Indian examples			
2. Describe how scientific inquiry has produced much knowledge about the world and a variety of contributions toward understanding events and phenomenon within the universe	• Ask questions relating to specific scientific knowledge.	question, observe, knowledge	
3. Describe science as a human endeavor and an ongoing process	• Identify that everyone can do science.		

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 2	
Content Standard 1	Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.
Content Standard 2	Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.
Content Standard 3	Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.
Content Standard 4	Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.
Content Standard 5	Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.
Content Standard 6	Students understand historical developments in science and technology.

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 2			
Content Standard 1 Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Develop the abilities necessary to safely conduct scientific inquiry, including (a step-by-step sequence is not implied): (a) asking questions about objects, events, and organisms in the environment, (b) planning and conducting simple investigations	• Through teacher-directed scientific investigations, students begin to identify variables. • Develop respect for classroom equipment and safe laboratory procedures.	procedure, question, investigation, experiment	7 and 8
2. Select and use appropriate tools including technology to make measurements (including metric units) and represent results of basic scientific investigations	• Demonstrate correct use of measurement tools.	time, metric, length, temperature, mass, volume, beaker, ruler, scale, thermometer, bar graphs, line graphs	2 and 8
3. Use data to describe and communicate the results of scientific investigations	• Communicate scientific data via illustrations, verbal discussions and written form.	data	1, 3, and 9
4. Use models that illustrate simple concepts and compare those models to the actual phenomenon	• Construct a model to illustrate a simple concept (at developmentally appropriate level)	model	1 and 6
5. Identify a valid test in an investigation	• Discuss and illustrate the results from a controlled experiment.		4
6. Identify how observations of nature form an essential base of knowledge among the Montana American Indians	• Identify how observations of nature form an essential base of knowledge among the Montana American Indians	nature, natural world	

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 2			
Content Standard 2 Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Create mixtures and separate them based on different physical properties (e.g., salt and sand, iron filings and soil, oil and water)	• Identify patterns of mixtures based on different properties.	mixture, separate	
2. Examine, measure, describe, compare and classify objects in terms of common physical properties	• Compare tangible objects in terms of common physical properties.	physical properties, size, measure, compare, similarities, differences	
3. Identify the basic characteristics of light, heat, motion, magnetism, electricity, and sound	• Observe and describe basic characteristics of sound.		8
4. Model and explain that matter exists as solids, liquids, and gases and can change from one form to another	• Classify and record properties of matter.		8
5. Identify that the position of an object can be described by its location relative to another object and its motions described, and measured by external forces action upon it	• Identify patterns that occur when external forces are applied to matter.		
6. Identify, build, and describe mechanical systems and the forces acting within those systems		tools, work	
7. Observe, measure and manipulate forms of energy: sound, light, heat, electrical, magnetic	• Observe, measure and manipulate sound energy (e.g., louder, softer, pitch-level)		8

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 2			
Content Standard 3 Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction	• Distinguish the differences between plants and animals. • Investigate the structure of plants.		8
2. Identify, measure, and describe basic requirements of energy and nutritional needs for an organism	• Discuss the need of proper nutrition for energy and growth.		10
3. Describe and use models that trace the life cycles of different plants and animals and discuss how they are differ from species to species	• Recognize and identify the different stages of development in the life cycles of plants and animals.	life cycle, seed, egg, reproduce, adult, grow, change, development, plant, animal	6 and 8
4. Explain cause and effect relationships between nonliving and living components with ecosystems; and explain individual response to the changes in the environment including identifying differences between inherited, instinctual, and learned behaviors	• Observe, identify and classify selected animals with respect to characteristics and habits.		8
5. Create and use a classification system to group a variety of plants and animals according to their similarities and differences	• Observe, identify and classify selected plants with respect to characteristics and habitat.	characteristics, classify, classification system	8

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 2			
Content Standard 4 Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Describe and give examples of earth's changing features	• Explore and compare features of Earth.	Earth, land, water, lake, pond, river, mountain, desert, valley, volcano, ocean	10
2. Describe and measure the physical properties of earth's basic materials (including soil, rocks, water and gases) and the resources they provide	• Explore natural resources	soil, rock, classify, texture, color	10
3. Investigate fossils and make inferences about life, the plants, animals, and the environment at that time	• Develop an understanding of prehistoric life.	fossil, plant, animal, evidence, extinct	5
4. Observe and describe the water cycle and the local weather and demonstrate how weather conditions are measured	• Explore influences of weather on the environment.	precipitation, weather, water, rain, snow, temperature, wind	8 and 10
5. Identify seasons and explain the difference between weather and climate	• Identify and describe weather conditions typical of various seasons across the country.	precipitation, weather, water, rain, snow, temperature, wind	10
6. Identify objects (e.g., moon, stars, meteors) in the sky and their patterns of movement and explain that light and heat comes from a star called the sun	• Identify relationships of the Sun, Moon and planets.		10
7. Identify technology and methods used for space exploration (e.g., star patterns, space shuttles, telescopes)	• Discuss current technology for space exploration (e.g., space shuttle, telescope)		9 and 10

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 2			
Content Standard 5 Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Describe and discuss examples of how people use science and technology	• Discuss the benefits of using science and technology.	technology, tools, community	9
2. Describe a scientific or technological innovation that impacts communities, cultures, and societies	• Explain how technological innovations impact their lives.		9
3. Simulate scientific collaboration by sharing and communicating ideas to identify and describe problems	• Begin to record and share scientific investigations in cooperative groups.		4
4. Use scientific knowledge to make inferences and propose solutions for simple environmental problems	• Develop ideas for conservation of the environment.	environment, issue, problem	2
5. Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures	• Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures.	tools, processes	5

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 2			
Content Standard 6 Students understand historical developments in science and technology.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile PK-2**
1. Give historical examples of scientific and technological contributions to communities, cultures and societies, including Montana American Indian examples	• Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures.		5
2. Describe how scientific inquiry has produced much knowledge about the world and a variety of contributions toward understanding events and phenomenon within the universe	• Explore the development of inventions over time.	question, observe, knowledge	5 and 10
3. Describe science as a human endeavor and an ongoing process	• Identify examples as a human process.		

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 3	
Content Standard 1	Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.
Content Standard 2	Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.
Content Standard 3	Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.
Content Standard 4	Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.
Content Standard 5	Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.
Content Standard 6	Students understand historical developments in science and technology.

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 3			
Content Standard 1 Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Develop the abilities necessary to safely conduct scientific inquiry, including (a step-by-step sequence is not implied): (a) asking questions about objects, events, and organisms in the environment, (b) planning and conducting simple investigations	• Conduct a simple experiment, identify the variables, and record data (with some teacher direction) • Develop respect for classroom equipment and safe laboratory procedures.	procedure, investigation, testable question, measure, observation	6 and 8
2. Select and use appropriate tools including technology to make measurements (including metric units) and represent results of basic scientific investigations	• Accurately select and use tools for simple measurement.	tables, metric system, volume (milliliter, liter), mass (gram, kilogram), distance (centimeter, meter), time (seconds), graph, graduated cylinder, meter stick, thermometer (Celsius)	4
3. Use data to describe and communicate the results of scientific investigations	• Communicate scientific data with supporting evidence.	data, results	
4. Use models that illustrate simple concepts and compare those models to the actual phenomenon	• Construct a model to illustrate a simple concept (at developmentally appropriate level)	model	6
5. Identify a valid test in an investigation	• Discuss, illustrate and use written form to communicate results form a controlled experiment.	valid	2
6. Identify how observations of nature form an essential base of knowledge among the Montana American Indians	• Identify how observations of nature form an essential base of knowledge among the Montana American Indians		9

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 3			
Content Standard 2 Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Create mixtures and separate them based on different physical properties (e.g., salt and sand, iron filings and soil, oil and water)	• Experiment and predict outcomes of mixtures based on different properties.	mixture, filtering, evaporation, physical properties	6
2. Examine, measure, describe, compare and classify objects in terms of common physical properties	• Classify tangible objects in terms of common physical properties.	classify, physical properties, mass, texture	4
3. Identify the basic characteristics of light, heat, motion, magnetism, electricity, and sound	• Investigate sound vibrations and pitch. • Investigate properties of light. • Investigate characteristics of magnets.	energy, light, heat, motion, magnetism, electricity, sound	4
4. Model and explain that matter exists as solids, liquids, and gases and can change from one form to another	• Analyze differences of matter, and explain how matter changes.	balance, scale, graduated cylinder, beaker, gram weights, thermometer, solid, liquid, gas, matter, melting, freezing, evaporation, boiling	4
5. Identify that the position of an object can be described by its location relative to another object and its motions described, and measured by external forces action upon it	• Analyze the effects of external forces on matter and interpret the data.	force, motion, push, pull, change in motion	4
6. Identify, build, and describe mechanical systems and the forces acting within those systems	• Identify and describe a simple machine.		7
7. Observe, measure and manipulate forms of energy: sound, light, heat, electrical, magnetic	• See benchmark 2.3		

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 3			
Content Standard 3 Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction	• Identify the parts of plants and the function of each of the parts.	living, plant, animal, energy, habitat, nutrients, air	2 and 7
2. Identify, measure, and describe basic requirements of energy and nutritional needs for an organism	• Describe food groups and their effect on human body systems.	energy, solar energy	7
3. Describe and use models that trace the life cycles of different plants and animals and discuss how they are differ from species to species	• Analyze and discuss the different stages of development in the life cycle of plants.	life cycle, animal kingdom, species, organism, plant kingdom	6
4. Explain cause and effect relationships between nonliving and living components with ecosystems; and explain individual response to the changes in the environment including identifying differences between inherited, instinctual, and learned behaviors	• Explore the characteristics and adaptations of plants and animals in relationship to their environments.		6 and 7
5. Create and use a classification system to group a variety of plants and animals according to their similarities and differences	• Observe, identify and classify selected plants with respect to characteristics and habitat.		2 and 7

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 3			
Content Standard 4 Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Describe and give examples of earth's changing features	• Investigate the effects of natural forces on the Earth's surface.	erosion, weathering, soil, rock, water, air	7
2. Describe and measure the physical properties of earth's basic materials (including soil, rocks, water and gases) and the resources they provide	• Discuss the properties of water and soil.		6
3. Investigate fossils and make inferences about life, the plants, animals, and the environment at that time	• Investigate the importance of conserving fossil fuels.		3 and 5
4. Observe and describe the water cycle and the local weather and demonstrate how weather conditions are measured	• Observe and record weather data. • Investigate the components of the water cycle.	melting, freezing, evaporation, condensation, precipitation, water cycle, thermometer, rain gauge, temperature, local weather, precipitation,	6 and 7
5. Identify seasons and explain the difference between weather and climate	• Explain the difference between weather and climate. • Discuss seasonal changes.	climate, weather, seasons, fall, autumn, winter, spring, summer	
6. Identify objects (e.g., moon, stars, meteors) in the sky and their patterns of movement and explain that light and heat comes from a star called the sun	• Investigate the relationship between the Earth, Moon, and Sun.	solar system, planets, sun, moon	7
7. Identify technology and methods used for space exploration (e.g., star patterns, space shuttles, telescopes)	• Identify current technology for space exploration and its impact.		5

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 3			
Content Standard 5 Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Describe and discuss examples of how people use science and technology	• Research the benefit of using science and technology.		9
2. Describe a scientific or technological innovation that impacts communities, cultures, and societies	• Identify a scientific or technological innovation that benefits the community.	technology, knowledge, society, processes, products, impact, discovery	9
3. Simulate scientific collaboration by sharing and communicating ideas to identify and describe problems	• Model scientific collaboration by sharing and communicating ideas and solutions in a variety of cooperative settings.		6
4. Use scientific knowledge to make inferences and propose solutions for simple environmental problems	• Investigate how humans affect the environment in which the live.	environment, problem, solution	3
5. Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures	• Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures.	tool, culture	9

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 3			
Content Standard 6 Students understand historical developments in science and technology.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Give historical examples of scientific and technological contributions to communities, cultures and societies, including Montana American Indian examples	• Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures.	society, contribution, historical, technology, impact	9
2. Describe how scientific inquiry has produced much knowledge about the world and a variety of contributions toward understanding events and phenomenon within the universe	• Identify how inventions have impacted the world.	scientific inquiry, natural world	9
3. Describe science as a human endeavor and an ongoing process	• Identify examples of science as an on-going process.		

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 4	
Content Standard 1	Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.
Content Standard 2	Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.
Content Standard 3	Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.
Content Standard 4	Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.
Content Standard 5	Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.
Content Standard 6	Students understand historical developments in science and technology.

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 4			
Content Standard 1 Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Standards/ Benchmarks**
1. Develop the abilities necessary to safely conduct scientific inquiry, including (a step-by-step sequence is not implied): (a) asking questions about objects, events, and organisms in the environment, (b) planning and conducting simple investigations	• Develop the abilities to safely conduct scientific inquiry, including (a step-by-step sequence in not implies) (a) asking questions about objects, events and organisms in the environment, (b) planning and conducting simple investigations.	procedure, materials, investigation, testable question, measure, observation	 6
2. Select and use appropriate tools including technology to make measurements (including metric units) and represent results of basic scientific investigations	• Select and accurately use appropriate equipment and technology to measure SI units, gather process and analyze data from a scientific investigation (e.g., rulers, scales, thermometer, stopwatch etc.)	tables, metric system, volume (milliliter, liter), mass (gram, kilogram), distance (centimeter, meter), time (seconds), graph, graduated cylinder, meter stick, thermometer (Celsius)	 6
3. Use data to describe and communicate the results of scientific investigations	• Represent (with graphs, charts, and diagrams), communicate, and provide supporting evidence of scientific investigations.	graphs, charts, diagrams, increase, decrease, data, results	 4 and 5
4. Use models that illustrate simple concepts and compare those models to the actual phenomenon	• Construct models to illustrate simple concepts and compare those models to what they represent (scale, legend, key)	scale, compare, contrast, phenomenon, legend/key	 7
5. Identify a valid test in an investigation	• Identify a valid test in an investigation		
6. Identify how observations of nature form an essential base of knowledge among the Montana American Indians	• Identify how observations of nature form an essential base of knowledge among the Montana American Indians		

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 4			
Content Standard 2 Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Create mixtures and separate them based on different physical properties (e.g., salt and sand, iron filings and soil, oil and water)	• Create mixtures and separate them based on different properties (e.g. salt and sand, iron filings and soil, oil and water).	substance, mixture, physical properties, separate	
2. Examine, measure, describe, compare and classify objects in terms of common physical properties	• Examine, measure, describe, compare, and classify tangible objects in terms of common physical properties.	physical property, characteristic, classify	 4 and 6
3. Identify the basic characteristics of light, heat, motion, magnetism, electricity, and sound	• Describe, compare / contrast, model basic characteristics of light, heat, magnetism and sound	attract, repel, magnet, magnetic field, reflect, refract, absorb, visible spectrum, prism, wave, vibration, sound, motion, speed, frequency, volume, pitch, wavelength, amplitude, electricity, energy, current, static, closed and open circuits, switch, parallel, series, battery (dry-cell vs. wet-cell), positive charge, negative charge	 7
4. Model and explain that matter exists as solids, liquids, and gases and can change from one form to another	• Model and explain that matter exists as solids, liquids, and gases and can change from one form to another.	solid, liquid, gas	 2 and 7
5. Identify that the position of an object can be described by its location relative to another object and its motions described, and measured by external forces action upon it	• Identify and predict what changes and what remains unchanged when matter experiences an external influence	physical property, physical change	
6. Identify, build, and describe mechanical systems and the forces acting within those systems	• Identify, build and describe mechanical systems (e.g., simple and complex machines)	speed, direction, fore, motion	
7. Observe, measure and manipulate forms of energy: sound, light, heat, electrical, magnetic	• Observe, measure and manipulate forms of energy: sound, light, heat, magnetic.	simple machine, work, levers, inclined plane, wheel and axel, pulley, wedge, screw	 6

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 4			
Content Standard 3 Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Identify that plants and animals have structures and systems that serve different functions for growth, survival, and reproduction	• Identify that plants and animals have structures and systems, which serve different functions.	stem, root, leaf, flower, stamen, sepal, pistil, pollen, ovule, petal, system	 2
2. Identify, measure, and describe basic requirements of energy and nutritional needs for an organism	• Identify, measure and describe basic requirements of energy needed and nutritional needs for an organism. • Compare / contrast food webs and food chains.	producer, consumer, decomposer, food chain, food web, herbivore, carnivore, omnivore	 5 and 7
3. Describe and use models that trace the life cycles of different plants and animals and discuss how they are differ from species to species	• Describe and use models that trace the life cycles of different plants and animals and discuss how they differ from species to species.		
4. Explain cause and effect relationships between nonliving and living components with ecosystems; and explain individual response to the changes in the environment including identifying differences between inherited, instinctual, and learned behaviors	• Explain cause and effect relationships between nonliving and living components within ecosystems; and explain individual response to the changes in the environment including identifying differences between inherited, instinctual, and learned behaviors.	adaptation, survival, environment, organism, instinctual, behavior, inherited, learned, predator, prey, competition	 4, 6, and 7
5. Create and use a classification system to group a variety of plants and animals according to their similarities and differences	• Create and use a classification system to group a variety of plants and animals according to their similarities and differences.	vertebrate, invertebrate, flowering, non-flowering, classify, similarities, differences, classification system	 4

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 4			
Content Standard 4 Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Describe and give examples of earth's changing features	• Describe and give examples of Earth's changing features (e.g., erosion, weathering, volcanoes, glaciers etc.)	erosion, weathering, earthquakes, volcano, glaciations	2 and 4
2. Describe and measure the physical properties of earth's basic materials (including soil, rocks, water and gases) and the resources they provide	• Describe and measure the physical properties of Earth's basic materials (including soil, rocks, water and gases)	classification, igneous, metamorphic, sedimentary, pressure, deposition	6 and 7
3. Investigate fossils and make inferences about life, the plants, animals, and the environment at that time	• Investigate fossils and make inferences about life and the environment long ago.	fossil, body fossil, trace fossil, environment, impression	
4. Observe and describe the water cycle and the local weather and demonstrate how weather conditions are measured	• Observe record and describe the water cycle and the local weather and demonstrate how weather conditions are measured.	barometer, anemometer, weather vane, temperature, humidity, wind, precipitation, air pressure, patterns, trends	6 and 7
5. Identify seasons and explain the difference between weather and climate	• Identify seasons and explain the differences between weather and climate.		
6. Identify objects (e.g., moon, stars, meteors) in the sky and their patterns of movement and explain that light and heat comes from a star called the sun	• Describe objects in the sky and their pattern of movement and explain that light and heat come from a star called the Sun.	orbit, rotation, revolution, planets, sun, axis, moon, planet, sun, orbit, Earth, meteor, comet, asteroid, solar system	2 and 7
7. Identify technology and methods used for space exploration (e.g., star patterns, space shuttles, telescopes)			

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 4			
Content Standard 5 Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Describe and discuss examples of how people use science and technology	• Describe and discuss examples of how people use science and technology.	technology, society, environment	9
2. Describe a scientific or technological innovation that impacts communities, cultures, and societies	• Identify a scientific or technological innovation that benefits the community.	technology, society, environment, community, culture	9
3. Simulate scientific collaboration by sharing and communicating ideas to identify and describe problems	• Model scientific collaboration by sharing and communicating ideas and solutions about a local current event / problem in a variety of cooperative settings.		1
4. Use scientific knowledge to make inferences and propose solutions for simple environmental problems	• Use current scientific knowledge to make inferences and propose solutions for local environmental problems (recycling, waste management)	environment	5
5. Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures	• Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures.		

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 4			
Content Standard 6 Students understand historical developments in science and technology.			
Benchmark End of Grade 4	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Give historical examples of scientific and technological contributions to communities, cultures and societies, including Montana American Indian examples	• Give historical examples of scientific and technological contributions to communities, cultures, and societies, including Montana American Indian examples.	society, culture, community	 9
2. Describe how scientific inquiry has produced much knowledge about the world and a variety of contributions toward understanding events and phenomenon within the universe	• Describe how scientific inquiry has produced much knowledge about the world and a variety of contributions toward understanding events and phenomenon within the universe.	scientific inquiry, natural world, collaborate	
3. Describe science as a human endeavor and an ongoing process	• Describe science occupations and the benefits.		

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 5	
Content Standard 1	Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.
Content Standard 2	Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.
Content Standard 3	Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.
Content Standard 4	Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.
Content Standard 5	Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.
Content Standard 6	Students understand historical developments in science and technology.

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 5			
Content Standard 1 Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Identify a question, determine relevant variable and a control, formulate a testable hypothesis, plan and predict the outcome of an investigation, safely conduct scientific investigation, and compare and analyze data	• Recognize and select a testable question to plan and design an investigation • Identify manipulated variables, dependent and independent • Identify relationship between a testable question and hypothesis • Develop respect for classroom equipment and use safe laboratory procedures	control, prediction, hypothesis, variable, testable question, independent variable, dependent variable	6
2. Select and use appropriate tools including technology to make measurements (in metric units), gather, process and analyze data from scientific investigations	• Use the metric system to measure length, mass, volume, density, weight, and temperature • Use SI units to collect data measure, and draw conclusion	graduated cylinder, scales, Celsius thermometers, beaker, digital probes, stop watch, balances, metric units, data tables, graphs	4
3. Review, communicate and defend results of investigations, including considering alternative explanations.	• Incorporate process skills and scientific methods to explain scientific investigations based upon gathered evidence.	hypothesis, supported, not supported, prediction	4
4. Create models to illustrate scientific concepts and use the model to predict change. (e.g., computer simulation, stream table, graphic representation)	• Construct models to illustrate simple concepts and discover relationships	2-D, 3-D, computer simulations, legend/key	2
5. Identify strengths and weakness in an investigation design.	• Identify and communicate results of controlled experiments		
6. Compare how observations of nature form an essential base of knowledge among the Montana American Indians.	• Identify how observations of nature form an essential base of knowledge among Montana American Indians.		

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 5			
Content Standard 2 Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Classify, describe, and manipulate the physical models of matter in terms of: elements, and compounds, pure substances and mixtures, atoms, and molecules	• Construct a simple model of an atom • Examine the parts of an atom (protons, neutrons and electrons) and their respective electrical charge. • Investigate properties of molecules and compounds	element, compound, mixture, pure substance	2, 4, and 7
2. Examine, describe, compare and classify objects and substances based on common physical properties and simple chemical properties	• Classify rocks and mineral according to the characteristic properties of the substance • Examine chemical properties of minerals and crystals	mass, volume, chemical change, physical change, physical property, chemical property	4 and 7
3. Describe energy and compare and contrast the energy transformations and the characteristics of light, heat, motion, magnetism, electricity, sound and mechanical waves	• Define energy and apply Newton's Laws of Motion • Compare and contrast different forms of energy	sublimation, evaporation, condensation, freezing point, melting point, energy, boiling point, solid, liquid, gas, matter, frequency, amplitude, pitch, wavelength, vibration, tension, medium, transmit, instrument, energy, electricity, circuits (simple, parallel, series), battery, positive and negative charge, conduction, convection, radiant, energy (light), heat, transfer, temperature	4 and 6
4. Model and explain that states of matter are dependent upon the quantity of energy present in the system and describe what will change and what will remain unchanged at the particulate level when matter experiences an external force or energy change	• Identify solids, liquids and gases using simple atoms and compounds		
5. Describe and explain the motion of an object in terms of its position, direction, & speed as well as the forces acting upon it	• Identify how objects move relative to their position	potential, kinetic, speed, force, mass, work	6
6. Identify, build, describe, measure, and analyze mechanical systems (e.g., simple and complex compound machines) and describe the forces acting within those systems	• Build and describe a simple or complex machine		
7. Give examples and describe how energy is transferred and conserved (e.g. electric to light and heat [light bulb], chemical to mechanical [fuel to propulsion])	• Show how energy can change forms		2 and 6

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 5			
Content Standard 3 Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Compare the structure and function of prokaryotic cells (bacteria) and eukaryotic cells (plant, animal, etc.) including the levels of organization of the structure and function, particularly with humans	• Investigate the structure of plant and animal cells • Describe structures and functions of plant and animal cells and their components	cell membrane, cell wall, nucleus, vacuoles, cytoplasm, mitochondria, chloroplast	2
2. Explain how organisms and systems of organisms obtain and use energy resources to maintain stable conditions (e.g., food webs, photosynthesis, respiration)	• Investigate plant systems (e.g., photosynthesis) • Investigate body systems (e.g., sensory, skeletal, circulatory, digestive, respiratory, nervous or muscular)	chlorophyll, photosynthesis, oxygen, carbon dioxide, sugar, water, light energy, transpiration, water vapor, roots, leaves	2
3. Communicate the differences in the reproductive processes of a variety of plants and animals using the principles of genetic modeling (e.g., Punnet squares)	• Investigate differences between reproductive processes in plants • Discuss the reproductive principles in animals		2 and 6
4. Investigate and explain the interdependent nature of populations and communities in the environment and describe how species in these populations adapt by evolving	• Identify the structure and function of various systems of living organisms • Discuss human impact on the environment	symbiosis, ecosystems, population, community, environment, interdependence, diversity	2 and 6
5. Create and use a basic classification scheme to identify plants and animals	• Describe differences between one-celled and multi-celled organisms.	dichotomous key, kingdom, phylum, class, vertebrate, invertebrate, cold-blooded, warm-blooded, mosses, ferns, flowering, non-flowering	2 and 6

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 5			
Content Standard 4 Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 3-5**
1. Model and explain the internal structure of the earth and describe the formation and composition of earth's external features in terms of the rock cycle and plate tectonics and constructive and destructive forces	• Classify rocks and minerals according to the characteristics of the substance • Examine chemical properties of minerals and crystals	glaciations, erosion, deposition, plate tectonics, continental drift, mountain, earthquake, volcano	
2. Differentiate between rocks types and minerals types and classify both by how they are formed and the utilization by humans	• Classify rocks and minerals according to the characteristic properties of the substance	igneous, sedimentary, metamorphic, mineral, rock	 2
3. Use fossils to describe the geological timeline	• Use fossils to describe the geological timeline • Describe how relative age of fossils can be determined from their position in sedimentary rock layers.	sedimentary, fossil, relative age	 7
4. Describe the water cycle, the composition and structure of the atmosphere and the impact of oceans on large-scale weather patterns	• Describe the water cycle, the composition and structure of the atmosphere and the impact of oceans on large-scale weather patterns.	water cycle, condensation, evaporation, precipitation, forecast, meteorologist, air mass, front, air pressure, warm front, cold front, precipitation, air currents	 7
5. Describe and model the motion and tilt of earth in relation to the sun, and explain the concepts of day, night, seasons, year, and climatic changes		revolution, rotation, tilt, axis, seasons, orbit, year	
6. Describe the earth, moon, planets and other objects in space in terms of size, force of gravity, structure, and movement in relation to the sun		Earth, planet, sun, moon, relative, phases of the moon, light, orbit	
7. Identify scientific theories about the origin and evolution of the earth and solar system			

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 5			
Content Standard 5 Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profiles 3-5**
1. Describe the specific fields of science and technology as they relate to occupations within those fields	• Explore scientific careers and opportunities in science.	life science, earth science, physical science, engineering, technology, occupations, science	1 and 2
2. Apply scientific knowledge and process skills to understand issues and everyday events	• Use scientific knowledge to discuss issues (e.g., air, land, and water pollution, recycling to conserve resources, reusing, reducing waste, etc.)	current event, issue, problem	3, 5, and 9
3. Simulate collaborative problem solving and give examples of how scientific knowledge and technology are shared with other scientists and the public	• Use group process to conduct scientific investigations		7
4. Use scientific knowledge to investigate problems and their proposed solutions and evaluate those solutions while considering environmental impacts	• Identify community connections with scientific investigations	environmental impact	5 and 9
5. Describe how the knowledge of science and technology influences the development of the Montana American Indian cultures	• Describe how the knowledge of science and technology influences the development of the Montana Indian cultures		9

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 5			
Content Standard 6 Students understand historical developments in science and technology.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profiles 3-5**
1. Give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding, including Montana American Indian examples	• Give examples of scientific discoveries and describe the interrelationship between technological contributions to communities, cultures, and societies, including Montana American Indian examples.	technology, scientific discoveries, advances	1 and 9
2. Identify major milestones in science that have impacted science, technology, and society	• Recognize scientific discoveries and their impact on society	milestones	9
3. Describe and explain science as a human endeavor and an ongoing process	• Recognize scientific discoveries and their impact on society	occupation	9

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 6	
Content Standard 1	Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.
Content Standard 2	Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.
Content Standard 3	Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.
Content Standard 4	Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.
Content Standard 5	Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.
Content Standard 6	Students understand historical developments in science and technology.

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 6			
Content Standard 1 Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 6-8**
1. Identify a question, determine relevant variable and a control, formulate a testable hypothesis, plan and predict the outcome of an investigation, safely conduct scientific investigation, and compare and analyze data	• Explain the goal and use scientific method • List important safety precautions to follow in a science laboratory	hypothesis, control, variables, data	 3
2. Select and use appropriate tools including technology to make measurements (in metric units), gather, process and analyze data from scientific investigations	• Identify and compare the metric units used to measure length, mass, volume, density, weight, and temperature • Explain the role of scientific tools in the study of science • Use information to prepare data sheets, charts, and graphs	gram, liter, meter, Celsius, mean, median, mode, range	 3, 6, and 9
3. Review, communicate and defend results of investigations, including considering alternative explanations.	• Incorporate scientific method and explain scientific experiments based upon gathered evidence.	supported, refute, hypothesis	
4. Create models to illustrate scientific concepts and use the model to predict change. (e.g., computer simulation, stream table, graphic representation)	• Create visuals to identify fossil fuels and their uses • Discuss other forms of energy resources, including alternative sources of energy	working models, representative models	 1 and 9
5. Identify strengths and weakness in an investigation design.	• Identify a variable in setting up a controlled and uncontrolled experiment	inquiry, investigations, sample size, control, repeated trials	
6. Compare how observations of nature form an essential base of knowledge among the Montana American Indians.	• Compare natural observations made by scientists to those made by Montana American Indians	Montana American Indian tribes: Crow, Blackfeet, Salish, Kootenai, Assiniboine Sioux, Little Shell, Northern Cheyenne, Chippewa Cree, Pend d'Oreille, and Gros Ventre	

Montana Instructional Alignment –
HPS Critical Competencies
Science

Grade Level: Grade 6

Content Standard 2 Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.

Benchmark End of Grade 8	HPS Critical Competencies	Essential Vocabulary (Instructional Purposes)	Technology Profile 6-8
1. Classify, describe, and manipulate the physical models of matter in terms of: elements, and compounds, pure substances and mixtures, atoms, and molecules	• Classify matter as elements, compounds, solutions, or mixtures • Describe the structure of the atom	atom, element, compound, pure substance, mixture, molecule	1
2. Examine, describe, compare and classify objects and substances based on common physical properties and simple chemical properties	• Explain the role of chemical cycles in nature • Explain and give examples of chemical properties and chemical changes	chemical property, physical property, chemical change, physical change	
3. Describe energy and compare and contrast the energy transformations and the characteristics of light, heat, motion, magnetism, electricity, sound and mechanical waves	• Describe the forces between electric charges and the atomic basis of electric charges • Identify the effects of static electricity • Define voltage, current and resistance, and apply these concepts to circuit situations • Identify the development and operations of technology in our society	energy, potential energy, kinetic energy, thermal energy, mechanical energy, radiant energy, chemical energy, nuclear energy, electric energy, Law of Conservation of Energy, visible spectrum, ultraviolet, infrared, reflection, refraction, electromagnetic spectrum, radiant heat, conduction, convection, electromagnetic, magnet, electricity, current, voltage, crest, trough, resting position, wavelength, amplitude, intensity, frequency, pitch, resonance	7
4. Model and explain that states of matter are dependent upon the quantity of energy present in the system and describe what will change and what will remain unchanged at the particulate level when matter experiences an external force or energy change	• Explain and give examples of physical properties, and physical and chemical changes	thermal energy, melting point, boiling point, solid, liquid, gas, sublimation, evaporation, condensation	1
5. Describe and explain the motion of an object in terms of its position, direction, & speed as well as the forces acting upon it	• Identify Newton's Laws of Motion	gravity, balanced forces, unbalanced force, friction, net force, air resistance, speed, velocity, acceleration, mass, inertia, momentum, air pressure, lift, drag, Newton's Laws of Motion	9
6. Identify, build, describe, measure, and analyze mechanical systems (e.g., simple and complex compound machines) and describe the forces acting within those systems	• Build a complex machine and explain how it works	simple machine, compound machine, work, force, lever, pulley, inclined plane, wedge, screw, wheel and axle, fulcrum, pivot, mechanical advantage	1
7. Give examples and describe how energy is transferred and conserved (e.g. electric to light and heat [light bulb], chemical to mechanical [fuel to propulsion])		energy transformation, energy conservation	

Montana Instructional Alignment –
HPS Critical Competencies
Science

Grade Level: Grade 6

Content Standard 3 Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.

Benchmark End of Grade 8	HPS Critical Competencies	Essential Vocabulary (Instructional Purposes)	Technology Profile 6-8
1. Compare the structure and function of prokaryotic cells (bacteria) and eukaryotic cells (plant, animal, etc.) including the levels of organization of the structure and function, particularly with humans	• Describe the basic characteristics of l living things • Describe the structures and functions of plant and animal cells and their parts	cell, tissue, organ, system, organism, organelle, eukaryotic, prokaryotic, nucleus, bacteria	1
2. Explain how organisms and systems of organisms obtain and use energy resources to maintain stable conditions (e.g., food webs, photosynthesis, respiration)	• Investigate plant and animal systems (e.g., photosynthesis, respiration) • Identify the characteristics of the six land biomes and the two water biomes • Describe food chains, food webs, and energy pyramids	photosynthesis, respiration, biomes, food web, food pyramid, producer, primary and secondary consumers, food chain, decomposer	1 and 9
3. Communicate the differences in the reproductive processes of a variety of plants and animals using the principles of genetic modeling (e.g., Punnet squares)	• Describe interactions and relationships between living things • Discuss the reasons for the extinction of organisms	chromosome, body cell, sex cell, mitosis, meiosis, asexual, sexual reproduction, phase, phenotype, genotype, dominant, recessive gene, inheritance, traits	1 and 9
4. Investigate and explain the interdependent nature of populations and communities in the environment and describe how species in these populations adapt by evolving	• Identify the structure and function of various systems of living organisms • Relate land biomes of the western hemisphere to their climates	Punnett square, genetic cross, genotype, phenotype	7
5. Create and use a basic classification scheme to identify plants and animals	• Identify the ecological relationships of plants and animals in their local biome	population, community, symbiosis, mutualism, commensalism, parasitism, predator, prey, competition, water cycle, adaption, natural selection, evolution, fossil, extinction, dichotomous key, kingdom, taxonomy, phylum, genus, species, scientific name, scheme	7

Montana Instructional Alignment –
HPS Critical Competencies
Science

Grade Level: Grade 6

Content Standard 4 Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.

Benchmark End of Grade 8	HPS Critical Competencies	Essential Vocabulary (Instructional Purposes)	Technology Profile 6-8
1. Model and explain the internal structure of the earth and describe the formation and composition of earth's external features in terms of the rock cycle and plate tectonics and constructive and destructive forces	• Describe and explain the motion of the Earth's crust • Describe the formation of mountains, plateaus, and domes • Describe what occurs during earthquakes • Describe the types of volcanoes and state the location of major zones of volcanic activity • List the major lithopheric plates • Discuss the theory of continental drift, ocean floor spreading, and plate tectonics	mantel, inner core, outer core, crust, lithosphere, rock cycle, metamorphic, sedimentary, igneous, constructive, weathering, erosion	1, 2, and 9
2. Differentiate between rocks types and minerals types and classify both by how they are formed and the utilization by humans	• Identify and describe minerals • Describe the uses of minerals • Describe rocks and the three basic types of rock • Explain the rock cycle • Identify the factors that cause erosion and deposition	mineral, rock, hardness, streak, luster, rock cycle, metamorphic, sedimentary, igneous	1 and 9
3. Use fossils to describe the geological timeline	• List the major lithopheric plates • Discuss the theory of continental drift, ocean floor spreading, and plate tectonics	Cenozic era, Mesozoic era, Paleozoic era, Precambrian	1 and 9
4. Describe the water cycle, the composition and structure of the atmosphere and the impact of oceans on large-scale weather patterns	• Describe the impact of air pressure, wind, and humidity on the weather • Describe how fronts affect weather patterns • Explain the process of predicting weather • Differentiate between weather and climate • Identify characteristics of Earth's climate zones • Detail the impact of climate change on organisms • Describe the varying climates of regions in the western hemisphere	atmosphere, precipitation, evaporation, condensation, water vapor, troposphere, convection currents, ocean currents, jet stream, el Nino, gulf stream	1, 7, and 9

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 6			
Content Standard 4 Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profiles 6-8**
5. Describe and model the motion and tilt of earth in relation to the sun, and explain the concepts of day, night, seasons, year, and climatic changes	• Relate the tilt of the Earth's axis and its position in reference to the Sun, Earth's seasons, and the length of days	rotation, revolution, orbit, axis, solstice, climate zone, Northern/Southern hemisphere, latitude, elevation, equator	 1 and 9
6. Describe the earth, moon, planets and other objects in space in terms of size, force of gravity, structure, and movement in relation to the sun	• Describe the characteristics of stars, star systems, and galaxies • Relates the starting mass of a star to its life cycle • Apply theories regarding the formation of the solar system to the characteristics of the planets and other objects in the solar system • Discuss the characteristics of the Earth and its moon • Identify the interactions that occur among the Earth, its Moon, and the Sun	planet, moon, orbit, period or rotation, year, day, gravity, force	 1, 7, and 9
7. Identify scientific theories about the origin and evolution of the earth and solar system	• Identify theories about the origin of the universe.	scientific theory, evidence, solar system, gas, dust, accretion	 8

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 6			
Content Standard 5 Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 6-8**
1. Describe the specific fields of science and technology as they relate to occupations within those fields	• Explore scientific careers	occupations, science, technology, science fields (life science, earth science, engineering, physical science)	4
2. Apply scientific knowledge and process skills to understand issues and everyday events	• Investigate ways of preventing air and water pollution • Recognize the need for recycling to conserve resources and to help prevent pollution • Name non-living natural resources of land, soil, water, and minerals and label them as renewable or nonrenewable resources		1 and 2
3. Simulate collaborative problem solving and give examples of how scientific knowledge and technology are shared with other scientists and the public	• Consider methods for managing land resources	current event, problem, issue, research, summarize, collaborate, relevant	2 and 3
4. Use scientific knowledge to investigate problems and their proposed solutions and evaluate those solutions while considering environmental impacts	• Identify sources of air, land, and water pollution • Identify fossil fuels and their uses	environmental impact, proposed solutions	2
5. Describe how the knowledge of science and technology influences the development of the Montana American Indian cultures	• Describe how the knowledge of science and technology influences the development of the Montana Indian Cultures		

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 6			
Content Standard 6 Students understand historical developments in science and technology.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profiles 6-8**
1. Give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding, including Montana American Indian examples	• Give examples of scientific discoveries and describe the interrelationship between technological contributions to communities, cultures, and societies, including Montana American Indian examples.		 8
2. Identify major milestones in science that have impacted science, technology, and society	• Trace the development of mankind's quest for space exploration • Recognize the need for recycling to conserve resources to help prevent pollution		 1 and 9
3. Describe and explain science as a human endeavor and an ongoing process	• Trace the development of mankind's quest for space exploration		

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 7	
Content Standard 1	Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.
Content Standard 2	Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.
Content Standard 3	Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.
Content Standard 4	Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.
Content Standard 5	Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.
Content Standard 6	Students understand historical developments in science and technology.

Montana Instructional Alignment –
HPS Critical Competencies
Science

Grade Level: Grade 7

Content Standard 1 Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.

Benchmark End of Grade 8	HPS Critical Competencies	Essential Vocabulary (Instructional Purposes)	Technology Profiles 6-8
1. Identify a question, determine relevant variable and a control, formulate a testable hypothesis, plan and predict the outcome of an investigation, safely conduct scientific investigation, and compare and analyze data	• Explain the goal of and use the steps in the scientific method • Demonstrate the use of proper laboratory safety procedures • Apply the scientific method to problem solving situations	hypothesis, control, variables, data	6 and 3
2. Select and use appropriate tools including technology to make measurements (in metric units), gather, process and analyze data from scientific investigations	• Use the metric system to measure length, mass, volume, density, weight, and temperature • Use scientific tools and techniques in the study of science (e.g., microscope) • Integrate math and science by using probability, the metric system, and graphing to solve science problems	gram, liter, meter, Celsius, mean, median, mode, range	7
3. Review, communicate and defend results of investigations, including considering alternative explanations.	• Analyze scientific results using various methods of scientific research	supported, refute, hypothesis	3 and 6
4. Create models to illustrate scientific concepts and use the model to predict change. (e.g., computer simulation, stream table, graphic representation)	• Use probability problems to predict genetic outcomes	working models, representative models	1
5. Identify strengths and weakness in an investigation design.	• Develop controls and variable in experiments	inquiry, investigations, sample size, control, repeated trials	
6. Compare how observations of nature form an essential base of knowledge among the Montana American Indians.	• Using literature from Montana American Indians apply information to nature	Montana American Indian tribes: Crow, Blackfeet, Salish, Kootenai, Assiniboine Sioux, Little Shell, Northern Cheyenne, Chippewa Cree, Pend d'Oreille, and Gros Ventre	8

Montana Instructional Alignment –
HPS Critical Competencies
Science

Grade Level: Grade 7

Content Standard 2 Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.

Benchmark End of Grade 8	HPS Critical Competencies	Essential Vocabulary (Instructional Purposes)	Technology Profiles 6-8
1. Classify, describe, and manipulate the physical models of matter in terms of: elements, and compounds, pure substances and mixtures, atoms, and molecules	• Relate organic compounds to biological systems	atom, element, compound, pure substance, mixture, molecule	1 and 9
2. Examine, describe, compare and classify objects and substances based on common physical properties and simple chemical properties		chemical property, physical property, chemical change, physical change	
3. Describe energy and compare and contrast the energy transformations and the characteristics of light, heat, motion, magnetism, electricity, sound and mechanical waves		energy, potential energy, kinetic energy, thermal energy, mechanical energy, radiant energy, chemical energy, nuclear energy, electric energy, Law of Conservation of Energy, visible spectrum, ultraviolet, infrared, reflection, refraction, electromagnetic spectrum, radiant heat, conduction, convection, electromagnetic, magnet, electricity, current, voltage, crest, trough, resting position, wavelength, amplitude, intensity, frequency, pitch, resonance	
4. Model and explain that states of matter are dependent upon the quantity of energy present in the system and describe what will change and what will remain unchanged at the particulate level when matter experiences an external force or energy change	• Explain the role of photosynthesis and respiration as related to energy in natural systems	thermal energy, melting point, boiling point, solid, liquid, gas, sublimation, evaporation, condensation	1, 7, and 9
5. Describe and explain the motion of an object in terms of its position, direction, & speed as well as the forces acting upon it		gravity, balanced forces, unbalanced force, friction, net force, air resistance, speed, velocity, acceleration, mass, inertia, momentum, air pressure, lift, drag, Newton's Laws of Motion	
6. Identify, build, describe, measure, and analyze mechanical systems (e.g., simple and complex compound machines) and describe the forces acting within those systems	• Compare body systems to simple machines	simple machine, compound machine, work, force, lever, pulley, inclined plane, wedge, screw, wheel and axle, fulcrum, pivot, mechanical advantage	1 and 9
7. Give examples and describe how energy is transferred and conserved (e.g. electric to light and heat [light bulb], chemical to mechanical [fuel to propulsion])	• Describe how energy is transformed in the human body • Describe how energy is used and transferred in plant and animal cells	energy transformation, energy conservation	1

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 7			
Content Standard 3 Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 6-8**
1. Compare the structure and function of prokaryotic cells (bacteria) and eukaryotic cells (plant, animal, etc.) including the levels of organization of the structure and function, particularly with humans	• Explain the cell theory • Describe the structures and activities of cells • Identify the parts of a virus, protists, fungi, plants, and animal cells • Identify the forms and functions of micro-organisms • Identify the parts of bacterium and classify bacteria • List the characteristics of protists fungi, plants and animal cells • Classify cells by using examples of cells structures and give examples of sarcodines, ciliates, flagellates, and sporozoans	cell, tissue, organ, system, organism, organelle, eukaryotic, prokaryotic, nucleus, bacteria	1 and 9
2. Explain how organisms and systems of organisms obtain and use energy resources to maintain stable conditions (e.g., food webs, photosynthesis, respiration)	• Compare vascular and nonvascular plants • Describe the characteristics and structures of plants and animals • Identify the factors that affect plant growth • Describe photosynthesis and compare to respiration • Compare invertebrates and vertebrates • Describe the characteristics of six groups of invertebrates and classify organisms using those characteristics • Compare cold-blooded and warm-blooded vertebrates • Identify the characteristics and needs of living things • Describe the processes and basic chemistry of organisms • Use comparative anatomy in a laboratory setting to examine representative organisms, i.e., earthworm, crayfish, grasshopper, perch, frog, and fetal pig • Identify and classify the levels of organization found in living systems • Describe the features and functions of the human body	photosynthesis, respiration, biomes, food web, food pyramid, producer, primary and secondary consumers, food chain, decomposer	1, 3, and 9

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 7			
Content Standard 3 Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 6-8**
3. Communicate the differences in the reproductive processes of a variety of plants and animals using the principles of genetic modeling (e.g., Punnet squares)	• Explain how traits are inherited on the basis of genetics, cell structure and probability theory • Describe DNA structure and replication • Identify certain genetic traits found in living systems • Explain practical application of genetics • Describe mutations and their contributions to the process of natural selection	chromosome, body cell, sex cell, mitosis, meiosis, asexual, sexual reproduction, phase, phenotype, genotype, dominant, recessive gene, inheritance, traits	 1 and 9
4. Investigate and explain the interdependent nature of populations and communities in the environment and describe how species in these populations adapt by evolving	• Analyze the reasons for the extinction of organisms • Define ecology and explain various components of ecosystems • Describe the interactions and relationships between living things • Describe and analyze the process of ecological succession • Investigate nonliving natural resource of land, soil, water, and minerals and label them as renewable or nonrenewable resources as how they are affected by human interaction	Punnett square, genetic cross, genotype, phenotype	 1, 3, and 9
5. Create and use a basic classification scheme to identify plants and animals	• Describe the five levels of organization of living things • Explain how living things are classified • Classify plants and animals into groups and compare their characteristics • Identify samples of local flora and fauna	population, community, symbiosis, mutualism, commensalism, parasitism, predator, prey, competition, water cycle, adaptation, natural selection, evolution, fossil, extinction, dichotomous key, kingdom, taxonomy, phylum, genus, species, scientific name, scheme	 1 and 9

Montana Instructional Alignment –
HPS Critical Competencies
Science

Grade Level: Grade 7

Content Standard 4 Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.

Benchmark End of Grade 8	HPS Critical Competencies	Essential Vocabulary (Instructional Purposes)	Technology Profile 6-8
1. Model and explain the internal structure of the earth and describe the formation and composition of earth's external features in terms of the rock cycle and plate tectonics and constructive and destructive forces		mantel, inner core, outer core, crust, lithosphere, rock cycle, metamorphic, sedimentary, igneous, constructive, weathering, erosion	
2. Differentiate between rocks types and minerals types and classify both by how they are formed and the utilization by humans		mineral, rock, hardness, streak, luster, rock cycle, metamorphic, sedimentary, igneous	
3. Use fossils to describe the geological timeline	• Identify fossils	Cenozic era, Mesozoic era, Paleozoic era, Precambrian	
4. Describe the water cycle, the composition and structure of the atmosphere and the impact of oceans on large-scale weather patterns	• Identify man-made chemicals that display an adverse effect upon natural cycles • Describe the importance of the water-cycle as it applies to living systems	atmosphere, precipitation, evaporation, condensation, water vapor, troposphere, convection currents, ocean currents, jet stream, el Nino, gulf stream	 5
5. Describe and model the motion and tilt of earth in relation to the sun, and explain the concepts of day, night, seasons, year, and climatic changes	• Discuss the effects of seasonal changes in relationship to biological systems	rotation, revolution, orbit, axis, solstice, climate zone, Northern/Southern hemisphere, latitude, elevation, equator	 4
6. Describe the earth, moon, planets and other objects in space in terms of size, force of gravity, structure, and movement in relation to the sun		planet, moon, orbit, period or rotation, year, day, gravity, force	
7. Identify scientific theories about the origin and evolution of the earth and solar system		scientific theory, evidence, solar system, gas, dust, accretion	

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 7			
Content Standard 5 Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 6-8**
1. Describe the specific fields of science and technology as they relate to occupations within those fields	• Explore contributions of scientist and career opportunities in science	occupations, science, technology, science fields (life science, earth science, engineering, physical science)	4
2. Apply scientific knowledge and process skills to understand issues and everyday events	• Identify source of air, land, and water pollution and ways of preventing or remediating • Recognize the need for recycling to conserve resources • Discuss the reason for the extinction of organisms		3, 7, and 8
3. Simulate collaborative problem solving and give examples of how scientific knowledge and technology are shared with other scientists and the public			
4. Use scientific knowledge to investigate problems and their proposed solutions and evaluate those solutions while considering environmental impacts	• Define ecology and explain various components of ecosystems • Describe food chains, food webs, and energy pyramids • Identify fossil fuels and their uses • Analyze recycling to conserve resources as it impacts society	current event, problem, issue, research, summarize, collaborate, relevant	3
6. Describe how the knowledge of science and technology influences the development of the Montana American Indian cultures	• Describe how the knowledge of science and technology influences the development of the Montana Indian cultures	environmental impact, proposed solutions	

Montana Instructional Alignment –
HPS Critical Competencies
Science

Grade Level: Grade 7

Content Standard 6 Students understand historical developments in science and technology.

Benchmark End of Grade 8	HPS Critical Competencies	Essential Vocabulary (Instructional Purposes)	Technology Profiles 6-8
1. Give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding, including Montana American Indian examples	• Give examples of scientific discoveries and describe the interrelationship between technological contributions to communities, cultures, and societies, including Montana American Indian examples.		5 and 7
2. Identify major milestones in science that have impacted science, technology, and society	• Identify major contributions, theories, equipment and events in the advancement of biological sciences (i.e., cell theory, disease medicine)		9
3. Describe and explain science as a human endeavor and an ongoing process	• Identify the major contributions and events in the advancement of life science		9

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 8	
Content Standard 1	Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.
Content Standard 2	Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.
Content Standard 3	Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.
Content Standard 4	Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.
Content Standard 5	Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.
Content Standard 6	Students understand historical developments in science and technology.

Montana Instructional Alignment –
HPS Critical Competencies
Science

Grade Level: Grade 8

Content Standard 1 Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.

Benchmark End of Grade 8	HPS Critical Competencies	Essential Vocabulary (Instructional Purposes)	Technology Profiles 6-8
1. Identify a question, determine relevant variable and a control, formulate a testable hypothesis, plan and predict the outcome of an investigation, safely conduct scientific investigation, and compare and analyze data	• Demonstrate the use of proper laboratory safety procedures • Apply the scientific method to problem-solving situations • Design and conduct a scientific investigation	hypothesis, control, variables, data	3,6, and 7
2. Select and use appropriate tools including technology to make measurements (in metric units), gather, process and analyze data from scientific investigations	• Utilize basic metric measurements in science and its relationship to the English system • Distinguish between the concepts of weight, mass, volume, density, linear measurement and temperature • Compare measurement systems	gram, liter, meter, Celsius, mean, median, mode, range	7
3. Review, communicate and defend results of investigations, including considering alternative explanations.	• Use critical thinking skills to present and defend the results of scientific investigations	supported, refute, hypothesis	3 and 6
4. Create models to illustrate scientific concepts and use the model to predict change. (e.g., computer simulation, stream table, graphic representation)	• Create and analyze graphs and tables for collecting data	working models, representative models	1, 3, and 6
5. Identify strengths and weakness in an investigation design.	• Apply and relate controls and variables in scientific investigations	inquiry, investigations, sample size, control, repeated trials	
6. Compare how observations of nature form an essential base of knowledge among the Montana American Indians.		Montana American Indian tribes: Crow, Blackfeet, Salish, Kootenai, Assiniboine Sioux, Little Shell, Northern Cheyenne, Chippewa Cree, Pend d'Oreille, and Gros Ventre	

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 8			
Content Standard 2 Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 6-8**
1. Classify, describe, and manipulate the physical models of matter in terms of: elements, and compounds, pure substances and mixtures, atoms, and molecules	• Interpret the atomic theory of atoms and molecules • Distinguish between atoms and molecules • Differentiate among protons, neutrons, and electrons • Construct models of atoms using structural and empirical formulas i.e. electron dot etc. • Interpret the periodic table of elements • Demonstrate the use of the pH scale and a variety of indicators • Identify the properties of acids, bases and salts • Distinguish between organic and inorganic compounds	atom, element, compound, pure substance, mixture, molecule	1
2. Examine, describe, compare and classify objects and substances based on common physical properties and simple chemical properties	• Distinguish between physical and chemical properties of matter • Compare and contrast physical and chemical changes • Describe the physical and chemical properties of common elements	chemical property, physical property, chemical change, physical change	3
3. Describe energy and compare and contrast the energy transformations and the characteristics of light, heat, motion, magnetism, electricity, sound and mechanical waves	• Describe and measure static electricity and electric currents • Demonstrate the difference between series and parallel circuits • Relate the principles of light and sound • Relate electricity and magnetism to the production of electricity	energy, potential energy, kinetic energy, thermal energy, mechanical energy, radiant energy, chemical energy, nuclear energy, electric energy, Law of Conservation of Energy, visible spectrum, ultraviolet, infrared, reflection, refraction, electromagnetic spectrum, radiant heat, conduction, convection, electromagnetic, magnet, electricity, current, voltage, crest, trough, resting position, wavelength, amplitude, intensity, frequency, pitch, resonance	3 and 6

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 8			
Content Standard 2 Students, through the inquiry process, demonstrate knowledge of properties, forms, changes and interactions of physical and chemical systems.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profiles 6-8**
4. Model and explain that states of matter are dependent upon the quantity of energy present in the system and describe what will change and what will remain unchanged at the particulate level when matter experiences an external force or energy change	• Explain the law of Conservation of Matter and Energy	thermal energy, melting point, boiling point, solid, liquid, gas, sublimation, evaporation, condensation	 1
5. Describe and explain the motion of an object in terms of its position, direction, & speed as well as the forces acting upon it	• Describe the nature of measurement of forces • Apply Newton's three Laws of Motion to practical situations • Differentiate between kinetic and potential energy • Demonstrate the application of forces involved in the principles of pressure, buoyancy, and flight	gravity, balanced forces, unbalanced force, friction, net force, air resistance, speed, velocity, acceleration, mass, inertia, momentum, air pressure, lift, drag, Newton's Laws of Motion	 1 and 7
6. Identify, build, describe, measure, and analyze mechanical systems (e.g., simple and complex compound machines) and describe the forces acting within those systems	• Describe energy transformations through the application of simple and compound machines • Differentiate between kinetic and potential energy	simple machine, compound machine, work, force, lever, pulley, inclined plane, wedge, screw, wheel and axle, fulcrum, pivot, mechanical advantage	 1
7. Give examples and describe how energy is transferred and conserved (e.g. electric to light and heat [light bulb], chemical to mechanical [fuel to propulsion])	• Describe the Law of Conservation of Energy • Demonstrate how energy is transferred	energy transformation, energy conservation	 1

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 8			
Content Standard 3 Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 6-8**
1. Compare the structure and function of prokaryotic cells (bacteria) and eukaryotic cells (plant, animal, etc.) including the levels of organization of the structure and function, particularly with humans	Standard is addressed in other grade levels	cell, tissue, organ, system, organism, organelle, eukaryotic, prokaryotic, nucleus, bacteria	
2. Explain how organisms and systems of organisms obtain and use energy resources to maintain stable conditions (e.g., food webs, photosynthesis, respiration)	Standard is addressed in other grade levels	photosynthesis, respiration, biomes, food web, food pyramid, producer, primary and secondary consumers, food chain, decomposer	
3. Communicate the differences in the reproductive processes of a variety of plants and animals using the principles of genetic modeling (e.g., Punnet squares)	Standard is addressed in other grade levels	chromosome, body cell, sex cell, mitosis, meiosis, asexual, sexual reproduction, phase, phenotype, genotype, dominant, recessive gene, inheritance, traits	
4. Investigate and explain the interdependent nature of populations and communities in the environment and describe how species in these populations adapt by evolving	Standard is addressed in other grade levels	Punnett square, genetic cross, genotype, phenotype	
5. Create and use a basic classification scheme to identify plants and animals	Standard is addressed in other grade levels	population, community, symbiosis, mutualism, commensalism, parasitism, predator, prey, competition, water cycle, adaption, natural selection, evolution, fossil, extinction, dichotomous key, kingdom, taxonomy, phylum, genus, species, scientific name, scheme	

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 8			
Content Standard 4 Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes and interactions of Earth's systems and other objects in space.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 6-8**
1. Model and explain the internal structure of the earth and describe the formation and composition of earth's external features in terms of the rock cycle and plate tectonics and constructive and destructive forces	Standard is addressed in other grade levels	mantel, inner core, outer core, crust, lithosphere, rock cycle, metamorphic, sedimentary, igneous, constructive, weathering, erosion	
2. Differentiate between rocks types and minerals types and classify both by how they are formed and the utilization by humans	Standard is addressed in other grade levels	mineral, rock, hardness, streak, luster, rock cycle, metamorphic, sedimentary, igneous	
3. Use fossils to describe the geological timeline	Standard is addressed in other grade levels	Cenozic era, Mesozoic era, Paleozoic era, Precambrian	
4. Describe the water cycle, the composition and structure of the atmosphere and the impact of oceans on large-scale weather patterns	Standard is addressed in other grade levels	atmosphere, precipitation, evaporation, condensation, water vapor, troposphere, convection currents, ocean currents, jet stream, el Nino, gulf stream	
5. Describe and model the motion and tilt of earth in relation to the sun, and explain the concepts of day, night, seasons, year, and climatic changes	Standard is addressed in other grade levels	rotation, revolution, orbit, axis, solstice, climate zone, Northern/Southern hemisphere, latitude, elevation, equator	
6. Describe the earth, moon, planets and other objects in space in terms of size, force of gravity, structure, and movement in relation to the sun	Standard is addressed in other grade levels	planet, moon, orbit, period or rotation, year, day, gravity, force	
7. Identify scientific theories about the origin and evolution of the earth and solar system	Standard is addressed in other grade levels	scientific theory, evidence, solar system, gas, dust, accretion	

Montana Instructional Alignment – HPS Critical Competencies Science Grade Level: Grade 8			
Content Standard 5 Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures and societies.			
Benchmark End of Grade 8	**HPS Critical Competencies**	**Essential Vocabulary (Instructional Purposes)**	**Technology Profile 6-8**
1. Describe the specific fields of science and technology as they relate to occupations within those fields	• Investigate the career opportunities in the physical sciences	occupations, science, technology, science fields (life science, earth science, engineering, physical science)	 4
2. Apply scientific knowledge and process skills to understand issues and everyday events	• Apply technology to the physical sciences, and understand how science and technology affect society • Recognize the integration of the physical sciences with the other sciences (e.g., life sciences, etc) and other disciplines (e.g., P.E., Art, English, Math, etc)		
3. Simulate collaborative problem solving and give examples of how scientific knowledge and technology are shared with other scientists and the public	• Recognize scientific views on energy topics that connect with physical science	current event, problem, issue, research, summarize, collaborate, relevant	 2 and 5
4. Use scientific knowledge to investigate problems and their proposed solutions and evaluate those solutions while considering environmental impacts	• Analyze local environmental problems and identify variables as they relate to physical science	environmental impact, proposed solutions	 2
5. Describe how the knowledge of science and technology influences the development of the Montana American Indian cultures	• Describe how the knowledge of science and technology influences the development of the Montana Indian cultures		

Montana Instructional Alignment –
HPS Critical Competencies
Science

Grade Level: Grade 8

Content Standard 6 Students understand historical developments in science and technology.

Benchmark End of Grade 8	HPS Critical Competencies	Essential Vocabulary (Instructional Purposes)	Technology Profile 6-8
1. Give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding, including Montana American Indian examples	• Give examples of scientific discoveries and describe the interrelationship between technological contributions to communities, cultures, and societies, including Montana American Indian examples		5
2. Identify major milestones in science that have impacted science, technology, and society	• Identify major contributions, theories, equipment and events in the advancement of biological sciences (i.e., cell theory, disease medicine)		9
3. Describe and explain science as a human endeavor and an ongoing process	• Appraise major contributions and events in the advancement of physical science		5 and 9

Helena Public Schools
Science

Grades K - 8
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Helena Public Schools
Kindergarten
SCIENCE
Critical Competencies

Content Standard 1:

- Observe/report teacher-directed scientific investigations
- Develop respect for classroom equipment and safe laboratory procedures
- Explore types of measurement using different manipulatives
- Participate in discussions of scientific investigations
- Construct a model to illustrate a simple concept.
- Report the results from a controlled experiment.
- Identify how observations of nature form an essential base of knowledge among the Montana American Indians.

Content Standard 2:

- Observe mixtures with different properties
- Sort tangible objects
- Explore magnets
- Develop awareness of mater in its different forms
- Observe, identify, and predict changes in matter resulting from external forces (e.g. pressure, heat, cold)

Content Standard 3:

- Observe and discuss similarities/difference of living and non-living things.
- Develop an awareness of the food groups and proper nutrition.
- Observe models of the life cycles of an insect and plants.
- Explore different types of habitats.
- Develop interests, respect, and appreciation for all living things.
- Sort according to plants/animals/non-living.

Content Standard 4:

- Develop an awareness of planet Earth.
- Discuss the physical properties of the Earth and show examples.
- Discuss prehistoric life.
- Observe daily weather.
- Observe seasonal changes.
- Name the sun, moon, and stars.
- Discuss what the sun does for the Earth.

Content Standard 5:

- Explore how science and technology are used in daily living.
- Participate in discussions about innovations that make our life easier.
- Share and listen in a group.
- Introduce concept of recycling, reduce, reuse.
- Identify how the knowledge of science and technology influences the development of the Montana American Indian culture.

Content Standard 6:

- Ask questions about science in their world.
- Explore science as a human endeavor and an ongoing process.

Helena Public Schools
First Grade
SCIENCE
Critical Competencies

Content Standard 1:

- Observe/tell and record scientific investigations.
- Develop respect for classroom equipment and safe laboratory procedures.
- Identify appropriate measurement tools.
- Communicate scientific data via illustrations or verbal discussions (e.g. class graphs, charts, tables)
- Construct a model to illustrate a simple concept.
- Discuss the results from a controlled experiment.
- Identify how observations of nature form an essential base of knowledge among the Montana American Indians.

Content Standard 2:

- Observe and describe mixtures with different properties.
- Examine and describe tangible objects in terms of common physical properties.
- Explore basic characteristics of magnets.
- Use appropriate vocabulary to identify properties of matter.
- Describe the changes in matter resulting from application of external forces.
- Observe, measure and manipulate forms of energy (e.g. temperature/higher/lower/thermometer)

Content Standard 3:

- Identify the characteristics of living and non-living things.
- Investigate the characteristics of animals.
- Recognize the importance of proper nutrition.
- Observe and record models of the life cycles of animals and plants.
- Compare and contrast different habitats.
- Compare and identify plants and animals into groups by size, shape, needs, and uses.

Content Standard 4:

- Identify landforms.
- Recognize the importance of air and water to living things.
- Introduce prehistoric life through investigation of fossils.
- Observe, discuss, and record weather.
- Observe the water cycle.
- Observe and record physical changes due to the seasons.
- Explore the relationship between the sun, moon, and Earth and include evidence of the sun as a source of light and heat.
- Explore the differences between night and day.
- Identify types of technology to observe objects in space (e.g. telescopes)

Content Standard 5:

- Explore how science and technology are used within the community.
- Discuss a scientific or technological innovation that has benefited the community.
- Collaborate in a group to perform a simple investigation.
- Describe the need for conservation of the environment.
- Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures.

Content Standard 6:

- Ask questions relating to specific scientific knowledge.
- Identify that everyone can do science.

Helena Public Schools
Second Grade
SCIENCE
Critical Competencies

Content Standard 1:

- Through teacher-directed scientific investigations, students begin to identify variables.
- Develop respect for classroom equipment and safe laboratory procedures.
- Demonstrate correct use of measurement tools.
- Communicate scientific data via illustrations, verbal discussions, and written form.
- Construct a model to illustrate a simple concept.
- Discuss and illustrate the results form a controlled experiment.
- Identify how observations of nature form an essential base of knowledge among the Montana American Indians.

Content Standard 2:

- Identify patterns of mixtures based on different properties.
- Compare tangible objects in terms of common physical properties.
- Observe and describe basic characteristics of sound.
- Classify and record properties of matter.
- Identify patterns that occur when external forces are applied to matter.
- Observe, measure and manipulate sound energy (e.g. louder, softer, pitch level).

Content Standard 3:

- Distinguish the differences between plants and animals.
- Investigate the structure of plants.
- Discuss the need of proper nutrition for energy and growth.
- Recognize and identify the different stages of development in the life cycles of plants and animals.
- Observe, identify and classify selected animals with respect to characteristics and habitats.

Content Standard 4:

- Explore and compare features of the Earth.
- Explore natural resources.
- Develop an understanding of prehistoric life.
- Explore influences of weather on the environment.
- Identify and describe weather conditions typical of various seasons across the country.
- Identify relationships of the sun, moon, and planets.
- Discuss current technology for space exploration (e.g. space shuttle, telescope)

Content Standard 5:

- Discuss the benefits of using science and technology.
- Explain how technological innovations impact their lives.
- Begin to record and share scientific investigations in cooperative groups.
- Develop ideas for conservation of the environment.
- Identify how the knowledge of science and technology influences the development of Montana American Indian cultures.

Content Standard 6:

- Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures.
- Explore the development of inventions over time.
- Identify examples as a human process.

Helena Public Schools
Third Grade
SCIENCE
Critical Competencies

Content Standard 1:

- Conduct a simple experiment; identify the variables, and record data (with some teacher direction).
- Develop respect for classroom equipment and safe laboratory procedures.
- Accurately select and use tools for simple measurement.
- Communicate scientific data with supporting evidence.
- Construct a model to illustrate a simple concept.
- Discuss, illustrate, and use written form to communicate results from a controlled experiment.
- Identify how observations of nature form an essential base of knowledge among the Montana American Indians.

Content Standard 2:

- Experiment and predict outcomes of mixtures based on different properties.
- Classify tangible objects in terms of common physical properties.
- Investigate sound vibrations and pitch.
- Investigate properties of light.
- Investigate characteristics of magnets.
- Analyze differences of matter, and explain how matter changes.
- Analyze the effects of external forces on matter and interpret the data.
- Identify and describe a simple machine.

Content Standard 3:

- Identify the parts of plants and the function of each of the parts.
- Describe food groups and their effect on human body systems.
- Analyze and discuss the different stages of development in the life cycle of plants.
- Explore the characteristics and adaptations of plants and animals in relationship to their environments.
- Observe, identify and classify selected plants and animals with respect to characteristics and habitats.

Content Standard 4:

- Investigate the effects of natural forces on the Earth's surface.
- Discuss the properties of water and soil.
- Investigate the importance of conserving fossil fuels.
- Observe and record weather data.
- Investigate the components of the water cycle.
- Explain the difference between weather and climate.
- Discuss seasonal changes.
- Investigate the relationship between the Earth, moon, and sun.
- Identify current technology for space exploration and is impact.

Content Standard 5:

- Research the benefit of using science and technology.
- Identify a scientific or technological innovation that benefits the community.
- Model scientific collaboration by sharing and communication ideas and solutions in a variety of cooperative settings.
- Investigate how humans affect the environment in which they live.
- Identify how the knowledge of science and technology influence the development of the Montana American Indian cultures.

Content Standard 6:

- Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures.
- Identify how inventions have impacted the world.
- Identify examples of science as an ongoing process.

Helena Public Schools
Fourth Grade
SCIENCE
Critical Competencies

Content Standard 1:

- Develop the abilities necessary to safely conduct scientific inquiry, including (a step-by-step sequence is not implied): (a) asking questions about objects, events, and organisms in the environment, (b) planning and conducting simple investigations.
- Select and accurately use appropriate equipment and technology to measure in SI units, gather, process and analyze data from a scientific investigation (e.g. rulers, scales, thermometer, stopwatch, etc.)
- Represent (with graphs, chars, and diagrams), communicate and provide supporting evidence of scientific investigations.
- Construct models to illustrate simple concepts and compare those models to what they represent (scale, legend, key).
- Identify a valid test in an investigation.
- Identify how observations of nature form an essential base of knowledge among the Montana American Indians.

Content Standard 2:

- Create mixtures and separate them based on different properties (e.g. salt and sand, iron fillings and soil, oil and water).
- Examine, measure, describe, compare and classify tangible objects in terms of common physical properties.
- Describe, compare/contrast, model basic characteristics of light, heat, magnetism and sound.
- Model and explain that matter exists as solids, liquids and gases and can change from one form to another.
- Identify and predict what changes and what remains unchanged when matter experiences an external influence.
- Identify, build and describe mechanical systems (e.g. simple and complex machines).
- Observe, measure and manipulate forms of energy: sound, light, heat, magnetic.

Content Standard 3:

- Identify that plants and animals have structure and systems which serve different functions.
- Identify , measure and describe basic requirements of energy needed and nutritional needs for an organism.
- Compare/contrast food webs and food chains.
- Describe and use models that trace the life cycles of different plants and animals and discuss how they differ from species to species.
- Explain cause and effect relationships between nonliving and living components within ecosystems; and explain individual response to the changes in the environment including identifying differences between inherited, instinctual, and learned behaviors.

Content Standard 4:

- Describe and give examples of Earth's changing features (e.g. erosion, weathering, volcanoes, glaciers, etc.)
- Describe and measure the physical properties of Earth's basic materials (including rocks, water and gases).
- Investigate fossils and make inferences about life and the environment long ago.
- Observe record and describe the water cycle and the local weather and demonstrate how weather conditions are measured.
- Identify seasons and explain the differences between weather and climate.
- Describe objects in the sky and model their pattern of movement and explain that light and heat come from a star called the sun.

Content Standard 5:

- Describe and discuss examples of how people use science and technology.
- Identify a scientific or technological innovation that benefits the community.
- Model scientific collaboration by sharing and communicating ideas and solutions about a local current event/problem in a variety of cooperative settings.
- Use current scientific knowledge to make inferences and propose solutions for local environmental problems (recycling, waste management).
- Identify how the knowledge of science and technology influences the development of the Montana American Indian cultures.

Content Standard 6:

- Give historical examples of scientific and technological contributions to communities, cultures and societies, including Montana American Indian examples.
- Describe how scientific inquiry has produced much knowledge about the world and a variety of contributions toward understanding events and phenomenon within the universe.
- Describe science occupations and their benefits.

Helena Public Schools
Fifth Grade
SCIENCE
Critical Competencies

Content Standard 1:

- Recognize and select a testable question to plan and design an investigation.
- Identify manipulated variables, dependent and independent.
- Identify relationship between a testable question and hypothesis.
- Develop respect for classroom equipment and sue safe laboratory procedures.
- Use the metric system to measure length, mass, volume, density, weight, and temperature.
- Use SI units to collect data measure, and draw conclusions.
- Incorporate process skills and scientific methods to explain scientific investigations based upon gathered evidence.
- Construct models to illustrate scientific concepts and discover relationships.
- Identify and communicate results of controlled experiments.
- Identify how observation of nature form an essential base of knowledge among Montana American Indians.

Content Standard 2:

- Construct a simple model of an atom.
- Examine the parts of an atom (protons, neutrons, and electrons) and their respective electrical charges.
- Investigate properties of molecules and compounds.
- Classify rocks and minerals according to the characteristic properties of the substance.
- Examine chemical properties of minerals and crystals.
- Define energy and apply Newton's Laws of Motion.
- Compare and contrast different forms of energy.
- Identify solids, liquids, and gases using simple atoms and compounds.
- Identify how objects move relative to their position.
- Build and describe a simple or complex machine.
- Show how energy can change forms.

Content Standard 3:

- Investigate the structure of plant and animal cells.
- Describe structures and functions of plant and animal cells and their components.
- Investigate plant systems (e.g. photosynthesis).
- Investigate body systems (e.g. sensory, skeletal, circulatory, digestive, respiratory, nervous or muscular).
- Investigate differences between reproductive processes in plants.
- Discuss the reproductive principles in animals.
- Identify the structure and function of various systems of living organisms.
- Discuss human impact on the environment.
- Describe differences between one-celled and multi-celled organisms.

Content Standard 4:

- Classify rocks and minerals according to the characteristics of the substance.
- Examine chemical properties of minerals and crystals.
- Classify rocks and minerals according to the characteristic properties of the substance.
- Describe how relative age of fossils can be determined from their position in sedimentary rock layers.

Content Standard 5:

- Explore scientific careers and opportunities in science.
- Use scientific knowledge to discuss issues (e.g. air, land, and water pollution, recycling to conserve resources, reusing, reducing waste, etc.)
- Use group process to conduct scientific investigations.
- Identify community connections with scientific investigations.
- Describe how the knowledge of science and technology influences the development of the Montana American Indian cultures.

Content Standard 6:

- Give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding, including Montana American Indian examples.
- Recognize scientific discoveries and their impact on society.

Helena Public Schools
Sixth Grade
SCIENCE
Critical Competencies

Content Standard 1:

- Explain the goal and use scientific method.
- List important safety precautions to follow in a science laboratory.
- Identify and compare the metric units used to measure length, mass, volume, density, weight, and temperature.
- Explain the role of scientific tools in the study of science.
- Use information to prepare data sheets, charts, and graphs.
- Incorporate scientific method and explain scientific experiments based upon gathered evidence.
- Create visuals to identify fossil fuels and their uses.
- Discuss other forms of energy resources, including alternative sources of energy.
- Identify a variable in setting up a controlled and uncontrolled experiment.
- Compare natural observation s made by scientists to those made by Montana American Indians.

Content Standard 2:

- Classify matter as elements, compounds, solutions, or mixtures.
- Describe the structure of the atom.
- Explain the role of chemical cycles in nature.
- Explain and give examples of chemical properties and chemical changes.
- Describe the forces between electric charges and the atomic basis of electric charges.
- Identify the effects of static electricity.
- Define voltage, current and resistance, and apply these concepts to circuit situations.
- Identify the development and operations of technology in our society.
- Explain and give examples of physical properties, and physical and chemical changes.
- Identify Newton's Laws of Motion.
- Build a complex machine and explain how it works.

Content Standard 3:

- Describe the basic characteristics of living things.
- Describe the structures and functions of plant and animal cells and their parts.
- Investigate plant and animal systems (e.g. photosynthesis, respiration)
- Identify the characteristics of the six land biomes and the two water biomes.
- Describe food chains, food webs, and energy pyramids.
- Describe interactions and relationships between living things.
- Discuss the reasons for the extinction of organisms.
- Relate land biomes of the western hemisphere to their climates.
- Discuss the reason for the extinction of organisms.
- Identify the characteristics of the six land biomes and the two water biomes.
- Identify the ecological relationships of plants and animals in their local biome.

Content Standard 4:

- Describe and explain the motion of the Earth's crust.
- Describe the formation of mountains, plateaus, and domes.
- Describe what occurs during earthquakes.
- Describe the types of volcanoes and state the location of major zones of volcanic activity.
- List the major lithopheric plates.
- Discuss the theory of continental drift, ocean floor spreading, and plate tectonics.
- Identify and describe minerals.
- Describe the uses of minerals.
- Describe rocks and the three basic types of rock.
- Explain the rock cycle
- Identify the factors that cause erosion and deposition.
- Describe the impact of air pressure, wind, and humidity on the weather.
- Describe how fronts affect weather patterns.
- Explain the process of predicting weather.
- Differentiate between weather and climate.
- Identify characteristics of Earth's climate zones.
- Detail the impact of climate change on organisms.

- Describe the varying climates of regions in the western hemisphere.
- Relate the tilt of the Earth's axis and its position in reference to the sun, to Earth's seasons, and the length of days.
- Describe the characteristics of stars, star systems, and galaxies.
- Relate the starting mass of a star to its life cycle.
- Apply theories regarding the formation of the solar system to the characteristics of the planets and other objects in the solar system.
- Discuss the characteristics of the Earth and its moon.
- Identify the interactions that occur among the Earth, its moon, and the sun.
- Identify theories about the origin of the universe.

Content Standard 5:

- Explore scientific careers.
- Investigate ways of preventing air and water pollution.
- Recognize the need for recycling to conserve resources and to help prevent pollution.
- Name nonliving natural resources of land, soil, water, and minerals, and label them as renewable or nonrenewable resources.
- Consider methods for managing land resources.
- Identify sources of air, land, and water pollution.
- Identify fossil fuels and their uses.
- Describe how the knowledge of science and technology influences the development of the Montana American Indian cultures.

Content Standard 6:

- Give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding, including Montana American Indian examples.
- Trace the development of mankind's quest for space exploration.
- Recognize the need for recycling to conserve resources and to help prevent pollution.

Helena Public Schools
Seventh Grade
SCIENCE
Critical Competencies

Content Standard 1:

- Explain the goal and use scientific method and use the steps in the scientific method.
- Demonstrate the use of proper laboratory safety procedures.
- Apply the scientific method to problem-solving situations.
- Use the metric system to measure length, mass, volume, density, weight, and temperature.
- Use scientific tools and techniques in the study of science (e.g. microscopes).
- Integrate math and science by using probability, the metric system, and graphing to solve science problems.
- Analyze scientific results using various methods of scientific research.
- Use probability problems to predict genetic outcomes.
- Develop controls and variables in experiments.
- Using literature from Montana American Indians, apply information to nature.

Content Standard 2:

- Relate organic compounds to biological systems.
- Classify objects and organisms using physical properties.
- Explain the role of photosynthesis and respiration as related to energy in natural systems.
- Compare body systems to simple machines.
- Describe how energy is transformed in the human body.
- Describe how energy is used and transferred in plant and animal cells.

Content Standard 3:

- Explain the cell theory.
- Describe the structures and activities of cells.
- Identify the parts of a virus, protists, fungi, plants, and animal cells.
- Identify the forms and functions of microorganisms.
- Identify the parts of bacterium and classify bacteria.
- List the characteristics of protists fungi, plants and animal cells.
- Classify cells by using examples of cell structures and give examples of sarcodines, ciliates, flagellates, and sporozoans.
- Describe the characteristics of several types of fungi, lichens, slime olds, mosses, and liverworts.
- Compare vascular and nonvascular plants.
- Describe the characteristics and structures of plants and animals.
- Identify the factors that affect plant growth.
- Describe photosynthesis and compare to respiration.
- Compare invertebrates and vertebrates.
- Describe the characteristics of six groups of invertebrates and classify organisms using those characteristics.
- Compare cold-blooded and warm-blooded vertebrates.
- Identify the characteristics and needs of living things.
- Describe the processes and basic chemistry of organisms.
- Use comparative anatomy in a laboratory setting to examine representative organisms (i.e. earthworm, crayfish, grasshopper, perch, frog and fetal pig)
- Identify and classify the levels of organization found in living systems.
- Describe the features and functions of the human body.
- Explain how traits are inherited on the basis of genetics, cell structure and probability theory.
- Describe DNA structure and replication.
- Identify certain genetic traits found in living systems.
- Explain practical application of genetics.
- Describe mutations and their contributions to the process of natural selection.
- Analyze the reasons for the extinction of organisms.
- Define ecology and explain various components of ecosystems.
- Describe the interactions and relationships between living things.
- Describe and analyze the process of ecological succession.

- Investigate nonliving natural resources of land, soil, water, and minerals and label them as renewable or nonrenewable resources as how they are affected by human interaction.
- Describe the five levels of organization of living things.
- Explain how living things are classified.
- Classify plant and animal into groups and compare their characteristics.
- Identify samples of local flora and fauna.

Content Standard 4:

- Identify fossils
- Identify man-made chemicals that display an adverse effect upon natural cycles.
- Describe the importance of the water cycle as it applies to living systems.
- Discuss the effects of seasonal changes in relationship to biological systems.

Content Standard 5:

- Explore contributions of scientists and career opportunities in science.
- Identify sources of air, land, and water pollution and ways to preventing and remediating.
- Recognize the need for recycling to conserve resources.
- Discuss the reason for the extinction of organisms.
- Define ecology and explain various components of ecosystems.
- Describe food chains, food webs, and energy pyramids.
- Identify fossil fuels and their uses.
- Analyze recycling to conserve resources as it impacts society.
- Describe how the knowledge of science and technology influences the development of the Montana Indian cultures.

Content Standard 6:

- Give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding, including Montana American Indian examples.
- Identify major contributions, theories, equipment and events in the advancement of the biological sciences (i.e. cell theory, disease medicine)
- Identify the major contributions and events in the advancement of life science.

Helena Public Schools
Eighth Grade
SCIENCE
Critical Competencies

Content Standard 1:

- Demonstrate the use of proper laboratory safety procedures.
- Apply the scientific method to problem-solving procedures
- Design and conduct a scientific investigation.
- Utilize basic metric measurements in science and its relationship to the English system.
- Distinguish between the concepts of weight, mass, volume, density, linear measurement and temperature.
- Compare measurement systems.
- Use critical thinking skills to present and defend the results of scientific investigations.
- Create and analyze graphs and tables for collecting data.
- Apply and relate controls and variables in scientific investigations.

Content Standard 2:

- Interpret the atomic theory of atoms and molecules.
- Distinguish between atoms and molecules.
- Differentiate among protons, neutrons, and electrons.
- Construct models of atoms using structural and empirical formulas (i.e. electron dot, etc.)
- Interpret the periodic table of elements.
- Demonstrate the use of the pH scale and a variety of indicators.
- Identify the properties of acids, bases and salts.
- Distinguish between organic and inorganic compounds.
- Distinguish between physical and chemical properties of matter.
- Compare and contrast physical and chemical changes.
- Describe the physical and chemical properties of common elements.
- Describe and measure static electricity and electric currents.
- Demonstrate the difference between series and parallel circuits.
- Relate the principles of light and sound.
- Relate electricity and magnetism to the production of electricity.
- Explain the Law of Conservation of Matter and Energy.
- Describe the nature and measurement of forces.
- Apply Newton's three Laws of Motion to practical situations.
- Differentiate between kinetic and potential energy.
- Demonstrate the application of forces involved in the principles of pressure, buoyancy, and flight.
- Describe energy transformations through the application of simple and compound machines
- Differentiate between kinetic and potential energy.
- Describe the Law of Conservation of Energy.
- Demonstrate how energy is transferred.

Content Standard 3 and 4: (addressed at other grade levels)

Content Standard 5:

- Investigate the career opportunities in the physical sciences.
- Apply technology to the physical sciences and understand how science and technology affect society.
- Recognize the integration of the physical sciences with the other sciences (e.g. life sciences, etc.) and other disciplines (e.g. P.E., Art, English, Math, etc.)
- Recognize scientific views on energy topics that connect with physical science.
- Analyze local environmental problems and identify variables as they relate to physical science.
- Describe how the knowledge of science and technology influences the development of the Montana American Indian cultures.

Content Standard 6:

- Give examples of scientific discoveries and describe the interrelationship between technological advances and scientific understanding including Montana American Indian examples.
- Identify major contributions, theories, equipment and events in the advancement of physical science.
- Appraise major contributions and events in the advancement of physical science.