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Philosophy

At Arlee, we believe that science literacy is a necessity for everyone. Science is a way of making sense of the world. Learning science is something students do, not something that is done to them. "Hands - on" activities are not enough. Students also must have "minds - on" experiences. The inquiry based approach to teaching science applies to all students, regardless of age, gender, cultural or ethnic background, disabilities, aspirations, or interest and motivation in science.

Process Standards

Science as Inquiry
- Abilities Necessary to do Scientific Inquiry
- Understanding about Scientific Inquiry

History and Nature of Science
- Science as a Human Endeavor
- Nature of Science
- History of Science
- Nature of Scientific Knowledge
- Historical Perspectives

Science in Personal and Social Perspectives
- Personal Health
- Populations, Resources, and Environments
- Natural Hazards
- Risks and Benefits
- Science and Technology in Society
- Personal and Community Health
- Population Growth
- Natural Resources
- Environmental Quality
- Natural and Human Induced Hazards
- Science and Technology in Local, National, and Global Challenges

Content Standards

Life Science
- Characteristics of Organisms
- Life Cycles of Organisms
- Organisms and Their Environment
- Structure and Function of Living Systems
- Reproduction and Heredity
- Regulation and Behavior
- Populations and Ecosystems
- Diversity and Adaptations of Organisms
- The Cell
- Molecular Basis of Heredity
- Biological Evolution
- Interdependence of Organisms
- Matter, Energy, and Organization in living Systems
- Behavior of Organisms

Physical Science

Properties of Objects and Materials
Position and Motion of Objects
Light, Heat, Electricity and Magnetism
Properties and Changes of Properties in Matter
Motion and Forces
Transfer of Energy
Structure of Atoms
Structure and Properties of Matter
Chemical Reactions
Motion and Forces
Conservation of Energy and Increase in Disorder
Interactions of Energy and Matter

Earth and Space Science

Properties of Earth Materials
Objects in the Sky
Changes in Earth and Sky
Structure of the Earth's System
Earth's History
Earth and the Solar System
Energy and the Earth's System
Geochemical Cycles
Origin and Evolution of the Earth System
Origin and Evolution of the Universe

Science and Technology

Abilities of Technological Design
Understanding about Science and Technology
Abilities to distinguish between Natural and Non-natural objects

Assessment Indicators

Teachers will use a variety of assessment tools in their classroom which may include the following:

T - Tests

1 Timed tests
2. Written tests
3, Student created tests or assessments
4. Standardized

O - Observation

1. Teacher observation
2. Activities and projects (individual and group)
3. Collaboration
4. Maps
5. Games
6. Homework / written assignments

PORT - Portfolio

1. Checklist - A list of skills
2. Portfolio - Compilation of student work
3. Journals

PPS - Parent/Peer/Staff

1. Conferencing - Talking to the student about what he/she understands (individual or group)
2. Class discussion or small group discussion

PR/PE/PA - Presentation/Performance/Participation

1. Demonstration
2. Inventions
3. Reports

Performance Standards

Note: The performance standards under each of the content standards below are cumulative and continue to be developed at ever-deeper levels as students progress through the Arlee Schools. The performance standards are identified for the cluster of years in which they are introduced and stressed in instruction.

Performance standards are met as the student progresses through the content standards enumerated in the tables below.

1. Science as Inquiry : Each student will develop:			
Grade |	**Performance Standards**		**| Assessment**
K - 12	**1.0**	**Identify and explain how observations of nature form an essential base of knowledge among the Montana American Indians.**	
K - 4	**1.1**	**Abilities necessary to do scientific inquiry**	
	1.1.1	Ask a question about objects, organisms, and events in the environment.	T, O, PPS PR/PE/PA
		1.1.1.1 Students should answer questions by seeking information from reliable sources of scientific information and from their own investigations.	O, PPS
		1.1.1.2 Predicting the results of experiments or observations after observing or analyzing scientific data.	O, PPS
	1.1.2	Plan and conduct a simple investigation.	O, PPS, PR/PE/PA
		1.1.2.1 Students should design and conduct simple experiments to answer questions.	O, PPS, PR/PE/PA
	1.1.3	Employ simple equipment and tools to gather data and extend the senses.	O, PPS, T, PR/PE/PA
		1.1.3.1 Use simple tools to measure and observe attributes of objects.	O, PPS, T
		1.1.3.2 Use models to illustrate simple concepts and compare those models to the actual phenomenon.	O, PPS
		1.1.3.3 Develop skills in the use of computers and calculators for conducting investigations.	O, PPS
	1.1.4	Use data to construct a reasonable explanation.	O, PPS
		1.1.4.1 Learn what constitutes evidence and judge the merits or strengths of the data and information that will be used to make explanations.	O, PPS
		1.1.4.2 Check their explanations against scientific knowledge, experiences, and observations of others.	O, PPS, PR/PE/PA

1. Science as Inquiry : Each student will develop:			
Grade |	**Performance Standards**		**| Assessment**
K - 4	1.1.4.3	Understand the importance of repeated trials on which to base a conclusion.	O, PPS
	1.1.5	Communicate investigations and explanations.	O, PPS
	1.1.5.1	Develop the ability to communicate, critique, and analyze their work and the work of others.	O, PPS, PORT, PR/PE/PA
K - 4	**1.2**	**Understandings about scientific inquiry**	
	1.2.1	Scientists use different kinds of investigations depending on the questions they are trying to answer, such as describing objects, events, and organisms; classifying them, and doing experiments.	O, PPS
	1.2.2	Simple instruments, such as magnifiers, thermometers, and rulers, provide more information than scientists obtain using only their senses.	O, PPS
	1.2.3	Scientists develop explanations using observations and what they already know about the work. Good explanations are based on evidence from investigations.	O, PPS
	1.2.4	Scientists make the results of their investigations public.	O, PPS
	1.2.5	Scientists review and ask questions about other scientists' work..	O, PPS
5 - 8	**1.3**	**Abilities necessary to do scientific inquiry**	
	1.3.1	Identify questions that can be answered through scientific investigations	PPS
	1.3.1.1	Clarify questions and inquiries and direct them toward objects and phenomena that can be described, explained, or predicted by scientific investigations.	PPS
	1.3.2	Design and conduct a scientific investigation.	O, PPS
	1.3.2.1	Develop general abilities, such as systematic observation, making accurate measurements, and identifying and controlling variables.	O, PPS
	1.3.2.2	Learn to formulate questions, design and execute investigations, interpret data, use evidence to generate explanations, propose alternative explanations, and critique explanations and procedures.	O, PPS
	1.3.3	Use appropriate tools and techniques to gather, analyze, and interpret data.	O, PPS
	1.3.3.1	The use of tools and techniques, including mathematics, will be guided by the questions asked and in the investigations students design.	T, O, PPS

5 - 8		1.3.3.2 Access, gather, store, retrieve, and organize data, using hardware and software designed for these purposes.	T, O, PPS, PORT
		1.3.3.3 Create models to illustrate scientific concepts and use the model to predict change. (eg. computer simulation, stream tables, graphic representation)	O, PPS
	1.3.4	Use evidence to develop descriptions, explanations, predictions, and models.	O, PPS
		1.3.4.1 Explanation should be based on what students observed. As cognitive skills develop, they should differentiate explanation from description-giving causes for effects and establishing relationships based on evidence and logic.	O, PPS
		1.3.4.2 Developing explanations establishing connections between the content of science and the contexts within which students develop new knowledge.	O, PPS
	1.3.5	Think critically and logically to establish the relationships between evidence and explanations.	O, PPS
		1.3.5.1 Students should be able to review data from a simple experiment, summarize it, and form a logical argument about cause-and-effect relationships in the experiment.	O, PPS
		1.3.5.2 Students should begin to state some explanations in terms of the relationship between two or more variables.	T, O, PPS
	1.3.6	Recognize and analyze alternative explanations and predictions.	O, PPS
		1.3.6.1 Students should remain open to and acknowledge different ideas and explanations, accept the skepticism of others, and consider alternative explanations.	O, PPS
	1.3.7	Communicate scientific procedures and explanations.	O, PPS
	1.3.8	Where appropriate use mathematics in scientific inquiry.	T, O, PPS
	1.4	**Understandings about scientific inquiry**	
	1.4.1	Some investigations involve observing and describing objects, organisms, or events; collecting specimens; experiments; seeking information; discovery of new objects and phenomena; making models.	T, O, PPS
	1.4.2	Different scientific domains employ different methods.	T, O, PPS
	1.4.3	Technology used to gather data enhances accuracy and allows scientists to analyze and quantify results of investigations.	T, O, PPS
	1.4.4	Scientific explanations emphasize evidence, have consistent logical arguments, and use scientific principles, models, and theories.	T, O, PPS
	1.4.5	The scientific community accepts and uses explanations until displaced by better scientific ones. When such displacement occurs, science advances.	O, PPS

5 - 8	1.4.6	Science advances through legitimate skepticism. Scientists evaluate explanations proposed by other scientists by examining and comparing evidence, identifying faulty reasoning, pointing out statements that go beyond the evidence, and suggesting alternative explanations for the same observations.	O, PPS
	1.4.7	Scientific investigations sometimes generate new investigative methods or procedures, or develop new technologies to improve data collection.	O, PPS

9 - 12	**1.5**	**Abilities necessary to do scientific inquiry**	
	1.5.1	Identify questions that can be answered with scientific investigation.	O, PPS
		1.5.1.1 Students formulate a testable hypothesis & demonstrate logical connections between scientific concepts guiding a hypothesis and design of an experiment.	O, PPS, PR/PE/PA
	1.5.2	Design and conduct a scientific investigation.	O,PORT, PPS
		1.5.2.1 Regardless of the scientific investigation performed, students must use evidence, apply logic, and construct an argument for their proposed explanations.	O, PORT, PPS
	1.5.3	Use technology and mathematics to improve investigation and communication.	O, PPS, PR/PE/PA
	1.5.4	Formulate and revise scientific explanations and models using logic and evidence.	O, PPS
		1.5.4.1 Student inquiries should culminate in formulating an explanation or model.	O, PPS, PR/PA/PE
		1.5.4.2 Models should be physical, conceptual, and mathematical.	T, O, PPS
		1.5.4.3 Students should engage in discussions and arguments that result in the revision of their explanations.	O, PPS
	1.5.5	Recognize and analyze alternative explanations and models	O, PPS
		1.5.5.1 Emphasize critical abilities of analyzing arguments by reviewing current science, weighing evidence, & examining logic to decide best explanations and models	O, PPS
	1.5.6	Communicate and defend a scientific argument.	T, O, PPS
		1.5.6.1 Develop the abilities associated with accurate and effective communication.	O, PPS

	1.6	**Understandings about scientific inquiry**	
	1.6.1	Scientists usually inquire about how physical, living or designed systems function guided by conceptual principles and knowledge.	T, O, PPS

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9 - 12	1.6.2	Historical and current scientific knowledge influence design and interpretation of investigations and evaluation of proposed explanations made by other scientists.	T, O, PPS
	1.6.3	New techniques and tools provide new evidence to guide inquiry and new methods to gather data, thereby contributing to the advance of science. Accuracy and precision of data, and thus the quality of the exploration, depends on the technology used.	T, O, PPS
	1.6.4	Mathematics is essential in scientific inquiry. Mathematical tools and models guide and improve the posing of questions.	T, O, PPS
	1.6.5	Scientific explanations must adhere to criteria such as: the proposed explanation must be logically consistent; it must abide by the rules of evidence; it must be open to questions and possible modification; and it must be based on historical and current scientific knowledge.	T, O, PPS
	1.6.6	The methods and procedures that scientists used to obtain evidence must be clearly reported to enhance opportunities for further investigation.	T, O, PPS

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2. History & Nature of Science :: Each student will develop an understanding of:				
Grade **|** Performance Standards				**|** Assessment
K-12	**2.0**	**History and nature of science in a local context**		
		2.0.1	Cultural knowledge and tradition by Montana Native Americans arose as a result of interactions with the local environment and ways of coping and adapting to that environment. This knowledge is valuable and should be conserved as a resource for future generations.	
K - 4	**2.1**	**Science as a human endeavor**		
		2.1.1	Although men and women using scientific inquiry have learned much about the objects, events and phenomena in nature, much more remains to be understood. Science will never be finished.	O, PPS
		2.1.2	Many people choose science as a career and devote their entire lives to studying it. Many people derive great pleasure from doing science.	O, PPS
5 - 8	**2.2**	**Science as a human endeavor**		
		2.2.1	The work of science relies on basic human qualities, such as reasoning, insight, energy, skill and creativity - as well as on scientific habits of mind, such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.	T, O, PPS
	2.3	**Nature of Science**		
		2.3.1	Scientists formulate and test their explanations of nature using observation, experiments, and theoretical and mathematical models.	O, PPS
		2.3.2	It is normal for scientists to differ with one another about the interpretation of the evidence or theory being considered. Different scientists might publish conflicting experimental results or might draw different conclusions from the same data. Ideally, scientists acknowledge such conflict and work towards finding evidence that will resolve their disagreements.	T, O, PPS
		2.3.3	Evaluation includes reviewing the experimental procedures, examining the evidence, identifying faulty reasoning, pointing out statements that go beyond the evidence, and suggesting alternative explanations for the same observations. Although scientists may disagree about explanations of phenomena, about interpretations of data, or about the value of rival theories, they do agree that questioning, response to criticism, and open communication are integral to the process of science. As scientific knowledge evolves, major disagreements are eventually resolved through such interactions between scientists.	T, O, PPS

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5 - 8	**2.4**	**History of Science**	
	2.4.1	In historical perspective, science has been practiced by different individuals in different cultures. In looking at the history of many peoples, one finds that scientists and engineers of high achievement are considered to be among the most valued contributors to their culture.	T, O, PPS
	2.4.2	Tracing the history of science can show how difficult it was for scientific innovators to break through the accepted ideas of their times of reach the conclusions that we currently take for granted.	O, PPS
9 - 12	**2.5**	**Science as a human endeavor**	
	2.5.1	Pursuing science as a career or as a hobby can be both fascinating and intellectually rewarding.	O, PPS
	2.5.2	Scientists have ethical traditions. Scientists value peer review, truthful reporting about the methods and outcomes of investigations, and making public the results of their work. Violations of such norms do occur, but scientists responsible for such violations are censured by their peers.	O, PPS
	2.5.3	Scientists are influenced by societal, cultural, and personal beliefs and ways of viewing the world. Science is not separate from society but rather science is a part of society.	O, PPS
	2.6	**Nature of science**	
	2.61.	Explanations on how the natural world changes based on myths, personal beliefs, religious values, mystical inspiration, superstition, or authority may be personally useful and socially relevant, but they are not scientific.	O, PPS
	2.6.2	.All scientific knowledge is, in principle, subject to change as new evidence becomes available. The core ideas of science have been subjected to a wide variety of confirmations and are therefore unlikely to change in the areas in which they have been tested. In areas where data or understanding are incomplete, new data may well lead to changes in current ideas or resolve current conflicts. In situations where information is still fragmentary, it is normal for scientific ideas to be incomplete, but this is also where the opportunity for making advances may be greatest.	O, PPS
	2.7	**Historical perspectives**	
	2.7.1.	In history, diverse cultures have contributed scientific knowledge and technological inventions.	T, O, PPS
	2.7.2.	Usually, changes in science occur as small modifications in existing knowledge.	T, O, PPS

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3. Science in Personal and Social Perspectives : Each student will develop an understanding of:			
Grade |	Performance Standards		| Assessment
K - 8	**3.1**	**Personal health**	
	3.11	Personal exercise, especially developing cardiovascular endurance, is the foundation of physical fitness.	T, O, PPS, PORT
	3.12	Tobacco use increases the risk of illness. Students should understand the influence of short-term social and psychological factors that lead to tobacco use.	T, O, PPS
	3.13	Alcohol and other drugs are often abused substances. Such drugs change how the body functions and can lead to addiction.	T, O, PPS
	3.14	Nutrition requirements vary with weight, age, sex, activity, and body functioning.	T, O, PPS
	3.15	Sex drive is a natural human function that requires understanding. Sex is also a prominent means of transmitting disease. Disease can be prevented through a variety of precautions.	T, O, PPS
	3.16	The natural environment may contain substances harmful to humans. Maintaining environmental health involves establishing and monitoring standards relating to the use of soil, water, and air.	T, O, PPS
	3.2	**Populations, resources, and environments**	
	3.2.1	When an area becomes overpopulated, the environment will become degraded due to the increased use of resources.	T, O, PPS
	3.2.2	Causes of environmental degradation and resource depletion vary from region to region and from country to country.	T, O, PPS
	3.3	**Natural hazards**	
	3.3.1	Internal and external processes of the earth system cause natural hazards, events that change or destroy human and wildlife habitats, damage property, and harm or kill humans.	T, O, PPS
	3.3.2	Human activities also can induce hazards through resource acquisition, urban growth, land-use decisions, and waste disposal. Such activities can accelerate many natural changes.	T, O, PPS
	3.4	**Risks and benefits**	
	3.4.1	Risk analysis considers type of hazard and estimates the numbers of people that might be exposed and likely to suffer consequences.	O, PPS
	3.4.2	Students should understand the risks associated with natural, chemical, biological, social and personal hazards.	O, PPS
	3.4.3	Individuals can use a systematic approach to thinking critically about risks and benefits.	O, PPS

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5 - 8	**3.5**	**Science and technology in society**	
	3.5.1	Scientific knowledge and the procedures used by scientists influence the way many in society think about themselves, others, and their environment. The effect of science on society is neither entirely beneficial nor entirely detrimental.	O, PPS
	3.5.2	Societal challenges often inspire questions for scientific research, and social priorities often influence research priorities through the availability of funding for research.	O, PPS
	3.5.3	Technology influences society through its products and processes. Social needs, attitudes, and values influence the direction of technological development.	O, PPS
	3.5.4	Science and technology have contributed enormously to economic growth and productivity among societies and groups within societies.	O, PPS
	3.5.6	Science cannot answer all questions and technology cannot solve all human problems or meet all human needs. There is a difference between scientific and other questions. Science and technology contribute much to society, but not all problems can be solved through their application.	O, PPS
9 - 12	**3.6**	**Personal and community health**	
	3.6.1	Drugs can result in physical dependence and can increase the risk of injury, accidents, and death.	T, O, PPS
	3.6.2	Sexuality is basic to the physical, mental, and social development of human beings. Human sexuality involves biological functions, psychological motives, and is influenced by cultural, ethnical , religious, and technological considerations. Sex is a basic and powerful force that has consequences to individuals' health and to society.	T, O, PPS

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9 – 12	**3.7 Population growth**		
	3.7.1	Populations can increase through linear or exponential growth, with effects on resource use and environmental pollution.	T, O, PPS
	3.7.2	Many factors influence birth rates and fertility rates. Examples are: average levels of affluence and education, importance of children in the labor force, education and employment of women, infant mortality, costs of raising children, availability and reliability of birth control methods, and religious beliefs and cultural norms	T, O, PPS
	3.7.3	Carrying capacity is the maximum number of individuals that can be supported in a given environment. The limitation is not the availability of space, but the number of individuals in relation to resources. Technology can cause significant changes, either positive or negative, in carrying capacity.	T, O, PPS
	3.8	**Natural resources**	
	3.8.1	The Earth does not have infinite resources. Increasing human consumption puts severe stress on natural processes that renew some resources, and deplete those that cannot be renewed.	T, O, PPS
	3.8.2	Natural systems have a limited capacity to reuse waste. Natural systems can change to an extent that exceeds the limits of organisms to adapt naturally or humans to adapt technologically.	T, O, PPS
	3.9	**Environmental quality**	
	3.9.1	Natural ecosystems provide an array of basic processes that affect humans. Those processes include maintenance of the quality of the atmosphere, generation of soils, control of the hydrologic cycle, disposal of wastes, and recycling of nutrients.	T, O, PPS
	3.10	**Natural and human-induced hazards**	
	3.10.1	As societies have grown, vulnerability to natural processes of change has increased.	T, O, PPS
	3.10.2	Natural changes which may be fast or slow, may positively or negatively affect society.	T, O, PPS
	3.10.3	Many changes in the environment designed by humans bring benefit to society, as well as cause risks.	T, O, PPS
9 – 12	3.10.4	The scale of events and accuracy with which scientists and engineers can (and cannot) predict events are important considerations.	T, O, PPS
	3.11	**Science and technology in local, national, and global challenges**	
	3.11.1	Progress in science and technology can be affected by social issues and challenges.	O, PPS
	3.11.2	Decisions involve assessment of alternatives. It depends on one's cultural context. Traditional world view considers science's interconnected nature as a precursor to decision making.	O, PPS

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4. Life Science : Each student will develop an understanding of:			
Grade |	**Performance Standards**		**| Assessment**
K - 4	**4.1**	**Characteristics of organisms**	
		4.1.1 Organisms have basic needs.	O,PR/PA/PE
		4.1.2 Each plant or animal has different structures, serving different functions in growth, survival, and reproduction.	T, O, PPS
		4.1.3 The behavior of individual organisms is influenced by internal and external cues (such as hunger and environmental change)	T, O, PPS
	4.2	**Life cycles of organisms**	
		4.2.1 Plants and animals have life cycles that include a variety of stages.	T, O, PPS PR/PE/PA
		4.2.2 Plants and animals closely resemble their parents.	O, PPS, PR/PE/PA
		4.2.3 Many characteristics of an organism are inherited from the parents of the organism but some are not. (Nature/Nurture).	O, PPS
	4.3	**Organisms and their environment**	
		4.3.1 All animals depend on plants, either directly or indirectly.	O, PPS
		4.3.2 An organism's patterns of behavior are related to the nature of that organism's environment. When the environment changes, some plants and animals survive and reproduce, and others die or relocate.	O, PPS PR/PE/PA
		4.3.3 All organisms cause changes in their environment; some are detrimental and others are beneficial.	T, O, PPS PR/PE/PA
		4.3.4 Human beings are an important part of the environment.	O, PPS PR/PE/PA
5 - 8		4.3.5 Some human activities are detrimental to the environment such as global warming and pollution, while other human activities are beneficial, such as conservation of natural resources (recycling, restoration, alternative fuel, etc.)	O, PPS PR/PE/PA

5 - 8	**4.4**	**Structure and function in living systems**	
	4.4.1	Structure and function include cells, tissues, organs, organ systems, whole organisms, ecosystems, and biomes.	PPS
	4.4.2	All organisms are composed of cells - the fundamental unit of life.	PPS
	4.4.3	Cells carry on the many functions needed to sustain life.	O, PPS
	4.4.4	Specialized cells perform specialized functions in multi-cellular organisms.	O, PPS
	4.4.5	Organisms have specialized systems that interact with one another.	O, PPS
	4.4.6	Disease is a breakdown in structures or functions of an organism due to intrinsic and/or extrinsic causes.	O, PPS
	4.5	**Reproduction and heredity**	
	4.5.1	Reproduction is a characteristic of all living systems whether sexual or asexual.	O, PPS
	4.5.2	In many plant and animal species, females produce eggs and males produce sperm. Sexually produced offspring are never identical to their parents.	O, PPS
	4.5.3	Every organism requires a set of instructions for specifying its traits which are passed from generation to generation.	O, PPS
	4.5.4	Hereditary information is contained in genes, located in the chromosomes of each cell.	T, O, PPS
	4.5.5	The characteristics of an organism can be described in terms of a combination of traits. Some traits are inherited and others result from interactions with the environment (nature/nurture).	T, O, PPS
	4.6	**Regulation and behavior**	
	4.6.1	All organisms must be able to obtain and use resources, grow, reproduce, and maintain stable internal conditions while living in a constantly changing external environment.	T, O, PPS
	4.6.2	Regulation of an organisms' internal environment involves sensing the internal environment and changing physiological activities to keep conditions within the range required to survive. Behavior is one kind of response an organism can make to both external and internal stimuli.	T, O, PPS
	4.6.3	Behavioral response is a set of actions determined in part by heredity and in part by experience.	T, O, PPS
	4.6.4	The behavior of organism's, of a species, evolves through adaptation by that species to its environment.	T, O, PPS

5 - 8	**4.7**	**Populations and ecosystems**	
	4.7.1	Populations of organisms can be categorized by the function they serve in an ecosystem.	T, O, PPS
	4.7.2	All species ultimately depend on one another. Interactions between two types of organisms include producer/consumer, predator/prey, parasite/host, as well as relationships that can be mutually beneficial or competitive.	T, O, PPS
	4.7.3	Food webs identify the relationships among producers, consumers, and decomposers in an ecosystem.	T, O, PPS
	4.7.4	The sun is the major source of energy for all ecosystems. This energy then passes from organism to organism in food webs.	T, O, PPS
	4.7.5	The number and types of organisms an ecosystem can support depend on the resources available and on biotic factors. Limitations of resources and other factors such as predation and climate limit the growth of populations in specific niches in the ecosystem.	T, O, PPS
	4.8	**Diversity and adaptations of organisms**	
	4.8.1	The unity among organisms becomes apparent from an analysis of internal structures, the similarity of their chemical processes, and the evidence of common ancestry.	T, O, PPS
	4.8.2	Biological evolution accounts for the diversity of species developed through gradual processes over many generations.	T, O, PPS
	4.8.3	Species acquire many of their unique characteristics through biological adaptations, which involves the selection of naturally occurring variations in populations.	T, O, PPS
	4.8.4	Extinction of a species occurs when the environment changes and the adaptive characteristics of a species are insufficient to allow its survival.	T, O, PPS
	4.8.5	The fossil record, through geologic evidence, documents the appearance, diversification, and extinction of many life forms.	T, O, PPS, PR/PE/PA
	4.8.6	Extinction of a species is common. However, humans have accelerated the rate of extinction.	T, O, PPS
9 - 12	**4.9**	**The cell**	
	4.9.1	Cells have particular structures that underlie their functions.	T, O, PPS
	4.9.2	Most cell functions involve chemical reactions.	T, O, PPS
	4.9.3	The genetic information stored in DNA is used to direct the synthesis of the thousands of proteins that each cell requires.	T, O, PPS
	4.9.4	Through regulation, cells respond to their environment and control and coordinate cell growth and division.	T, O, PPS

9 - 12		4.9.5 Photosynthesis occurs when chloroplasts in plant cells allow the plant to capture the sun's energy and produce sugar which is used for food.	T, O, PPS
		4.9.6 Cells can differentiate; this is regulated through the expression of different genes.	T, O, PPS
		4.9.7 Complex multi-cellular organisms are formed as a highly organized arrangement of differentiated cells.	T, O, PPS
	4.10	**Molecular basis of heredity**	
		4.10.1 In all organisms, the instructions for specifying the characteristics of the organism are carried in self-replicating molecules of DNA. Each DNA molecule in a cell forms a single chromosome.	T, O, PPS
		4.10.2 Different organisms have different number of chromosomes. These chromosomes pair, one coming from the male and one from the female, and this genetic information is transferred via the egg and sperm during sexual reproduction.	T, O, PPS
		4.10.3 Changes in DNA (mutations) occur spontaneously at low rates. Only mutations in germ cells are passed on to the next generation.	T, O, PPS
	4.11	**Biological evolution**	
		4.11.1 Evolution is the consequence of the interactions of: species to increase its numbers, genetic variability of offspring due to mutation and recombination of genes, a finite supply of resources required for life, and the ensuing selection by the environment of those offspring better able to survive and leave offspring.	T, O, PPS
		4.11.2 Natural selection leads to organisms that are well suited for survival in particular environments, so that when an environment changes, some inherited characteristics, including behavior, become more or less advantageous or neutral. Chance alone can result in characteristics having no survival or reproductive value.	T, O, PPS
		4.11.3 Natural selection and its evolutionary consequences provide a scientific explanation for the fossil record of ancient life forms, as well as for the striking molecular similarities observed among the diverse species of living organisms. The millions of different species that live on Earth today are related by descent from common ancestors.	T, O, PPS, PORT
		4.11.4 Biological classifications are based on their evolutionary relationships.	T, O, PPS PR/PE/PA
	4.12	**Interdependence of organisms**	
		4.12.1 The atoms and molecules cycle on the earth among the living and nonliving components of the biosphere.	T, O, PPS
		4.12.2 Energy flows through ecosystems in one direction, from photosynthetic organisms to herbivores to carnivores and decomposers.	T, O, PPS

9 - 12		4.12.3	Organisms both cooperate and compete in ecosystems.	T, O, PPS
		4.12.4	Populations of organisms have the ability to reach their biological potential, but environments and resources limit that potential.	T, O, PPS
		4.12.5	Humans have an impact on the equilibrium of the natural world. This impact is threatening global stability.	T, O, PPS
	4.13	**Matter, energy, and organization in living systems**		
		4.13.1	All matter tends toward more disorganized states. Living systems require a continuous input of energy to maintain their chemical and physical organizations.	T, O, PPS PR/PA/PE
		4.13.2	Plants capture energy by absorbing light and using it to form strong chemical bonds between the atoms of carbon-containing molecules.	T, O, PPS PR/PA/PE
		4.13.3	The chemical bonds of food molecules contain energy. Energy is released when the bonds of food molecules are broken.	T, O, PPS
		4.13.4	As matter and energy flow through different levels or organization of living systems and the physical environment, chemical elements are recombined in different ways. Matter and energy are conserved in each transformation.	T, O, PPS
	4.14	**Behavior of organisms**		
		4.14.1	Multi-cellular animals have nervous systems that generate behavior. These systems vary in complexity, depending on the evolutionary complexity of the organism.	T, O, PPS
		4.14.2	The broad patterns of behavior exhibited by animals have evolved to ensure reproductive success.	T, O, PPS

5. Physical Science: Each student will develop an understanding of:			
Grade |	**Performance Standards**		**| Assessment**
K - 4	**5.1**	**Properties of objects and materials**	
	5.1.1	Objects have many observable properties which can be measured. These properties can be used to separate or sort a group of objects or materials.	T, O, PPS PE/PE/PA
	5.1.2	Objects are made of one or more materials.	T, O, PPS
	5.1.3	Materials can exist in different states - solid, liquid, and gas.	T, O, PPS
	5.2	**Position and motion of objects**	
	5.2.1	The position of an object can be described by locating it relative to another object or the background.	O, PPS PR/PE/PA
	5.2.2	An object's motion can be described by tracing and measuring its position over time.	O, PPS PR/PE/PA
	5.2.3	The position and motion of objects can be changed by pushing or pulling. The size of the change is related to the strength of the push or pull.	T, O, PPS
	5.2.4	Sound is produced by vibrating objects. The pitch of the sound can be varied by changing the rate of vibration.	T, O, PPS
	5.3	**Light, heat, electricity, and magnetism**	
	5.3.1	Light travels in a straight line until it strikes an object. Light can be reflected, refracted, or absorbed.	T, O, PPS PR/PE/PA
	5.3.2	Heat can be produced in many ways. Heat can move from one object to another by conduction.	T, O, PPS PR/PE/PA
	5.3.3	Electricity in circuits require a complete loop to produce light, heat, sound, and magnetic effects.	T, O, PPS PR/PE/PA
	5.3.4	Magnets attract and repel each other and certain kinds of other materials.	O, PPS PR/PE/PA
5 - 8	**5.4**	**Properties and changes of properties in matter**	
	5.4.1	A substance has characteristic properties, all of which are independent of the amount of the sample. A mixture can be separated into the original substances.	T, O, PPS
	5.4.2	Substances react chemically with other substances to form compounds with different characteristic properties. In chemical reactions, the total mass is conserved.	T, O, PPS PR/PE/PA
	5.4.3	There are more than 100 known elements that combine in numerous ways to produce compounds, which account for living and nonliving substances that we encounter; chemical elements do not break down chemically, by normal laboratory reactions.	T, O, PPS

5. Physical Science: Each student will develop an understanding of:			
Grade |	**Performance Standards**		**| Assessment**
5 - 8	5.4.4	Many elements can be grouped according to similar properties on the periodic table. Some elements do not fit into any of the categories.	T, O, PPS
	5.4.5	All substances are made up of different arrangements of atoms which are too small to see directly through a microscope.	T, O, PPS
	5.4.6	Atoms in solids are close together and don't move about easily. In liquids, atoms are close together and stick to each other, but move easily. Atoms in gas are quite far apart and move about freely.	T, O, PPS
	5.4.7	Atoms often combine to form a molecule (or crystal), the smallest particle of a substance that retains its properties.	T, O, PPS
	5.4.8	The temperature and acidity of a solution influence reaction rates. Many substances dissolve in water, which may greatly facilitate reactions between them.	T, O, PPS, PR/PE/PA
	5.4.9	Oxidation involves the combining of oxygen with something else.	T, O, PPS
	5.5	**Motion and forces**	
	5.5.1	The motion of an object can be described by its position, direction of motion, and speed.	T, O, PPS, PR/PE/PA
	5.5.2	Newton's 1st Law - An object that is not being subjected to a force will continue to move at a constant speed and in a straight line.	T, O, PPS, PR/PE/PA
	5.5.3	Newton's 2nd and 3rd Laws - When more than one force acts on an object along a straight line, the forces will amplify or cancel one another, depending on their direction and magnitude. Unbalanced forces cause changes in speed or direction of an object's motion.	T, O, PPS, PR/PE/PA
	5.6	**Transfer of energy**	
	5.6.1	Energy is a property of many substances. Energy is transferred in many ways and can be manifested as heat, light, electricity, kinetic potential, sound, nuclear, and chemical energy.	T, O, PPS
	5.6.2	Heat moves in predictable ways flowing from warmer objects to cooler ones, until both reach the same temperature.	T, O, PPS, PR/PE/PA
	5.6.3	Light interacts with matter by transmission, absorption, or scattering (including reflection).	T, O, PPS
	5.6.4	Electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced.	T, O, PPS
	5.6.5	In most chemical reactions, energy is released or added to the system in the form of heat, light, electrical, or mechanical energy.	T, O, PPS

5. Physical Science: Each student will develop an understanding of:			
Grade |	**Performance Standards**		**| Assessment**
5 - 8	5.6.6	The sun loses energy by emitting light. Only a tiny portion of that light reaches the earth. The sun's energy arrives as light with a range of wavelengths, consisting of visible light, infrared, and ultraviolet radiation.	T, O, PPS
9 - 12	**5.7**	**Structure of atoms**	
	5.7.1	Matter is made of minute particles called atoms, and atoms are composed of even smaller components. These components have measurable properties, such as electrical charge and mass.	T, O, PPS
	5.7.2	Each atom has a positively charged nucleus surrounded by negatively charged electrons, and some atoms have particles called neutrons with no electrical charge. The electric force between the nucleus and electrons holds the atom together.	T, O, PPS
	5.7.3	The atom's nucleus is composed of protons and neutrons, which are much more massive than electrons. When an element has atoms that differ in the number of neutrons, these atoms are called isotopes of the element.	T, O, PPS
	5.7.4	In an atom where the number of electrons equals the number of protons, the atom is electrically neutral.	T, O, PPS
	5.75	In an atom where the number of electrons is not equal to the number of protons, the atom acquires a charge and is called an ion.	T, O, PPS
	5.7.6	Scientists continue to investigate atoms and have discovered even smaller constituents of which electrons, neutrons, and protons are made.	T, O, PPS
	5.7.7	The nuclear forces that hold the nucleus of an atom together, at nuclear distances, are usually stronger than the electric forces that would make it fly apart.	T, O, PPS
	5.7.8	Nuclear reactions convert a fraction of the mass of interacting particles into energy, and they can release much greater amounts of energy than atomic interactions. Fission is the splitting of a large nucleus into smaller pieces.	T, O, PPS
	5.7.9	Fusion is the joining of two nuclei at extremely high temperature and pressure and is the process responsible for the energy of the sun and stars.	T, O, PPS
	5.7.10	Radioactive isotopes can decay spontaneously, emitting particles and/or wavelike radiation.	T, O, PPS
	5.7.11	The decay of any one nucleus cannot be predicted, but a large group of identical nuclei decay at a predictable rate. This predictability can be used to estimate the age of materials that contain radioactive isotopes.	T, O, PPS

9 - 12	**5.8**	**Structure and properties of matter**		
		5.8.1	Atoms interact with one another by transferring or sharing electrons that are furthest from the nucleus. These outer electrons govern the chemical properties of the element.	T, O, PPS
		5.8.2	A particular element is composed of atoms with the same number of protons. When elements are listed in order according to the number of protons (called the atomic number), repeating patterns of physical and chemical properties identify families of elements with similar properties which are contained in the periodic table.	T, O, PPS
		5.8.3	Bonds between atoms are created when electrons pair up by being transferred or shared.	T, O, PPS
		5.8.4	The physical properties of compounds are determined by their structure.	T, O, PPS, PR/PE/PA
		5.8.5	Solids, liquids, and gases differ in the distances and angles between molecules or atoms. The chemical bonds linking solids, liquids and gases differ in energy due to these differing distances and angles.	T, O, PPS
		5.8.6	Carbon atoms can bond to one another to form a variety of structures. Life is based on the chemistry of the carbon atom.	T, O, PPS
	5.9	**Chemical reactions**		
		5.9.1	Complex chemical reactions involving carbon-based molecules take place constantly in every cell in our bodies.	T, O, PPS
		5.9.2	Chemical reactions may release or consume energy.	T, O, PPS
		5.9.3	A large number of important reactions involve the transfer of either electrons (oxidation/reduction reactions) or hydrogen ions (acid/base reactions) between reactants. In other reactions, chemical bonds are broken by heat or light.	T, O, PPS
		5.9.4	Chemical reactions can take place very quickly or very slowly. Reaction rates depend on how often the reactants encounter one another, on the temperature, and on the properties - including shape - of the reactants.	T, O, PPS
		5.9.5	Catalysts accelerate chemical reactions; enzymes are biological catalysts.	T, O, PPS
		5.9.6	The mole is an important unit of measure in chemistry.	T, O, PPS
	5.10	**Motions and forces**		
		5.10.1	Objects change their motion only when a new force is applied. The magnitude of the change in motion can be calculated using the relationship F=ma, which applies to all forces.	T, O, PPS

9 - 12		5.10.2	Gravitation is a universal force that each mass exerts on any other mass. The strength of the gravitational attractive force between two masses is proportional to the masses and inversely proportional to the square of the distance between them.	T, O, PPS
		5.10.3	The electric force is a universal force that exists between any two charged objects. Opposite charges attract while like charges repel. The strength of the force is proportional to the charges, and, as with gravitation, inversely proportional to the square of the distance between them.	T, O, PPS
		5.10.4	Most observable forces may be traced to electric forces acting between atoms and molecules.	T, O, PPS
		5.10.5	Electricity and magnetism are two aspects of a single electromagnetic force.	T, O, PPS
		5.10.5	Moving electric charges produce magnetic forces, and moving magnets produce electric forces.	T, O, PPS
	5.11	**Conservation of energy and the increase in disorder**		
		5.11.1	The total energy of the universe is constant therefore it cannot be created or destroyed. However, energy can be transferred in many ways. As these transfers occur, the matter involved becomes steadily less ordered.	T, O, PPS
		5.11.2	All energy can be considered to be either kinetic energy, potential energy, or energy contained by a field.	T, O, PPS
		5.11.3	Heat consists of random motion and the vibrations of atoms, molecules, and ions. The higher the temperature, the greater the atomic or molecular motion.	T, O, PPS
		5.11.4	Everything tends to become less organized and less orderly over time. In all energy transfers, the overall effect is that the energy is spread out uniformly.	T, O, PPS
	5.12	**Interactions of energy and matter**		
		5.12.1	Waves have energy and can transfer energy when they interact with matter.	T, O, PPS
		5.12.2	Electromagnetic waves result when a charged object is accelerated or decelerated. The energy of electromagnetic waves is carried in packets whose magnitude is inversely proportional to the wavelength.	O, PPS
		5.12.3	Each kind of atom or molecule can gain or lose energy only in particular discrete amounts and thus can absorb and emit light only at wavelengths corresponding to these amounts. These wavelengths can be used to identify the substance.	T, O, PPS
		5.12.4	In conductors, electrons flow easily, whereas, in insulators they hardly flow at all. Semiconductors have intermediate behavior. At low temperatures, some materials become superconductors and offer no resistance to the flow of electrons.	T, O, PPS

6. Earth and Space Science : Each student will develop an understanding of:				
Grade |	**Performance Standards**			**| Assessment**
K - 4	**6.1**	**Properties of earth materials**		
	6.1.1		Earth materials are solid rocks and soils, water, and the gases of the atmosphere. The varied materials have different physical and chemical properties, which made them useful in different ways. Earth materials provide many of the resources that humans use.	T, O, PPS, PR/PE/PA
	6.1.2		Soils have properties of color and texture, and a capacity to retain water, which gives them the ability to support the growth of many kinds of plants.	T, O, PPS
	6.1.3		Fossils provide evidence about the plants and animals that lived long ago and the nature of the environment at that time.	T, O, PPS
	6.2	**Objects in the sky**		
	6.2.1		Objects in the sky have properties, locations, and movements that can be observed and described.	T, O, PPS
	6.2.2		The sun provides the light and heat necessary to maintain the temperature of the earth.	T, O, PPS
	6.3	**Changes in the Earth and sky**		
	6.3.1		The surface of the earth changes. Some changes are due to slow processes and some to rapid processes.	T, O, PPS
	6.3.2		Weather changes from day to day and over the seasons. Weather can be described by measurable quantities.	T, O, PPS
	6.3.3		Objects in the sky have patterns of movement. The sun, for example, appears to move across the sky in the same way every day, but its path changes slowly over the seasons. The moon has similar movements. The observable shape of the moon changes from day to day in a cycle that lasts about a month.	T, O, PPS, PR/PE/PA
	6.3.4		Clouds, formed by the condensation of water vapor, affect weather and climate.	T, O, PPS, PR/PE/PA
5 - 8	**6.4**	**Structure of the Earth system**		
	6.4.1		The solid earth is layered with a lithosphere; a hot, convecting mantle; and a dense metallic core. The Earth's magnetic field has reversed its polarity several times in the past, and will do so in the future.	T, O, PPS
	6.4.2		Lithospheric plates constantly move at rates of centimeters per year in response to movements in the mantle. Major geological events result from these plate motions.	T, O, PPS
	6.4.3		Landforms are the result of a combination of constructive and destructive forces.	T, O, PPS

6. Earth and Space Science : **Each student will develop an understanding of:**			
Grade |	**Performance Standards**		**| Assessment**
5 - 8	6.4.4	Some changes in the solid earth can be described as the "rock cycle." In this cycle, one type of rock can be converted into another type of rock through geologic processes which act upon that rock.	T, O, PPS
	6.4.5	Thousands of layers of sedimentary rock confirm the long history of the Earth and the long history of changing life forms whose remains are found in the rock's successive layers. The most recent layers may not always be found on top because of the folding, breaking, and uplifting of layers.	T, O, PPS
	6.4.6	Soil consists of weathered rocks and decomposed organic material from dead plants, animals, and bacteria. Soils are often found in layers, with each having a different chemical composition and texture.	T, O, PPS
	6.4.7	Water, which covers the majority of the earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the "water cycle".	T, O, PPS
	6.4.8	Water is a solvent. As it passes through the water cycle, it dissolves minerals and gases and carries them to the oceans.	T, O, PPS
	6.4.9	The atmosphere is a mixture of nitrogen, oxygen, and trace gases that include water vapor. The atmosphere has different properties at different elevations.	T, O, PPS
	6.4.10	Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate, because water in the oceans holds a large amount of heat.	T, O, PPS
	6.4.11	Living organisms have played many roles in the Earth system, including affecting the composition of the atmosphere, producing some types of rocks, and contributing to the weathering of rock.	T, O, PPS
	6.5	**Earth's history**	
	6.5.1	The earth processes we see today are similar to those that occurred in the past. Earth history is also influenced by occasional catastrophes.	T, O, PPS
	6.5.2	Fossils provide important evidence of how life and environmental conditions have changed.	T, O, PPS

5 - 8	**6.6**	**Earth in the Solar System**	
	6.6.1	The Sun is a medium-sized star, located at the edge of a disk-shaped galaxy called the Milky Way, part of which can be seen on a clear night as a glowing band of light.	T, O, PPS
	6.6.2	The universe contains many billions of galaxies, each containing many billions of stars.	T, O, PPS
	6.6.3	Planets of differing sizes, surface features and with differing compositions move around the Sun in nearly circular orbits; some planets are orbited by a variety of moons and rings of particles.	T, O, PPS
	6.6.4	Planets change their position in the sky relative to the general pattern of stars.	T, O, PPS
	6.6.5	The patterns of stars in the sky stay the same, although they appear to move across the sky nightly, and different stars can be seen in different seasons.	T, O, PPS
	6.6.6	We live on a fairly small planet, the third from the Sun.	T, O, PPS
	6.6.7	Many pieces of rock and ice orbit our Sun; some meet the Earth in its orbit, glow, and disintegrate from friction as they plunge through our atmosphere; other objects called comets, have long, off-center orbits that bring them close to the Sun, whose radiation boils off material and pushes it into a long, illuminated tail.	T, O, PPS
	6.6.8	The Moon orbits around the Earth in about 28 days. How much of the Moon is lighted by the Sun and how much of that part can be seen from the Earth, results in the phases of the Moon.	T, O, PPS
	6.6.9	Astronomical objects in interstellar space are unimaginably distant from the Earth and each other. Stars are like the Sun but so distant they look like points of light. Galaxies, though very large, are so distant, they look like a single star.	T, O, PPS
	6.6.10	Light travels from the Sun to the Earth in a few minutes, from the next nearest star in four years, and from very distant stars in several billion years; the distance light travels in a few years would take the fastest rocket thousands of years.	T, O, PPS
	6.6.11	Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion in the solar system. Gravity along holds us to the Earth's surface and explains the phenomena of the tides.	T, O, PPS
	6.6.12	The sun is the major source of energy for phenomena on the Earth's surface, such as winds, ocean currents, and the water cycle. Seasons result from variations in the amount of the sun's energy hitting the surface, due to the tilt of the earth's rotation on its axis and the length of the day.	T, O, PPS

9 - 12	**6.7**	**Energy in the Earth system**		
		6.7.1	Earth systems have internal and external sources of energy. Both of these energy sources create heat. Two of the primary sources of internal energy are the decay of radioactive isotopes, and the gravitational energy from the Earth's original formation.	T, O, PPS
		6.7.2	The solid crust of the Earth, including both the continents and the ocean basins, consists of separate plates that ride on a denser, hot, and gradually deformable layer of the Earth. These crust sections move very slowly, pressing against one another in some places and pulling apart in other places.	T, O, PPS
		6.7.3	The slow movement of material within the Earth results from heat flowing out from the deep interior of the planet and from the action of gravitational forces on regions of different densities.	T, O, PPS
		6.7.4	Molten rock from below the Earth's surface creates pressure that is released by volcanic eruptions. Under the ocean basins, molten rock may well up between separating plates to create new ocean floor. Volcanic activity along the ocean floor may form undersea mountains. These mountains may eventually become islands.	T, O, PPS
		6.7.5	Earthquakes often occur along the boundaries between colliding plates.	T, O, PPS
		6.7.6	Solar radiation heats the Earth's land masses, oceans, and air. The transfer of heat energy at their boundaries (i.e. between the atmosphere, the land masses, and the oceans) results in different temperatures and densities in the layers of both oceans and the atmosphere.	T, O, PPS
		6.7.7	The action of gravitational force on layers of different densities causes the layers to rise or fall. Such circulation (influenced by the rotation of the Earth) produces winds and ocean currents.	T, O, PPS
		6.7.8	Dynamic processes such as cloud cover and the rotation of the Earth, and static conditions such as the position of mountain ranges and oceans influence global climate.	T, O, PPS

9 - 12	**6.8**	**Geochemical cycles**		
		6.8.1	The earth is a system containing a fixed amount of each stable chemical atom or element. Each element can exist in several different chemical reservoirs. Each element on Earth moves among reservoirs in the solid earth, oceans, atmosphere, and organisms as part of geochemical cycles.	T, O, PPS
		6.8.2	Movement of matter between reservoirs is driven by the Earth's internal and external sources of energy. These movements are often accompanied by a change in the physical and chemical properties of the matter.	T, O, PPS
	6.9	**Origin and evolution of the Earth System**		
		6.9.1	Our solar system formed from a nebular cloud of dust and gas 4.6 billion years ago.	T, O, PPS
		6.9.2	Geologic time can be estimated by observing rock sequences and using fossils to correlate the sequences at various locations. Recent methods use the predictability of decay rates of radioactive isotopes in rock formations to determine geologic time.	T, O, PPS, PR/PE/PA
		6.9.3	We can observe some changes such as earthquakes and volcanic eruptions on a human time scale, but many processes such as mountain building and plate movements take place over hundreds of millions of years.	T, O, PPS
		6.9.4	Evidence for simple, one-celled forms of life such as bacteria and algae, extends back more than 3.5 billion years. The evolution of life resulted in dramatic changes in the composition of the Earth's atmosphere which did not originally contain oxygen.	T, O, PPS
	6.10	**Origin and evolution of the universe**		
		6.10.1	Scientific account of the universe comes from studying evidence about its contents and imagining, with the help of mathematical models and computer simulations, how the contents got to be the way they are.	T, O, PPS
		6.10.2	The 'big bang' theory places the origin between 10 and 20 billion years ago, when the universe began in a hot dense state. According to this theory, the universe has been expanding ever since.	T, O, PPS
		6.10.3	At the beginning of the universe, stars formed out of clouds of the lightest elements (hydrogen and helium) and became hot as the material condensed and began releasing energy from the nuclear fusion of these light elements into heavier ones in their extremely hot, dense cores.	T, O, PPS
		6.10.4	Some stars eventually exploded, producing clouds of material from which other stars and planets would condense. This process of star formation and destruction continues.	T, O, PPS

9 - 12	6.10.5	Billions of galaxies, each of which is a gravitationally bound cluster of billions of stars, now form most of the visible mass in the universe.	T, O, PPS
	6.10.6	Stars produce energy from nuclear reactions, primarily the fusion of hydrogen to form helium.	T, O, PPS
	6.10.7	Stars differ from each other in size, temperature, and age, but appear to be made up of the same elements and appear to behave according to the same principles. However, unlike our Sun, most stars are in systems of two or more stars orbiting around a common point.	T, O, PPS

7. Science and Technology : **Each student will develop:**			
Grade |	**Performance Standards**		**| Assessment**
K - 4	**7.1**	**Abilities in the aspects of technological design**	
	7.1.1	Identify a simple problem.	PPS
	7.1.1.1	Develop the ability to explain a problem in his or her own words	PPS
	7.1.2	Propose a solution	PPS
		7.1.2.1 Make proposals to build something and/or get something to work better	PPS
		7.1.2.2 Establish criteria	PPS
		7.1.2.3 Describe and communicate ideas	PPS
		7.1.2.4 Recognize that solution design may have constraints, such as cost, materials, time, space, or safety	PPS
	7.1.3	Implement proposed solutions	PPS
		7.1.3.1 Develop abilities to work individually and collaboratively	PPS
		7.1.3.2 Use suitable tools, techniques and quantitative measurements when appropriate	PPS
		7.1.3.3 Demonstrate the ability to balance simple constraints in problem solving	PPS
	7.1.4	Evaluate a product or design	PPS
		7.1.4.1 Evaluate their own results or solutions to problems, as well as those of other children, by considering how well a product or design meets the challenge to solve a problem	PPS
		7.1.4.2 Modify designs based on evaluation results	PPS
	7.1.5	Communicate a problem, design, and solution.	PPS
		7.1.5.1 Include oral, written, visual, and pictorial communication of the design process and product	PPS
	7.2	**Understandings in science and technology**	
	7.2.1	People have always had problems and invented tools and techniques to solve problems.	PPS
	7.2.2	Scientists and engineers often work in teams with different individuals doing different things that contribute to the results.	PPS
	7.2.3	Tools help scientists make better observations, measurements, and equipment for investigations.	PPS

5 - 8	**7.3**	**Abilities in the aspects of technological design**		
	7.3.1	Identify appropriate problems for technological design		PPS
		4.3.1.1	Develop abilities by identifying a specific need, considering its various aspects, and talking to different potential users or beneficiaries	PPS
	7.3.2	Design a solution or product		O
		7.3.2.1	Make and compare different proposals and design a solution or product taking into account needs and constraints	O
		7.3.2.2	Communicate ideas with drawings and simple models	O
	7.3.3	Implement a proposed design		O
		7.3.3.1	Organize materials and other resources, plan the work, make good use of group collaboration where appropriate, choose suitable tools and techniques, and work with appropriate measurement methods to ensure adequate accuracy	O
	7.3.4	Evaluate completed technological designs or products		O
		7.3.4.1	Know that a technological design should meet criteria established in the original purpose.	O
		7.3.4.2	Develop measures of quality with respect to criteria.	O
		7.3.4.3	Suggest improvements and try proposed modifications.	O, PPS
	7.3.5.1	Communicate the process of technological design.		O, PPS
		7.3.5.1	Review and describe any completed piece of work and identify the stages of problem identification, solution design, implementation, and evaluation.	O, PPS
	7.4	**Understandings in science and technology**		
	7.4.1	Technological solutions are temporary.		O, PPS
	7.4.2	Technologies must obey the fundamental laws of nature.		O, PPS
	7.4.3	Science helps drive technology, providing knowledge for better understanding, instrumentation, and techniques.		O, PPS
	7.4.4	Technology is essential to science because it enables observations of phenomena that are far beyond the capabilities of scientists due to factors such as distance, location, size, and speed.		O, PPS
	7.4.5	Perfectly designed solutions do not exist. Technological solutions have intended benefits and unintended consequences. Some consequences can be predicted, others cannot.		O, PPS

9 - 12	**7.5**	**Abilities in aspects of technological design:**	
	7.5.1	Implement a proposed solution	O
		7.5.1.1 Introduce students to the roles of models and simulations.	O, PPS
	7.5.2	Evaluate the solution and its consequences	O, PPS
		7.5.2.1 A variety of skills may be needed in proposing a solution depending on the type of technology that is involved.	O, PPS
	7.5.3	Communicate the problem, process and solution	O, PPS
		7.5.3.1 After testing solutions, new criteria may be considered.	O, PPS
	7.6	**Understand aspects about science and technology.**	
	7.6.1	Many scientific investigations require the contributions of individuals from different disciplines.	O, PPS
	7.6.2	New disciplines of science, such as geophysics and biochemistry often emerge at the interface of two older disciplines.	O, PPS
	7.6.3	Solving technological problems often results in new scientific knowledge.	O, PPS
	7.6.4	Scientific inquiry is driven by the desire to understand the natural world, and technological design is driven by the need to meet human needs and solve human problems.	O, PPS
	7.6.5	Scientific advances sometime challenge people's beliefs and practical explanations concerning various aspects of the world.	O, PPS