

Science 7 (1) - DRAFT

STRAND	SUBSTRAND	STANDARD	BENCHMARK	ESSENTIAL ELEMENTS	MATERIALS / RESOURCES	ASSESSMENTS
History and Nature of Science	Scientific World View	The student will understand that science is a way of knowing about the world that is characterized by empirical criteria, logical argument and skeptical review.	<p>The student will recognize how scientific knowledge is subject to change as new evidence becomes available, or as new theories cause scientists to look at old observations differently.</p> <p>The student will explain natural phenomena by using appropriate physical, conceptual and mathematical models.</p>	<p>1. Scientific knowledge changes as new evidence becomes available. Plate tectonics is an example of new knowledge that scientists have used.</p> <p>2. Natural phenomena are events that occur naturally. Examples include physical models of cells, phases of the moon, and models of an atom.</p>	Teacher generated notes, handouts and overheads.	Homework, Homework Quizzes, Chapter Tests and Quizzes.
History and Nature of Science	Scientific Inquiry	The student will design and conduct scientific investigations.	<p>The student will formulate a testable hypothesis based on prior knowledge.</p> <p>The student will recognize that a variable is a condition that may influence the outcome of an investigation and know the importance of manipulating one variable at a time.</p> <p>The student will write a specific step-by-step procedure for a scientific investigation.</p> <p>The student will explain how classroom scientific investigations relate to established scientific principles.</p>	<p>1. A hypothesis is a scientific guess.</p> <p>2. Investigatable questions are measurable (observable), and identify variables. A variable is something that changes in a scientific investigation. A control does not change in scientific investigation. A testable hypothesis is based on prior knowledge. A variable is a condition and should be manipulated one variable at a time.</p> <p>Manipulate (control) means.</p> <p>3. Scientific investigation includes questions, hypothesis, experiment, conclusion. Classroom scientific investigations relate to established scientific principles.</p>	Teacher generated notes, handouts and overheads.	Homework, Homework Quizzes, Chapter Tests and Quizzes.

Science 7 (2) - DRAFT

<p>History and Nature of Science</p>	<p>Scientific Enterprise</p>	<p>The student will know that science and technology are human efforts that both influence, and are influenced by, society.</p>	<p>The student will give examples of the development of technology influencing scientific knowledge, and investigation and scientific knowledge influencing the development of technology.</p>	<p>Technology influences scientific knowledge and investigation.</p> <p>An example of scientific technology is the microscope.</p> <p>The development of microscopes (technology) was needed to advance microbiology. (study of microorganisms)</p> <p>Scientific knowledge influences technology.</p>	<p>Teacher generated notes, handouts and overheads.</p>	<p>Homework, Homework Quizzes, Chapter Tests and Quizzes.</p>
<p>History and Nature of Science</p>	<p>Historic Perspectives</p>	<p>The student will understand how scientific discovery, culture, societal norms and technology have influenced one another in different time periods.</p>	<p>The student will cite examples of individuals throughout history who made discoveries and contributions in science and technology.</p> <p>The student will cite examples of how culture influences scientific and technological advances.</p>	<p>1. Individuals throughout history have made contributions and discoveries in science. Examples include: Isaac Newton (gravity), Charles Darwin (classification), Gregor Mendel (genetics) Louis Pasteur (pasteurization), James Hutton (geology) and many more.</p> <p>2. Culture influences scientific and technological advances.</p> <p>Advances can include agricultural, manufacturing, sanitation, medicinal.</p>	<p>Teacher generated notes, handouts and overheads.</p>	<p>Homework Homework Quizzes, Chapter Tests and Quizzes.</p>

Science 7 (3) - DRAFT

<p>Life Science</p>	<p>Cells</p>	<p>The student will understand that all organisms are composed of cells that carry on the many functions needed to sustain life.</p>	<p>The student will know that cells are the fundamental units of life.</p> <p>The student will distinguish between single-cellular and multi-cellular organisms.</p> <p>The student will distinguish between plant and animal cells.</p> <p>The student will recognize that cells repeatedly divide for growth and repair.</p> <p>The student will recognize that cells convert energy from food for the production of molecules necessary for life, and for life processes including cell growth and cell division.</p> <p>The student will recognize that specialized cells in multi-cellular organisms perform specialized functions.</p>	<ol style="list-style-type: none"> 1. Cells are the fundamental units of life. 2. There are single-cellular and multi-cellular organisms. Protists are examples of single cellular organisms. Plants and animals are multi-cellular. 3. There are differences between plant and animal cells. Plant cells have cell walls, animal cells don't. Plant cells have chloroplasts (green color). 4. Cells divide for growth and repair. Mitosis (division) 5. Cells convert energy from food for cell growth and cell division. 6. Multi-cellular organisms have specialized cells for specialized functions. Nerve cells receive and transmit signals. Red blood cells carry oxygen. White blood cells fight disease. 	<p>Teacher generated notes, handouts and overheads.</p>	<p>Homework, Homework Quizzes, Chapter Tests and Quizzes.</p>
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Science 7 (4) - DRAFT

<p>Life Science</p>	<p>Diversity of Organisms</p>	<p>The student will understand that living systems, at every level of organization, demonstrate the complementary nature of structure and function.</p>	<p>The student will explain that individuals are composed of specialized cells, tissues, organs and organ systems that perform specialized functions.</p> <p>The student will recognize that an organism's body plan and its ability to regulate its internal environment enable it to make or find food, grow and reproduce in a constantly changing environment.</p> <p>The student will recognize that behavioral responses of organisms may be determined by heredity and past experience.</p> <p>The student will use and create dichotomous keys.</p> <p>The student will use the characteristics of an organism to identify the kingdom to which it belongs.</p>	<p>1. The organization of a multi-celled organism includes cells, tissues, organs, and organ systems.</p> <p>2. Endothermic means inside. Ectothermic means outside. Organisms adapt to their habitat.</p>	<p>Teacher generated notes, handouts and overheads.</p>	<p>Homework, Homework Quizzes, Chapter Tests and Quizzes.</p>
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Science 7 (5) - DRAFT

<p>Life Science</p>	<p>Interdependence of Life</p>	<p>The student will understand that within ecosystems, complex interactions exist between organisms and the physical environment.</p>	<p>The student will provide examples of the potentially irreversible effects of human activity on ecosystems.</p> <p>The student will define a population as all individuals of a species that exist together at a given place and time.</p> <p>The student will define an ecosystem as all populations living together and the physical factors with which they interact.</p> <p>The student will explain the factors that affect the number and types of organisms an ecosystem can support, including available resources, abiotic and biotic factors and disease.</p>	<p>1. Examples of irreversible human effects on ecosystems include pollution, deforestation, urban sprawl, global warming, and biological magnification.</p> <p>2. Population is all individuals of a species that exist together at a given place and time.</p> <p>3. An ecosystem is the populations of animals (biotic) in an area. Ecosystems include abiotic factors such as water, soil, temperature, and light. In an ecosystem abiotic and biotic factors interact.</p> <p>4. Ecosystems can have a carrying capacity. A carrying capacity is the numbers of organisms an ecosystem can support. Factors of carrying capacity include water, temperature, and light.</p>	<p>Teacher generated notes, handouts and overheads.</p> <p>Video: "Never Cry Wolf"</p>	<p>Homework, Homework Quizzes, Chapter Tests and Quizzes.</p>
<p>Life Science</p>	<p>Heredity</p>	<p>The student will understand that heredity information is contained in genes which are inherited through both sexual and asexual reproduction.</p>	<p>The student will recognize that inherited traits result from information contained in genes, which are located on chromosomes of each cell.</p> <p>The student will recognize that each gene carries a single unit of information and can influence more than one trait.</p> <p>The student will explain how inherited traits can be determined by one or many genes.</p> <p>The student will comprehend that interactions with the</p>	<p>1. Inherited traits come from genes located on chromosomes of each cell. Each gene carries a single unit of information that can influence traits. Genes are units in chromosomes that affect heredity. A trait is a physical characteristic brought about by genes.</p> <p>2. Interactions with our environment affect some of our inherited traits. Examples are malnutrition, diet, and the amount of light and water on plants.</p>	<p>Teacher generated notes, handouts and overheads.</p> <p>Video: "Clone"</p> <p>Video: "Double Take"</p> <p>Punnett square/heredity handout</p>	<p>Homework, Homework Quizzes, Chapter Tests and Quizzes.</p>

			<p>environment affect some inherited traits.</p> <p>The student will comprehend that reproduction is essential for the continuation of a species.</p> <p>The student will compare and contrast the advantages and disadvantages of sexual and asexual reproduction.</p>	<p>Reproduction is essential for the continuation of a species. Reproduction is a life activity (like respiration, nutrition) Reproduction ties in with sustainability</p> <p>6. Sexual reproduction is the union of two sex cells An advantage of sexual reproduction is genetic diversity. A disadvantage of sexual reproduction is expending increased energy. Asexual reproduction is when no sex cells are involved. Advantages of asexual reproduction are rapid reproductions, and no mate is required. A disadvantage is decreased genetic variation.</p>		
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Science 7 (7) - DRAFT

<p>Life Science</p>	<p>Biological Populations Change Over Time</p>	<p>The student will understand how biological evolution provides a scientific explanation for the fossil record of ancient life forms, as well as for the striking similarities observed among the diverse species of living organisms.</p>	<p>The student will recognize extinction is a common event.</p> <p>The student will describe how the fossil record documents the appearance and diversification of many life forms.</p> <p>The student will explain how biological adaptations in structure, function and behavior enhance the reproductive success and survival of a species in a particular environment.</p> <p>The student will recognize that scientific evidence can be used to infer common ancestry among some organisms.</p> <p>The student will explain how diversity of species develops through gradual processes over generations.</p>	<ol style="list-style-type: none"> 1. Extinction is when groups of organisms (species) die out. Extinction is a common event. 2. The fossil record shows when many life forms lived during various times. Organisms have changed over time. 3. A biological adaptation is when a plant or animal adjusts to its environment. Adaptation increases a species survival rate. Biological adaptations enhance reproductive success. 4. Scientific evidence can be used to infer common ancestry among organisms. Fossil records are examples of how scientific evidence. 5. Diversity means variety. Diversity develops in species through gradual processes over generations. Some gradual processes of diversity are food sources and climate changes. 	<p>Teacher generated notes and overheads.</p>	<p>Homework, Homework Quizzes, Chapter Tests and Quizzes.</p>
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Science 7 (8) - DRAFT

<p>Life Science</p>	<p>Flow of Matter and Energy</p>	<p>The student will understand how the flow of energy and the recycling of matter contribute to a stable ecosystem.</p>	<p>The student will know that plants use the energy in light to make sugars out of carbon dioxide and water.</p> <p>The student will explain how energy is transferred through food chains and food webs in an ecosystem.</p> <p>The student will explain how the amount of useable energy available to organisms decreases as it passes through a food chain and/or food web.</p> <p>The student will know that the total amount of matter in a closed system remains the same as it is transferred between organisms and the physical environment even though its location or form changes.</p> <p>The student will compare and contrast predator/prey, parasite/host and producer/consumer/decomposer relationships.</p>	<p>1. Plants use energy in light to make sugars out of carbon dioxide and water. This process is called photosynthesis.</p> <p>2/3. Energy is transferred through food chains and food webs in an ecosystem. Energy decreases in a food pyramid as it goes up. Food chains are the pathways by which living things obtain, use, and transfer energy. Pyramids can be used to show information about ecosystems. An ecosystem consists of living and nonliving organisms working together in an environment. Producers are plants. Consumers get energy from producers. Decomposers break down living and nonliving things.</p> <p>4. The amount of matter transferred between organisms in a system remains the same.</p> <p>5. Owls and mice are examples of a predator and prey relationship in Minnesota. Owls are predators (eat prey for energy). A parasite is a plant or animal that feeds on a host. A host provides energy for the parasite. (Deer and Deer Ticks)</p> <p>Producers, consumers, and decomposers make up ecosystems. (Deer, rabbits, grass)</p>	<p>Teacher generated notes and overheads.</p>	<p>Homework, Homework Quizzes, Chapter Tests and Quizzes.</p>
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Science 7 (9) - DRAFT

<p>Life Science</p>	<p>Human Organism</p>	<p>The student will understand human body systems and their relationship to disease.</p>	<p>The student will recognize that disease can be caused by genetics, infection by other organisms, exposure to environmental factors or a combination of these.</p> <p>The student will identify risks associated with natural, chemical and biological hazards.</p> <p>The student will describe the structure and function of systems for digestion, respiration, reproduction, circulation, excretion, movement, control and coordination and for protection from disease, in the human organism.</p>	<p>1&2. Diseases can be caused by genetics (inherited), infection, or exposure to environmental factors, or a combination of these.</p> <p>3. The body has systems that have certain functions.</p> <p>Systems in the body are digestion, respiration, reproduction, circulation, excretion, movement, control and coordination.</p> <p>These systems are part of life activities.</p> <p>Digestion is absorbing food and nutrients.</p> <p>Respiration is using energy (breathing).</p> <p>Reproduction is needed for sustainability.</p> <p>Circulation is blood moving throughout the body.</p> <p>Movement is "locomotion;" using energy.</p> <p>Excretion is getting rid of waste.</p> <p>Control is response to stimuli.</p>	<p>Teacher generated notes and overheads.</p>	<p>Homework, Homework Quizzes, Chapter Tests and Quizzes.</p>
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