

MINNESOTA ACADEMIC STANDARDS GRADE 7

SCIENCE			
STANDARD	STRAND	SUB-STRAND	BENCHMARKS
I. HISTORY AND NATURE OF SCIENCE	A. 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.	<ol style="list-style-type: none"> 1. 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. 2. The student will explain natural phenomena by using appropriate physical, conceptual and mathematical models.
I. HISTORY AND NATURE OF SCIENCE	B. Scientific Inquiry	The student will design and conduct scientific investigations.	<ol style="list-style-type: none"> 1. The student will formulate a testable hypothesis based on prior knowledge. 2. 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. 3. The student will write a specific step-by-step procedure for a scientific investigation. 4. The student will explain how classroom scientific investigations relate to established scientific principles.
I. HISTORY AND NATURE OF SCIENCE	C. Scientific Enterprise	The student will know that science and technology are human efforts that both influence, and are influenced by, society.	<ol style="list-style-type: none"> 1. The student will give examples of the development of technology influencing scientific knowledge, and investigation and scientific knowledge influencing the development of technology.
I. HISTORY AND NATURE OF SCIENCE	D. Historic Perspectives	The student will understand how scientific discovery, culture, societal norms and technology have influenced one another in different time periods.	<ol style="list-style-type: none"> 1. The student will cite examples of individuals throughout history who made discoveries and contributions in science and technology. 2. The student will cite examples of how culture influences scientific and technological advances.

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IV. LIFE SCIENCE	A. Cells	The student will understand that all organisms are composed of cells that carry on the many functions needed to sustain life.	<ol style="list-style-type: none"> 1. The student will know that cells are the fundamental units of life. 2. The student will distinguish between single-cellular and multi-cellular organisms. 3. The student will distinguish between plant and animal cells. 4. The student will recognize that cells repeatedly divide for growth and repair. 5. 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. 6. The student will recognize that specialized cells in multi-cellular organisms perform specialized functions.
IV. LIFE SCIENCE	B. Diversity of Organisms	The student will understand that living systems, at every level of organization, demonstrate the complementary nature of structure and function.	<ol style="list-style-type: none"> 1. The student will explain that individuals are composed of specialized cells, tissues, organs and organ systems that perform specialized functions. 2. 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. 3. The student will recognize that behavioral responses of organisms may be determined by heredity and past experience. 4. The student will use and create dichotomous keys. 5. The student will use the characteristics of an organism to identify the kingdom to which it belongs.
IV. LIFE SCIENCE	C. Interdependence of Life	The student will understand that within ecosystems, complex interactions exist between organisms and the physical environment.	<ol style="list-style-type: none"> 1. The student will provide examples of the potentially irreversible effects of human activity on ecosystems. 2. The student will define a population as all individuals of a species that exist together at a given place and time. 3. The student will define an ecosystem as all populations living together and the physical factors with which they interact. 4. 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.

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IV. LIFE SCIENCE	D. Heredity	The student will understand that heredity information is contained in genes which are inherited through both sexual and asexual reproduction.	<ol style="list-style-type: none"> 1. The student will recognize that inherited traits result from information contained in genes, which are located on chromosomes of each cell. 2. The student will recognize that each gene carries a single unit of information and can influence more than one trait. 3. The student will explain how inherited traits can be determined by one or many genes. 4. The student will comprehend that interactions with the environment affect some inherited traits. 5. The student will comprehend that reproduction is essential for the continuation of a species. 6. The student will compare and contrast the advantages and disadvantages of sexual and asexual reproduction.
IV. LIFE SCIENCE	E. Biological Populations Change Over Time	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.	<ol style="list-style-type: none"> 1. The student will recognize extinction is a common event. 2. The student will describe how the fossil record documents the appearance and diversification of many life forms. 3. 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. 4. The student will recognize that scientific evidence can be used to infer common ancestry among some organisms. 5. The student will explain how diversity of species develops through gradual processes over generations.
IV. LIFE SCIENCE	F. Flow of Matter and Energy	The student will understand how the flow of energy and the recycling of matter contribute to a stable ecosystem.	<ol style="list-style-type: none"> 1. The student will know that plants use the energy in light to make sugars out of carbon dioxide and water. 2. The student will explain how energy is transferred through food chains and food webs in an ecosystem. 3. 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. 4. 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. 5. The student will compare and contrast predator/prey, parasite/host and producer/consumer/decomposer relationships.

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IV. LIFE SCIENCE	G. Human Organism	The student will understand human body systems and their relationship to disease.	<ol style="list-style-type: none">1. The student will recognize that disease can be caused by genetics, infection by other organisms, exposure to environmental factors or a combination of these.2. The student will identify risks associated with natural, chemical and biological hazards.3. 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.
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