Minnesota Academic Standards: Interface with Big River Journey

NOTE: All grade levels within the Minnesota State Standards include a strand titled "The Nature of Science and Engineering." This strand is not intended to be taught separately, but as a process for teaching the other standards. Activities below can be modified slightly to include the appropriate grade level standards for the strand.

Big River Teacher's Guide Classroom Activities	Grade Level	Strand	Sub-Strand	Standard Understand that…	Benchmarks (ex.)
Water Cycle: Imagine!	4	**SCIENCE** III. EARTH AND SPACE SCIENCE	2. Interdependence Within the Earth System	3. Water circulates through the earth's crust, oceans and atmosphere in what is known as the water cycle.	1. Identify where water collects on Earth, including atmosphere, ground, and surface water, and describe how water moves through the Earth system using the processes of evaporation, condensation, precipitation.
Water Cycle: The Incredible Journey	4 6 5	**SCIENCE** III. EARTH AND SPACE SCIENCE II. PHYSICAL SCIENCE **LANGUAGE ARTS** II. WRITING	2. Interdependence Within the Earth System 1. Matter B. Elements of Composition	3. Water circulates through the earth's crust, oceans and atmosphere in what is known as the water cycle. 2. Substances can undergo physical changes which do not change the composition or the total mass of the substance in a closed system. The student will engage in a writing process, with attention to organization, focus, and quality of ideas, audience and a purpose.	1. Identify where water collects on Earth, including atmosphere, ground, and surface water, and describe how water moves through the Earth system using the processes of evaporation, condensation, precipitation. 3. Use the relationship between heat and the motion and arrangement of particles in solids, liquids, and gases to explain melting, freezing, condensation, and evaporation. 1. Write topic sentences. 2. Create multiple paragraph compositions. 3. Use composing processes.
Geology: Create Sedimentary Strata	4 5	**SCIENCE** III. EARTH AND SPACE SCIENCE III. EARTH AND SPACE SCIENCE	1. Earth Structure and Processes 1. Earth Structure and Processes	3. Rocks are Earth materials that may vary in composition. 2. The surface of the Earth changes. Some changes are due to slow processes and some changes are due to rapid processes.	1. Recognize that rocks may be uniform or made of mixtures of different materials. 1. The student will explain how, over time, rocks weather and combine with organic matter to form soil. 2. The student will explain how slow processes, such as water erosion, and rapid processes,, such as landslides, and volcanic eruptions, form features of the Earth's surface.
Geology: Make Your Own Fossil	7	**SCIENCE** IV. LIFE SCIENCE	3. Evolution in Living Systems	2. Individual organisms with certain traits in particular environments are more likely than others to survive and have offspring.	1. Explain how the fossil record documents the appearance, diversification and extinction of many life forms. 2. Use internal and external anatomical structures to compare and infer relationships between living organisms as well as those in the fossil record.

(continued) Geology: Make your own Fossil	8	III. EARTH AND SPACE SCIENCE	1. Earth Structure and Process	3. Students will understand that rocks and rock formations indicate evidence of the materials and conditions that produced them.	4. Recognize that extinction is a common even t and it can occur when the environment changes and a population's ability to adapt is insufficient to allow its survival. 1. Interpret successive layers of sedimentary rocks and their fossils to infer relative ages of rock sequences, past geologic events, changes in environmental conditions, and the appearance and extinction of life forms.
Aquatic Bugs & Their Feeding Habits	3	**SCIENCE** IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Compare how the different structures of plants and animals serve various functions of growth, survival, and reproduction. 2. Identify common groups of plants and animals using observable physical characteristics, structures and behaviors.
	3	IV. LIFE SCIENCE	3. Evolution in Living Systems	2. Students will understand that offspring are generally similar to their parents, but may have variations that can be advantageous or disadvantageous in a particular environment.	1. Give examples of likenesses between adults and offspring in plants and animals that can be inherited or acquired. 2. Give examples of differences among individuals that can sometimes give an individual an advantage in survival and reproduction.
	5	IV. LIFE SCIENCE	1. Structure and Function in Living Systems	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.
Macro invertebrate Mayhem	5	**SCIENCE** IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.
	5	IV LIFE SCIENCE	2. Interdependence Among Living Systems.	1. Students will understand that natural systems have many components that interact to maintain the living system.	1. Describe a natural system in Minnesota, such as a wetland, prairie or garden, in terms of the relationships among its living and nonliving parts, as well as inputs and outputs. 2. Explain what would happen to a system such as a wetland, prairie, or garden if one of its parts were changed.
	5	IV. LIFE SCIENCE	4. Human Interactions with Living Systems	1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Give examples of beneficial and harmful human interaction with natural systems.

Birds, Beaks, and Adaptations	3	**SCIENCE** IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Compare how the different structures of plants and animals serve various functions of growth, survival, and reproduction. 2. Identify common groups of plants and animals using observable physical characteristics, structures and behaviors.
	3	IV. LIFE SCIENCE	3. Evolution in Living Systems	2. Students will understand that offspring are generally similar to their parents, but may have variations that can be advantageous or disadvantageous in a particular environment.	1. Give examples of likenesses between adults and offspring in plants and animals that can be inherited or acquired. 2. Give examples of differences among individuals that can sometimes give an individual an advantage in survival and reproduction.
	5	IV. LIFE SCIENCE	1. Structure and Function in Living Systems	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.
River Ecosystem: Web of Life Game	3	**SCIENCE** IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Compare how the different structures of plants and animals serve various functions of growth, survival, and reproduction. 2. Identify common groups of plants and animals using observable physical characteristics, structures and behaviors.
	3	IV. LIFE SCIENCE	3. Evolution in Living Systems	2. Students will understand that offspring are generally similar to their parents, but may have variations that can be advantageous or disadvantageous in a particular environment.	1. Give examples of likenesses between adults and offspring in plants and animals that can be inherited or acquired. 2. Give examples of differences among individuals that can sometimes give an individual an advantage in survival and reproduction.
	5	IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.
	5	IV LIFE SCIENCE	2. Interdependence Among Living Systems.	1. Students will understand that natural systems have many components that interact to maintain the living system.	1. Describe a natural system in Minnesota, such as a wetland, prairie or garden, in terms of the relationships among its living and nonliving parts, as well as inputs and outputs. 2. Explain what would happen to a system such as a wetland, prairie, or garden if one of its parts were changed.
	5	IV. LIFE SCIENCE	4. Human Interactions with Living Systems	1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Give examples of beneficial and harmful human interaction with natural systems.

Build an Aluminum Foil Boat	6	**SCIENCE** I. THE NATURE OF SCIENCE AND ENGINEERING	2. The Practice of Engineering	1. Students will understand that engineers create, develop and manufacture machines, structures, processes and systems that impact society and may make humans more productive.	1. Identify a common engineered system and evaluate its impact on the daily life of humans. 2. Recognize that there is no perfect design and that new technologies have consequences that may increase some risks and decrease others. 3. Describe the trade-offs in using manufactured products in terms of features, performance, durability, and cost. 4. Explain the importance of learning from past failures, in order to inform future designs of similar products or systems.
	6	I. THE NATURE OF SCIENCE AND ENGINEERING.	2. The Practice of Engineering	2. Students will understand that engineering design is the process of devising products, processes and systems that address a need, capitalize on an opportunity, or solve a specific problem.	1. Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system that solves a problem.
The Island Watershed Activity	4-8	**SOCIAL STUDIES** V. GEOGRAPHY	B. Maps and Globes	The student will make and use maps to acquire, process, and report on the spatial organization of people and places on Earth.	1. Students will create a variety of maps to scale.
			C. Physical Features and Processes	The student will use basic terminology describing basic physical and cultural features of continents.	1. Students will locate and describe major physical features and analyze how they influenced cultures and civilizations.
	4	**SCIENCE** III. EARTH AND SPACE SCIENCE	2. Interdependence Within the Earth System	1. The students will understand that water circulates through the Earth's crust, oceans, and atmosphere in what is known as the water cycle.	1. Identify where water collects on Earth, including atmostphere, ground and surface water, and describe how water moves through the Earth system using the processes of evaporation, condensation, and evaporation.
			3. Human Interactions with Earth Systems	1. Students will understand that in order to improve their existence, humans interact with and influence Earth systems.	1. Describe how the methods people utilize to obtain and use water in their homes and communities can affect water supply and quality.
	5	IV LIFE SCIENCE	2. Interdependence Among Living Systems	1. Students will understand that natural systems have many components that interact to maintain the living system.	1. Describe a natural system in Minnesota, such as a wetland, prairie, or garden, in terms of the relationships among its living and nonliving parts, as well as inputs and outputs.

Non-point Source Pollution	4	**SCIENCE** I. THE NATURE OF SCIENCE AND ENGINEERING	2. Practice of Engineering	1. Engineers design, create and develop structures, processes and systems that are intended to improve society and may make humans more productive.	1. Describe the positive and negative impacts that the designed world has on the natural world as more and more engineered products and services are created and used.
	5	III. EARTH AND SPACE SCIENCE	4. Human Interactions with Earth Systems	1. Students will understand that in order to improve their existence, humans interact with and influence Earth Systems.	1. Describe how the methods people utilize to obtain and use water in their homes and communities can affect water supply and quality.
	5	IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.
	5	IV LIFE SCIENCE	2. Interdependence Among Living Systems.	1. Students will understand that natural systems have many components that interact to maintain the living system.	1. Describe a natural system in Minnesota, such as a wetland, prairie or garden, in terms of the relationships among its living and nonliving parts, as well as inputs and outputs. 2. Explain what would happen to a system such as a wetland, prairie, or garden if one of its parts were changed.
		IV. LIFE SCIENCE	4. Human Interactions with Living Systems	1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Give examples of beneficial and harmful human interaction with natural systems.
The Enviroscape	4	**SCIENCE** III. EARTH AND SPACE SCIENCE	4. Human Interactions with Earth Systems	1. Students will understand that in order to improve their existence, humans interact with and influence Earth Systems.	1. Describe how the methods people utilize to obtain and use water in their homes and communities can affect water supply and quality. 4. Understand that different models can be used to represent natural phenomena and these models have limitations about what they can explain.
	5	I. THE NATURE OF SCIENCE AND ENGINEERING	1. The Practice of Science	1. Science is a way of knowing about the natural world, is done by individuals and groups, and is characterized by empirical criteria, logical argument and skeptical review.	
	5	IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.
	5	IV LIFE SCIENCE	2. Interdependence Among Living Systems.	1. Students will understand that natural systems have many components that interact to maintain the living system.	1. Describe a natural system in Minnesota, such as a wetland, prairie or garden, in terms of the relationships among its living and nonliving parts, as well as inputs and outputs. 2. Explain what would happen to a system such as a wetland, prairie, or garden if one of its parts were changed.

(continued) The Enviroscape	5	IV. LIFE SCIENCE	4. Human Interactions with Living Systems	1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Give examples of beneficial and harmful human interaction with natural systems.
My Street is a River	4	**SCIENCE** III. EARTH AND SPACE SCIENCE	3. Human Interactions with Earth Systems	1. Students will understand that in order to improve their existence, humans interact with and influence Earth Systems.	1. Describe how the methods people utilize to obtain and use water in their homes and communities can affect water supply and quality.
	5	IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.
	5	IV LIFE SCIENCE	2. Interdependence Among Living Systems.	1. Students will understand that natural systems have many components that interact to maintain the living system.	1. Describe a natural system in Minnesota, such as a wetland, prairie or garden, in terms of the relationships among its living and nonliving parts, as well as inputs and outputs. 2. Explain what would happen to a system such as a wetland, prairie, or garden if one of its parts were changed.
	5	IV. LIFE SCIENCE	4. Human Interactions with Living Systems	1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Give examples of beneficial and harmful human interaction with natural systems.
	6	I. THE NATURE OF SCIENCE AND ENGINEERING	2. The Practice of Engineering	1. Students will understand that engineers create, develop and manufacture machines, structures, processes and systems that impact society and may make humans more productive.	1. Identify a common engineered system and evaluate its impact on the daily life of humans. 2. Recognize that there is no perfect design and that new technologies have consequences that may increase some risks and decrease others. 3. Describe the trade-offs in using manufactured products in terms of features, performance, durability, and cost. 4. Explain the importance of learning from past failures, in order to inform future designs of similar products or systems.

(continued) My Street is a River	6	I. THE NATURE OF SCIENCE AND ENGINEERING	2. The Practice of Engineering	2. Students will understand that engineering design is the process of devising products, processes and systems that address a need, capitalize on an opportunity, or solve a specific problem.	1. Apply and document an engineering design process that includes identifying criteria and constraints, making representations, testing and evaluation, and refining the design as needed to construct a product or system that solves a problem.
Map the Mississippi Watershed	4-8	**SOCIAL STUDIES** V. GEOGRAPHY	A. Concepts of Location	The student will identify and locate major physical and cultural features that played an important role in the history of the United States.	1. Students will locate and name all 50 states, mountain ranges, major river valleys, state capitols and cites.
			B. Maps and Globes	The student will make and use maps to acquire, process, and report on the spatial organization of people and places on Earth.	1. Students will create a variety of maps to scale.
			C. Physical Features and Processes	The student will use basic terminology describing basic physical and cultural features of continents.	1. Students will locate and describe major physical features and analyze how they influenced cultures and civilizations.
			E. Essential Skills	The student will use maps, globes, geographic systems and other sources of information to analyze the nature of places at a variety of scales.	1. Students will demonstrate the ability to obtain geographic information from a variety of print and electronic sources.
Map the River in the Twin Cities	4-8	**SOCIAL STUDIES** V. GEOGRAPHY	A. Concepts of Location	The student will identify and locate major physical and cultural features that played an important role in the history of Minnesota.	1. Students will locate major Minnesota ecosystems, topographic features, continental divides, river valleys, and cities.
			B. Maps and Globes	The student will make and use maps to acquire, process, and report on the spatial organization of people and places on Earth.	1. Students will create a variety of maps to scale.
			C. Physical Features and Processes	The student will identify and locate geographic features associated with the development of Minnesota.	3. Students will identify physical features that either hindered or promoted the development of the fur trade and the rapid settlement in the early 19th century.
			D. Interconnections	The student will give examples that demonstrate how people are connected to each other and the environment.	2. Students will analyze how the physical environment influences human activities.
Lessons from a Landscape **(continued)**	4	**SCIENCE** III. EARTH AND SPACE SCIENCE	3. Human Interactions with Earth Systems	1. Students will understand that in order to improve their existence, humans interact with and influence Earth Systems.	1. Describe how the methods people utilize to obtain and use water in their homes and communities can affect water supply and quality.
	5	IV. LIFE SCIENCE	1. Structure and	1. Students will understand that living things are diverse with	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.

Lessons from a Landscape	5	IV LIFE SCIENCE	Function in Living Systems. 2. Interdependence Among Living Systems.	many different characteristics that enable them to grow, reproduce and survive. 1. Students will understand that natural systems have many components that interact to maintain the living system.	1. Describe a natural system in Minnesota, such as a wetland, prairie or garden, in terms of the relationships among its living and nonliving parts, as well as inputs and outputs. 2. Explain what would happen to a system such as a wetland, prairie, or garden if one of its parts were changed.
	5	IV. LIFE SCIENCE	4. Human Interactions with Living Systems	1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Give examples of beneficial and harmful human interaction with natural systems.
	4-8	**SOCIAL STUDIES** V. GEOGRAPHY	B. Maps and Globes	The student will make and use maps to acquire, process, and report on the spatial organization of people and places on Earth.	1. Students will create a variety of maps to scale.
History at Fort Snelling	4-8	**HISTORY** I. U.S. HISTORY	E. Growth and Westward Expansion, 1801-1861	The student will demonstrate knowledge of western expansion, conflict, and reform in America.	1. Students will examine the processes that led to the territorial expansion of the United States, including wars and treaties with foreign nations and Indian nations,…Louisiana Purchase… 2. Students will analyze the impact of inventions and technologies on life in America…
	4-8	II. MINNESOTA HISTORY	C. Early Settlement and Statehood, 1810-1860	The student will know and understand the factors that led to rapid settlement of Minnesota in the 19th century and the changes the new Minnesotans brought with them.	1. Students will explain why early settlers came to Minnesota and analyze their impact on political, cultural, and physical landscapes.
Surf the Mississippi	4-8	**SOCIAL STUDIES** I. U.S. HISTORY	E. Growth & West-ward Expansion, 1801-61	The student will demonstrate knowledge of western expansion, conflict, and reform in America.	2. Students will analyze the impact of inventions and technologies on life in America, including… the steamboat,…
	4-8	V. GEOGRAPHY	A. Concepts of Location	The student will identify and locate major physical and cultural features that played an important role in the history of the United States.	1. Students will locate and name all 50 states, mountain ranges, major river valleys, state capitols and cites.
			C. Physical Features and Processes	The student will identify and locate geographic features associated with the development of Minnesota.	3. Students will identify physical features that either hindered or promoted the development of the fur trade and the rapid settlement in the early 19th century.
			D. Interconnections	The student will give examples that demonstrate how people are connected to each other and the environment.	1. Students will identify factors that drew people to their local communities. 2. Students will analyze how the physical environment influences human activities.

The River Is a Poem	5	**LANGUAGE ARTS** II. WRITING	A. Types of Writing	The student will compose various pieces of writing.	1. The student will write in a variety of modes to express meaning, including: …e. poetry.
Big River Art Contest	4-5	**ARTS** ARTISTIC EXPRESSION	D. Visual Arts	The student will understand and use artistic processes to create, perform, and interpret art works…	1. The student will understand the following components of visual arts: a) elements, including color, line, shape, form, texture, and space; b) principles such as repetition, contrast, or balance. 2. The student will create original works of art to express specific artistic ideas.
	6-8	ARTISTIC CREATIVITY	D. Visual Arts	The student will understand and use artistic processes to create and perform…	1. The student will understand the following components of visual art: a) elements, including color, line, shape, form, texture, and space; b) principles such as repetition, contrast, or balance; d) styles, such as abstract or expressionist. 4. The student will use artistic processes to create in a variety of visual arts contexts. 5. The student will express and communicate ideas using components of visual arts. 7. The student will make and explain artistic choices in creating visual art.
Service Learning: Storm Drain Stenciling	4	**SCIENCE** III. EARTH AND SPACE SCIENCE	3. Human Interactions with Earth Systems	1. Students will understand that in order to improve their existence, humans interact with and influence Earth Systems.	1. Describe how the methods people utilize to obtain and use water in their homes and communities can affect water supply and quality.
	5	III. EARTH AND SPACE SCIENCE	4. Human Interaction with Earth Systems	1. In order to maintain and improve their existence, humans interact with and influence Earth systems.	3. Compare the impact of individual decisions on natural systems.
	5	IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.
	5	IV LIFE SCIENCE	2. Interdependence Among Living Systems.	1. Students will understand that natural systems have many components that interact to maintain the living system.	1. Describe a natural system in Minnesota, such as a wetland, prairie or garden, in terms of the relationships among its living and nonliving parts, as well as inputs and outputs. 2. Explain what would happen to a system such as a wetland, prairie, or garden if one of its parts were changed.
	5	IV. LIFE SCIENCE	4. Human Interactions with Living Systems	1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Give examples of beneficial and harmful human interaction with natural systems.

Waters to the Sea (CD-ROM)	4-8	**SOCIAL STUDIES** II. MINNESOTA HISTORY	C. Early Settlement and Statehood, 1810-1860	The student will know and understand the factors that led to rapid settlement of Minnesota in the 19th century and the changes the new Minnesotans brought with them.	1. Students will explain why early settlers came to Minnesota and analyze their impact on political, cultural, and physical landscapes.
			E. Industrial Era, 1865-1914	The student will know and understand Minnesota's major industries and the economic, social, political, and technological changes that accompanied industrialization.	2. Students will describe the impact of industrialization on work, home, leisure life, politics, immigration, urbanization, and changes in the physical landscape.
	4-8	V. GEOGRAPHY	A. Concepts of Location	The student will identify and locate major physical and cultural features that played an important role in the history of Minnesota.	1. Students will locate major Minnesota ecosystems, topographic features, continental divides, river valleys, and cities.
			C. Physical Features and Processes	The student will identify and locate geographic features associated with the development of Minnesota.	1. Students will identify and compare and contrast the landforms, natural vegetation, climate, and systems of rivers and lakes of Minnesota with those of other parts of the United States.
			D. Interconnections	The student will give examples that demonstrate how people are connected to each other and the environment.	2. Students will analyze how the physical environment influences human activities.
	4	**SCIENCE** III. EARTH AND SPACE SCIENCE	3. Human Interactions with Earth Systems	1. Students will understand that in order to improve their existence, humans interact with and influence Earth Systems.	1. Describe how the methods people utilize to obtain and use water in their homes and communities can affect water supply and quality.
	5	IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.
	5	IV LIFE SCIENCE	2. Interdependence Among Living Systems.	1. Students will understand that natural systems have many components that interact to maintain the living system.	1. Describe a natural system in Minnesota, such as a wetland, prairie or garden, in terms of the relationships among its living and nonliving parts, as well as inputs and outputs. 2. Explain what would happen to a system such as a wetland, prairie, or garden if one of its parts were changed.
	5	IV. LIFE SCIENCE	4. Human Interactions with Living Systems	1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Give examples of beneficial and harmful human interaction with natural systems.

Big River Journey Learning Stations (field trip activities)	Grade Level	Strand	Sub-Strand	Standard	Benchmarks (ex.)
1: Aquatic Invertebrates	3	**SCIENCE** IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	2. Identify common groups of plants and animals using observable physical characteristics, structures and behaviors.
	3	IV. LIFE SCIENCE	3. Evolution in Living Systems	2. Students will understand that offspring are generally similar to their parents, but may have variations that can be advantageous or disadvantageous in a particular environment.	2. Give examples of differences among individuals that can sometimes give an individual an advantage in survival and reproduction.
	5	I. NATURE OF SCIENCE AND ENGINEERING	3. Interactions Among Science, Technology Engineering, Mathematics, and Society	4. Tools and mathematics help scientists and engineers see more, measure more accurately, and do things that they could not otherwise accomplish.	1. Use appropriate tools and techniques in gathering, analyzing and interpreting data.
	5	IV. LIFE SCIENCE	1. Structure and Function in Living Systems.	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.
	5	IV LIFE SCIENCE	2. Interdependence Among Living Systems.	1. Students will understand that natural systems have many components that interact to maintain the living system.	2. Explain what would happen to a system such as a wetland, prairie, or garden if one of its parts were changed.
	5	IV. LIFE SCIENCE	4. Human Interactions with Living Systems	1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Give examples of beneficial and harmful human interaction with natural systems.
2: Mystery of the Disappearing Waterfall	4	**SCIENCE** III. EARTH AND SPACE SCIENCE	1. Earth Structure and Processes	3. Rocks are Earth materials that may vary in composition.	1. Recognize that rocks may be uniform or made of mixtures of different materials.
	5	III. EARTH AND SPACE SCIENCE	1. Earth Structure and Processes	2. The surface of the Earth changes. Some changes are due to slow processes and some changes are due to rapid processes.	1. The student will explain how, over time, rocks weather and combine with organic matter to form soil. 2. The student will explain how slow processes, such as water erosion, and rapid processes,, such as landslides, and volcanic eruptions, form features of the Earth's surface.

2: Mystery of the Disappearing Waterfall (cont'd)	4-8	**SOCIAL STUDIES** V. GEOGRAPHY	C. Physical Features and Processes D. Interconnections	The student will use basic terminology describing basic physical and cultural features of continents. The student will give examples that demonstrate how people are connected to each other and the environment.	1. Students will locate and describe major physical features and analyze how they influenced cultures/civilizations studied. 1. Students will identify factors that drew people to their local communities. 2. Students will analyze how the physical environment influences human activities.
3: Adopt-A-River Crime Lab	4 4 5 5	**SCIENCE** I. THE NATURE OF SCIENCE AND ENGINEERING III. EARTH AND SPACE SCIENCE III. EARTH AND SPACE SCIENCE IV. LIFE SCIENCE	2.Practice of Engineering 4. Human Interactions with Earth Systems 4. Human Interactions with Earth Systems 4. Human Interactions with Living Systems	1. Engineers design, create and develop structures, processes and systems that are intended to improve society and may make humans more productive. 1. In order to improve their existence, humans interact with and influence Earth Systems. 1. In order to maintain and improve their existence, humans interact with and influence Earth systems. 1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Describe the positive and negative impacts that the designed world has on the natural world as more and more engineered products and services are created and used. 1. Describe how the methods people utilize to obtain and use water in their homes and communities can affect water supply and quality. 3. Compare the impact of individual decisions on natural systems. 1. Give examples of beneficial and harmful human interaction with natural systems.
4: River Birds	3 3 5	**SCIENCE** IV. LIFE SCIENCE IV. LIFE SCIENCE I. NATURE OF SCIENCE AND ENGINEERING	1. Structure and Function in Living Systems. 3. Evolution in Living Systems 3. Interactions Among Science, Technology Engineering, Mathematics, and Society	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive. 2. Students will understand that offspring are generally similar to their parents, but may have variations that can be advantageous or disadvantageous in a particular environment. 4. Tools and mathematics help scientists and engineers see more, measure more accurately, and do things that they could not otherwise accomplish.	1. Compare how the different structures of plants and animals serve various functions of growth, survival, and reproduction. 2. Identify common groups of plants and animals using observable physical characteristics, structures and behaviors. 1. Give examples of likenesses between adults and offspring in plants and animals that can be inherited or acquired. 2. Give examples of differences among individuals that can sometimes give an individual an advantage in survival and reproduction. Use appropriate tools and techniques in gathering, analyzing and interpreting data.

4: River Birds (cont'd)	5	IV. LIFE SCIENCE	1. Structure and Function in Living Systems	1. Students will understand that living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	1. Describe how plant and animal structures and their functions provide an advantage for survival in a given natural system.
5: Ecosystem-Ottersystem		**SCIENCE**			
	3	IV. LIFE SCIENCE	1. Structure and Function in Living Systems	1. Living things are diverse with many different characteristics that enable them to grow, reproduce and survive.	2. Indentify common groups of plants and animals using observable physical characteristics, structures and behaviors.
	4	III. EARTH AND SPACE SCIENCE	3. Human Interactions with Earth Systems	1. Students will understand that in order to improve their existence, humans interact with and influence Earth Systems.	1. Describe how the methods people utilize to obtain and use water in their homes and communities can affect water supply and quality.
	5	I. NATURE OF SCIENCE AND ENGINEERING	3. Interactions Among Science, Technology Engineering, Mathematics and Society	4. Tools and mathematics help scientists and engineers see more, measure more accurately, and do things that they could not otherwise accomplish.	1. Use appropriate tools and techniques in gathering, analyzing and interpreting data.
	5	III. EARTH AND SPACE SCIENCE	1. Earth Structure and Processes	1. The students will understand that the surface of the Earth changes, some changes are due to slow processes and some changes are due to rapid processes.	2. The student will explain how slow processes, such as water erosion, and rapid processes, such as landslides, and volcanic eruptions, form features of the Earth's surface.
	5	IV. LIFE SCIENCE	4. Human Interactions with Living Systems	1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Give examples of beneficial and harmful human interaction with natural systems.
6: Riverboat Piloting		**SCIENCE**			
	5	I. NATURE OF SCIENCE AND ENGINEERING.	3. Interactions Among Science, Technology Engineering, Mathematics, and Society	The student will understand that tools and mathematics help scientists and engineers see more, measure more accurately, and do things that they could not otherwise accomplish.	1. Use appropriate tools and techniques in gathering, analyzing and interpreting data. 2. Create and analyze different kinds of maps of the student's community and of Minnesota.
	5	II. PHYSICAL SCIENCE	2. Motion	1. An object's motion is affected by forces and can be described by the object's speed and the direction it is moving.	2. Identify the force that starts something moving or changes its speed or direction of motion.
	6	II PHYSICAL SCIENCE	2. Motion	1. The motion of an object can be described in terms of speed, direction and change of position.	1. Measure and calculate the speed of an object that is traveling in a straight line.

6: Riverboat Piloting (cont'd)				2. Forces have magnitude and direction and affect the motion of objects.	1. Recognize that when the forces acting on an object are balanced, the object remains at rest or continues to move at a constant speed in a straight line, and that unbalanced forces cause a change in the speed or direction of the motion of an object. 2. Identify the forces acting on an object and describe how the sum of the forces affects the motion of the object.
A: River Artifacts	5 4-8 4-8	**SCIENCE** I. NATURE OF SCIENCE AND ENGINEERING **SOCIAL STUDIES** II. MINNESOTA HISTORY V. GEOGRAPHY	3. Interactions Among Science, Technology Engineering, Mathematics, and Society A. Pre-contact to 1650 B. Contact and Fur Trade 1600-1810 D. Interconnections	The student will understand that men and women throughout the history of all cultures, including Minnesota American Indian tribes and communities, have been involved in engineering design and scientific inquiry. The student will demonstrate knowledge of Minnesota's indigenous peoples. The student will demonstrate knowledge of early explorers and fur traders in Minnesota and the impact of the fur trade on both European and Native societies. The student will describe how humans influence the environment and in turn are influenced by it.	1. Describe how science and engineering influence and are influenced by local traditions and beliefs. 1. Students will describe the evidence of the indigenous cultures in Minnesota, and make reasoned inferences from that evidence. 1. Students will describe how early explorers and fur traders affected the development of Minnesota. 1. Students will recognize changes over time in nearby landscapes, resulting from human occupation.
B: Soldier Hike	4-8 4-8 4-8	**SOCIAL STUDIES** I. U.S. HISTORY II. MINNESOTA HISTORY V. GEOGRAPHY	E. Growth and Westward Expansion, 1808-1861 C. Early Settlement and Statehood, 1810-60 C. Physical Features and Processes	The student will demonstrate knowledge of western expansion, conflict, and reform in American. The student will know and understand the factors that led to rapid settlement of Minnesota in the 19th century and the changes the new Minnesotans brought with them. The student will identify and locate geographic features associated with the development of Minnesota.	1. Students will examine the processes that led to the territorial expansion of the United States including wars and treaties with… Indian nations,… Louisiana Purchase and other land purchases, and the removal of American Indians to reservation. 1. Students will explain why early settlers came to Minnesota and analyze their impact on political, cultural, and physical landscapes. 3. Students will understand why and how the Minnesota Indian Nations negotiated treaties with the United States, and the impact of these treaties for the Ojibwe, the Dakota, and the settlers. 3. Students will identify physical features that either hindered or promoted the development of the fur trade and the rapid settlement in the early 19th Century.
C: Cultural Confluence	4-8	**SOCIAL STUDIES** I. U.S. HISTORY	A. Pre-history through 1607 B. Pre-history through 1607	The student will understand that large and diverse American Indian Nations were the original inhabitants of North America. The student will demonstrate knowledge of European exploration of the North American continent and the resulting interaction with American Indian Nations.	1. Students will compare ways of life of Indian Nations from different regions of North America. 2. Students will know and explain that interactions between American Indian tribes and European explorers had positive and negative impacts.

C: Cultural Confluence (cont'd)	4-8	II. MINNESOTA HISTORY	A. Pre-contact to 1650	The student will demonstrate knowledge of Minnesota's indigenous peoples.	1. Students will describe the evidence of the indigenous cultures in Minnesota, and make reasoned inferences from that evidence. 2. Students will explain the major historical aspects of Dakota and Ojibwe culture, social organization and history, and compare and contrast them.
			B. Contact and Fur Trade, 1600-1810	The student will demonstrate knowledge of early explorers and fur traders in Minnesota and the impact of the fur trade on both European and Native societies.	1. Students will describe how early explorers and fur traders affected the development of Minnesota. 2. Students will describe the economic and cultural… interaction between the Dakota and Ojibwe and the explorers and the fur traders.
	4-8	V. GEOGRAPHY	C. Physical Features and Processes	The student will identify and locate geographic features associated with the development of Minnesota.	2. Students will identify physical features that shaped settlement and life-ways of the Dakota and the Ojibwe and analyze their impact. 3. Students will identify physical features that either hindered or promoted the development of the fur trade and the rapid settlement in the early 19th Century.
D: Floodplain Hike		**SCIENCE**			
	4	III. EARTH AND SPACE SCIENCE	3. Human Interactions with Earth Systems	1. Students will understand that in order to improve their existence, humans interact with and influence Earth Systems.	1. Describe how the methods people utilize to obtain and use water in their homes and communities can affect water supply and quality.
	5	III EARTH AND SPACE SCIENCE	1. Earth Structure and Processes	1. The students will understand that the surface of the Earth changes, some changes are due to slow processes and some changes are due to rapid processes.	2. The student will explain how slow processes, such as water erosion, and rapid processes, such as landslides, and volcanic eruptions, form features of the Earth's surface.
	5	IV. LIFE SCIENCE	4. Human Interactions with Living Systems	1. Students will understand that humans change environments in ways that can be either beneficial or harmful to themselves and other organisms.	1. Give examples of beneficial and harmful human interaction with natural systems.
	4-8	**SOCIAL STUDIES** V. GEOGRAPHY	C. Physical Features and Processes	The student will identify and locate geographic features associated with the development of Minnesota.	1. Students will identify and compare and contrast the landforms, natural vegetation, climate, and systems of rivers and lakes of Minnesota with those of other parts of the United States.