

Appendix

Supplemental Material

A1 Career Launch

A list of potential career ideas for students and related professional associations.

A2 Major Tributaries of the Mississippi River

A list of major tributaries and their locations along the Mississippi River.

A3 Bridge Crossings of the Upper Mississippi River

A list of major bridge crossings and their bridge descriptions.

A4 Mississippi River Watershed States Chart

Includes information such as state tree, bird, flower, fish, and mammal.

A5 Endangered Species by State

A list of threatened and endangered species by State.

A6 Glossary

A list of words and definitions throughout this guide that students are expected to learn.

A7 Education Standards

A table showing the national learning standards used in preparing this guide and the corresponding state standards for Illinois, Iowa, Missouri, Minnesota, and Wisconsin.

A8 Planning Chart

A matrix of information (lesson objectives, lesson standards, etc.) for teachers to use in selecting and planning lessons in the guide.

A9 Bibliography

A list of references and resources used in creating this guide.

A10 Image Credits

A list of all image and graphic credits.

A1: Career Launch

To find a speaker for the classroom, contact your local chapter of the Professional Association. The rangers from the U.S. Army Corps of Engineers, U.S. Fish & Wildlife Service, or your State Department of Natural Resources would be able to speak on many of the topics. Visit the Department of Labor's website for a complete list of occupations at www.occupationalinfo.org.

Anthropologist

Description: Studies human beings and how they behave

Contact: American Anthropological Association (www.aaanet.org)

Archeologist

Description: Studies the past by looking for remains and artifacts left by people who lived long ago

Contact: Society for American Archaeology (www.saa.org)

Biologist

Description: Studies living organisms

Contact: American Institute of Biological Sciences (www.aibs.org)

Botanist

Description: Studies plants, flowers, and plant-like things such as moss and seaweed

Contact: Botanical Society of America (www.botany.org)

Business developer

Description: Identifies new business opportunities

Contact: The Society for Business Development Professionals (www.sbdp.org)

Career counselor

Description: Helps you find your career path

Contact: Your local high school career or guidance counselor

Cartographer

Description: Makes maps

Contact: North American Cartographic Information Society (www.nacis.org)

City planner

Description: Responsible for the city's general plan, zoning, municipal land decisions, and environmental studies

Contact: American Planning Association (www.planning.org)

Civic leader

Description: Leader in municipal affairs

Contact: City, county, or state offices

Climatologist

Description: Studies climate, specifically weather conditions over a period of time

Contact: American Association of State Climatologists (www.stateclimate.org)

Conservation officer or warden

Description: Protects and enforces conservation values and laws

Contact: State Department of Natural Resources

Conservationist

Description: Advocates for the protection of all the species in an ecosystem with a strong focus on the natural environment

Contact local: U.S. Fish & Wildlife Service (www.fws.gov), U.S. Army Corps of Engineers (www.usace.army.mil), or Nature Conservancy (www.nature.org)

Ecologist

Description: Studies living things, their environment, and their interactions

Contact local: U.S. Fish & Wildlife Service (www.fws.gov), U.S. Army Corps of Engineers (www.usace.army.mil), or Nature Conservancy (www.nature.org)

Economist

Description: Studies economic relationships and solution of problems arising from production and distribution of goods and services

Contact: National Association for Business Economics (www.nabe.com)

Employment coordinator

Description: Finds, screens, and interviews potential employees for their organization

Contact: Society for Human Resources Management local chapter (www.shrm.org)

Engineer

Description: Applies scientific knowledge, mathematics and ingenuity to develop solutions for technical problems. Engineers design materials, structures, machines and systems while considering the limitations imposed by practicality, safety and cost. e.g. Hydroelectric engineer

Contact: National Society of Professional Engineers (www.nspe.org)

Farmer

Description: Raises living organisms for food or raw materials

Contact: Local 4-H, FFA (Future Farmers of America), National Farmers Association (www.nfo.org)

Fisherman

Description: Captures fish and other animals from a body of water, or gathers shellfish

Contact local: Commercial Fishermen of America (www.cfafish.org)

Forester

Description: Makes sure that the forest and all the wildlife that lives there is healthy

Contact local: U.S. Fish & Wildlife Service (www.fws.gov), U.S. Army Corps of Engineers (www.usace.army.mil), or Nature Conservancy (www.nature.org)

Geologist

Description: Studies nonliving things the Earth is made of

Contact: Geological Society of America (www.geosociety.org)

Glaciologist

Description: Studies glaciers and their effects on the landscape and our climate

Contact: American Association for the Advancement of Science (www.aaas.org)

Historian

Description: Studies the passage of time and the events that happen within that passage

Contact: American Historical Association (www.historians.org)

Hydrogeologist

Description: Studies the ways that groundwater moves through the soil and rock of the earth

Contact: Geological Society of America (www.geosociety.org)

Hydrologist

Description: Studies the movement, distribution, and quality of water throughout the Earth

Contact: Geological Society of America (www.geosociety.org)

Lock master

Description: Manages canals, locks, and related property

Contact: U.S. Army Corps of Engineers (www.usace.army.mil)

Merchant mariner

Description: Operates and maintains numerous types of watercraft

Contact: National Mariners Association (www.nationalmariners.org)

Microbiologist

Description: Studies bacteria and other micro-organisms

Contact: The American Society For Microbiology (www.asm.org)

Mineralogist

Description: Examines, analyzes, and classifies minerals, gems, and precious stones

Contact: Geological Society of America (www.geosociety.org)

News reporter

Description: Collects and analyzes information about newsworthy events and writes news stories for publication or broadcast

Contact: Society of Professional Journalists (www.spj.org)

Ornithologist

Description: Studies birds

Contact: Ornithological Societies of North America (www.osnabirds.org)

Park ranger

Description: Enforces laws, protects resources, manages facilities, and provides education for visitors on public lands and waters managed by Federal and state governments

Contact local: U.S. Army Corps of Engineers (www.corpslakes.us) or U.S. Fish & Wildlife Service (www.fws.gov)

Sociologist

Description: Researches the structures that organize society, such as race, gender, and social classes

Contact: American Sociological Association (www.asanet.org)

Surveyor

Description: Measures and maps land or a building site to establish boundaries

Contact: National Society of Professional Surveyors (www.nspsmo.org)

Tourism occupations

Description: Information center staff, restaurant staff, hotel staff, recreation equipment, etc. For instance, guides that escort individuals or groups on sightseeing tours or through places of interest

Contact: The World Federation of Tourist Guide Associations (www.wftga.org)

Towboat captain

Description: Pushes water-going vessels (ship, barge, ferry, etc.) to transport passengers, freight, and other cargo

Contact: American Waterways Operators (www.americanwaterways.com)

Water safety specialists

Description: Provides professional open water, surf, and enclosed water rescue services.

Contact: Water Safety Specialist (www.watersafetyspecialists.com) or U.S. Coast Guard (www.uscg.mil)

U.S. Coast Guard member

Description: Protects our maritime economy and the environment, defends maritime borders, and saves those in peril

Contact: U.S. Coast Guard (www.uscg.mil)

Wildlife biologist

Description: Applies the principles of ecology to the conservation and management of wildlife and its habitats

Contact: The Wildlife Society (www.wildlife.org)

A2: Major Tributaries of the Mississippi River

Arkansas River in Arkansas

Big Black River in Mississippi

Big Muddy River in Illinois

Chippewa River in Wisconsin

Crow River in Minnesota

Des Moines River in Iowa

Illinois River in Illinois

Iowa River in Iowa

Kaskaskia River in Illinois

Maquoketa River in Iowa

Minnesota River in Minnesota

Missouri River in Missouri

Ohio River in Kentucky

Red River in Louisiana

Rock River in Illinois

Skunk River in Iowa

St. Croix River in Minnesota and Wisconsin

Wapsipinicon River in Iowa

White River in Arkansas

Wisconsin River in Wisconsin

Yazoo River in Mississippi

A3: Bridge Crossings on the Upper Mississippi River

Bridges over the Mississippi River that have notable engineering or landmark significance. Listed in order from the source of the river to its mouth.

Stone Arch Bridge

Former Great Northern Railway (now pedestrian) bridge at Saint Anthony Falls in downtown Minneapolis.

I-35W Mississippi River Bridge

This bridge collapsed catastrophically on August 1, 2007, killing 13 and injuring over 100. It was replaced by the I-35W Saint Anthony Falls Bridge, which opened in September 2008, ahead of schedule and on budget.

I-90 Mississippi River Bridge

Connects La Crosse, Wisconsin to Winona County, Minnesota, located just south of Lock and Dam No. 7.

La Crosse Rail Bridge

This bridge was one of the first 15 bridges built to cross the Mississippi River. Built in 1876, it is a swing bridge that spans the river between La Crescent, Minnesota, and La Crosse, Wisconsin, and carries Amtrak's Empire Builder train.

Mississippi River Bridge

Also known as the Big Blue Bridges, it is a combination of two individual bridges, the Cass Street and Cameron Avenue Bridges, that cross the east channel of the Mississippi River connecting downtown La Crosse, Wisconsin, to Barron Island.

Black Hawk Bridge

Connects Lansing in Allamakee County, Iowa, to rural Crawford County, Wisconsin, locally referred to as the Lansing Bridge and documented in the Historic American Engineering Record.

Julien Dubuque Bridge

Joins the cities of Dubuque, Iowa, and East Dubuque, Illinois and is listed in the National Register of Historic Places.

Savanna-Sabula Bridge

Truss bridge and causeway that connects the city of Savanna, Illinois with the island city of Sabula, Iowa. The bridge carries U.S. Highway 52 over the river. It is also the terminus of both Iowa Highway 64 and Illinois Route 64. Added to the National Register of Historic Places in 1999.

Fred Schwengel Memorial Bridge

Four-lane steel girder bridge that connects Le Claire, Iowa and Rapids City, Illinois. Completed in 1966.

I-74 Bridge

Originally known as the Iowa-Illinois Memorial Bridge, connects Bettendorf, Iowa and Moline, Illinois.

Government Bridge

Connects Rock Island, Illinois and Davenport, Iowa, adjacent to Lock and Dam No. 15. The fourth crossing in this vicinity, having been built in 1896.

Rock Island Centennial Bridge

A five-arched bridge connecting Rock Island, Illinois and Davenport, Iowa, opened in 1940.

Norbert F. Beckey Bridge

Connects Muscatine, Iowa to Rock Island County, Illinois, became the country's first bridge to use light-emitting diode lights to decoratively illuminate the facade of the bridge.

Great River Bridge

Cable-stayed bridge connecting Burlington, Iowa to Gulf Port, Illinois.

Fort Madison Toll Bridge

Also known as the Santa Fe Swing Span Bridge. At the time of its construction, it was the longest and heaviest electrified swing span on the river. It connects Fort Madison, Iowa and unincorporated Niota, Illinois. Listed in the National Register of Historic Places since 1999.

Bayview Bridge

Cable-stayed bridge bringing westbound U.S. Highway 24 over the river, connecting the cities of West Quincy, Missouri and Quincy, Illinois. Eastbound U.S. 24 is served by the older Quincy Memorial Bridge.

Clark Bridge

Also known as the Super Bridge as the result of an appearance on the PBS program, *Nova*. This cable-stayed bridge connects West Alton, Missouri and Alton, Illinois, was built in 1994, and carries U.S. Route 67 across the river. It is the northernmost river crossing in the St. Louis metropolitan area and replaces the Old Clark Bridge, a truss bridge built in 1928, named after explorer William Clark.

Old Chain of Rocks Bridge

Located on the northern edge of St. Louis, the old Chain of Rocks Bridge is notable for the 22-degree bend that occurs in the middle of the crossing, which was necessary for navigation on the river. This bridge was once part of U.S. Route 66, but is now used only by pedestrians and bicyclists. Vehicle traffic now travels across the river on nearby I-270.

McKinley Bridge

Named for William B. McKinley, CEO of Illinois Traction System Electric Railway. It connected St. Louis, Missouri, to Venice, Illinois, in 1910. In 1978, the railroad line was closed. The bridge closed to all traffic in 2001, but was reopened in 2007.

Martin Luther King Bridge

Formerly known as the Veterans Bridge, this cantilever truss bridge connects St. Louis, Missouri, with East St. Louis, Illinois. It was built in 1951 as a toll bridge. In 1967, the bridge fell into disrepair when the toll-free Poplar Street Bridge opened. In 1968, the bridge was renamed after Martin Luther King, Jr. In 1987, the toll was removed and repairs begun.

Eads Bridge

Combined road and railway bridge, connecting St. Louis, Missouri and East St. Louis, Illinois. When completed in 1874, it was the longest arch bridge in the world, with an overall length of 6,442 ft (1,964 m). The ribbed steel arch spans were considered daring, as was the use of steel as a primary structural material; it was the first such use of true steel in a major bridge project.

Poplar Street Bridge

Officially the Bernard R. Dickmann Bridge, the Poplar Street Bridge was completed in 1967, crossing the Mississippi River between East St. Louis, Illinois, and St. Louis, Missouri, just south of the Gateway Arch. The bridge is crossed by approximately 100,000 vehicles daily, making it the second most heavily used bridge on the river after the Dartmouth Bridge in Minneapolis, Minnesota.

Jefferson Barracks Bridge

Often called the J.B. Bridge, it is a pair of bridges that cross the Mississippi River from St. Louis, Missouri, to Columbia, Illinois. The 909-foot steel arch bridges were built nine years apart, with the first opening in 1983.

Chester Bridge

Truss bridge connecting Route 51 in Missouri with Illinois Route 150, between Perryville, Missouri and Chester, Illinois. The bridge can be seen in the beginning of the 1967 film, *In the Heat of the Night*. In the 1940s, the main span was destroyed by a tornado.

A4: Mississippi River Watershed States Chart

State	Tree	Flower	Mammal	Fish	Bird
Alabama	Longleaf Pine <i>Pinus palustris</i>	Camellia <i>Camellia sp.</i>	Black bear	Largemouth bass	Yellowhammer
Arkansas	Pine <i>Pinus echinata</i>	Apple blossom <i>Malus domestica</i>	White-tailed deer		Mockingbird
Colorado	Blue Spruce <i>Picea pungens</i>	Rocky Mountain Columbine <i>Aquilegia caerulea</i>	Rocky Mt bighorn sheep	Greenback cutthroat trout	Lark Bunting
Georgia	Live Oak <i>Quercus virginiana</i>	Cherokee rose <i>Rosa laevigata</i>	Marine mammal – right whale	Largemouth bass	Brown Thrasher
Illinois	White Oak <i>Quercus alba</i>	Native violet <i>Viola sororia</i>	White-tailed deer	Bluegill	Cardinal
Indiana	Yellow Poplar <i>Liriodendron tulipifera</i>	Peony <i>Paeonia sp.</i>			Cardinal
Iowa	Oak <i>Quercus</i>	Wild rose <i>Rosa blanda</i>		(unofficial) Channel catfish	Eastern Goldfinch
Kansas	Cottonwood <i>Populus deltoides</i>	Native sunflower <i>Helianthus annuus</i>	American buffalo		Western Meadowlark
Kentucky	Yellow Poplar <i>Gymnocladus dioica</i>	Goldenrod <i>Solidago sp.</i>	Gray squirrel	Kentucky spotted bass	Cardinal
Louisiana	Bald Cypress <i>Taxodium distichum</i>	Magnolia <i>Magnolia grandiflora</i>	Black bear	White crappie	Eastern Brown Pelican

A4: Mississippi River Watershed States Chart

State	Tree	Flower	Mammal	Fish	Bird
Maryland	White Oak <i>Quercus alba</i>	Black eyed susan <i>Rudbeckia hirta</i>		Rockfish	Baltimore Oriole
Michigan	Eastern White Pine <i>Pinus strobus</i>	Apple blossom <i>Pyrus coronaria</i>	White-tailed deer	Brook trout	Robin
Minnesota	Red Pine <i>Pinus resinosa</i>	Lady slipper <i>Cypripedium reginae</i>		Walleye	Common Loon
Mississippi	Southern Magnolia <i>Magnolia grandiflora</i>	Magnolia <i>Magnolia grandiflora</i>	White-tailed deer	Largemouth bass	Mockingbird
Missouri	Flowering Dogwood <i>Cornus florida</i>	Hawthorn <i>Crataegus sp.</i>	Missouri mule	Channel catfish	Bluebird
Montana	Ponderosa Pine <i>Pinus ponderosa</i>	Bitterroot <i>Lewisia rediviva</i>	Grizzly bear	Blackspotted cutthroat trout	Western Meadowlark
Nebraska	Cottonwood <i>Populus deltoides</i>	Goldenrod <i>Solidago gigantea</i>	White-tailed deer	Channel catfish	Western Meadowlark
New Mexico	Pinyon <i>Pinus edulis</i>	Yucca <i>Yucca sp.</i>	Black bear	Cutthroat trout	Roadrunner
New York	Sugar Maple <i>Acer saccharum</i>	Rose <i>Rosa sp.</i>	Beaver	Brook trout	Bluebird
North Carolina	Pine <i>Pinus palustris</i>	Dogwood <i>Cornus florida</i>	Gray squirrel	Channel Bass	Cardinal
North Dakota	American Elm <i>Ulmus americana</i>	Wild prairie rose <i>Rosa carolina</i>	Nokota horse	Northern pike	Western Meadowlark
Ohio	Ohio Buckeye <i>Aesculus glabra</i>	Scarlet carnation <i>Dianthus caryophyllus</i>	White-tailed deer		Cardinal

A4: Mississippi River Watershed States Chart

State	Tree	Flower	Mammal	Fish	Bird
Oklahoma	Eastern Redbud <i>Cercis canadensis</i>	Mistletoe <i>Phoradendron serotinum</i>	Buffalo	White Bass	Scissor-tailed Flycatcher
Pennsylvania	Eastern Hemlock <i>Tsuga canadensis</i>	Mountain laurel <i>Kalmia latifolia</i>	White-tailed deer	Brook trout	Ruffed Grouse
South Dakota	White Spruce <i>Picea glauca</i>	Pasque flower <i>Anemone pulsatilla</i>	Coyote	Walleye	Ring-necked Pheasant
Tennessee	Yellow Poplar <i>Liriodendron tulipifera</i>	Purple iris <i>Iridaceae sp.</i>	Raccoon	Channel catfish	Mockingbird
Texas	Pecan <i>Carya illinoensis</i>	Bluebonnet <i>Lupinus subcarnosus</i>	Texas longhorn	Guadalupe bass	Mockingbird
Virginia	Flowering Dogwood <i>Cornus florida</i>	Dogwood <i>Cornus florida</i>		Brook trout	Cardinal
West Virginia	Sugar Maple <i>Acer saccharum</i>	Rhododendron <i>Rhododendron sp.</i>	Black bear	Brook trout	Cardinal
Wisconsin	Sugar Maple <i>Acer saccharum</i>	Wood violet <i>Viola sororia</i>	Badger	Muskellunge	Robin
Wyoming	Cottonwood <i>Populus sargentii</i>	Indian paint brush <i>Castilleja affinis</i>	Buffalo	Cutthroat trout	Western Meadowlark

A5: Endangered Species by State

Illinois

Animals	Endangered	Amphipod, Illinois cave (<i>Gammarus acherondytes</i>)
	Endangered	Bat, gray (<i>Myotis grisescens</i>)
	Endangered	Bat, Indiana (<i>Myotis sodalis</i>)
	Endangered	Butterfly, Karner blue (<i>Lycaeides melissa samuelis</i>)
	Endangered	Clubshell Entire Range (<i>Pleurobema clava</i>)
	Endangered	Dragonfly, Hine's emerald (<i>Somatochlora hineana</i>)
	Endangered	Fanshell (<i>Cyprogenia stegaria</i>)
	Endangered	Higgins' eye pearl mussel (<i>Lampsilis higginsii</i>)
	Endangered	Pink mucket pearl mussel (<i>Lampsilis abrupta</i>)
	Endangered	Orangefoot pimpleback pearl mussel (<i>Plethobasus cooperianus</i>)
	Endangered	Plover, piping (<i>Charadrius melodus</i>)
	Endangered	Pocketbook, fat (<i>Potamilus capax</i>)
	Endangered	Snail, Iowa Pleistocene (<i>Discus macclintocki</i>)
	Endangered	Sturgeon, pallid (<i>Scaphirhynchus albus</i>)
	Endangered	Tern, least (<i>Sterna antillarum</i>)
Plants	Threatened	Aster, decurrent false (<i>Boltonia decurrens</i>)
	Threatened	Bush-clover, prairie (<i>Lespedeza leptostachya</i>)
	Threatened	Daisy, lakeside (<i>Hymenoxys herbacea</i>)
	Threatened	Milkweed, Mead's (<i>Asclepias meadii</i>)
	Threatened	Orchid, eastern prairie fringed (<i>Platanthera leucophaea</i>)
	Threatened	Pogonia, small whorled (<i>Isotria medeoloides</i>)
	Threatened	Potato-bean, Price's (<i>Apios priceana</i>)
	Endangered	Prairie-clover, leafy (<i>Dalea foliosa</i>)
	Threatened	Thistle, Pitcher's (<i>Cirsium pitcheri</i>)
Fish	Threatened	Banded Killifish (<i>Fundulus diaphanus</i>)
	Endangered	Bigeye shiner (<i>Notropis boops</i>)
	Threatened	Blackchin shiner (<i>Notropis heterodon</i>)
	Endangered	Bluenose shiner (<i>Notropis welaka</i>)
	Endangered	Cypress minnow (<i>Hybognathus hayi</i>)
	Threatened	Gravel chub (<i>Erimystax x-punctatus</i>)
	Endangered	Greater redhorse (<i>Moxostoma valenciennesi</i>)
	Threatened	Iowa darter (<i>Etheostoma exile</i>)
	Endangered	Lake sturgeon (<i>Acipenser fulvescens</i>)
	Threatened	Longnose sucker (<i>Catostomus catostomus</i>)
	Endangered	Pallid shiner (<i>Hybopsis amnis</i>)
	Endangered	Pallid Sturgeon (<i>Notropis anogenus</i>)
	Endangered	Pugnose shiner (<i>Scaphirhynchus albus</i>)
	Threatened	River redhorse (<i>Moxostoma carinatum</i>)
	Threatened	Starhead topminnow (<i>Fundulus dispar</i>)
Endangered	Sturgeon chub (<i>Macrhybopsis gelida</i>)	
Endangered	Weed shiner (<i>Notropis texanus</i>)	
Endangered	Western sand darter (<i>Ammocrypta clara</i>)	

Iowa

Animals	Endangered	Bat, Indiana (<i>Myotis sodalis</i>)
	Endangered	Higgins' eye pearl mussel (<i>Lampsilis higginsii</i>)
	Threatened	Plover, piping (<i>Charadrius melodus</i>)
	Endangered	Shiner, Topeka (<i>Notropis topeka</i>)
	Endangered	Snail, Iowa Pleistocene (<i>Discus macclintocki</i>)
	Endangered	Sturgeon, pallid (<i>Scaphirhynchus albus</i>)
	Endangered	Tern, least (<i>Sterna antillarum</i>)
Plants	Threatened	Bush-clover, prairie (<i>Lespedeza leptostachya</i>)
	Threatened	Milkweed, Mead's (<i>Asclepias meadii</i>)
	Threatened	Monkshood, northern wild (<i>Aconitum noveboracense</i>)
	Threatened	Orchid, eastern prairie fringed (<i>Platanthera leucophaea</i>)
	Threatened	Orchid, western prairie fringed (<i>Platanthera praeclara</i>)
Fish	Threatened	American Brook Lamprey (<i>American Brook Lamprey</i>)
	Threatened	Bluenose shiner (<i>Notropis welaka</i>)
	Threatened	Black redhorse (<i>Moxostoma duquesni</i>)
	Endangered	Bluntnose darter (<i>Etheostoma chlorosoma</i>)
	Threatened	Burbot (<i>Lota lota</i>)
	Threatened	Chestnut lamprey (<i>Ichthyomyzon castaneus</i>)
	Endangered	Freckled madtom (<i>Noturus nocturnus</i>)
	Threatened	Grass pickerel (<i>Esox americanus vermiculatus</i>)
	Endangered	Lake sturgeon (<i>Acipenser fulvescens</i>)
	Threatened	Orangethroat darter (<i>Etheostoma spectabile</i>)
	Endangered	Pallid Sturgeon (<i>Scaphirhynchus albus</i>)
	Endangered	Pearl Dace (<i>Margariscus margarita</i>)
	Endangered	Pugnose shiner (<i>Notropis anogenus</i>)
	Endangered	Weed shiner (<i>Notropis texanus</i>)
Threatened	Western sand darter (<i>Ammocrypta clara</i>)	

Minnesota

Animals	Endangered	Butterfly, Karner blue (<i>Lycaeides melissa samuelis</i>)
	Endangered	Higgins' eye pearl mussel (<i>Lampsilis higginsii</i>)
	Threatened	Lynx, Canada (<i>Lynx canadensis</i>)
	Endangered	Mapleleaf, winged Entire (<i>Quadrula fragosa</i>)
	Threatened	Plover, piping (<i>Charadrius melodus</i>)
	Endangered	Shiner, Topeka (<i>Notropis topeka</i>)
	Threatened	Wolf, gray (<i>Canis lupus</i>)
Plants	Threatened	Bush-clover, prairie (<i>Lespedeza leptostachya</i>)
	Endangered	Lily, Minnesota dwarf trout (<i>Erythronium propullans</i>)
	Threatened	Orchid, western prairie fringed (<i>Platanthera praeclara</i>)
	Threatened	Roseroot, Leedy's (<i>Sedum integrifolium</i> ssp. <i>leedyi</i>)
Fish	Threatened	Paddlefish (<i>Polyodon spathula</i>)

Missouri

Animals	Endangered	Bat, gray (<i>Myotis grisescens</i>)	
	Endangered	Bat, Indiana (<i>Myotis sodalis</i>)	
	Endangered	Bat, Ozark big-eared (<i>Corynorhinus (=Plecotus) townsendii</i>) ingens)	
	Endangered	Beetle, American burying (<i>Nicrophorus americanus</i>)	
	Threatened	Cavefish, Ozark (<i>Amblyopsis rosae</i>)	
	Endangered	Cavesnail, Tumbling Creek (<i>Antrobia culveri</i>)	
	Threatened	Darter, Niangua (<i>Etheostoma nianguae</i>)	
	Endangered	Higgins' eye pearl mussel (<i>Lampsilis higginsii</i>)	
	Threatened	Madtom, Neosho (<i>Noturus placidus</i>)	
	Endangered	Mapleleaf, winged Entire (<i>Quadrula fragosa</i>)	
	Endangered	Pink mucket pearl mussel (<i>Lampsilis abrupta</i>)	
	Endangered	Mussel, scaleshell (<i>Leptodea leptodon</i>)	
	Endangered	Curtis pearl mussel (<i>Epioblasma florentina curtisi</i>)	
	Threatened	Plover, piping (<i>Charadrius melodus</i>)	
	Endangered	Pocketbook, fat (<i>Potamilus capax</i>)	
	Endangered	Shiner, Topeka (<i>Notropis topeka</i>)	
	Endangered	Sturgeon, pallid (<i>Scaphirhynchus albus</i>)	
	Endangered	Tern, least (<i>Sterna antillarum</i>)	
	Plants	Threatened	Aster, decurrent false (<i>Boltonia decurrens</i>)
		Threatened	Bladderpod, Missouri (<i>Lesquerella filiformis</i>)
Endangered		Clover, running buffalo (<i>Trifolium stoloniferum</i>)	
Threatened		Milkweed, Mead's (<i>Asclepias meadii</i>)	
Threatened		Geocarpon minimum (<i>No common name</i>)	
Threatened		Orchid, western prairie fringed (<i>Platanthera praeclara</i>)	
Threatened		Pogonia, small whorled (<i>Isotria medeoloides</i>)	
Endangered		Pondberry (<i>Lindera melissifolia</i>)	
Threatened	Sneezeweed, Virginia (<i>Helenium virginicum</i>)		
Fish	Threatened	Central mudminnow (<i>Umbra limi</i>)	
	Endangered	Crystal darter (<i>Crystallaria asprella</i>)	
	Endangered	Flathead chub (<i>Platygobio gracilis</i>)	
	Endangered	Lake sturgeon (<i>Acipenser fulvescens</i>)	
	Endangered	Pallid Sturgeon (<i>Scaphirhynchus albus</i>)	

Wisconsin

Animals	Endangered	Butterfly, Karner blue (<i>Lycaeides melissa samuelis</i>)
	Endangered	Dragonfly, Hine's emerald (<i>Somatochlora hineana</i>)
	Endangered	Higgins' eye pearl mussel (<i>Lampsilis higginsii</i>)
	Threatened	Lynx, Canada (<i>Lynx canadensis</i>)
	Endangered	Mapleleaf, winged tortoise (<i>Quadrula fragosa</i>)
	Endangered	Plover, piping (<i>Charadrius melodus</i>)
	Endangered	Wolf, gray (Lower 48 States) (<i>Canis lupus</i>)
	Plants	Threatened
Threatened		Iris, dwarf lake (<i>Iris lacustris</i>)
Threatened		Locoweed, Fassett's (<i>Oxytropis campestris var. chartacea</i>)
Threatened		Milkweed, Mead's (<i>Asclepias meadii</i>)
Threatened		Monkshood, northern wild (<i>Aconitum noveboracense</i>)
Threatened		Orchid, eastern prairie fringed (<i>Platanthera leucophaea</i>)
Threatened		Thistle, Pitcher's (<i>Cirsium pitcheri</i>)
Fish	Threatened	Black buffalo (<i>Ictiobus niger</i>)
	Threatened	Black redhorse (<i>Moxostoma duquesnei</i>)
	Threatened	Blue sucker (<i>Cyprinella elongatus</i>)
	Endangered	Bluntnose darter (<i>Etheostoma chlorosoma</i>)
	Endangered	Crystal darter (<i>Crystallaria asprella</i>)
	Endangered	Goldeye (<i>Hiodon alosoides</i>)
	Endangered	Gravel chub (<i>Erimystax x-punctatus</i>)
	Threatened	Greater redhorse (<i>Moxostoma valenciennesi</i>)
	Threatened	Longear sunfish (<i>Lepomis megalotis</i>)
	Threatened	Ozark minnow (<i>Notropis nubilis</i>)
	Threatened	Paddlefish (<i>Polyodon spathula</i>)
	Endangered	Pallid shiner (<i>Hybopsis amnis</i>)
	Threatened	Pugnose shiner (<i>Notropis anogenus</i>)
	Threatened	Redfin shiner (<i>Lythrurus umbratilis</i>)
	Threatened	River redhorse (<i>Moxostoma carinatum</i>)
	Endangered	Skipjack (<i>Alosa (Pomolobus) chrysochloris</i>)
Endangered	Starhead topminnow (<i>Fundulus dispar</i>)	
Endangered	Striped shiner (<i>Luxilus coccogenis</i>)	

Some species that were once listed as threatened or endangered have recovered enough to be removed from the list, including the bald eagle, peregrine falcon, and brown pelican.

A6: Glossary

Abiotic means non-living, or never having lived. Non-living chemical and physical components in the environment, such as temperature, light, moisture, or air currents. Examples: rocks, soil, sunlight, water, air, and any items made by humans from non-living components, such as brick and cement.

Abolitionism is the movement to end the slave trade and set slaves free.

Abolitionist is one who worked toward the termination of slavery in the United States.

Adaptation is the biological characteristic that improves the chance of survival of an animal and its descendants.

Anthropology is the study of the origins, physical and cultural development, and the social customs and beliefs of people.

Aquifer is a saturated underground rock layer with enough available water to be pumped out or flow from the ground as a spring.

Archeology, also spelled **Archaeology**, is the study of past human culture by the recovery and examination of remaining material evidence, such as burial sites, buildings, tools, and pottery.

Atmosphere is the layer of gases that make up the air around Earth. The air includes gases that plants and animals need to breathe.

BCE is known as Before Common Era.

Bacteria are a large group of single-celled organisms that live in soil, water, organic material, and the bodies of living plants and animals.

Belief is feeling sure that something or someone exists or is true.

Biotic means living or having lived. The organic components in an environment that affect organisms. They consist of plant and animal organisms, both living and dead, as well as the results of their activities, including what they eat and defecate.

Biodegradable is something that can be broken down naturally and then becomes part of the soil, water, or air.

Biodiversity is the number and variety of organisms in a given locality, community, or ecosystem.

Biome is a geographical area that shares the same climatic conditions.

Breeding grounds are the areas where an animal mates and produces offspring.

Bridge is a structure built to span a valley, road, body of water, or other physical obstacle, for the purpose of providing passage over the obstacle.

Carbon footprint is the amount of carbon emitted by something during a given period. It relates to the amount of greenhouse gases produced when fossil fuels are burned.

Carnivore is an animal that eat only other animals.

Carrying capacity is the maximum number of healthy individuals within a species that a habitat can sustain.

CE is known as the Common Era.

Channel is the bed where a natural stream of water flows.

Chronology is the organization of events in order of their occurrence.

Civilization is similar to culture but commonly used to refer to a more complex or advanced form of organized life, including complex social, political, military, and religious values, goals, and practices.

Climate is statistical weather information that describes the variation of weather at a given place for a specified interval. It represents the synthesis of weather; more formally it is the weather of a locality averaged over some period (usually 30 years) plus statistics of weather extremes.

Climate change is often used synonymously with the term global warming; it refers to the long-term changes in the climate of a region. A warmer earth may lead to changes in rainfall patterns, a rise in sea level, and a wide range of impacts on plants, wildlife, and humans.

Community refers to different populations of species that live and interact together. Several communities live together in an ecosystem.

Confluence is where two or more bodies of water meet together, usually referring to tributaries.

Conservation is the wise use of natural resources in order to ensure continued availability to future generations.

Consumers are members of the food chain that eat other living things. There are four types, or trophic levels, of consumers.

Contaminants enter the Mississippi River untreated from runoff and stormwater drains. Contaminants may include: pesticides, petroleum, toxic metals, industrial chemicals, nitrate and phosphate.

Crest is a high point of an action or process.

Crustaceans are a large group of invertebrates that includes shrimp, crabs, and barnacles.

Culture is a shared set of attitudes, values, goals, and practices that characterizes an institution, organization or group.

Current is a "path" of water or ice that flows in a certain direction.

Decomposers are living things that break down the cells of dead plants and animals into simpler parts, helping to return nutrients to the soil to be used by the primary producers. Decomposers can include fungi (mold), bacteria, and worms.

Detritus are small pieces of organic material from dead and decaying plants and animals.

Drainage basin, also called a watershed, is a region or area of land where water from rain or snow drains downhill into a body of water, such as a river, lake, wetland, estuary, sea, or ocean.

Drainage divide, water divide, divide, or watershed is the line separating neighboring drainage basins (catchments).

Ecological footprint (eco-foot print) is the negative impact that something has on the environment.

Ecosystems are groups of living and nonliving things interacting with and dependent on each other to create a stable, self-sustaining system. They can be as small as a puddle or as large as the Earth itself.

Endangered refers to a plant or animal species that is in immediate danger of becoming extinct and needs protection to survive.

Erosion occurs when rock or soil is loosened and carried off by glaciers, rivers, winds, and waves.

Estuary is a partly enclosed coastal body of water with one or more rivers or streams flowing into it, and with a free connection to the open sea. The mix of freshwater and marine environments creates very productive habitats.

Evaporation is the releasing of water back into the atmosphere when it changes from a liquid to water vapor.

Extinct refers to a plant or animal species that is no longer living on earth.

Firn is a snowflake that has lost half of its air and did not completely melt during its first summer. Firn comes from German meaning “of last year.”

Flyway is a general flight route used by many migrating bird species between their wintering grounds and their breeding grounds. There are four major migratory flyways in North America: Atlantic, Mississippi, Central, and Pacific Flyways.

Floodplain is flat or nearly flat land next to a stream or river that occasionally or periodically floods.

Flood stage is the established gage height for a given location above which a rise in water surface level begins to create a hazard to lives, property, or commerce.

Food chain is the relationships among organisms in a habitat arranged in order of predation (interactions between predators and prey).

Food web is all the food chains in a particular habitat.

Free negro is a person born to a free African-American woman (the rights of the child were determined by the rights of the mother); rights restricted by laws intended for slaves.

Free states are states that had prohibited the institution of slavery (as of 1836): Indiana, Illinois, Michigan, Ohio, Pennsylvania, Rhode Island, Connecticut, New Jersey, New York, Massachusetts, New Hampshire, Vermont, Maine.

Freed slave is a free African-American who has purchased freedom or was freed by his or her owner.

Fugitive slave is one who flees; a runaway.

Geopolitical boundaries are the political and geographic factors that influence boundaries. Drainage basins have been historically important for determining territorial boundaries, particularly in regions where trade by water has been important.

Glacier is a huge collection of ice that moves slowly across the land. Glaciers form when more snow accumulates than melts. Glacier comes from the Latin word *glacies* meaning ice.

Global warming is the average increase in the Earth’s temperature, which causes changes in climate.

Gravity is a force. Every time you jump, you experience gravity. It pulls you back down to the ground. Without gravity, you’d float off into the atmosphere.

Greenhouse gases are gases that trap heat in the atmosphere, much like a greenhouse. Greenhouse gases include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), halogenated fluorocarbons (HCFCs), ozone (O₃), and hydrofluorocarbons (HFCs).

Groundwater is water located beneath the ground surface.

Habitat is the place where an animal makes its home and meets all of its needs for survival, including food, water, shelter, and space.

Headwaters or source of a river or stream is the place from which the water in the river or stream begins.

Herbivore is an animal that eat only plants.

Historic is the term used to describe the period of time known about through records, such as written or oral traditions.

Humidity is the amount of water vapor (moisture) in the air.

Igneous rocks form when magma solidifies. Magma is molten rock from deep within the Earth. The chemical composition of the magma and its cooling rate determine the final igneous rock type.

Indicator species is a species whose presence, absence, or relative well-being in a given environment tells us about the health of its ecosystem as a whole. Also called bioindicators.

Invertebrates are animals without backbones, which includes about 95% of all animal species, such as insects, worms, spiders, crustaceans, and mollusks.

Language is a form of communication. Without language, people could not learn from one another across generations and culture could not be transmitted.

Magma is deep within the Earth. It is so hot that some rocks slowly melt and become a thick flowing substance. Some of the magma pushes through vents and fissures in the Earth's surface until a volcanic eruption occurs. Magma that has erupted is called lava.

Metamorphic rocks are rocks that have been substantially changed from their original igneous, sedimentary, or earlier metamorphic form.

Migration is the movement of a species from one place to another, often following a change of season. Migration of people to new areas is usually an attempt to find new opportunities or resources.

Migration route is the path taken during the course of migration by a single bird species. There are four major migratory routes in North America: Atlantic, Mississippi, Central, and Pacific Flyways.

Mollusks are a large group of invertebrates that includes snails, slugs, clams, and mussels.

Niche is the functional role a particular organism plays in an ecosystem. If two species occupy the same niche then competition occurs until one has replaced the other.

Non-renewable resources are non-living resources that do not regenerate themselves.

Ocean is a major body of salt water. About 71% of the Earth's surface is covered by ocean, a continuous body of water that is customarily divided into several principal oceans and smaller seas.

Ojibwe is a group of Native American people from along the Mississippi River and the Great Lakes. Also spelled Ojibwey and Ojibwa. The name is sometimes anglicized as Chippewa.

Omnivore is an animal that eat both plants and other animals.

Organism is an individual living thing, such as a plant, animal, fungus, and bacteria.

Photosynthesis is the process through which green plants make their own food from sunlight, water, and a gas called carbon dioxide.

Phytoplankton are microscopic plants that live in or near the surface of the water.

Plankton are microscopic organisms that live in both salt and fresh water.

Pollution is the contamination of air, water, or soil by substances that are harmful to living organisms, usually caused by human activities.

Population is a group of the same species living in the same place at the same time.

Precipitation in general is the name for freshwater that falls from clouds as rain, hail, snow, or dew.

Predator is an animal that kills and eat other animals.

Prehistoric is a term used to describe the period before recorded history.

Prey are animals that are killed and eaten by other animals.

Producers are organisms, such as plants and algae, that make their own food through photosynthesis.

Recycling is reusing or making a substance available for reuse. For example, when organisms die or produce waste, they become food for decomposers, which break down the organic matter into nutrients that can be used again by producers.

Reservoir is an artificial lake used to store water. Reservoirs are often created by building a reinforced dam.

Riparian habitat is the habitat along the bank of a river.

River mouth is where a river empties into an ocean or other large body of water.

Safe house is a place that provides safe haven for people. Safe houses were part of the Underground Railroad. Their locations were kept secret from all but a limited number of people.

Scavengers are animals that eat dead things.

Sea generally refers to a large body of salt water and is commonly used as a synonym for ocean.

Sediment is the matter that settles to the bottom of a liquid, usually sand, rock, or gravel. Sediment refers to a collection of solid material that gets dragged along with the flow of the river water, and then settles to the riverbed when the flow slows down.

Sedimentary rocks are formed from pieces of pre-existing rocks worn away from weathering and erosion of once-living organisms. Called sediment, these small pieces may be transported and deposited elsewhere by rivers.

Shared resource means sharing an entity by many. At school, you share the playground with other students. The playground is a shared resource.

Settler is a person who has migrated to an area and established residence there.

Settlement is a permanent or temporary community in which people live.

Slavery is a system in which people are the property of others and can be bought and sold.

Slave states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, Missouri, North Carolina, Tennessee, Texas, Virginia, West Virginia, Delaware, Maryland. Slavery was also legal in the District of Columbia.

Social organization is a set of complex systems and institutions developed to meet basic needs, such as family, governments, languages, universities, hospitals, business corporations, and legal systems.

Species is a single kind of living thing. All people are one species. Two organisms of the same species can reproduce.

Spirituals are religious songs which were created by African American slaves. Some believe they were coded with information to help slaves escape.

Stopovers are places where birds stay for a brief time during their migration.

Strata are distinct layers of sediment compressed over time. For example, sand eventually becomes sandstone because of pressure and cementing agents.

Stream flow refers to the amount of water that moves through streams, rivers, and other water channels.

Sustainable means meeting the needs of the present without exceeding the needs of the future.

Threatened means an organism whose population is declining in numbers, but has not yet become endangered. A plant or animal species that is likely to become endangered if it is not protected.

Timeline is a visual representation of the events of a certain era, used as a tool for studying history and culture.

Topography is the study of the shape of physical features of the Earth, such as mountains, valleys, plains, peninsulas, cliffs, rivers, and lakes.

Trade is the voluntary exchange of goods, services, or both. Trade is also called commerce. The original form of trade was barter, the direct exchange of goods and services without using money.

Tradition is the practice of handing down information, beliefs, or customs from one generation to another.

Transportation is the movement of people and goods from one location to another.

Tributary is a stream or river which flows into a main stem river. A tributary does not flow directly into a sea, ocean, or lake. Tributaries and the main stem river serve to drain the surrounding drainage basin of its surface water and groundwater by leading the water out into an ocean or some other large body of water.

Trophic level is the position of an organism in a food chain.

Underground Railroad was an informal network of secret routes and safe houses used by 19th-century African American slaves in the U.S. to escape to free states and Canada with the aid of abolitionists who were sympathetic to their cause.

Value is the idea that something, such as an object, goal, or belief, is valuable or desirable.

Volcano refers to an opening or vent through which the molten rock and associated gases are expelled.

Water cycle is the continuous movement of water on, above, and below the surface of the Earth. Water can change states among liquid, vapor, and ice at various places in the water cycle. Also called the hydrologic cycle.

Watercraft is a vehicle, vessel or craft designed to move across (or through) water, including saltwater and freshwater, for pleasure, recreation, physical exercise, commerce, transport, and military missions.

Watershed is a region or area of land where water from rain or snow drains downhill into body of water, such as a river, lake, wetland, estuary, sea, or ocean. Also called a drainage basin.

Weather is the day-to-day state of the atmosphere, and its short-term (minutes to weeks) variation. Popularly, weather is thought of as the combination of temperature, humidity, precipitation, cloudiness, visibility, and wind.

Wetland is an area of land whose soil is saturated with moisture either permanently or seasonally. Such areas may also be covered partially or completely by shallow pools of water.

Zooplankton are microscopic animals that eat other plankton, such as phytoplankton.

A7: Education Standards

The planning chart in Appendix 8 shows which activities and lessons are associated with which standard.

NATIONAL STANDARDS	ILLINOIS	IOWA
	http://www.isbe.state.il.us/ils/	http://www.corecurriculum.iowa.gov/Home.aspx
Science		
<p>Science Standards <i>(Grades 5–8)</i> National Committee on Science Education Standards and Assessment</p> <ul style="list-style-type: none"> • Science as inquiry • Physical science • Life science • Earth science • Science and technology • Science in personal and social perspectives • History and nature of science 	<p>Science <i>(Grades K-12)</i></p> <ul style="list-style-type: none"> • Inquiry and design • Concepts and principles • Science, technology and society 	<p>Science <i>(Grades 5-6)</i></p> <ul style="list-style-type: none"> • Science as inquiry • Physical science • Life science • Earth and space science
Math		
<p>Math Standards <i>(Grades 6–8)</i> National Council of Teachers of Mathematics</p> <ul style="list-style-type: none"> • Numbers and operations • Algebra • Geometry • Measurement • Data analysis and probability • Problem solving 	<p>Math Standards <i>(Grades K-12)</i></p> <ul style="list-style-type: none"> • Applications of learning • Solving problems • Communicating • Using technology • Working on teams • Making connections 	<p>Math <i>(Grades 5-6)</i></p> <ul style="list-style-type: none"> • Number and operations • Algebra • Geometry and measurement • Data analysis and probability
Social Science		
<p>Social Science Standards <i>(Grades K-12)</i> National Council for the Social Studies</p> <ul style="list-style-type: none"> • Civics • Economics • Geography • History 	<p>Social Studies <i>(Grades K-12)</i></p> <ul style="list-style-type: none"> • Political systems • Economics • History • Geography • Social systems 	<p>Social Studies <i>(Grades 5-6)</i></p> <ul style="list-style-type: none"> • Political science and civic literacy • Behavioral science • Economics • Geography • History

MINNESOTA	MISSOURI	WISCONSIN
<p>http://education.state.mn.us/mde/Academic_Excellence/Academic_Standards/index.html</p>	<p>http://dese.mo.gov/standards/content.html</p>	<p>http://dpi.wi.gov/standards/applying.html</p>
<p>Science (Grade 5)</p> <ul style="list-style-type: none"> • The nature of science and engineering • Physical science • Earth and space science • Life science <p>(Grade 6)</p> <ul style="list-style-type: none"> • The nature of science and engineering • Physical science 	<p>Science (Grades K-12)</p> <ul style="list-style-type: none"> • Physical science • Life science • Earth science • Scientific inquiry • Impact of science, technology and human activity on resources and the environment 	<p>Science (Grades 5-6)</p> <ul style="list-style-type: none"> • Clarity and specificity • Advanced science content • Examples of science in Wisconsin • Connectedness • Continuity • Safety
<p>Math (Grades 5–6)</p> <ul style="list-style-type: none"> • Number and operation • Algebra • Geometry and measurement • Data analysis 	<p>Math (Grades K-12)</p> <ul style="list-style-type: none"> • Numbers and operations • Geometric and trigonometry • Data analysis, probability and statistics • Mathematical systems • Discrete mathematics 	<p>Math (Grades 5-6)</p> <ul style="list-style-type: none"> • Connections • Problem solving • Reasoning • Communication • Technology
<p>Social Studies (Grades 5-6)</p> <ul style="list-style-type: none"> • Government and citizenship • Economics • Geography • United States history • Minnesota history • World history • Historical skills 	<p>Social Studies (Grades K-12)</p> <ul style="list-style-type: none"> • Civics • History of Missouri, the United States, and the world • Social science inquiry • Economic concepts and principles • Geography • Relationships of the individual and groups to institutions and cultural traditions 	<p>Social Studies (Grades 5-6)</p> <ul style="list-style-type: none"> • Definition of social studies • Knowledge and skills • Connections in social studies

NATIONAL STANDARDS	ILLINOIS	IOWA
Fine Arts		
<p>Fine Arts Standards <i>(Grades 5–8)</i> Consortium of National Arts Education Associations</p> <ul style="list-style-type: none"> • Visual media • Music • Drama • Dance 	<p>Fine Arts <i>(Grades K-12)</i></p> <ul style="list-style-type: none"> • Language of the arts • Creating and performing • Arts and civilization 	<p>Fine Arts <i>(Grades 5-6)</i> NA</p>
Language Arts		
<p>Language Arts Standards <i>(Grades K–12)</i> National Council of Teachers of English</p> <ul style="list-style-type: none"> • Reading for perspective • Understanding the human experience • Evaluation strategies • Communication skills • Communication strategies • Applying knowledge • Evaluating data • Developing research skills • Multicultural understanding • Participating in society • Applying language skills 	<p>Language Arts <i>(Grades K-12)</i></p> <ul style="list-style-type: none"> • Reading • Literature • Writing • Listening and speaking • Research 	<p>Literacy <i>(Grades 5-6)</i></p> <ul style="list-style-type: none"> • Reading • Writing • Speaking • Listening • Viewing essential concepts and skills

MINNESOTA

MISSOURI

WISCONSIN

The Arts
(Grades 5-6)

- Dance
- Music
- Theater
- Visual arts

Visual and Performed Arts
(Grades K-12)

- The principles and elements of different art forms
- Interrelationships of visual and performing arts and the relationships of the arts to other disciplines
- Historical and cultural contexts

Fine Arts
(Grades 5-6)

NA

Language Arts
(Grade 5)

- Reading and literature
- Writing
- Speaking, listening and viewing

(Grade 6)

- Reading and literature
- Writing
- Speaking, listening and viewing

Communication Arts
(Grades K-12)

- Speaking and writing standard english
- Reading and evaluating
- Reading and evaluating nonfiction works and material
- Writing formally and informally
- Formal and informal presentations and discussions of issues and ideas

Language Arts
(Grades 5-6)

- Language arts: A developmental subject
- Great authors and literary works
- Connectedness

A8: Planning Chart

Unit 1 Goal:

Introduce students to the Mississippi River Watershed and explore how it made its mark on the country's ecosystems and commerce.

1.0 Introduction to the Mississippi River Watershed

Learn why the Mississippi River Watershed is considered one of the world's greatest river systems

- Introduce the Mississippi River Watershed
- Discover some interesting facts about the watershed
- Identify your state in the watershed

Page 6

- Geography
- Earth Science
- Language Arts
- Pre-assessment
- Introduce wall map
- Word search

1.1 Movers and Scrapers: Upper Mississippi Glaciations

Learn how the Mississippi River Watershed was formed by the movement of glaciers

- Define geographic terms related to the formation of the Mississippi River
- Demonstrate how the Mississippi River was formed
- Demonstrate glacial erosion

Page 17

- Physical Science
- Earth Science
- Social Studies-Geography
- Language Arts
- Demonstrate glacial erosion

1.2 Built from the Bottom Up: Sediment Strata

Learn why the Mississippi River is constantly changing

- Define geographic terms related to the formation of the Mississippi River
- Explain and discuss the rock cycle
- Demonstrate how sediment is formed

Pages 25

- Social Studies-Geography
- Earth Science
- Language Arts
- Create sediment bottles

1.3 Going with the Flow: Ups and Downs of the Water Cycle

Learn the many ways the water cycle affects the Mississippi River

- Define geographic terms related to the Mississippi River water cycle
- Discuss the water cycle
- Identify some of the impacts of the water cycle on the river

Pages 33

- Earth Science
- Physical Science
- Science in Personal and Social Perspectives
- Language Arts
- Do an evaporation experiment

1.4 One Trunk with Many Branches: Mapping the Mississippi River Watershed

Learn the importance of the Mississippi River Watershed and the communities located along the Upper Mississippi River

- Define geographic terms related to the Mississippi River
- Identify states, tributaries, and major cities along the Upper Mississippi River
- Discuss the impact of the waterways on people and commerce

Page 43

- Physical Science
- Life Science
- Math
- Geography
- Language Arts
- Map usage and legend creation

Unit 2 Goal:

Explore the ecosystems of the Mississippi River and how humans affect them

<p>2.0 Introduction to Upper Mississippi River Ecosystems</p>	<p>Introduce students to the ecosystems of the Mississippi River</p>	<ul style="list-style-type: none"> Define terms related to ecosystems of the Mississippi River Study the ecosystems of Upper Mississippi River floodplain Investigate biotic and abiotic components outside 	<p>Page 62</p>	<ul style="list-style-type: none"> Science as Inquiry Life Science Science in Personal and Social Perspectives Pre-assessment Explore Your Ecosystem - outside
<p>2.1 At Home in the River: Plants, Animals, and Habitats of the Upper Mississippi River</p>	<p>Understand how living things are connected to their environment</p>	<ul style="list-style-type: none"> Define terms related to ecosystems of the Mississippi River Research species connections in a food web Understand the importance of indicator species Care for tadpoles in an aquarium and record their development 	<p>Page 75</p>	<ul style="list-style-type: none"> Life Science Science in Personal and Social Perspectives Fine Arts Language Arts Food Chain Checkers Raising Tadpoles
<p>2.2 Just Passing Through: Bird Migration and the Mississippi River Flyway</p>	<p>Understand why the Mississippi Flyway is a major migration route for birds</p>	<ul style="list-style-type: none"> Define terms related to ecosystems of the Mississippi River Research migration routes and identify stopovers Create a flyway in your classroom Prepare for a birdwatching field trip Go birdwatching 	<p>Page 89</p>	<ul style="list-style-type: none"> Life Science Science in Personal and Social Perspectives Geography Fine Arts Language Arts Create a classroom flyway Bird watching field trip
<p>2.3 Well River Check-up: Assessing the Health of the River</p>	<p>Understand we all use and reuse the same water</p>	<ul style="list-style-type: none"> Understand point and non-point pollution Examine the effects of detergents and fertilizers on aquatic life Test for dissolved oxygen in water samples Determine the relationship between pollutants and dissolved oxygen in water Collect and interpret data 	<p>Page 103</p>	<ul style="list-style-type: none"> Physical Science Life Science Science in Personal and Social Perspectives Virtual car wash Phosphates in your water
<p>2.4 Life on the Brink: Endangered Species of the Upper Mississippi River</p>	<p>Learn how we can help endangered species that depend on the Upper Mississippi River</p>	<ul style="list-style-type: none"> Define terms related to ecosystems of the Mississippi River Identify endangered species in your local area Design and plant and school wildlife garden 	<p>Page 117</p>	<ul style="list-style-type: none"> Physical Science Life Science Science in Personal and Social Perspectives Geography Identify endangered species Create a wildlife garden
<p>2.5 Mississippi River Sustainability: How to Make a Positive Impact on Your Environment</p>	<p>Learn how we can make a positive impact on their environment</p>	<ul style="list-style-type: none"> Define terms related to ecosystems of the Mississippi River Discuss the effect humans have on the environment Identify conservation ideas for school and home 	<p>Page 122</p>	<ul style="list-style-type: none"> Physical Science Life Science Science in Personal and Social Perspectives Read and comprehend Calculate your eco-footprint

Unit 3 Goal:

Learn how communities and cultures develop and evolve to form civilizations

<p>3.0 Introduction to Mississippi River History and Culture</p>	<p>Understand our own traditions and culture</p> <ul style="list-style-type: none"> Discover your family culture Identify your family traditions Investigate how technology influences or changes traditions 	<p>Page 134</p>	<ul style="list-style-type: none"> Social Science Language Arts 	<ul style="list-style-type: none"> Pre-assessment Write about your culture
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<p>3.1 Mississippi River's Ancient Civilizations</p>	<p>Learn about ancient Americans living along the Mississippi</p> <ul style="list-style-type: none"> Explore early American civilizations Discover their customs and cultures Compare their cultures to yours 	<p>Page 149</p>	<ul style="list-style-type: none"> Social Science Fine Arts Language Arts 	<ul style="list-style-type: none"> Express yourself through poetry
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<p>3.2 Where Worlds Meet: Early European Exploration</p>	<p>Learn how new European settlements started along the Mississippi River</p> <ul style="list-style-type: none"> Identify explorers of the Mississippi River and their sponsoring countries Discuss why many countries wanted to claim the Mississippi River Explain the importance of the Louisiana Purchase 	<p>Page 159</p>	<ul style="list-style-type: none"> Social Science Fine Arts Language Arts 	<ul style="list-style-type: none"> Plot the routes of early European explorers
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<p>3.3 Louisiana Purchase: Gateway to the Western Frontier</p>	<p>Understand the Mississippi River's role in the Louisiana Purchase</p> <ul style="list-style-type: none"> Review the importance of the Louisiana Purchase Discuss the significance of Zebulon Pike's expedition on the Mississippi River Compare and contrast the Lewis and Clark and the Zebulon Pike expeditions 	<p>Page 169</p>	<ul style="list-style-type: none"> Social Science Math Fine Arts Language Arts 	<ul style="list-style-type: none"> Plan river trip like Zeb Pike
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<p>3.4 Rivers of Human Migration: Settlement, Transportation, and Trade</p>	<p>Learn why people migrate and the river's role in migration</p> <ul style="list-style-type: none"> Explore reasons for human migration Research your state Identify geographic characteristics that influenced migration and settlement 	<p>Page 181</p>	<ul style="list-style-type: none"> Social Science Fine Arts Language Arts 	<ul style="list-style-type: none"> Views of the Valley of the Mississippi Ask the Expert Americans on the Move
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<p>3.5 Mississippi River: Pathway to Freedom</p>	<p>Learn the role of the Mississippi River in the Underground Railroad</p> <ul style="list-style-type: none"> Learn about key people in the Abolitionist Movement and the Underground Railroad Discover the routes of the Underground Railroad Become a railroad "rider" 	<p>Page 199</p>	<ul style="list-style-type: none"> Social Science Fine Arts Language Arts 	<ul style="list-style-type: none"> Plan an Underground route
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Unit 4 Goal:

Explore the Mississippi River at work and how it has changed over time

4.0 Introduction to the Mississippi River at Work
 Research river-related occupations on the Mississippi River

- Introduce the Mississippi River at work
- Identify river occupations
- Discuss the river's role in these occupations
- Write about an occupation of your choosing

Page 212

- Social Sciences
- Fine Arts
- Language Arts

- Pre-assessment
- Research river-related occupations

4.1 Early Navigation: Powered by People
 Explore what river navigation was like before the Age of Steam

- Compare watercrafts used before steamboats
- Understand how early watercrafts were navigated
- Build a flatboat

Page 227

- Social Science
- Fine Arts
- Language Arts

- Create new verses to Row, Row, Row your Boat
- Make a flatboat

4.2 All Aboard the Steamboat Era: Steam Powers a New Economy
 Learn how the steamboat changed travel and commerce on the river

- Introduce the steamboat
- Discuss how the steamboat revolutionized river commerce
- Use maps to navigate the river
- Demonstrate the power of steam

Page 235

- Science
- Social Science
- Fine Arts
- Language Arts

- Create steam power
- Make the Twain

4.3 River Running Dry, River Running High: Major Floods on the Upper Mississippi River
 Understand the natural cycles of flooding and drought on the Upper Mississippi River

- Discuss causes of flooding
- Identify major floods along the Mississippi River
- Research what kind of technology was used after each major flood
- Produce news article and broadcast

Page 249

- Science
- Social Studies
- Fine Arts
- Language Arts

- Produce a news broadcast

4.4 Controlling the River: Locks and Dams make it possible to navigate the Upper Mississippi River
 Learn how locks and dams make it possible to navigate the Upper Mississippi River

- Explore how locks and dams changed the river
- Discuss the impact on wildlife
- Watch how a lock works

Page 261

- Science
- Social Studies
- Fine Arts
- Math
- Language Arts

- Water equilibrium

4.5 To Market! To Market! Our Inland Waterway System
 Understand the river's role as a vital economic interstate

- Research which products go up the river and which ones down
- Compare modes of transportation via river, rail, and road
- Create a virtual trip from the Atlantic Ocean through the Saint Lawrence Seaway to the Gulf of Mexico
- Read a navigational chart

Page 273

- Science
- Social Studies
- Math
- Fine Arts
- Language Arts

- Create a virtual trip on the river

Unit 5 Goal:

Explore what it means to safely share the Upper Mississippi River

5.0 Introduction to A Shared Resource - Our Mississippi River

Explore how to safely share this resource

- Define shared resource
- Investigate Mississippi River issues and concerns
- Discuss how we share this resource and the students' responsibilities in protecting it

Page 280

- Life Science
- Science in Personal and Social Perspectives

- Pre-assessment
- Investigate river issues & concerns

5.1 Sharing Our River: One River, Many Uses - Playing it Safe on the Mississippi

Learn how to share the river safely

- Research the different types of water safety
- Identify keys elements of water safety
- Teach younger kids in your school about water safety

Page 285

- Science in Personal and Social Perspectives
- Fine Arts
- Language Arts

- Create water safety poster
- Teach younger students boating safety

5.2 Managing Our River for Everyone: Competing Views and Values

Discuss ideas for how to sustainably manage the river for multiple uses

- Identify issues facing communities
- Understand different points of view
- Brainstorm ideas
- Problem-solve solutions

Page 295

- Life Science
- Science in Personal and Social Perspectives
- Social Science
- Fine Arts
- Language Arts

- Create a new town after a flood
- Discuss at a mock town hall meeting

5.3 Caring for Our River: Protecting Our Precious Resource

Adopt a service project or design a service learning project

- Research service projects for your class and school
- Do a service project
- Design a science fair project on conservation

Page 301

- Science in Personal and Social Perspectives
- Fine Arts
- Language Arts

- Research service-learning projects and choose one

Bibliography

Books

- Adil, Janeen R. *Natural Wonders: The Mississippi River*. New York: Weigl Publishers Inc., 2004
- Anfinson, John. *The River We Have Wrought: A History of the Upper Mississippi*. Minnesota: Univ. of Minnesota Press, 2003
- Ambrose, Stephen E and Douglas G. Brinkley. *The Mississippi and the Making of a Nation*. Washington, D.C.: National Geographic Society, 2002
- Arbuthnot, May Hill and Shelton L. Root, Jr. *Time for Poetry*. Glenview: Scott, Foresman and Company, 1968
- Benton-Banai, Edward. *The Mishomis Book: The Voice of the Ojibway*. Minneapolis: Univ. of Minnesota Press, 1988
- Blashfield, Jean F. *America the Beautiful: Wisconsin*. New York: Children's Press, 1998
- Birmingham, Robert A. and Lynne G. Goldstein. *Aztalan: Mysteries of an Ancient Indian Town*. Madison: Wisconsin Historical Society Press, 2005
- Castaldo, Nancy F. *River Wild: An Activity Guide to North American Rivers*. Chicago: Chicago Review Press, 2006
- Chambers, Catherine. *Mapping Earthforms: Rivers*. Chicago: Reed Educational & Professional Publishing, 2000
- Childcraft. *Poems and Rhymes. The How and Why Library, Volume 1*. Chicago: Field Enterprises Educational Corporation, 1976
- Chrisp, Peter. *Atlas of Ancient Worlds*. New York: DK, 2009
- Daniel, Pete. *Deep'n As it Come: The 1927 Mississippi River Flood*. New York: Oxford Univ. Press, 1977
- Dott, Robert, Jr. and John Attig. *Roadside Geology of Wisconsin*. Missoula, MT: Mountain Press, 2008
- Eyden, Pamela, Molly McGuire, and Reggie McLeod. *Big River Reader: An Anthology of Stories about the Upper Mississippi, from the First Four Years of the Big River*. Winona, MN: Big River, 1996
- Fiedler, Julie. *Learning About Food Chains and Food Webs with Graphic Organizers*. New York: The Rosen Publishing Group, Inc., 2007
- Flippo, Kathy. *Between the Saints: Louis and Paul. A Towboat Travelogue on the Mississippi River*. Florissant, MO: Little River Books, 1998
- Fremling, Calvin R. *Immortal River: The Upper Mississippi in Ancient and Modern Times*. Madison: The University of Wisconsin Press, 2005
- Gardner, Robert. *Experimenting with Water*. New York: Dover, 1993
- Hewitt, Sally. *Using Water*. Canada: Crabtree Publishing Company, 2009
- Hintz, Martin. *America the Beautiful: Iowa*. New York: Children's Press, 2000
- Hintz, Martin. *America the Beautiful: Minnesota*. New York: Children's Press, 2000
- Hintz, Martin. *America the Beautiful: Missouri*. New York: Children's Press, 1999
- Holland, Simon and Anna Lofthouse. *Eye Wonder: Rivers and Lakes*. New York: DK Publishing, Inc., 2003
- Hume, Rob. *Birdwatching*. New York: Random House, 1992
- Judson, Katherine B. *Myths and Legends of the Mississippi Valley and the Great Lakes*. Amsterdam, The Netherlands: Fredonia Books, 2002. Reprinted from the 1915 ed.
- Kukla, Jon. *A Wilderness So Immense: The Louisiana Purchase and the Destiny of America*. New York: Knopf, 2003
- Larson, Ron. *Upper Mississippi River History: Fact—Fiction—Legend*. Winona, MN: Steamboat Press, 1998
- Lund, Duane R. *Our Historic Upper Mississippi*. Cambridge, MN: Adventure Publishing, 1991
- Mann, Charles C. *1491: New Revelations of the Americas Before Columbus*. New York: Vintage Books, 2006
- McCall, Edith. *Biography of a River: The Living Mississippi*. New York: Walker Publishing, Inc., 1990
- McGhee, Karen and George McKay. *Encyclopedia of Animals*. Washington DC: National Geographic Society, 2007
- McKnight Foundation. *The Mississippi River in the Upper Midwest: Its Economy, Ecology, and Management*. Minneapolis: McKnight Foundation, 1996
- Medina, Sarah. *Real World Data: Graphing Water*. Chicago: Heinemann Library, 2009
- Meltzer, David J. *First Peoples in a New World: Colonizing Ice Age America*. Berkeley: Univ. of California Press, 2009

Modern Earth Science: Small Scale Investigations. New York: Holt, Rinehart and Winston.

Morley, Jacqueline. *Across America: The Story of Lewis & Clark*. New York: Franklin Watts A Division of Grolier Publishing, 1998

Ojakangas, Richard W. *Roadside Geology of Minnesota*. Missoula, MT: Mountain Press, 2009

Packman, Chris et al., *The Practical Naturalist*. New York: DK Publishing, Inc., 2010

Pauketat, Timothy R. *Cahokia: Ancient America's Great City on the Mississippi*. New York: Penguin, 2009

Petterchak, Janice. *Taming the Upper Mississippi: My Turn at Watch, 1935-1999*. William H. Klingner. Rochester, IL: Legacy Press, 2000

Pollock, Steven. *Eyewitness Ecology*. New York: DK Publishing, 2005

Rockman, Marcy and James Steele, Eds. *Colonization of Unfamiliar Landscapes: The Archaeology of Adaptation*. New York: Routledge, 2003

Rodes, Barbara K. and Rice Odell. *A Dictionary of Environmental Quotations*. Baltimore: The Johns Hopkins University Press, 1992

Santella, Andrew. *America the Beautiful: Illinois*. New York: Children's Press, 1998

Severin, Timothy. *Explorers of the Mississippi*. London: Routledge and Kegan Paul, 1967

Theiler, James L. and Robert F. Boszhardt. *Twelve Millennia: Archaeology of the Upper Mississippi River Valley*. Iowa City: Univ. of Iowa Press, 2003

Twain, Mark. *Life on the Mississippi*. Unabridged. Boston: Osgood & Co., 1883

Woodward, John. *Eyewitness Climate Change*. New York: DK Publishing, 2008

Magazines

Journal of the National Geographic Society. *Special Issue Water: Our Thirsty World*, 217, no. 4 (April 2010)

Videos

Scott, James. *Confluence: The River Heritage of St. Louis*. St. Louis: Saint Louis University, 2004

Cahokia Mounds: Ancient Metropolis. Collinsville, IL: Camera One, 2008

Websites

American Land Conservancy: Mississippi River
www.alcnet.org/projects/overview/mississippi

American Indian Heritage Foundation
www.indians.org

American Planning Association: Kids and Community
www.planning.org

Audubon Society
www.audubon.org

Cornell Lab of Ornithology
www.birds.cornell.edu

Corporation for National Community Service
www.serve.gov

EPA: (Environmental Protection Agency):
Climate Change Kids Site
www.epa.gov/climatechange/kids

SurfYour Watershed.
cfpub.epa.gov/surf/locate/index.cfm

WaterSense Kids
www.epa.gov/watersense/kids/

FEMA (Federal Emergency Management Agency) for Kids
www.fema.gov/kids

Friends of the Mississippi River
fmr.org/

Izaak Walton League of America
www.iwla.org

Learn and Serve America
www.learnandserve.gov

Library of Congress
www.loc.gov

Living Lands and Waters
www.livinglandsandwaters.org

Mississippi River Wild
www.mississippiriverwild.com

Mississippi Valley Archaeology Center, University of Wisconsin - La Crosse
www.uwlax.edu/mvac

National Aeronautics and Space Administration (NASA)
www.nasa.gov

National Flood Insurance Program
www.floodsmart.gov

National Geographic: Genographic Project: Atlas of the Human Journey
genographic.nationalgeographic.com

National Geographic Kids
kids.nationalgeographic.com

National Geographic Xpeditions
www.nationalgeographic.com/expeditions

- National Geophysical Data Center
ngdc.noaa.gov
- National Great Rivers Museum
www.mvs.usace.army.mil/Rivers/museum.html
- National Great Rivers Research and Education Center
www.ngrrec.org
- National Oceanic and Atmospheric Administration (NOAA)
www.noaa.org
- National Park Service: NPS: Mississippi National River and Recreation Area
nps.gov/miss
- Archeology for Kids
www.nps.gov/archeology/PUBLIC/kids
- National Service Learning
www.servicelearning.org
- National Youth Leadership Council
www.nylc.org
- National Wildlife Federation
www.nwf.org
- Nature Conservancy
www.nature.org
- PBS (Public Broadcasting Service)
www.pbs.org
- Riverlands Migratory Bird Sanctuary
www.mvs.usace.army.mil/rivers
- Service Learning Partnership
www.service-learningpartnership.org
- Sierra Club
www.sierraclub.org
- Smithsonian National Zoological Park's Migratory Bird Center
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- Steamboats.org
www.steamboats.org
- Steamboat Times
www.steamboattimes.com
- U.S. Army Corps of Engineers:*
- Bobber the Water Safety Dog
www.bobber.info
- Kids and Nature
www.usace.army.mil/CECW/Operations/Pages/kids_n_nature.aspx
- Navigation and Ecosystem Sustainability Program
<http://www2.mvr.usace.army.mil/UMRS/NESP>
- Mississippi Valley Division
www.mvd.usace.army.mil
- Mississippi River Commission
www.mvd.usace.army.mil/mrc
- Water Safety
www.sas.usace.army.mil/wtrsafty.htm
- Upper Mississippi River Navigation Charts
http://www2.mvr.usace.army.mil/NIC2/mrcharts_omni.cfm
- Upper Mississippi River Restoration
www.mvr.usace.army.mil/EMP
- Underground Railroad Freedom Center
www.freedomcenter.org
- U.S. Coast Guard
www.uscg.mil
- U.S. Fish and Wildlife Service:*
- Educating for Conservation
www.fws.gov/educators
- Endangered Species
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- National Wildlife Refuges
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- Neighborhood Explorers
www.fws.gov/neighborhoodexplorers
- U.S. Geological Society (USGS):*
- Science in Your Watershed
water.usgs.gov/wsc
- Water Science for Schools
ga.water.usgs.gov/edu/watershed.html
- Waterways Council, Inc.
www.waterways.org
- Wildlife Conservation Society
www.wcs.org
- World Wildlife Fund
www.worldwildlife.org

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