2019 River Quest Learning Stations – Alignment with State Learning Standards

Station	Station Location	MN Standard and Benchmark	Next Generation Standard
Break the Grip of the Rip! **Twin Ports Rip Currents**	DECC D1	**6.2.2.2.1** Motion: 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.	**MS-ESS2-5** Earth Systems: Weather and Climate: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions
What's the difference between Storm & Sanitary Sewers? **City of Duluth – Utility Operations** (M/T)	DECC D2	**6.1.2.1.2** Practice of Engineering: Recognize that there is no perfect design and that new technologies have consequences that may increase some risks and decrease others.	**MS-ESS3-3** Earth & Human Activity: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
Maritime Oil Spill Response **US Coast Guard & USCG Auxiliary** (W/Th)	DECC D2	**7.4.4.1.2** Human Interactions w/Living Systems: Describe ways that human activities can change the populations and communities in an ecosystem.	**MS-ETS1-2** Engineering Design: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
Industrial Water Use: Reduce, Reuse, Recycle! **Sappi** (M/T)	DECC D3	**6.2.1.2.1** Physical Science: Identify evidence of physical changes, including changing phase or shape, and dissolving in other materials.	**MS-ESS3-3, 3-4** Earth & Human Activity: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. Human Impacts: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

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Sustainable Forestry **Verso Corporation** (W/Th)	DECC D3	**7.4.4.1.2** Human Interactions w/Living Systems: Describe ways that human activities can change the populations and communities in an ecosystem.	**MS-ESS3-3, 3-4** Earth & Human Activity: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. Human Impacts: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
Water Power *(Hydroelectric)* **MN Power/Boulder Lake Environmental Learning Center** (M/T)	DECC D4	**6.2.3.2.1** Energy: Differentiate between kinetic and potential energy and analyze situations where kinetic energy is converted to potential energy and vice versa.	**MS-ETS1-4** Engineering Design: Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.
Great Lakes Cargo Capital **Duluth Seaway Port Authority** (W/Th)	DECC D4	**6.1.2.1.1** Impact of Engineered Systems: Identify a common engineered system and evaluate its impact on the daily life of humans.	**MS-ETS1-1** Engineering Design: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
The Disappearing Beach **MN DNR Scientific and Natural Areas Program** (M/T)	DECC D5	**7.4.4.1.2** Human Interactions w/Living Systems: Describe ways that human activities can change the populations and communities in an ecosystem.	**MS-ESS3-3** Earth & Human Activity: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
Stream Table **USDA Forest Service – Superior National Forest** (W/Th)	DECC D5	**7.4.4.1.2** Human Interactions w/Living Systems: Describe ways that human activities can change the populations and communities in an ecosystem.	**MS-ESS2-4** Earth Systems: Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

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Bacteria: The Real Workers at WLSSD **Western Lake Superior Sanitary District**	DECC D6	**6.1.2.1.1** Nature of Science & Engineering: Identify a common engineered system and evaluate its impact on the daily life of humans.	**MS-ETS1-1** Engineering Design: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
Cold Hand Luke *(Hypothermia & Water Safety)* **US Army Corps of Engineers**	VISTA V1	**6.2.3.2.3** Energy: Describe how heat energy is transferred in conduction, convection and radiation.	**MS-ETS1-2** Engineering Design: Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
Pollution & the River Watershed **US Environmental Protection Agency**	VISTA V2	**7.4.4.1.2** Human Interactions w/Living Systems: Describe ways that human activities can change the populations and communities in an ecosystem.	**MS-ESS2-4** Earth & Human Activities: Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
What is the Es-chew-air-ee? **Lake Superior National Estuarine Research Reserve** (M/T)	VISTA V3	**7.4.2.1.1** Interdependence Among Living Systems: Identify a variety of populations and communities in an ecosystem and describe the relationships among the populations and communities in a stable ecosystem.	**MS-ESS2-4** Earth Systems: Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.
It floats, you don't. Wear your life jacket. **Duluth Sail & Power Squadron** (W/Th)	VISTA V3	**6.2.2.2.2** Physical Science: Identify the forces acting on an object and describe how the sum of the forces affects the motion of the object. For example: Forces acting on a book on a table or a car on the road.	**MS-ETS1-3** Engineering Design: Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

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Get Habitattitude! **Minnesota Sea Grant Program**	VISTA V4	**6.1.1.1.1** Citizenship & Government Civic Skills: **7.4.4.1.2** Humans Changing Ecosystems Describe ways that human activities can change the populations and communities in an ecosystem.	**MS-ESS3-3, ETS1-1** Earth & Human Activity: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. Engineering Design: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
Fishy Physics **Great Lakes Aquarium** (M/T)	VISTA V5	**6.2.2.2.2** Physical Science : Identify the forces acting on an object and describe how the sum of the forces affects the motion of the object. For example: Forces acting on a book on a table or a car on the road.	**MS-ESS2-4** Forces and Interactions: Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.
Bringing Back the Piping Plover **St. Louis River Alliance** (W/Th)	VISTA V5	**7.4.2.1.2** Life Science: Roles of Organisms: Compare and contrast predator/prey, parasite/host and producer/consumer/decomposer relationships.	**MS-ESS3-3** Earth & Human Activity: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.
Observation Station **(Top Deck)** **River Quest Volunteers**	VISTA V6	**6.1.2.1.1** Practice of Engineering: Identify a common engineered system and evaluate its impact on the daily life of humans.	**MS-ETS1-1** Engineering Design: Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.