

2018 River Quest Learning Stations – Alignment with State Learning Standards

Station	Station Location	MN Standard and Benchmark	Next Generation Standard
<p><i>Bacteria: The Real Workers at WLSSD</i> Western Lake Superior Sanitary District</p>	<p>DECC D1</p>	<p>6.1.2.1.1 Nature of Science & Engineering: Identify a common engineered system and evaluate its impact on the daily life of humans.</p>	<p>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.</p>
<p><i>What's the difference between Storm & Sanitary Sewers?</i> City of Duluth – Utility Operations</p> <p style="text-align: right;">(M/T)</p>	<p>DECC D2</p>	<p>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.</p>	<p>MS-ESS3-3 Earth & Human Activity: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.</p>
<p><i>Stream Table</i> USDA Forest Service – Superior National Forest</p> <p style="text-align: right;">(W/Th)</p>	<p>DECC D2</p>	<p>7.4.4.1.2 Human Interactions w/Living Systems: Describe ways that human activities can change the populations and communities in an ecosystem.</p>	<p>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.</p>
<p><i>Water Power (Hydroelectric)</i> MN Power/Boulder Lake Environmental Learning Center</p> <p style="text-align: right;">(M/T)</p>	<p>DECC D3</p>	<p>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.</p>	<p>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.</p>

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<p><i>Great Lakes Cargo Capital</i> Duluth Seaway Port Authority</p> <p>(W/Th)</p>	<p>DECC D3</p>	<p>6.1.2.1.1 Impact of Engineered Systems: Identify a common engineered system and evaluate its impact on the daily life of humans.</p>	<p>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.</p>
<p><i>Industrial Water: Reduce, Reuse, Recycle!</i> Sappi</p> <p>(M/T)</p>	<p>DECC D4</p>	<p>6.2.1.2.1 Physical Science: Identify evidence of physical changes, including changing phase or shape, and dissolving in other materials.</p>	<p>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.</p> <p>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.</p>
<p><i>Sustainable Forestry</i> Verso Corporation</p> <p>(W/Th)</p>	<p>DECC D4</p>	<p>7.4.4.1.2 Human Interactions w/Living Systems: Describe ways that human activities can change the populations and communities in an ecosystem.</p>	<p>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.</p> <p>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.</p>
<p><i>Maritime Oil Spill Response</i> US Coast Guard & USCG Auxiliary</p> <p>(M/T)</p>	<p>DECC D5</p>	<p>7.4.4.1.2 Human Interactions w/Living Systems: Describe ways that human activities can change the populations and communities in an ecosystem.</p>	<p>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.</p>

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<p><i>Fishy Physics</i> Great Lakes Aquarium</p> <p>(W/Th)</p>	<p>DECC D5</p>	<p>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.</p>	<p>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.</p>
<p><i>Break the Grip of the Rip!</i> Twin Ports Rip Currents</p>	<p>DECC D6</p>	<p>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.</p>	<p>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</p>
<p><i>Cold Hand Luke (Hypothermia & Water Safety)</i> US Army Corps of Engineers</p>	<p>VISTA V1</p>	<p>6.2.3.2.3 Energy: Describe how heat energy is transferred in conduction, convection and radiation.</p>	<p>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.</p>
<p><i>Pollution & the River Watershed</i> US Environmental Protection Agency</p>	<p>VISTA V2</p>	<p>7.4.4.1.2 Human Interactions w/Living Systems: Describe ways that human activities can change the populations and communities in an ecosystem.</p>	<p>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.</p>
<p><i>What is the Es-chew-air-ee?</i> Lake Superior National Estuarine Research Reserve</p>	<p>VISTA V3</p>	<p>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.</p>	<p>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.</p>

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<p><i>Get Habitattitude!</i> Minnesota Sea Grant Program</p>	<p>VISTA V4</p>	<p>6.1.1.1.1 Citizenship & Government Civic Skills:</p> <p>7.4.4.1.2 Humans Changing Ecosystems Describe ways that human activities can change the populations and communities in an ecosystem.</p>	<p>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.</p> <p>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.</p>
<p><i>It floats, you don't. Wear your life jacket.</i> Duluth Sail & Power Squadron</p>	<p>VISTA V5</p>	<p>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.</p>	<p>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.</p>
<p><i>Observation Station (Top Deck)</i> River Quest Volunteers</p>	<p>VISTA V6</p>	<p>6.1.2.1.1 Practice of Engineering: Identify a common engineered system and evaluate its impact on the daily life of humans.</p>	<p>MS-ETS1-1 Earth & Human Activity: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.</p>