# Table of Contents

Ahoy! Welcome to the RMSC! How to Use this Guide: .......................................................... 3

Navigating the Exhibit: ........................................................................................................... 4

Section 1: Deep Waters........................................................................................................... 5

Section 2: What's in Our Waterways?.................................................................................... 5

Section 3: On Dry Land............................................................................................................ 6

Section 4: Advocating for Change.......................................................................................... 7

Glossary of Related Terms and Phrases:.................................................................................. 7

Bibliography: ........................................................................................................................... 8

Online Resources: .................................................................................................................... 8

Read Further: ........................................................................................................................... 8
Ahoy! Welcome to the RMSC! How to Use this Guide:

The Educator Guide for RMSC’s Wonders of Water exhibit provides teachers with resources and extension activities to teach about Environmental Activism, Water Pollution, and local and indigenous history with our waterways. This guide can serve to:

- **Prepare for your visit to the museum.** The exhibit summary, extension activities, discussion prompts, and suggested resources will provide you and your students with the opportunity and background to get the most from your museum experience.
- **During your visit:** supplement your experience by reflecting on the essential questions in each section. These questions can be used to start discussion before and/or after your visit.
- **Culminate your visit.** Provided are activities and questions that will encourage further discussion and understanding of the topics and themes that are shown in the exhibit.
- **Find more resources and information** about each of the topics discussed in the exhibit. This guide includes a list of books, documents, and websites that will help educators become more knowledgeable of the topics discussed in each section.
- **Understand** important terms, concepts, and vocabulary involved in the discussion of environmental activism and local or indigenous associations with water. Each of the defined terms will appear in **bolded** text, and can be found in the glossary at the end of this guide.

**Organization**

This exhibit can be organized into four distinct sections, each one dealing with a different “identity” or association with water. Each section will include discussion questions, activities, and suggested reading/resources. All activities, discussion prompts and questions are meant to be a fun addition to the exhibit or your unit of study. Please make copies of the guide as needed.
Navigating the Exhibit:

Let the exploration of the Great Lakes begin! Students start their expedition at the entrance of the Wonders of Water Exhibit completely under the surface of Lake Ontario. Here they are greeted by the wreck of the SS Scourge, a shipwreck with a story to tell. To the right, individuals of different cultural backgrounds share creation stories from around the world that discuss water. Jump start your wonder as you explore the floor of the Great Lakes with an ROV unit. Even discover for yourself the different species that live in different depths of the Great Lakes, by ascending the magnificent climber in the center of the exhibit. This structure even shows you the different temperature data taken by real-life scientists over years and in different seasons. Check out how the Lakes have been changing over time.

**Related New York State Learning Standards:**

**Science:**
- K-ESS2-2
- K-ESS3-3
- 2-LS2-2
- 2-LS4-1
- 3-LS4-3
- 3-LS4-4
- 4-ESS3-1
- 4-ESS3-2
- 5-ESS3-1

**Social Studies:**
- K.2b
- K.3a
- K.8b
- 1.1b
- 1.6b
- 1.6c
- 1.8b

As students move to the back of the exhibit, they ascend onto land, the watershed of the Great Lakes. Here they will discover more about why the wetlands are so important to environmental health, check out a working model of an erie canal lock system, get hands-on understanding of hydro electrics, and even have the opportunity to learn more about current water activism and activists. The focus of this exhibit is inquiry based learning; in which students have hands-on and fun educational opportunities for a variety of different topics relating to our local waterways.

**Topics and Themes:** Social Justice and Activism, Environmental Awareness, Cultural Connections and Diversity, Haudenosaunee People, History of Lake Ontario, Exploration of Lake Ontario
Section 1: Deep Waters

Bathtime Bathymetrics
After checking out the USS Scourge, how do you think that scientists and historians found the ship wreckage? Right next door is an ROV that might help you shed some light on the problem. ROV units can help scan the bottom of lakes and oceans. That way we can get data on what the floor of that body of water looks like. Now we have better technology like this ROV unit that can show us pictures, video, or even scanned data points for a very exact replication of what the floor of a body of water looks like. But before the ROV technology was created, they had to find a different way. The earliest form of taking these depth measurements, or bathymetric measurements, was called a lead line. This strategy used a piece of string tied to a very heavy piece of lead, lowered over the side of the boat to measure different depths of the water. What a slog! Try your hand at being a bathymetrics expert by connecting the depth maps on the given charts. Draw your best representation of the lake floor as given by the depth measurements taken by using the lead line, and see if you can find the hidden wreckage! Don't forget to color code the depths so that it's easy to read the map.

Roving ROVs
Check out the ROV unit by the remake of the USS Scourge! This is similar to the kinds of technology scientists use currently to map the bathymetry in bodies of water, but these ROV units are also useful for other things. There are three different informative videos hidden in the depths of the tank. Try to maneuver the ROV unit to learn more about Lake Ontario and how ROV units help scientists.

Think about it:
Why are ROV units important? What do they do?
How are they better than older forms of bathymetric measuring tools, like the lead line?

Section 2: What’s in Our Waterways?

Pollution Problems
If you had to guess, how many different kinds of plastics do you think there are? If you guessed seven you'd be right! But did you know each of these different kinds of plastics get recycled in different kinds of ways? Get familiar with the different kinds of plastics, and learn what you can do to properly sort and recycle plastics. Some plastics are easier to recycle than others, and that’s why it's important to remember and practice all three steps of “reduce, reuse and recycle.” Check out the list of plastics and discuss what you have in your household and what you can do to help the environment.
Check out the small bottle provided in your self guided box. Notice what you see. Why do you think the plastics float at different levels? The answer is **density**. The plastics are made of different materials, which is why they have to be recycled differently.

*Think about it:*
What might be the use of sorting these plastics according to density? Why is it important to be able to sort plastics?

### Wetland Walk
Check out the far left side of the exhibit that delves deeper into the Wetlands and how they play an important role in our environment. Try out the wetland interactive on the boardwalk. What happens when the table is tilted? The bigger marbles get stuck, mimicking how wetlands and marshlands work as a natural filter. The “bigger” things, like some pollutants and trash get filtered out, while the water (the smaller marbles) can pass right through. Cool, huh?

But right now a lot of wetlands and marshlands are at risk! Because of expanding infrastructure, building projects like businesses, housing developments, and roads, many of these critical habitats are being hurt. Look at the different animal species that are all around the boardwalk. The wetlands are their home environment. Man made changes like this can harm an ecosystem’s ability to self regulate, or bounce back from pollutants.

*Reading! Reading! Reading!*
Grab a book and hunker down in the USS Scourge reading room! Learn more about the Great Lakes, as well as ways that we can help keep them clean! Learn more about a variety of topics including: the water cycle, history on Lake Ontario, water activism.

*Think about it:*
What is one new thing you learned about from the book?

### Section 3: On Dry Land

### I Say, You Say: Seneca Scavenger Hunt
Check out the worksheet of Seneca words and the plaques around the exhibit. Work with your group to match each of the Seneca words to the plaques. Try sounding the words out using the pronunciation guide. Find as many of the words as you can and mark them off on your sheet. Once you get familiar with how they sound, play a game of I Spy. You might say “I spy something yellow” the answer might be “Onëö”.
Did you know that the Seneca language doesn’t have a written system? In order to document the language, a system was created to describe the pronunciation, but there is no official alphabet or written system for the Seneca language.
Section 4: Advocating for Change

**Watershed Scavenger Hunt**
Weather permitting, check out the RMSC grounds. There are some special features to the grounds that emphasize **Green Infrastructure**, especially in an urban environment. Urban areas tend to generate and retain more heat, because pavement and asphalt absorb more sunlight than trees and water. Increased heat can be linked to health issues for residents of urban areas. Green infrastructure encompasses a variety of design and building practices that aim to reduce heat absorption, improve drainage of rainwater, and promote urban biodiversity.

As you take in the surrounding green space, keep your eyes out for these special features:

- **Green Roof**: A roof or structure covered with native plants and vegetation.
- **Porous pavement**: Cements that are purposefully created to allow water to permeate or drain through it, instead of standing in puddles or draining into the sewer system. *There are three different kinds (conglomerate rock, pervious cement, and recycled rubber)*
- **Rain Garden** (*Spring, Summer, Fall only*): A collection of vegetation that soaks up water so that it doesn't end up in the sewer system. It also adds pollinator friendly plants, as well as some beautiful color to the landscape in the summer months. *What colors do you see?*
- **Rain Barrels**: Blue barrels that are connected to the gutter systems of buildings and structures to collect rainwater. This water can be reused for plants during drier seasons. *How many can you find?*

Think about it:
There are three things to keep in mind when planning green infrastructure: *heat, drainage vs runoff,* and *emissions.* *In what ways do each one of these elements create beneficial environments based on those three categories?*

Remember, Rochester is in the Lake Ontario watershed, so all the water that flows into the sewers here in the city will eventually flow into the lake. *What effects might this have on the Lake?*

What effects do green spaces have on urban environments?
What are some ways that your home, school, or community could put these concepts into action?

**Glossary of Related Terms and Phrases:**

- **Bathymetry**: The inverse of topography, measuring the depth of bodies of water. Bathymetric maps resemble topographic maps, as lines closer together indicate steepness and farther apart indicate a more gradual shift in depth.
**Density:** Density describes what a substance is made up of and how compact the molecules are that make up that substance. Commonly this is misunderstood as weight, which while weight is sometimes correlated with, is not the same as density.

**Green Infrastructure:** Buildings or constructions created in or to limit or ameliorate their impact on the environment. Green Infrastructure has been especially important in the discussion of Urban development to minimize the effects of heat and emissions, as well as maximize drainage instead of runoff.

*Haudenosaunee:* (hoe-dee-no-SHOW-nee) Called the Iroquois Confederacy by the French, and the League of Five Nations by the English, the confederacy is properly called the Haudenosaunee Confederacy meaning “People of the longhouse.”

**Lead Line:** An early form of taking bathymetric measurements, involving the tedious process of lowering a marked string, tied at one end with a heavy piece of lead, over the side of the boat until the lead had reached the bottom of the body of water. This time-consuming process was later replaced first with Radar scanning, and eventually more effective scanning processes that give a much more detailed and accurate account of the floor of a body of water.

**Reduce, Reuse and Recycle:** Remember to Reduce the amount of plastics you buy or use. If you already have plastic items in your home Reuse them to the best of your ability. And if you need to dispose of them, remember to properly sort and Recycle those plastics. Some plastics may need to be dropped off at a recycling facility.

**Bibliography:**

*https://www.haudenosauneeconfederacy.com/who-we-are/

**Online Resources:**

**Seneca Language Dictionary:**

**Plastic Pollution, Where it Comes from, and How We Can Help:**
https://www.nationalgeographic.com/environment/article/plastic-pollution
https://www.biologicaldiversity.org/campaigns/ocean_plastics/
https://oceanliteracy.unesco.org/plastic-pollution-ocean/
Read Further:

**K-8:**

*The Big Beach Cleanup* by Charlotte Offsay- A story about the importance of working together to solve pollution problems.

*The Mess that We Made* by Michelle Lord- An in depth description of just how much plastic pollution disrupts life in the ocean. This rhythmic book confronts the reader with the reality of growing pollution problems.

*What Milly Did* by Elise Moser- This real-life story quickly describes the life and work of Milly Zantow, who pioneered the recycling movement, as well as developed a system for numbering plastics.

*Micoplastics and Me* by Anna Du- The real-life story of how one student took on a science fair project to try to fix the plastic pollution problem in her hometown.

*Ducks Overboard: A True Story of Plastic in Our Oceans* by Markus Motum- A book that follows the journey of a rubber duck as it floats its way through the ocean.
Give us your Feedback! We want to hear from you!
Please contact us with your comments:
Head of School and Teacher Programs
RMSC Rochester Museum & Science Center
657 East Avenue
Rochester, NY 14607
Phone: (585) 271-4552
**Bathtime Bathymetry:**

Create a map that shows the bottom of the lake by grouping together the numbers according to their depth. Make sure to color code each group so that it’s easy to read. Help us find the sunken wreckage!

*Where could it be hiding?*

<table>
<thead>
<tr>
<th>5</th>
<th>3</th>
<th>7</th>
<th>6</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>25</td>
<td>25</td>
<td>30</td>
<td>37</td>
<td>35</td>
</tr>
<tr>
<td>30</td>
<td>34</td>
<td>25</td>
<td>45</td>
<td>53</td>
<td>50</td>
</tr>
<tr>
<td>45</td>
<td>25</td>
<td>25</td>
<td>50</td>
<td>62</td>
<td>70</td>
</tr>
<tr>
<td>50</td>
<td>58</td>
<td>25</td>
<td>59</td>
<td>64</td>
<td>68</td>
</tr>
<tr>
<td>68</td>
<td>60</td>
<td>58</td>
<td>79</td>
<td>71</td>
<td>77</td>
</tr>
<tr>
<td>70</td>
<td>67</td>
<td>72</td>
<td>78</td>
<td>85</td>
<td>80</td>
</tr>
<tr>
<td>75</td>
<td>79</td>
<td>87</td>
<td>93</td>
<td>88</td>
<td>79</td>
</tr>
<tr>
<td>75</td>
<td>76</td>
<td>78</td>
<td>85</td>
<td>96</td>
<td>95</td>
</tr>
<tr>
<td>80</td>
<td>81</td>
<td>82</td>
<td>87</td>
<td>96</td>
<td>99</td>
</tr>
<tr>
<td>83</td>
<td>79</td>
<td>78</td>
<td>85</td>
<td>89</td>
<td>97</td>
</tr>
<tr>
<td>86</td>
<td>87</td>
<td>79</td>
<td>86</td>
<td>92</td>
<td>98</td>
</tr>
<tr>
<td>87</td>
<td>88</td>
<td>81</td>
<td>85</td>
<td>90</td>
<td>97</td>
</tr>
<tr>
<td>90</td>
<td>89</td>
<td>86</td>
<td>94</td>
<td>99</td>
<td>98</td>
</tr>
<tr>
<td>91</td>
<td>95</td>
<td>97</td>
<td>97</td>
<td>95</td>
<td>100</td>
</tr>
<tr>
<td>92</td>
<td>105</td>
<td>98</td>
<td>95</td>
<td>107</td>
<td>101</td>
</tr>
<tr>
<td>95</td>
<td>100</td>
<td>106</td>
<td>96</td>
<td>97</td>
<td>105</td>
</tr>
<tr>
<td>98</td>
<td>109</td>
<td>103</td>
<td>100</td>
<td>109</td>
<td>110</td>
</tr>
<tr>
<td>101</td>
<td>106</td>
<td>111</td>
<td>107</td>
<td>110</td>
<td>115</td>
</tr>
<tr>
<td>109</td>
<td>113</td>
<td>114</td>
<td>113</td>
<td>117</td>
<td>120</td>
</tr>
</tbody>
</table>

**KEY:**

- 0-9
- 10-19
- 20-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70-79
- 80-89
- 90-99
- 100+

**USS Scourge Wreckage:**

*Where could it be hiding?*
I Say, You Say: Seneca Scavenger Hunt

Below are listed some Seneca Words. Match the Seneca words to the English translations, see if you can find them all!

I found these words!

- ☐ 0:yakayö’
- ☐ Osae’da’
- ☐ 0:nyohsa’
- ☐ Onö’

Seneca Birds:

- ☐ Dzago:gi:h
- ☐ Jöhjöh
- ☐ Dzoäshä Ganëhdaukö’
- ☐ Dzoäshä Niawa’a:h
- ☐ Ga:nyagä:’
Seneca is spelled here with the following letters and other symbols:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Sound</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>a in ‘father’</td>
<td>o’wà:’</td>
</tr>
<tr>
<td>e</td>
<td>e in ‘they’</td>
<td>gage:da’</td>
</tr>
<tr>
<td>i</td>
<td>i in ‘police’</td>
<td>dekni:h</td>
</tr>
<tr>
<td>o</td>
<td>o in ‘note’</td>
<td>hakso:t</td>
</tr>
<tr>
<td>u</td>
<td>u in ‘tune’</td>
<td>niwú’u:h</td>
</tr>
<tr>
<td>ä</td>
<td>a in ‘cat’</td>
<td>gā:ha’</td>
</tr>
<tr>
<td>ē</td>
<td>e in ‘men’ (nasal)</td>
<td>ē:deh</td>
</tr>
<tr>
<td>ō</td>
<td>o in ‘own’ (nasal)</td>
<td>ō:gweh</td>
</tr>
<tr>
<td>w</td>
<td>w in ‘wash’</td>
<td>wahda’</td>
</tr>
<tr>
<td>n</td>
<td>n in ‘not’</td>
<td>nēːgē:h</td>
</tr>
<tr>
<td>y</td>
<td>y in ‘yes’</td>
<td>yeː:i’</td>
</tr>
<tr>
<td>d</td>
<td>d in ‘dog’</td>
<td>dosgēh</td>
</tr>
<tr>
<td>dz</td>
<td>dz in ‘adze’</td>
<td>dzaːdak or jaːdak</td>
</tr>
<tr>
<td>t</td>
<td>t in ‘tail’</td>
<td>otoːwe’</td>
</tr>
<tr>
<td>g</td>
<td>g in ‘girl’</td>
<td>geːih</td>
</tr>
<tr>
<td>k</td>
<td>k in ‘kite’</td>
<td>o’keːgē’</td>
</tr>
<tr>
<td>s</td>
<td>s in ‘sit’</td>
<td>sēh</td>
</tr>
<tr>
<td>ş</td>
<td>sh in ‘show’</td>
<td>şaːsōh</td>
</tr>
<tr>
<td>j</td>
<td>j in ‘job’</td>
<td>johdōːh</td>
</tr>
<tr>
<td>h</td>
<td>h in ‘hat’</td>
<td>haːnīh</td>
</tr>
<tr>
<td>’</td>
<td>middle of ‘uh-oh’</td>
<td>hē’ěh</td>
</tr>
<tr>
<td>a:</td>
<td>long vowel</td>
<td>wa’aːgē’</td>
</tr>
<tr>
<td>á:</td>
<td>high pitched vowel</td>
<td>ahdā’hgwa’</td>
</tr>
<tr>
<td>à:</td>
<td>long vowel with falling pitch</td>
<td>ěɡāːt</td>
</tr>
</tbody>
</table>

1 But halfway to the o in ‘on’.
2 Some people pronounce dz like j.