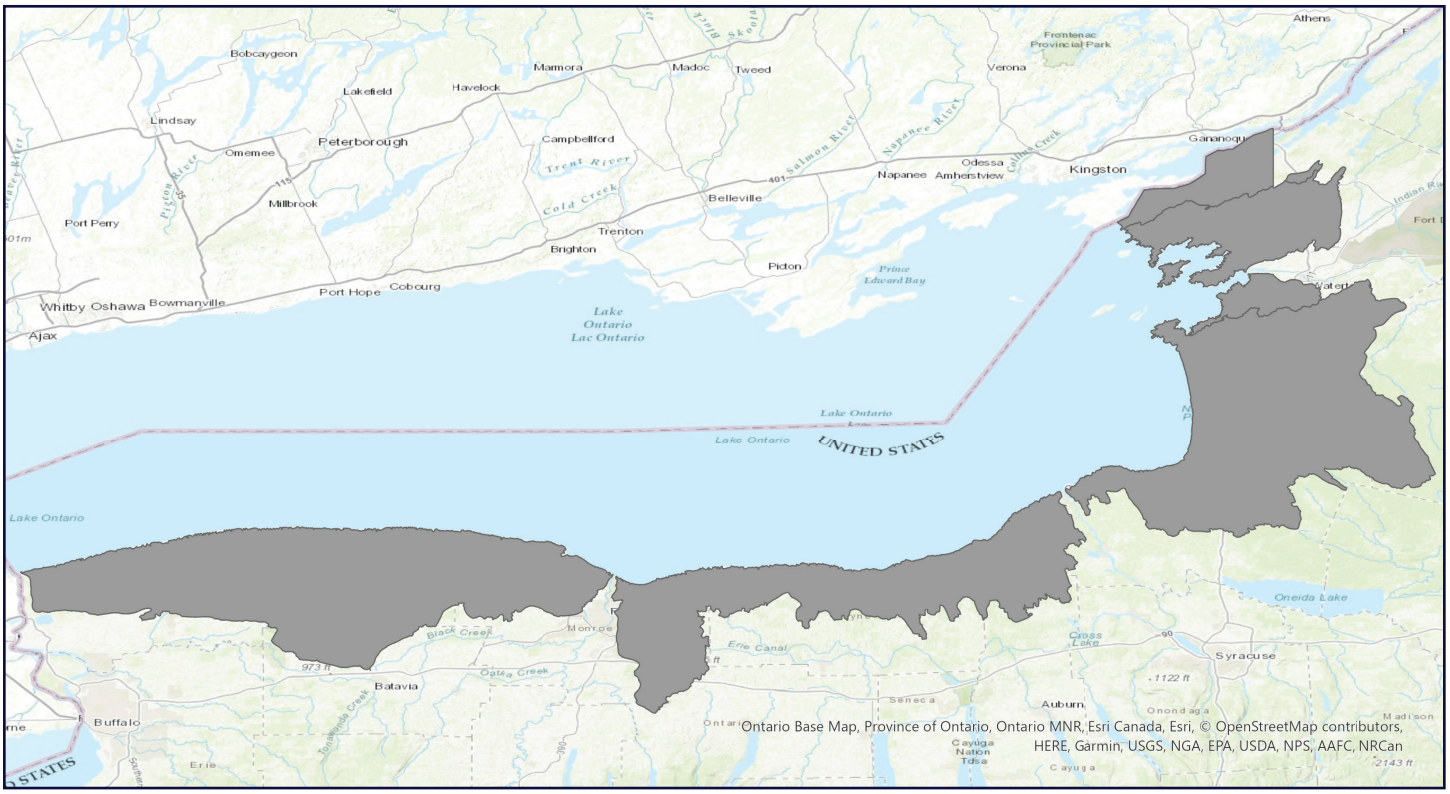
Student Data Packet

Welcome to the Lake Ontario and St. Lawrence River Watershed!



Map displaying the Lake Ontario-St. Lawrence River Watershed (shaded gray) in New York State.

As a scientist, your goal for today is to explore, discover, and observe everything you can about your sample site Collecting data is like taking a snapshot of the Lake and River: temperature, weather, plants, animals, and chemistry are all part of that picture

Carefully collect your data and record your findings on the following data sheets Investigate environmental clues that might help you to understand or explain your data Good luck!

Name:_____

Teacher:_____

School:_____

New York State Parks, Recreation and Historic Preservation

Sea Grant NEW YORK

NEW YORK STATE Department of Environmental Conservation

Station 1: Land Assessment

You have 45 minutes to complete the following sections:

1. Date, Location, Weather and Wind
2. General Environmental Assessment
3. Plant and Animal Observations

Section #1: Date, Location, Weather, and Wind

Objective: Record basic information about your sampling location.

Time Limit: 15 minutes

Equipment:

- ☐ pencil
- ☐ data sheet
- ☐ watershed map
- ☐ thermometer
- ☐ compass
- ☐ flagging tape
- ☐ timer
- ☐ anemometer

Record: **Date and Location**	
Date	
Location (Park Name)	
Name of Waterbody	
Watershed	

Measure and Record: **Air Temperature**	
Time	
Temperature (°F)	
Temperature (°C)	

Temperature Conversions
$°C = 0.556 \times (°F - 32)$
$°F = (1.8 \times °C) + 32$

Station 1: Land Assessment

Section #1: Date, Location, Weather, and Wind (*continued*)

Record: **Precipitation** Check all that apply.	
None	
Rain	
Snow	
Sleet	
Other: _____	

Record: **Cloud Cover** Check one.	
Clear (0-25%)	
Partly Cloudy (26-50%)	
Mostly Cloudy (51-75%)	
Overcast (75-100%)	

Measure and Record: **Wind**	
Wind Direction (N, S, E, W)	
Wind Speed (rotations per minute)	

Cause and Effect: **Weather**
Describe the weather conditions for the last three days. Were there any heavy rains, extreme temperatures, or high winds? How could these conditions affect the water quality?

Station 1: Land Assessment

Section #2: General Environmental Assessment

Objective: Observe and record information about the land around your sampling site.

Time Limit: 15 minutes

Equipment:

☐ pencil ☐ data sheet ☐ satellite map

Record: **Land Composition** Using the list below, estimate the percent land composition around your site to the nearest 5%.	
Estimated Percentage	**Land Type**
	% Houses (urban, residential, etc.)
	% Forest
	% Beach
	% Marsh/Swamp
	% Industrial/Commercial
	% Recreational (playgrounds, sports fields, etc.)
	% Roads/Parking Lots
	% Other (*Specify other:*_____)
= 100 %	(*Your percentages should total up to 100.*)

Station 1: Land Assessment

Section #2: General Environmental Assessment (*continued*)

Record: **Shoreline Appearance** Check all that apply.	
	Covered with Vegetation
	Muddy
	Natural Debris (logs, sticks, leaves, etc.)
	Pier/Dock
	Pipe Entering River
	Bulkheading (wooden timbers or metal plates holding bank in place)
	Riprap (large rocks piled up along the bank)
	Other notable features (*list them here*): _____

Cause and Effect: **Environment and Water Quality**
Describe <u>three ways</u> in which the environment at your sample site can impact water quality either positively or negatively. _____ _____ _____ _____ _____ _____ _____

Station 1: Land Assessment

Section #3: Plant and Animal Observations

Objective: Observe, identify, and describe the organisms present at your sampling site.

Time Limit: 15 minutes

Equipment:

☐ pencil ☐ data sheet ☐ field guides

Identify and Record: **Organisms at Sample Site**			
Species/Common Name	**Short Description**	**Number Observed**	**Native? (Y/N)**

Station 1: Land Assessment

Additonal Space for Notes, Sketches, or Calculations

Station 2: Water Assessment

You have 45 minutes to complete the following sections:

1. Site Characteristics
2. Temperature and Turbidity

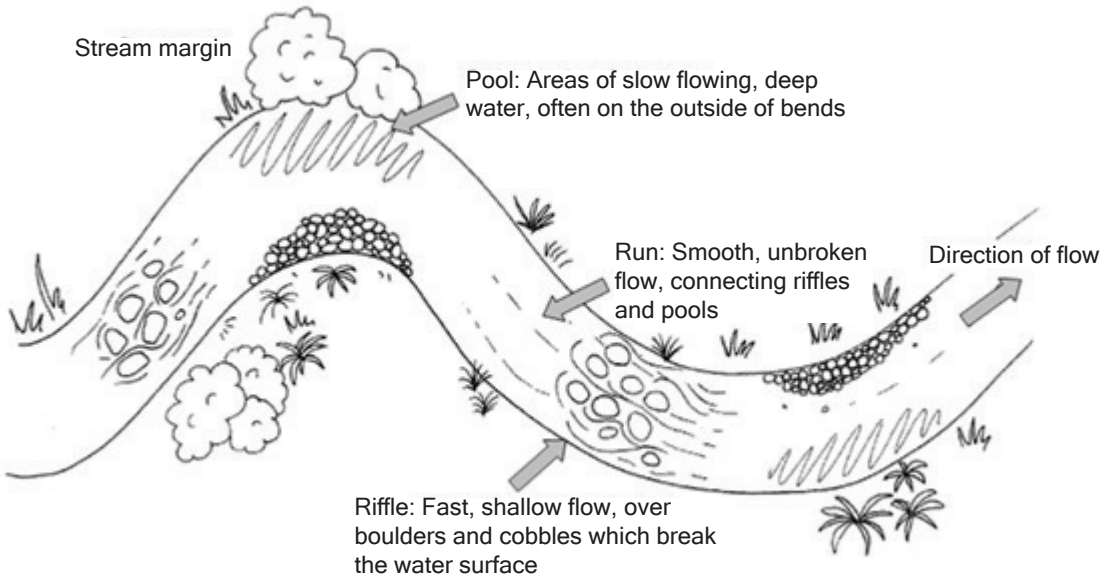
Section #1: Site Characteristics

Objective: Observe important characteristics of the water, substrate, and vegetation at your site.

Time Limit: 20-25 minutes

Equipment:

- ☐ pencil
- ☐ data sheet



Record: **Pools, Runs, Riffles**

Using the image above as reference, how many pools, runs, and riffles can you identify at your site?

Pools	Runs	Riffles	Unable to Determine

Station 2: Water Assessment

Section #1: Site Characteristics (*continued*)

Record: **Substrate** Determine which substrate type is most abundant at your site. Check one.				
Sandy	**Rocky**	**Muddy**	**Weedy**	**Unable to Determine**

Record: **Aquatic Vegetation** Check one for each column.		
Percentage of Vegetation	**Water Bottom**	**Water Surface**
0-25%		
26-50%		
51-75%		
76-100%		
Unable to Determine		

Cause and Effect: **Aquatic Vegetation**
What could cause your sampling site to have so much, or so little, aquatic vegetation?

Station 2: Water Assessment

Section #1: Site Characteristics (*continued*)

Sketch Your Sampling Site:

Station 2: Water Assessment

Section #2: Temperature and Turbidity

Objective: Measure the temperature and turbidity of the water at your sampling site.

Time Limit: 20-25 minutes

Equipment:

- ☐ pencil
- ☐ data sheet
- ☐ thermometer
- ☐ measuing tape
- ☐ turbidity tube
- ☐ funnel pitcher

Measure and Record: **Water Temperature**			
Reading	**Time**	**Depth**	**Temperature (°C)**
Reading 1			
Reading 2			
		Average Temperature:	

Measurement Conversions
Centimeters = inches × 2.54 Inches = centimeters × 0.394

Measure and Record: **Water Turbidity**			
Reading	**Time**	**Turbidity (in)**	**Turbidity (cm)**
Reading 1			
Reading 2			
	Average Turbidity Readings:		

Station 2: Water Assessment

Section #2: Temperature and Turbidity (*continued*)

Observe: **Water Turbidity**
How turbid is the water? Mark your observation on the line below. 

Cause and Effect: **Water Appearance** Check all that apply.		
	Observation	**Likely Cause**
	Light brown water (muddy or cloudy)	Mud, silt, or sand on the river bottom may result from runoff from construction sites or bank erosion
	Green water: dark green or blue-green	Organic pollution is being released into the water, feeding algae, and causing them to grow
	Multi-color film over water surface	Oil or gasoline spill
	Foam floating on water surface	If white in color and over 3 inches high, indicates fertilizer/detergent pollution
	Bubbles rising to surface	Anaerobic respiration: bacteria digest vegetation which creates gas bubbles

Cause and Effect: **Turbidity**
If the water at your sampling site is clear, does that mean that the water is clean? Why? _____ _____ _____ _____

Station 3: Chemical Water Quality Assessment

You have 45 minutes to complete the following sections:

1. Nitrate and Phosphate
2. Dissolved Oxygen and pH

Section #1: Nitrate and Phosphate

Objective: Measure the amount of nitrate and phosphate in the water at your sampling site.

Time Limit: 20-25 minutes

Equipment:

- ☐ pencil
- ☐ data sheet
- ☐ timer
- ☐ disposable gloves
- ☐ nitrate test kit
- ☐ phosphate test kit
- ☐ chemical waste container

Measure and Record: **Nitrate**	
Time	**Nitrate Level (ppm)**

Measure and Record: **Phosphate**	
Time	**Phosphate Level (ppm)**

Cause and Effect: **Nitrate and Phosphate**
Do the nitrate levels show pollution (above 4 ppm)? _____
Are the phosphate levels within the healthy range (below 0.1 ppm)? _____
List two possible causes of increased nitrate or phosphate levels in the river: _____ _____ _____ _____ _____

Station 3: Chemical Water Quality Assessment

Section #2: Dissolved Oxygen and pH

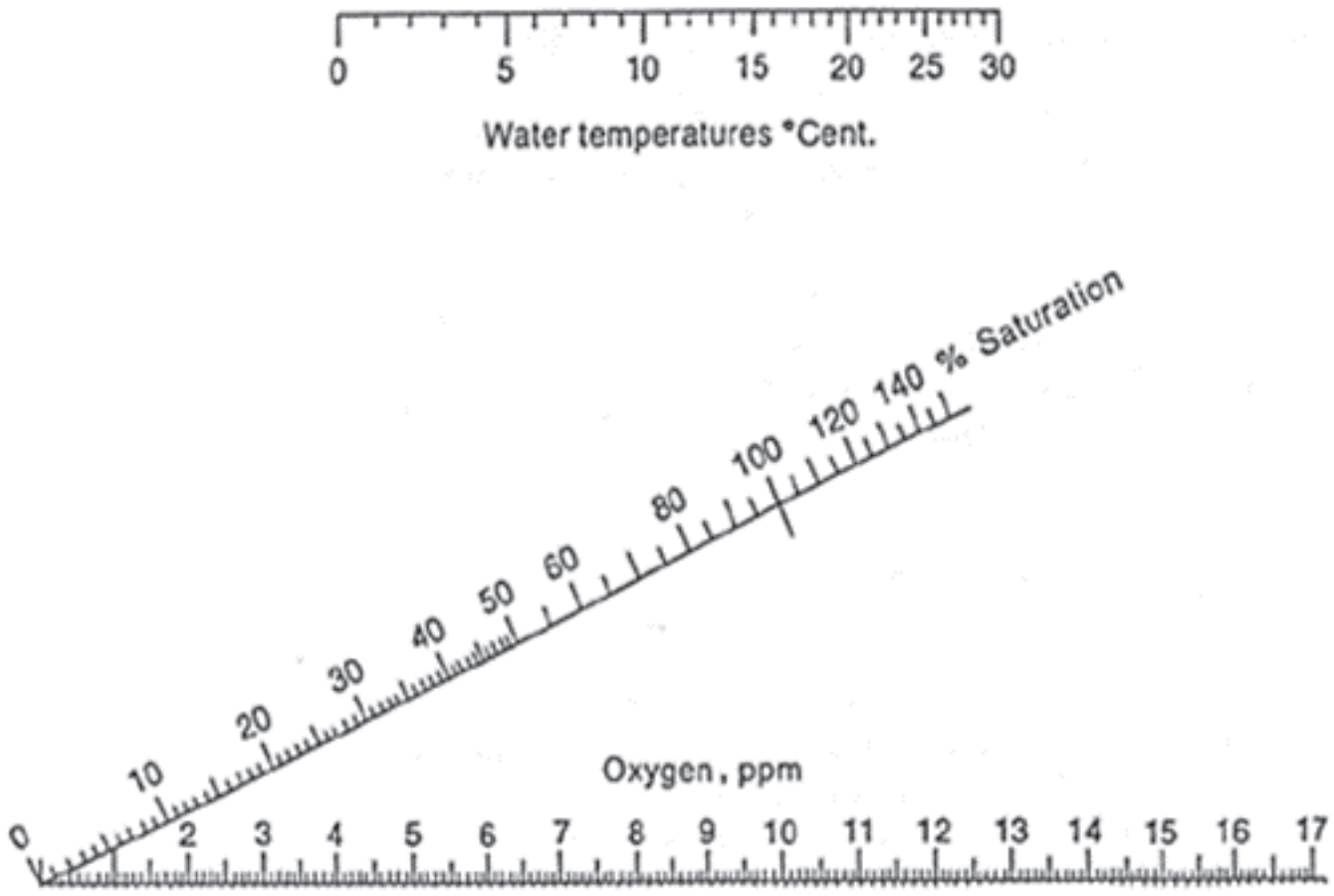
Objective: Measure the amount of dissolved oxygen and the pH of the water at your sampling site.

Time Limit: 20-25 minutes

Equipment:

- ☐ pencil
- ☐ data sheet
- ☐ timer
- ☐ disposable gloves
- ☐ dissolved oxygen test kit
- ☐ pH test kit
- ☐ chemical waste container

Measure and Record: **Dissolved Oxygen**			
Time	**Water Temperature (°C)**	**Dissolved Oxygen (ppm)**	**% Saturation** (calculate below)



Station 3: Chemical Water Quality Assessment

Section #2: Dissolved Oxygen and pH (*continued*)

Cause and Effect: **Dissolved Oxygen**
Is the DO within the healthy range (5-11 ppm)? _____
What could cause DO to change? (Hint: look at turbidity, water temperature, and wind speed data.)

Measure and Record: **pH**	
Time	**pH Level**

Cause and Effect: **pH**
Is the tablet-test pH within the healthy range (6.5-8.2)? _____
What could cause the pH of the water to change?

Station 3: Chemical Water Quality Assessment

Additonal Space for Notes, Sketches, or Calculations

Station 4: Biological Water Quality Assessment

You have 45 minutes to complete the following sections:

1. Macroinvertebrate Sampling
2. Pollution Tolerance Index

Section #1: Macroinvertebrate Sampling

Objective: Sample the macroinvertebrate community at your site and identify which species are present. Then use the macroinvertebrates you've identified to calculate a pollution tolerance index.

Time Limit: 45 minutes to complete both sections

Equipment:

- ☐ pencil
- ☐ data sheet
- ☐ life jackets
- ☐ waders
- ☐ D-frame net
- ☐ dip nets
- ☐ 4qt collection tubs
- ☐ tweezers
- ☐ plastic spoons
- ☐ ice cube trays
- ☐ macroinvertebrate cards

Sketch: **Macroinvertebrates**

Sketch an aquatic macroinvertebrate that you collected in the space below.

Station 4: Biological Water Quality Assessment

Section #1: Macroinvertebrate Sampling (*continued*)

Identify and Record: Macroinvertebrates	
Common Name	**Number Collected**

Station 4: Biological Water Quality Assessment

Section #2: Pollution Tolerance Index

Calculate: **Pollution Tolerance Index**			
Macroinvertebrate Order	Column A **# Collected**	Column B **Tolerance Value**	Column C **Total**
Plecoptera (stoneflies)		× 100	=
Ephemeroptera (mayflies)		× 90	=
Megaloptera (fishflies and dobsonflies)		× 90	=
Tricoptera (caddisflies)		× 80	=
Diptera (flies)		× 70	=
Coleoptera (beetles)		× 70	=
Odonata (dragonflies and damselflies)		× 60	=
Decapoda (crayfish)		× 50	=
Amphipoda (shrimp and scuds)		× 40	=
Gastropoda (snails)		× 40	=
Isopoda (sow bugs)		× 30	=
Oligochaeta (segmented worms)		× 20	=
Pelecyposa (mussels and clams)		× 20	=
Hirudinea (leeches)		× 10	=
Sum of Columns (sum A, then sum C)	=	–––––	=
Polution Tolerance Index Number (sum of column C / sum of column A)			=

Determine: **Water Quality** Determine the water quality based on your Pollution Tolerance Index Number. Circle one.			
> 79 = Excellent	60 - 79 = Good	40 - 59 = Fair	> 40 = Poor

Station 4: Biological Water Quality Assessment

Additonal Space for Notes, Sketches, or Calculations