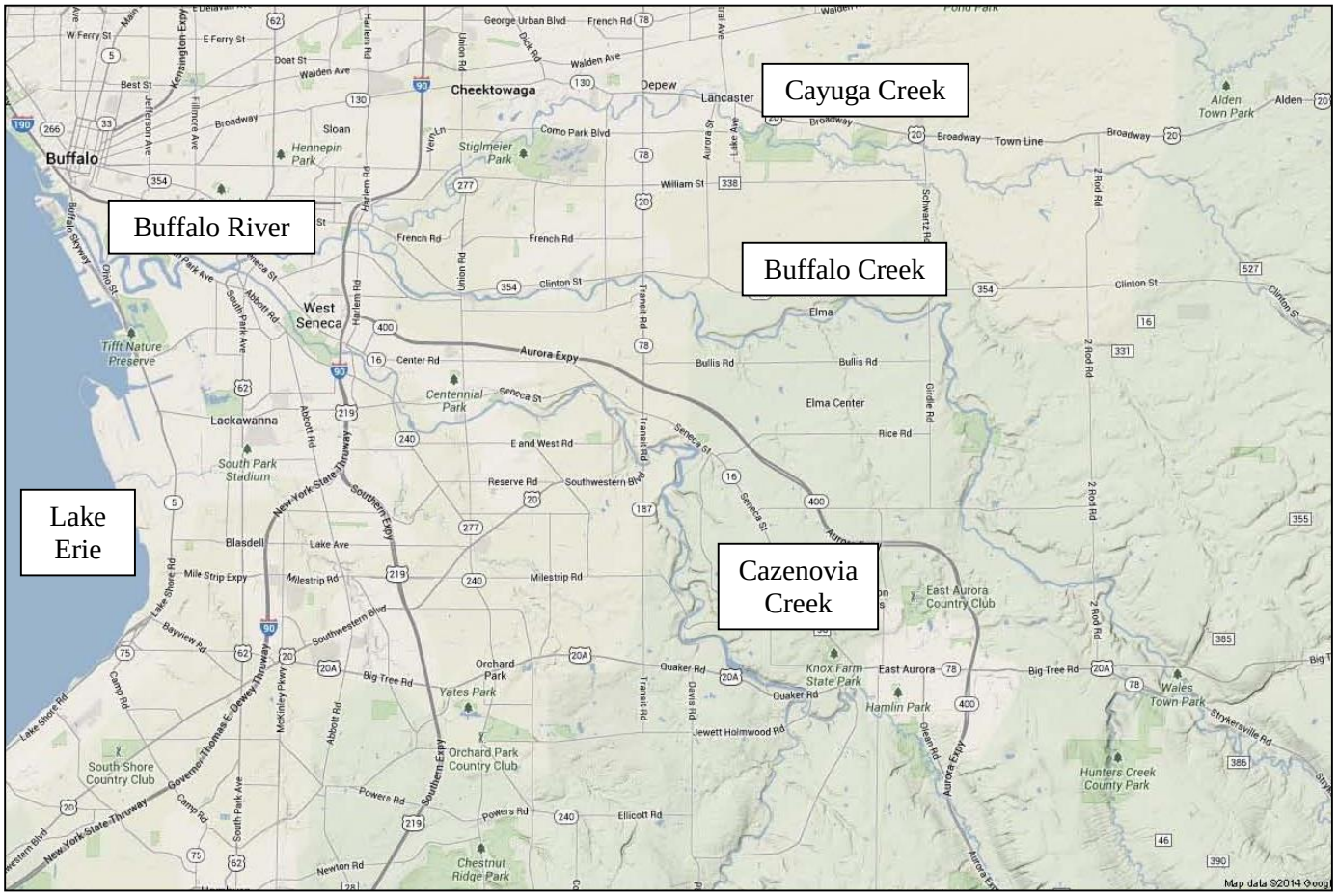
A Day in the Life of the Buffalo River
Student Activity Packet



Welcome to the Buffalo River!
As a scientist, your goal for today is to explore, discover, and observe everything you can about your sample site.

Taking data is like taking a snapshot of the Buffalo River: temperature, weather, plants, animals and chemistry are all part of that picture. Carefully collect your data and record your findings. Investigate environmental clues that might help you to understand or explain your data. Good luck!

Name: _____

Sample Site: _____

Circle your waterway: Buffalo River Buffalo Creek Cayuga Creek Cazenovia Creek

FRIENDS OF Reinstein WOODS

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

Activity 1: Turbidity

Time Limit: 15 minutes
Equipment: turbidity tube, measuring cup, waders, life jacket, Activity 1 Instructions

Time	Reading 1	Reading 2	Average
	in.	in.	in.
	cm.	cm.	cm.

Conversions

Centimeters = inches x 2.54
Inches = cm x 0.394

Field Observations

How turbid is the water? Mark your observation on the line.

Clear Mostly clear Half & Half Cloudy Extremely cloudy

Field Observations: Circle 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 leaves etc. which creates gas bubbles.

Activity 2: Weather and Wind

Time Limit: 15 minutes
Equipment: air thermometer, compass, Activity 2 Instructions

1. **Weather**

Time	Air Temperature º F	Air Temperature º C

Temperature Conversions

º C = 0.556 x (º F - 32)
º F = (1.8 x º C) + 32

Cloud cover: (*check one*)

- ☐ Clear (0-25%)
- ☐ Partly cloudy (26-50%)
- ☐ Mostly cloudy (51-75%)
- ☐ Overcast (76-100%)

Precipitation: (*check all that apply*)

- ☐ None
- ☐ Rain
- ☐ Snow
- ☐ Rain and snow
- ☐ Other: _____

2. **Wind**

Wind direction: _____

Beaufort Force Figure # _____ (*refer to the Beaufort Scale on instructions sheet.)*
Wind Speed: _____

Describe the river water: (*check one*)

- ☐ Virtually flat
- ☐ Calm, slightly wavy
- ☐ Rippled
- ☐ Choppy/High waves

Field Observations

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?

Activity 3: The Environment at the Sample Site

Time Limit: 15 minutes
Equipment: measuring tape, meter stick, field guides, Activity 3 Instructions

1. Using the list below, describe the land around your site.
   _____ Estimated % houses (urban/residential)
   _____ Estimated % forest
   _____ Estimated % beach
   _____ Estimated % marsh
   _____ Estimated % industrial/commercial
   _____ Estimated % recreational (playgrounds, sports)
   _____ Estimated % other: _____
   = 100%

Field Observations

Draw/identify a plant found at your site.

2. Shoreline appearance (*check all that apply*):
   - ☐ Beach area
   - ☐ Marsh
   - ☐ Covered with plants
   - ☐ Muddy
   - ☐ Pier
   - ☐ Debris
   - ☐ Pipe entering river
   - ☐ Bulkheading (wooden timbers or metal plates that hold the shore in place)
   - ☐ Riprap (large rocks piled up along the shore)
   - ☐ Other: _____

3. What is the water depth at the sample site? _____in. /_____cm.

4. River *bottom* is mostly: (*check one*)
   ☐ Sandy ☐ Muddy ☐ Unable to determine
   ☐ Rocky ☐ Weedy

5. What percent of the river *bottom* is covered with plants? (*check one*)
   ☐ 0-25% ☐ 26-50% ☐ Unable to determine
   ☐ 51-75% ☐ 76-100%

6. What percent of the river *surface* is covered with plants? (*check one*)
   ☐ 0-25% ☐ 26-50%
   ☐ 51-75% ☐ 76-100%

Field Observations

Walk along the shoreline and list the items you find (both man-made and natural):

Field Observations

Describe three ways in which the environment at your sample site can impact water quality either positively or negatively.

Activity 4: Sketch a Map of the Sample Site

Time Limit: 15 minutes
Equipment: Colored pencils (Note: there is no Instruction sheet for this activity).
Get creative! Draw the landmarks around your site, indicate where you sampled, and label the river.

Activity 5: Water Temperature

Time Limit: 15 minutes
Equipment: water thermometer, meter stick, waders, Activity 5 Instructions

Time	Water Depth	Reading 1	Reading 2	Average
	in.	° F	° F	° F
	cm.	° C	° C	° C

Field Observations

Check off all of the potential sources of thermal pollution at your site.

- ☐ Industry/power plant
- ☐ Road
- ☐ Parking lot/sidewalk
- ☐ Pipe entering water
- ☐ Buildings
- ☐ Other: _____

Activity 6: Bioassessment

Time Limit: 15 minutes
Equipment: waders, life jackets, scoop nets, viewers, shallow tubs, macroinvertebrate ID sheets, field guides, seine net (optional), Activity 6 Instructions

Macroinvertebrate Species List

Species	Estimated #
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

Field Observations

Sketch an animal you saw!

Field Observations

List any other species you saw (birds, fish, frogs, etc.)

Pollution Tolerance Index

Group 1 Macroinvertebrates: Very Intolerant	**Group 2 Macroinvertebrates: Intolerant**	**Group 3 Macroinvertebrates: Tolerant**	**Group 4 Macroinvertebrates: Very Tolerant**
____ Stonefly ____ Mayfly ____ Caddisfly ____ Dobsonfly	____ Dragonfly ____ Damselfly ____ Scud	____ Water Strider ____ Water Mite ____ Crayfish	____ Pouch Snail ____ Aquatic Worm ____ Water Boatman
# of checks _____ x 4 Group Score = _____	# of checks _____ x 3 Group Score = _____	# of checks _____ x 2 Group Score = _____	# of checks _____ x 1 Group Score = _____

Total Score = _____

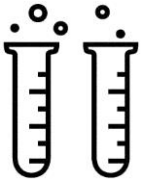
Water Quality Assessment (*circle one*):
23 or more = Potentially Excellent Water Quality
17-22 = Potentially Good Water Quality
11-16 = Potentially Fair Water Quality
10 or less = Potentially Poor Water Quality

Intolerant = animal <u>can't</u> live in polluted water.

Tolerant = animal <u>can</u> live in polluted water.

Adapted from Project WET, 2011

Activity 7: Chemical Analysis



Time Limit: 15 minutes
Equipment: water chemistry kit, waders, water thermometer, container for waste chemicals, Activity 7 Instructions

1. **DISSOLVED OXYGEN**

Time	Water Temperature	DO (ppm)	% Saturation (*extra activity*)
	° F ——— ° C		

Field Observations

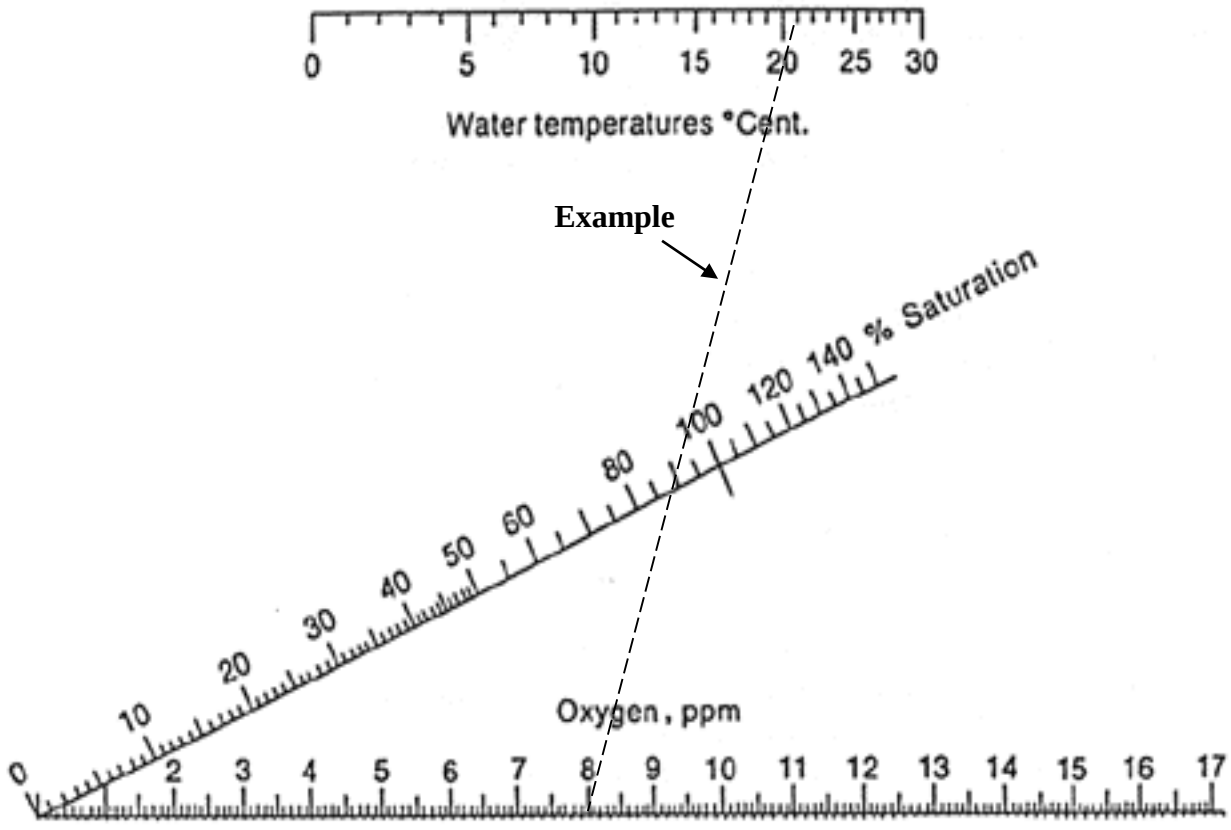
Is the DO within the healthy range (5-11 ppm)? *(circle one)* Yes No

What could cause DO to change? (Hint: look at turbidity, water temperature, and wind speed data.)

Extra Activity: Based on the % saturation value, is your water healthy (90% or above)? Yes No

EXTRA ACTIVITY: Dissolved Oxygen - Percent Saturation

Pair up the measured ppm of DO with the water temperature (° C). Draw a straight line between the two values. The percent saturation is the value where your drawn line intercepts the angled saturation scale.



http://www.waterontheweb.org/under/waterquality/oxygen.html

2. **pH**

Time	pH

Field Observations

Is the pH within the healthy range (6.5 - 8.2)? *(circle one)* Yes No

What could cause the pH of the river to change?

Congratulations!
You have completed your picture of a Day in the Life of the Buffalo River!

Reflect on your river experience. Write a poem, draw a picture, list the sounds you hear, record any extra data, or think of something else to share: