



# Enhanced River Academy Curriculum: Introductory Module, Part III

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## **OVERVIEW**

### **Name of the Course**

The River Academy: Place-based Environmental Science Program

**Course Description:** Using a series of place-based, water-focused modules, the River Academy aims to empower a cohort of students to become active citizens in protecting and preserving local waterways. This intensive program includes 9 modules covering cultural, historical and environmental perspectives, hands-on field ecology trainings, water quality monitoring practicum, service learning workshops and paddling lessons.

**Name of the Module:** Introduction to the River Academy

**Module Description:** This module serves as the introductory module for the entire training program, and it will provide historical perspectives on the Buffalo-Niagara region, foundational knowledge of the Niagara River watershed (including Buffalo River), and substantial understanding of community-based environmental stewardship. It will also introduce students with upcoming modules, program expectations and field protocols.

**How to Use the Module:** The module is structured in a way that any teacher with no formal training in Watershed Science can pick it up, review the materials and launch it in the classroom. A teacher should digest the rationale of the module by reviewing the CONSCIENTIZATION section, and proceed with the LESSON PLAN. The instructions in the LESSON PLAN are detailed enough for use by teachers unfamiliar with the subject matter, and are supported by media presentations and hands-on exercises.

## **CONSCIENTIZATION**

### **Audience and Context Analysis**

*The Introduction to the River Academy* acquaints students with water-related environmental issues in the Buffalo-Niagara region and helps them to become immersed in community-based environmentalism. The target audience is middle and high school students – ages ranging from 12 to 19 years. Participating students are expected to have a minimum of middle school level natural and social science education or equivalent, basic computer literacy and some interest in the outdoors. The introductory module may be commenced in-class, outdoors or both.<sup>1</sup>

### **Next Generation Science Standards Themes**

- HS – Earth Systems
- HS – Weather and Climate
- HS – Human Sustainability
- HS – Interdependent Relationships in Ecosystems

### **Common Core and STEM Initiatives**

Participants of this module will be exposed to the contextualized Mathematics and Geological Science practices that enhance their efficiencies in STEM subjects.

### **Objectives for Significant Learning Experiences**

After this module is over, participating students will:

1. Understand the core concept of a watershed, and remember key elements of Buffalo-Niagara region ecosystems (FOUNDATIONAL);
2. Decide to actively engage in upcoming modules (APPLICATION);

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<sup>1</sup>Recommendation for launch site(s) can be found at respective Lesson Plan.

3. Relate the health of local waterways to the existence of organisms, well-being of communities and thriving blue economy (INTEGRATION);
4. Come to see themselves as defenders of the Niagara River watershed (including Buffalo River) and protectors of local waterways for generations to come, and encourage fellow students to get involved in fresh water resource preservation efforts (HUMAN DIMENSION);
5. Value fresh water, commit to protect drinkable, fishable, swimmable waters, and energize to become active stewards in Western New York (CARING); and
6. Relentlessly engage in environmental education, identify additional learning opportunities and strive to become resourceful environmentalists (LEARNING HOW-TO-LEARN).

### **Topic Analysis**

1. Watershed as a System – Grand Introduction
  - The Great Lakes and You
  - Who is Niagara?
  - Holistic Concept of Watershed
2. Environmental and Cultural History of Buffalo-Niagara Watershed
  - Revisiting the Watershed Concept
  - Screening of *If Our Water Could Talk*
  - Problems and Issues
3. Our Water and Our Future
  - Usurpation of the Public Trust
  - Screening of *If Our Water Could Talk*
  - Rust to Blue
4. Program Overview and Expectations

- What Can I Do?
- Overview of the Modules
- Expectations and Field Safety

### **Implementation Challenges**

Transportation and Logistics

### **Length of the Module**

In-Class Activities: Approximately 3 – 4 Hours

Out-of-Class Activities: Approximately 6 – 8 Hours

### **Program Materials and Equipment Needed**

#### ***Instructor Qualifications:***

- Be community-oriented and well-versed in High School level Earth Sciences;
- Be highly motivated to mentor students to become young environmental stewards; and
- Be cognizant of pedagogical methods and applications.

#### ***Materials and Equipment:***

- Intro to Watershed PowerPoint slides;
- A course Blog for reflective entries;
- *If Our Water Could Talk* WNED Documentary; and
- Appendixes (A. IV).

### **Recommended Room Setup**

The room can be set up at teacher's discretion as per class size and group dynamic.

However, the classroom should have audio-visual screening capability.

## LESSON PLAN

### *Module 1: Introduction to the River Academy*

#### *Lesson 3: Our Water and Our Future*

##### ***Learning Objectives Addressed:***

- Relate the health of local waterways to the existence of organisms, well-being of communities and thriving blue economy (INTEGRATION);
- Come to see themselves as defenders of the Niagara River watershed (including Buffalo River) and protectors of local waterways for generations to come, and encourage fellow students to get involved in fresh water resource preservation efforts (HUMAN DIMENSION);
- Value fresh water, commit to protect drinkable, fishable, swimmable waters, and energize to become active stewards in Western New York (CARING); and
- Relentlessly engage in environmental education, identify additional learning opportunities and strive to become resourceful environmentalists (LEARNING HOW-TO-LEARN).

#### **IN-CLASS PLAN**

<b>TIMING</b>	<b>SUB-TOPIC(S)</b>	<b>TEACHER NOTES &amp; CUES</b>
10 – 15 Minutes	Usurpation of Public Trust	<p><b>ACTIVITY</b></p> <ul style="list-style-type: none"><li>• Students debrief on pollutions, problems and legacy contaminants<ul style="list-style-type: none"><li>○ Students and teacher will revisit last topic, and debrief his or her take on impacts of unregulated industrialization.<ul style="list-style-type: none"><li>▪ <b>HINT:</b> Challenge students to critically examine the severity of post-industrial pollution, and the impact of Stan Spisiak’s citizen action.</li></ul></li></ul></li></ul> <p><b>ASK</b></p> <ul style="list-style-type: none"><li>• Imagine that there were no concerned citizens – what would happen to our waterways?<ul style="list-style-type: none"><li>○ Do you think we can enjoy our beautiful rivers and streams today? Have we resolved all the</li></ul></li></ul>

problems?

- Who needs to advocate for protecting and preserving our rivers?
  - HINT: Every citizen.
- Why did industries pollute our waterways? How are we involved?
- Can we change our system so that we have jobs, products we need, AND healthy waterways? What might be some changes?

#### COMMENT

- The Buffalo River and other local waterways are the public trust, co-owned by all citizens living in the region. This public trust was usurped when waterways were polluted by private industry.
- These industries were in business creating products people wanted to buy. They provided jobs to the City's people, but poor regulation allowed them to dump wastes into the waterways, sacrificing our public water resource.
- As citizens we must learn from our history and reclaim our public trust. We can do this by demanding clean, regulated industry and innovative products that reduce waste and minimize damage to our environment.
- Please post some reflections on the course blog (Appendix A. IV).

#### ASSESSMENT

- Forward-Looking → Students should actively debrief their thoughts and ideas on the previous topic, and share their takes on industrial history of Buffalo-Niagara

		<p>region.</p> <ul style="list-style-type: none"> <li>• Feedback → Teacher should promptly promote the importance of citizen actions in response to students’ debriefs.</li> <li>• Self-Assessment → Students should post a blog entry at the end of the class with meaningful reflections.</li> </ul>
18 – 20 Minutes	Screening of <i>If Our Water Could Talk</i> (Second Half)	<p><b>BACKGROUND</b></p> <ul style="list-style-type: none"> <li>• In the 40 years since President Johnson’s visit, there has been remarkable progress. Water quality in Lake Erie and the Buffalo River has significantly improved. While there is much more to be done, water is once again creating opportunities for the region.</li> </ul> <p><b>ACTIVITY</b></p> <ul style="list-style-type: none"> <li>• Screening of WNET documentary <i>If Our Water Could Talk</i> (00:15:00 through 00:30:00) <ul style="list-style-type: none"> <li>○ Students and teacher will watch the inspirational documentary video</li> </ul> </li> </ul> <p><b>ASSESSMENT</b></p> <ul style="list-style-type: none"> <li>• Forward-Looking → Students will pay close attention during the documentary screening, and engage in audio-visual learning.</li> </ul>
10 – 15 Minutes	Rust to Blue	<p><b>BACKGROUND</b></p> <ul style="list-style-type: none"> <li>• Western New York lies at the heart of the Great Lakes, and is an ideal community to advance a “<b>blue economy</b>”. Our water resources support recreation, eco-tourism, fish and wildlife, manufacturing, waste processing, power generation, trans-shipment, and drinking water.</li> </ul> <p><b>ACTIVITY</b></p> <ul style="list-style-type: none"> <li>• Small groups break out to explore solutions for WNY</li> </ul>



waterfront

- Teacher will split students into small groups, and encourage them to explore progress and opportunities with local waterways.
  - HINT: Keep the student groups small – no more than 3 per group.

#### ASK

- How are we making progress to improve and enjoy our waterways?
  - Give some specific evidence of recent progress for healthy waterways in Buffalo.
  - What activities and ideas interest you the most?
- Would you paddle in the Buffalo River or in the Lake Erie in 1960?
  - Would you paddle in them today?
- What are some of the “priorities” discussed in the video?
  - Are those priorities directly related to us? Why or why not?
  - What has “returned” to the City of Buffalo?
- What does “RUST TO BLUE” mean to you?
  - Please reflect on the watershed as a system we discussed in past few classes—how does healthy rivers and streams contribute to our well-being, including economic developments, community enjoyments and social activities?

#### COMMENT

- Due to past irresponsible industrial activities, our precious water resources were polluted. However, citizen actions and collaborative efforts have brought us our waterways back, although more is needed to be

		<p>done.</p> <ul style="list-style-type: none"> <li>• Water is our new HOPE! Water will help this region move forward and revitalize the communities. We will explore more about the progress in upcoming modules.</li> </ul> <p>ASSESSMENT</p> <ul style="list-style-type: none"> <li>• Forward-Looking → Each student group should identify at least one item of progress and one opportunity to become better region. Students should also realize the importance of collaborative problem solving.</li> <li>• Feedback → Teacher should provide constructive feedbacks to progress and opportunities identified by students.</li> <li>• Self-Assessment → Students should post a blog entry at the end of the class with meaningful reflections.</li> </ul>
<b>OUT-OF-CLASS PLAN</b>		
<b>TIMING</b>	<b>SUB-TOPIC</b>	<b>TEACHER NOTES &amp; CUES</b>
Varies	Take-Home Reflection	<p>ACTIVITY</p> <ul style="list-style-type: none"> <li>• Self-Reflection <ul style="list-style-type: none"> <li>○ Each student will reflect upon the learning and activities s/he has done so far in the course.</li> </ul> </li> </ul> <p>COMMENT</p> <ul style="list-style-type: none"> <li>• Please take some time to reflect, and see what you—as an individual—could do to improve our local waterways.</li> </ul> <p>ASSESSMENT</p> <ul style="list-style-type: none"> <li>• Self-Assessment → Students should post a blog entry at the end of the class with meaningful reflections.</li> </ul>

## **APPENDIX**

### **Appendix A. IV: Construction of Course Blog for Critical Reflection**

Critical reflection is the center of pedagogical and andragogical learning systems. As such, it is crucial that an educator encourages students to actively engage in critical reflection during and after in-class coursework. Web 2.0 tools can be used to encourage students to reflect on their own learning, and on the transformative changes of others around them while participating in the coursework. Blogging allows student to reflect, contribute and engage in constructive two-way discussions.

#### ***Blogging Procedure:***

##### ***Step 1 –***

Select a host for blogging – a website whose blogging platform you can use in order to start blogging. There are many free hosts, while others require subscription fees. Some of the most popular hosting sites are:

- [WordPress](#)
- [Tumblr](#)
- [HostGator](#)
- [Blogger](#)
- [GoDaddy](#)
- [HostMonster](#)

##### ***Step 2 –***

Choose a design that would motivate students to blog consistently throughout the course. Most hosting platforms have easy-to-use preformatted designs, and designs with simple navigations are most preferable.

##### ***Step 3 –***

If the blog is intended for private, constructive discussions, it is more appropriate to choose “private” option, which can be located in blog settings. Maintain the blog with consistent postings from the course instructor, and integrate course participation grades into blog posts.