

Ohiyo'

Beautiful River

Jonyadih
Beyond the bend, Jimesontown

Onë'dagöh
Salamanca, in the hemlocks

Jo'sgwä:da:se:h
Kilbuck, it turns around the rock there

Dewëniöhgeh
Hellbender, giant salamander

Dejódiha:kdö:h
Horseshoe, at the River bend

Gä:hasde'gen
Windfall, strong wind there

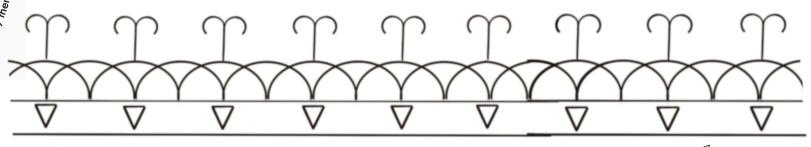
Gahae:neh
Witch place

Tga'deodak
Old town, Orenville, there used to be a chimney here

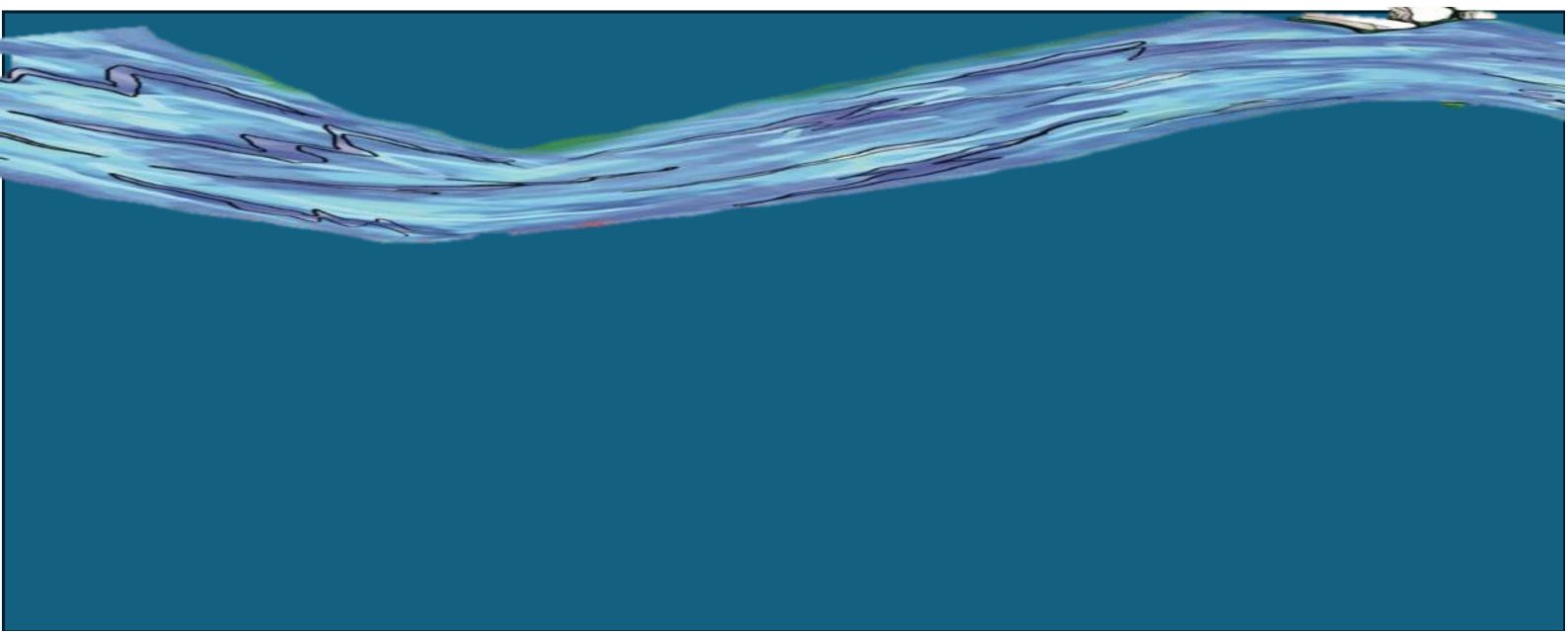
Ha'deyoyá:ya'kdöh
Quaker Bridge, it's been made to cross there

JONEGANÖ:H "Coldwater here"
COLDSPRING

Cwehda'ë'niganöhsodéh - Red House
Jo'ehestha' - A depot there



Bill Crowne



Ohi:yo' Place-Name Markers Curriculum Guide

ABOUT THIS PROJECT

New York Folklore is engaged in a place-marking project to mark places of significance to Indigenous histories of New York State. Through the lens of collected narratives and community histories, the project provides alternative cultural and social histories of the region, providing a more equitable lens through which to portray significant sites within the Susquehanna Watershed of the Chesapeake Bay.

Partners include the New York State Parks System through the New York State Office of Parks, Recreation and Historic Preservation, and collaboratively with The ARTS Council of the Southern Finger Lakes, the Onhsagw:de' Cultural Center (Seneca), Local Learning: The National Network for Folk Arts in Education, Catskills Folk Connection, Regional Economic Development agencies, and conservation partners such as the Schoharie River Center, Chesapeake Bay Foundation, New York State Department of Environmental Conservation.



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Ohi:yo' Place-Name Markers Curriculum Guide



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Unit 1: TEACHING AND LEARNING WITH PLACE MARKERS

Unit 1 Curriculum developed by Mira Johnson and Paddy Bowman, Local Learning



Haudenosaunee language and story have been missing from history books as well as place markers. This guide invites students to ask: What stories are missing in your region? What is important about your community that you want people to know about? How will you research a topic for your own place marker?

INFORMATION FOR TEACHERS

Teaching Rationale

Place markers offer a unique portal to studying, analyzing, and contributing to local, state, and American history. This guide provides context and activities for integrating place markers into Social Studies, English Language Arts, and Earth Sciences for employing a cultural perspective to deepen students' understanding of how history talks to us.

Keywords

history, place markers, point of view, sense of place, mapping, decoding, inquiry, environment, geography, watersheds, culture, primary sources, Indigenous language

What Is in Unit 1

- **Lesson 1** introduces place markers, asks students to inventory what they know of markers, and presents two examples from different eras and perspectives to open investigation of markers.
- **Lesson 2** involves mapping community.
- **Lesson 3** presents tools for considering sense of place and how culture influences history.
- **Lesson 4** guides students to create a class or individual place marker for something important to them.

Goals for Students

Students will...

- Analyze local and regional place markers, including historic markers
- Consider the importance of point of view, language, and representation on markers
- Find personal connections to history
- Conduct research to create a place marker about a location, a person, or an event important to them
- Examine the role of primary sources in researching history
- Practice the skill of summarizing and synthesizing information by writing text for a place marker

Assessment Strategies

Reflection Points

To assess the learning experience, in a class discussion, return to students' inventory of what they thought they would learn from the markers. What differed? What was the same? What surprised them? How did students respond to the Reflection Points in each unit?

Writing

Assign students to write a short essay about what they have learned about history and about place markers.

Teacher's Reflection

What did you notice about your students' responses to the markers? What Study Guide activities engaged them? What surprised you about your students' work?

New York State Social Studies Standards

Key Idea - SS.3.TCC.4: EACH COMMUNITY OR CULTURE HAS A UNIQUE HISTORY, including heroic figures, traditions, and holidays.

- Conceptual Understanding - SS.3.TCC.4.a:
People in world communities use legends, folktales, oral histories, biographies, and historical narratives to transmit cultural histories from one generation to the next.

Key Idea - SS.4.2: NATIVE AMERICAN GROUPS AND THE ENVIRONMENT: Native American groups, chiefly the Iroquois (Haudenosaunee) and Algonquian-speaking groups, inhabited the region that became New York. Native American Indians interacted with the environment and developed unique cultures.

Key Idea - SS.5.1: EARLY PEOPLES OF THE AMERICAS: The first humans in the Western Hemisphere modified their physical environment as well as adapted to their environment. Their interactions with their environment led to various innovations and to the development of unique cultures.

Key Idea - SS.5.4: GEOGRAPHY IN THE WESTERN HEMISPHERE: The diverse geography of the Western Hemisphere has influenced human culture and settlement in distinct ways. Human communities in the Western Hemisphere have modified the physical environment.

Key Idea - SS.7.1: NATIVE AMERICANS: The physical environment and natural resources of North America influenced the development of the first human settlements and the culture of Native Americans. Native American societies varied across North America.

- Conceptual Understanding - SS.7.1.a:
Geography and climate influenced the migration and cultural development of Native Americans. Native Americans in North America settled into different regions and developed distinct cultures.
 - Content Specification - SS.7.1.a.3:
Students will examine the various Native American culture groups located within what became New York State including Haudenosaunee (Iroquois), and the influence geographic factors had on their development.

New York State English Language Arts Standards

4-5R: Locate and refer to relevant details and evidence when explaining what a text says explicitly/implicitly and make logical inferences. (RI & RL)

4-5R2: Determine a theme or central idea of text and explain how it is supported by key details; summarize a text. (RI & RL)

4-5R3: In literary texts, describe a character, setting, or event, drawing on specific details in the text.

(RL) In informational texts, explain events, procedures, ideas, or concepts, including what happened and why, based on specific evidence from the text. (RI)

4R4: Determine the meaning of words, phrases, figurative language, academic, and content-specific words. (RI & RL)

4R6: In literary texts, compare and contrast the point of view from which different stories are narrated, including the difference between first- and third-person narrations. (RL)

In informational texts, compare and contrast a primary and secondary source on the same event or topic. (RI)

4R7: Identify information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, illustrations, and explain how the information contributes to an understanding of the text. (RI & RL)

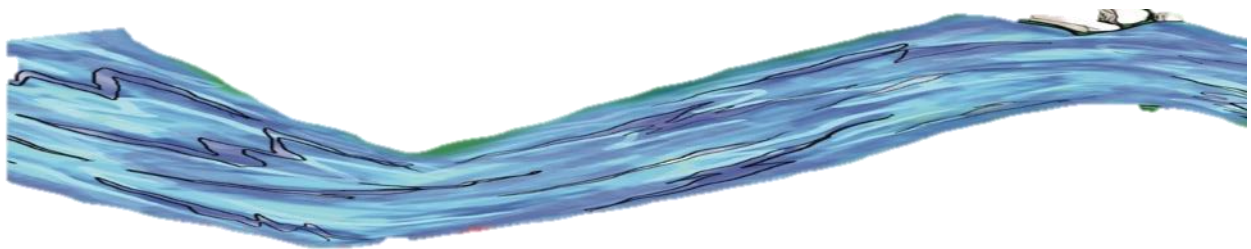
4R8: Explain how claims in a text are supported by relevant reasons and evidence. (RI&RL)

4R9: Recognize genres and make connections to other texts, ideas, cultural perspectives, eras, personal events, and situations. (RI&RL)

4-7W2: Write informative/explanatory texts to explore a topic and convey ideas and information relevant to the subject.

4-7W6: Conduct research to answer questions, including self-generated questions, and to build knowledge through investigating multiple aspects of a topic.

4-7W7: Recall relevant information from experiences or gather relevant information from multiple sources; take notes and categorize information and provide a list of sources.





1.1 — METHODOLOGY FOR READING MARKERS

Introduce the study of place markers by asking students to think about what they know about place markers, what are their assumptions about them? What do they know, what do they wonder, what do they want to know about place markers?

How does history talk to us? Place markers are one way. Students have probably seen place markers on highways or in their community. Have they ever stopped to read one? Use this activity to practice decoding two markers and compare findings. Use the [Reading Place](#)

[Markers Worksheet](#) to guide your analysis.

Reflection Points

(Use after students engage with the [Reading Place Markers Worksheet](#))

- What is different, what is the same about the two markers? What surprised you? You might use a Venn diagram to compare the two markers.
- Who writes history?
- How does marking a place and highlighting certain histories make us think about a place? Do we think about a place differently if we highlight different stories?
- How does the format of markers influence their stories?

Extensions

Using the [Reading Place Markers Worksheet](#), assign students to closely read other markers. Have them share findings in a class discussion.

Ask students to use the [Historical Marker Database](#) and search for [New York State](#) to choose three markers to analyze and decode using the Reflection Points above. Ask them to report their findings in a class discussion. What surprised them? Did they discover a biased point of view? How are they thinking differently about markers because of their research?



Reading Place Markers Worksheet



OLD-SCHOOL MARKER

(Learn more at <https://www.hmdb.org/m.asp?m=88803>)



PROJECT MARKER

(Learn more in the [Appendix](#))

Location

Where is the marker located? What surrounds it? Where is the marker in relation to the person, place, or event it's referencing? Is the marker placed where it is easy to read?

Topic

What is this marker telling us about? Is this something that you know about?

Purpose

Why do you think someone thought this person, place, or event was important to remember?

Audience

Who might read the marker? Who is likely to visit this area? (For example, age, nationality, education, etc.) Who do you think might not visit this area?

Point of View

Who created the marker? Does it name an author, a group, or an organization that created or funded it? Why is this important to consider? Did you notice any errors? Did the marker leave out information that you would have included?

Word and Image Choice

What kinds of words are on the marker? Is there an image? Does it help tell the marker's story? Are there words that you don't know or are confusing to you? Are there words in a language other than English? Why is this important to think about?



Schoolhouse Road.

Folklore Place Marker, Franklinville, NY
<https://www.wgpfoundation.org/historic-markers/ischua-creek>

1.2 — MAPPING

How are we moving through time and spaces? People have lived in New York State since time immemorial, yet place markers did not appear on the landscape until 1926, when the New York State Education Department marked the nation's Sesquicentennial, the 150th anniversary of the American Revolution. After the 1960s, the state encouraged local towns and counties to erect markers. Signs were required to be cast at the Walton East Branch Foundry, now the [Catskills Castings Company](#). The [William G. Pomeroy Foundation](#) has a robust program to fund markers across the state, including this project.

With students, think about your own community and what places are marked. Discuss what stories are being told. By whom? How do you find these stories? What primary sources could they look to when making a marker about a place? Who would they talk to about this place?

Ask students to look carefully at a map of your town or neighborhood and consider the names of streets or parks.

Reflection Points

What do you notice?

What are the names telling you about the stories associated with those places? For example, often roads are named for important community spaces that once stood along that route, like Lime Kiln Road or

Who gets to name places? Learning why places are named what they are is one way to learn more about the history of that place.

What sources could tell you about why places have the names they do? What people could you ask?

Ask students as they learn more about the history of places in your community, to consider whether the place names on signs or maps match what they know about or have experienced in those places. If they could rename a place, what would they name it and what story would their name reference? Are there places that they think need a place marker to commemorate an event, a person, or as a special community space?

Extensions

Looking ahead to the 250th anniversary of the United States in 2026, what markers should be created to mark that? What would students like markers to commemorate in 20 years? Ask them to create a marker for someone who sees it in the future.

1.3 — SENSE OF PLACE

Sense of place as a form of inquiry defines our relationships with the environment as well as with local and global history and culture. No matter where we live, we have an aesthetic relationship with the land and landscapes. A place has many meanings—and different meanings—for different people and cultural communities. We present two ways to consider cultural perspectives in the worksheets below: a list and a graphic organizer.



What local places matter and to whom? How can special places be recognized through markers? Are some places associated with events? How can we “read” a place to inform how we commemorate it through creating markers? Employing different cultural perspectives allows us both to describe and to understand a place in greater depth. To begin reading, or analyzing, our sense of place, we can use our five senses: sight, sound, taste, smell, touch. Other methods can be geographic, ecological, or historical (and don’t forget to ask, whose history?). A cultural approach allows for a variety of voices and points of view.

Activity One

Ask students to choose a place or an event special to them. Then have them examine the [Cultural Perspectives on Places and Events](#) worksheet and pick at least three perspectives, or elements, to use in analyzing their place or an event in a short essay. They may include images. Students can their sense of place writing and images in class discussion or a gallery walk.

Activity Two

As a class, discuss local places that students know, perhaps sharing their assignments from activity one. Include natural and environmental places and landmarks. They will have a variety of answers. They might name a lake, a mountain, an ice cream shop, or a skateboarding park. The teacher or a scribe should write down all the places that students name.

From the list that students generate, ask each to choose one place and use elements from the [Cultural Perspectives on Places and Events](#) worksheet to write a newspaper article about why it is important. The article would be read today as well as in the future, so students are creating a primary source. They may include an image with the article.

Reflection Points

What makes a place special?

Thinking about your five senses (sight, hearing, touch, smell, taste), how do any or all help describe a special place?

Can you describe how your five senses influence your experiences of nature?

Extensions

Assign students to write a poem or a haiku about a special place.

They may also draw or sketch a special place. What title would you give their drawing?

Cultural Perspectives on Places and Events Worksheet

Language

What languages or dialects are spoken?

Geography, Ecology, and Environment

Where is your community? What is the population? Climate? What are some landforms like rivers, swamps, mountains, or valleys? What plants and animals are found there? What are important built environment features, such as roads and bridges? How has the natural environment influenced people's lifeways?

Landscape and Land Use

Where are farms, businesses, industries, parks, playgrounds, and neighborhoods?

Soundscape

What types of natural sounds and human-made sounds define this place?

Religions

What religions are practiced? Where are religious activities held?

Seasonal Round

What events occur at a particular season? Where do they occur? Who participates and how? Are there festivals, a homecoming, fair, pageant, parade? Are there traditions related to the natural environment and seasons? How do they reflect the values and cultural groups of the area?

Oral Narratives

Are there stories or legends unique to this place? Are there narratives about local places or events? What are stories of important events in local history or how national events affected people in the community? Are there stories of immigration and migration particular to this place and the people living there?

Family Names and Place Names

Are there common family names? What are major street and place names? How did they get these names? Do different cultural groups have different names for places?

Occupations

What are some major occupations? Are there special skills, customs, or stories of different jobs or occupations? What occupations might be unique to this place?

Settlement History and Patterns

What groups of people have called this place home? When did different cultural groups move there? Where did they come from? Why did they choose this place? Are there particular areas where these groups of people live or have lived? Are there events and traditions unique to these groups?

Directions: Select a place and list it in the center hexagon. Select categories of cultural perspectives from the box below and enter them in the remaining hexagons. Brainstorm specific ideas related to the place in each category and list them around the hexagons.

SAMPLE CULTURAL PERSPECTIVES GRAPHIC ORGANIZER



Cultural Perspectives

- | | |
|------------------------------|-----------------------------------|
| Language and Dialect | Foodways |
| Music and Dance | Geography, Ecology, Environmental |
| Landscape, Land Use | Soundscape |
| Religions | Crafts, Arts, Material Culture |
| Customs, Celebrations | Seasonal Round |
| Oral Narratives | Names – Family, Place |
| Ethnic and Folk Groups | Occupations |
| Settlement History, Patterns | |

Organizer courtesy of *Journal of Folklore and Education*. <https://jfe-publications.org/article/grounding-ourselves>

1.4 — MAKE A PLACE MARKER

Students may work in groups or individually to create a place marker about a place, a person, or an event in your community or region that is important to them. They may use the [template](#) in this guide or create their own. They may include an image as well as text. Calling on what students have learned in the previous units, ask them to use their knowledge as they plan their markers: The Questions to Consider in Unit 1; Mapping in Unit 2; and Cultural Perspectives in Unit 3. They may use the [Creating a Place Marker](#) worksheet to guide their process.

Activity

To research their topic, students will need to consider these questions:

- Why is this topic important to them or your community?
- What sources would they use to explain its importance?
- Are there primary sources such as newspapers, photographs, or oral histories?
- Are there different stories or perspectives that need to be considered?
- Where would this marker fit on a historical timeline?

Finally, have students consider what is most important to include on their marker and draft their text. Students should draft the text for a marker. Pairing and sharing with another student would help polish the final text. Likewise, to include an image, creating a draft is a good idea.

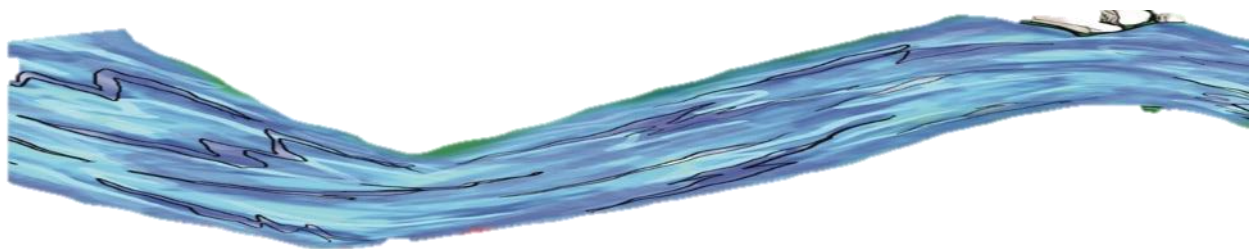
The Pomeroy Foundation's guidelines for historic markers call for a title line of up to 15 characters. Text should be no more than 130 words. They also advise considering what information will help a reader understand the inscription without assuming background knowledge. Students may also want to include an image on their marker.

Reflection Points

- After thinking deeply about history and place markers, what has surprised students?
- Did students' early assumptions about place markers change?
- What would students like others to know about their community?

Extension

As a culminating activity, display students' markers in the classroom and host a gallery walk for the class. Invite others to the marker exhibit and have students act as docents for their markers.



Creating Place Markers Worksheet

After choosing a person, place, or event to commemorate with a place marker, you will need to conduct research to learn more about your topic. In addition to history books, primary sources such as newspapers, photographs, and oral histories are useful. You may also interview people in your school, family, or community who might know something about your topic.

Summarize your findings from each source on another sheet of paper. Compare them. Are there contradictions? Do people have the same story or point of view? Do you need to do further research to determine your point of view?

List three important facts from your research.

1.

2.

3.

Write a draft of what you think should go on your marker.

Next, you need to fit your story into 130 words plus a title (worksheet below). You might ask a classmate to review your draft. Is there an image you want to include?

RESOURCES

Historical Marker Society of America <https://www.erielandmark.com/us-historical-markers>

Oral history repositories in the region or state. Find a list of Repositories at the bottom of this website: <https://locallearningnetwork.org/professional-development/tps>

Pomeroy Foundation <https://www.wgpfoundation.org>

Unit 2: SENECA NATION ALLEGANY TERRITORY (OHI:YO')

COMMUNITY PLACE MARKERS IN THE SENECA LANGUAGE UNIT

Unit 2 is by Rachael Wolfe, Salamanca City Central School District

Each lesson uses the Seneca place name vocabulary and stories from "Map of Ohi:yo'" (Bill Crouse/Rachael Wolfe), aligns to a NYS Grades 7–8 World Language standard, and includes: a language objective, a content objective, formative checks, assessment and accommodations.

2.1 — Canoe Journey: Listening & Interpretive Comprehension of Ohi:yo' Place-Name Stories

Objectives:

- **Language objective (World Language):** Students will accurately identify and interpret 5 Seneca place-name terms from spoken/read stories and match each to its English gloss and map location (interpretive listening/reading).
- **Content objective:** Students will understand how place names describe landscape/events. The selected words for this lesson are:
 - Gä'hasade'geh/Windfall — "There is a strong wind there"
 - Dejodihakdöh/Horseshoe — "Bend in the river"
 - Jo'sgä:da:se:h/Killbuck — "It turns around a rock there"
 - Onë'dagöh/Salamanca — "In the hemlocks"
 - Tga'do:dak/Onoville— "There was a chimney there" / boundary.

Standards:

- **NYS World Language Standard (Grades 7–8):** Standard 1 — Communicate (Interpretive mode): "Students will understand and interpret written and spoken language on a variety of topics." (Students interpret place-name stories and labels.)

Procedure:

Anticipatory Set (5 min)

Teacher frames the canoe journey: explain Ohi:yo' territory and that today we "float downstream" using the Map of Ohi:yo' narrative. Quick choral repeat of the Seneca words Ohi:yo' (Allegany Territory) and Onöndowa'ga' (Seneca).

Interpretive story listening/reading (15 min)

Use the ["Canoe Journey: Exploring Seneca Place Names of Ohi:yo'"](#) PowerPoint for this lesson. The teacher reads [5 short place-name story excerpts](#) or play the audio clips on the PowerPoint. Students have a printed simplified map of Ohi:yo' (["Map of Ohi:yo' Lesson #1"](#))

[Worksheet](#)) with numbered spots. As each excerpt is read, students circle the number on the map they think matches the story and write the English name and a short cultural detail for each story.

Pair check (10 min)

Students compare answers and explain why they matched a story to a place (cite a phrase from the story as evidence).

Teacher debriefs & mini-lecture (10 min)

Teacher clarifies correct matches, ensures that students have correct Seneca spelling of words, models pronunciation of the 5 target Seneca names (Gä'hasada'ge, Dejodihakdöh, Joda'sgä:dase, Onë'dagöh, Tga'do:dak), and highlights cultural interpretations (e.g., how tornado event led to Gä'hasada'ge).

Formative check (5 min)

Quick multiple choice [Map of Ohi:yo' Exit Ticket](#).

Assessment:

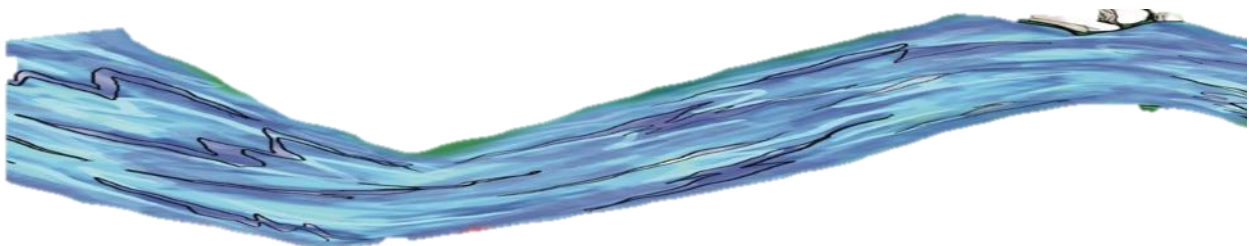
Collected map worksheet which assesses comprehension of spoken/written Seneca place-name usage and mapping.

Materials:

- [Canoe Journey: Exploring Seneca Place Names of Ohi:yo'](#) PowerPoint
- [Interpretive Story Listening/Reading Passages](#) (for teacher to read aloud if chosen)
- [“Map of Ohi:yo’” Worksheet](#)
- [“Map of Ohi:yo’” Exit Ticket](#)
- Pencils/Pens

Accommodations:

- Provide printed phonetic cues and small gloss dictionary for each student.
- Extended time or oral response option for matching task.



Interpretive Story Listening/Reading Passages:

Gä'hasde'geh: "There is a strong wind there" / Windfall. Located near present-day Vandalia, this place was named after a tornado that caused significant destruction. The Seneca people considered the tornado's power so significant that they gave it a permanent place name to remember the event.

Dejodihakdöh: "Bend in the River" / Horseshoe. Near present-day Horseshoe, the river once curved sharply. This bend caused problems in winter when ice would jam, creating dangerous conditions for canoes and leading to flooding. The Seneca people eventually used dynamite to break up the ice jams, and over time the river's curve nearly disappeared.

Jo'sgwä:da:se:h- "It turns around rock there"/Killbuck. There was a large rock on the edge of the river. The rock has pitted channels believed to be made by grinding corn. During the construction of route 86 this landmark rock was moved to the Seneca Iroquois National Museum. It can be viewed there. Indian mounds were located on this historic settlement next to the Allegany River.

Onë'dagöh-"In the Hemlocks"/Salamanca. Prior to being leased from the Seneca Nation, the area that became Salamanca was a vast hemlock swamp. White settlers came to the area to work on the railroads as the oil industry flourished in the mid-nineteenth century. After the land was leased, the swamp was drained, and the hemlocks were all cut down and floated downstream to sawmills. The resulting settlement along Great Valley Creek became known as Hemlock. Later, West Salamanca and Hemlock were renamed Salamanca in 1862. To this day, the lawns in town still become swampy when it rains.

Tga'deodak – "There was a chimney there" / Old Town, Onoville. This community was identified by the landmark of an old chimney. Many homes once stood there until they were burned to make way for the Kinzua Dam. After the American Revolution, a group of Onondagas relocated to this area. It was also the site of some of the earliest Quaker residences. The Senecas shared a small plot of land with the Quakers of Philadelphia as they began their mission work at Allegany. Following the Revolution, New Arrow became the leader of this village, and Cornplanter designated the area for the Onondagas.

Map of Ohi:yo'

*Use PDF file link for full copy of this worksheet

Name: _____ Date: _____

Map of Ohi:yo'

1

Seneca: _____
English: _____
Cultural Detail: _____

2

Seneca: _____
English: _____
Cultural Detail: _____

3

Seneca: _____
English: _____
Cultural Detail: _____

4

Seneca: _____
English: _____
Cultural Detail: _____

5

Seneca: _____
English: _____
Cultural Detail: _____

Name: _____

Date: _____

Map of Ohi:yo' Exit Ticket

1. What was the original meaning of "Gä'hasde'geh" and why was this place named this way?
 - A. "Bend in the River" - named after a sharp curve in the river
 - B. "Strong Wind There" - named after a significant tornado
 - C. "In the Hemlocks" - named after the abundant hemlock trees
 - D. "It turns around rock there" - named after a landmark rock
2. What natural feature characterized the area known as "Dejodihakdöh" (Horseshoe)?
 - A. A large rock with pitted channels
 - B. A vast hemlock swamp
 - C. A sharp bend in the river
 - D. An old chimney that remained after homes were burned
3. What happened to the landmark rock at Jo'sgwä:da:se:h (Killbuck) during construction?
 - A. It was destroyed during dynamite blasting
 - B. It was moved to the Seneca Iroquois National Museum
 - C. It was submerged when the Kinzua Dam was built
 - D. It was incorporated into the foundation of Route 86
4. What was the original environmental condition of the area that became Salamanca?
 - A. A hemlock swamp
 - B. A tornado-damaged forest
 - C. A sharp river bend
 - D. A site of Indian mounds
5. Which group shared land with the Senecas at Tga'deodak (Old Town, Onoville)?
 - A. The Onondagas
 - B. The railroad workers
 - C. The Quakers of Philadelphia
 - D. Both A and C

Map of Ohio:yo' Exit Ticket ANSWER KEY

B

C

B

A

D

2.2 — Vocabulary Deep Dive & Cultural Connection: Meanings, Stories, and Contexts

Objectives:

- **Language objective (WL):** Students will explain (interpersonal/presentational) the meaning of 6 Seneca place-name words (including Jöya:dih, Gwëhdä'ë niganöso'dëh, Gahaineh, Joneganöh, Ha'deyoyoya'kdöh, Janöhsade:gëh) and use each in a short English sentence that references the cultural reason for the name.
- **Content objective:** Students will connect place-name meanings to cultural events, community memory, and local historical impacts (e.g., Kinzua Dam flooding of Janöhsade:gëh; Onë'dagöh and swamp logging; Gahaineh as a “dark” spiritual community).

Standards:

- **NYS World Language Standard (Grades 7–8):** Standard 2 — Cultures: "Students will demonstrate understanding of the relationship between practices and perspectives of the cultures studied." (Students tie vocabulary to practices, beliefs, and historical events.)

Procedure:

Anticipatory Set (5 min):

Quick recall — students list one place name from Day 1 and one fact they learned.

Listening (10 min):

Students will listen to the audio clips on the PowerPoint entitled "[Ohi:yo' Vocabulary Deep Dive & Cultural Connection](#)". They will then use those audio clips to complete the worksheet entitled "[Vocabulary Deep Dive & Cultural Connection Audio Clips](#)".

Work Stations (25 min):

Use the "[Ohi:yo' Vocabulary Deep Dive and Cultural Connection](#)" PowerPoint" for student directions. Divide class into 6 small groups; assign each group one place-name story from the "[Place-Name Stories Cards for Work Stations](#)" (Jöya:dih, Gwëhdä'ë niganöso'dëh, Gahaineh, Joneganöh, Ha'deyoyoya'kdöh, Janöhsade:gëh). Each group reads the excerpt, discusses cultural significance, and completes a graphic organizer ("[Local Tales: Mapping Our Community's Stories](#)" Graphic Organizer)

Teach-back (15 min):

Each group presents a 2-minute teach-back to the whole class. Class listens for connections to culture/land and writes one question for the presenting group on paper to have an open discussion.

Formative check (5 min): "[Exit Ticket: Place-Name Stories](#)"

Assessment:

Teach-back clarity and the collected exit ticket

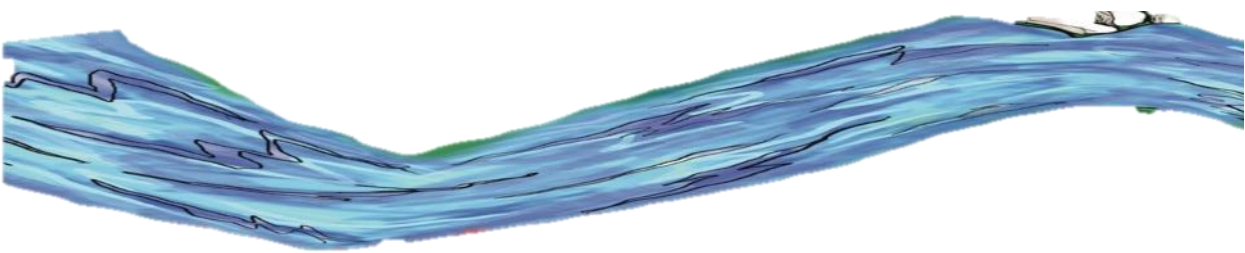
Accommodations:

- Provide group roles (reader, recorder, reporter, presenter) so students can play to strengths.
- Offer sentence starters: “This place is called _____. It means _____. It was named because _____.”
- For language-processing learners, provide short, bulleted notes summarizing the story.

Materials:

- [“Ohi:yo’ Vocabulary Deep Dive & Cultural Connection” PowerPoint](#)
- [“Vocabulary Deep Dive and Cultural Connection Audio Clip Worksheet”](#)
- [“Place-Name Stories” Cards for Work Stations](#)
- [“Local Tales: Mapping Our Community’s Stories” Graphic Organizer](#)
- [“Place-Name Stories” Exit Ticket](#)
- Pencils/Pens

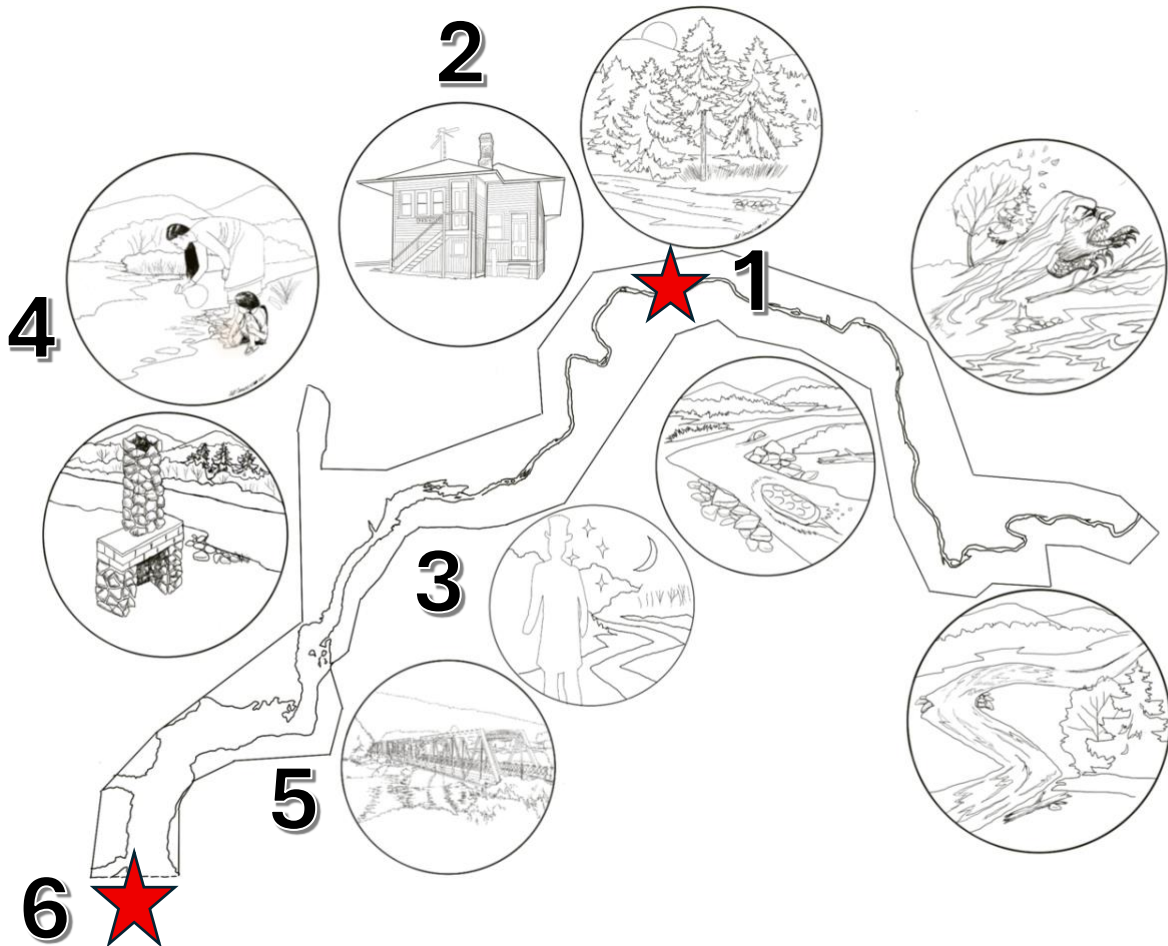
***Teacher note:** Emphasize respect when discussing sensitive stories (e.g., Gahae:neh “witch” stories, graves at Janöhsade:gëh); remind students these are community narratives and require cultural sensitivity.



Vocabulary Deep Dive and Cultural Connection Audio Clip Worksheet

Name: _____ Date: _____

Listen to the audio clips on the PowerPoint entitled "*Ohi:yo' Vocabulary Deep Dive & Cultural Connection*" and then fill in the Seneca pronunciation and literal translation of the Seneca name. Write the Seneca pronunciation by writing how it sounds to you.



	English Name	Seneca Name	Pronunciation (how it sounds to me)	Literal Translation
1.	Shongo/ Jimersontown	Jönya:dih		
2.	Red House	Gwëhdä'ë' niganöhso'dëh		
3.	Witch Place	Gahae:neh		
4.	Coldspring	Joneganöh		
5.	Quaker Bridge	Ha'deyoya:yakdöh		
6.	Cornplanter Tract	Janöhsade:gëh		

Teach-Back Portion of Activity:

While listening to each group give their short presentation, write down one fact of each community in the spaces below:

	English Name	Seneca Name	Facts about each community:
1.	Shongo/ Jimersontown	Jönya:dih	
2.	Red House	Gwëhdä'ë' niganöhso'dëh	
3.	Witch Place	Gahae:neh	
4.	Coldspring	Joneganöh	
5.	Quaker Bridge	Ha'deyoya:yakdöh	
6.	Cornplanter Tract	Janöhsade:gëh	



Place-Name Stories Work Station #1

SENECA COMMUNITY	Jönya:dih	ENGLISH NAME	Shongo/Jimersontown
LITERAL TRANSLATION	"Beyond the Flats"	SENECA TERRITORY	Ohi:yo' (Allegany)

Shongo was a location within the Allegany Territory, close to what is now known as "Jimersontown." It served as the ancestral home for many of Mary Jemison's ancestors. Over the years, the name evolved into Jimerson.

Previously, on the Bucktooth side of the river—its northern bank—there was a residential area also named "Jimersontown," as it was inhabited by the Jimerson family prior to the construction of the Kinzua Dam. After the dam's completion, the new relocation area for "Jimersontown" was established on the southern side of the river.

Not many residents called Jönya:dih home before the dam's construction, but it became one of the locations where the Onöndowa'ga (Seneca) were relocated for the dam project. Most of the population lived further downstream, yet they were always aware of this place known as Jöya:dih.

Today, Jimersontown plays a vital role in the community. However, it's worth noting that the loops and all the houses were constructed in the 1960s.



Place-Name Stories Work Station #2

SENECA COMMUNITY	Gwëhdä'ë niganöso'dëh	ENGLISH NAME	Red House
LITERAL TRANSLATION	Red House	SENECA TERRITORY	Ohi:yo' (Allegany)

The History of Red House

Red House was once home to one of the five single-room Indian schools on the Allegany Territory before schools became integrated into the United States. Additionally, this community featured a railroad station.

Unfortunately, the Seneca Red House community was displaced from their homes and land due to the construction of the Kinzua Dam.

The Early Story

The early history of this community predates the Kinzua Dam, and like Jöya:dih, it was not inhabited at that time. The name “Red House” originates from a white individual who, noticing the absence of residents, decided to build a house without obtaining permission. This action raised concerns among the Onöndowa'ga (Seneca), who wondered, “What is this man doing?”

Rather than confronting the builder, the community observed him from a distance, trying to understand his purpose and intentions. They spent considerable time watching.

The Origin of the Name

Although Red House derived its name from this incident, the structure itself was not originally red. In reality, after the house was completed, the builder painted the door red, following American tradition as a way to symbolize a warm welcome to visitors.

Unfortunately, to the Onöndowa'ga (Seneca), the color red represented blood and war. They found it hard to believe that someone alone in their territory would make such a declaration of hostility. Known as the "Keepers of the Western Door," the Seneca were recognized for their warrior skills. Consequently, they began to approach the man to inquire about his actions and intentions, prepared to address any potential threats.

During their conversation, he admitted to constructing the house without permission. He subsequently spoke with the community leaders, seeking approval to remain there. He assured them that he intended to live peacefully and that the red door was meant as a welcoming gesture. Later, he requested permission to build a railroad depot. The Onöndowa'ga (Seneca) consented to both proposals, and the area became known as Gwëhdä'ë' niganöso'dëh, or "Red House," due to the door, while also acquiring the name Joë'hesta', which refers to the railroad depot located there.



Place-Name Stories Work Station #3

SENECA COMMUNITY	Gahae:neh	ENGLISH NAME	
LITERAL TRANSLATION	"Witch Place"	SENECA TERRITORY	Ohi:yo' (Allegany)

The Haunted Tales of Gahae:neh

This area is reputed to be haunted, with many strange occurrences chronicled in the stories surrounding it. One tale speaks of a spirit dressed in a tall hat and a long coat. Additionally, there are accounts of people witnessing "witch lights" or glowing orbs floating around the hill.

Numerous stories and experiences have emerged from Gahae:neh, contributing to its negative reputation. It is said that a community of witches once thrived here. The term "witches" is merely a label to describe the activities for which the people that lived there were known to participate in.

Today, no one resides in the Gahae:neh community. Those who practiced black magic were no longer accepted by the Onöndowa'ga. Throughout Onöndowa'ga history, the use of magic and "witchcraft" has become regarded with disdain.



Place-Name Stories Work Station #4

SENECA COMMUNITY	Joneganöh	ENGLISH NAME	Cold Spring
LITERAL TRANSLATION	"Cold water there"	SENECA TERRITORY	Ohi:yo' (Allegany)

In 1767, this village became the second prominent Seneca town recorded by Moravian missionary David Zeisberger during his explorations. It is one of the oldest villages along the Allegany River. A remarkable circular site, measuring 20 feet high and 200 feet in diameter, was uncovered in this area, located near the Kinzua Dam relocation zone of Steamburg, NY.

The origin of its name is quite straightforward: the water here is notably cold. Historically, residents utilized this stream as a natural refrigerator, tying strings to their perishable items and placing them directly in the water. In the era of glass milk bottles, these would also be submerged to keep the milk chilled.

Additionally, the presence of the longhouse in this location made it well-known to the community. The Coldspring longhouse stood there until the construction of the Kinzua Dam, at which point it was relocated uphill to Steamburg.



Place-Name Stories Work Station #5

SENECA COMMUNITY	Ha'deyoyá:ya'kdöh	ENGLISH NAME	Quaker Bridge
LITERAL TRANSLATION	"It's been made to cross there"	SENECA TERRITORY	Ohi:yo' (Allegany)

This riverside community lay between Tunesassa and Coldspring along the Allegany. Quakers, calling themselves “Friends of the Seneca,” first settled in Onoville, then moved to Tunesassa on Tunesassa Creek around 1803–1804. In the 1960s, the Kinzua Dam overtook the bridge and community—an act that broke the 1794 Pickering Treaty.



Place-Name Stories Work Station #6

SENECA COMMUNITY	Janöhsade:gëh	ENGLISH NAME	Cornplanter Tract
LITERAL TRANSLATION	"Burned House There"	SENECA TERRITORY	Tract of land gifted to Cornplanter and his descendants from the state of Pennsylvania

Janöhsade:gëh, also known as the Cornplanter Tract, was a small plot of land in Pennsylvania that was bestowed upon Cornplanter and his descendants. While it is not officially part of Ohi:yo', its close proximity to the Ohi:yo' territory makes it a significant community in Seneca history.

Unfortunately, Janöhsade:gëh is eternally lost as a place we can inhabit. This land, considered sacred by many Onöndowa'ga' (Seneca), is now completely submerged underwater. Although the land still exists, it was entirely flooded when the Kinzua Dam was constructed. The dam's construction necessitated the relocation of graves and cemeteries throughout the lower part of Ohi:yo'. In the case of Janöhsade:gëh, the town of Corydon, Pennsylvania, generously contributed a section of their cemetery for the remains that the Army Corps of Engineers relocated, including those of Cornplanter and his descendants. Today, there remains a dedicated section in the Corydon Cemetery for Cornplanter and his lineage. Visitors to the cemetery can find a monument honoring Cornplanter, where many leave offerings in his memory. However, it is rumored that bones lie beneath the monument, though they are not believed to belong to Cornplanter himself.

When Cornplanter was moved to the cemetery, it is said that the Seneca people were distressed by the disruption of his remains. There are numerous stories suggesting that community members took it upon themselves to unearth Cornplanter's remains and relocate him to a place where he could rest peacefully, refusing to allow the Army Corps of Engineers to handle the move. Those who relocated him kept his resting place a secret. Despite various searches inspired by these tales, Cornplanter's remains have never been found. It is a comforting thought that Cornplanter may still be among the people, and those who moved him acted in the best interest of him and his descendants.

2.3 — Create a Place Marker & Present

(Presentational Task + WL Production)

Objectives:

- **Language objective (WL):** Students will produce a 1–2 minute presentational statement (spoken or recorded) explaining their designed place marker using at least one Seneca place name correctly embedded in English (presentational mode). They will reference cultural meaning and respectful use (ties to Ganö:nyök/giving thanks).
- **Content objective:** Students will design a visual place marker (poster/slide) for one Ohi:yo’ location from the Map of Ohi:yo’ text, accurately label it with the Seneca name and English gloss, and explain how the marker honors local history and protocols.

Standards:

- NYS World Language Standard (Grades 7–8): Standard 1 — Communicate (Presentational): "Students will present information, concepts, and ideas to an audience of listeners." (Students present their marker and cultural rationale.)

Procedure:

Anticipatory Set (3–5 min):

Use the PowerPoint entitled [“Create a Place Marker.”](#) Students will start with a brief pronunciation warm-up — teacher models the Seneca name for each community of Ohi:yo’ while the students do a choral repeat or teacher plays the audio clips on the PowerPoint for the teacher and students to do a choral repeat.

Design time (25 min):

- Use the [“Create a Place Marker”](#) PowerPoint for this lesson. Individually or in pairs, students choose one Ohi:yo’ place from the [provided list](#) (teacher ensures each place is used at least once across class). Create a place marker (single poster or slide) that includes:
 - The Seneca place name, English translation and the literal translation into English.
 - One image/symbol representing the story/feature (e.g., chimney for Tga’dο:dak, boulder in the river for Joda’sgä:dase, cold waterways for Joneganöh).
 - A 3–5 sentence cultural rationale in English explaining: why the name fits, what the marker commemorates, and one other interesting fact that stood out for that community.

Presentation practice & recording (approx. 15 min):

Students either present live (2 min max) or submit a short audio/video recording of their 1–2 minute rationale that includes the Seneca word pronounced aloud.

Peer feedback (approx. 10 min):

After each short live presentation, peers give one positive note and one question. If recorded, teacher selects several to play and invites peer comments. This can be done on a small slip of paper for each presentation or aloud after each presentation.

Formative check:

Teacher completes a quick rubric checklist ([“Place Marker Rubric”](#)) during presentations focused on: correct spelling, cultural rationale, pronunciation attempt, and interesting fact.

Assessment:

Final artifact (marker) & presentational recording or live presentation, evaluated with rubric ([“Ohi:yo’ Create a Marker Project Rubric”](#)):

- Seneca name included & spelled correctly
- Cultural rationale (accurate connection to story/land)
- Presentational use of Seneca word (attempted pronunciation)
- Interesting Fact
 - ◆ Total: 12 pts

Accommodations:

- Allow written submission instead of oral recording for students with speech or anxiety concerns.
- Provide template poster and sentence starters.
- Offer teacher or peer reading of student rationale if needed for presentation.

Materials:

- [“Create a Place Marker” PowerPoint](#)
- [Ohi:yo’ Communities List](#) *if needed
- Poster board
- Access to technology (computer, Microsoft PowerPoint or Google Slides)
- Pencils/Pens/Markers
- [“Ohi:yo’ Create a Marker Project Rubric”](#)

Additional Cultural Connection Discussion: Close lesson with a short reflective circle: each student shares one thing they learned about how language preserves memory (ties to Revitalization & Activism).

***Teacher note:** Before any public posting or display, verify place-name spellings and the cultural appropriateness of artwork (especially for sacred places like Janöhsade:gëh) with Seneca language/culture staff. Emphasize student humility and consent before sharing.



Ohi:yo' Communities

Windfall	Gä'hasde'geh
Horseshoe	Dejodihakdöh
Killbuck	Joda'sgwä:da:se:h
Salamanca	Onë'dagöh
Onoville	Tga'deodak
Shongo/Jimersontown	Jönya:dih
Red House niganöhso'déh	Gwëhdä'ë'
Witch Place	Gahae:neh
Coldspring	Joneganöh
Quaker Bridge	Ha'deyoya:yakdöh
Cornplanter Tract	Janöhsade:gëh

Student's Name: _____

Place Marker Rubric

Criteria	3 - Excellent	2 - Satisfactory	1 - Needs Improvement
Correct Spelling	All Seneca names and English glosses are spelled correctly without errors.	Most Seneca names and English glosses are spelled correctly; minor errors that do not distract meaning.	Frequent spelling errors in Seneca names or English glosses that affect clarity.
Cultural Rationale	Provides a clear, thoughtful explanation of how the marker honors local history and protocols, showing deep understanding.	Provides a general explanation of how the marker honors local history and protocols with some understanding evident.	Explanation is unclear, incomplete, or shows little understanding of local history and protocols.
Pronunciation Attempt - Seneca Name	Attempts pronunciation of Seneca names with clear effort and respect, demonstrating familiarity with sounds.	Attempts pronunciation but with some hesitation or inaccuracies; effort and respect apparent.	Little to no attempt or incorrect pronunciation showing lack of effort or understanding.
Interesting Fact - Community	Shares a unique, engaging fact about their assigned Ohi:yo' location that enriches the presentation.	Shares an interesting fact about their assigned community, though it may be common or less engaging.	Does not share an interesting fact or the fact is unrelated to the assigned Ohi:yo' location.

Total Score: /12= _____

Comments:



Unit 3: WHAT IS YOUR WATERSHED? : INCORPORATING THE WATER AROUND US INTO OUR SENSE OF PLACE

Unit 3 curriculum developed by Annemarie Dooley and John McKeeby

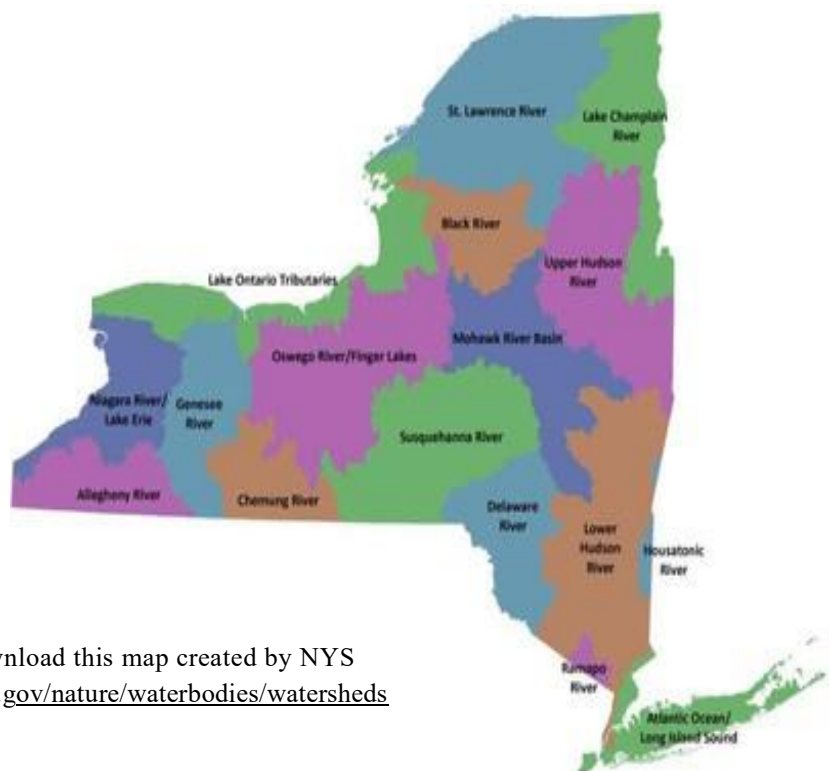


INTRODUCTION

What is your idea of place? What comes to mind as being around you and part of the identity of where you currently live? What about the identity of where you're from? Answers to these questions could be related to culture, history, social interactions, and more. But what about aspects of the natural world around us that we might not think about, especially when living in more urban areas? Do you ever think about what **watershed** you're in? Is your **watershed** in your sense of place?

A **watershed** is an area of land where water passes through and over to drain into a central water body. This includes all types of surface waters: creeks, streams, rivers, and lakes. *Everyone* belongs to a watershed no matter where they live. Oftentimes a larger watershed, such as one for a major river, is comprised of many smaller watersheds.

So, what is your **watershed**? In New York State, there are 17 major watersheds. This includes the water bodies such as a lake or river and the land that surrounds it. Here is a map from NYS DEC that outlines these 17 watersheds:



For more information and to download this map created by NYS DEC, visit the site: <https://dec.ny.gov/nature/waterbodies/watersheds>

Our organization, the Schoharie River Center, is located right on the Schoharie Creek, making it a part of the Schoharie Creek Watershed. The Schoharie Creek is also the largest tributary to the Mohawk River, so we are also a part of the Mohawk River Basin. Our mission is to inform and educate youth and others on the importance of their local watershed with the goal of fostering a greater sense of responsibility to protect the water's integrity and health by engaging them in learning skills to assess water quality.

This curriculum guide provides three activities that are aimed to get students thinking about a watershed as being a place that they belong to, a place that needs protection and consideration, and the ways that watersheds can be monitored biologically. All activities can be adapted to the region you are within and your available resources, and we strongly encourage you to use linked resources throughout the guide such as NYS DEC to discover more about your watershed. If you are outside of NYS, your state may have specific resources available for your watershed.

WHAT IS IN THIS UNIT GUIDE

- **Lesson 1:** introduces the concept of a watershed through a hands-on drawing activity exploring how land use can affect water
- **Lesson 2 & 3:** involves learning how to do a biological assessment of a stream within your watershed and how this relates to water quality. This is also modified to be classroom only if needed

STUDENT GOALS

Students will:

- Understand the concept of a watershed through a hands-on drawing activity exploring how land use within a watershed can impair water quality
- Look at how land use within a watershed can impair water quality
- Learn how you can perform a biological assessment of macroinvertebrates to examine water quality
- Understand the concept of a watershed and the various features within it
- Gain familiarity with the watershed that they live in and potential impacts to it

ASSESSMENT STRATEGIES

Discussion

To assess student's watershed awareness after completing the activities, facilitate a discussion about what they learned and write their answers on a board. What is a watershed? How would they define it? Was this concept easy to understand? What watershed do they live in? What are some examples of macroinvertebrates that might live within their watershed?

Writing

Ask students to write a short reflection about what they learned about watersheds through this activity. Was this a topic they had any familiarity with? Why would it be important to be familiar with one's watershed? Do they live near any water bodies within their watershed or do they visit any frequently? Has this changed the view of the water around them and how? Is there any more information they would want to know about their watershed? Were they surprised by the macroinvertebrates that live in streams and creeks? Has their view of water changed in any way?

3.1 — ACTIVITY: DESIGNING A WATERSHED



The purpose of this activity is for students to gain a general idea of how a watershed functions and how land use within it effects water quality. By the end of the activity, students should gain a general understanding of what a watershed is and be informed about how land use can affect the overall watershed.

Important Concepts:

Watershed: The flow and drainage of water from higher elevation points into the lowest elevation and central body of water. This includes all the adjacent land. (Streams flowing into rivers, rivers flowing into lakes, rivers flowing into river deltas, and river deltas flowing into oceans.) Also called drainage basins or catchment areas.

Point Source Pollution: A single source of pollution where pollutants are dispensed and able to be identified as the source. Usually, pollution is discharged from a pipe and therefore traced back to the beginning. Ex: sewage treatment plants, mines, offshore oil drilling rigs, electric power plants, smokestack, pipe, ditch, etc.

Nonpoint Source Pollution: Difficult to identify the sources and thus difficult to control. Multiple sources contribute as pollutants and mostly occur from runoff but also can be air pollutants. Can also be a wide area that pollutants are discharged over, causing them to be diluted. Ex: feedlots, cultivated land, clear-cut forests (turned into suburban development), cities, and construction sites.

Downstream: The direction in which a stream, river, or creek flows.

Upstream: The opposite direction of a stream, river, or creek flowing.

Riparian Zone: The area of land surrounding bodies of water like rivers, streams, lakes, and wetlands that have adapted to accommodate excess water and events of flooding. These areas contain vegetation that help to stabilize banks and filter out potential pollutants in runoff.

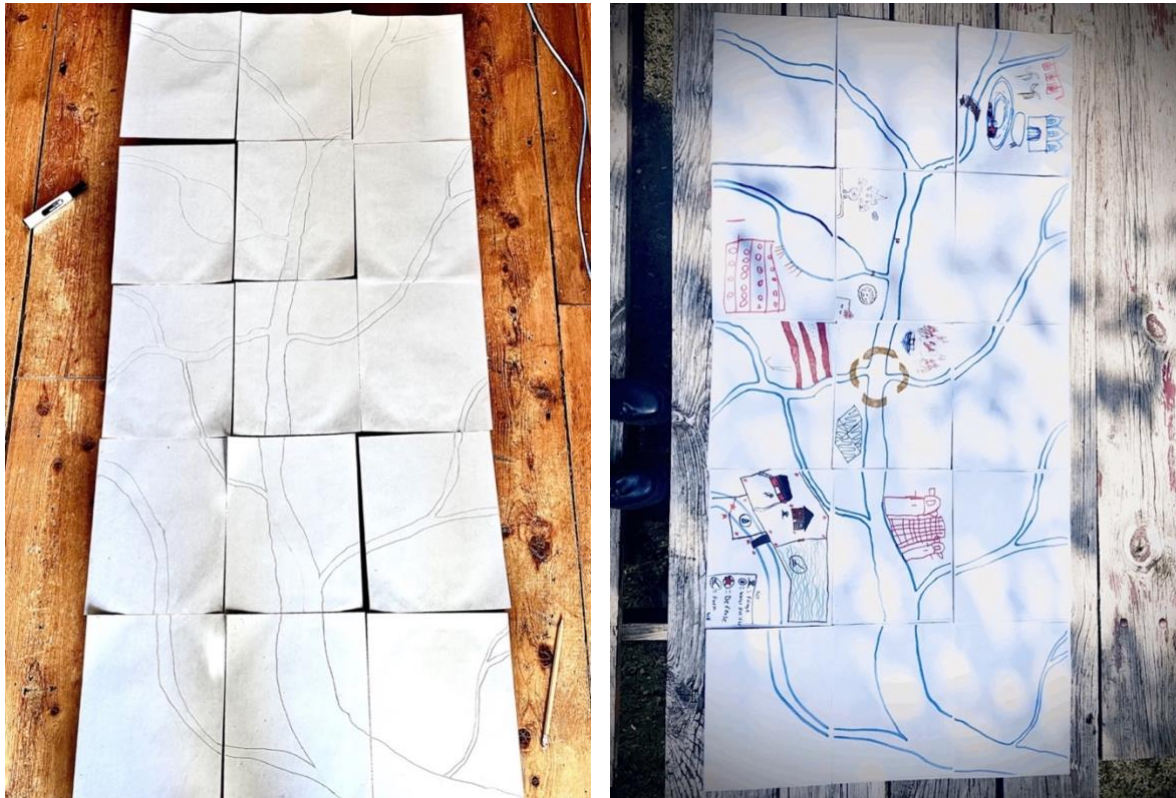
Materials:

- 15 (or tailor to your class size) Pre-Drawn Watershed Map Pieces
Feel free to utilize the sheets in this google drive:
<https://drive.google.com/drive/folders/1KvIYhzeIDbBnJdbt0-r6vfZjTn-iCie1?usp=sharing> These sheets are a made-up watershed containing 1st through 3rd order streams flowing into a river. Feel free to also create your own map sheets and even mimic a map of the watershed you and your class belong to!
 - To Create Your Own: Line up your sheets of paper into the desired shape of a watershed. Now draw your watershed map over the pages so that the water flows through each one and line up. Number each page in the bottom corner in the order they would be laid out in. We encourage you to scan your sheets to repeat this activity in the future.
- Drawing Materials: Pencils, markers, etc.
- Table space needed to lay out all pages into map (could be done on the floor if needed)

Activity Steps:

1. Students will each be given a piece of paper that has a section of water on it. Tell them that this is their dream property. Encourage them to design it with whatever they would have on their dream property. Give them approximately 10 minutes each to draw.
 - a. It is important that they do not know that any of their pieces are connected to each other and that they all make up a watershed. This will be revealed at the end after all students are done drawing.
2. After all students are done with their drawings, arrange all the pieces into the overall watershed map. Ask the students: Do they know what all their pages made up? Are any of them familiar with what a watershed is?
3. Now define a watershed and explain that this is what we are seeing. Explicitly show them the direction that water is moving in the watershed. Where is upstream and downstream?
4. Does land use affect water? Have each student explain the way they used their land and take the time to discuss how their land use might impact the water.
 - a. EX: If there are any farms drawn, are there pesticides used on the crops, is it organic, are there livestock? How could this impact the nearby waterway? Will these have any effects on water quality for the neighbor downstream?
 - b. The goal is to have students consider what aspects of land use could impact water quality.

Completed Example Pages:



Pictured above, the lines were outlined in blue to indicate water. We did not have 15 students, so some pages were left blank, which still works to demonstrate land use. Blank pages can be used to indicate natural, undeveloped land.

5. As a final wrap up to this activity, connect students a map of their watershed. For our purposes, we would show them a map of the Mohawk River Watershed. By showing students this they will be connected to a real example of how land use might affect the water quality and it will help them learn more about the size of their watershed and how it is used. Feel free to use the following examples as a model to be tailored to any watershed.
6. When showing students the watershed map, explain the following:
 - a. Length/ size of water body: The Mohawk River is 147 miles long
 - b. Acreage of watershed: The Mohawk River Watershed is around 2.2 million acres
 - c. Largest tributary: The largest tributary is the Schoharie Creek
 - d. Number of counties & municipalities: The Mohawk River watershed includes 14 counties and 172 municipalities.
 - e. Drinking water source: The Mohawk River Watershed supplies drinking water for over 375,000 residents in surrounding counties and also serves as a water supply system for over 1 million residents in New York City.
 - f. Modifications: There are 14 locks, 5 permanent dams, and 9 removable dams

Reference: 6a-f is taken from the Mohawk River Basin Action Agenda New York State Department of Environmental Conservation. (2021). Mohawk River Basin Action Agenda 2021–2026: Conserving, preserving, and restoring the Mohawk River watershed.
https://extapps.dec.ny.gov/docs/water_pdf/mohawkrbaa2021.pdf

7. By showing the map of your watershed, you are highlighting the importance of this water and why it's important to test whether it is clean. Students will learn where their drinking water comes from and how many other people rely on it.

3.1 and 3.2 — ACTIVITY: MACROINVERTEBRATES



The purpose of these activities is to zero in on an aspect of a watershed: What is living within the water and what does this tell us about water quality? Students will get the opportunity to conduct biomonitoring by collecting macroinvertebrates living in their local waterways and learn how to identify them. If access to water and sampling for macroinvertebrates is not accessible, this can be modified as a classroom activity that will still allow students to learn macroinvertebrate identification and how they are used as water quality indicators. We encourage teachers to do what works best for their classroom and spaces.

Important Concepts:

Limnology: The study of inland, surface waters

Lentic: A moving body of water (streams, rivers, creeks)

Macroinvertebrate: Small, spineless organisms that live in water bodies and are visible to the naked eye.

Riffle: A shallow area within a stream where water moves fast over rocks, causing more gas exchange with the atmosphere. These areas have oxygen-rich levels.

Pollution Tolerant: An organism with the ability to tolerate levels of pollution in water without being affected.

Pollution Intolerant/Sensitive: An organism without the ability to tolerate levels of pollution within water. They will not be able to survive in polluted waters, making them water quality indicators. If they are present, they indicate good water quality.

EPT Richness: The amount of Ephemeroptera, Plecoptera, and Trichoptera families in a sample. These are the three most pollution-sensitive macroinvertebrate families. Therefore, having a high abundance in your sample indicates EPT richness.

STREAM ACCESS: SAMPLING FOR MACROINVERTEBRATES

For those that are interested in going out to a local stream or creek and collecting a biological sample, we highly encourage you to check out NYS DEC's Water Assessment by Volunteer Evaluators (WAVE):

<https://dec.ny.gov/environmental-protection/water/water-quality-management/water-assessments-by-volunteer-evaluators-WAVE>

This is a NYS DEC resource that has all the information needed to sample for macroinvertebrates, as well as how to get the needed equipment! They have an equipment loan program which can help you to access kick nets and other needed supplies. We also encourage you to reach out to any local organizations that may do macroinvertebrate collection to see if they might be able to help you get a sample for you and your class. Our organization has supported local high schools in collecting macroinvertebrates and providing education on identification and assessing water quality. We encourage local schools to reach out to us directly if interested. The Schoharie River Center follows WAVE and EPA protocols when sampling for macroinvertebrates. We also highly encourage you to check out the STROUD Water Research Center:

<https://stroudcenter.org/macros/> This website has many resources for Macroinvertebrates such as Dichotomous Keys for identification.

The first activity is to bringing students out to a stream or creek within their watershed. This is an extremely valuable experiential learning experience to enhance students' understanding of a watershed. By sampling for macroinvertebrates, students are directly interacting with the ecosystem and connecting the knowledge learned to the natural setting. We encourage allowing a window of time to let the students familiarize themselves with and explore the sampling area.

Materials:

- Kick Nets
- Waders
- Arm-Length Gloves if needed
- Bucket(s) depending on class size
- Aerator with batteries

Sampling Steps:

1. Locate a **riffle**: This is the optimal place to sample for macroinvertebrates. It is also important to ensure depth and stream current is safe for students to sample in. If the sampling site is known to be of poor water quality, ensure students have the appropriate gear to prevent skin contact with water.
2. Show students how to use the kick net to collect macroinvertebrates. The net should be facing upstream, so the flow of water goes into the net. Stand facing the net opening and turn your feet side to side for a few minutes, stirring up the bottom rocks and stream bed. This will allow the macroinvertebrates to be carried by the current into the net. All the step-by-step procedures for collecting macroinvertebrates are found within the linked WAVE guide:

<https://dec.ny.gov/sites/default/files/2026-02/waveinstructions.pdf>

3. Once you have your macroinvertebrates in the net, empty them into a bucket filled with water from your sampling site. Ensure there is an aerator with batteries to keep macroinvertebrates alive.
4. Have students try out the collection methods.

Looking at Macros in Field or Classroom:

After the macroinvertebrate samples are collected, they can be identified as a third activity where students will use a dichotomous key and either microscopes or hand lenses to identify the species and then tally them up. You should also provide guides that will indicate which species of macroinvertebrates are pollution sensitive or pollution tolerant. When all macroinvertebrates have been identified, sorted, and tallied, you can assess the water quality of your sample site.

Materials:

- Microscopes
- Hand lenses
- Spoons
- Forceps
- Trays
- Bins
- Dichotomous Key- We recommend using this one from STROUD <https://stroudcenter.org/wp-content/uploads/StroudWebsiteMacroKeyFNL.pdf>
They have each Macroinvertebrate color coded to their pollution tolerance

Activity Steps:

1. Divide students into groups and fill a small bin with some of the macroinvertebrates and water from the collection bucket. The bin should be shallow enough for students to spot the macroinvertebrates but deep enough for the macroinvertebrates to be submerged. Provide each group with a microscope or hand lenses
2. If using forceps, ensure students use them gently so as not to harm any of the macroinvertebrates.
3. Help students use the dichotomous keys to identify the macroinvertebrates. Have them look at the number of legs, body segments, gills, etc, As they identify them, they can sort them into an ice cube tray. (This is outlined in WAVE) Have students record the species and the quantity of them on a sheet.
4. Once all macroinvertebrates have been sorted and identified, have students assess the water quality based on the pollution tolerance of their species.

NO STREAM ACCESS: CLASSROOM MODIFIED

This activity is designed to teach the concepts of using macroinvertebrates to assess water quality but modified for those who cannot access a stream to get macroinvertebrates to look at with microscopes. Instead of looking at real macroinvertebrates, photos of the common macroinvertebrates found in streams in the Northeast, will be printed and used in place. Students will be able to identify each macroinvertebrate by using a dichotomous key. They will then look at a pollution scale classification for the species to determine if their “sample” indicates good, decent, or poor water quality.

This activity is best done in small groups, where each group gets a dichotomous key, a pollution index for macroinvertebrates, and a “sample” of 20 total macroinvertebrates cards. You can give all groups the same variety of macroinvertebrates or have each groups’ sample reflect a different pollution tolerance. Ex: One group has all the macroinvertebrates that are pollution sensitive indicating their sample to be good water quality. Another group has all the somewhat intolerant macroinvertebrates indicating potential impacted waters and another group has all of the pollution tolerant macroinvertebrates, signaling poor water quality.

Materials:

- Macroinvertebrate Cards- We recommend making your own cards based off the photos found STROUD: <https://stroudcenter.org/macros/gallery/>
There are also many photos available on Macroinvertebrates.org: <https://www.macroinvertebrates.org>
 - Good Water Quality Sample- Pollution Sensitive Species: Mayflies, Common Stonefly, Water Penny Beetle, Aquatic Snipe Flies, Dobsonflies, Adult Riffle Beetle, Case-Making Caddisflies, Free-Living Caddisflies, Alderflies, Riffle Beetle Larvae, Right-Handed/Gilled Snails
 - Somewhat Polluted Water Sample- Somewhat Pollution Sensitive Species: Crayfish, Scuds, Aquatic Sowbugs, Clams, Mussels, Craneflies, Net-Spinning Caddisflies, Damselflies, Dragonflies, Crane Flies
 - Pollution Likely Water Sample- Pollution Tolerant Species: Midge Flies, Black Flies, Rat-Tailed Maggots, Left-Handed/Lunged Snails, Leeches, Planaria/Flatworms, Aquatic Worms
- Macroinvertebrate Dichotomous Key & Pollution Scale – We recommend using this one from STROUD <https://stroudcenter.org/wp-content/uploads/StroudWebsiteMacroKeyFNL.pdf> They have each Macroinvertebrate color coded to their pollution tolerance

Activity Steps:

1. Divide students into groups and give each group a “sample” of macroinvertebrate cards. Be sure each group has a dichotomous key and a pollution index to analyze their water quality. Explain how these macroinvertebrates were “collected” from nearby streams and will need to be identified to discover whether the streams have clean water or whether they might be polluted.
2. Assist each group with the dichotomous key, showing them where to start and the different identifying features on a macroinvertebrate.

3. After each group has identified the macroinvertebrates in their sample, have them record each species on a sheet and the number of how many there are. Have students assess the water quality based on the macroinvertebrates in their sample.

Appendix



Onë'dagöh- "In the hemlocks" Salamanca

Prior to being leased from the Seneca Nation the area established as Salamanca was a huge hemlock swamp. White settlers came to this area to work on the railroads as the oil industry flourished in the mid-nineteenth century. After being leased the swamp was drained and the hemlocks were all cutdown and floated to sawmills down-stream. This population grew into and the community below Great Valley Creek became Hemlock. Later, West Salamanca and Hemlock was renamed to Salamanca in 1862. To this day the lawns in town get swampy when it rains.



Dejódihak:kdö:h- “Bend in the River” Horseshoe

The strong bend in the river was the site of constant ice jams in the winter. It caused flooding in the surrounding area. In the early 1900’s dynamite was used to blast the ice sheets. This practice eroded the river path. During a flood about the year of 1925, the river cut a new channel across the base of the loop and left the old bend as dead water. Each spring snow melt and spring flooding overruns into Horseshoe bend and it is still a dead-end section of the former main route of the Allegany River. It is a nice fishing hole for bass, northern pike, bullheads, and panfish today.



Gä:hasde'geh - Strong wind there. Windfall

A fierce beast known to the Seneca as the Flying Head is said to be the spirit of tornadoes. Moving so fast he left a flaming trail of fallen trees. It is said he blazed through the Allegany Territory going over the hill at windfall. Windfall is known for high winds and some tornados on the Allegany Territory. He has never been seen again. This is where Dau-ga-se (Long John) lived near on the east end of the Allegany Territory. There once was a Longhouse.



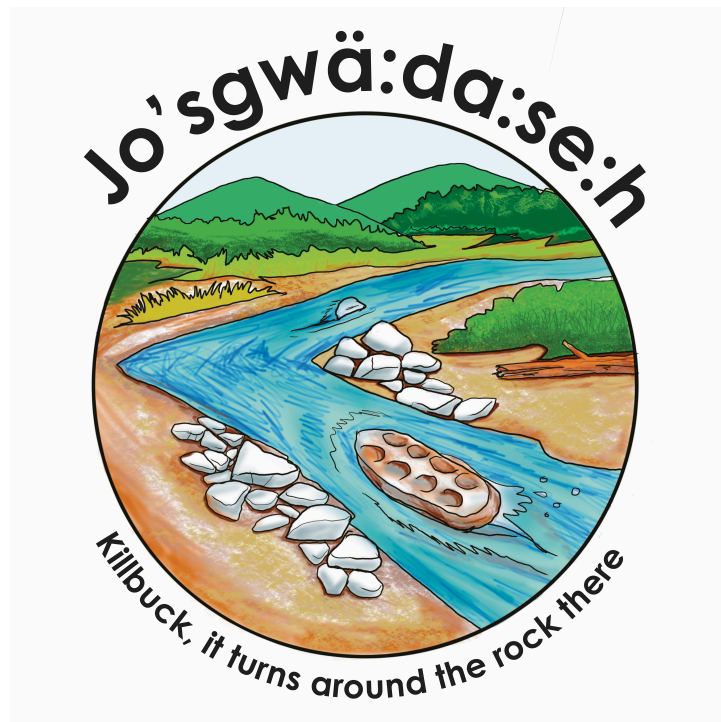
Ha'deyoyá:ya'kdöh- "It's been made to cross there" Quaker Bridge.

This community and the bridge was north of the second Quaker site Tunesassa and south of Coldspring by the Allegheny River. The "Friends" first located at Onoville before moving to off of the Allegheny territory to Tunessassa on Tunessassa Creek in 1803-1804. The bridge and community were inundated by the Kinzua Dam in the 1960s by the United States. A violation of the 1794 Pickering Treaty.



Dewëinigöhgeh- “Hellbender” Giant Salamander

This fresh water salamander has been seen as a bad sign when fishing. When asked about them the old timers said if you catch one don't touch it. Cut your line and move to a different fishing hole.



Jo'sgwä:da:se:h- "It turns around rock there" Killbuck

There was a large rock on the edge of the river. The rock has pitted channels believed to be made by grinding corn. During the construction of route 86 this landmark rock was moved to the Seneca Iroquois National Museum. It can be viewed there. Indian mounds were located on this historic settlement next to the Allegany River.



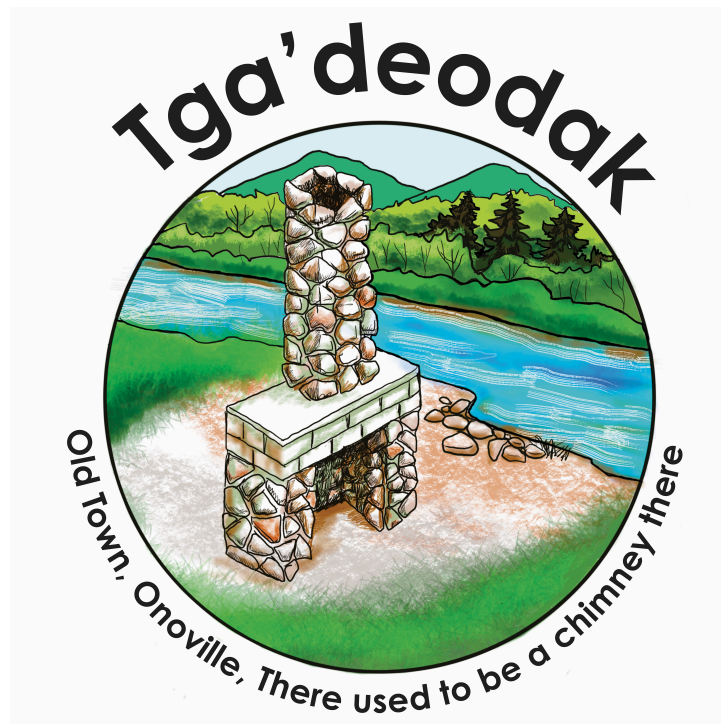
Jönya:dih “beyond the flats”

Shongo was an area on the Allegany Territory near modern-day Jimersontown on the Allegany Territory. It was the home of many ancestors of Mary Jemison. The name transformed to Jimerson over generations. Prior, there was a residential area on the Bucktooth side of the river, the opposite or north side, called “Jimersontown” because Jimersons lived there before the building of the Kinzua Dam. The new Jimersontown relocation area is on the other side of the river after the building of the Kinzua Dam, on the south side of the river.



Gahae:neh- “Witch Place”

This area is said to be haunted. Many strange occurrences have been told in the stories of this place. One tells of a spirit wearing a tall hat and long coat.



Tga'deodak- "There was a chimney there" Old town, Onoville

The landmark of an Old Chimney described this community. Many homes existed there until they were burned to make way for the Kinzua Dam. A group of Onondagas relocated there after the American Revolution. It was also the site of the earliest Quaker residences. The Senecas shared a small plot to the Quakers of Philadelphia as they began their mission development at Allegany. After the American Revolution, New Arrow was the leader of this village. Cornplanter designated this area for the Onondagas..

