PROGRAM OVERVIEW

- This two-hour, two-part program is based on the book *A Long Walk to Water*, by Linda Sue Park. The dual narrative documents the experiences of a fictional character and an international hero, both in South Sudan and in Rochester, NY.

- Students use both Seneca Park Zoo and Seneca Park to participate in a facilitated scientific field-study and a self-guided writing assignment which bring alive concepts related to both the story and the disciplines of Science, Social Studies and ELA.
LEARNING STANDARDS

NextGen & NYS P-12 Science Learning Standards:
- MS. Matter and Energy in Organisms and Ecosystems
- MS. Interdependent Relationships in Ecosystems
- MS. Human Impacts

Common Core:
- Writing: 6.3, 6.4, 7.3, 7.4, 8.3, 8.4
- Language: 6.1, 6.2, 7.1, 7.2, 8.1, 8.2
**HOW TO PREPARE YOUR STUDENTS**

**Logistics**
- Have your students split into groups of 15 or fewer.
- Assign 2-3 chaperones/teachers per group.
- Make sure that students are prepared for a hike and dressed for the weather (closed-toe shoes, raincoats, etc.).
- Bring pencils and clipboards for the self-guided Salva assignment.
- Provide name tags for students to wear.

**Content**
- If you haven’t started reading *A Long Walk to Water*, introduce the story to the students in advance.
- Pre-teach about macroinvertebrates and turbidity if your students aren’t already familiar with those topics.
WHAT TO EXPECT WHEN YOU ARRIVE

- Your buses will pull up to the drop off area at the Front Gate.
- A Zoo staff person will check in your bus.
- You will check in at the Front Gate. Make sure that you know the **total number of guests** (students and teachers/chaperones) in your group. Have **payment ready** unless you have already submitted a purchase order.
- While you are checking in, a Zoo staff member will greet your group and give a brief presentation on Zoo etiquette and safety. Your group will enter the Zoo and wait at a designated flag area.
- The Zoo educator will take your first group and begin your Expedition. Subsequent Expedition groups will meet the Zoo educator at the **Mural at the front of the Zoo** at the times listed on the schedule provided to begin their Expedition.
- Some groups will be scheduled to complete the self-guided Salva assignment first and will be given their worksheets by the Zoo educator.
PART 1: FIELD STUDY WITH ZOO EDUCATORS

Essential Questions:

▪ How can we determine the water quality of natural water sources in our region?
▪ How does our access to fresh water differ from that of those who live in South Sudan?
PART 1: FIELD STUDY WITH ZOO EDUCATORS

Walk to Trout Lake

What to expect:
- Students will experience the challenge of carrying water to and from Trout Lake in Seneca Park.
- Students will use naturalist observations skills to locate water.

Notes:
- Students should be prepared for a hike by wearing closed-toe shoes.
- Students need to stay quiet so that we can observe as much wildlife as possible.
- Students need to stay on the trail for their safety.
- Be sure to dress for the weather!
PART 1: FIELD STUDY WITH ZOO EDUCATORS

At Trout Lake

**What to expect:**
- Students will make observations.
- Students will complete water quality tests.
- Students will observe and identify macroinvertebrates.
- Students will make conclusions about the water quality of Trout Lake based on their observations and results from the water quality tests.
- Students will record their observations, data and conclusions in Field Study Journals provided by Zoo educators.

**Notes:**
- Students will be interacting with the lake water and should use caution to not get wet.
PART 2: SELF-GUIDED SALVA ASSIGNMENT

Essential Questions:

- Which animals at the Zoo are representative of the animals that live in South Sudan?
- How do writers use factual information to develop and create both fictional and factual narratives?
PART 2: SELF-GUIDED SALVA ASSIGNMENT

What to expect:
- Students explore Zoo grounds and identify animals that are mentioned in the book *A Long Walk to Water*.
- Students choose one animal to focus their observations on.
- Students record observations and develop a descriptive/sensory word bank on an observation sheet provided by Zoo educators.

Notes:
- Students need to have their own pencils/pens for this portion of the Expedition.
- It is helpful to bring your own clipboards for this portion of the Expedition.
- Students can use their observation sheet to complete a writing assignment back at school.
POST VISIT SUGGESTIONS

- Use the data collected during the macroinvertebrate test to determine the biotic index of Trout Lake (see Resources at the end of the Teacher Guide.)

- Compile the results from the water quality tests done during the field study. Have students work in groups of 3 or 4 to discuss and analyze findings. Write a summary that could be given to guests visiting the park.

- Have students complete a creative writing assignment using the observations collected during the self-guided Salva assignment. Examples include:
  - Write an essay from the perspective of one of the animals that you observed at the zoo describing a brief encounter with Salva on his journey across South Sudan.
  - Write a descriptive paragraph setting the scene and tone for a reader to experience what it might be like to enter into a habitat that you observed at the Zoo.
  - Write a factual descriptive essay on one of the animals you observed including their behavior, their adaptations, and their habitat.
How to determine the Biotic Index of Trout Lake (post-visit activity):

- Transfer the number of macroinvertebrates observed from the Field Journal into the chart at right.
- Multiply the number of organisms by the assigned biotic index in the chart to determine the biotic value for the group.
- Add the biotic values of all the groups to determine your total biotic value.
- Add the number of organisms of all the groups to determine your total number of organisms.
- Divide the total biotic value by the total number of organisms to determine the Biotic Index of Trout Lake.
- Evaluate the Biotic Index of Trout Lake to determine how much impact humans have had on its water quality.

Biotic Index  =  Total Biotic Value/Total # Observed

<table>
<thead>
<tr>
<th>Macroinvertebrate</th>
<th># Observed</th>
<th>Assigned Biotic Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caddisfly</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Mayfly Nymph</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Water Penny</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Riffle Beetle</td>
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<td>4</td>
</tr>
<tr>
<td>Dobsonfly</td>
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<td>4</td>
</tr>
<tr>
<td>Dragonfly Nymph</td>
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<td>4</td>
</tr>
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<td>Crayfish</td>
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<td>6</td>
</tr>
<tr>
<td>Scud</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Fingernail Clam</td>
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</tr>
<tr>
<td>Sowbug</td>
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<td>8</td>
</tr>
<tr>
<td>Leech</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Midgefly Larva</td>
<td>6</td>
<td>6</td>
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<tr>
<td>Aquatic Worm</td>
<td>9</td>
<td>9</td>
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<tr>
<td>Mosquito Larva</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Blackfly Larva</td>
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<td>5</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td><strong>N/A</strong></td>
<td></td>
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<table>
<thead>
<tr>
<th>Biotic Index</th>
<th>0-4.50 non-impacted</th>
<th>4.51-5.50 slightly impacted</th>
<th>5.51-7.00 moderately impacted</th>
<th>7.01-10 severely impacted</th>
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<tbody>
<tr>
<td>Human</td>
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<tr>
<td>Impact</td>
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2. Know Your Macros! – Slideshow for pre-teaching macroinvertebrates [http://www.nwnature.net/macros/docs/know_macros.pdf](http://www.nwnature.net/macros/docs/know_macros.pdf)