

## **Lesson: Activity 72: The Miracle Fish?**

<b>Teacher:</b>	Kaylan Duthie
<b>Unit Theme/Course:</b>	SEPUP Ecology
<b>Date:</b>	Feb 9 <sup>th</sup> & 10 <sup>th</sup>
<b>Timing:</b>	2 days

### **Challenge Question:**

What are the trade-offs of introducing a species into a new environment?

### **Overview:**

Students will read a story about a boy who is a fisher in Lake Victoria. They will then read a bit more about the introduction of Nile Perch into Lake Victoria and the effects it has had. Students will then take on one of four roles and discuss how the introduction of the species effects each of those individuals. Students will then complete a set of analysis questions.

<b>Learning Objectives [cognitive, academic, language, socio-cultural]</b>	<b>Assessment Criteria</b>
Introducing a species into a new environment can have intended and unintended consequences to ecosystems and people	Students will be able to explain that when Nile perch were added to the lake, the amount of fish increased along with employment, money, and food for the locals.  Students will also be able to explain that the introduction of perch caused cichlids to become extinct, algae increased, and there are now dead-spots in the lake.
Populations of organisms can be categorized by the function they serve in an ecosystem	Student will explain that perch function as predators, causing other fish populations to decline.
Making decisions about complex issues often involves trade-offs – giving up one thing to gain another	Students will complete question 6 using some of the following supporting evidence.

	<b>Perspective</b>	Nile perch should have been introduced.	Nile perch should not have been introduced.
	<b>Evidence</b>	<p>Has provided more food and money (through exports) to the local people. Specifically, the amount of total fish caught has increased five-fold, from 100,000 tons to 500,000 tons. Over 50% of that increase has been due to the Nile perch, as shown in the data provided in Figure 2.</p> <p>Has increased the number of fishing jobs, from 16,000 in 1979 to 82,300 by 1993.</p> <p>The story of James Abila, though fictional, is representative of the attitude of many Africans who live along the lake, and may also be cited as evidence.</p>	<p>Has significantly changed the lake ecosystem, i.e. decrease in populations of catfish, lungfish, and cichlids.</p> <p>Resulting eutrophication of Lake Victoria, creating a “dead” zone.</p> <p>Extinction of up to 200 cichlid species.</p> <p>Possibly not a permanent solution if the Nile perch population also collapses.</p> <p>Decision to introduce Nile perch not made locally.</p>

**Standard/EALR:**

6-8 INQC Investigate	Collecting, analyzing, and displaying data are essential aspects of all <i>investigations</i> .	<p><i>Communicate</i> results using pictures, tables, charts, diagrams, graphic displays, and text that are clear, accurate, and informative. *a</p> <p>Recognize and interpret <i>patterns</i> – as well as <i>variations</i> from previously learned or observed <i>patterns</i> – in data, diagrams, symbols, and words.</p>
6-8 LS2A	An <i>ecosystem</i> consists of all the <i>populations</i> living within a specific area and the nonliving <i>factors</i> they interact with. One geographical area may contain many <i>ecosystems</i> .	<p><i>Explain</i> that an <i>ecosystem</i> is a defined area that contains <i>populations</i> of <i>organisms</i> and nonliving <i>factors</i>.</p> <p>Give examples of <i>ecosystems</i> (e.g., Olympic National Forest, Puget Sound, one square foot of lawn) and <i>describe</i> their boundaries and contents.</p>
6-8 LS2D	<i>Ecosystems</i> are continuously changing. Causes of these changes include nonliving <i>factors</i> such as the amount of light, range of temperatures, and availability of water, as well as living <i>factors</i> such as the disappearance of different <i>species</i> through disease, <i>predation</i> , <i>habitat</i> destruction and overuse of resources or the introduction of new <i>species</i> .	<i>Predict</i> what may happen to an <i>ecosystem</i> if nonliving <i>factors</i> change (e.g., the amount of light, range of temperatures, or availability of water or <i>habitat</i> ), or if one or more <i>populations</i> are removed from or added to the <i>ecosystem</i> .

**Preparation Time:**

30 minutes to make copies

**Materials:**

- Copies of Intra-action worksheet
- Copies of Discussion Web worksheet
- Copies of Evidence and Trade-offs worksheet

### **Instructional Sequence:**

#### **Day 1:**

1. Ask the students who has had a pet before or who has one right now?
2. Explain that sometimes people have pets that they can no longer take care of.
  - a. Ask what is the most human and responsible thing to do with that pet?
3. Story: My neighbors have a young son who has a pet goldfish. He doesn't want the pet goldfish any more. I have a stream in my backyard which connects to a pond farther down the street. My neighbors asked if they could bring their son and goldfish over and release it into the stream.
  - a. What do you think I should say?
  - b. What are advantages and disadvantages of this?
4. We are now going to consider a similar situation where a fish has been introduced into a lake
5. Begin a new entry on lined notebook paper
  - a. Entry # \_\_\_\_: The Miracle Fish?
  - b. Read the introductory paragraph in the book
  - c. Write down the challenge question
6. As a group, read the text in the green box.
7. Pull up Google Earth and show students where they are and where Lake Victoria is
8. Explain that they will be graded using the Group Interactions Rubric for today and tomorrow.
9. Have students move to their lab groups and read through/explain the procedure
  - a. Students will read the rest of the story aloud in their small groups
  - b. Explain the Intra-act worksheet.
    - i. Students should go through each statement 1 by 1, making predictions and then discussing it.

#### **Day 2:**

1. Vocabulary: Ecologist
2. Students will begin the period by finishing the intra-act worksheet
3. After their discussion, they will fill out the discussion web as a group.
4. Students will work as a group to write the answers to the analysis questions on their lined notebook paper
  - a. Questions #6 will be a graded question.
  - b. Students will write their answers using the evidence and trade-offs worksheet to scaffold their use of evidence in answers.
5. At the end of the period, come back to the challenge question and ask for student answers.
  - a. What were the advantages and disadvantages of adding the perch to lake Victoria?
  - b. What role do perch play in the ecosystem?

**Assessments:**

Students will be graded on group work and interaction using the GI rubric

Students will be graded on question #6 using the ET rubric

The Notebook entry will be stamped to check for completion of activities