Name: Edwin Meagher, Christian Moreira
Lesson Title: Coliforms Water Sampling  Lesson Length (class periods): 2-3 classes
SSI Topic: Coliforms  Grade Level(s): 9th Grade – Biology

Appropriateness for Middle/High School Students
Teaching strategies used:

Background

Florida State Standards (NGSSS)
List the Florida Sunshine State Standards (SSS) that directly applies to your objectives, as well as the NGSSS for relevant grade level(s) that you will connect the lesson content to.
SC. 412.L.17.2 (Aquatic Ecosystems)
SC.912.L.17.9 (Producers and consumers)
SC.912.L.17.9 (Energy Flow in Ecosystems)

Performance Objectives
• I can explain the ecological importance of aquatic ecosystems and describe the criteria ecologist use to classify them
• To Learn more about the basic components of the bacteria, Coliform

Materials List and Student Handout
• Coliform Calamity from SSI Website
• Post it Notes
• Smart room equipped with computer, internet, and projector
• Rubric for Coliform Webbing

5E Lesson Template

In the left column, list all activities you are planning. Also include information on how the class will be organized (grouping; individual work). The right column contains only probing questions you intend to ask of your students to guide their learning. For each phase, complete a brief (2-3 sentence) overview of what will occur in the space provided.

Consider the following during the Engage:
• Include an interesting attention grabber that focuses students’ interest and attention on the lesson content and activities.
• Introduce a guiding question that students should be able to answer at the end of the lesson.

Probing Questions:
• Elicit prior knowledge and students’ experiences.

<table>
<thead>
<tr>
<th>ENACTIVE</th>
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<tbody>
<tr>
<td>Overview:</td>
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<tr>
<td>• Video on You tube. (5 Min)</td>
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Adapted from UFTeach: Developing the Next Generation of Florida Math and Science Teachers
Consider the following during the Explore:
- Explain how your students will explore the concept(s), relating specifically to SSI elements when appropriate, including students’ interests shared during the Engage.

Probing Questions:
- Design questions that guide student explorations, evaluate student understanding, and facilitate student interaction and group collaboration.

### EXPLORE

**Overview: Coliform Calamity**

<table>
<thead>
<tr>
<th>Activities (Teacher or Student Actions)</th>
<th>Probing Questions</th>
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<tbody>
<tr>
<td>Using Coliform Calamity Handout</td>
<td>Location of sample Location of sample</td>
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<td></td>
<td>What do you think we will find in the water sample?</td>
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<td>Would you swim in the water?</td>
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<td></td>
<td>Would you drink the water?</td>
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Consider the following during the Explain:
- Have students share and explain the results of their investigation. Connect to relevant SSI elements.
- Add additional content, including definitions, explanations, and new vocabulary in the context of concepts explored.

Probing Questions:
- Ask probing questions to deepen students’ conceptual understanding and skills of the concepts that the lesson is based upon.

### EXPLAIN

**Overview: Oral Presentation.**
Where was the sample located?
Visual Description of the Water source
Consider the following during the Elaborate:
- Opportunity to provide students with the chance to transfer and extend (apply) the concepts and skills they have just learned to their interests and new situations.

**Probing Questions:**
- Connect and apply the lesson to students’ interests outside the classroom.

### ELABORATE

**Overview:**
Picture of the Coliform with different parts of the coliform, which students have to label. Compare coliform as to whether they are prokaryotes or eukaryotes and compare their structure to other microscopic organisms that we have discussed.

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<td></td>
<td>Is this a virus, bacteria, or parasite and why?</td>
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Consider the following during the Evaluate:
- Utilize the grading rubric you designed for the formative assessment tool to assess the students’ mastery of all benchmarks.

### EVALUATE

**Overview**
Illustrate a food web that relates coliform to their environment.

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<td>Students will be following a rubric.</td>
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