ACTIVITY: Help! I’m Up to My Hips in Water

A small increase in sea level has a major effect on the low-lying wetlands of the coastal areas of Louisiana, including the Lake Pontchartrain Basin. When sea-level rise is measured together with the natural process of subsidence, or sinking of the land that occurs in these areas, a rate of relative sea-level rise is obtained. Relative sea-level rise is of great concern for the wetlands of the Lake Pontchartrain Basin because it adds to the problems of wetland loss and saltwater intrusion. As the land becomes lower relative to the sea level, salty water floods areas that were once more freshwater environments, killing the vegetation and leading to erosion of wetlands.

Objectives:

Students will:

1. investigate the effect of water-logging on the growth of wetland plants;
2. measure the growth rate of wetland plants over time; and
3. make observations and inferences about the response of wetland plants to increased water levels.

Teaching Materials:

Per group or class:

- Ten plant pots — uniform size, proportional to the size of the plants
- Ten wetland plants obtained from a nursery, not the wetlands
- Potting soil
- Large, shallow trays on which to place the pots
- Water
- Ruler
- Handout: “Help! I’m Up to My Hips in Water!” (Page 225)
Getting Ready:

1. Before proceeding with this activity, be sure that you have enough time to collect the data on plant growth (at least eight weeks).

2. Research wetland plants with your students, becoming familiar with the common species.

3. Obtain enough wetland plants for each group of students to have a sample of ten. Examples of suitable wetland species include: bald cypress (Taxodium distichum) seedlings; marsh hay grass (Spartina patens); any species of rush (Juncus); any species of sedge (Carex, Scirpus or Cyperus); bulltongue (Sagittaria).

4. Obtain enough plant pots and soil to carry out the experiment. Choose smaller plants to make the experiment manageable.

Procedure:

This experiment may work best outside if you have a secure place at your school.

1. Set up the wetland plants in pots, arranging them in a convenient pattern for watering.

2. Carefully water each pot to the levels according to the handout: “Help! I’m Up to My Hips in Water!”

3. Maintain the water levels in the pots by watering as needed.

4. Measure the growth of the plants once a week; choose a day and time and always measure at the same time each week.

5. Make and record observations about the appearance of the wetland plants in each pot at each watering time.

6. At the end of the eight-week period of the measurement, calculate the growth rate of each plant and plot this value on the graph for each water level.

7. Draw conclusions about the effect of water levels on the plant growth.

8. How do your results relate to sea-level rise in the natural wetlands?

Extensions:

1. Include a non-wetland species of plant in the experiment to make a comparison between plant types.

2. Repeat the experiment, but keep the water level constant and vary the salinity. Use water of 0, 2, 5, 10, 15 and 20 parts per thousand (ppt) of salt. (One teaspoon in one liter of water makes approximately 1 ppt solution).

3. Draw conclusions about the effect of saltwater intrusion on the wetland plants used in the experiment.

4. Research further the natural habitat of the plants you used in your experiment. Do they naturally occur in the marsh or swamp? Do they live in fresh water, intermediate or brackish marsh?
Assessment Procedure:
Assess the students on their ability to maintain their experiment over time, keep accurate records, and to reach reasonable conclusions based on their observations and measurements. Assess their ability to translate the raw data on the chart into graph form.

<table>
<thead>
<tr>
<th>Value Points</th>
<th>Student’s experiment was:</th>
<th>Student’s conclusion was:</th>
<th>Translation of raw data into graph form:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Partially complete; there were incomplete records.</td>
<td>Not present.</td>
<td>There were many errors, causing the graph to be inaccurate.</td>
</tr>
<tr>
<td>2</td>
<td>More than half complete; at least half of the records were kept.</td>
<td>Partially formed.</td>
<td>Most data was correctly transferred, but graph contained many errors.</td>
</tr>
<tr>
<td>3</td>
<td>Complete; records were kept for all 8 weeks.</td>
<td>Complete, but did not match results well.</td>
<td>Data was transferred from chart to graph accurately. Graph was missing some labels.</td>
</tr>
<tr>
<td>4</td>
<td>Completed; good records were kept for all 8 weeks.</td>
<td>Complete and matched results well.</td>
<td>Data transferred accurately and graph complete. Graph’s appearance was adequate.</td>
</tr>
<tr>
<td>5</td>
<td>Very thoroughly completed; excellent records were kept throughout.</td>
<td>Well written and showed excellent understanding of observations and results.</td>
<td>All data was accurately transferred. Graph was complete and visually pleasing.</td>
</tr>
</tbody>
</table>

Maximum points: 15