

Integrated Lesson Plan

Julio De Jesus

Title: How different are the calls of tree frogs species

Overview:

This lesson integrates environmental science and geography topics into physical sciences. The lesson involves teaching about sound waves, specifically the differentiation of properties such as frequency, wavelength and amplitude. In a conventional lesson, it has been found that students presents problems into understanding these concepts as they applied to real life. By adding tree frogs sound analysis into the lesson as an engaging context, student will learn the concepts with more interest (who in Puerto Rico do not know about coquies?) and at the same time students will learn about geographical features that could be related to call differences as represented in the sound spectrograms. Across the three subjects, the skill of pattern identification will be developed as well as the interpretation of maps.

Grade Level: 10 - 12 graders

Topics: Geographical Barriers, Sound Waves, Spectrogram, Competition, Resource Partitioning

Standards:

Students will address Puerto Rico educational standards throughout the addressed content areas. The specific standards covered in each area are listed below.

Social Studies Standards Addressed

- * Exploration
- * Immigration
- * Applied knowledge
- * Research

Science Standards Addressed

- * Life Science Concepts: Ecology
- * Scientific Thinking: Analysis
- * Scientific Investigation

Mathematics Standards Addressed

- * Patterns
- * Connections
- * Probability
- * Algebra

Language Arts Standards Addressed

- * Groups Interaction for the purpose of gathering and sharing information.
- * Technical and narrative writing.
- * Oral presentation and communication skills.

Time: Three 55 minutes periods.

Objectives:

Guiding Question	Knowledge	Comprehension	Application	Analysis	Synthesis	Evaluation
What are different wave types?	Events happen in waves	Waves of exploration and immigration	Students will recognize physical and perceived waves across the discipline.		Students identify the presence of various wave patterns.	Students will work individually and in groups, creating a variety of projects and presentations which will be evaluated.
How do waves influence our lives?	Waves influence literature by influencing people. Students will learn to describe their experiences in literary forms.		Most human events occur in waves. Students will learn to recognize these patterns throughout their lives. Will gain practical knowledge of light, sound, and ocean waves.	Students will examine various literary forms, recognizing effective elements of descriptive writing.		Students will write about their own experiences with animal sounds.
Where do we find waves?	Do waves exist in history? In literature, math, and science?	How do sound waves work? What are the elements in sound waves in history?		Students will locate wave patterns in animal sounds. How do they connect?		
How do we ride waves?	Students will learn about animal calls.					

Procedure:

Background :

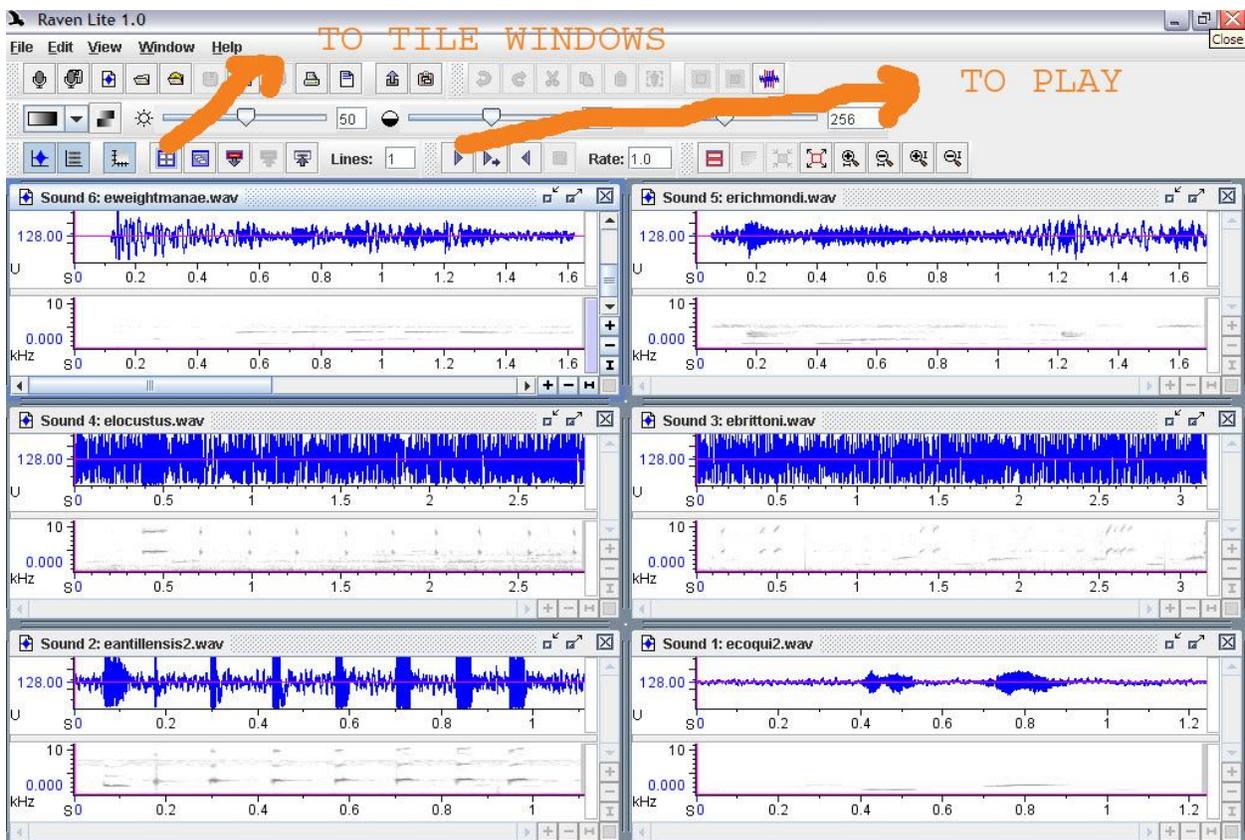
In order to develop the lessons to its maximum level, the introductory sections of the waves and sound chapters need to be reviewed first.

In addition an introductory discussion related to tree frog calls and its use as a resource partitioning strategy is needed as well as the geographical occurrence of the different species. A complete account for this could be found at:

<http://proyectocoqui.org/>

Development:

1. Download the Raven lite Sound Analyzer Software at:
<http://www.birds.cornell.edu/brp/raven/RavenOverview.html>
2. Download the coqui calls set file into the desktop.
3. Load Raven and open the calls files.
4. Select to tile all windows.
5. Click once at the sound name to activate a specific window.
6. Construct specific sonograms for each tree frog species.
6. Play the calls and compare the sonograms.



Open questions discussion:

Which species have similar sonograms?

If all 5 species live in the same area of the forest, which strategies they might be using to avoid interfere among each other?

For species living together, do you expect that they produce similar calls, or different? Explain

Map the range of each species and check for patterns in their sonograms. (use google earth if possible)

Assessment:

A major focus of this unit is student ability to recognize waves in different forms and throughout subject areas. The interconnectedness of this theme should be readily apparent to all students upon completion. These outcomes will be assessed through a variety of means in the covered disciplines. A combination of formal written work, informal reflections, and authentic assessment via discussions and quick writes will be utilized to determine if students are meeting these goals.

Taking into consideration new policies in the school requiring evaluations by test items only (no rubrics), the assessments for the lessons will be adaptations of the self check quizzes taken from the reference textbook (http://glencoe.mcgraw-hill.com/sites/0078778409/student_view0/chapter1/section1/self-check_quiz-sp_.html).