Lesson Title	Let's hear it for sound waves!
Length of Lesson	One (50 minute) class period
Created By	Bo Cherry
Subject	General Science
Grade Level	7th grade
State Standards	7th: 1 h (Inquiry); 2 e (Physical Science)
DOK Level	DOK 2
DOK Application	Distinguish, Compare, Classify
National Standards	5-8: A (Inquiry); B (Physical Science)
Graduate Research Element	Acoustic waves are used in my research to map streambeds in order to calculate discharge for streams and rivers.

Student Learning Goal:
MS 7th Grade:
(Inquiry) 1 (h) Make relationships between evidence and explanations. (DOK 2); (Physical Science) 2 (e) Distinguish how various types of longitudinal and transverse waves (e.g., water, light, sound, seismic) transfer energy. (DOK 2)

National Science Education Standards of Content 5-8:
(Inquiry - A) Use mathematics in all aspects of scientific inquiry; (Physical Science - B) Transfer of Energy.

Materials Needed (supplies, hand-outs, resources)
Computer, Projecter, Powerpoint (INSPIRE_Cherry_PP_11.15.11), Handout for note-taking and exercise (INSPIRE_HO_Cherry_11.15.11), Guitar, Recorder, Doppler Boat, Drums

Lesson Performance Task/Assessment:
This lesson will focus on the properties of sound waves. Students will have some background with waves in general (knowledge of frequency, amplitude, wavelength, etc.), but this lesson will focus solely on sound waves. A powerpoint will guide the students through the lesson and several demonstrations will give students an opportunity to fully understand how sound travels and how one can get various sounds from different instruments or even from their own voice. Demonstrations include a recorder, a guitar, and various size drums. The recorder will show loudness as a function of energy required to produce the sound. The guitar and drums will show different pitches. A discussion of the actual mechanism by which sound waves are produced from these instruments will follow.

Lesson Relevance to Performance Task and Students:
This lesson will be made relevant to students by demonstrating and explaining the theory behind music and musical instruments. Also, by incorporating the Doppler boat, which measures stream discharge, the students get to see how these principles that they are learning can be important to scientific research.

Anticipatory Set/Capture Interest:
The anticipatory set for this lesson will be an interesting video, which will be displayed via the projector or promethean board (smart board).

Guided Practice:
This lesson will be guided throughout most of the lesson in that the instructor will be showing and explaining several aspects of sound waves.

Independent Practice:
Students will be expected to complete workbook pages on the material after the lesson is complete.

Remediation and/or Enrichment:
Remediation - Individual IEP
Enrichment - Have students build their own instruments at home and bring them to class in order to explain how they work.

Check(s) for Understanding:
The instructor should be moving around the classroom in order to check the students' tables as each demonstration is performed. Also, formative feedback from the students will be important as a check for understanding.

Closure:
Question 1: Describe why a higher pitch is prevalent with the smaller drum.

Question 2: How does frequency affect the sounds that we hear?

Possible Alternate Subject Integrations:
Physics, Physical Science

Teacher Notes:
Playing popular songs will get the students more involved in the lesson by capturing their interest.