Lesson Title	Waves in Action
Length of Lesson	One (50 minute) class period
Created By	Charlotte Buehler
Subject	General Science
Grade Level	7th grade
State Standards	7th: Inquiry (1b), Physical Science (2b)
DOK Level	DOK 3
DOK Application	Predict, Model, Compare and Contrast
National Standards	5-8: Inquiry (A), Physical Science (B)
Graduate Research Element	Waves are a disturbance that transfers energy from one place to another. Erosion can occur when ocean waves come into contact with the beach (increased energy) resulting in sediment loss and beach dune destruction. Wave action, along with the presence of Australian pine along a beach, all contribute to beach shoreline modification.

Student Learning Goal:
MS 7th Grade:
Inquiry- (c) Collect and display data using simple tools and resources to compare information.
Physical Science- (e) Distinguish how various types of longitudinal and transverse waves (e.g. water, light, sound, seismic) transfer energy.

National Science Education Standards of Content 5-8:
Inquiry (A)-- Use appropriate tools and techniques to gather, analyze, and interpret data.
Physical Science (B)—Transfer of Energy

Materials Needed (supplies, hand-outs, resources):
Slinkys, computer, projector, powerpoint (INSPIRE_Buehler_pptwaves_11_3_11), student wave demonstration, tsunami video (http://www.youtube.com/watch?v=w3AdFjklR50)

Lesson Performance Task/Assessment:
This lesson will introduce waves. The instructor will demonstrate what waves are, types, of waves, and properties of waves providing examples from light, sound, and seismic waves. First, the instructor will begin the lesson with an interest catcher, which will show footage from the Japanese tsunami. The lesson will proceed to an interactive

powerpoint, introducing the concepts of waves. The demonstration on waves should be conducted during the powerpoint (INSPIRE_Buehler_pptwaves_11_3_11) including using slinkys to show transverse waves and longitudinal waves. The lesson should segue to wave properties including amplitude, frequency, and wavelength. The students will then gather in a line formation in the hallway and they will then act as the medium though which waves travel (both transverse and longitudinal). The lesson will conclude with applications of waves to light, sound, and seismic waves.

Lesson Relevance to Performance Task and Students:
The lesson incorporates inquiry into the types of waves and how waves are classified. The students will learn through a series of demonstrations (using a slinky) the waves types along with appropriate vocabulary. Understanding how waves propagate and the basic properties including amplitude, wavelength, and frequency will increase their understanding about future lesson on sound waves, light waves, and even earthquake seismic waves.

Anticipatory Set/Capture Interest:
The instructor will show footage from the Japanese tsunami (http://www.youtube.com/watch?v=w3AdFjklR50).

Guided Practice:
Using the powerpoint (INSPIRE_Buehler_pptwaves_11_3_11) the instructor will introduce the vocabulary for waves. The terms will help the students understand the slinky demonstration. After the guided practice, the students will be given slinkys to see for themselves how waves work.

Independent Practice:
The students will use the slinkys to demonstrate transverse waves, longitudinal waves, and show high frequency, low frequency, and long and short wavelengths. After the slinky demonstration the instructor will take the students into the hallway and the students will act as the medium through which the waves will travel. They will demonstrate, lining up and standing side by side and shoulder to shoulder, wave propagation. The instructor will nudge the last person in line and the energy created will propagate though the students to the end of the line. This shows a longitudinal wave. The transverse wave is shown by the students standing in the same line formation but having their arms over their neighbor's shoulders. The instructor then has the first student in line take a bow and stand up and the energy produced propagates down the line to the last student.

Remediation and/or Enrichment:
Remediation- Individual IEP; work in groups

Enrichment – Have the students compare and contrast light, sound, and heat waves using terminology such as frequency, amplitude, and wavelength

Check(s) for Understanding:
Can the students compare and contrast transverse and longitudinal waves? Can the students apply what they learned about waves to the interest catcher on tsunamis?

Closure:
Question 1: What is a light wave? What is a sound wave? What is a seismic wave?
Question 2: Can waves be both invisible and visible?

Possible Alternate Subject Integrations:
Mathematics

Teacher Notes:
none