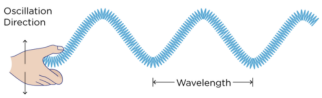
3-Day Lesson Plan		
Teacher: Abigail Gogan	**Subject:** Physics	**Date:** N/A
Unit: Energy & Waves	**Topic:** Wave Actions	**Grade:** 11
Achievement Indicator(s): - Compare the production and characteristics of waves - Apply the universal wave equation to solve problems		
Lesson Objective:		
Required Materials: powerpoint, sorting activity, slinky observation activity, Wave Production & Equation Lab, slinkies, ropes		

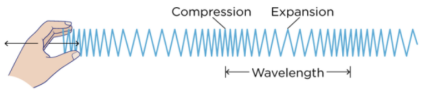
DAY 1

Required Materials: Slinky for every 2 students

First part of this lesson plan will be this powerpoint (**15 mins**) followed by wave sorting handout (**10 mins**).

After the sorting activity:

- Ask the class to name or title the groups they sorted their waves into and have each group share.
- Mention the possibility for distance or time to be on x-axis (measuring wavelength vs. frequency)
- Hand out one slinky and one copy of waves observation sheet per pair of students. Allow them to play around with the slinkies for a couple minutes before telling them they have 15 minutes to complete the activity.
- Afterwards, give the following definitions & examples of **transverse** vs. **longitudinal** waves; ie. the two types of **mechanical waves**
- Transverse: a wave in which particles of the medium move in a direction perpendicular to the direction that the wave moves
- Longitudinal: a wave in which particles of the medium move in a direction parallel to the direction that the wave moves
- draw this: (T) 

(L) 

- be sure to specify in which direction the wave is moving in both cases

Closure (10 Minutes):

Weekly Question:

- Are water waves transverse or longitudinal? Think about swimming at a beach for example–how/where do the waves on the surface of the water move you as they go by? Explain your reasoning with reference to the characteristics of these wave types.
- (Answer: both! When swimming, you will be bobbed up and down *and* pushed in the direction of the wave travel as strong enough waves go by.)

Reflection:

DAY 2

LAB DAY!

Required Materials: 8x ~4m rope, phone stopwatches

Wave Production & Equation Lab

Reflection:

DAY 3

Warmup / Hook (10 Minutes):

How many types and examples of waves can we identify as a class?

- Look for both types and examples, try to identify types early on and from then on categorize all other waves
- Electromagnetic, mechanical, matter (advanced for this class)
- Water, sound, heat, radio, light, etc.
- Try to come up with 7+ types of electromagnetic and mechanical

Introduction / Opener (10 Minutes): *[Review - Activate - Recap]*

- Watch this video as a refresher

Body (20 Minutes):

- Small group investigations/mini presentations on a specific type of wave
- Gather students into groups of 2 (class of ~20) or 3 (class of ~30) and assign half of the groups to an electromagnetic wave and half to a mechanical wave
- Give them 10 mins as small group to research and compile information about their wave
- Then take 10 mins with a group with the opposite type of waves to come up with a list similar/contrasting features of the wave examples
- Prepare to present findings to the class in 2 minutes. At least one person from each wave group should contribute to the presentation. Can use visuals, verbal explanation, numbers, functions, etc.

Closure (20 Minutes):

- Have each group give their condensed presentation about their waves and how they compare to/contrast each other.

Assessment: *(how will you know that the lesson objective has been achieved?)*

- Presentation contains correct information about waves
- Groups reflect understanding of the difference between types of waves
- Groups mention something about wave characteristics and/or how they work in their specific contexts or something related to what we have been learning in class

Reflection: