

# ENERGY AND WAVES PHYSICS LAB

## APPLIED SCIENCES

**Designed For Students:**

Grades 3rd-12th  
Ages 8-18

## HELLO EDUCATOR!

Disney Youth Education Series is pleased to be able to provide you with these materials to gauge your students' progress as they prepare for and complete their Disney Y.E.S. experience.

To encourage creative thinking, open-mindedness, and generate excitement, we suggest that you use the Pre-Trip Coursework to help your students prepare for Energy and Waves Physics Lab. Upon your return to school, you might find the Post-Trip Assessment useful to measure student learning.

These tools are sure to get your students moving in the right direction and help ensure a learning experience that is relevant, inspiring, and thought-provoking!

We look forward to hosting you at the Walt Disney World® Resort where iconic settings, imagination, and storytelling come together to create a unique learning environment and life-long memories. See you soon!

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### 1. Waves, Waves, Waves!

- Obtain 8 feet of pliable rope or heavy string.
- Tape one end of the rope/string onto a tile floor. The end of the rope/string should be taped onto an intersection of the tiles so that the tiles serve as a visual grid.
- Instruct a student volunteer to hold the free end of the rope.
- Other students to line up on either side of the rope to observe the action to take place.
- Instruct student volunteer:
  - ✓ Keep their hand and the free end of the rope on the floor
  - ✓ Move their hand back and forth across the floor to generate a wave in the rope
- Instruct student volunteer:
  - ✓ To vary the speed and distance of their hand movement
- Student observers to observe the action taking place and to take note of the height and number of waves being generate by the variety of hand motions.
- Students to graph the different waves that they observed throughout the experiment.
- Classroom discussion:
  - ✓ Discuss the different graphs
  - ✓ Develop definitions for wavelength, frequency, and amplitude

### 2. Students to work in cooperative groups to research how ears receive sound.

### 3. Students to take a walk outside:

- Students will:
  - ✓ Individually record the different sounds that they heard
  - ✓ Discuss while in small groups, what sounds they heard and make a comprehensive list
  - ✓ Each student to select 3 different sounds from the comprehensive list and research the frequencies of these sounds
  - ✓ Once the students have completed their research, the class will compile the information and chart all of the frequencies that were researched
  - ✓ Small student groups will then research sounds that are beyond the range of human ear and add those sound frequencies to the existing chart
  - ✓ Discuss while in small groups, what would be different, if anything, about their lives if they were unable to hear

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**At the conclusion of the Disney Youth Education Energy and Waves Physics Lab experience, have each student do the following:**

1. Articulate a variety of forms of energy.
2. Demonstrate a compression wave.
3. Demonstrate and/or articulate how solids, liquids, and gases affect sound.
4. Articulate factors that may affect the speed of sound.
5. Define acoustics
6. Demonstrate that white light is composed of different colors of lights.
7. Articulate how different colors of light causes fluorescing in some substances.
8. Articulate factors that can influence the intensity of UV light.
9. Articulate the parts of a wave.
10. Define and demonstrate wave frequency.