

TECHLAB SPRINGBOARD: AMPLITUDE & WAVELENGTH



APPARATUS

- computer (iBook or equivalent) DataStudio with WavePort
- headphones and signal splitters (optional)

SET UP

- a. Start the computer (PhyzMac iBook). While it is starting up...
- b. Connect the headphones so that each member gets a set. Use signal splitters as needed.
- c. When the computer has completed its start-up cycle, make sure the sound volume level is turned up to its maximum setting. (Use the Sound Tool on the Control Strip.) If you find the sound level too high later on, you may turn it down at the Control Strip or on the headphone cord if available.
- d. Start DataStudio; when asked what you would like to do, select "Open Activity."
- e. Choose "Amplitude and Wavelength." (File location: X PhyzMac X/DataStudio/eLabs/Phyz TechLabs/Unitnumber/Amplitude and Wavelength) Click "OK" to the warning that the file is locked and cannot be changed.

1. AMPLITUDE

- a. Click the on-screen speaker picture-button to initiate sound generation. (If sound generation does not begin, click the on-screen speaker again.)
- b. Which on-screen hand tool is used to change the **amplitude** of the sound wave?
 The one connected to a crest. The one connected to a trough.
- c. How does the sound change when the amplitude is changed? Be specific in your description. (Responses such as "It gets higher," or "It gets louder" are incomplete. Describe what change occurs under what conditions.)

When the amplitude is increased, the sound gets louder.

When the amplitude is decreased, the sound gets quieter.

- d. Let each member of the lab group make a change while the others aren't looking. The others must identify what kind of change the controller made. All members start with an amplitude of 0.5.
 - i. Member 1 increased the amplitude. decreased the amplitude.
 - ii. Member 2 increased the amplitude. decreased the amplitude.
 - iii. Member 3 increased the amplitude. decreased the amplitude.
 - iv. Member 4 increased the amplitude. decreased the amplitude.

2. WAVELENGTH

- a. If the sound isn't already being generated, click the on-screen speaker picture-button to initiate sound generation.
- b. Which on-screen hand tool is used to change the **wavelength** of the sound wave?
 The one connected to a crest.
 The one connected to a trough.

c. How does the sound change when the wavelength is changed? Be specific in your description. (Responses such as "It gets higher," or "It gets louder" are incomplete. Describe what change occurs under what conditions.)

*When the wavelength is increased, the pitch/frequency gets lower.
 When the wavelength is decreased, the pitch/frequency gets higher.*

d. Let each member of the lab group make a change while the others aren't looking. The others must identify what kind of change the controller made. Start with a wavelength of 0.500 m.

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|---------------|--|--|
| i. Member 1 | <input type="checkbox"/> increased the wavelength. | <input type="checkbox"/> decreased the wavelength. |
| ii. Member 2 | <input type="checkbox"/> increased the wavelength. | <input type="checkbox"/> decreased the wavelength. |
| iii. Member 3 | <input type="checkbox"/> increased the wavelength. | <input type="checkbox"/> decreased the wavelength. |
| iv. Member 4 | <input type="checkbox"/> increased the wavelength. | <input type="checkbox"/> decreased the wavelength. |

3. RANK THE SOUNDS

The waveforms of several sounds are shown below and identified with numerals 1 through 6. Use your experience in the previous activities to rank the sounds as follows.

a. Rank the sounds from highest frequency to lowest frequency.

4, 5, 1, 6, 3, 2

b. Rank the sounds from loudest to quietest.

3, 1, 4, 6, 2, 5

