

# Download File PDF Phet Wave Simulation Lab Answers

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Go to [http://phet.colorado.edu/simulations/sims.php?sim=Wave\\_Interference](http://phet.colorado.edu/simulations/sims.php?sim=Wave_Interference) and click on Run Now.

**Introduction:** When waves momentarily overlap, they temporarily add their amplitudes without affecting the original waves. This interference can be seen when two wave sources are used and their overlaps viewed. You will view this phenomenon in parts [Lab 1](#) and [Lab 2](#). When a wave strikes a barrier, some of the energy will bend around the barrier and spread out. This is known as **diffraction**. In part three of the lab, you will view the results of splitting a single wave source with a narrow slit, and then observe as the new waves created at the slit interfere. This interference pattern that results is symmetrical. The bands of constructive interference are referred to as maxima (single-maxima).

**Important Formulas:**  $d \sin \theta = m \lambda$   $x_m = \frac{m \lambda L}{d}$

Please note that many texts use  $m$  to represent the  $0^{\text{th}}$  maximum from the central maximum. The College Board has chosen to use  $m$ , I suspect so as not to be confused with index of refraction.



**Procedure:** [Lab 1](#) Simulations → Play With Sine → Sound and Waves → Wave Interference [Lab 2](#)

**Part I: Water Waves Analogy** *Take some time to familiarize yourself with the simulation's controls*

- Observe the water waves created in the faucet analogy. The darker areas are areas of higher amplitude.
- Adjust frequency and amplitude and observe the characteristics of the waves.
- Comment on the waves as amplitude is changed:           . *The amplitude of a wave can be changed by using another wave to interfere with it.*
- Comment on the waves as frequency is changed:           .
- Now add a second dip to the simulation. Observe the interference of the two water waves.
- Comment on the interference of the two waves:           .

**Part II: Light Wave Interference** *Please note the waves take some time to settle out and show good graphs be patient*

- Change the simulation to show [concurrently colored](#) light emission from the single-light source. [Lab 1](#)
- Observe the wavelength of red light and then move the wavelength slider to cyan or blue light.
- Comment on the actual wavelength of blue light versus red light.
- Add the screen to show how the light would look if viewed on a screen. [View Screen](#)
- Add a second light source and view the interfering waves and the pattern they create on the screen.
- Showing the *Intensity Graph* quantifies the energy that is incident upon the screen.

What effect does amplitude have on the maxima separation in the interference pattern?

What effect does source spacing have on the maxima separation in the interference pattern?

What effect does wavelength have on the maxima separation in the interference pattern?

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