PHYSICS IN MOTION
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Unit 6H

Light Diffraction and Interference

Diffraction and Interference of Light Lab

Name:

Date:

In this activity, you will be conducting a virtual laboratory and examining how light waves diffract through thin slits and how multiple light sources interact with one another.

Virtual Lab: PhET Wave Interference

You can access this simulation at: https://phet.colorado.edu/en/simulation/legacy/wave-interference.

Part One: Interference

1. **Open the simulation and click on the "Light" tab.**
2. **The first light that is shown is red. Adjust the color slide and notice how the wavelengths of the light changes. Which color light has the longest wavelength?**

3. **How does the frequency of the light relate to the wavelength?**

4. **On the right-hand side of the window, click on "Two Lights." This will add a second light source to the simulation. What do you notice when two lights are being shown simultaneously?**

5. **To the right of the color box, click on "Show Screen." Make the light sources show red light. What do you notice on the screen?**

6. **Adjust the color of the light down to blue. How does the distance between the maxima shown on the screen change?**

7. **Based on the wavelength of red and blue light, how does this affect the distance between the maxima reated when light interferes?**

questions continued on next page

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Part Two: Double-Slit Diffraction

1. Change the simulation back to "One Light," and click on "Two Slits."

2. Increase the intensity of the light used. What change happens to the distance between the maxima on the screen?

3. Change the color of light to blue. How does the distance between the maxima change as the wavelength of light shortens?

4. Change the Slit Width. Does the distance between the bright maxima change when the slit width changes?

5. Does the number of maxima change when the slit width changes?

6. Slide the Barrier Location tab. How does the distance between the maxima change as the Barrier Location changes?

7. Finally, adjust the Slit Separation. How does the distance between the maxima change as the Slit Separation distance changes?

Courtesy of:
PhET Interactive Simulations
University of Colorado Boulder
https://phet.colorado.edu