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 conduct a virtual laboratory to examine 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

   a. Open the simulation and click on the Light tab.
   b. The first light shown is red.
   c. Adjust the color slide and notice how the wavelengths change.

1. Which color light has the longest wavelength?

_____

2. How does the frequency of light relate to the wavelength?

_____

   d. On the right-hand side of the window, click on Two Lights. This will add a second light source to the simulation.

3. What do you notice when two lights are shown simultaneously?

_____

_____

   e. To the right of the color box, click on Show Screen.
   f. Set the light sources to red.

4. What do you notice on the screen?

_____

   g. Adjust the light sources to blue.

5. How does the distance change between the maxima shown on the screen?

_____

6. How does the wavelength of light affect the distance between the maxima?

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Part Two: Double-Slit Diffraction

    a. Change the simulation back to One Light and click on Two Slits.

    b. Increase the intensity of the light used.

1. What happens to the distance between the maxima on the screen?

_____

    c. Adjust the light to blue.

2. How does the distance between the maxima change as the wavelength shortens?

_____

    d. Change the Slit Width.

3. Does the distance between the bright maxima change when the slit width changes?

_____

_____

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

_____

_____

    e. Slide the Barrier Location tab.

5. How does the distance between the maxima change as the barrier location changes?

_____

_____

    f. Adjust the Slit Separation.

6. How does the distance between the maxima change as the Slit Separation changes?

_____

_____