

Single And Double Slit Interference

1. Open up the **VSlits** program. (note::It is also available as a button in the **Vinterference** and **Vdiffraction** program)
2. Verify that you can properly measure the values by setting the following conditions. Then use the ruler to measure the appropriate values to solve for the “unknown”.
 - a) For a single slit, set Screen distance to be 260 cm, slit width to be 80 μm and wavelength of light to be 400nm. Calculate x_2 . measure x_2 to verify results
 - b) For a single slit, Set Screen distance to be 180 cm, slit width to be 60 μm and wavelength of light to be 480 nm. Measure Δx . Assume slit width is your unknown. Solve and check if you get 60 μm .
 - c) For a double slit, Set screen distance to be 180 cm, slit separation to be 120 μm and wavelength to 650 nm. Solve for x_4 . Measure to verify.
 - d) For a double slit, Set screen distance to be 380 cm, slit separation to be 110 μm and wavelength to 570 nm. Measure Δx . Assume screen distance is the unknown. Solve and check if you get 380 cm.

Once you are comfortable with using the program complete the following lab.

1. Select experiment #1 from the dropdown Box.
2. What type of interference pattern do you see, Single or double slit? Explain why.
3. Use the ruler to measure the Δx value for this pattern and record your results.
4. Solve for the missing value. (show calculations)
5. Repeat for experiments #3 and #5.
6. Are the unknowns for each of the experiments? (Show calculations)
7. Repeat for the experiments #2, 4 and 6 but measure the x_n value. For accuracy, use the largest “n” possible.
8. Record the results.
9. What are the unknowns for each of the experiments? (Show calculations)
10. Redo exp #3 by measuring x_n and redo exp #4 by measuring Δx .
11. Should your values match your previous answers? Why/why not?