

## 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  $\mu\text{m}$  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  $\mu\text{m}$  and wavelength of light to be 480 nm. Measure  $\Delta x$ . Assume slit width is your unknown. Solve and check if you get 60  $\mu\text{m}$ .
  - c) For a double slit, Set screen distance to be 180 cm, slit separation to be 120  $\mu\text{m}$  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  $\mu\text{m}$  and wavelength to 570 nm. Measure  $\Delta x$ . 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  $\Delta x$  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  $\Delta x$ .
11. Should your values match your previous answers? Why/why not?