FLINN SCIENTIFIC

Name_____

Measuring with Laser Light Worksheet

Data Table(s) or Observations

Object	Distance from object to screen, L (mm)	Distance between dark spaces, Δy (mm)	Wavelength of laser light, λ (mm)	Object width (mm)	Object width (μm)
Fishing line					
Copper wire					
Human hair					

Post-Lab Calculations *(Show your work on a separate sheet of paper.)*

1. For each object, measure the distance in mm between pieces of tape (see Figure 7) on the paper screen. Record the results in the data table.
2. Record the wavelength of the laser light in mm. *Note:* Most lasers have a label with the wavelength recorded in nm. Convert nm to mm. If your laser pointer does not indicate the wavelength, check with your instructor.
3. Calculate the width of each object in mm using Equation 1. Round to the nearest hundredth of a mm and record in the data table.
4. Convert the width of each object from mm to μm and record the results.

Post-Lab Questions and Analysis

5. List the measured objects from the data table in order from smallest width to largest. How did the diffraction pattern change from one object to the next?

6. The diameter of human hair varies, but is usually in the range of 20–180 μm. Did the experimental value obtained fall within this range? Compare your results with other groups. Does there seem to be a relationship between hair color and width? Explain.

7. The diameter of a 30-gauge copper wire is 0.255 mm. a) How does the measured width of the copper wire compare to the accepted width? b) Use Equation 2 to calculate the percent error between the measured and accepted values for the width of the wire. c) What are some possible sources of error in this experiment?

$$\text{Percent error} = \frac{|\ \text{measured value} - \text{accepted value}\ |}{\text{accepted value}} \times 100\% \qquad \textit{Equation 2}$$