Name _____

Young's Double Slit Internet Experiment Sheet

Young's Double-Slit Experiment
In 1801 the English scientist Thomas Young (1773 – 1829) performed an historic experiment that demonstrated the wave nature of light by showing that two overlapping light waves interfered with each other. Young was also able to determine the wavelength of the light from his measurements, the first such determination of this important property.

Your responsibility is to gain an understanding of what happens to the interference pattern when a number of characteristics of the experiment is changed.

Web Site: **http://tutor-homework.com/Physics_Help/double_slit_experiment.html**

Investigation

Part 1
How does changing the wavelength of the light affect the spacing of the bright fringes?

1. Enter the following settings into the simulation:

   - Slit separation = $8.50 \times 10^{-5}\ m$
   - Wavelength = $440\ nm$ (blue light)
   - Distance to screen = $2.30\ m$
   - Vertical size of the screen = $6.00\ cm$

2. Draw a diagram illustrating the pattern of dark and colored lines shown on the screen.

3. Use the measurement feature to determine the distance between the central bright fringe and the 1st bright fringe.

4. Change the wavelength setting to:

    - Wavelength = 640 nm (red light)

5. Draw a diagram illustrating the pattern of dark and colored lines shown on the screen.

6. Use the measurement feature to determine the distance between the central bright fringe and the 1st bright fringe.

7. Briefly explain how the spacing of the bright fringes changed when the wavelength was changed.

Part 2

How does changing the slit separation affect the spacing of the bright fringes?

1. Enter the following settings into the simulation:

    - Slit separation = $4.00 \times 10^{-5}\ m$
    - Wavelength = 640 nm (red light)
    - Distance to screen = 2.30 m
    - Vertical size of the screen = 6.00 cm

2. Draw a diagram illustrating the pattern of dark and colored lines shown on the screen.

3. Use the measurement feature to determine the distance between the central bright fringe and the 1st bright fringe.

4. Change the slit separation setting to:

   - Slit separation = $9.00 \times 10^{-5}\ m$

5. Draw a diagram illustrating the pattern of dark and colored lines shown on the screen.

6. Use the measurement feature to determine the distance between the central bright fringe and the 1st bright fringe.

7. Briefly explain how the spacing of the bright fringes changed when the slit separation was changed.

Part 3

How does changing the distance to the screen affect the spacing of the bright fringes?

1. Enter the following settings into the simulation:

   - Slit separation = $9.00 \times 10^{-5}\ m$
   - Wavelength = $640\ nm$ (red light)
   - Distance to screen = $1.50\ m$
   - Vertical size of the screen = $6.00\ cm$

2. Draw a diagram illustrating the pattern of dark and colored lines shown on the screen.

3. Use the measurement feature to determine the distance between the central bright fringe and the 1st bright fringe.

4. Change the distance to the screen setting to:

   - Distance to the screen = $3.00\ m$

5. Draw a diagram illustrating the pattern of dark and colored lines shown on the screen.

6. Use the measurement feature to determine the distance between the central bright fringe and the 1st bright fringe.

7. Briefly explain how the spacing of the bright fringes changed when the distance to the screen was changed.