Alternate CBL Instructions
Double-Slit Interference of Light

Safety Precautions

- Use laser protective eyewear approved by ANSI.
- Never look directly into the light of a laser.
- Use caution when plugging in, using, or unplugging the CBL 2 unit's power supply.

Possible Materials
laser pointer or laser to be tested
double-slit plate
clothes pin to hold laser pointer switch on
clay ball to hold the double-slit plate
meter stick
masking tape
string
protractor
CBL 2 unit
link cable
TI graphing calculator
DataMate program
light sensor
DIN adapter

Procedure
1. Determine which equation applies to double-slit interference.

2. Use a double slit of known slit separation distance, *d,* or develop a method to determine *d.*

3. Sketch how light passes through a double slit to help you determine how *x* and *L* can be measured. Consider setting up the laser pointer and slits several meters from the light sensor. Determine which equation relates angular measurements of double-slit patterns. Use a piece of string to establish a zero-angle point from the laser light double-slit pattern. A second piece of string may be used to measure the angle at the slit.

4. Connect the light probe Channel 1 of the CBL 2 unit. Connect the CBL 2 unit to the graphing calculator using a link cable. Firmly press the ends of the link cable into each unit. Set the light probe switch to "0-600".

5. Turn on the graphing calculator. Start the DataMate program. The CBL 2 unit should auto ID the light probe. Press CLEAR to reset the application program. The current intensity reading will be displayed on the Main screen.

6. Design the lab setup and write a procedure for performing the experiment. Determine the values of m that would be invalid for the equation. *CAUTION: Looking directly into laser light could damage your eyes.*

7. Be sure to check with your teacher and have approval before you implement your design.

8. Perform your experiment. Write your data in a date table similar to the one in the textbook.

Alternate lab procedure, using a CBL unit
1. Determine which equation applies to double-slit interference.

2. Use a double slit of known slit separation distance, d, or develop a method to determine d.

3. Sketch how light passes through a double slit to help you determine how x and L can be measured. Consider setting up the laser pointer and slits several meters from the light sensor. Determine which equation relates angular measurements of double-slit patterns. Use a piece of string to establish a zero-angle point from the laser light double-slit pattern. A second piece of string may be used to measure the angle at the slit.

4. Connect the light probe Channel 1 of the CBL 2 unit. Connect the CBL 2 unit to the graphing calculator using a link cable. Firmly press the ends of the link cable into each unit. Turn on the CBL unit and the graphing calculator and start the PHYSICS program and go to the MAIN MENU.

5. From the MAIN MENU select SET UP PROBES. Select ONE as the NUMBER OF PROBES. Select LIGHT from the SELECT PROBE menu. Press ENTER. On the CALIBRATION menu, select USE STORED. Set the light probe switch to "0-600" and press ENTER. Select "0-600 LUX" on the LIGHT PROBE menu. The program will return to the MAIN MENU.

6. On the MAIN MENU select COLLECT DATA, then select MONITOR INUT from the DATA COLLECTION screen.

7. Design the lab setup and write a procedure for performing the experiment. *CAUTION: Looking directly into laser light could damage your eyes.* Determine the values of m that would be invalid for the equation.

8. Be sure to check with your teacher and have approval before you implement your design.

9. Perform your experiment. Write your data in a date table similar to the one in the textbook.

10. When you are done collecting data, press "+" to end. Select RETURN TO MAIN and then select QUIT from the MAIN MENU to exit the PHYSICS program.