

PROCEDURE

1. Plug the Light Sensor into Channel 1 of the LabPro interface. Connect the handheld to the LabPro using the interface cable. If your sensor has a range switch, set it to 600 lux. Firmly press in the cable ends.
2. Press the power button on the handheld to turn it on. To start Data Pro, tap the Data Pro icon on the Applications screen. Choose New from the Data Pro menu or tap **New** to reset the program.
3. Set up the handheld and interface for the Light Sensor.
 - a. On the Main screen, tap **Setup**.
 - b. If the handheld displays LIGHT or LIGHT(lux) in CH 1, proceed directly to Step 4. If it does not, continue with this step to set up your sensor manually.
 - c. Tap **CH1:** to select Channel 1.
 - d. Press the Scroll buttons on the handheld to scroll through the list of sensors.
 - e. Select the correct Light Sensor (LIGHT-TI CBL if you are using a TI Light Sensor or LIGHT 600(LX) if you are using a Vernier Light Sensor) from the list of sensors.
4. Set up the data-collection mode.
 - a. On the Setup screen, tap **Mode:**, then choose Single Point.
 - b. Tap **OK** to return to the Main screen.
5. Use a utility clamp and ring stand to fasten the Light Sensor 5 cm from and perpendicular to a piece of colored paper as shown in Figure 1. The classroom lights should be on.
6. When the light reading displayed on the screen is stable, tap **Start** to begin collecting data. **Note:** The handheld and interface will be taking data for the next 10 seconds.
7. After 10 seconds, the light value will appear on the screen. Record this value in your data table.
8. Tap **OK** to return to the Main screen.
9. Obtain a second piece of colored paper. Repeat Steps 5-8. Continue with this method to collect and record readings for aluminum, black, white, and two other colors.

DATA

Color	Aluminum	Black	White	_____	_____
Reflection Value	_____	_____	_____	_____	_____

PROCESSING THE DATA

1. Calculate the percent reflectivity (albedo) of each color using the formula given in the introduction. Show your work and record the results in the table below.

Color	Aluminum	Black	White	_____	_____
Percent Reflectivity	<u>100%</u>	_____	_____	_____	_____

2. Which color, other than aluminum, has the highest reflectivity?
3. Which color has the lowest reflectivity?
4. What materials might give a planet a high reflectivity or albedo? Explain.
5. Does the planet Earth have high reflectivity? Why?

EXTENSION

1. Design an experiment to determine if there is a relationship between reflected light and heat absorbed by various colors or materials.

TEACHER INFORMATION**Reflectivity of Light**

1. The student pages with complete instructions for data collection using LabQuest App, Logger *Pro* (computers), EasyData or DataMate (calculators), and DataPro (Palm handhelds) can be found on the CD that accompanies this book. See *Appendix A* for more information.
2. Equal-size pieces of construction paper and aluminum foil can be used and saved for reuse.
3. The computer procedure directs students to record reflectivity values from the meter (without clicking on the Collect button). Another possibility is to have students use the Selected Events mode for each of the 5 trials. The Logger*Pro* file for this experiment is already set up for this option. Simply have your students click the Collect button and click the Keep button when the reflectivity reading is stable. This saves the reflectivity reading along with its trial number in the table.

SAMPLE RESULTS

Color	Aluminum	Black	White	Purple	Green
Reflection Value (Lux)	xxxx	xxxx	xxxx	xxxx	xxxx
Percent Reflectivity	xxxx	xxxx	xxxx	xxxx	xxxx

ANSWERS TO QUESTIONS

Answers have been removed from the online versions of Vernier curriculum material in order to prevent inappropriate student use. Graphs and data tables have also been obscured. Full answers and sample data are available in the print versions of these labs.