

Truth in Packaging Lab

When we purchase light bulbs at the store, we choose a wattage rating based on the amount of light we expect or need to get from the bulb when it is lighted. Recently, a spate of compact fluorescent light bulbs (CFL's) has hit the stores. CFL's claim to give the same amount of light as a standard incandescent bulb but with significantly less power and thus less expense. I have included a fourth investigation that uses a Watts Up Pro to study the actual wattage being supplied to the light bulbs.

Questions

1. How does the amount of light one gets from a given brand of standard incandescent bulbs vary with the wattage rating?
2. Is the amount of light one gets from standard incandescent bulbs the same for the same wattage, or does it vary with the brand? Are there other factors that influence the results?
3. How does the advertised amount of light from CFL's compare to the amount of light from standard incandescent bulbs?
4. How does the rated wattage of different lights compare with the actual wattage? How does the amount of light output compare with the actual wattage?

Materials

- Vernier data collection system*
- Light sensor
- Various light bulbs
- Distance measuring device
- Watts Up Pro



Procedure

1. Develop a method of measuring and recording the light intensity in a consistent manner as you change the light bulb you are testing. What variables must you control? How are you going to deal with the background light in the laboratory room? Make a data table.
2. Address the question(s) you have been given by your instructor. Following the procedures you developed, collect your data and enter it into the data table you also developed.
3. Analyze your data. Construct a graph if the data warrants it.
4. Share your results with other groups who may have examined different variables or even the same variables. Develop a class set of conclusions based on your experimentation.
5. Develop a combined statement stating about what consumers might want to know about light bulbs as studied by your class.

Extensions

A number of other lighting products are on the market in addition to standard incandescent bulbs and CFL's. Halogen bulbs of various types, LED's, reflectors including spotlights and floodlights, etc. are readily available on the market. Extend your investigation to include these other types of bulbs.

* Data Collection System = CPU (computer, graphing calculator, Palm device or LabQuest) + Interface (Go! Link, LabPro, CBL2 or LabQuest)

C. Bakken
Updated 11/09