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Monitoring How Much Electricity You Use

People are frustrated by their inability to control their energy use and the amount of money that this energy costs. Both technology and science teachers have units in their curriculum that explore energy basics, new alternative energy sources, converting energy to power, and the impacts of energy and power on our society. Both subjects use hands-on approaches to learning about these energy and power topics.

Black & Decker has a new power-monitoring product that could become a very interesting teaching aid in your classroom. You will have to decide if the location of the electric meter in your school and the practicality of performing real-time student experiments using the information provided by this meter is feasible. Black & Decker's manual indicates that the digital display and power meter sensor can be located up to 60' apart. This distance could be adversely affected by your building's construction, weak batteries in the units, or winter temperatures. In my own tests of the system, the units continued to communicate even when they were 80' apart.

As you know, the goal of the STEM initiative is to integrate science, technology, engineering, and mathematics into your classroom. This power monitor will allow you to integrate math when you let the students program the digital display, compute billing rates, determine the cost of using different classroom equipment for extended periods of time, convert watts into kilowatts, and compute tax rates. You will be able to establish many other math problems for students to compute as they perform their power consumption experiments.

The Black & Decker power monitor is not built as a classroom teaching aid. It is designed to help people conserve electricity by helping them



Photo 1 (above)—
The meter sensor



Photo 2 (at right)—
Digital display

constantly monitor their electricity usage. The system has two parts. The meter sensor (Photo 1) is simply attached to the electric meter. Every 30 seconds, this sensor wirelessly updates electricity usage to its battery operated (3" x 6-1/2") digital display, which is located at a more convenient location within the building (Photo 2).

The setup process for the system includes the programming of the digital display unit with the actual electricity billing rates for the building. Once installed, the unit can:

1. Determine electricity usage at various times of the day.
2. Determine the power consumption (energy efficiency) of individual electric appliances.
3. Show people why they should shut off lights, TVs, and so forth when they leave a room to save money.
4. Estimate monthly electric bills.

The instruction manual provides specific instructions for installing the Black & Decker meter sensor on electromechanical meters, electronic meters with the optical port on their face, and also electronic meters with the optical port on top. When you program the unit, you provide billing information that could reflect flat-rate electricity charges, tiered-rate charges, or even time-of-use rate charges. Your estimated electricity charges will be calculated based on the specific way you are charged for electricity. The Black & Decker catch phrase for this product is "know more, use less, save money."

A short Black & Decker video on the new power monitor should clarify the monitoring process, installation, and also whether or not it could become an interesting teaching aid within your classroom. You can find the video at: www.technologytoday.us/Black_and_Decker/Power_Monitor_Final_Lg_Prog_001

Recalling the Facts

1. Could feedback on electrical usage in your home help you to remember to shut off lights and other appliances when they are not in use? Why?
2. If your home electric meter can compute time-of-use rates, why would you want to use less electricity during high peak demand periods? ©

Alan Pierce, Ed.D., CSIT, is a technology education consultant. Visit www.technologytoday.us for past columns and teacher resources.