

Tips for Teachers on Using the GE Lighting Auditor

Overview and Background

The GE Lighting Auditor (GELA) is a useful online site to help anyone evaluate the energy consumption and cost of lighting. It will compute the annual cost of lighting your building, given information about the types and numbers of bulbs and lighting fixtures used in the building. It will also suggest how to save money by changing to more energy efficient bulbs.

This site is written specifically for middle school students to audit their schools' lighting system; but it can easily be used by anyone for any building. The Auditor consists of four steps, including filling out a downloadable worksheet. If you want to audit the entire school, the project may take several sessions. Alternatively, your students could simply audit your classroom, the halls, or one section of the building.

Besides completing the downloadable worksheet, the audit is accomplished entirely online. To prepare your students and to make large class instruction much more effective, consider projecting the Web pages onto a pull-down screen, printing out the pages, or making overheads.

Creating a Team Effort

You will probably want to enlist the help of your custodial staff to save you time and effort. They may supply you with light bulbs used throughout the school or at least information about them. They will also be able to help you get to hard-to-reach fixtures, if needed.

Also, you will probably want to alert your principal about the project. He or she will surely want to see the results of the GELA. Consider letting the rest of the staff know about it as well, since you may ask your students to get information about the fixtures in other classrooms.

Another key communication will be with parents. Send home a newsletter at the beginning of the project to explain it. Mention the learning goals of the Technology, Science, History, and Math Lessons as well as the actual Lighting Audit. Provide the link to the Lesson so that parents can learn along with their students and the link to the Audit so that parents can audit their own home or business. Encourage parents to have students help with the home audit after they do the classroom audit. You may also want to provide other suggested reading materials or Website links to supplement the project lessons (see Recommended Websites in the Teacher's Toolkit).

Planning Lessons

Completing the GELA will be much easier if students have first done the Technology of Light Lesson, because it is here that they learn about the different types of light bulbs and their uses. You might also have them do the Math of Light lesson to learn more about the illumination properties of different types of bulbs and how light intensity is measured. Of course, the Science and History lessons will further enrich students' understanding of the GELA, but they can be taught afterwards. An understanding of basic math, especially multiplication skills, will be handy for your students to have, as well as basic computer skills.

You will probably want to visit the site to download the worksheet before beginning the GELA with the class. Have many copies of the worksheet ready for the lesson. Know the number of rooms and hallways in the school and have your groupings and their assignments ready, being sure each area of the school is accounted for (some areas can be grouped, such as classrooms with identical lighting fixtures).

The worksheet will be the data collector, which your class will use for the project. List on it types of lighting fixtures, the light bulbs used, and each bulb's wattage. Diagrams on the page will help students determine information about your specific bulbs.

This is a good time to discuss the importance of recording data accurately. Discuss how the answers they give to questions about the frequency and duration of use of lighting fixtures will change the results of the audit. Give students problems to work, so that they can see the importance of the correct information. For example, you might say that it costs \$5,000 a week to light the school. Have students figure the difference between whether the lights are on all year (52 weeks) or just during the school year (40 weeks). Students will not find it difficult to see the difference \$60,000 would make!

Collecting Data

Organize groups of two to three students and assign one or more rooms in the school to each group. The team members will fill out a worksheet for their rooms and report their findings to be compiled on the GELA.

Alternatively, have the custodian supply you with all the types of light bulbs, including their packaging. Visit each room in the building in advance to determine with the students the types of fixtures in that room. Complete the worksheet together in large group instruction.

If you allow students to visit rooms themselves, make arrangements ahead of time to be sure that the room will be available to them. Also, remind students to get help if they cannot easily see the bulbs. Ask the custodian to be ready with his or her ladder in this event.

Before students complete the worksheet, be sure that they can easily distinguish incandescent bulbs from fluorescent and that they can find the wattage on the bulb and package. Remind students to count all lighting fixtures in each room and hallway – including exit signs. They should also know the names of basic lighting fixtures, such as ceiling fan light, track lighting, overhead lights, etc.

Entering data from the worksheets will take time and might be difficult as a whole class activity. Have students provide input in their groups, use students with free time, or, if you have a computer-overhead projector, input the data yourself during whole group instruction. You may want to appoint one student as the recorder to input the data from each team into the GELA.

Answering Questions

The importance of providing the name of your state in Step 1 may puzzle some students. Help students guess or determine that this enables the site to estimate the "cost per kilowatt hour (kwh)." Discuss kwh, as well as the reasons why the cost in different states may differ. Point out that the site has information about the average cost of power in each region of the country, which is used in making the final calculations.

Let students know that the Website will do the final calculations for them. Ask what else does the site can do more easily than they can.

You will need to provide certain information for the class as they complete Step 3. For example, the amount of time each light is used is essential for the audit. Give the students an estimate of how many hours a week each is on. Do the custodians leave certain lights on continuously? When are halls lights turned on in the morning? Are the gym lights left on late for club meetings? And how many weeks of the year are the lights actually used? What happens in the summer and during breaks?

Reviewing and Disseminating the Results

After receiving the evaluation, go over each point with students, explaining the layout as well as the terminology of the chart. Have students evaluate suggested changes according to what they know from the Technology of Light Lessons. You may want to have students meet with or write to the principal to discuss the results and any suggested changes. Challenge students to prepare a presentation of their findings for parent night or for a meeting of the School Board. Encourage them to encourage others to complete the GELA for their home, school, or office.