

WEEK OF RESOURCEFULNESS CLASSROOM ACTIVITY**TOPIC**

School Energy Use Mapping

KEY LEARNING OBJECTIVES

Students will be able to:

- **Identify** areas in their school where energy is being used
- **Create** an energy usage map for one area of the school
- **Propose** ways that energy use could be reduced or improved

OVERVIEW

In this activity, students will work together to create an energy audit of their school. They will then brainstorm ways that energy could be saved or used more efficiently in each area and overall by the school. Students will divide into small groups and will be assigned an area in the school building to survey. Each group will create a map of their area that identifies and classifies all of the ways that energy is being used in that room. After a 10–15-minute period of mapping, groups will then report back to the classroom. They will use their map to discuss ways that they think energy could be saved or used more efficiently in that area; these will be added as captions or diagrams to their map to create an efficiency or improvement plan for that area. When the activity is complete, student groups can display their maps for others to view and reflect on.

CONNECTION TO THE ENERGY-WATER NEXUS

- It is important to recognize and understand how humans use energy in daily life, including work, school, and home.
- Creating ways to reduce energy use and waste is crucial to cutting both monetary and environmental costs.

NATIONAL STANDARDS

Science

[Next Generation Science Standards](#)

[MS-ETS1-1 Engineering Design](#)

Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

[MS-ESS3-3 Earth and Human Activity](#)

Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

BACKGROUND INFO

It takes a lot of energy to run a school building for a day. What types of energy does your school use? Could you identify sources of energy in school? From the classroom, to the kitchen, to the gym, and even the bathrooms, schools use energy in many different ways. All this energy use can be costly, both for the environment and the school's budget. However, the building doesn't use the energy, the people do! Decisions that people make on how they use energy in a school building can make a big difference in the amount of energy used and the amount of energy wasted. Unplugging things, using energy-efficient lighting, and conserving water can all make a big difference in reducing both energy costs and monetary costs of running a school building.

KEY VOCABULARY

- Energy audit
- Energy efficiency

MATERIALS

- Graph paper
- Colored pencils or markers
- Pencil
- Clipboard
- Student devices with internet access

TEACHER PREPARATION

- Teacher may need have areas in the school pre-approved for an energy audit and mapping by students. For example, if students will be in the school's kitchen, mechanical room, or other areas that students would not normally have access to.

PROCEDURE

1. To begin this activity, the teacher should ask students to get into small groups and create a quick list of everywhere in the classroom where energy is being used. Give groups 3 minutes to compile their list.
2. Next, ask groups to go and stand by the place where they think that most energy is being used. When all groups have moved, ask students to observe where groups have chosen to stand and take a couple of minutes to allow groups share why their reasons why they chose that spot in the room.
3. Explain to students that they have just done an informal energy audit of the classroom. An energy audit is an accounting of energy use in a building, as a way to improve the efficiency of the energy that is used. But why should we care about how and how much energy is being used? Direct students to read through the information on the **Resourcefulness: An Introduction to the Water-Energy Nexus**

app at <http://stem.guide/carrying-capacity/>. Explain that energy consumption is a global issue, and as the human population continues to grow, the amount of energy we use will too. It is important to encourage efficient energy use not just for monetary reasons, but to help reduce global energy consumption as well. For the next step in this activity, they will extend their energy audit to other parts of the school building for a more complete picture of how their school is using energy.

4. Assign each small group an area in the school to audit; areas may include the gym, kitchen, office, bathrooms, auditorium, cafeteria, science laboratories, industrial technology shops, etc.
5. Give each group a piece of graph paper, a clipboard, and a pencil. Ask students to create a map of the area that they are auditing that gives the location and brief description of areas where and what type of energy is being used. They can use symbols or labels for things like lights, outlets, or other devices. Give students 15 minutes to complete their energy audits and maps.
6. When groups return to the classroom, they should take the remainder of the class period to examine their map and brainstorm ways and strategies that energy use could be reduced, or efficiency could be improved in their assigned area. They could use devices such as laptops or iPads to conduct research to determine types of energy-saving lights or light bulbs, for example, that could replace existing ones. They should use color to add these efficiency improvements and strategies as captions or graphics to their map.
7. Completed maps could then be pieced together into a greater map of school and displayed for students to view and reflect on the energy audit as a whole.

EXTENSION

As an extension of this activity, student groups could use their maps to create a class presentation to be given to school administrators (principals, business directors, head of maintenance) where they can present the results of their energy audit and give suggestions for how to cut down on energy costs and improve the efficiency of the school building.

SOURCES

<https://www.need.org/files/curriculum/guides/energysurveystudent.pdf>

<https://www.ck12.org/book/CK-12-Physical-Science-For-Middle-School/section/17.2/>

<https://aceee.org/topics/energy-audits>

<https://www.studentenergy.org/map>

Resourcefulness App: stem.guide