Imagination Station

Energy Revealed
Inquiry & Take Action Activity
Grade Level 4-12

Main Objective

Learners will research a chosen topic on how conserving energy will impact the school.

Learning Outcomes

By the end of this activity, learners will:

- Utilize GreenLearning's Spiral Inquiry Model to investigate energy use in their school.
- Collaborate amongst peers to develop their own focus question(s) and inquiry plan

Length of Activity: 7-10 hours

Step 1: Answer research question
Step 2: Hypothesize and create inquiry question
Step 3: Conduct research to answer inquiry question
Step 4: Make a conclusion statement
Step 5: Present research findings and act

Materials Required

- Energy Metering Technology
- Imagination Station Inquiry Worksheet

Activity

Step 1: Spark (A Learner Investigation)

- Begin by getting familiar with GreenLearning's Spiral Inquiry Model found here:

  https://programs.greenlearning.ca/course/spiral-inquiry-model

- Imagine having a gadget that would measure all the electricity in your house and put it into a series of graphs and charts. What could you do with that? What could your guardians do? What could you and your household do with the extra money saved?
- Now imagine one at your school...
  - What do you want to understandI about your school's energy use from the energy metering technology?

Brainstorm Activity

1. Working with a partner, have learners start off by imagining having a gadget in the home that measures the electricity in a series of graphs and charts. What would it measure? What would it show? When would energy be used the most? What kind of charts would you like to see?
2. Next, brainstorm where electricity is being used in your school. Think of the energy use in the different classes you attend, as well as the different areas of the school that use energy (E.g., the library, cafeteria, etc.)
3. Next, as a class, take a look at the energy metering software and talk about the areas being monitored. Discuss what energy is being used in those monitored areas. Brainstorm ideas for how you might like to use the energy metering technology to measure a certain aspect of energy use in your school. Think of what you would like to investigate with the energy metering technology. Different possibilities include:
   a. Current energy use of the school
   b. Energy use in a certain area of the school
   c. How energy use changes in the seasons
   d. What are the biggest uses of energy in our school?
   e. How energy use changes on weekends when the school isn't occupied.

Note: Depending on the energy metering technology available to you, you may not be monitoring all aspects of the school's energy use, so be sure to check what is available before your learners decide on a topic.

Discuss the ideas as a class

Step 2: Hypothesize and Plan 

Focus:
Working as a class or in small groups, have learners decide on the focus of their inquiry. Have the learners revisit the brainstorming activity and think about what they would like to investigate. Log into the energy metering technology software and experiment with the different types of graphs and analysis that it can produce. Some ideas include:

- Energy use on school days vs weekends
- Energy use of upper-level vs lower level of schools
- Energy use of the library, cafeteria, etc.
- Energy use of school hours vs non-school hours
- Energy use of a specific piece of equipment (E.g., a Smart Board)
- Energy use of hand dryers

Inquiry Question:
The learners are now ready to move on to create the group's inquiry question or questions. Have each group meet and discuss what they have taken away from the class brainstorming and discussions. What interests the group? What would be the most relevant to your school? What topics would help them understand their findings?

The inquiry question needs to investigate both how the learners are going to use the energy metering technology using "If _____, then _____." Language.

For example, "If our classroom turned off the lights for one hour when we are at the gym 3 times a week, then we could save 300 kw of energy a week"

Remember! While learners are conducting their inquiry, they may need to modify their question or hypothesis, and it should be something testable and workable within the time you have.

Plan:
Next, have each group plan each step of their inquiry.

Check In:
Have the learners fill out part 1 of the learner worksheet.

Step 3: Explore and Research 

Research:
Have each group **gather** and review information needed to answer their question or to test their hypotheses.

Record:
Record information and remember to remind them to keep track of their sources. If available, have learners create the appropriate reports in the energy metering technology software. Have each group **evaluate** the information they have collected:

- Does it answer their question or test their hypothesis? Does it raise more questions – of so, how can they be answered?

Reflect:
Have the learners reflect on and discuss their preliminary findings and observations to compare these to their previous knowledge. They may need to modify their focus.

Check In:
Have each group fill out the worksheet (check in #2) as a group.

Step 4: Analyze and Check 

Have each group **compare**, sort and **classify** their information. Describe characteristics and note patterns.

Conclude:
Have each group draw **conclusions** about their questions and hypotheses.

Check in:
Have the learners fill out the worksheet (Check in #3).

Step 5: Communicate 

Now the groups are ready to turn their knowledge into action.

Communicate:

- Have each group communicate their inquiry findings to the class and other. They should think about what message they want to get across and tailor that message to the audience. Groups may produce a YouTube video, PowerPoint presentation, research blog, web pages on school site, podcast, mem, rap (or other style poem or song), skit or play, poster or other artwork, infographics, etc.
    - The audience does not have to be just the class. Have the learner think of other people who can benefit from learning what was discovered:
        - Junior learners - maybe in feeder schools
        - School council (possibly with a small request for funding to help your action project)
        - Parents
        - Display in a local mall
        - Part of a school assembly for Earth Day or other occasions
        - Experts who helped your research
        - Share on social media

Act:

Throughout the research, learners have probably come across many calls to action. They likely also have many ideas for what you and your class could do to inform your school or community about your school's energy use.

There are many suggestions classes have for energy education including:

- Meeting with local politicians/ school boards about issues
- Speaking at public meetings
- Awareness Fair

Plan:

Developing a plan is a good way to start. GreenLearning and ACEE would love to see it!