Speak for the Trees

Energy Revealed
Grab & Go Activity
Grade Level 7-12

Main Objective

Learners will investigate energy use and relate it to the number of trees absorbing CO2.

Learning Outcomes

By the end of this activity, learners will:

- Understand how trees are natural carbon sinks
- Describe the amount of CO2 a typical tree can absorb
- Identify the amount of CO2 emissions caused by our daily energy usage

Length of Activity: 2 - 3.5 hours

Activity 1: Discussion about personal energy use.
Activity 2: Investigation on personal energy use.

Materials Required

- Plug in energy meter or circuit level energy metering technology
- Energy Calculator
- Comparing GHGs to Trees Background Information
- Laptop
- Pen

Background Information

Comparing GHGs to Trees

Comparing GHGs produced or saved to the number of trees needed to absorb that CO2 in a year will help learners to tangibly comprehend the GHGs caused by their electricity consumption.

According to New York State University, the average tree absorbs 48 pounds (approximately 21 kg) of CO2 per year. We can therefore calculate the number of trees it would take to balance those emissions with the following calculations:

D kg CO2 / 21 kg CO2 = # trees needed to balance CO2 emissions within one year.

Example:
Using GreenLearning Electrical Energy Calculator or through your energy metering software you were able to determine your school produced 13,714.2 kg CO2 in January 2019.

GreenLearning Electrical Energy Calculator

To calculate how many trees, they would need to balance this amount use the following calculation:
D kg CO2 / 32 kg CO2
D = 13,714.2 kg CO2e

13,714.2 kg CO2e/21 kg CO2 = 653 trees needed to balance your schools November 2018 CO2 emissions within one year.

Summary statement: 653 trees breathing for one year are needed to absorb the emissions produced in November 2018 by your school.

Activity 1: Personal Energy Use Discussion

- To bring awareness to the learners as to how many activities they do every day that require energy, ask the learners to reflect on their day yesterday. Have them write down all the different activities they did yesterday that used energy.
    - For example, in the morning I work up and used the toaster to make breakfast, used water for my shower (and gas for the hot water), and the hair dryer for my hair. Then, I took the bus to school, which uses diesel gas. When I got to school, I sat in a class with lights on, and used my laptop, etc.
- Have the learners tally how many different things they used that needed energy that day. Did anything surprise them about the number of activities they do that rely on energy?
- Tell the class you will be looking at the amount of energy used by one of the devices they identified on their list.
- Have each learner identify what portable device they would like to investigate.
    - ***Note:*** to keep it personal it would be great to have the appliance they specifically used brought in but if not, they can use a school's version.
        - For example, if a learner wants to investigate a microwave, and it is too hard to bring in their own, have them use the staff room microwave.

Activity 2: Device Investigation

- Have the learners identify which electrical outlet they will be using to calculate the energy used by their chosen appliance. This is especially important if you are using the circuit level metering technology as you will want to make sure it is being monitored.
- Turn the device on and record the watts produced while the device is in full/high mode.
- Have the learners think about how many minutes a day they use that device.
- Use the energy calculator for Alberta or Ontario to determine the amount of Kg of GHG produced in one year.
- Divide that number by 21 kg (the average tree absorbs about 21 kg of CO_2 in a year).
- Write a finishing statement based on the results. This could be something like "You would need (the total from #6 trees breathing for one year to absorb the amount of CO_2 produced by that device.

Extension Ideas

1. Have learners do some research on the different types of trees and how much CO2 they absorb. Which trees absorb more CO2 coniferous or deciduous trees? Does the age of the tree matter to their absorption?
2. Have the learners create a visual showing the results. Try to use recycled materials where possible!
3. Have the learners chart the results. For example, you could plot x # of trees breathing for one year by Y energy use.
4. 4Turn this into an action project for the school and consider participating in a local tree planting event on earth day. Or, research the benefits of native trees and plant a native tree garden at your school.