

Electronic Overload

Energy Revealed
Grab & Go Activity
Grade Level 9-12



Main Objective

Learners will investigate how much energy it takes to keep their daily technology working.

Learning Outcomes

By the end of this activity, learners will:

- Assess and understand the energy use of everyday electronic devices used in their household.

Length of Activity: 2 - 3 hours

Step 1+2: Discuss and assess electronic energy use.

Materials Required

- Installed energy metering technology or plug in every meter
- Variety of different electronics
- Copies of Electronic Overload Worksheet
- Paper and pen

Activity

Step 1: Electronics Discussion

1. As a class brainstorm all the electronic pieces learners' family/friends have.
(Smartphone, iPad, laptop, etc.)
2. Once completed, have the class estimate the frequency they charge each electronic, as well as the duration they charge it for (or in the case of laptops, if they leave it plugged in). Post the results of this activity on the wall.
3. Explain to them that they will be investigating the energy it takes to charge the various devices.
4. Decide as a class what and how many uncharged electronics they would like to investigate.
 - a. Which learners are going to bring the devices in?
 - b. Is the educator just going to bring in theirs?
 - c. Will you use the school's technology and test that? Laptop carts of individual laptops?
5. Have each learner estimate how much electricity each electronic device will use, and write down their predictions in the learner worksheet. Example:
 - a. Power Use Prediction for a laptop = 20 Watts
 - b. Power Use Prediction for a laptop cart = 200 Watts

Step 2: Technology Energy Use

1. Using the energy metering technology software, or your wattmeter, coordinate which electrical outlet(s) you will be using for this activity if you are using the energy metering technology.
2. As a class decide how you would like to assess the energy use specifically:
 - a. Does the class want to work in small groups and assess the different types of electronics (E.g., have one group look at the energy use of all the tablets, one group look at the laptops, one group look at the cell phones)?
 - b. Within each type of electronic being used, the group could also look at the energy use between different brands or the class could work independently and assess how much energy is being used per individual.
3. If available, an educator could bring in an older and new laptop (one that is ENERGY STAR® certified) and compare the electricity consumption of the old vs new
4. Plug in each electronic piece and record the amount of energy being used in the handout.
5. Have the learners go back to their predictions and see if they were accurate.
6. Based on the amount of energy used, and the identified number of hours it takes to charge each electronic, calculate the total energy used for each electronic piece by multiplying the two numbers.

7. Based on the total energy of each electronic piece, calculate the energy used for charging all the electronics in one week.
8. Based on the amount of energy used, and the number of hours it takes to charge each electronic, calculate the cost of charging each electronic using GreenLearning's Electrical Energy Calculator for Alberta and Ontario.

Extension Activities

1. Have the learners think about all the tech pieces in the home that their parents, siblings, etc. use and based on the above findings infer how much energy they use as a family in a day, week, etc.
2. Investigate whether it is more energy efficient to leave a laptop plugged in or leave it unplugged and then charge it.
3. Investigate ways to save power – and charge less- using options like 'low battery mode', 'airplane mode', etc. Also consider sustainable ways of charging electronic devices, such as solar powered chargers.
4. Calculate what the load would be if all the students in the school charged their phones at the same time.