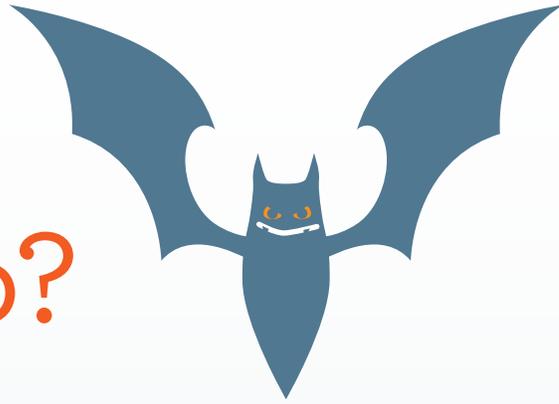


Watt's Up?

Vampire Load



Topic: Learn how to identify and calculate how much money and energy you spend on devices you aren't even using.

Suggested grades 5 - 8

Materials/Resources needed:

- DVD player or another classroom electric device that is always plugged in (even when not in use)
- Watt meter
- Student worksheet

Prep time: 5 minutes

Lesson time: 15 minutes

Outcome: Students will know how to recognize and calculate a vampire load and examine ways to promote energy conservation and efficiency.

Purpose: Electricity is often used without consideration of costs or efficiency. After learning how to identify vampire loads in the classroom, students can discuss ways to eliminate electricity waste and save money and energy.

Standards:

In appendix

Vocabulary:

In appendix

Prep



- Prepare student worksheets.

Engage



- Show a DVD player or other device that is drawing power while not in use.
- Remind students of previous activity (“Watt’s Up? - Measuring Energy”) and how they learned to calculate the cost of operating electric devices.
- Ask, “Is the DVD player using electricity right now?”
- Define vampire load.
- Have students point out other electric devices in the classroom drawing power when not in use, list them on the board. Label these “vampire loads”.

Teach



- Electricity is measured in units of power called watts. The amount of electricity we use in a period of time is measured in kilowatt-hours (kWh).
- Define: 1 kWh is 1,000 watts for one hour.
- Use classroom audit data either from the board, if still available, or the previous “Watt’s Up? – Measuring Energy” worksheet.
- Ask the students to identify which of these items have vampire loads.
- Circle the devices that have vampire loads.
- Discuss various ideas on how to eliminate the vampire loads.

Explore



- Show the SMUD Vampire Load Video available on YouTube. (Video available at smud.org/Education)
- Use the “Watt’s Up? - Vampire Load” worksheet to calculate the cost of the vampire loads.
- Review the DVD player example on the board as a class activity.

Activity



- Have group of students calculate various vampire loads identified on the list (suggestion: assign one device per group of students).
- Write the calculated cost when not in use by each item on the board.
- Students can repeat for any additional electric devices with vampire loads.
- Write the total for the classroom vampire load cost.
- Discuss strategies for eliminating or reducing the vampire load cost.
 - Changing behavior (unplug devices when not in use).
 - Using smart power strips.
 - Using controls like timers.

Assessment



Students should be able to correctly answer the following questions:

- What three pieces of information are needed to determine how much a vampire load costs?
- What are some suggestions for reducing the cost of vampire loads?

Crossover



- Have students research and present findings on energy efficient appliances with standby power and other technology used to reduce or eliminate vampire loads.
- Have students write stories or comic story boards explaining how to identify and calculate the cost using vampires as the villain.
- Encourage students to develop other story lines with superheroes who can reduce plug load costs.

Accommodations and Extensions



- Have the students use sticky notes to label the electric appliances with the vampire cost to operate.
- Complete the worksheet as a class activity.
- Use pictures to explain the steps to calculate vampire loads.

Reference



National Energy Education Development Project – Plug Load Audit workbook
need.org/files/curriculum/guides/PlugLoads.pdf

Additional Resources



Department of Energy
<https://energy.gov/science-innovation/science-education>

Appendix



Standards:

Common Core Mathematics – Mathematical Practices

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Next Generation Science Standards (NGSS 4-PS3-2 Energy)

- Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat and electric currents.

Additional References and Digital



<https://www.youtube.com/watch?v=RkgH6Ba8s9A>

For copies or more information contact:

SMUD Energy Education and Technology Center
916-732-6738
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smud.org/Education

Vocabulary

Electricity – A type of energy that can build up in one place or flow from one place to another. Electrical power is measured in watts, or kilo-watts (kW).

Electrical energy - Using electrical power to do work, over time. Electrical energy is measured in kilowatt-hours (kWh).

Energy audit – A survey and analysis of how a home or classroom uses energy.

Energy conservation – Using less energy with the same devices or equipment, typically by using them less or turning them off when not in use.

Energy efficiency – Using less energy by replacing old devices with newer equipment or technology.

Kilowatt-hour – Using one thousand watts (1 kW) of electrical power for one hour. Electric utilities bill their customers for every kWh used.

Plug load – The electrical energy used by things that are plugged into an outlet.

Vampire load – The electricity used by device when you are not even using it.

Watt meter – A tool for measuring how much electrical power (watts) anything plugged into an outlet is using.

