Classroom Energy Meter Activity

1. Find items that use electricity in your classroom.
2. Use your energy meter to measure the energy use in **watts** and use this sheet for tracking. Calculate the **power** used in kilowatt-hours (kWh). To do this, multiply the watts by 1 hour and then divide by 1000 watts per kilowatt.
3. Estimate how many hours you use the item during a month. For example, lights are on for an average of 5 hours per day.
4. Calculate **monthly power use**. To do this, by multiply power use (kWh) by the estimated hours this item is used per month.
5. Calculate the item's power cost per month. To do this, multiply power (kWh) by the standard Nova Scotia residential rate: $0.15/kWh.

Appliance/electronic item	**Energy use (W)**	**Power use (kWh)**	**Estimated hours per month item is on (30 days)**	**Monthly power use**	**Monthly cost (rate: $0.15/kWh)**
Example: MacBook Pro Charger	***85 W***	*85W x 1 h / 1000 W/kW =* ***0.085 kWh***	*5 h per day x 30 days* **= 150 h/month**	*0.085 kWh x 150 h =* **12.75 kWh/month**	*12.75 kWh x $0.15/kWh* **= $1.91/month**
1.					
2.					
3.					
4.					
5.					
6.					

CURRICULUM LINKS

Mathematics 4

-Numbers

N04 Students will be expected to apply and explain the properties of 0 and 1 for multiplication and the property of 1 for division. [C, CN, R]

N06 Students will be expected to demonstrate an understanding of multiplication (one-, two-, or three-digit by one-digit numerals) to solve problems by

- using personal strategies for multiplication, with and without concrete materials;
- using arrays to represent multiplication;
- connecting concrete representations to symbolic representations;
- estimating products;
- applying the distributive property [C, CN, ME, PS, R, V].

N07 Students will be expected to demonstrate an understanding of division (one-digit divisor and up to two-digit dividend) to solve problems by

- using personal strategies for dividing, with and without concrete materials;
- estimating quotients;
- relating division to multiplication [C, CN, ME, PS, R, V].

-Patterns and Relations

PR03 Students will be expected to represent, describe, and extend patterns and relationships, using charts and tables, to solve problems. [C, CN, PS, R, V]

Mathematics 5

-Numbers

N05 Students will be expected to demonstrate, with and without concrete materials, an understanding of multiplication (two-digit by two-digit) to solve problems. [C, CN, PS, V]

N06 Students will be expected to demonstrate, with and without concrete materials, an understanding of division (three-digit by one-digit), and interpret remainders to solve problems. [C, CN, PS]

Mathematics 6

-Numbers

N02 Students will be expected to solve problems involving whole numbers and decimal numbers. [ME, PS, T]

N08 Students will be expected to demonstrate an understanding of multiplication and division of decimals (one-digit whole number multipliers and one-digit natural number divisors). [C, CN, ME, PS, R, V]

Mathematics 7

B4 determine and use the most appropriate computational method in problem situations involving whole numbers and/or decimals [C, CN, ME, PS, R, V]

Mathematics 8

B12 add, subtract, multiply, and divide positive and negative decimal numbers with and without the calculator

Mathematics 10

M01 Students will be expected to solve problems that involve linear measurement, using SI and imperial units of measure, estimation strategies, and measurement strategies. [ME, PS, V]

Mathematics at Work 10

N01 Students will be expected to solve problems that involve unit pricing and currency exchange, using proportional reasoning. [CN, ME, PS, R]

Mathematics Essentials 10

A1 understand purchasing power

F4 make decisions regarding the purchase of costly items by identifying and ranking criteria for the comparison of possible choices

F5 make decisions regarding the payment options for purchases

F6 identify various incentives to make purchases

Mathematics at Work 11

A01 Students will be expected to solve problems that require the manipulation and application of formulas related to:

- finance charges.

A03 Students will be expected to solve problems by applying proportional reasoning and unit analysis.

Mathematics at Work 12

A01 Students will be expected to demonstrate an understanding of linear relations by

- recognizing patterns and trends;
- graphing;
- creating tables of values;
- writing equations;
- interpolating and extrapolating;
- solving problems [CN, PS, R, T, V].

Science 9
Electricity, Energy and the Environment
- relate electrical energy to domestic power consumption costs (308-18)
- make informed decisions and propose a course of action on science, technology, and social issues, including human and environmental needs for electricity and energy (113-9, 113-13)

Science 10
Module 2: Green Technology
2.2 examine the consequences of technology in domestic use and consumption of energy

CROSS-CURRICULAR LINKS

Mathematics 9
B14 select and use appropriate strategies in problem situations

Information and Communication Technology Integration 9
Social, Ethical, and Human Issues (SEHI)
SEHI 9.1 (relates to **6.1, 6.2, 6.3**) demonstrate understanding of the nature of technology and its impacts on different societies and environments; using technology, in local and global contexts, with due regard for the legal and human rights of others
Productivity (PTS)
- The efficient selection and use of ITC to perform tasks such as:
  - the exploration of ideas;
  - data collection;
  - data manipulation, including the discovery of patterns and relationships;
  - problem solving;
  - the representation of learning.

Research, Problem Solving, and Decision Making (RPSD)
RPSD 9.1 (relates to 6.2) select appropriate measuring and recording devices and/or software to collect data, discover patterns of change over time, solve problems and make logical decisions based on their investigations; with teacher assistance

Science 6
Physical Science: Electricity
- Learners will evaluate renewable and non-renewable sources of energy; Indicator: Analyse impact of electrical energy consumption (CZ, COM, PCD, CT, TF)

Science 9

Electricity, Energy, and the Environment
- relate electrical energy to domestic power consumption costs (308-18)
- determine quantitatively the efficiency of an electrical appliance that converts electrical energy to heat energy (308-19)
- make informed decisions and propose a course of action on science, technology, and social issues, including human and environmental needs for electricity and energy (113-9, 113-13)

Science 10
Sustainability of an Ecosystem
- predict and analyze the impact of external factors on the sustainability of an ecosystem, using a variety of formats (212-4, 214-3, 331-6)

Energy, Power, and Transportation Technology 11
Unit 6: Environmental Impact of Energy, Power, and Transportation
6.3 provide examples of methods used to save energy in the commercial and residential sectors of society, and identify the use of several energy-saving appliances