



# Energy: Power x Time = Energy

How can I reduce my electricity use, reduce greenhouse gas emissions, and save money?

Take photos of the actions you are taking to save energy or keep a list or journal of what you are doing to save electricity. Do the math. Share your actions with your teacher, family, and friends.

## I turn out lights when not needed

- Make use of natural light from windows.
- If it is a sunny day only turn on the lights that you need.
- Turn out lights when you leave the room.
- Place a poster by each switch to remind your family to turn out the lights.
- Use your journal to track how you reduced lighting use over 3 days.



## I unplug stuff that's not in use

- **Phantom or standby power** is the power a device uses even when it is turned off. It is using some power if it has ... a clock, a remote control, a visible light when not in use, it is programmable, it is instant on, or it is a SMART device.
- Use a power bar, to make it easier to turn devices on and off.
- By reducing phantom load by **50%** the average home saves:
  - power (**350 kWh/y**),
  - greenhouse gas emissions (**210 kgCO<sub>2e</sub>/y**), and
  - money on utility bills (**\$60/y**).
- Make a list of all the things in your home that use phantom power. Identify the ones you can unplug.



## I change an old light bulb for a new LED light bulb

Compare the 2 bulbs:

**Power** **x Time** = **Energy**  
**60 Watt** incandescent light bulb x 5h/d = **300 Wh/d**  
 300 Wh/d x 365 d/y = 109,500 Wh/y/1000 kWh = 109.5 kWh/y  
 109.5 kWh x 0.5 kgCO<sub>2e</sub> = **54.75 kgCO<sub>2e</sub>/y**

**9 Watt** LED light bulb x 5h/d = **45 Wh/d**  
 45 Wh/d x 365 d/y = 16,425 Wh/y/1000 kWh = 16.43 kWh/y  
 16.43 kWh x 0.5 kgCO<sub>2e</sub> = **8.2 kgCO<sub>2e</sub>/y**



W = watt      h = hours      d = day      y = year  
 kg = kilogram      CO<sub>2e</sub> = carbon dioxide equivalent

## Curriculum Connections

**Grade 4 Mathematics** **N4.1** Demonstrate an understanding of whole numbers to 10 000 (pictorially, physically, orally, in writing, and symbolically) by: representing, describing, comparing two numbers, ordering three or more numbers. **N4.2** Demonstrate an understanding of addition of whole numbers with answers to 10 000 and their corresponding subtractions (limited to 3 and 4-digit numerals) by: using personal strategies for adding and subtracting, estimating sums and differences, solving problems involving addition and subtraction. **N4.3** Demonstrate an understanding of multiplication of whole numbers (limited to numbers less than or equal to 10) by: applying mental mathematics strategies, explaining the results of multiplying by 0 and 1 **N4.7** Demonstrate an understanding of decimal numbers in tenths and hundredths (pictorially, orally, in writing, and symbolically) by: describing, representing, relating to fractions. **N4.8** Demonstrate an understanding of addition and subtraction of decimals limited to hundredths (concretely, pictorially, and symbolically) by: using compatible numbers, estimating sums and differences, using mental math strategies, solving problems. **P4.1** Demonstrate an understanding of patterns and relations by: identifying and describing patterns and relations in a chart, table or diagram, reproducing patterns and relations in a chart, table, or diagram using manipulatives, creating charts, tables, or diagrams to represent patterns and relations, solving problems involving patterns and relations

**Science** **LI4.1** Investigate the characteristics and physical properties of natural and artificial sources of light in the environment. **LI4.3** Assess personal, societal, and environmental impacts of light-related technological innovations including optical devices.

**Social Studies** **RW4.3** Assess the impact of Saskatchewan resources and technological innovations on the provincial, national, and global communities.

**Grade 5 Mathematics** **N5.1** Represent, compare, and describe whole numbers to 1 000 000 within the contexts of place value and the base ten system, and quantity. **N5.2** Analyze models of, develop strategies for, and carry out multiplication of whole numbers. **N5.6** Demonstrate understanding of decimals to thousandths by: describing and representing, relating to fractions, comparing and ordering. **N5.7** Demonstrate an understanding of addition and subtraction of decimals (limited to thousandths). **P5.1** Represent, analyse, and apply patterns using mathematical language and notation. **P5.2** Write, solve, and verify solutions of single-variable, one-step equations with whole number coefficients and whole number solutions. **SP5.1** Differentiate between first-hand and second-hand data.

**Social Studies** **RW5.1** Explain the importance of sustainable management of the environment to Canada's future.

**RW5.2** Hypothesize about economic changes that Canada may experience in the future.

**Grade 6 Mathematics** **N6.3** Demonstrate understanding of the order of operations on whole numbers (excluding exponents) with and without technology. **N6.4** Extend understanding of multiplication and division to decimals (1-digit whole number multipliers and 1-digit natural number divisors).

**Science** **EL6.1** Assess personal, societal, economic, and environmental impacts of electricity use in Saskatchewan and propose actions to reduce those impacts.

**Social Studies** **RW6.2** Contribute to initiating and guiding change in local and global communities regarding environmental, social, and economic sustainability.

**Grade 7 Mathematics** **N7.2** Expand and demonstrate understanding of the addition, subtraction, multiplication, and division of decimals to greater numbers of decimal places, and the order of operations. **P7.3** Demonstrate an understanding of one- and two-step linear equations of the form  $ax/b + c = d$  (where  $a$ ,  $b$ ,  $c$ , and  $d$  are whole numbers,  $c \leq d$  and  $b \neq 0$ ) by modeling the solution of the equations concretely, pictorially, physically, and symbolically and explaining the solution in terms of the preservation of equality. **P7.4** Demonstrate an understanding of linear equations of the form  $x + a = b$  (where  $a$  and  $b$  are integers) by modeling problems as a linear equation and solving the problems concretely, pictorially, and symbolically.

**Social Studies** **RW7.2** Investigate the influence of resources upon economic conditions of peoples in circumpolar and Pacific Rim countries. **RW7.3** Assess the ecological stewardship of economies of Canada and the circumpolar and Pacific Rim countries.

**Grade 8 Health Education** **USC8.6** Examine and assess the concept of sustainability from many perspectives, and develop an understanding of its implications for the well-being of self, others, and the environment. **AP8.10** Design, implement, and evaluate three seven-day action plans that establish multiple supports for responsible health action related to family roles and responsibilities, non-curable infections/diseases, violence and abuse, body image, sustainability, and sexual health.

**Mathematics** **N8.3** Demonstrate understanding of rates, ratios, and proportional reasoning concretely, pictorially, and symbolically.

**Social Studies** **RW8.3** Critique the approaches of Canada and Canadians to environmental stewardship and sustainability.