

# KETTLE EFFICIENCY ACTIVITY GUIDE



To understand why energy efficiency is so important we are going to complete a math problem.

In this example, we will reduce the energy consumed to boil a kettle by 30% to represent an energy efficient choice. We will apply this change based on the daily usage of the item.

Example: A full kettle uses 3 kilowatt hours to boil 1.75 liters of water, which takes about 6 minutes. We boil the kettle at least once a day, every day of the year. In Nova Scotia, the price of electricity is \$0.15/kWh.

1. Calculate the annual cost to use a full kettle:

$$3 \text{ kWh} \times 0.1\text{h/day (6 minutes)} \times 365 \text{ days/year} = 109.5\text{kWh/year}$$

$$109.5 \text{ kWh} \times \$0.15/\text{kWh} = \$16.35/\text{year to boil a full kettle}$$

2. Calculate the annual cost to use a kettle only 70% full. The energy efficient option would be to only boil the water that is needed. We don't need to boil a full kettle for just 2-3 cups of hot water. So, we can assume that if we don't use a full kettle, it will decrease the energy used. If we fill the kettle to 70% full, we only require 70% of the electricity.

$$3 \text{ kWh (energy to boil a full kettle)} \times 0.7 \text{ (a kettle that is 70% full)} = 2.1 \text{ kWh}$$

$$2.1 \text{ kWh} \times 0.1\text{h/day 6 minutes} \times 365 \text{ days/year} = 76.65 \text{ kWh/year}$$

$$76.65\text{kWh} \times \$0.15 = \$11.50/\text{year to boil a kettle that is 70% full}$$

3. Calculate the energy savings!

$$\$16.35 \text{ (full kettle)} - \$11.50 \text{ (70% full kettle)} = \$4.85 \text{ saved by filling the kettle with only water that is needed.}$$

If you use your kettle in an energy efficient way by boiling 30% less water over the course of a year, you will save about \$4.85 that year just on that one appliance!

4. What are other ways we can reduce the amount of electricity by adjusting our behaviour to reduce energy waste? (Discussion)
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## **CURRICULUM LINKS**

Grade 6 Mathematics N02: Students will be expected to solve problems involving whole numbers and decimal numbers

Grade 6 Science: Consumption and Conservation: Describe how our actions could lead to reducing electrical energy consumption in your environment (108-5, 108-8, 303-30, 106-3)

Grade 7 Mathematics SCO N02: Students will be expected to demonstrate an understanding of the addition, subtraction, multiplication, and division of decimals to solve problems (for more than one-digit divisors or more than two-digit multipliers, the use of technology is expected).

- B14 solve and pose problems that utilize addition, subtraction, multiplication, and division of integers
- D3 develop and use rate as a tool for solving indirect measurement problems in a variety of contexts

Grade 7 Science GCO 1: Students will develop an understanding of the nature of science and technology, of the relationships between science and technology, and of the social and environmental contexts of science and technology.

Grade 8 Mathematics N04: Students will be expected to demonstrate an understanding of ratio and rate.  
N07: Students will be expected to demonstrate an understanding of multiplication and division of integers, concretely, pictorially, and symbolically.