


Question, Investigate, Discover!

A CLOSER LOOK:

Using Energy Meters

SCIENCE 6 and **SCIENCE 9**

A CURRICULUM SUPPLEMENT

conserve
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Education

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When I was a child in the early ’70s,
my grandmother and I would go exploring together.
Her words of wisdom still hold true.

“Care for the world so that it’s still here for your grandchildren and their children. Take care so that their world is the same as the one that we are discovering when we explore.”

— Sandra Webster
October 2007

CONTENTS

INTRODUCTION

A Closer Look: Using Energy Meters: Science 6 and Science 9: A Curriculum Supplement incorporates using the technology of electronic energy meters in the electricity units of the Nova Scotia curriculum as described in the curriculum guides for Science 6 and Science 9.

This curriculum supplement was developed to engage students in hands-on, minds-on science for calculating the cost of electricity used by appliances.

Activities include a variety of formats and address outcomes for science and other subject areas. The outcomes can be found in the appendix, along with other resources.

The Department of Education is grateful to Conserve Nova Scotia for its contributions to this curriculum project and support of our hands-on, minds-on philosophy.

For more information, please contact

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THE ENERGY OPPORTUNITY

To the Teacher

Increasing interest in energy and the environment is evident in many areas of society. Citizens of all ages are becoming more aware of their energy use and beginning to examine their lifestyles with regard to energy conservation. Engaging youth in problem-solving and decision-making activities provides opportunity for new ways of thinking and exciting discoveries about energy.

Because this topic is multidisciplinary, students will develop and use a range of skills as they learn about energy management, including mathematics and literacy skills in meaningful contexts. Students examine and reflect on social aspects of their lives, debate personal choices, and develop more responsible attitudes towards energy conservation. Reading, listening, writing, researching, and calculating skills can be enhanced as students engage in hands-on learning about energy and the examination of their findings.

The activities provide opportunities for students to work as a whole class, in small groups, and individually. They are designed to help students accept responsibility for controlling their energy use.

Pre/Post Information Forms

Pre and post information about students' learning and attitudes is valuable to both the students and teachers. There are various ways to collect this information.

Sample forms include surveys, incomplete statements, and scales. A participation certificate is included in the appendix.

SURVEY

There are several ways to conduct a survey (e.g., using a secret ballot, using coloured paper to indicate choices, dropping ballots in different containers, having a show of hands). This is a quick way to determine where the class and individuals stand on issues. Survey data can be used to generate further class discusion.

Following are some sample surveys. You may wish to make your own.

Survey: Science 6
Home Questions and Results

Question	Yes	No	Pass	Undecided
1 Do you recycle paper or metal at home?				
2 Do you make gifts to give for presents?				
3 Do you leave lights, TV, and computers on when not using them?				

Survey: Science 9
Transportation Questions and Results

Question	Yes	No	Pass	Undecided
1 Do you ride on public transportation?				
2 Do you think gasoline supplies will run out?				
3 Do you own and ride a bike?				
4 Do you like to drive long distances on holidays?				

INCOMPLETE STATEMENTS

Provide students with statements or have them create some of their own. Have students discuss their statements in small groups.

Grade 6 Statements

1 Recycling is going to …

2 I save …

3 I could improve …

Grade 9 Statements

1 If I had my own car …

2 I want to invent …

3 I could save energy if …

Activity 1: Comparing Appliances (Science 6)

There are many electrical devices operating in and around your home each day. Some of them are large consumers of electricity while others do not consume very much. Through the following activity you will use the Electronic Energy Meter to compare the cost of running different electrical devices in your home.

PURPOSE

To compare the energy consumption and costs of running six different electrical devices in your home.

MATERIALS

- 1 EM 100 Energy Meter
- 6 household devices (e.g., lamps, computers, freezers, hair dryers, televisions, kettles, video game systems)
- data table

PROCEDURE

1. Predict which of the devices identified will cost the most to operate and the device that will cost the least to operate.
2. Plug the EM 100 into a wall outlet and plug the device you are monitoring into the unit.
3. Leave the device operating for a length of time. The amount of time required for each device will vary. Keep the device operating for a period of time so you can complete the data table. If you are using a device that is not plugged in for an extended period of time (i.e., full day or automatic shut-off, like a kettle), you should calculate the price by using the following formula:
   cost/day = (watts)(price/kWh)(hours on)
4. Unplug the EM 100 and fill in the data table showing the energy and cost of operation as shown in the example of the kettle.
5. Reset the EM 100 by pressing the price and down arrow together and holding them until the unit beeps.
6. Repeat steps 1–5 for each electrical device.

Appliances and Cost

Appliance/Device	Max Power (watts)	Time (h:min:s)	Energy (kWh)	Rate ($/kWh)	Cost ($)
kettle	1500	0.001389	0.05	0.11	0.01

ANALYSIS AND DISCUSSION

1. Determine the cost to run each of the devices for five minutes. You may calculate this manually using the formula in procedure 3 on page 7. As a class, determine the length of time that the device will be using electricity. Controlling this variable will allow for comparisons with each others data.
2. How do the results compare to your predictions at the start of the activity? Explain.
3. Estimate the time each device operates each month and determine the cost of running these six devices for a month.
4. Use your discoveries in this investigation to suggest ways in which you could cut back on energy use and costs in your home and at school.

Activity 2: Comparing Light Bulbs (Science 6)

The Government of Nova Scotia suggests that people switch from using traditional incandescent light bulbs to the more energy efficient compact fluorescent lights (CFL). These bulbs are designed to reduce the amount of energy we all consume and, therefore, the amount of pollution produced by power generating stations.

PURPOSE

To determine the amount of energy saved by switching to CFL bulbs.

MATERIALS

- 1 EM 100 Energy Meter
- 1 table lamp
- 1 60-watt incandescent light bulb
- 1 11–15-watt CFL bulb

⚠ Caution: The 60-watt bulb can get hot and may cause a burn if touched.

PROCEDURE

1. Plug the EM 100 into a wall outlet and plug in the lamp with the 60-watt bulb.
2. Operate the lamp for two hours and use the EM 100 to determine the energy usage and cost of operating the lamp.
3. Reset the EM 100 by pressing the price and down arrows together and holding them until the unit beeps.
4. Replace the 60-watt bulb (be careful, it will be hot) with the 11–15-watt bulb and monitor it for two hours and determine the energy use and cost of operating the lamp.

Comparing Bulbs

Type of Bulb	Energy (kWh)	Cost of Operation ($)
60-watt incandescent		
11–15-watt compact fluorescent		

ANALYSIS AND DISCUSSION

1. How much energy and money is saved by switching to a CFL bulb in this lamp?
2. Count the number of bulbs in your house or classroom. How much money and energy could be saved if all the incandescent bulbs were replaced by CFL bulbs (assume each light runs for five hours a day).

EXTENSION

1. Prepare a chart that displays the results of your experiment with that of your classmates.
2. How much money could your class save in one month if everyone switched to CFL bulbs?

Activity 3: Energy after Dark (Science 6 and Science 9)

Many people leave their computers, televisions, and other electrical devices plugged in all of the time. What many do not realize is that these devices continue to consume energy as they are plugged in but turned off. This is called phantom power. How much energy do you think is wasted after things go dark?

PURPOSE

To determine the amount of energy wasted by leaving electronic devices plugged in when not in use.

MATERIALS

- 1 EM 100 Energy Meter
- 1 television
- 1 computer monitor
- 1 other electrical device (e.g., DVD, VCR)

PROCEDURE

1. At night, after you have finished using the television for the day, plug the EM 100 into a wall socket and plug the television into it and go to bed. (Good night: ZZZZZZZZ)
2. (RIIIIIIIIIINNNNG: Wake Up) Before unplugging the EM 100 (to be sure your data is not lost in case your battery is low), record in the table the amount of energy and the cost of the energy consumed by the television after dark. Small amounts of time may not give a good reading, but extended time works well.
3. Reset the EM 100 by pressing the price and down arrows together and holding them until the unit beeps. At bedtime, plug in the EM 100 and the computer monitor. In the morning, record the nighttime consumption of the monitor.
4. Reset the EM 100 by pressing the price and down arrows together and holding them until the unit beeps. At bedtime, plug in the EM 100 and another electrical device. In the morning, record the nighttime energy consumption of the electrical device.

Energy after Dark

Electrical Device	Overnight Energy Consumption (kWh)	Overnight Energy Cost ($)
television		
computer monitor		

ANALYSIS AND DISCUSSION

1. Based on your analysis, how much energy and money could be saved by unplugging the television every night for one year?

2. Are there any reasons for not unplugging electrical devices when not in use? Explain your answers in complete sentences.

Activity 4: My Convenient Helpers (Science 6 and Science 9)

Energy is very valuable. Energy is the ability to do work. It can change form. Energy is a part of every life process.

PURPOSE

To determine what the source of electricity is for various electrical devices.

PROCEDURE

Fill in the chart with comments and examples of how the different energy sources have been, or could be, used.

My Convenient Helpers

Energy	Description and Examples
chemical	
electrical	
sun/solar	
wind	
water	
geothermal	
ocean tides	
oil	
natural gas	
coal	
nuclear	

What kind of energy do the following items use?

	Energy		Energy
wood stove		satellite	
gas flame on stove		sawmill	
solar house		railroad	
vegetables		home appliances	
power dam		oil furnace	
water wheels		wooden gears	
sailing ship		solar panels	
Roman baths		volcano	
cancer isotopes		wave	

Activity 5: Our Lifestyle (Science 6 and Science 9)

How much energy do you consume? Our lifestyle relates directly to energy use.

PURPOSE

What are some factors that directly contribute to energy consumption?

PROCEDURE: PART 1

Using the list below, identify and explain how each might be controlled.

Controlling Energy

Activity	Explanation
dripping hot water tap	
electronic devices	
big car	
climate	
culture	
21°C or warmer house	

If you look at the direct use of energy for your lifestyle, what would that include? Specific examples that might be included are cars, appliances, and heating. These are easily available for measuring and collecting data in order to use and discuss the energy consumed. Indirect use of energy by each of us might include manufactured goods as well as services that society offers. Some of these include hospitals, schools, garbage collection, post offices, and shopping malls. You may not use these goods and services all the time, but even when we are not using them, they are still operating and consuming energy.

PART 2: GRADE 6

Make lists, using the following headings, of places where energy is used.
Note: The class may be divided into groups to discuss these categories.

CATEGORIES

- My Home: Energy (e.g., lights, appliances, heating)
- My Home: The Building (e.g., maintenance, materials, personal items)
- My Food ("from the farm to the gate," preparing, processing, transportation; include pet food)

PART 2: GRADE 9

Make lists, using the following headings, of places where energy is used.
Note: The class may be divided into groups to look at these categories.

CATEGORIES

- Recreation (e.g., operating devices, such as TV and Wii, reading materials, crafts, movies, music, parks, sports)
- Transportation (e.g., family car used for family and work, public transit, bikes)
- Public Services (e.g., schools, hospitals, government, military)

Using websites, books, and other sources, find and/or calculate data to show how much energy is used in each category. Plot two bar graphs to compare more than one type of energy use.

There are several places that calculate information on energy consumption for various countries. Compare Canada's use of energy with the energy use of the country you have been assigned.

Activity 6: My Home Appliance Inventory (Science 6 and Science 9)

PURPOSE

To find out times various appliances are used.

PROCEDURE

Collect data for your chart.

Appliance: Day: Hourly Use: Comments:	Appliance: Day: Hourly Use: Comments:
Appliance: Day: Hourly Use: Comments:	Appliance: Day: Hourly Use: Comments:
Appliance: Day: Hourly Use: Comments:	Appliance: Day: Hourly Use: Comments:
A power failure occurs suddenly. You may not have power for two days. What would you do? What changes would you have to make?	

Activity 7: Use of Electricity in My School

Many schools have a wide range of electrical devices. These devices have a range of uses.

PURPOSE

To predict and measure electricity rates of various devices.

PROCEDURE

When looking at your school, determine the devices that use electricity and share your answers with the class. Look at which ones are running, or on all of the time, and those which are used during various times of the day.

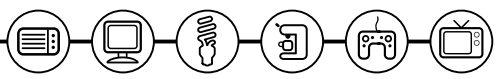
1. Make a list of the devices you will measure.
2. Predict how much energy each device uses (e.g., very little, average, a lot).
3. Measure the actual rate of energy use using an energy meter.
4. List the devices from least to most based on their energy consumption.

SAMPLE LIST

computer, clock, photocopier, printer, lights, refrigerator, VCR, DVD, vacuum, fish tank

Energy in My School

1. Device	2. Prediction	3. Actual Rate	4. Actual from Least to Most



Activity 8: Language Arts Connections

The following suggestions may be used to address some language arts outcomes. These may also give an awareness of the degree to which electricity is used and conserved.

PROCEDURE: GRADE 6

- Make a time line of the development of electrical devices.
- Compare and contrast your use of a certain appliance with someone twenty years older than you.
- Search in the media (e.g., newspapers) for articles connected to energy. Design a display for these collected articles. Have a section where people might leave their comments.
- Look at flyers/catalogues that advertise appliances for your house/kitchen. Chart the appliance, size, and the amount of energy it uses.
- In a chart, trace the process needed to produce a carton of milk. Add the energy used in each step.
- Develop and conduct a school energy survey. Make a list of different ways the energy is used.
- List renewable and non-renewable energy sources.
- Collect three sample power bills. The information you need is the chart that indicates past electric use. Tell the story of what is happening with the particular households.

PROCEDURE: GRADE 9

- Collect some energy related text/information items from various sources. Defend or dismiss the text/information item. Which are myths?
- In defending my use of _____ (a device that uses energy), I will elaborate on the reason why I think its use is essential ...
- List ten basic classroom objects. Working in pairs, research the materials, processes, and people needed to make and deliver one item to the classroom.
- Research Canada's energy consumption. Plot a pie chart of the energy consumption for transportation, homes, businesses, and industry.
- In Science 8, you learned about the circulatory system in your body. How is energy like this system?

Activity 9: How Much Do I Use? (Science 9)

PURPOSE

To determine the percentage of your daily energy usage in your home to the total energy consumption of a number of electrical devices.

MATERIALS

- 2 EM 100 Energy Meters
- 1 home electric meter
- 2 electrical devices

PROCEDURE

1. On Sunday at noon, read the electrical meter on the side of your house to determine the initial reading for your study. (See page 368 in *SciencePower 9* to refresh your memory on meter reading.)
2. Plug the energy meters into two wall outlets and plug two devices into them. Try to pick a device that you think consumes a lot of energy and a device that you think consumes little energy.
3. Leave the devices until noon the following Sunday.
4. Reread the electrical meter on the side of your house to determine the total energy (kWh) consumed throughout the week.
5. Read the energy meters and determine the total energy consumed by each of the devices throughout the week.
6. Determine the percentage of the total energy consumed by each device and the cost to operate each one for a week.

DISCUSSION

1. How could an investigation such as this one assist you and your family in exploring ways to conserve energy in your home?
2. What are Energy Star appliances and how might they reduce your family energy consumption on a day-to-day basis?
3. Do you have any Energy Star appliances in your home? What are they?

Activity 10: Measuring Energy (Science 9)

You will be measuring energy in kilowatt-hours. Power bills record energy use in kilowatt-hours. Power companies sell energy. If you think about a powerful car, powerful means that the car can speed up (gain energy) in a very short time and maintain power.

PURPOSE

What do the following terms mean: **energy, time, joules, watt, CSA?**

MATERIALS

- 1 EM 100 Energy Meter
- 1 microwave
- 1 kettle
- water

PROCEDURE

1. Rearrange the formula below to get energy.

$$\text{power} = \frac{\text{energy}}{\text{time}}$$

2. Substitute the units for power and time. Manipulate the units.
The words: (watt)(time) = joules
The units: (W)(s) = J

Research to find out who was Joule. Who was Watt?

Rather than use the J/s unit as a name for power, it was decided to name it after Scottish physicist, James Watt. He helped explain work and energy, so
1 J/s = 1 W
1 joule/second = 1 watt
Note: In practice, one thousand watts or one kilowatt is used.

3. How many seconds are in an hour? What is a kilowatt? What is a kilojoule? One kilowatt-hour on your "power" bill is really 3 600 000 joules of energy.
Explain, in words, how a kilowatt-hour is calculated.

Energy Use

The approximate cost of energy is 11¢/kWh. Research the purpose of CSA approval? Research this. In your science laboratory, determine the time it takes to bring 500 mL of water to a boil at full power in a microwave. Repeat this at 50 percent power. Record your data in a data table.

⚠ Caution: Be sure to add a stir stick to the container of water to protect against scalding.

Sample Data Table

Appliance	Power (watts)	Time (seconds)	Energy (kWh)	Cost (cents)
microwave	1500	120		
microwave	750	240		
kettle				

What is the ratio for the time at full power to half power? Show your calculations. Is the energy the same? Explain.

6. Boil 500 mL of water with an electric kettle to see how much energy this appliance uses. Record in your data table.

7. Predict which appliance in your home uses the most energy per month. How do you know? Is there a way to reduce this energy usage?

Activity 11: Comparing Energy Use of Bulbs (Science 9)

PART A

PURPOSE

Design an experiment to compare various light bulbs and compact fluorescent bulbs.

PROCEDURE

1. Write down the steps of the experiment.
2. Indicate the variables in the experiment. Include controlled variables, independent variables, and dependant variables.
3. Include a sample data table.
4. Formulate three questions that might be asked if the experiment were performed.

PART B

PURPOSE

To compare Canada and Sweden's per capita energy usage.

PROCEDURE

1. Canada and Sweden have about the same climate and the same style of living. Research the per capita energy of each and record in a data table.
2. Plot a graph of your data.
3. Discuss your results.

Activity 12: Electricity Data (Science 9)

PURPOSE

To collect and compare data about the leisure habits of Canadians.

PROCEDURE

1. There are over 600 muscles of the body that run on energy. The energy, which is distributed through the bloodstream, comes from food that is processed by the digestive system. Is this really energy? Is it renewable? Explain your answers.
2. Design a chart and list some leisure habits of Canadians. In another column, identify the type(s) of energy needed to do these activities.
3. Make a chart for this activity. It should include the following: hobbies of class members, skills needed, kind of energy needed, and energy needed to produce the materials. Fill in the chart with five examples.
4. Outdoor activities might include sports and games. What is the type(s) of energy involved here? Research some First Nations' games. Explain the game(s) and the type(s) of energy involved.
5. Keep a log book of the electricity that you use for one week.
6. Design your own electricity information. It might be in the form of a poster, flip book, shadow play, film, puzzle, game, or comic book. Display this for people to see the information. You may wish to include questions for them to ponder.

APPENDIX

Energy Engaged!

has the power

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Electrical Devices

SAMPLE LIST

- alarm clock
- blender
- bread-making machine
- broiler
- cellular phone
- clothes washer
- coffee maker
- computer
- dehumidifier
- dishwasher
- electric blanket
- electric frying pan
- electric lawn mower
- electric toothbrush
- freezer
- hair dryer
- hot plate
- humidifier
- iron
- kettle
- lights (various types)
- microwave
- MP3 player
- musical instruments
- refrigerator
- sewing machine
- slow cooker
- stereo
- television
- telephone answering machine
- toaster
- vacuum cleaner
- video game systems
- waffle maker

Measuring Electricity

The two most useful measurements on an energy meter are "watts" and "cost."

MEASURE THE WATTS

The "watt" measures energy use. Select "W" at the top of the display (using the top button), plug the meter into the wall, and plug your household appliance into the meter. You will see how many watts are being used at that specific time. For example,

Large Appliances
Is it really necessary to have that second fridge in the basement? Measure the energy use of your fridge, freezer, and so on.

Computers
Do you leave your computer, monitor, and printer on all day? Use this energy meter to tally your savings in watts by powering off these electronics when not in use.

Phantom Loads
Many appliances use electricity even when turned off. Examples include the TV, DVD, VCR, cable/satellite box, and stereo. Even when these are not turned on they may be using electricity (as seen on the energy meter). Solution—plug these into a power bar that can easily be switched off when you're not using the appliances.

Note: Some cable/satellite boxes must reboot once unplugged. Therefore, plug your cable/satellite box into the wall instead of the power bar.

Your electricity is sold by the kilowatt-hour (kWh).

- 1000 watts = 1 kilowatt
- One 100-W light bulb = 0.1 kW
- Using this bulb for 10 hours per day = 1 kWh (100W × 10 hours / 1000).
- At $0.115 per kWh, this one bulb will cost you $0.80 per week (0.1 kW × 10 h × $0.115/kWh × 365 days) ... over $40 a year just for one light bulb!
- A compact fluorescent bulb uses 75% less energy—so even if you pay a bit more for the more efficient bulb up front, you save a lot in the long run.

HOW MUCH DOES IT COST?

This meter can calculate how much you pay to use your appliances:

- Set the cost per kWh if not done so already.
- Reset the time and total energy used (hold down arrow and price for three seconds).
- Plug the meter into the wall, plug an appliance into the meter, and leave it for an hour.
- Review the hourly cost on the meter.
- Use this cost to determine daily, weekly, and monthly costs for that appliance.
- If it's on all year, multiply the hourly cost by 8766 hours to figure out the yearly cost.

For more information please visit www.conservens.ca or call EnerInfo at 1-800-670-4636.

Measurement Data

LINEAR MEASURES

1 kilometre = .62 miles
1 metre = 39.37 inches
1 metre = 3.28 feet
1 metre = 1.09 yards
1 centimetre = 0.39 inch

1 mile = 1.61 kilometres
1 year = 0.914 metre
1 foot = 0.305 metre
1 inch = 2.54 centimetres

AREA MEASURES

1 square kilometre = 0.386 square mile = 247.1 acres
1 hectare = 2.47 acres = 107 640 square feet
1 square metre = 1.20 square yards

1 square mile = 2.59 square kilometres
1 acre = 0.405 hectare
1 square yard = 0.84 square metre

Outcomes

SCIENCE 6: ELECTRICITY UNIT

- demonstrate how electricity in circuits can produce light, heat, sound motion, and magnetic effects (303-26)
- describe how electricity has led to inventions and discuss electrical safety features at work and at play (107-9, 106-4, 108-2, 303-31)
- make predictions and investigate static electricity; and draw conclusions based on evidence (104-5, 204-3, 204-7, 205-9, 206-5)
- compare a variety of electrical pathways by constructing simple circuits, series circuits, and parallel circuits and illustrate them with appropriate symbols (303-23, 303-25, 207-2)
- perform activities that compare the conductivity of different solids and liquids (205-3, 300-20)
- describe the role of switches in electrical circuits, and identify materials that can be used to make a switch (303-24, 204-8)
- investigate and describe the relationship between electricity and magnetism using electromagnets and electric generators (204-1, 303-27, 303-22)
- explain various methods by which electricity is generated including renewable and non-renewable (105-3, 303-28, 303-29)
- describe how our actions could lead to reducing electrical energy consumption in your environment (108-5, 108-8,303-30, 106-3)

SCIENCE 9: ELECTRICITY UNIT

- relate electrical energy to domestic power consumption costs (308-18)
- explain that precise language is required to properly interpret EnerGuide labels and to understand a utility bill (109-14)
- compare examples of past and present technologies that used current electricity to meet similar needs (110-9)
- determine quantitatively the efficiency of an electrical appliance that converts electrical energy to heat energy (308-19)
- propose a course of action that reduces the consumption of electrical energy (113-9, 113-13)

ENGLISH LANGUAGE ARTS 6

- use a range of strategies in writing and other ways of representing to frame questions and design investigations to answer their questions
- address the demands of an increasing variety of purposes and audiences
- make informed choices of form, style, and content for specific audiences and purposes
- use technology with increasing proficiency to create, revise, edit, and publish texts
- select, organise, and combine relevant, information from three to five resources

ENGLISH LANGUAGE ARTS 9

- use a range of strategies in writing and other forms of representing to reflect on problems and responses to problems
- demonstrate an awareness of the effect of context on writing and other ways of representing
- make appropriate choices of form, style, and content for specific audiences and purposes
- integrate information from several sources to construct and communicate meaning

MATHEMATICS 6

F1 choose and evaluate appropriate samples for data collection
F2 identify various types of data sources
F7 make inferences from data displays
F9 explore relevant issues for which data collection assists in reaching conclusions
G1 conduct simple simulations to determine probabilities
G2 evaluate the reliability of sampling results
G3 analyse simple probabilistic claims
G4 determine theoretical probabilities
G5 identify events that could be associated with a particular theoretical probability
B6 demonstrate an understanding of the function nature of input-output situations
B7 solve and create relevant addition, subtraction, multiplication, and division problems involving whole numbers

MATHEMATICS 9

- A5 compare and order real numbers
- A6 represent problem situations using matrices
- B14 select and use appropriate strategies in problem situations
- C1 represent patterns and relationships in a variety of formats and use these representations to predict and justify unknown values
- C3 construct and analyse tables and graphs to describe how changes in a quantity affect a related quantity
- C5 explain the connections among different representations of patterns and relationships
- F4 select, defend, and use the most appropriate method of displaying data
- F5 draw inferences and make predictions based on data analysis and data displays
- F6 demonstrate an understanding of the role of data management in society
- F7 evaluate arguments and interpretations that are based on data analysis

Sample Professional Learning Workshop: Energy in My Life

Below is a sample professional learning workshop for Energy in My Life. Various adaptations have been used for learning groups, schools, and school boards.

8:30	Opening Activity
9:00	Participation Sessions: Various Tried and Tested Activities
10:15	Nutrition Break
10:30	Resources
11:00	Cross-Curricular Connections
11:30	Energy Games
12:00	Litter Free Lunch / Physical Activity Break
1:00	Workshops
1:30	Speaker
2:00	Reports
2:45	Charging Ahead!

Resources

Advertisements	Cameras
Videos	People
Books/magazines	Field Trips
Maps	Organizations

Glossary

biomass — total mass of living organisms in a given area

circuit — path that electric current flows through

compact fluorescent bulb — light bulb

conservation — the wise use and protection of natural resources

consumption — use of resource

CSA — Canadian Standards Association

electrical devices — machine run by electricity

electricity — interaction of electrical charges

energy — ability to do work

energy meter — device to measure energy consumption

environment — surrounding conditions in which an organism lives

fossil fuels — coal, oil, and natural gas formed from ancient plants and animals

geothermal — thermal energy inside earth

grounded — area that stops current flowing

incandescent light bulb — light glowing with heat

inventory — list of equipment

joule — unit of work and energy

kilowatt — 1000 watts

non-renewable — not renewable

nuclear — powered by atomic energy

phantom loads — energy used when devices are plugged in, but turned off

power bill — cost of power

power — force

renewable — can be used again

sun — star that provided light, heat and life to earth

tidal — daily rise and fall of the oceans, gravitational pull of moon

watt — unit of power, equal to 1 joule

wind — movement of air/differences of air pressure