



Energy Campaign Lights Half Off

Lighting our schools uses a lot of electricity. In Saskatchewan about $\frac{3}{4}$ of our electricity is made by burning fossil fuels, generating CO₂ emissions that cause climate change.



The **Lights Half Off** campaign allows you to use less electricity and still have the light you need in your classroom. The idea is to make use of natural light like windows and skylights as much as possible. If it is a very sunny day, maybe you don't need to turn on any lights in the classroom. If you have skylights or clerestory windows in the hallways or front entrance of the school, maybe some or all of the hallway lights can be kept off.

Concepts:

- Gathering and charting data
- Calculating electricity use in lighting
- Calculating CO₂ emissions
- Reducing greenhouse gas emissions

Timeline: The campaign should be done over a period of about a month. That will allow students time to audit, educate, and monitor changes in lighting use behaviour.

Procedure:

1. Collect information on how lights are used in the school. Using this information, decide whether the lights half off campaign would be useful to reduce electricity use in your school.
2. Do the *Lights Half Off Case Study* attached below.
3. Educate classes about how they can choose to reduce lighting use in the school.
4. Monitor changes in lighting use over a few weeks.
5. Estimate greenhouse gas emissions saved by reducing lighting use.



Pre Campaign Audit:

1. Check each room in your school to find out when lights are on or off. With this information you can decide whether a campaign to turn out unneeded lighting would be valuable for your school.

Use this chart or create your own to represent the rooms and lights in your school.

Audit: Lights Half Off

Date:

Students:

Location	Is there natural light?	Time of Day (record # of switches on /total # of switches) E.g. 2 switches on, out of 4 switches = 2/4						
		Room number	E.g. windows, skylights, none	Before class	During am class	recess	lunch	During pm class
Total number of lights on								
Total % of lights on								

2. Is natural lighting (from windows and skylights) used to reduce the number of electrical lights used? List areas and times where natural lighting is used.



3. Is task lighting (e.g. desk lamps) used to reduce the number of larger overhead lights used?
 - List areas where task lighting is used instead of overhead lighting.
 - Does task lighting use energy efficient lamps like Compact Fluorescent Lights (CFL) or Light Emitting Diode's (LED)? **Note:** To check this, with the lamp off, look at the top of the bulb, where you will find the Watts printed on the bulb. An efficient LED bulb that uses 12W provides the same amount of light (lumens) as an inefficient incandescent bulb that uses 60W.

4. If the results of your audit show that lights are often turned on and left on, even when not needed, use the ideas below and the case study attached for information on how to carry out the **Lights Half Off** campaign.

Education and Monitoring:

Using some of the ideas from the case study, or from the *Ideas for Campaign* below, prepare a short presentation for each classroom. Explain why you are doing the campaign, what you want them to do, and how you will be checking for success. During the first week of your campaign, check on classrooms at different times of the day, to see if staff and students are making use of natural lighting. Use the same chart you used for your pre-campaign audit, and compare to see if your campaign is working.

Post Campaign Audit:

Ask some staff and students the following questions:

1. Were you aware of the **Lights Half Off** campaign?
2. What helped you to remember to turn on only the lights that were needed? E.g. stickers on lights, announcements, posters, etc.
3. If you were not turning off unneeded lights, what would help you make this change?
4. Using the audit chart, check the classrooms one more time to see if staff and students are remembering to use only the lighting that is needed.



Estimating Greenhouse Gas Reductions

Use the results of your pre and post audits to estimate the amount of time lights are on in your school, and how that contributes to greenhouse gas emissions.

- Ask your caretaker what sorts of lights are in your school. For T8 use 30W per tube. For T12 use 40W/tube. Look carefully at how many tubes are in each fixture.
- Energy = Power x Time
- Pre and post audit information charts: estimate the number of hours that lights are on in the school, or in the classrooms that you checked. One way to do this would be to use the percentage of lights on x the number of hours in the school day.
- # tubes x W/tube x hours/day x days/school year x kW/1000W = Energy (kWh). (see also [Lights Out – Detailed School Energy Audit](#))
- Energy (kWh) x 0.5 kgCO₂/kWh = Greenhouse gas emissions (kgCO₂)

Lights Half Off

Ideas for Campaign

- Prepare a set of small, bright stickers for each room in the school (even the gym, office and staff rooms). Small, coloured, circle stickers available at office stores work well.
- Place **Green** stickers on switches for lights that use the least amount of power. (The case study explains how to figure that out) If lighting is needed, students will turn on that switch first.
- Place **Red** stickers on the switches for the lights that use the most amount of power. Students could then decide to only use that switch in situations where more light was needed.
- Visit each class to explain how the stickers help to remind staff and students to use natural lighting. **Turn on one switch at a time (first green, then red) until there is enough light in the room.**
- During the campaign, use happy face sticky notes or posters on classroom doors, or other prompts to reward classrooms using natural lighting.
- Each time you monitor how many lights are being kept off, use the audit chart to record the information and let everyone know how turning out lights behaviour is reducing electricity use.
- After a month, follow-up to see how many staff and students are still practicing the **lights half off** method.
- Estimate the amount of CO₂ your school is saving by reducing lighting use.

Curriculum Connections



Grade 4 Physical Science: Outcome LI4.1 Investigate the characteristics and physical properties of natural and artificial sources of light in the environment.

LI4.2 Analyze how light interacts with different objects and materials to create phenomena such as shadows, reflection, refraction, and dispersion.

LI4.3 Assess personal, societal, and environmental impacts of light-related technological innovations including optical devices.

Social Studies: Outcome RW4.1 Analyze the strategies Saskatchewan people have developed to meet the challenges presented by the natural environment.

Grade 5 Social Studies: Outcome RW5.1 Explain the importance of sustainable management of the environment to Canada's future.

Grade 6 Physical Science: Outcome EL6.1 Assess personal, societal, economic and environmental impacts of electricity use in Saskatchewan and propose actions to reduce those impacts.

EL6.2 Investigate the characteristics and application of static electric charges, conductors, an insulators, switches and electromagnetism.

EL6.3 Explain and model the properties of simple series and parallel circuits.

Grade 7 Social Studies: Outcome RW7.3 Assess the ecological stewardship of economies of Canada and the circumpolar and Pacific Rim Countries.

Grade 8 Health Education: Outcome 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.

Grade 9 Physical Science: Outcome CE9.4 Critique impacts of past, current, and possible future methods of small and large scale electrical energy production and distribution in Saskatchewan.

Additional Resource

Case Study – Lights Half Off (Increasing the use of natural light)

This case study takes students through a lights half off campaign, includes education resources used to promote turning out unnecessary lights, and the results of student inquiry into the use of lighting in the school. This case study could be used as pre-teaching for students before they begin their own lights half off campaign.

Materials: Set of small coloured circle stickers

Directions:

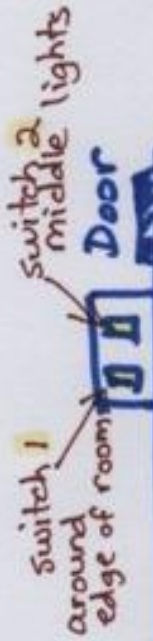
1. Read the case study.
2. Look at the materials including the classroom diagram, and pre audit information.
3. Discuss the questions.

While learning about electricity in their grade six, science class, students in Saskatoon decided to figure out how electricity was being used for lighting in their classroom and in other rooms in the school. They made a diagram of the lighting in their classroom, including the number of lights that were controlled by each light switch. The caretaker told them that each light bulb (T8 fluorescent tubes) used 30Watts of power.



Our Class - Lights

— Each bulb uses 30 watts of power (called T8's)



How many lights on switch 2? —

How much power do they use? — x 30w = —

How many lights on switch 1? —

How much power do they use? — x 30w = —

Our questions? — If we want to save electricity, which lights should we use?

— When could we work without switch 1? without switch 2?

— Is natural light from windows enough? some days? not all?

— How can we use this information to get other classes to use less electricity?

Next, they sent small groups of students to each classroom in the school to see



how lights were used during one school day, and made a chart of what they found out.

Location	Is there natural light?	Time of Day (record # of switches on /total # of switches) E.g. 2 switches on, out of 4 switches = 2/4					
		Before class	During am class	recess	lunch	During pm class	After school
Room 12	windows	0/2	2/2	1/2	1/2	2/2	0/2
Room 15	windows	2/2	2/2	0/2	2/2	2/2 no one in room	0/2
Room 9	windows	1/2	2/2	1/2	1/2	1/2	1/2
Library	skylights	5/5	5/5	5/5 no one in room	5/5	5/5	2/5
Room 21	windows	0/2	2/2	2/2	2/2	2/2	0/2
Staff Room	no	2/2	2/2 no one in room	2/2	2/2	2/2 no one in room	2/2
Gym	no	0/4	4/4	2/4	2/4	4/4	2/4
Total number of lights on		10/19	19/19	13/19	15/19	18/19	7/19
Total % of lights on		=53%	=100%	=68%	=79%	=95%	=37%



With the information they gathered, they decided to try a different kind of **lights out** campaign. The idea was to get people to only use as much lighting as the room needed. For example, if it was a bright sunny day, a class might decide to leave the lights off, or only have one switch turned on.

This is how the campaign worked:

- Students organized a set of small, bright stickers for each room in the school (even the gym, office and staff rooms).
- **Green** stickers were placed on switches for lights that used the least amount of power. The idea was that if lighting was needed, students would turn on that switch first.
- **Red** stickers were placed on the switch for the set of lights that used the most amount of power. Students could then decide to only use that switch in situations where more light was needed.
- Students visited each class or room to explain the campaign. All students and staff were asked to turn on **one switch at a time** (first greens, then red), and to only turn on as many lights as were needed.
- During the first week of the campaign, the grade six students would randomly check on classrooms. Not disturbing the classes, they would put a sticky note with a smiley face in a light bulb (see their example) on the doors of those who were seen to be participating.
- During announcements at the beginning of the next week, everyone was told how well the classes did, and how many sets of lights had been kept off during the first week.
- Each week after that for a month, students did random checks of how many classrooms were saving energy by keeping unnecessary lights off.
- Two months later, after the campaign was over, they did a follow-up check and found that many staff and students were still practicing the **lights half off** method. They made sure everyone in the school community knew how well they were working together to save energy!



Discussion:

Have a look at the diagram the students drew of their classroom lights. How much power does each of the two light switches use?

How could students in that class use the information about light switches to help them save electricity?

What information would students need to record when checking the other rooms in the school?

Make a list of information that would be helpful.

What information would the students have needed to share with other classes and staff to introduce the project?

Make a list of things people would need to know.

Go over to your own classroom light switches and see if you can figure out how much electricity each light switch uses.

Method:

- Turn all the lights off
- Turn on 1 switch and count the number of lights that come on.
- Check to see if there are 1 or 2 bulbs in each light fixture (If you can't tell, the caretaker will be able to tell you)
- Most bulbs will use 30Watts of power. (The caretaker will be able to tell you for sure)
- Multiply the number of lights x the number of bulbs in each light x 30W. That is the amount of power that switch uses. E.g. $4 \times 2 \times 30 = 240W$
- Turn on the other switches to find out how much power they use.

How could you use the information about your light switches to help you reduce electricity use?

Do you think stickers would work in your school on lights or on doors, or would you need to come up with something else? What other kinds of signs could you use to promote the campaign?

Present some of your discussion to the whole group.
(Adapted from DCBC)