

# Energy Audits

Using Energy Audits to  
Encourage and Support  
Inquiry and Action



# Contact

[www.environmentalsociety.ca](http://www.environmentalsociety.ca)

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# Saskatchewan Environmental Society (SES)

## Our Mission:

To support and encourage a global community in which all needs are met in sustainable ways.



# What is an Audit?

- **Test** or **assessment** – provides necessary information to guide inquiry and action

**What is the energy ( or water, or waste) issue at our school?**


- Pre-Audit – provides baseline data
- Post-Audit – measures success
- Math – use the statistics and probability information you are teaching






# Energy Audits

## Lighting and Lights Out



Student Action  
for a  
Sustainable Future



**About the Rooms:**

Room name or number	Power: Watts per Light <sup>1</sup>	How many lights on each switch			Power: Watts per switch (Watts per light x lights per switch)		
		Switch #1	Switch #2	Switch #3	Switch #1	Switch #2	Switch #3
	30				0	0	0
	30				0	0	0
	30						
	30						

Energy: Total Watts x Minutes	Wmin	Wmin
÷60 (to convert minutes to hours)	Wh	Wh
÷1000 (to convert Watts to KiloWatts)	kWh	kWh
<b>= kiloWatt Hours (kWh)</b>		
x 0.655 Kg CO <sub>2</sub> per kWh		
<b>= greenhouse gas emissions</b>	Kg CO <sub>2</sub> per day	Kg CO <sub>2</sub> per day

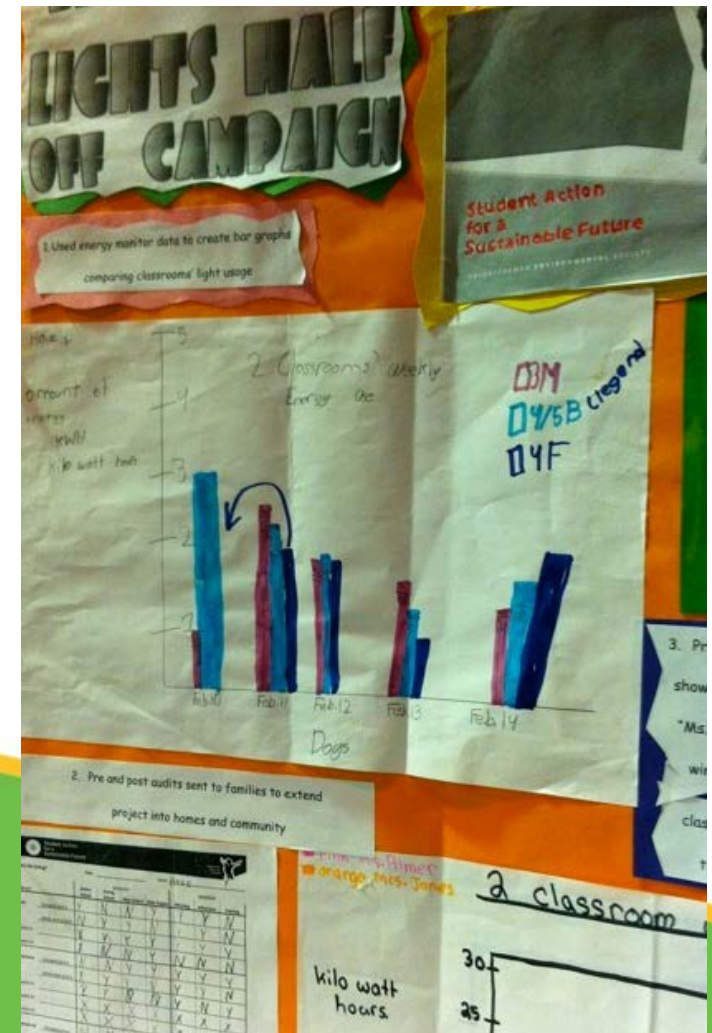


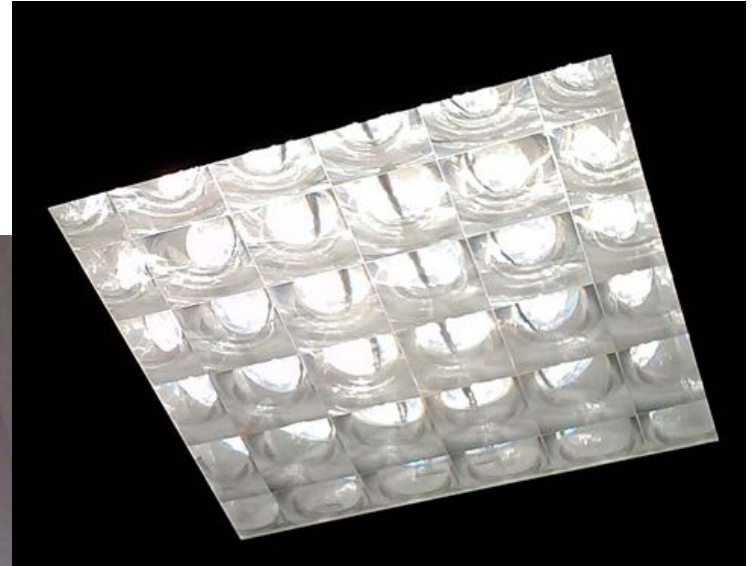
# What does this tell us?

And...what can we do about it?

Action Campaigns:

- Lights out
- Use natural light
- Task lighting?
- Action at home...





SASKATCHEWAN ENVIRONMENTAL SOCIETY



A Better Planet Begins in the ***Classroom***



# Energy Audits

## Heating and Drafts

To estimate your greenhouse gas emission savings:

### Method #1

Action	Potential Savings*	% Savings at my house*
Turn down the heat overnight	<b>2%</b> savings for each degree it's turned down	$2\%/^{\circ}\text{C} \times \underline{\hspace{1cm}}^{\circ}\text{C}$ = $\underline{\hspace{1cm}}\%$
Turn down the heat during the day	<b>2%</b> savings for each degree it's turned down	$2\%/^{\circ}\text{C} \times \underline{\hspace{1cm}}^{\circ}\text{C}$ = $\underline{\hspace{1cm}}\%$
Caulk and weather strip	If your house felt windy before and isn't now: <b>20%</b> If you found and fixed a few things: <b>5%</b>	
Install a high efficiency furnace	If you do some of these things, and upgrade to a high efficiency furnace, add <b>30%</b> . If you do none of these and upgrade to a high efficiency furnace, add <b>35%</b> .	
<b>Total</b>		<b>%</b>

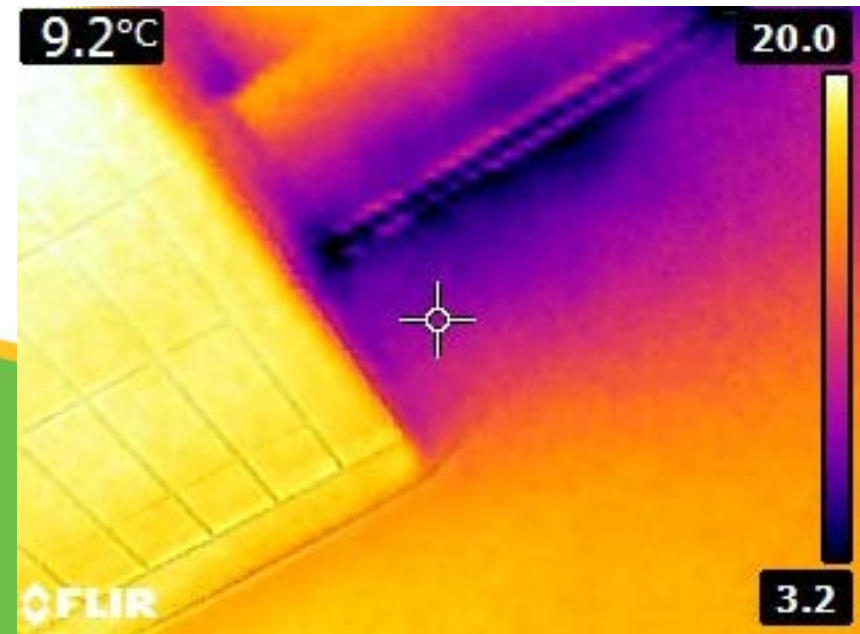
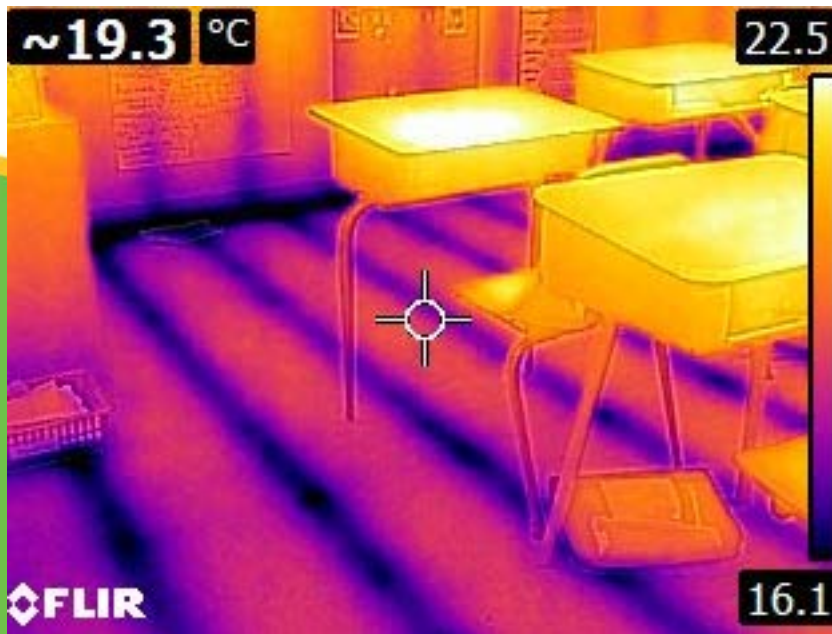
\*These are very rough estimates. Savings from heating are tricky, because each saving affects the others. That is why doing more than one action reduces the savings per action





# What does this tell us?

- Draft proofing: weather stripping, door snakes
- Window plastic



# Water Audits

- Leaking toilets and taps at school
- Water bottle use
- Home water audit



3. Does your home have low-flow shower heads? (9 l/min or less)

Estimate how much water your family uses for showering.

- **Method 1:** Estimate how many showers your family takes each day and how many minutes they shower for. Calculate how much water is used by each person and by all showers. (Volume = Flowrate x Time)

E.g. Shower #1: 5 minutes: 9 litres x 5 mins = 45 litres of water

Shower #2: 10 minutes: 9 litres x 10 mins = 90 litres of water

Total water used: 45 litres + 90 litres = 135 litres of water.

- **Method 2:** Put the plug in the tub as you start running water for your shower. When your shower is done, measure how much water is in the tub. (Volume = Length x Width x Depth). Have each member of your family do the same thing.

E.g.: (1.10m x 0.5m x 0.1m) x 1000 litres/m<sup>3</sup> = 55 litres of water

4. Are there aerators on taps in bathrooms and kitchen? (Aerators increase the pressure of the water while decreasing the flowrate.)



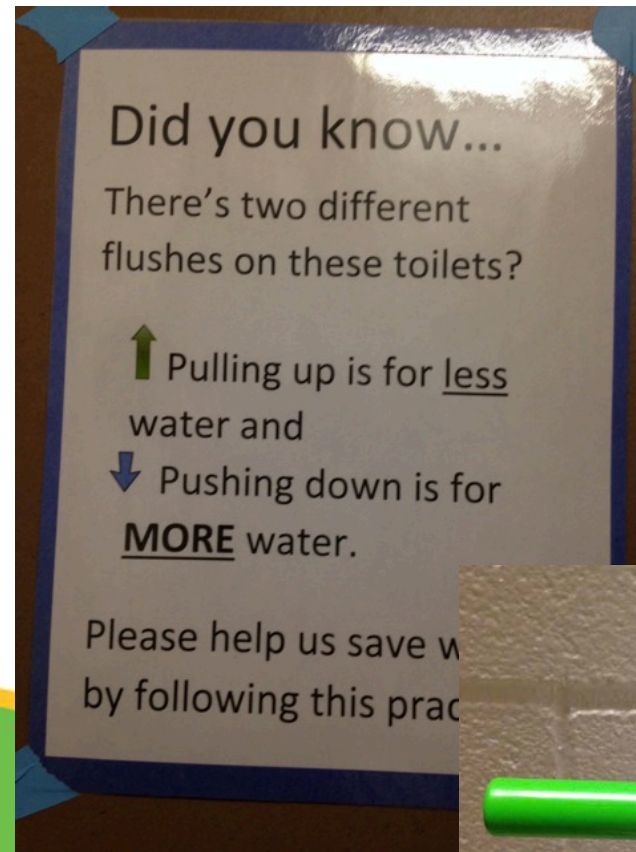
# What does this tell us?

## School

- Green handle
- Taps off

## Home

- Shorter showers
- Fix leaks
- Tooth brushing





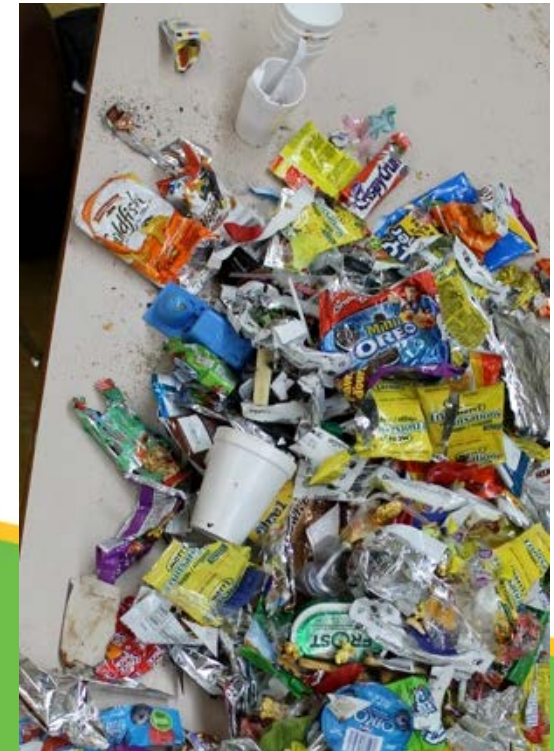
# Waste Audits

- What is in our school garbage?
- Effect on our environment?
  - locally and globally

## Calculate Greenhouse Gas Reduction

Using the weights of waste reduced from your post audit campaign, fill in the following chart:

	kg of waste reduced	kg CO <sub>2</sub> / kg material	Number of school days/ year	kg CO <sub>2</sub> reduced p school yec
Refundables		x 7.6	x 200	=
Paper and cardboard		x 1.6	x 200	=
Metal		x 5.4	x 200	=
Plastic		x 1.5	x 200	=



A Better Planet Begins in the **Classroom**



# What does this tell us?

- Garbage free lunch
- Sharing basket
- No plastic bags
- Compost



# Transportation Audit

- Idle free zones
- Bike/walk/board to school



# What does this tell us?

- Active transportation
- Reducing emissions by our choices





# Biodiversity Audits

- Use Google maps – satellite photos to estimate green space
- Species counts – plants, birds, insects



# What does this tell us?

- School yard biodiversity
- Community improvements



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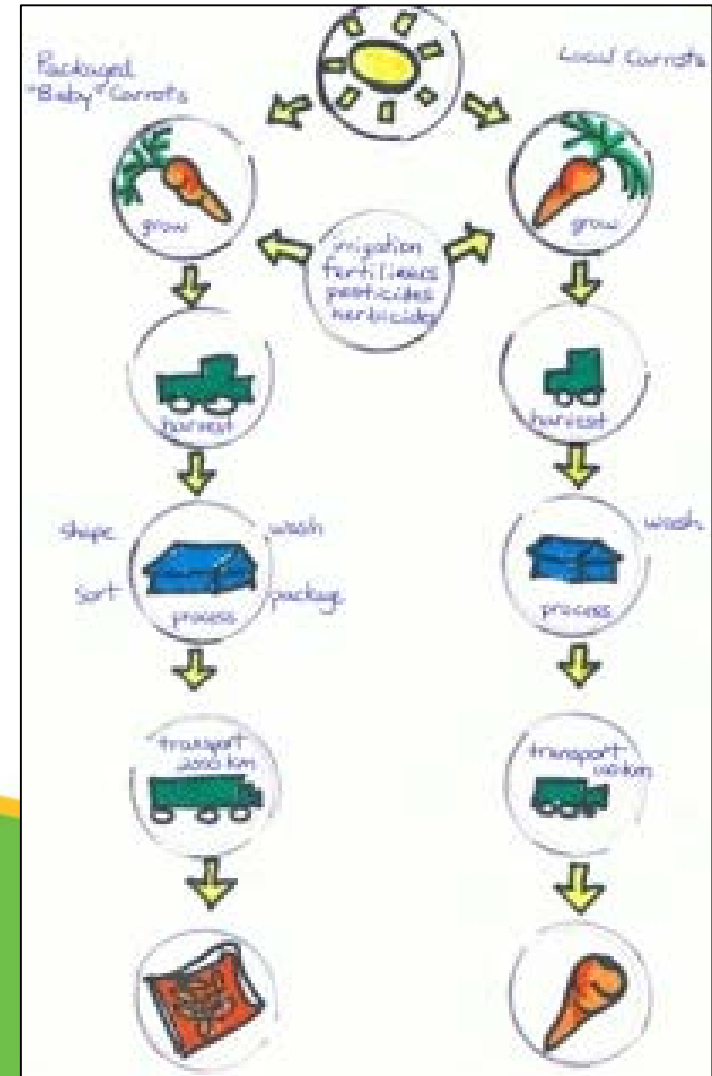


A Better Planet Begins in the *Classroom*



# Food Audits

- Food miles
- Grocery stores
- Community gardens



# What does this tell us?

- Eat local, eat less meat, grow your own, reduce food waste...





# Action Based on Results

## Campaigns

- Barriers
- Benefits
- Communication
- Reminders
- Who can help?
- Commitment

(Community Based Social Marketing,  
Doug McKenzie-Mohr)





# Learning from Results

page 4.

Pre-Campaign Audit- Idling  
Date- Nov 15<sup>th</sup>, 2011 -( 3<sup>15</sup> - 3<sup>45</sup>pm.)

Vehicle (make/colour)	Is it Idling? YES / NO	If Yes, for how long?
Honda blue	Yes	10 minutes
Ford silver	NO	
Ford TRUCK white	YES	15 mins 3:20 - 3:35
Toyota white	Yes	8 mins
Truck red	NO	
Chevy Black	YES	2 mins
Hyundai white	Yes	22 mins 3:45 - 3:67
Truck Dodge silver	NO	
SUV white	YES	10 mins.

Counted- 14 cars Total: 38 cars idling  
Average idling time- 10

Post-Campaign Audit- Idling  
Date - Nov 24<sup>th</sup>, 2011 (3<sup>15</sup> - 3<sup>45</sup>) page 4.

Vehicle (make/colour)	Is it Idling? YES/ NO	If yes, for how long?
Toyota grey	NO	
Hyundai orange	YES	5 mins.
Bug green	NO	
Ford truck white	turned off when they saw us	
Honda green	Yes	11 mins.
Truck black	NO	
Van Blue	NO brought baby in school	
Red Ford	NO	
Toyota Van	NO	

Counted- 67 cars Total: 8 cars idling  
Average time- 6 m

PRE-AUDIT /week	POST-AUDIT /week
Electricity: 110.082 kw/h	91.264 kw/h
Water: 7994 L	6852 L

## Problems I encountered...

- Changing habits
- Finding out watts
- Persuading siblings to participate

## Action Plan

### \*Water Usage:

- Toilet use: instead of "full flushing", we used half flushes.
- Baths/Shower: Each member of my family tried to take shorter showers. (15 min → 10)
- Brushing Teeth: My family did not leave the tap on when brushing their teeth.

### \*Electricity Usage

- use electric heater less
- watch T.V an hour less (6 hrs → 5)
- turn off unnecessary lighting and make use of natural light from outside
  - Living Room lamp (4 hrs → 3)
- Reduce "laptop using" by an hour (8 hrs → 7)
- Unplug printer when not in use

$$\begin{aligned}
 \$ \text{ Saved} &= (0.14 \times 110.082) \\
 \text{Electricity: } \$15.41 &- \$12.78 = \$2.63 \\
 &\quad (0.14 \times 91.264) \quad \text{saved per week}
 \end{aligned}$$

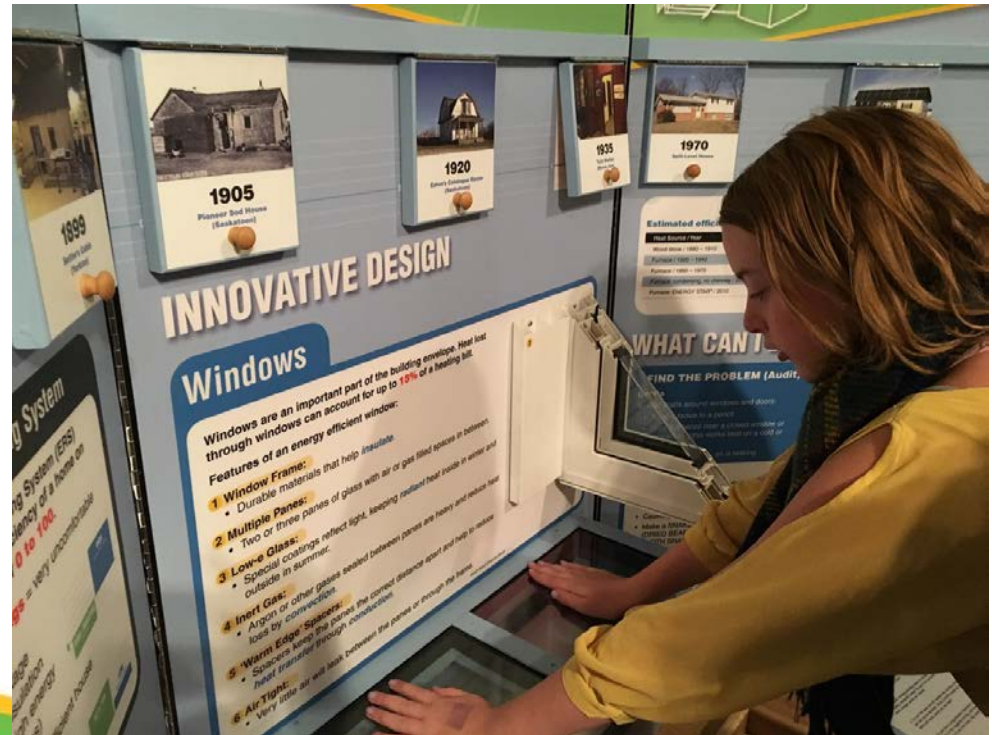
# Smarter Science Better Buildings

Yorkton, Oct 16 – Nov 3

Saskatoon, Jan 30 – Feb 16

Moose Jaw, Feb 27 – Mar 9

North Battleford, May 7 – 25



**SaskEnergy** paying for limited number of buses to and from the WDM

<https://www.wdm.ca/EdPrograms/smarterscience.htm>





# Learning Resources

[www.environmentalsociety.ca](http://www.environmentalsociety.ca)

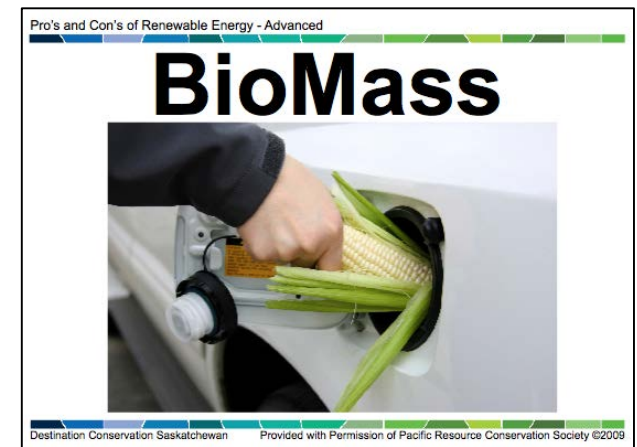


# Finding Resources

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- Sustainability
- Climate Change
- Conservation
- Environmental Issues
- Renewable Resources
- Inquiry and Action plans





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