

Cool School Challenge



Monitor & Evaluate: Classroom Post-Survey

Student Challenge Leaders: Use this survey to follow up with classrooms participating in the Cool School Challenge to assess their progress toward achieving their CO₂ emission reduction goals from electricity, heating, waste, and transportation.

Post-survey conducted for:

_____ (teacher)

Room: _____

Electricity

Electricity used by schools for lighting and powering computers, televisions, and other appliances contributes to emissions of carbon dioxide, a greenhouse gas. Reducing the amount of electricity used can help lower CO₂ emissions.

➡ PART ONE: CLASSROOM LIGHTING

1. Estimate electricity from lighting in kWh

- Refer to your data gathered in the Electricity section of Step 1b: Take An Audit - Estimate Emissions. Record the Kilowatts per Switch in the table below.
- Ask the teacher how many hours per day during the Challenge period each switch was left on, so you can see whether there has been any change. Enter the answer in the table below.

Switch	Kilowatts per switch (enter results from Take an Audit)	# of hours per day the switch is on <u>during the Challenge</u>	Kilowatt-hours per day <u>during the Challenge</u>
<i>Example</i>	<i>0.16 kW</i>	<i>5 hours</i>	<i>0.8 kWh</i>
1			
2			
3			
4			

Total kWh used per day for lighting DURING the Challenge

2. Estimate CO₂ emissions from lighting during the Challenge.

Estimate the CO₂ emissions from lighting during the Challenge, as well as what they would be over the course of the year if the classroom continues to use the lighting for fewer hours a day:

- Record "Total kWh per day" from #1 into the table below.
- Enter the appropriate Conversion Factor for your school (be sure to use the same one you used in the **Take an Audit-Estimate Emissions** section!)
- Calculate pounds of CO₂ emitted per kWh; then project them out for the rest of the school year (180 days).

Pounds (lbs) of CO₂ emissions = conversion factor x kWh

CONVERSION FACTORS
Pounds (lbs) of CO₂ per kWh by utility

Utility	Lbs CO ₂ per kWh
Puget Sound Energy	1.1
Seattle City Light	0.1
Snohomish County PUD	0.2
Tacoma Power	0.1
Washington state average	0.5
National average	1.4

Source: State of Washington Department of Community, Trade, and Economic Development (CTED), 2006

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Total kWh per day DURING the Challenge (enter data from Step One)	Conversion factor (enter value from table above)	Pounds of CO ₂ per kWh	Pounds of CO ₂ per 180-day school year
<i>Example: .8 kWh</i>	<i>1.1 lbs</i>	<i>.88</i>	<i>158.4 lbs</i>

Total lbs CO₂ emitted by lighting per year

3. Calculate CO₂ emissions SAVINGS from lighting.

The next step is to compare the classroom's CO₂ emissions before and after the Challenge, to see whether changes in behavior resulted in changes in emissions. Use the data above, and the original data gathered in "Take an Audit - Estimate Emissions" to measure the classroom's carbon savings.



Pre-Challenge
CO₂ emissions: _____ lbs

Post-Challenge
CO₂ emissions: _____ lbs

Total CO₂ Emissions Savings _____ lbs

PART TWO: ENERGY “VAMPIRES”

Did the classroom successfully ‘slay’ its energy vampires?
 For all of the appliances identified in your Classroom Survey, find out the energy usage and calculate emissions.



1. Estimate electricity from vampires in kWh.

- a. During the Challenge period, at the end of the day were the computers and monitors:
 - Left on, “active” mode
 - Put into standby mode
 - Turned off
- b. Were other appliances plugged into a power strip and turned off at night?
- c. For each appliance identified in the Classroom Survey, record below any change in its operating mode overnight (i.e., plugged into power strip, rather than left in ‘standby’ mode all night). Refer to Table 1 on the next page and calculate whether the classroom successfully reduced electricity consumption from energy vampires.

Appliance	Wattage (from Table 1)	Total watts for the appliance (quantity x wattage)	Kilowatts (total watts ÷ 1000)	Kilowatt-hours per 16-hour “night”	kWh per 180-day school year
<i>Example: 7 desktop computers, turned off</i>	<i>4 watts</i>	<i>28 watts</i>	<i>0.028 kW</i>	<i>0.45 kWh</i>	<i>81 kWh/year</i>
Total kWh used for classroom appliances per school year					

TABLE ONE: WATTS/HOUR FOR COMMON APPLIANCES IN DIFFERENT OPERATING MODES

Appliance	Off or Passive Standby (watts)	Active Standby (watts)	Active (watts)
Computers, etc.			
Desktop Computer	4 watts	17 watts	68 watts
Laptop Computer	1 watt	3 watts	22 watts
Conventional (CRT) Monitor	2 watts	3 watts	70 watts
Flat screen (LCD) Monitor	1 watt	2 watts	27 watts
Computer Speakers	2 watts	-	7 watts
Modem	5 watts	-	6 watts
Wireless Router	2 watts	-	6 watts
USB Hub	1 watt	-	3 watts
Printer	2 watts	3	9 watts
Fax	4 watts	4	4 watts
Mutli-Function Printer/Scanner/Copier	6 watts	9	15 watts
Entertainment			
Plasma TV (<40")	3 watts	-	246 watts
DVR/TiVo	37 watts	37 watts	37 watts
Digital Cable	26 watts	26 watts	26 watts
Satellite Cable	12 watts	11 watts	16 watts
CRT TV (<40")	1 watts	-	73 watts
LCD TV (<40")	3 watts	-	70 watts
Video Game Console	1 watt	-	24 watts
DVD player	1 watt	5 watts	11 watts
Rechargeable Devices			
Power Tool	4 watts	-	34 watts
Hand-Held Vacuum	3 watts	-	3 watts
Cordless Phone	2 watts	3	5 watts
Electric Toothbrush	2 watts	-	4 watts
Shaver	1 watt	-	1 watt
MP3 Player	1 watt	-	1 watt
Cell Phone	0	1 watts	3 watts
Digital Camera	0	-	2 watts

Source: ECOS Consulting, 2006: *Final Field Research Report for the California Energy Commission*; available from the American Council for an Energy Efficient Economy; www.aceee.org

2. Calculate CO₂ emissions from appliances.

To determine whether the classroom reduced the pounds of CO₂ classroom machines generate each year, multiple the Total kWh results from above by the appropriate CO₂ conversion factor for your school. Refer to the table of Conversion Factors on Page 2. If you do not know your school’s electricity provider, or if it isn’t listed, just use the national average.



Total kWh used per year (enter total from above)	Conversion Factor (from table on page 2)	Total lbs CO ₂ per year
<i>Example: 81 kWh</i>	<i>1.1 lbs</i>	<i>89 lbs</i>
Total CO ₂ emitted by appliances per year		

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3. Calculate CO₂ emissions SAVINGS from classroom appliances

The next step is to compare the classroom’s CO₂ emissions from computers, printers, and other electronic equipment before and after the Challenge, to see whether changes in behavior resulted in changes in emissions. Use the data from above, and the original data gathered in “Step 1b: Take an Audit - Estimate Emissions,” to measure the classroom’s CO₂ savings.



Pre-Challenge
CO₂ emissions: lbs

Post-Challenge
CO₂ emissions: lbs

Total CO₂
Emissions Savings lbs



Transportation

1. Estimate teacher’s CO₂ emissions from commuting during the Challenge.

How, if at all, did the classroom teacher change his/her commute habits? Did he/she ride a bike or carpool instead of drive alone each day? Find out:

1. How many days per week did the teacher:

	Drive alone	Carpool/ bus	Walk, or ride a bike
# days:			



- Calculate the teacher’s CO₂ emissions from his/her commute during the Challenge by completing the table below. You will need your data collected in the “Transportation” section of Take an Audit - Estimate Emissions.
- Record the “CO₂ emissions per day” from the teacher’s pre-survey into the table below.
- Input the number of days the teacher drove alone into the table below.
- Multiple the # of days per week by 36 weeks to find the annual amount of CO₂ emissions from the teacher’s commute.

	CO ₂ emissions per day (enter data from Pre-Survey)	#days per week the teacher drives alone	Pounds of CO ₂ per school year (=lbs CO ₂ x # days per week x 36 weeks)
<i>Example:</i>	<i>26.6 lbs</i>	<i>3 days</i>	<i>2873 lbs</i>

Total CO₂ from teacher’s commute per year

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2. Calculate CO₂ emissions SAVINGS from commuting

Now compare the teacher’s CO₂ emissions from his/her commute before and after the Challenge, to see whether changes in behavior resulted in changes in emissions. Use the data from above, and the original data gathered in “Take an Audit - Estimate Emissions,” to measure CO₂ savings.



Pre-Challenge
CO₂ emissions:

 lbs

Post-Challenge
CO₂ emissions: —

 lbs

Total CO₂
Emissions Savings

 lbs

Heating

Complete this section only if the classroom has an adjustable thermostat. If not, proceed to the next section.

1. If the classroom has an adjustable thermostat, did the teacher turn down the temperature?
 - Yes
 - No
2. If “yes” - by how many degrees was the temperature turned down? _____
3. Calculate emissions savings by multiplying the number of degrees the thermostat was turned down by the conversion factor for your utility below.

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CONVERSION FACTORS

Pounds (lbs) of CO₂ saved per year per degree thermostat is turned down
by utility

Utility	Lbs CO ₂
Puget Sound Energy	356 lbs
Seattle City Light	22 lbs
Snohomish County PUD	70 lbs
Tacoma Power	30 lbs

Source: Puget Sound Clean Air Agency. Conversion factors for schools using electricity for heat.

	# of degrees the thermostat was turned down	Conversion factor	Pounds of CO ₂ per school year reduced
<i>Example:</i>	<i>1 degree</i>	<i>356 lbs (utility = PSE)</i>	<i>356 lbs</i>

Total CO₂ REDUCED from classroom heating per year

Solid Waste

How well did the classroom do in reducing, reusing, and recycling? Find out what steps the class took toward generating less waste and how those efforts helped the climate!



➔ PART ONE: PAPER

1. Estimate CO₂ emissions from paper use during the Challenge.
 - a. How many reams of paper did the classroom use each week? _____
 - b. What % post-consumer recycled content did the printing paper have?
 - 0-20 %
 - 40-50%
 - 75%
 - 100%
 - c. Record this information in the table below and calculate pounds of CO₂ that would be emitted per year, if the class continues its current paper usage patterns.

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CONVERSION FACTORS
Pounds (lbs) of CO₂ equivalent per ream of paper

Recycled content	Lbs CO ₂ per ream
0 - 20%	14 lbs
20 - 40%	13 lbs
40 - 50%	12 lbs
50 - 75%	11 lbs
75 - 90%	10 lbs
90 - 100%	9 lbs

Source: Unit of measurement is CO₂ equivalents and includes carbon dioxide emissions from burning fossil fuels and methane from paper decomposing in landfills. Environmental impact estimates were made using the Environmental Defense Paper Calculator. For more information visit <http://www.papercalculator.org>.

# Reams used per week	CO ₂ per ream (enter conversion factor from table at right)	Pounds of CO ₂ per week	Pounds of CO ₂ per year (assume 36 weeks/year)
<i>Example: 2 reams, 75% recycled content</i>	<i>10 lbs</i>	<i>20 lbs</i>	<i>720 lbs</i>

Total CO₂ from paper used per year



2. Calculate CO₂ emissions SAVINGS from paper use during the Challenge.

Now compare the classroom’s CO₂ emissions from paper use before and after the Challenge, to see whether changes in behavior resulted in changes in emissions. Use the data from above, and the original data gathered in “Step 1b: Take an Audit - Estimate Emissions,” to measure the classroom’s carbon savings.

Pre-Challenge

CO₂ emissions:

 lbs

Post-Challenge

CO₂ emissions: _____

 lbs

Total CO₂

Emissions Savings

 lbs


PART TWO: PLASTIC

1. Estimate CO₂ emissions from plastic water bottles during the Challenge.

- a. Approximately how many bottled waters did the teacher drink per day?
_____ Record this in the table below.
- b. Estimate the emissions associated with each plastic bottle used, vs. using a reusable bottle.



Lbs of emissions = # of bottles x .03 lbs x 3 lbs CO₂
 (One plastic water bottle weighs on average 15 grams, or 0.03 lbs
 One pound of waste produces 3 pounds of CO₂ - Source: EPA)

# bottles per week	Pounds of plastic used (#bottles x 0.03 lbs)	Pounds of CO ₂ per week (lbs plastic x 3 lbs CO ₂)	Pounds of CO ₂ per year (assume 36 weeks/year)
<i>Example: 8 bottles a week</i>	<i>0.24 lbs</i>	<i>0.72 lbs</i>	<i>25.92 lbs</i>

Total CO₂ from plastic bottles used per year

2. Calculate CO₂ emissions SAVINGS from using fewer plastic water bottles during the Challenge.

Enter the classroom’s CO₂ emissions from using plastic water bottles before and after the Challenge, to see whether changes in behavior resulted in changes in emissions. Use the data from above, and the original data gathered in “Step 1b: Take an Audit - Estimate Emissions,” to measure the classroom’s carbon savings.



Pre-Challenge
CO₂ emissions:

Post-Challenge
CO₂ emissions: __

Total CO₂
Emissions Savings

PART THREE: RECYCLING

Recycling paper and other materials instead of throwing them away helps reduce greenhouse gas emissions. Every pound of waste that is recycled rather than sent to the landfill prevents 3 lbs of CO₂ emissions. How well did the classroom recycle?

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Estimate emissions saved by recycling.

1. How many full recycling bins did the classroom generate per week? _____

2. One full recycling bin contains about 4 lbs of mixed recycled material. How many pounds of recyclable material did the classroom generate per week? _____
Enter this in the table below to calculate CO₂ emissions saved from recycling.

Lbs recycled/week	Pounds of CO ₂ avoided per week (lbs recycled x 3 lbs CO ₂)	Pounds of CO ₂ avoided per school year (assume 36 weeks)
<i>Example: 8 lbs</i>	<i>24 lbs</i>	<i>864 lbs</i>
Total CO₂ SAVED by recycling		

Add it all up!



Now that you've calculated the CO₂ emissions saved by classrooms participating in the Cool School Challenge through reductions in electricity use, transportation fuel use and waste, add them up to determine the total CO₂ saved, and see whether the classroom achieved its Cool School Challenge goals!

Record the values from each section into the table below for a final result.

Emissions from...	Pounds of CO ₂ SAVED per year
Electricity - Lighting	
Electricity - Classroom computers & vampires	
Transportation - Teacher's commute	
Heating - Turning down the thermostat	
Solid Waste - Paper	
Solid Waste - Plastic bottles	
Solid Waste - Recycling	
Total Classroom CO₂ SAVED per year	

Note: Savings are based on the assumption that each classroom will maintain throughout the school year the climate-friendly actions they've adopted.

