

Contact Information	
Board	Waterloo Catholic District School Board
Development date	August 2010
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Specialist High Skills Major	<i>Energy, Environment, Construction</i>
Course code and course title	SVN3E
Name of contextualized learning activity/activities	<i>Conserving Energy and Saving You Money</i>
Brief description of contextualized learning activity/activities	<p>In this series of activities students will learn how to</p> <ul style="list-style-type: none"> • be a smart consumer when buying appliances; • build an understanding about the usage of the new Smart Meters; • Make changes in their lifestyles, homes and environment to decrease their impact on the environment and conserve energy.
Duration	<i>7 – 8 Classes (9 hours)</i>

Overall expectations	<p>Unit D - Energy Conservation</p> <p>D1. evaluate initiatives and technological innovations related to energy consumption and conservation, and assess their impact on personal lifestyles, social attitudes, and the environment;</p> <p>D2. investigate various methods of conserving energy and improving energy efficiency;</p> <p>D3. demonstrate an understanding of the basic principles of energy production, with reference to both renewable and non-renewable sources, and of various methods of energy conservation.</p>
Specific expectations	<p>D1.1 assess, on the basis of research, the impact that initiatives for reducing energy consumption and waste have on personal lifestyles, societal attitudes, and the environment (e.g., local, provincial, or national initiatives by government, business, or non-governmental organizations) [IP, PR, AI, C]</p> <p>D1.2 evaluate, on the basis of research, some of the advantages or disadvantages of technological innovations that contribute to the production of renewable energy and/or aid in conservation (e.g., bio-oil, biodiesel, wind turbines, improved insulation, programmable thermostats) [IP, PR, AI, C]</p> <p>D2.1 use appropriate terminology related to energy conservation and consumption, including, but not limited to: <i>conventional source, alternative source, efficiency, watt, kilowatt-hour [kWh], joule, BTU, gas meter, electric meter, thermostat, and EnerGuide</i> [C]</p> <p>D2.2 determine the energy consumption of their household over a given time period by reading and interpreting gas and/or electric meters, calculate the cost of consumption (e.g., the number of kWh \times cost per kWh, cubic metres of gas \times cost per cubic metre), and suggest ways in which the household could conserve energy [PR, AI, C]</p> <p>D2.3 use a research or inquiry process to compare the efficiency of different types or brands of a common household appliance (e.g., different brands of kettles, fans, or refrigerators; natural gas and electric water heaters) or of audio-visual equipment (e.g., different types of computer monitors), and report their findings [IP, PR, AI, C]</p> <p>D3.3 describe methods of energy conservation (e.g., the replacement of incandescent bulbs with compact fluorescent bulbs, the replacement of a manual thermostat with a programmable one, the installation of more energy-efficient windows) and some policies that are intended to manage energy demand in the home and the workplace (e.g., variable pricing, which increases the price of electricity during peak hours)</p> <p>D3.4 describe several criteria used in the construction of energy-efficient buildings (e.g., "smart homes", in which the use of light, heat, and power for equipment can be programmed;</p> <p>A1.6 compile accurate data from laboratory and other sources, and organize and record the data, using appropriate formats, including tables, flow charts, graphs, and/or diagrams</p> <p>A1.10 draw conclusions based on inquiry results and research findings, and justify their conclusions with reference to scientific knowledge</p> <p>A1.13 express the results of any calculations involving data accurately and precisely, to the appropriate number of decimal places or significant figures</p>
Catholic graduate expectations (if applicable)	<p>CGE2b -reads, understands and uses written materials effectively;</p> <p>CGE2c -presents information and ideas clearly and honestly and with sensitivity to others;</p> <p>CGE3c -thinks reflectively and creatively to evaluate situations and solve problems;</p> <p>CGE4f -applies effective communication, decision-making, problem-solving, time and resource management skills;</p> <p>CGE5a -works effectively as an interdependent team member;</p>

	<p>CGE5e -respects the rights, responsibilities and contributions of self and others; CGE5g -achieves excellence, originality, and integrity in one's own work and supports these qualities in the work of others; CGE7i respects the environment and uses resources wisely;</p>
<p>Essential Skills and work habits</p>	<p>Reading Text Understanding text in the form of sentences or paragraphs</p> <p>Numeracy Use of numbers and quantities</p> <p>Writing Completing solutions of multi-step problem-solving questions</p> <p>Continuous Learning Ongoing process of learning and acquiring skills</p> <p>Thinking Skills Cognitive ability, problem solving</p> <p>Initiative Starts work with little or no prompting</p> <p>Work Habits Punctual, time effective, and able to follow directions</p> <p>Organization Written work is well laid out and neat</p> <p>Working Independently Accomplishes tasks independently</p>

Instructional/Assessment Strategies

Teacher's notes

- The Science teacher should be familiar with the usage of power meters, PowerPoint, Smart Meters, and the areas in the school where changes have been made to make the school more energy efficient
- Providing applicable and simple real life examples about how to conserve energy around the house.
- Constant diagnostic and formative feedback is important for consistent learning and student development (ie. through use of student worksheets). The students will be working towards a final goal of making an informational pamphlet. Feedback along the way will make them more successful on the final summative.
- If the class is a split group (not all SHSM students) it may be advantageous to group the SHSM students together, however, this CLA has benefits for all science students, not just those enrolled in the SHSM program.
- Allow students to supplement their learning with applicable computer programs.
- The Teacher will need to book a computer lab so that the students can make a PowerPoint presentation based on their pictures from their scavenger hunt and to make the final pamphlet.
- The teacher should put a sample copy of the final pamphlet on the I: drive so the students can use it as a template for the final summative.
- Lesson #1
 - Have some calculators on hand.

- Lesson #2
 - For this lesson you will need the power meters (one per group) and you can decide to have each group measure the power on one appliance and then share their findings with the class or have each group measure all the appliances. This lesson was designed to have them share so that the lesson would go quicker.
 - Have some calculators on hand.
- Lesson #3
 - Have some calculators on hand.
 - Show the video on this page to introduce the Smart Meter. It is about 7 minutes long. When it is done, ask the following questions
 - What jobs did they see in the movie that relate to Smart Meters?
 - Why do we use Smart Meters?
 - <http://www.capgemini.com/insights-and-resources/by-video/smart-meters-hydro-one/>
- Lesson #4 (2 periods)
 - They will need either a digital camera or use the camera function on their cell phone for this lesson.
 - You may want to go to the Eco School website to learn more about the program.
 - You will want to book a computer lab for the second part of this lesson so the students can put all their pictures on PowerPoint presentation to show the rest of the class. Have each group present their slide shows at the end of the class. You will need an LCD projector for this.
- Lesson #5
 - This is the culminating activity for the group of lessons. Give the students two classes to create an informational pamphlet on energy conservation so that that can demonstrate everything that they have learned about energy conservation. Encourage the students to make convincing arguments about why energy conservation is important.
- Lesson #6 (OPTIONAL)
 - GIZMO – Household Energy Usage
 - This GIZMO allows students to work online to calculate the energy consumption of various household appliances instead of using a power meter. This would work well if you don't have a power meter for each group. The downside is that it doesn't use actual appliances. See the Student Worksheet (on the GIZMO page) for more information.
 - www.explorelearning.com

Context

This CLA is designed for students entering the work force or apprenticeship training in the energy, construction or environmental conservation sectors.

Assessment and Evaluation of Student Achievement

Strategies/Tasks	Purpose <i>Assessment for Learning (diagnostic, formative)</i> <i>Assessment of Learning (summative, evaluation)</i>
1. Lesson #1 <i>Does Buying Energy Efficient Appliances</i>	Formative Assessment (give consistent feedback on student Progress and make sure the handout is finished correctly)

<i>Saving You Money?</i>	
2. Lesson #2 <i>Energy Efficiency</i>	Formative Assessment (give consistent feedback on student Progress and make sure the handout is finished correctly)
3. Lesson #3 <i>Smart Meters</i>	Formative Assessment (give consistent feedback on student Progress and make sure the handout is finished correctly)
4. Lesson #4 <i>Energy Conservation Scavenger hunt</i>	Formative Assessment (give consistent feedback on student Progress and make sure the handout is finished correctly)
5. Lesson #5 <i>Culminating Activity Energy Conservation Pamphlet</i>	Summative Assessment (See Rubric for Pamphlet)
Assessment tools <ul style="list-style-type: none"> • <i>See attached Rubric</i> 	

Resources

Authentic workplace materials <ul style="list-style-type: none"> • <i>Power Meter</i> • <i>Examples of Energy Star Appliances</i> • <i>Digital Cameras</i> • <i>A map of the school that indicates where the students can find examples of energy conservation.</i>
Human resources <ul style="list-style-type: none"> • N/A
Print <ul style="list-style-type: none"> • Copies of the hand-outs
Video <ul style="list-style-type: none"> • Smart Meter Video. http://www.capgemini.com/insights-and-resources/by-video/smart-meters-hydro-one/
Software <ul style="list-style-type: none"> • N/A
Websites <ul style="list-style-type: none"> • Power Pledge - http://www.powerpledge.ca/ • Every Kilowatt Counts - http://everykilowattcounts.ca/ • PowerWISE - http://www.powerwise.ca/ • WCDSB Eco Zone – Our Board's Eco-School website - http://ecozone.wcdsb.ca/
Other

Accommodations

- Individual Education Plans (IEP) should be followed at all times. Be sure to consult the SERT for additional information and suggestions;
- additional time may be needed for diagnostic, formative and summative assignments;
- the activities and lessons outlined in this CLA allow for flexibility in the delivery of the material. Alternating teaching strategies can help students who are not progressing at the appropriate level;
- font can be increased for those students that have vision problems;
- class rules, behaviours, and due dates should be posted in the classroom and talked about so that all students are aware of the expectations;
- if possible, more individual instruction time can be allotted to students in need;
- can account for student work habits when considering assignments;
- provide opportunities for enrichment for exceptional students;
- provide time for peer-to-peer teaching;
- use audio aids if needed;
- provide alternate assessment opportunities that are geared towards students strengths or areas of interest;

List of Attachments

1. Lesson #1 - Does Buying Energy Efficient Appliances Saving You Money?
 - Worksheet
2. Lesson #2 - Energy Efficiency
 - Instructions handout
 - Data collection worksheet
3. Lesson #3 – Smart Meters
 - Worksheet
4. Lesson #4 - Energy Conservation Scavenger Hunt
 - Worksheet
5. Lesson #5 - Culminating Activity Energy Conservation Pamphlet
 - Instructional handout
 - Pamphlet Template
 - Assessment Rubric