

About the Green Calgary School Waste Audit Program

At Green Calgary, we are currently working in collaboration with the City of Calgary on a project called *Children and Youth: Tactile Learning Through Waste Audits*. Through this program, we work with junior and senior high schools in Calgary to provide information on waste diversion to help them understand their waste stream, give them tips and activities to reduce waste and provide leadership opportunities for youth. A Green Calgary consultant will teach your students how to do a waste audit to identify any materials that are placed in the incorrect stream (garbage, compost, recycling) or any other confusion. Then from this baseline, we hope to create some sustainability goals and ultimately an action plan, whereby they educate and inform other students about waste diversion. To track progression, the students will perform another waste audit 6-12 weeks after the visit from the Green Calgary consultant.

Curriculum Links

Grades 7-12: the school audit project falls in line with the Alberta Curriculum in terms of the Foundation of **Skills**. The project requires an inquiry-based investigation/experiment whereby the students will use their observations to implicate or promote a solution or change within their schools waste and recycling practices. For grades 7-10 this is foundation 3. For Biology 20-30, Chemistry 20-30, Physics 20-30 and Science 20-30: this is foundation 4.

Initiating and Planning: During my visit I will show the students how to do a waste audit with a sample of garbage from their school. Through this waste audit, we will identify problems within the waste stream that need to be addressed to improve the schools current diversion rate. From the results, the students will create sustainability goals and an action plan. In the future, the students will perform their own waste audit to quantify the improvement in diversion as a result of their action plan.

Performing and Recording: Within the initial and final waste audit, the students will be sorting and weighing different materials of the waste stream. This procedure requires the collection/recording of evidence through quantitative and qualitative observation through the utilization of different equipment and materials (scale, buckets, safety equipment, recording sheets).

Analyzing and Interpreting: Following the second (final) waste audit, the students must determine if their efforts to increase their schools diversion rate were

successful (i.e. did their diversion rate increase from the initial audit diversion rate?). From these results, it is encouraged the students rationalize how and why, if improvements could be made, and how they will go about it in the future.

Communication and Teamwork: The creation of sustainability goals and a corresponding action plan requires the students within a classroom to work collaboratively. They will need to plan how they will address the discovered problems within their school waste stream to increase awareness and ultimately improve diversion rates. They will need to determine which problems are the biggest, how they will address them, how they will effectively communicate this to others and how they will make a potential change. This project allows the students to actively engage in a team-orientated setting and gain leadership skills.

Additionally, this project falls in line with the Alberta Curriculum in terms of the Foundation of **Attitude**. For grades 7-10, Science 10, Science 14-24 this is foundation 4. For Biology 20-30, Chemistry 20-30, Physics 20-30 and Science 20-30 this is foundation 1.

Scientific Inquiry: the students will be required to create an action plan (which involves inquiry, problem solving and decision making), in relation to results observed in their first waste audit.

Collaboration: the students will need to collaborate to decide on their action plan and how to effectively implement it within their schools waste practices.

Stewardship: this program provides the opportunity for students to work as a group to promote sustainable waste and recycling practices within their school setting. They are applying scientific inquiry and analyses to create a baseline for the current state of their waste streams.

Potential Unit: Grade 7

https://education.alberta.ca/media/3069389/pos_science_7_9.pdf

Specifically Unit A: Interactions and Ecosystems
Applicable Focusing Questions (page 11)

1. "How do human activities affect ecosystems?"
2. "What methods can we use to observe and monitor changes in ecosystems, and assess the impacts of our actions?"

Applicable Key concepts:

- Program discusses how human activities, related to waste production, disposal and recycling practices impact the environment

Outcomes for Science, Technology and Society (STS) and Knowledge

1. “Investigate and describe relationships between humans and their environments, and identify related issues and scientific questions” (page 11)

- Program investigates the impacts of human waste production and waste/recycling practices via landfill use on the environment: GHG emissions (methane) and potential water contamination
 - Students will perform a waste audit on a sample of waste from their school, determine which materials are being disposed of inappropriately (leading to contamination of waste streams) and calculate the schools diversion rate (i.e. how much of the material within the landfill stream is being diverted from landfill into appropriate streams of recycling or compost)
 - Discuss potential impacts of landfills and why its important to keep diversion rate high
 - Using the data collection and observations, students create goals and an associated action plan to improve the schools diversion rate. Improvements are quantified when the students perform a second waste audit 6-12 weeks after the Green Calgary consultant’s initial visit.

4. “Describe the relationships among knowledge, decisions and actions in maintaining life-supporting environments” (page 12)

- Through the program we are identifying unintended impacts of landfills within our city and environment
- By quantifying efficiency of correct disposal within their school, students are able to participate in data collection and scientific observation. This process will help them understand the issues at hand and allow them to make informed decisions based on scientific inquiry.

Potential Units: Grade 9

https://education.alberta.ca/media/3069389/pos_science_7_9.pdf

Specifically Unit A: Biological Diversity

Applicable Focusing Question: (page 51)

1. “What impact does human activity have on biological diversity?”

Outcomes for Science, Technology and Society (STS) and Knowledge

4. “Identify impacts of human action on species survival and variation within species, and analyze related issues for personal and public decision making” (page 53)

- Program acts to identify the potential impacts of landfill use on the environment, through the production of green house gas emissions and potential water contamination, and thus potential risks to biodiversity
- we assess waste audit of the schools waste stream to determine problem areas and to develop more efficient waste disposal practices with the goal to increase the facilities diversion rate
 - students need to collaborate to create an effective and realistic sustainability plan for their school, challenging them to reevaluate their daily practices and lifestyle through a more eco-friendly lens

Specifically Unit C: Environmental Chemistry

Applicable Key Concepts:

- During the waste audit we identify materials and what they’re composed of to determine their appropriate stream (waste, recycling or compost), including defining compostable versus biodegradable

Outcomes for Science, Technology and Society (STS) and Knowledge

3. “Analyze and evaluate mechanism affecting the distribution of potentially harmful substances within an environment” (page 63)

- Program assesses the current waste and recycling system within the city, specifically the schools disposal practices. We introduce the reason for why we need to encourage recycling and compost use relative to landfill use and its potential risks or consequences for the environment: green house gas emissions and ground water contamination.
 - We work with students to create goals and an action plan to increase diversions of materials from their schools landfill waste stream in efforts to mitigate potential risks to the environment

Potential Unit: Science 10

https://education.alberta.ca/media/3069384/pos_science_10.pdf

Specifically Unit D: Energy Flow in Global Systems

Applicable Key Concepts (page 30)

- Can act as a exercise to investigate social and environmental contexts and contributions to climate change
- Serves to promote further understanding of how human activity influences climate change

Outcomes for Science, Technology and Society (STS) and Knowledge

4. “Investigate and interpret the role of environmental factor on global energy transfer and climate change” (page 31).

- Program investigates human activities, specifically landfill waste and recycling practices which are contributing to emissions of green house gases and ultimately climate change. We assess the actions that must take place to change our behaviours to mitigate methane emissions from landfill use.

Potential Unit: Science 10-4

<https://education.alberta.ca/media/160494/science-10-4-20-4.pdf>

Specifically Unit D: Investigating Matter and Energy in Environmental Systems

Applicable Focusing Questions: (page 18)

1. “How does human activity influence the natural flow of energy in the environment?”
2. “Should humans as a species be concerned about the effect of their activities on other species and the environment?”

Applicable Key Concepts:

- Program identifies various human-generated materials and how to dispose or recycle them appropriately
- Program discusses the potential impacts on the environment as a result of landfill use

Specific Outcomes for Science, Technology and Society and Knowledge

1. “examine how the flow of matter in the biosphere is cyclical along characteristic pathways and can be disrupted by human activity” (page 18)
 - In the program we discuss and identify materials within the schools current waste stream and determine the appropriate stream for disposal (waste, recycling, compost) based on its material composition (natural versus human-made)
 - Develop strategies/action plan to mitigate contamination of streams
 - Discuss potential consequences of landfill usage: green house gas emissions, water contamination
 - Discuss ways we can reduce waste generation in our lifestyles and why its important
 - We discuss what compostable versus biodegradable means in terms of decomposition and how it plays a role in the waste management system

Potential Unit: Science 14

https://education.alberta.ca/media/3069383/pos_science_14_24.pdf

Specifically Unit D: Investigating Matter and Energy in the Environment

Applicable Key Concepts: (page 26)

- Acts to educate students on the current human-generated waste and recycling practices with an urban setting, and how to improve diversion rates
- Explores the potential human impacts on the environment as a result of landfill use

Outcomes for Science, Technology and Society and Knowledge

1. “Describe how the flow of matter in the biosphere is cyclical along characteristic pathways and can be disrupted by human activity” (page 26).
- The program identifies the array of materials within the waste stream at the students school, and shows them which stream (waste, recycling or compost) is the most appropriate for the material based on composition
 - Addressing actions we can do to mitigate contaminations of each stream and potentially other actions to reduce waste production all together (cost and benefits to manufactured materials)

- We discuss what compostable versus biodegradable means in terms of decomposition and how it plays a role in the waste management system

Potential Unit: Science 20

https://education.alberta.ca/media/3069385/pos_science_20_30.pdf

Specifically Unit D: Changes in Living Systems

Applicable Key Concepts

- Program investigates how human activities, specifically waste generation and recycling practices, can influence the environment, including biogeochemical cycles

Applicable General Outcome:

2. “analyze and investigate the cycling of matter and the flow of energy through the biosphere and ecosystems as well as the interrelationship of society and the environment” (page 41)

Specific Outcomes for Knowledge:

- Program aligns with 20-DK.1k (page 45): in terms of identifying methane emissions from landfill practices which in turn contribute to carbon cycles.

Specific Outcomes for Science, Technology and Society:

- Program aligns with 20-D2.1sts (page 45): within the program we discuss ways to mitigate methane emissions through decreasing landfill usage by increasing diversion rates and embracing the reduction of waste all together. The students collaborate to discuss practical ways in how they will increase the diversion of waste to the landfill stream, forcing them to assess which efforts/ideas are viable.

Potential Unit: Science 30

https://education.alberta.ca/media/3069385/pos_science_20_30.pdf

Specifically Unit D: Energy and the Environment

Applicable Key Concepts:

- Program addresses the need for balancing energy use through more sustainable waste practices and strategies

Applicable General Outcome:

1. “explain the need for balancing the growth in global energy demands with maintaining a viable biosphere” (page 80)

Specific Outcomes for Science, Technology and Society:

- Program aligns with 30-D1.1sts (page 81): we discuss the current city mandate in terms of expectations for waste, recycling and disposal practices and investigate how the schools current waste program is or is not in aligned with expectations. We discuss where more efficient practices are needed and the students develop practical strategies and an action plan to increase the diversion of waste from landfill stream.

Potential Unit: Biology 20

https://education.alberta.ca/media/3069386/pos_bio_20_30.pdf

Specifically Unit A: Energy and Matter Exchange in the Biosphere

Applicable Key Concepts:

- Program addresses impacts of landfills on carbon cycles

Applicable General Outcome:

1. “explain the cycling of matter through the biosphere” (page 17)

Specific Outcomes for Science, Technology and Society:

- Program aligns with 20-A2.1sts (page 20): we discuss the potential unintended consequences/impacts of waste disposal practices within an urban setting. We identify why the schools diversion rate is or is not high, and how these practices influence the environment. Specifically, we assess how landfill use contributes to green house gas emissions and potentially groundwater contamination.