

# Grade 5 Science Curriculum Links to Sustainability Education and Action

## Topic A: Electricity and Magnetism

Demonstrate safe methods for the study of magnetism and electricity, identify methods for measurement and control, and apply techniques for evaluating magnetic and electrical properties of materials.

### Links to Place and Nature

- Where does the electricity that we use at school and at home come from?
- How is the electricity that we use produced? How does it get to my home or my school?
- What is the history of electricity use in my area? What did people use prior to electricity?

### Links to Climate Change

- How can electricity use contribute to climate change?
- What can we do to reduce our electricity use?
- How will heat waves increase the amount of electricity used in our homes?

### Links to Indigenous Perspectives

- Where do Indigenous communities in my area get their electricity?
- What is the history of electricity use in local Indigenous communities?
- What did Indigenous peoples use as energy sources prior to electricity?

### Links to City of Calgary Environmental and Climate Strategies

- **Climate Resilience Strategy (3)**: Energy use in buildings is the largest opportunity for greenhouse gas reductions in Calgary. From heating to cooling, cooking to lighting, our buildings provide many energy intensive services. Natural gas and electricity used in Calgary's residential, commercial, and institutional buildings make up almost 65% of total emissions generated in our community (p.33).



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## Topic B: Mechanisms Using Electricity

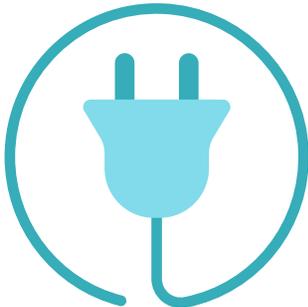
Construct simple circuits, and apply an understanding of circuits to the construction and control of motorized devices.

### Links to Place and Nature

- What devices at school and at home use electricity?
- Where does the electricity that we use come from?
- How is it produced?
- How does it get to my home or school?

### Links to Climate Change

- How can electricity use contribute to climate change?
- What can we do to reduce our electricity use?
- How will heat waves increase the amount of electricity used in our homes?



### Links to City of Calgary Environmental and Climate Strategies

- **Climate Resilience Strategy (3)**: Natural gas and electricity used in Calgary's residential, commercial, and institutional buildings make up almost 65% of total GHG emissions generated in our community (p.33). Additionally, emissions associated with transporting people and goods account for one third of Calgary's emissions (p.40)
  - **Climate Mitigation Action Plan, Program 1: Energy Performance Standards in New and Existing Buildings (p. 34-35)**: Energy performance standards refer to the minimum energy performance requirements that are regulated for new and existing buildings. Actions with this Program include supporting the development of new building codes and investigating and enable new incentives and financing mechanisms for improved energy performance.
  - **Climate Mitigation Action Plan, Program 2: Energy Consumption Information (p.36-37)**: Many people are unaware of how much energy their everyday activities require. By making energy consumption information more readily available and easily understood, we help provide the tools to make better decisions about how energy is used in specific buildings, and we also allow better comparisons between buildings.
  - **Climate Mitigation Action Plan, Program 3: Renewable and Low-Carbon Energy Systems (p.38-39)**: On-site renewable energy systems and district energy systems are important strategies to transition away from fossil fuels. Actions within this Program relate to enabling the implementation of onsite renewable and low-carbon energy systems, and to supporting community ownership of renewable energy generation.
  - **Climate Mitigation Action Plan, Program 4: Electric and Low-Emissions Vehicles (p.41-42)**: It is important that we reduce the impacts of remaining cars, buses, and trucks through cleaner vehicles and fuels. Actions within this Program relate to supporting and enabling the uptake of electric vehicles, and to supporting and enabling the uptake of low emissions vehicles in commercial fleets.
- **Electric Vehicle Strategy (4)**: The EV Strategy was developed as part of the Climate Resilience Program, since it represents one of the greatest opportunities to reduce greenhouse gas emissions from transportation (p.19). Visit the Electric Vehicle Strategy to learn more about its objectives.
- **imagineCALGARY (2)**: By 2036 there is a 50% reduction from 1990 levels in pollution (greenhouse gases) associated with automobiles. By 2036 we increase peak period transit, walking and cycling and carpool travel to downtown by 50%, 40% and 20% respectively (p. 6).



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# Grade 5 Science Curriculum Links to Sustainability Education and Action

## Topic C: Classroom Chemistry

Describe the properties and interactions of various household liquids and solids, and interpret their interactions.

### Links to Place and Nature

- How does water act as a solvent for nutrients and pollutants? What happens to dissolved substances in water?
- How does water temperature affect the amount of dissolved gases like oxygen and carbon dioxide?
- What role does dissolved oxygen and carbon dioxide play in aquatic ecosystems?
- What parameters affect water quality? How do we measure water quality?
- What is the water quality of nearby water sources?
- How do human activities affect the quality of local water sources?
- What is the pH of water?
- How does my municipality ensure the quality of the drinking water in my community?
- What can I do to protect the quality of local water sources?

### Links to Indigenous Perspectives

- How are Indigenous communities in my area or province affected by water quality issues?

### Links to Climate Change

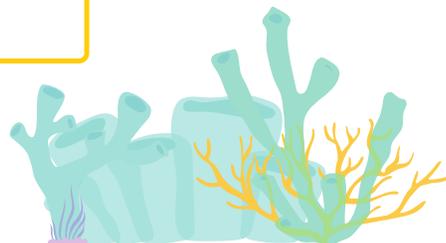
- How does water temperature affect the amount of carbon dioxide in oceans, ocean acidity, and coral reefs?

### Links to City of Calgary Environmental and Climate Strategies

- **Water Treatment in Calgary:** The City works to ensure all Calgarians have a safe and reliable supply of drinking water. To achieve this, Calgary's water treatment plants operate 24 hours a day, 365 days a year. The Bearspaw Water Treatment Plant draws water from the Bearspaw Reservoir on the Bow River. The Glenmore Water Treatment Plant draws water from the Glenmore Reservoir, which is fed by the Elbow River. To learn more about Calgary's water treatment strategy, visit our [Online Water Treatment Tour \(9\)](#). To learn about what you can do to conserve water and water treatment, visit [Drinking water and water treatment \(7\)](#).
- **Household hazardous waste drop-off program (8):** Paint, oil, propane tanks and chemicals don't belong in your carts. In Calgary, you can dispose of these items at our household hazardous waste drop-off locations. Learn more about the program and how to label and package your waste on our [waste drop-off website \(8\)](#).



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# Grade 5 Science Curriculum Links to Sustainability Education and Action

## Topic D: Weather Watch

Observe, describe and interpret weather phenomena; and relate weather to the heating and cooling of Earth's surface. Investigate relationships between weather phenomena and human activity.

### Links to Place and Nature

- What elements make up local weather patterns (e.g. wind, temperature, humidity, etc.)?
- How does our local weather vary?
- What are the drivers of local weather patterns that lead to sunny, rainy, or windy days?
- How do people in my community and scientists predict weather? Why is it important to predict the weather?
- What is the difference between weather and climate?

### Links to Indigenous Perspectives

- See [Learn Alberta grade 5 sample lesson plan \(1\)](#) for this unit.
- What was Indigenous peoples' knowledge of weather and why was this important?
- How are Indigenous communities in my area or province affected by climate change?
- What can be done to control greenhouse emissions?



### Links to Climate Change

- What is climate change and how do humans contribute to it?
- What is the difference between climate change and global warming?
- What is the difference between climate and weather?
- How will climate change impact the amount and intensity of rain and snowfall in Calgary? How will it impact ambient temperatures?
- How do human activities affect climate through increased greenhouse gas emissions?
- What can we do to combat climate change?

### Links to City of Calgary Environmental and Climate Strategies

- **Climate Resilience Strategy (3)**: Climate change has become one of the defining issues of our time, given the effect communities across Canada and the world continue to experience, from more extreme heat waves to increased winter storms and flooding, to advanced invasive species and vector borne diseases. In response to these changes, The City of Calgary is focusing on developing policies, programs, infrastructure designs, and leadership strategies to increase the climate resilience of natural and built systems (p.64). The amount and rate of climate change is posing new challenges, and climate science now allows communities to anticipate a range of new and more extreme weather conditions, and therefore take action before the worst impacts are incurred (p.65). For details about the climate impacts anticipated within Calgary, visit pages 65 to 72 of the Climate Resilience Strategy.
- The City is taking action to prepare for climate-related impacts, and also reduce our contribution to the cause of climate change. Visit [calgary.ca/ClimateProgram](http://calgary.ca/ClimateProgram) (5) to learn more.



# Grade 5 Science Curriculum Links to Sustainability Education and Action

## Topic E: Wetland Ecosystems

Describe the living and nonliving components of a wetland ecosystem and the interactions within and among them.

### Links to Place and Nature

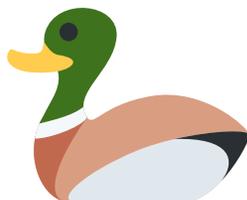
- What types of wetlands exist in my area? What plants and animals are associated with them?
- Why are wetlands important for biodiversity, for filtering water, and flood prevention?
- What can we do to protect local wetlands?

### Links to Indigenous Perspectives

- What was the importance of wetlands to Indigenous peoples in my area?
- What relationship did Indigenous peoples have with wetlands and the animals and plants that inhabit them?

### Links to Climate Change

- How will wetland ecosystems change or have to adapt as a result of climate change?
- How can I help preserve local wetlands?



### Links to City of Calgary Environmental and Climate Strategies

- **Climate Resilience Strategy (3):** Natural assets include wetlands, river banks, trees, and other green infrastructure that provide similar services to hard infrastructure. In addition to providing a critical role in preparing for climate change, trees and other green infrastructure help by sequestering carbon dioxide and reducing building energy use through cooling and shading in summer and lessening heat loss in winter (p.50).
  - **Climate Mitigation Action Plan, Program 9: Green Spaces and Natural Areas to Support Mitigation (p.51):** Actions in this Program aim to coordinate efforts across multiple City Business Units to develop processes to conserve and understand the mitigation properties of The City's natural assets in conjunction with the climate change adaptation work.
  - **Adaptation Action Plan, Program 6: Natural Assets Management (p.84-85):** Natural infrastructure can serve two different purposes: 1) everyday service provision (e.g. park space, water conveyance), 2) adaptation to climate change (tree canopy shading, absorption of stormwater).
- **Calgary Wetland Conservation Plan (10):** Wetlands play an important role in improving water quality and quantity, reducing flooding and soil erosion, providing bio-diversity, moderating climate conditions, contributing to an aesthetic urban design, and providing educational and recreational opportunities. To ensure that these benefits remain viable and sustainable for our future generations, The City of Calgary has developed the Wetland Conservation Plan, which sets priorities and explores alternatives for wetland conservation in order to guide future urban development (p.6).
- To learn more about Calgary's wetlands and what you can do to help preserve them visit [Conserving Our Wetlands \(6\)](#)



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## References

- (1) Alberta Education. (2020). Sample Lesson Plans: Science. Retrieved from LearnAlberta <http://www.learnalberta.ca/content/fnmilp/science.html>
- (2) City of Calgary. (2006). imagineCALGARY: Calgary's plan for long range urban sustainability [PDF]. Retrieved from <http://publicaccess.calgary.ca/lldm01/livelink.exe?func=ccpa.general&msgID=RTTTTryTsAK&msgAction=Download>
- (3) City of Calgary. (2018). Climate Resilience Strategy: Mitigation & Adaptation Action Plans [PDF]. Retrieved from <https://www.calgary.ca/content/dam/www/uep/esm/documents/esm-documents/climate-resilience-plan.pdf>
- (4) City of Calgary. (2019). Electric and Low-Emissions Vehicles Strategy [PDF]. Retrieved from <https://www.calgary.ca/content/dam/www/transportation/tp/documents/strategy/electric-vehicle-strategy/electric-vehicle-strategy-report.pdf>
- (5) City of Calgary. (2020). Calgary's Climate Program. Retrieved from <https://www.calgary.ca/uep/esm/energy-savings/climate-change.html?redirect=/climateprogram>
- (6) City of Calgary. (2020). Conserving our wetlands. Retrieved from <https://www.calgary.ca/csps/parks/planning-and-operations/conserving-our-wetlands.html>
- (7) City of Calgary. (2020). Drinking water and water treatment. Retrieved from <https://www.calgary.ca/uep/water/drinking-water/drinking-water-water-treatment.html>
- (8) City of Calgary. (2020). Household hazardous waste drop-off program. Retrieved from <https://www.calgary.ca/uep/wrs/garbage-collection-information/residential-services/household-chemical-drop-off-program/household-hazardous-waste-drop-off-program.html>
- (9) City of Calgary. (2020). Water treatment online tour. Retrieved from <https://www.calgary.ca/uep/water/water-and-wastewater-systems/water-treatment/water-treatment-tour/water-treatment-tour.html>
- (10) City of Calgary Parks. (2004). Calgary Wetland Conservation Plan [PDF]. Retrieved from <https://www.calgary.ca/content/dam/www/csps/parks/documents/planning-and-operations/natural-areas-and-wetlands/wetland-conservation-plan.pdf>

