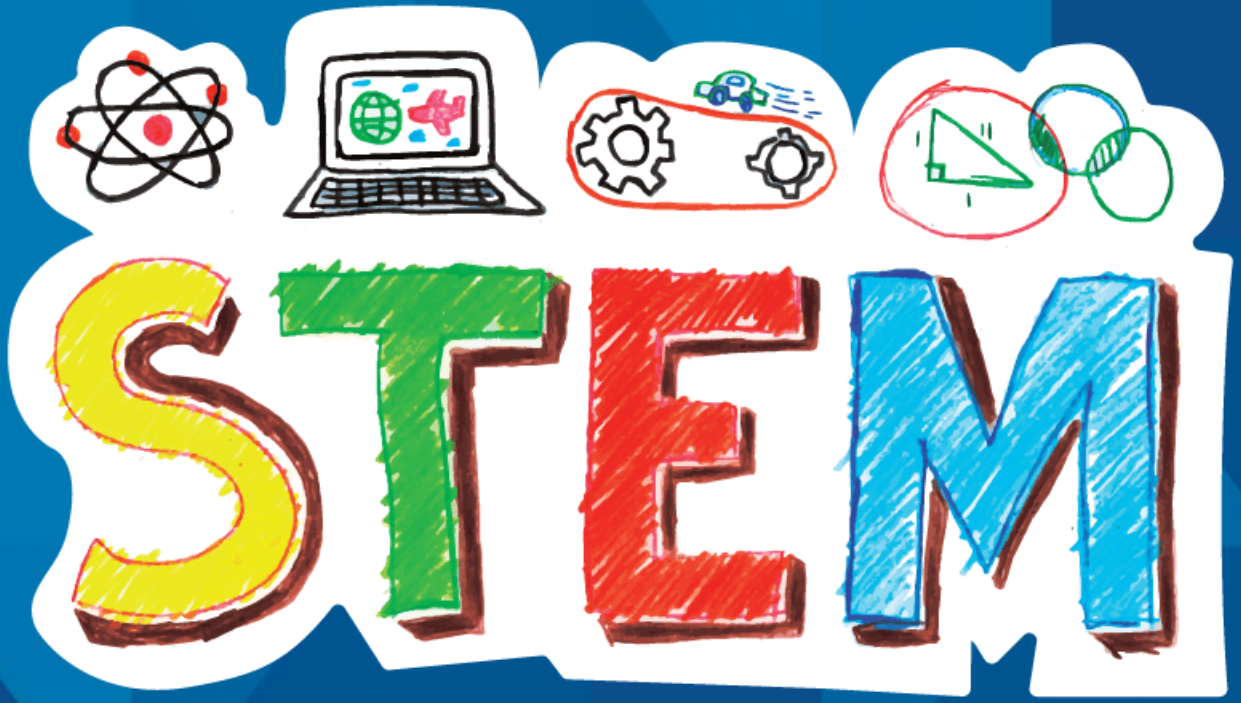
Sunrise Session
STEM In the Classroom



Friday, December 1, 2023

Grand Erie District School Board
Learn Lead Inspire

Grand Erie Land Acknowledgement

Grand Erie District School Board recognizes
Six Nations of the Grand River and **Mississaugas of the Credit First Nation**,
as the longstanding peoples of this territory.

We honour, recognize, and respect these communities as well as all
First Nations, **Métis** and **Inuit Peoples** who reside within
Grand Erie District School Board.

We are all stewards of these lands and waters where we now gather, learn and play, and commit to working together in the spirit of Reconciliation.

STEM Learning

STEM Learning and Why it Matters K - 12

STEM has grown to represent a unique approach to teaching and learning one that:

•Centers around individual students' learning styles and interests. It has something to offer every student.

•Integrates subjects in ways that connect disciplines and relate them to each other.

•Allows for students to see innovation from different viewpoints.

•Links Elementary subject and skill development to Secondary Pathway opportunities to post-secondary education and careers.

STEM Learning and Skills for the Future

Deep Learning Competencies – 6 C's

CREATIVITY
Having an 'entrepreneurial eye' for economic and social opportunities, asking the right inquiry questions to generate novel ideas, and leadership to pursue those ideas and turn them into action.

CRITICAL THINKING
Critically evaluating information and arguments, seeing patterns and connections, constructing meaningful knowledge, and applying it in the real world.

COMMUNICATION
Communicating effectively with a variety of styles, modes, and tools (including digital tools), tailored for a range of audiences.

CHARACTER
Learning to deep learn, armed with the essential character traits of grit, tenacity, perseverance, and resilience; and the ability to make learning an integral part of living.

CITIZENSHIP
Thinking like global citizens, considering global issues based on a deep understanding of diverse values and worldviews, and with a genuine interest and ability to solve ambiguous and complex real-world problems that impact human and environmental sustainability.

COLLABORATION
Work interdependently and synergistically in teams with strong interpersonal and team-related skills including effective management of team dynamics and challenges, making substantive decisions together, and learning from and contributing to the learning of others.

STEM and Pathways

Learning Through Experience

Cooperative Education Programs

oyap

ONTARIO YOUTH APPRENTICESHIP PROGRAM

SPECIALIST HIGH SKILLS MAJOR

SHSM

Ontario.ca/SHSM

Vertical Classroom Activity

Where do you see STEM?

What skills were needed to create this project?

[Indigenous thinkers reinvigorate STEM with traditional knowledge | CBC Radio]

Ready, Set, Design – Design Thinking

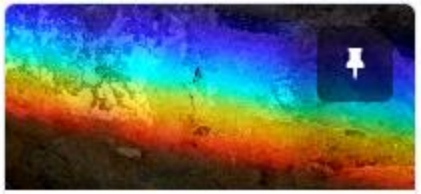
Challenge: I need to collect and carry water.

no glue, tape or scissors are allowed. excluding these items forces participants to use materials more creatively!

In the paper lunch bags

* Challenge cards (can be a slip of paper or an index card)
* Fastener items (for example, pipe cleaners, rubber bands, paper clips, string)
* Surface items (for example, coffee filters, carboard squares, balloons, paper)
* Structure items (for example, straws, tongue depressors, wood skewers, tin foil)

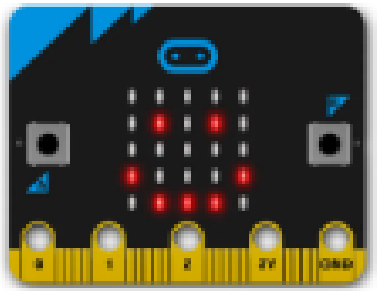
GEDSB STEM Resource Exploration



STEM Education Toolkit

Digital Resource Binder - Coding Resources

PLE: Technology for Innovation and Learning



Digital Resources for Students to Explore STEM

Britannica Scie...

Edge Factor

Gizmos

myBlueprint

OCTE | ONTARIO COUNCIL FOR TECHNOLOGY EDUCATION

PhET INTERACTIVE SIMULATIONS

Skills Compétences Canada Ontario

takeTECH

Curriculum Support Resources for Educators

Ontario Science Centre

Let's Talk Science

Science North

K2i (Grade 9)

Sustain Ontario

First Robotics

FNMIEO Ways of Knowing

UN Sustainability Goals

STAO Lesson Plans

TVO Learn

Indigenous Knowledge and Western Science

FNMI – Introduction to Indigenous Knowledge and Western Science

- Indigenous Knowledge – Preamble
- Indigenous Knowledge – Understandings and Considerations
- Indigenous Science in the Classroom
- Pedagogy – Ways of Teaching

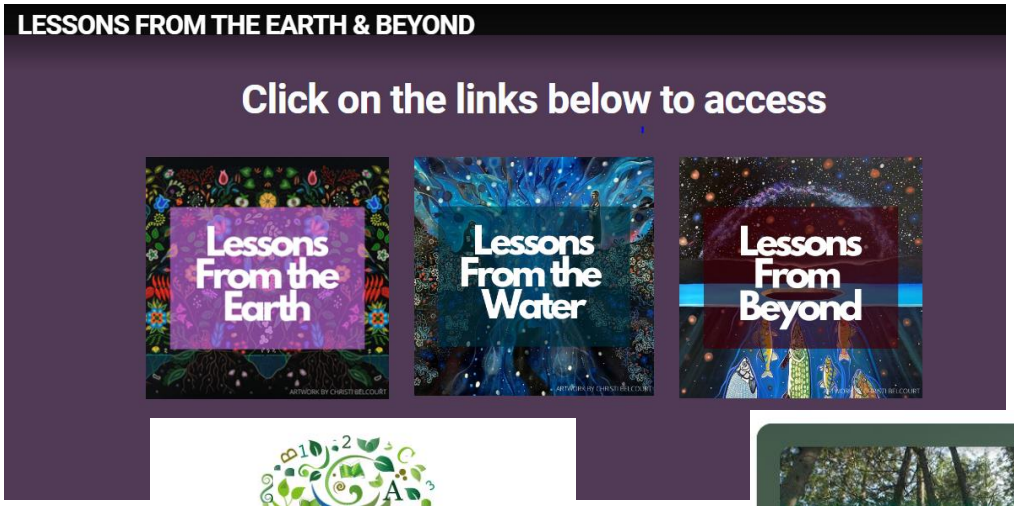
FNMI – Elementary Curriculum Resources

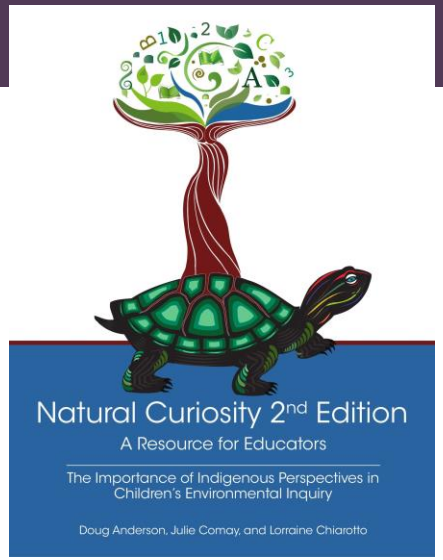
- Tree of Life
- Grades 1, 3 , 4 – Lessons in Balance and Respect
- Wild Rice Activities
  - Wild Rice Primary/Junior
  - Wild Rice Junior/Intermediate
  - Wild Rice Resources
- Grades 1-3 – Primary
  - Intermediate Manoomin (Anishinabe) or Manomin (Cre)
  - Wild Rice
- Grades 4, 5, 6, 7 – Our Relationship with Mother Earth
- Grades 4-6 – Our Relationship with Celestial Bodies
  - Our Relationship with the Stars
- Grade 5 – Fire Keeping
  - Fire Keeping-Oshkaabewis
  - Fire Keeping Matter
- Grade 8 – Water Systems
  - Water Unit task slides
  - Grade 8 Science – Water Unit
  - Presentation Slides
  - Resource Articles
  - Guide sheets

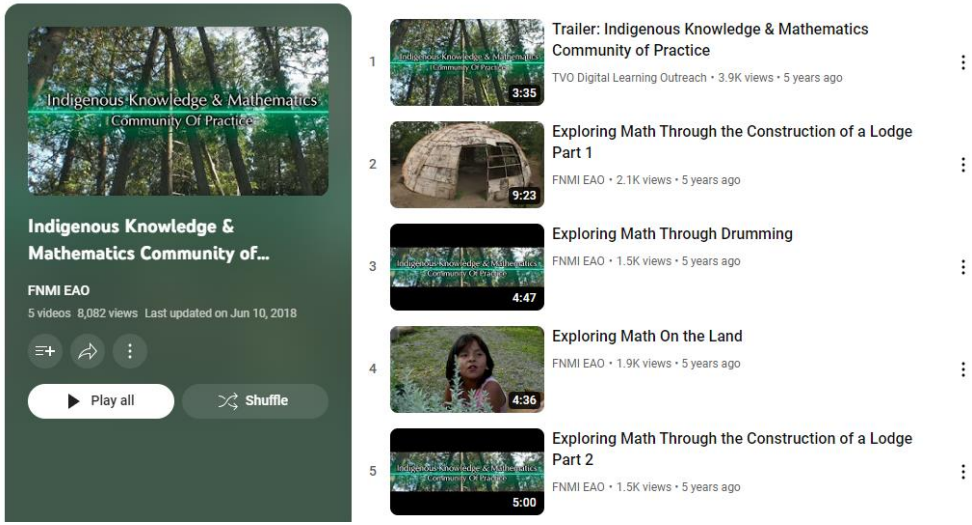
FNMI – Secondary Curriculum Resources

- Grade 9 Science
- Grades 9, 10 Science (Grassy Narrows Study)
- Grade 11 Science – Biodiversity
- Grade 11 Biology
- Grade 9-12 Science (Profiles of Indigenous Scientists)
- Grades 10, 11, 12 Science
  - Case Studies for Indigenous Science
  - Climate Change in the Arctic Study

Indigenous Knowledge and Math

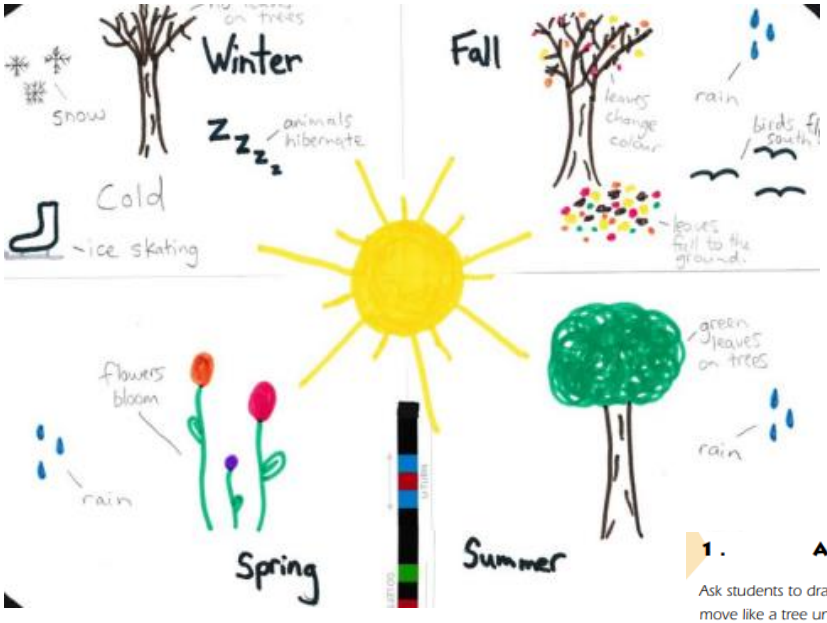


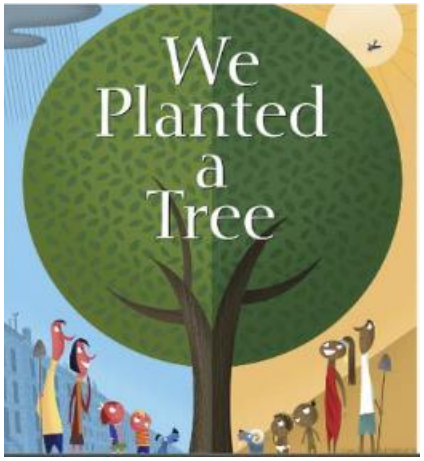


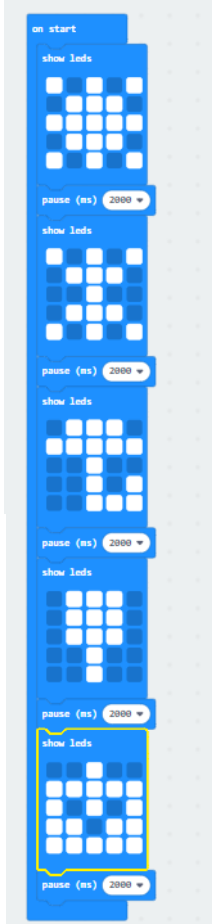


Grade 1- Sequential Events

creating clear and precise instructions for simple algorithms







[Creating Patterns and Code, and Making Predictions about them Grade 1 - Teaching and Learning Math: Long Range Plans - GEDSB]

1. A TREE'S FEELINGS

Ask students to dramatize how a tree would "feel," using large and small muscle movements to move like a tree under the following conditions:

- a gentle spring breeze
- a violent autumn windstorm
- pelting rain
- a summer forest fire
- having bare limbs in the winter
- a squirrel running up its trunk
- a bird nesting in its branches
- a person climbing it
- someone cutting it down

Source: [The Learning Circle Ages 4 to 7]

Grade 2- Concurrent Events

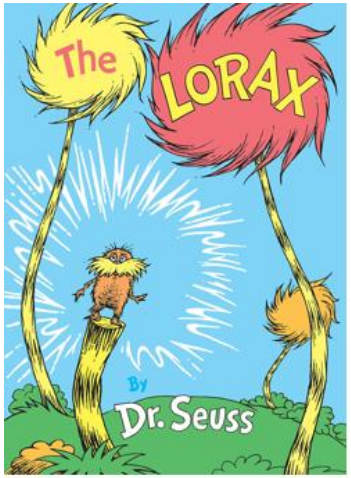
decomposing problems into smaller steps

[Using Coding to Show Equivalent Relationships Grade 2 - Teaching and Learning Math: Long Range Plans - GEDSB]

[Growing Poems (kidsgardening.org)]

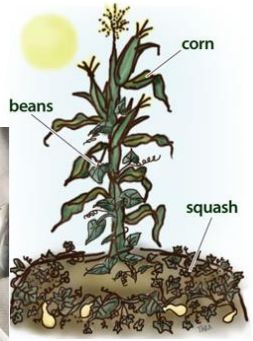
Grade 3- Repeating Events

testing, debugging, and refining programs

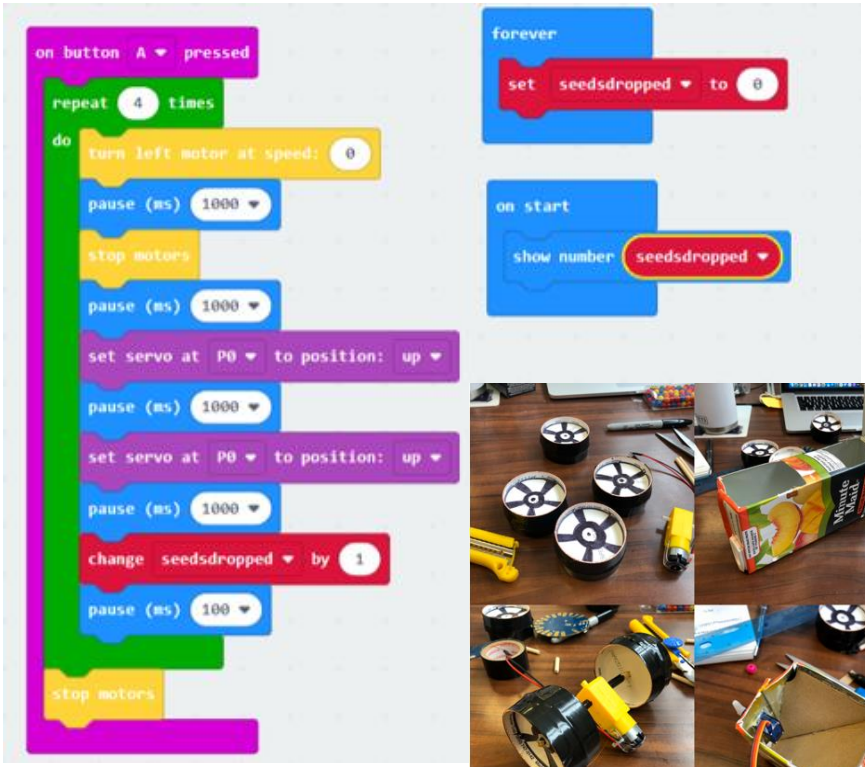


[Happy Maps]

[Using Coding to show Equivalent Relationships Grade 3 - Teaching and Learning Math: Long Range Plans - GEDSB]



[Three Sisters]



Meal 1: Breakfast		Meal 2: Lunch		Meal 3: Dinner		Snacks	
Dish	Ingredients	Dish	Ingredients	Dish	Ingredients	Dish	Ingredients
Porridge	Oats						
	Milk						
	Raspberries						
	Brown sugar						
Fruit salad	Orange						
	Apple						
	Watermelon						
Toast	Whole wheat bread						
	Peanut butter						
Water	Water						
...							

[WHAT DOES BIODIVERSITY HAVE TO DO WITH THE FOOD WE EAT?]

[Deforestation- Background Information]

[Deforestation- Coding a Tree Planter]

Grade 4- Nested Events

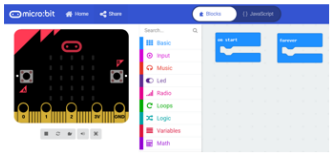
producing different types of output for a variety of purposes

[Creating Patterns and Code, and Making Predictions about them Grade 4 - Teaching and Learning Math: Long Range Plans - GEDSB]

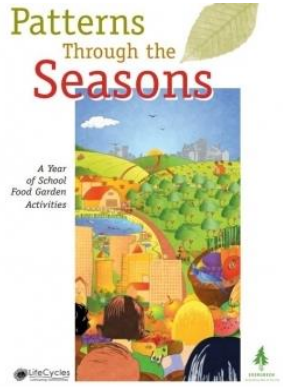
[Patterns-Seasons.pdf (evergreen.ca)]

Creating LED nature art

- We will create LED representations of some plants/animals we found on our nature walk.
- What steps will we need to take to create our LED nature art?



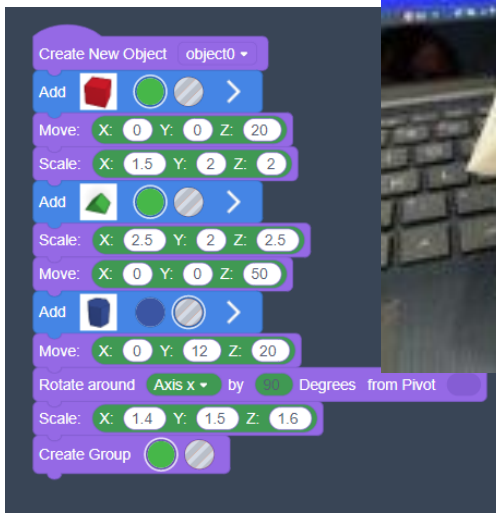
[Nature Art with Micro:bits]

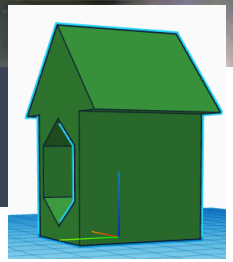


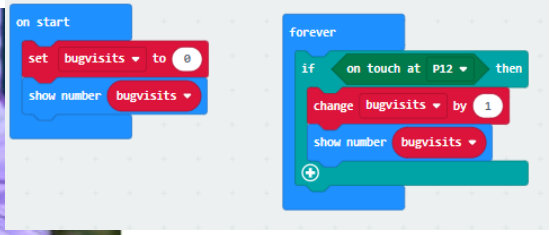
[Garden project in Six Nations connects youth with land and each other | CBC News]

using different methods to store and process data for a variety of purposes

Grade 5- Conditional Statements







[Plants and Pollinators- Background Information]

[Plants and Pollinators- Coding a Bee Sensor]

Earth: It's Everybody's Home
A Look at How Young People Are Protecting Our Planet

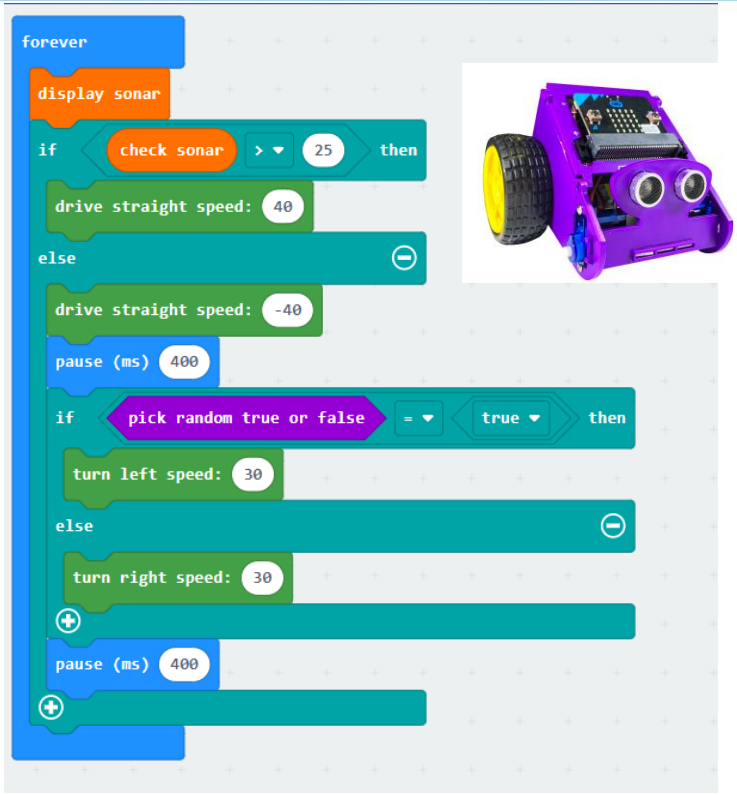
[Earth is Everyone's Home]

[Creating, Describing, and Performing Transformations Grade 5 - Teaching and Learning Math: Long Range Plans - GEDSB]

Make space for Indigenous knowledge keepers, Elders, and community partners in your schools. Value stories and the importance of oral tradition, many of the "whys" are taught to us through stories. Give yourself time to reflect and make your own meaning from the stories Elders and knowledge keepers share with you. Remain open to other perspectives and worldviews, we exist together (e.g., [Two Row Wampum] and [Dish With One Spoon]). **Source**: [ETFO Learning From the Land Resource]

Grade 6- Efficient Code

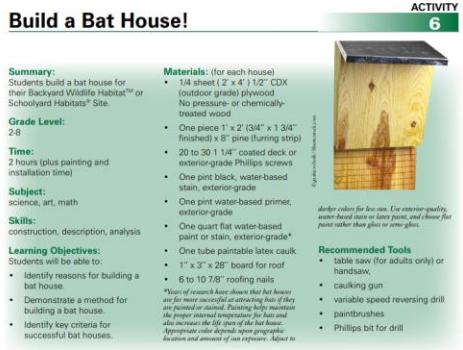
obtaining input in different ways for a variety of purposes



[Bats (nwf.org)]

[Ontario Bat Guide]

[Indigenous research into little brown bats aims to help species survive | CBC News]



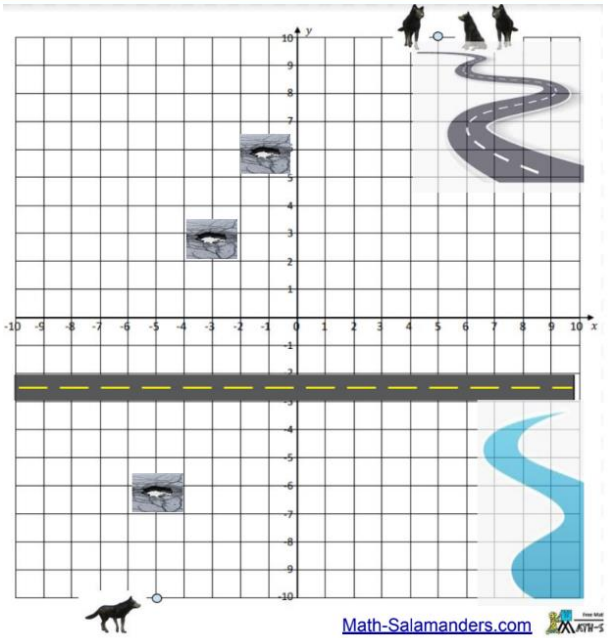
[Night_Friends.pdf (pwnet.org)]

[How do Wind Farms Affect Birds and Bats?]

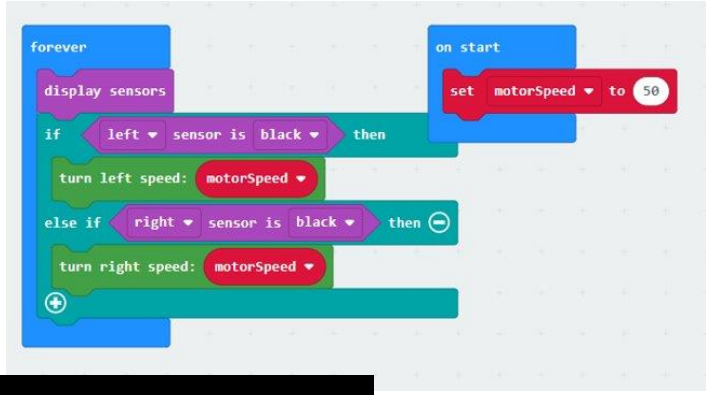
[Coding can be used to create patterns, check predictions, and simulate probabilities Grade 6 - Teaching and Learning Math: Long Range Plans - GEDSB]

Grade 7- Subprograms

planning and designing programs

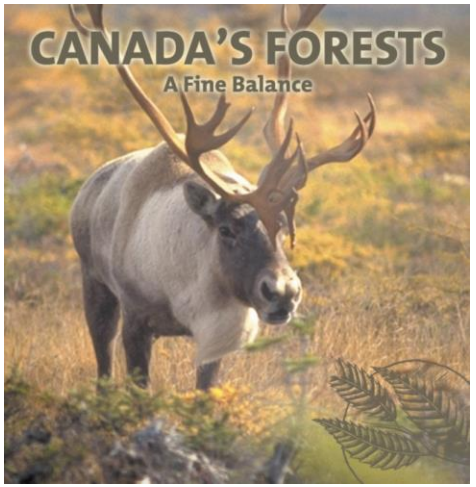


[Lesson and Assessment Plan - Get the Wolf to her Pups](#)



[Creating, describing, and performing transformations Grade 7 - Teaching and Learning Math: Long Range Plans - GEDSB](#)

[How Indigenous land-based learning can help fight climate change | TVO.org](#)

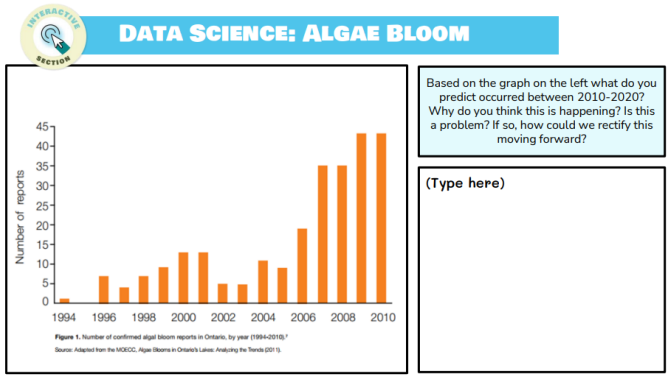


[Canadas_Forest_Teaching_Kit_Vol5.pdf (resources4rethinking.ca)](#)

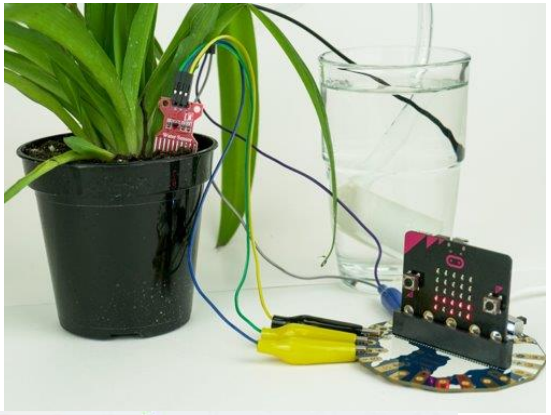
Grade 8- Data Analysis

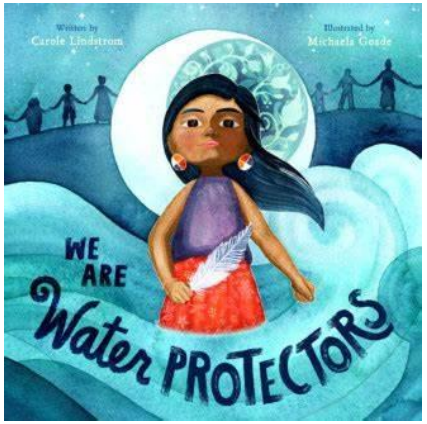
automating large systems in action

Learn Lead Inspire



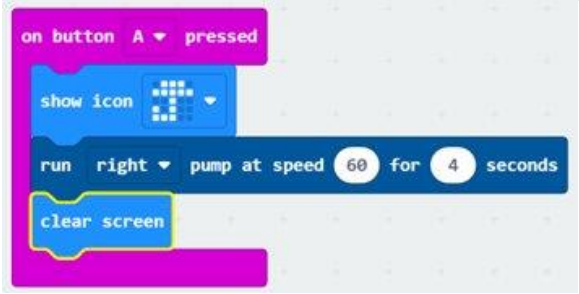
[Advanced Agriculture – Background Information]





[Safe Water for First Nations | The Council of Canadians]

[Nestle-and-First-Nations_-3.pdf (stao.ca)]

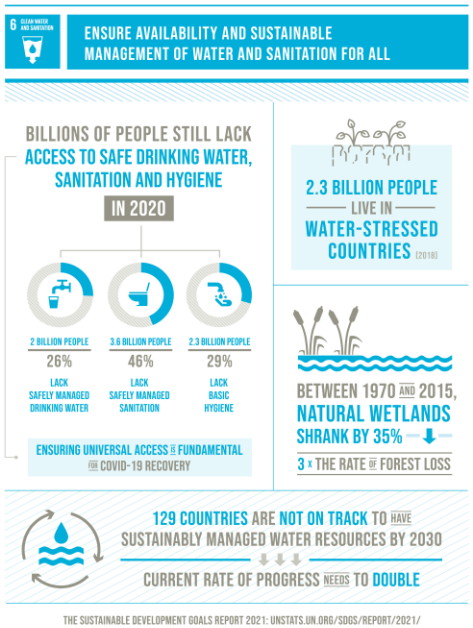


[Advanced Agriculture – Coding for Water Pump]

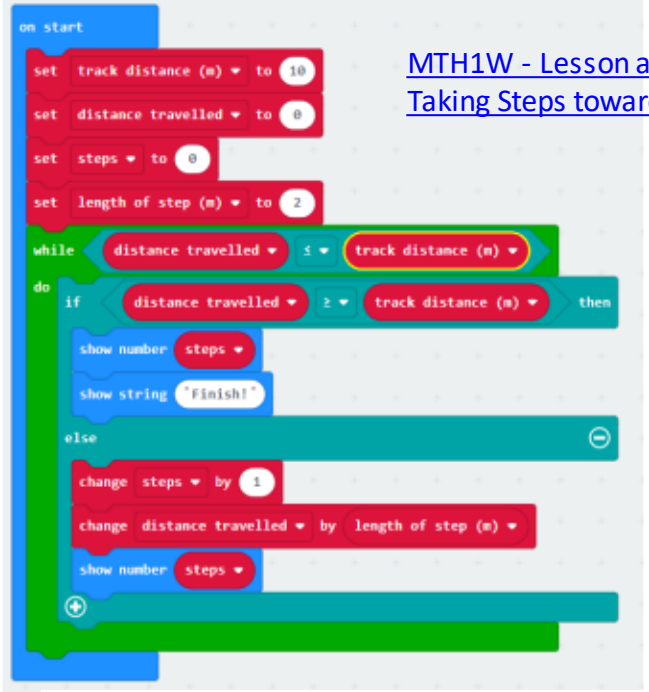
1. Activity	2. Frequency (# of times) or minutes spent	3. Total frequency or minutes	4. Water use rate	5. Total volume (L) of water used
Shower with regular shower-head (total minutes)			20 L/min	
Shower with low-flow shower-head			10 L/min	
Outdoor hose			35 L / min	
Toilet flushing			17 L / flush	
Hand washing			8 L	
Brushing teeth with tap running			10 L	
Brushing teeth, turning tap off between water use.			0.5 L	
Bath (half full)			30 L	
Bath (1/3 full)			20 L	
Bath (full tub)			60 L	
Washing dishes by hand			35 L	
dishwasher			40 L	
Washing clothes			225 L	
Drinking glass of water				
Sip from water fountain				
Other:				

Source: Sustainable Schools Water Use Pg 36

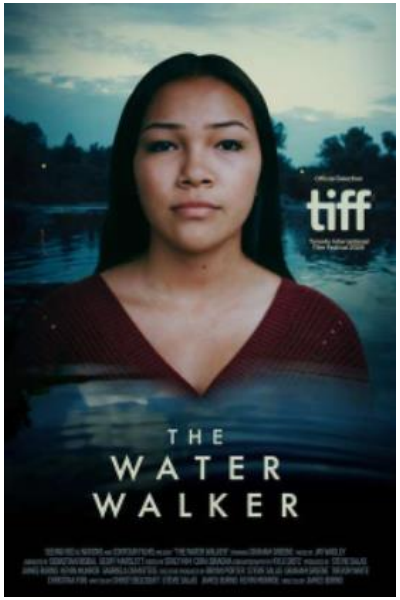
Grade 9 – Cross Curricular



Goal 6 | Department of Economic and Social Affairs



MTH1W - Lesson and Assessment Plan - Taking Steps towards Coding



Walking for water

- How do you think walking for 8 hours a day impacts on Aysha's life?
- Why does the 'Water Burden' impact women & girls most?
- Estimate how far Aysha walks every day (8 hours, 4 stops of 15 minutes, average pace of 4k per hour, 1km = approx 1500 steps).

Walking for water | micro:bit

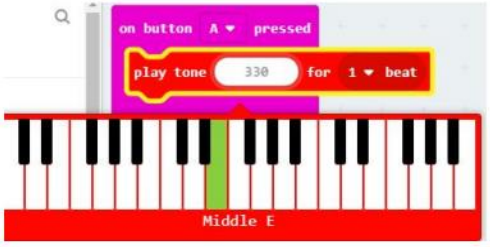
Grade 9 - Exploring Technologies

[Fatigue Test Case Study Lesson](#)
[Code for Case Study](#)

[Energy awareness | micro:bit (microbit.org)](#)

[Rogers Communication Challenge](#)

[Health tech | micro:bit (microbit.org)](#)



[Micro:Music](#)

[Design a Food Temperature Probe](#)

[Night safety | micro:bit (microbit.org)](#)

[Build models to Understand and Mitigate Brain Injury](#)

Have any Questions?

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