Professional Learning – Coding Series



Land Acknowledgement

Anishinaabe Territory

Robinson-Huron Treaty

Located on the traditional lands of

Atikameksheng Anishnawbek





schools.sciencenorth.ca/virtual-learning-packages

VIRTUAL LEARNING PACKAGES

VIRTUAL LEARNING

SMALL SCHOOL PACKAGE

MEDIUM SCHOOL PACKAGE

LARGE SCHOOL PACKAGE

SYNCHRONOUS E-WORKSHOPS Science North is pleased to offer Ontario schools virtual learning packages. We understand that experiential learning is of utmost importance for students and with new guidelines and field trip restrictions in place, why not go virtual?! Purchasing a virtual learning package for your school means that all students in the school will have the opportunity to participate in dynamic live shows, engaging synchronous workshops, and be able to drive their own experience by asking our Scientists anything!

Let Science North support your curriculum with our customizable packages.





JUST FOR TEACHERS

TEACHERS

TEACHERS WORKSHOPS EDUCATOR RESOURCES SCIENCE AT HOME TEACHERS ACCESS PASS SUBSCRIBE TO SCIENCE.

SUBSCRIBE TO SCIENCE-ATIONAL NEWS!

TEACHERS WORKSHOPS



Science North has developed a series of dynamic teacher workshops that will bring the Ontario Science and Technology Curriculum to life. Each workshop is designed to give teachers the confidence and resources they need to investigate and explore the scientific concepts involved. These workshops involve teachers in fun, hands-on activities that are easily reproduced for the classroom at little or no cost.

COVID UPDATE

<u>schools.sciencenorth</u> <u>.ca/just-teachers</u>



education.sciencenorth.ca





Workshop Goals

Science North is dedicated to getting **students excited** and **thinking about science**. We aim to provide teachers with **innovative**, **hands-on activities** and **creative learning tools** that make learning more meaningful and fun.

Motivate students:

- Connect to their interests.
- *Highlight relevance of material.*
- Use real-world examples.
- Choose challenging activities.
- Boost confidence.

Promote active learning:

- Use a group or individual activity.
- Challenge them to solve a problem.



Be efficient– Gr 5/6

Part 1 – January 25, 2021

- Unplugged Activities
 - Lesson Plan
 - Slides
 - Fuel Consumption Handout
 - Energy Efficient Homes and Appliances Handout
 - Coding Efficiency Handout
- Debugging Activity
 - Lesson Plan
 - Slides
 - Debugging Handout
 - Computers with web access (Scratch)

Part 2 – January 26, 2021Coding Math Activity

- Lesson Plan
- Slides
- Coding Handout
- Computers with web access (MakeCode)
- Micro:bits **Optional



Curriculum Connections

Math

Algebra: Coding

C3. solve problems and create computational representations of mathematical situations using coding concepts and skill

Specific Expectations

C3.1 solve problems and create computational representations of mathematical situations by writing and executing code

C3.2 read and alter code and describe how changes to the code affect the outcomes

Financial Literacy; Money and Finance

C3. demonstrate the knowledge and skills needed to make informed financial decisions

Specific Expectations

F1.5 calculate unit rates for various goods and services, and identify which rates offer the best value

Science

Conservation of Energy and Resources

•Conservation is one way of reducing the impacts of using energy and resources

Overall Expectations

•Analyse the immediate and long-term effects of energy and resource use on society and the environment, and evaluate options for conserving energy and resources

Specific Expectations

1.2 evaluate the effects of various technologies on energy consumption

3.1 identify a variety of forms of energy and give examples from everyday life of how that energy is used



Unplugged Activities Efficiency – 3 ways!

Fuel Efficiency

Financial Literacy

Energy Efficiency

• Financial Literacy

• Coding Efficiency

Coding



54 hr (4,969 km)

2 < 🖶

via SK-16 W and BC-97

A Your destination is in a different time zone.

100 Ramsey Lake Rd

Sudbury, ON P3E 5S9

Get on Trans-Canada Hwy/Hwy 17/ON-17 from Greater Sudbury Regional Road 80 S

9 min (5.6 km) –

Continue on Trans-Canada Hwy/Hwy 17. Take ON-17 N, Trans-Canada Hwy, ON-17 W, Trans-Canada Hwy, ... and Yukon 1 W to S Access Rd/Robert Service Way in Whitehorse

53 hr (4,958 km) -

Continue on Robert Service Way. Drive to Secret Mission St

6 min (5.2 km) —

Whitehorse

Yukon

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.





Vehicle Make and Model	Fuel	Distance to	L of fuel	Gas price**	Total Fuel Cost
	Consumption	travel*	required		
Car - Toyota Yaris	6.6 L/100 km	10 000 km		106.4¢/L	
Car - Mini Cooper 3 door	7.5 L/100 km	10 000 km		106.4¢/L	
Car - Lamborghini	21.4 L/100 km	10 000 km		106.4¢/L	
Aventador					
Truck - Ford F-150	10.6 L/100 km	10 000 km		106.4¢/L	
Truck - GMC Sierra	11.1 L/100 km	10 000 km		106.4¢/L	
SUV - Chevrolet Suburban	13.4 L/100 km	10 000 km		106.4¢/L	
SUV - Hyundai Santa Fe	9.6 L/100 km	10 000 km		106.4¢/L	

Vehicle Make and Model	L of fuel required	Emissions per L	CO ₂ emissions
Best - Toyota Yaris		2.3kg/L	
Worst – Lamborghini Aventador		2.3kg/L	





SCIENCE

Unplugged Activity 2

Dryer rating	Length of dry	How many watt- hours?	How many kilowatt-hours?
3 000W	½ an hour or 0.5hr	1 500 Wh	1.5 kWh
5 000W	1 hr		
1 800W	45 min or 0.75hr		
2 500W	1 hr		

Dishwasher rating	Length of cycle	How many watt- hours?	How many kilowatt-hours?
2 400W	½ an hour or 0.5hr	1 200 Wh	1.2 kWh
1 200W	1 hr		
1 800W	45 min or 0.75hr		
2 000W	1 hr		



Unplugged Activity 3



Repeat yearly Bring to vet

> Repeat monthly Clean terrarium

> > Repeat weekly Add clean water

> > > Repeat daily Feed once



Debugging Activity

- Can you identify a pattern in this code?
- Which code blocks repeat?
- How many times does the code repeat?
- Can you predict what the code is doing?















Debugging in Scratch

- Debug 1 On and Off Again: <u>bit.ly/369a0Qm</u>
- Debug 2 High Score: <u>bit.ly/3sXcZFx</u>
- Debug 3 Making Shapes: <u>bit.ly/39e7fiA</u>







Coding Math Activity – Microsoft MakeCode

www.microsoft.com/en-ca/makecode

Hands on computing education

Microsoft MakeCode brings computer science to life for all students with fun projects, immediate results, and both block and text editors for learners at different levels.



Coding Math Activity – Home automation

• Code a more efficient light

• Code a thermostat







Coding Math Activity – BBC micro:bit

microbit.org/



- Power Source
 - Batteries: Store chemical energy and transform it into electrical energy
- Sensors
 - Accelerometer: detects movement based on changes in gravitational potential energy
 - Temperature sensor: detects heat energy
 - Light sensor: detects light energy
 - Digital Compass: detects magnetic fields
 - Buttons: detects electrical energy (require some muscular energy to activate)
 - Touch sensor(logo): detects changes in capacitance (changes when you touch it)
- Outputs
 - 25 LEDs: transform electrical energy into light
 - Speaker: transforms electrical energy into sound



Code a light that is always on





💿 micro:bit 🕋 Home < Share		t	Blocks		ş	Pythe	on	~				?	٠		Mic	osoft
Se	earch	Q	+	+	+	+	+	+	+	+	+ + +	+	+ +	+	+	+ +
	Basic															
	Input										forever					
	Music										show leds		+			
	O Led											╉╋╴	+			
	Radio												+			
	C Loops											╉╋	+			
0 1 2 3V GND 2	C Logic															
	Variables										+ + +	+				
	Math															
	 Advanced 															
				+									+ + + +			
🕹 Download 🛛 🚥	Energy conservatio	on - the		0	Ó								2	٩	•	O



Add a conditional statement (If/Then)



Add a sensor

💿 micro:bit 🏾 🖓 Home 🛛 < Share		ἐ Blocks 🛛 🧔 Python	·	?	٠	Microsoft
	Search C III Basic O Input Input	on pin P0 → pressed button A → is pressed acceleration (mg) X → pin P0 → is pressed light level compass heading (°) temperature (°C) is shake → gesture micro:bit (V2)		f true	the	
🕹 Download 🛛 🚥	Energy Conservation -	lig 🕒 🙃	0	ر ر	5	۹ 9



Set the threshold for the sensor to activate the light









Q





Test the code by sliding the light level on the light sensor

💿 micro:bit 🕋 Home < Share	🖹 Blocks 🗬 Python 🗸	?	٠
	Search Q	- + +	+
	Basic forever	+ +	
	O Input Input If Iight level < ▼ 100 ther	n	
	••• more show leds		
· •	Music		
	€ Led		
\bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc \bigcirc	I Radio		
0 1 2 3V GND	C Loops		
	C Logic ⊕		
	■ Variables		
	Hath		
	✓ Advanced		
	+ + + + + + + + + +		



Add an Else to the conditional statement





Code a thermostat using an If/Then statement





Use the temperature sensor and set a threshold



NORD

NORTH

Add an Else to the If/Then statement





Add an Else to the If/Then statement





Code a thermostat with a heater and an air conditioner





Puchasing BBC micro:bit



 Follow the link below to a list of all canadian resellers for micro:bits

microbit.org/buy/?location=CA



Thank You!!



educators@sciencenorth.ca

