Environmental monitoring systems (temperature)	Gr 5 - Conservation of Energy & Resources

Slideshow Speaker Notes

Slide 2: Introduction – Climate Tech

Link to YouTube video by Yale on Climate Tech: https://youtu.be/2TcdEryPQ8E. English only.
Photo credit https://www.publicdomainpictures.net/en/view-image.php?image=310545&picture=climate-change

Slide 3: Introducing Micro:bits

What are micro:bits?
If you are new to micro:bits you will need a few lessons just to get started!

1. Lesson one: What is a Micro:bit, how do you code it and pair/download? (Follow the linked videos and websites/tutorials for more information.)

The love meter is a great tutorial that also teaches about conduction!

1. Lesson two: Explore Micro:bit Tutorials, try a few that use addons like lights and speakers
2. Lesson 3-4+: Follow the slides.

Video prompt - https://www.youtube.com/watch?v=u2u7UJSRuko

Also see this website with a great series of introductory coding lessons to learn how to use micro bits, debug, and get going!
https://sites.google.com/gshare.blackgold.ca/blackgoldMicro:bit/Micro:bit

Slide 4: Computational Thinking – Inputs and Outputs

https://Micro:bit.org/get-started/user-guide/features-in-depth
Video prompt https://www.youtube.com/watch?v=NkoS2JXaBuM

Slide 7: 1. Temperature Sensor

Go to https://makecode.Micro:bit.org/ and start a new project (+) - type in the above code, download and try it out!

Thermometer lesson https://www.Micro:bit.org/projects/make-it-code-it/thermometer/

Hex Files https://drive.google.com/drive/folders/1_B0ZV4W7F-lN2cwkuQs65mvhmUEe8GSd?usp=share_link

Slide 8: Radio Temperature

Have students pair up - requires two Micro:bits
Each group needs to "set radio group" to a **unique number** for their group - this one says 23.

They will be able to put one Micro:bit inside a fridge, greenhouse, car, or other area and be able to measure the temperature over Bluetooth.

https://www.Micro:bit.org/projects/make-it-code-it/indoor-outdoor-thermometer/
Hex Files https://drive.google.com/drive/folders/1_B0ZV4W7F-lN2cwkuQs65mvhmUEe8GSd?usp=share_link

Or see this example that works well too!.https://docs.google.com/document/d/19qkNdNkG9r8ZIEBnCaGC2OpJj0fJQfFEw_3QymytyCQ/edit?usp=sharing

Slide 9: Temperature Alarm

Hex Files https://drive.google.com/drive/folders/1_B0ZV4W7F-lN2cwkuQs65mvhmUEe8GSd?usp=share_link

You can do this both WITH or WITHOUT a speaker.
V2s have a built-in speaker. V1s you can add them on as an accessory
https://www.pishop.ca/product/speaker-for-Micro:bit/

Slide 10: Advanced Temperature Alarm

For this lesson you would need accessories like a motor (https://www.pishop.ca/product/Micro:bit-servo/) and light bulb (https://www.pishop.ca/product/Micro:bit-red-led/)

Extension - students could build model energy efficient homes or greenhouses!

Slide 11: Debugging

Photo credit - https://freesvg.org/debugging

Slide 12: Consolidation

Photo credit - https://www.pexels.com/photo/teenager-looking-through-binoculars-in-during-hiking-through-forest-10431313/

Other automation ideas:

- Watering systems – slide 15.
- Water use alarm
- Automated lights
- Carbon sensors (https://www.pishop.ca/product/co2-sensor-for-Micro:bit/) and alarms

Slide 13: Extension - Solar Power

Solar Power banks for Micro:bit- https://www.pishop.ca/product/solar-bit-solar-powered-battery-for-micro-bit/

Slide 14: STEM Extension

See full lesson plan here:
https://docs.google.com/document/d/1X6FeANka2qcMC2ZFQgSSxEoHxsQc--6a0Pk9xxMOwE8/edit

Photo credit https://pxhere.com/en/photo/1587953

Slide 15: Extension – Energy Transformation

In this other Micro:bit project students built an automated watering system to care for their classroom gardens.
They made the system solar powered and then drew a circuit diagram.
Students then labeled the energy transformations throughout the system.

Watering System - https://sites.google.com/gshare.blackgold.ca/blackgoldMicro:bit/Micro:bit/grade-7-Micro:bit
Circuits with Micro:bits -
https://sites.google.com/gshare.blackgold.ca/blackgoldMicro:bit/Micro:bit/grade-9-Micro:bit

Slide 16: Accommodations

If you do not have a Micro:bit you have two options:

- Do the coding right in MakeCode: https://makecode.Micro:bit.org/ and see the emulator on the left of the screen show you what it would look like
- Head to Tinkercad: https://www.tinkercad.com/blog/explore-Micro:bit-with-tinkercad and try their circuit builder and simulator - **more advanced so practice beforehand.**

Slide 17: Additional Resources

https://sites.google.com/gshare.blackgold.ca/blackgoldmicrobit