6th Grade Science
STEAM Integration

Unit 7: Earth's Changing Climate	Topic: Coding and Robotics	Time: 3 Days

Standards:

ESS3-3: Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment

ESS3-5: Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

ISTE 1.4 Students use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions.

ISTE 1.6 Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats and digital media appropriate to their goals.

Scenario	The world is heating up—and fast. As global temperatures rise due to increased greenhouse gases, glaciers and ice caps are melting at alarming rates, leading to rising sea levels and major changes in climate. Scientists and engineers are racing to find ways to protect the ice before it's too late. You've been recruited by the World Climate Institute as a junior climate engineer. Your mission is to design and build a small model using everyday materials that can protect a block of ice from melting in a warm environment. Your model will simulate real-world solutions being tested to slow ice melt and reduce the impact of climate change.
Success Criteria	Students can use micro:bit to simulate how greenhouse gases increase Earth's temperature using variables, conditionals, and visual output.

Lesson Outline	Day 1 – Science + Simulation Planning
	Warm-Up (10 min):
	"How could we simulate something invisible like CO_2?"
	Mini-Lesson (15 min):
	• Quick review of the greenhouse effect: sun's energy enters → some escapes → more trapped when CO_2 increases
	• Translate into code:
	  ○ Variable: CO_2 level
	  ○ Input: button press = adding CO_2
	  ○ Output: rising temp on LED display
	  ○ Use of loops or visual warnings at thresholds
	Planning (20 min):
	Students complete a simulation plan:
	• What will button A do? (e.g., increase CO_2)
	• What will happen as CO_2 rises?
	• How will you show temperature change? (LED bar graph, numbers, emoji faces?)
	
	Day 2 – Code the Greenhouse Effect

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	Studio Time (Full Period):
	Students code their simulations using MakeCode. Encourage:
	• Use of a CO_2 variable (e.g., starts at 0, increases with button press)
	• Conditional statements:
	  ○ If CO_2 > 20, show 😓
	  ○ If CO_2 > 40, scroll "TOO HOT!"
	  ○ If CO_2 = 0, scroll "CLIMATE SAFE"
	• Optional: Use temperature sensor for extra realism (v2 micro:bit only)
	• CODE: CO2 Code
	Stretch goals:
	• Add "cooling button" (B) to simulate climate action
	• Add sound for alerts
	• Use loops to show time passing and gradual increase
	
	Day 3 – Test, Present & Reflect
	Showcase (25 min):
	• Students demonstrate their greenhouse simulators
	• Explain the coding logic + the science behind it
	• Peer feedback: "What's clear? What's confusing?"
	Reflection (15 min):
	Students respond:
	• How did your simulation model the greenhouse effect?
	• What part of the science was hardest to show in code?
	• How could simulations like this help people understand climate change?

Resources	Microbit: https://makecode.microbit.org/ CO2 Code: CO2 Code