Maple Bytes: Traditions, Science, and Technology

Grade Level: 5–6
Duration: 3–4 class periods (40–60 minutes each, or can be expanded)
Subjects: Social Studies, Science, Computer Science, Wabanaki Studies

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Learning Objectives

By the end of this unit, students will:

1. Understand the cultural importance of maple syrup harvesting to the Wabanaki.
2. Explain traditional methods of maple syrup collection and how the Wabanaki stewarded the sugar bush for future generations.
3. Collect and analyze environmental data (temperature, light) using micro:bits.
4. Connect cultural traditions with modern scientific and technological tools.
5. Reflect on sustainability and respect for natural resources.

Materials

- Articles, stories, or videos on **Wabanaki maple syrup traditions** (teacher-selected, culturally appropriate sources), and map of Maine showing Wabanaki homelands.
    - Maple Bytes: Wabanaki & Maple Syrup Resources
- Buckets (or plastic containers) and spouts for tree tapping.
- Drill for tree tapping
- Piping for sap
- Access to nearby maple trees.
- Evaporator and equipment
- **micro:bits** with sensors (temperature and light).
- Computers or tablets for coding micro:bits.
- Graph paper or spreadsheets for recording data.
- Chart paper, markers.

Part 1: Cultural Foundations

Subject: Social Studies & Cultural Learning
Time: 1 class period (45–60 minutes)
Grade Bands: 3–5, 6–8 (adaptable)

Learning Objectives:

Students will:

- Describe the cultural significance of maple sugaring in Wabanaki communities.
- Explain traditional sugaring practices and how they have changed or continued over time.
- Understand stewardship practices used to maintain a healthy "sugar bush."
- Compare past and present techniques for tapping and boiling sap.
- Reflect on cultural values such as respect for land, sustainability, and community.

Standards Alignment

Maine Learning Results – Social Studies

History (D1):

- D1.3–5a / D1.6–8a: Analyze primary and secondary sources about cultural practices and traditions.
- D2.3–5 / D2.6–8: Describe how cultural traditions influence community life and resource use.

Civics & Government (C):

- C1.3–5 / C1.6–8: Explain how groups make decisions based on cultural values and shared responsibilities.
- C2.3–5 / C2.6–8: Describe traditions of stewardship and community.

Geography (B):

- B1.3–5 / B1.6–8: Explain how people use, adapt to, and care for their environment.

Wabanaki Studies (Maine LD 291 Requirements)

- Cultural Knowledge: Understand that the Wabanaki have distinct cultural traditions connected to the land.
- Sustenance & Stewardship: Describe traditional ecological knowledge and practices of caring for natural resources.
- Historical Continuity: Recognize that Wabanaki cultural practices continue today.

Computer Science (optional light tie-in)

CSTA 1A/1B – Data Literacy:

- Access and interpret information from multimedia sources (video, maps, diagrams).

Materials:

- Short video or article on Wabanaki maple sugaring (teacher-selected; I can provide curated options if you want)
- Images of traditional tools, boiling structures, and sugar camps
- Chart paper or whiteboard
- Exit ticket slips
- Optional: maple syrup tasting, bark samples, or wooden tapping replicas
- Optional: guest speaker or video message from Wabanaki educator, community member, or cultural center (e.g., Nibezun, Wabanaki Public Health & Wellness)

Lesson Plan

1. Hook – "Where Does Maple Syrup Come From?" (5 minutes)

Ask students:

- "Have you ever had maple syrup?"
- "Where do you think it comes from?"
- "Who were the first people to make maple syrup here?"

Collect answers briefly on the board.

Transition: Explain that long before Maine became a state, the Wabanaki people developed ways to harvest sap and turn it into syrup and sugar—and continue these traditions today.

2. Learning About Wabanaki Sugaring Traditions (15–20 minutes)

Articles, stories, or videos on **Wabanaki maple syrup traditions** (teacher-selected, culturally appropriate sources), and map of Maine showing Wabanaki homelands.

Maple Bytes: Wabanaki & Maple Syrup Resources

Option A: Read Aloud (article or picture book excerpt)

Choose a culturally accurate resource describing:

- How maple trees were tapped using carved wooden or bone tools.
- Birchbark or wooden containers used to collect sap.
- Boiling sap over open fires in hollowed logs with hot stones.

- Syrup used not only as food, but for nutrition, trade, and community gatherings.

Option B: Watch and Discuss (video)

Show a short clip about Wabanaki maple-sugaring traditions.
Students jot down or sketch:

- Tools
- Techniques
- How the community worked together
- Cultural values (respect for land, gratitude, sustainability)

3. Mini-Lesson: Tradition, Change, and Continuity (10 minutes)

Explain:

- Many Wabanaki sugaring methods have thousands of years of history.
- Some tools and methods changed (metal taps, evaporators), but values stayed consistent.
- Stewarding the "sugar bush" means:
  - Only tapping healthy trees
  - Not overtapping
  - Protecting forests
  - Ensuring maple trees thrive for future generations

Prompt students: "What does this tell us about how the Wabanaki viewed their relationship with the land?"

Chart student responses such as:

- Stewardship
- Respect
- Gratitude
- Sustainability
- Providing for community
- Long-term thinking

4. Whole-Class Discussion – Why does syrup matter? (10 minutes)

Use these prompts:

- "Why is maple syrup important beyond being food?"
- "How did it support community life?"
- "How did the Wabanaki ensure the sugar bush stayed healthy?"
- "How do traditional ecological practices help us today?"
- "What values are reflected in these traditions?"

Encourage connections to modern sustainability and land stewardship.

5. Exit Ticket – What Did You Learn? (5 minutes)

Students complete **one** of the following:

- **Write:** One thing they learned about how the Wabanaki cared for maple trees.
- **Draw:** A tool, practice, or scene showing traditional sugaring.
- **Explain:** A cultural value connected to maple sugaring.

Collect as assessment and reflection.

Extensions (Optional)

- **STEAM Connection:** Compare traditional carved taps with modern metal spiles.
- **Art Extension:** Students create a storyboard of traditional maple sugaring.
- **Cultural Learning:** Invite a Wabanaki educator or storyteller to speak.
- **Place-Based Learning:** Explore local geography and forests to identify sugar bushes.

PART 1 — Cultural Foundations Worksheet

Name: _____ Date: _____

1. Warm-Up: What Do You Already Know?

Have you ever had maple syrup? Where do you think syrup comes from?

_____

_____

_____

_____

2. Learning About Wabanaki Sugaring

As you read or watch today's resources, take notes or sketch what you learn.

Traditional Tools Used for Sugaring

- _____
- _____
- _____

How Did the Wabanaki Collect Sap?

_____

_____

How Did They Turn Sap into Syrup or Sugar?

_____

_____

Why Was Maple Sugar Important? (circle all that apply)

- Food
- Medicine
- Community gatherings

- Trade
- Survival in winter
- Cultural practice

Add your own thoughts: _____

_____

3. Stewardship & Values

How did the Wabanaki show care for maple trees and forests?

_____

_____

What value or belief do you think this represents?

_____

_____

4. Exit Ticket – Show What You Learned

Choose ONE:

Write one important thing you learned about Wabanaki maple sugaring.
Draw a tool, method, or scene from traditional sugaring.
Explain how the Wabanaki took care of their sugar bush.

_____

_____

_____

_____

Part 2: The Science of Maple Syrup

Time: 1 class period (45–60 minutes)
Subject: Science with integrated Computer Science
Grade Bands: 3–5, 6–8 (adaptable)

Learning Objectives

Students will:

- Explain why and how sap flows in maple trees.
- Describe the role of xylem, tree health, and environmental conditions in sap production.
- Understand the freeze–thaw cycle and its effect on sap flow.
- Describe the chemical changes from sap to syrup.
- Interpret and analyze environmental and sap collection data.
- Connect data patterns to real-world seasonal changes and maple syrup production.
- (CS) Use data as evidence to support scientific reasoning.

Standards Alignment

Science (NGSS)

Grades 3–5

- 3-LS1-1: Develop models to describe how organisms grow and survive.
- 4-ESS2-2: Analyze and interpret data to describe patterns in weather conditions.
- 5-PS1-4: Conduct investigations to determine physical changes in matter.

Grades 6–8

- MS-LS1-5: Construct explanations based on evidence of environmental influences.
- MS-ESS2-5: Collect data to provide evidence for how weather conditions vary.
- MS-PS1-4: Develop a model predicting changes in particle motion, temperature, and states of matter.

Computer Science (CSTA)

Grades 3–5

- 1B-DA-06: Organize and present collected data visually.
- 1B-DA-07: Use data to highlight relationships and support claims.

Grades 6–8

- 2-DA-08: Collect, visualize, and analyze data to identify trends.
- 2-AP-19: Document programs and data to support problem-solving (ties to micro:bit data in Part 3).

Materials

- Tree branch cross-sections or small twigs
- Hand lenses/magnifiers
- Bark identification charts or posters
- Access to weather graphs or data (micro:bits, weather app, or provided university link)
- Chart paper or student notebooks
- Optional: sap collection equipment if doing hands-on tapping
- Optional: visit or virtual meeting with a local maple syrup maker

Lesson Plan

1. Engage – What Do You Know About Sap? (5 minutes)

Ask students:

- "Where does maple sap come from?"
- "Why does it only flow at certain times of year?"

Chart initial ideas.

2. Tree Biology – Why Sap Flows (10 minutes)

Mini-lesson. Explain:

- In late winter/early spring, trees move stored starches from their roots upward to feed new buds.
- These starches dissolve into water → sap.
- Sap moves through **xylem**, the tree's internal pipeline.
- Only **healthy, mature trees** (10+ inches in diameter) should be tapped.

Hands-on Activity: Tree Cross-section Exploration

1. Give each group a small branch cross-section.

2. Students use magnifiers to identify:
    - **Growth rings** (age)
    - **Xylem tissue** (lighter wood)
3. Students sketch what they see and label xylem.

Optional Extension:

If trees in your area have no leaves:

- Students learn to **identify maple trees by their bark**.
- Go outside and collect small bark samples or take observational sketches.

3. Weather & Environmental Science – The Freeze–Thaw Cycle (10–12 minutes)

Mini-lesson. Explain:

- Sap runs best when **nights are below 32°F** and **days around 40°F**.
- Freezing nights create pressure changes inside the tree that **pump sap upward**.
- Weather changes like drought, storms, or long cold spells affect output.
- Climate change may shorten or shift the sap season.

Classroom Data Activity

Students compare:

- Micro:bit temperature/light data **OR**
- Local weather data from a weather app **AND**
- Their sap collection logs

Optional resource:

University of Maine Climate Office Data:
https://mco.umaine.edu/climate/me_monthly/?cdiv_id=me&var_id=prcpanom&mon_id=mjjas

4. Chemistry – How Sap Becomes Syrup (10 minutes)

Mini-lesson. Explain:

- Raw sap is **98% water**, **2–3% sugar**.
- Boiling evaporates water → concentration of sugar increases.
- It takes **40 gallons of sap to make 1 gallon of syrup**.
- Maple syrup finishes at **219°F**, slightly above water's boiling point because dissolved sugars raise it.
- Caramelization and **Maillard reactions** create color and flavor.

Optional Demo:

- Simulate evaporation with saltwater on a hot plate.
- Explain that this is similar to reducing sap.

5. Data & the Scientific Method (10 minutes)

Student Task: Mini-Scientific Investigation

Students complete four steps:

1. **Prediction**
    - "Based on today's weather, how much sap do you think we would collect?"
2. **Data Collection**
    - Use classroom temperature/light readings OR previously collected sap data.
3. **Analysis**
    - Create a simple graph (line graph recommended).
    - Identify peaks, drops, and patterns.
4. **Conclusion**
    - Students explain which environmental factors most impacted sap flow.

6. Guiding Questions for Discussion (5 minutes)

Use these as whole-group prompts or exit tickets:

- Why does sap only flow during certain times of the year?
- How do environmental conditions affect the amount of sap collected?
- What physical changes happen when sap is boiled into syrup?
- How can data help us predict sap flow in the future?
- What environmental data would be useful to track during syrup season?

Group Brainstorm: Students list environmental variables worth tracking:

- Temperature
- Sunlight
- Soil moisture
- Wind
- Tree size
- Snow depth
- Previous day's temperature

These will support Part 3 of Maple Bytes when they use micro:bits for real data collection.

Extensions

- **CS Integration:** Tie directly into upcoming micro:bit lesson (Part 3).
- **Math Connection:** Use ratios to understand sap-to-syrup reduction.
- **Community Connection:** Visit or video call with a local sugarhouse.

PART 2 — The Science of Maple Syrup Worksheet

Name: _____ Date: _____

1. Tree Biology

Look at your branch cross-section using a magnifier.

A. Draw your branch cross-section:

Label: **xylem**, **growth rings**, **bark** *(Use the blank space below.)*

_____

_____

B. What does the xylem do?

_____

_____

_____

2. Weather & Sap Flow

Sap flows best when nights are below **32°F** and days are around **40°F**.

A. Record today's weather:

Night temperature: _____°F
Day temperature: _____°F

Based on this, do you predict sap would flow today?
□ Yes □ No
Why? _____

_____

3. Environmental Connections

List **two** weather or environmental conditions that could affect sap flow.

1. _____

2. _____

3. _____

4. Chemistry: Turning Sap into Syrup

We observed sugar-water boiling.

A. What happened to the water?

_____

B. Why did the sugar stay behind?

_____

C. How is this similar to making real maple syrup?

_____

_____

5. Data Analysis

If you collected temperature or sap data, graph it below or attach your graph. (Blank graph grid can be inserted here if needed.)

_____

_____

_____

_____

6. Science Reflection Question

Why does sap only flow during certain times of the year?

_____

_____

_____

_____

Part 3: Micro:bit Environmental Data Collection

Time: 1–2 class periods (45–90 minutes total)
Grades: 4–8 (adaptable up/down)
Focus: Collecting and analyzing environmental data (temperature & light) using Micro:bit sensors.
Subjects: Computer Science + Earth/Environmental Science

LEARNING GOALS

Students will:

1. Understand how temperature and light affect sap flow in maple trees.
2. Use Micro:bit sensors to collect environmental data.
3. Write a program that records and stores data over time.
4. Analyze collected data to identify patterns and connect them to maple sap production.
5. Communicate findings using graphs and scientific explanation.

STANDARDS ALIGNMENT

Computer Science (CSTA)

CSTA 3A-DA-11: Create computational models that represent data using collected sensor information.
CSTA 3A-AP-16: Design and iteratively develop programs that collect and analyze data.
CSTA 2-AP-12/14: Design and develop programs that use input from sensors.
CSTA 2-DA-08: Collect data using computational tools and devices.

Next Generation Science Standards (NGSS)

MS-ESS2-1: Develop a model to describe cycling of Earth's materials influenced by energy and climate conditions.
5-ESS2-1: Develop a model describing interactions among the geosphere, hydrosphere, atmosphere, and biosphere.
MS-PS3-4: Plan an investigation to determine the relationships among temperature, sunlight, and energy transfer.
3–5 ETS1-3: Plan and carry out tests to collect relevant data to support solutions.

Maine Science & Engineering Standards (aligned with NGSS)

Supports: ME ETS1, ME ESS2, ME PS3, ME SEP (science & engineering practices)—collecting data, using tools, interpreting patterns.

MATERIALS

- Micro:bits (1 per group)
- Battery packs (optional but recommended for outdoor placement)
- Computers or tablets with MakeCode editor
- Micro USB cables
- Clipboards or digital notebook for student observations
- Graphing tools: Google Sheets, Excel, paper graph templates, or Micro:bit data viewer
- Optional: zip-top plastic bags or containers to protect Micro:bits outdoors
- Thermometer (for comparison)

TEACHER PREP

1. Ensure devices can access **https://makecode.microbit.org**.
2. Test one Micro:bit to confirm temperature & light sensors are functioning.
3. Pre-select a safe outdoor location near trees (or plan for indoor simulations).
4. Decide whether students will collect data:
    - *Live during class* (every few minutes)
    - *Logged automatically* (device stores data for later download)

PART 1 – INTRODUCTION (10 minutes)

Teacher Script (optional):

> "Maple trees produce sap when the temperature cycles between freezing nights and warmer days. Today we're going to use Micro:bits to measure temperature and light—two important factors that help us understand when sap might flow."

Mini-Lesson: Sensors

Show a Micro:bit. Ask:

- Where do you think the temperature sensor is?
- What might affect the light readings?
- How could this data help us study maple trees?

Review:

- Temperature sensor = built into the processor
- Light sensor = on the LED matrix

- They measure *relative* values, not exact scientific-grade readings (good teachable moment).

PART 2 – CODING THE MICRO:BIT PROGRAM (15–20 minutes)

Step-by-Step Directions:

1. Open MakeCode Editor
   Go to: https://makecode.microbit.org
   Click New Project → Name: MapleBytes_Data

2. Build the basic program

   Students drag these blocks:

   A. On Start Block:

   on start:

   show icon (heart or maple leaf if using advanced icons)

   Purpose: lets you know the program started successfully.

   B. Input Reading Block:

   Students add a loop to read sensor data every 10 seconds:

   forever:

   let temp = temperature (°C)

   let light = light level (0–255)

   serial write line (join "Temp: " temp)

   serial write line (join "Light: " light)

   pause (10000)

   Explanation for students:

   - temperature block returns degrees Celsius.
   - light level block uses the LED matrix to estimate brightness.
   - serial write line sends data to a computer for logging.

- pause (10000) waits 10 seconds between readings.

3. OPTIONAL: Show live data on the Micro:bit

   Add inside the forever loop:

   1. show number temp
   2. pause (1000)
   3. show number light
   4. pause (1000)

4. Download & Flash the Program

- Click **Download**
- Drag .hex file onto the MICROBIT drive
- Test by covering/uncovering LEDs and warming the Micro:bit with your hands.

PART 3 – DATA COLLECTION (20–40 minutes)

Option A: Outdoor Data Logging

1. Place Micro:bits near a tree using battery packs.
2. Protect with a clear plastic bag if weather is damp.
3. Let them run for the full class period (or over several days).
4. Students record observations:
   - Cloud cover
   - Time of day
   - Sunlight exposure
   - Weather conditions

Option B: Indoor Simulation

Students simulate conditions:

- Put Micro:bit under a lamp (light & warmth).
- Open a window or use a fan for cooler readings.
- Shade the Micro:bit to simulate night.

PART 4 – DATA RETRIEVAL (5–10 minutes)

Using the MakeCode Data Viewer

1. Plug Micro:bit into computer.
2. Click the “Show device console” button in MakeCode.

3. You'll see scrolling lines like:

   Temp: 22

   Light: 145

   Temp: 22

   Light: 160

4. Click Save to download as .csv file.

PART 5 – ANALYSIS & GRAPHING (20–30 minutes)

Students import data into Google Sheets / Excel.

Graph Types

- Line graph: temperature over time
- Line graph: light level over time
- Overlay comparison (two lines on one graph)

Analysis Prompts

- What patterns do you notice?
- Did temperature or light increase or decrease during collection?
- How might these conditions impact sap flow in maple trees?
- Compare to a classmate's Micro:bit—why might readings differ?

PART 6 – CONNECT TO MAPLE SCIENCE (10 minutes)

Discussion Questions

- Why does sap run best when nights are below freezing and days are above freezing?
- How can tools like Micro:bits help farmers or sugar makers?
- How might Indigenous maple harvesting knowledge compare to digital methods?

EXTENSION OPTIONS

- Add humidity sensors (if available).
- Collect long-term data over a full week.
- Compare Micro:bit readings to actual weather station data.
- Create a "Sap Prediction Model" using simple if/then logic.

ASSESSMENT OPTIONS

- Completed program (checked via code review)
- Data tables and graphs
- Written paragraph explaining findings
- Connection explanation: how environmental data relates to sap flow

PART 3 — Computer Science: Micro:bit Data Collection Worksheet

Name: _____ Date: _____

1. Micro:bit Setup

Check off each step as you set up your device.

□ I connected my micro:bit to my computer.
□ I opened MakeCode.
□ I added blocks to record **temperature**.
□ I added blocks to record **light level**.
□ I programmed the micro:bit to show or log data.
□ I tested my program.

2. My Micro:bit Program

Briefly explain how your code works.

_____

_____

_____

_____

3. Data Collection

A. Where did you place your micro:bit?

_____

B. Record your data:

Time	Temperature (°C/°F)	Light Level	Notes

(Add more rows if needed.)

4. Data Analysis

A. Graph your data

Attach a graph

B. What patterns do you notice?

_____

_____

C. Why might warmer/sunnier days produce more sap?

_____

_____

_____

5. Connection to Real Sugaring

How could a maple syrup maker use sensors or data to make decisions?

_____

_____

_____

_____

Part 4: Making Connections (Integration & Reflection)

Subject: Integration of Social Studies, Science, and Computer Science
Time: 1 class period (45–60 minutes)
Grade Bands: 3–5, 6–8 (adaptable)

Learning Objectives

Students will:

- Compare traditional Wabanaki sugaring practices with modern maple syrup production.
- Explain how scientific observation and digital tools both support understanding of sap flow.
- Connect lessons from Wabanaki stewardship to modern sustainability practices.
- Demonstrate their learning through a reflective project that synthesizes cultural knowledge, science, and technology.
- Communicate findings using evidence from their micro:bit data, observations, and cultural learning.

Standards Alignment

Maine Learning Results – Social Studies

- D1.3–5 / D1.6–8: Compare cultural practices across time periods.
- C2.3–5 / C2.6–8: Explain how cultural values guide stewardship practices.

Science (NGSS-Aligned)

- 3-LS1-1 / MS-LS1-5: Understand how organisms process and transport matter.
- 3-ESS2-1 / MS-ESS2-5: Analyze weather data to predict patterns.
- 5-PS1-4 / MS-PS1-2: Model changes in matter (evaporation, concentration).
- Science & Engineering Practices (SEPs): Developing and using models, analyzing data, constructing explanations.

Computer Science (CSTA)

- 1B-DA-06 / 2-DA-08: Organize and interpret data.
- 1B-CS-02: Use tools to collect and record environmental data.
- 1B-AP-09: Create programs that collect and display information.

Materials

- Access to images/artifacts of traditional Wabanaki sugaring tools (teacher-selected)
- Micro:bits and previously collected temperature/light data
- Student science notebooks or reflection journals
- Chart paper or discussion board
- Link to Maine Climate Office temperature data
- Reflection project materials (paper, markers, or digital tools)

Lesson Plan

1. Engage (5–10 minutes)

Display the first historical image of traditional Wabanaki sugaring tools. Ask:

- "What do you think this is made of?"
- "What could it be used for?"

Show the second image. Ask:

- "Are these the same kinds of bowls?"
- "What is she collecting in the bowl?"
- "What could the collected sap be used to make?"

Introducing the **Essential Question: "How do natural conditions affect sap flow, and how do traditional knowledge and modern tools help us understand this process?"**

(Teacher Note: Use the third page of the image file for background information.)

2. Explore (20–25 minutes)

A. Tree Biology – Modeling Xylem Movement

- Students identify maple trees using a teacher-selected identification guide.
- Once identified, students collect small branch samples using pruning shears (or use pre-collected samples).
- Using magnifying glasses, students locate xylem tissue using a descriptive guide.
- Students draw a labeled model of the branch cross-section, identifying xylem and explaining its function in sap movement.

B. Weather Data Collection – Applying Micro:bit Learning

- Students revisit their micro:bit data from Part 3 (light and temperature).
- Students graph temperature and/or light levels across days or class periods.
- As a class, discuss how temperature patterns relate to optimal sap flow.

C. Chemistry – Modeling Changes in Matter (Sap → Syrup)

- Students observe boiling a sugar-water solution until only sugar remains.
- Teacher guides discussion:
    - Where did the water go?
    - Why does the sugar stay?
    - How does this connect to maple syrup production?
- Students create a model showing evaporation of water and concentration of sugar.

3. Explain (5–7 minutes)

Students share their models of:

- Tree xylem
- Temperature/sap connections
- Evaporation and concentration of sugar

Teacher addresses misconceptions and reinforces key concepts from Parts 1–3.

4. Elaborate – Making Deeper Connections (10 minutes)

A. Tradition vs. Today

On chart paper, compare:

Traditional Wabanaki Methods:

- Careful observation of nature
- Sustainable tapping practices
- Community stewardship
- Cultural values tied to land

Today's Methods:

- Continued observation of weather and tree cycles
- Use of sensors (micro:bits) and digital data
- Modern tools but similar goals

Ask:

- “What’s the same?”
- “What’s different?”
- “How can technology support sustainability, as the Wabanaki practiced for generations?”

B. Climate Change & Sap Flow

- Students use Maine Climate Office data to observe temperature trends.
- Students predict:
  - How might changing winter temperatures alter sap flow timing?
  - What impacts could this have on syrup production?
  - How might people adapt?

5. Evaluate (10 minutes)

Reflection Project (Summative Assessment)

Students create one of the following:

- Poster
- Short slideshow
- Digital journal entry
- Video explanation

Their project must answer:

1. What did I learn about Wabanaki syrup traditions?
2. What data did we collect with micro:bits?
   How does technology help us connect with and care for nature?

Formative Assessment

- Class discussions
- Student models from Explore
- Review of micro:bit code/data
- Exit ticket:
  “One connection I made today between culture, science, and technology was…”

Optional Extensions

- Invite a local maple syrup maker to share real-world data.
- Students design a sustainable sugar bush management plan.
- Integrate writing: a compare/contrast paragraph or narrative.

PART 4 — Making Connections Worksheet

Name: _____ Date: _____

1. Tradition vs. Today

Fill in the chart based on what you've learned.

Wabanaki Traditional Methods	Modern Methods
_____	_____
_____	_____
_____	_____

2. What's the Same? What's Different?

One similarity between past and present sugaring:

_____

One difference between past and present sugaring:

_____

_____

3. Sustainability Connection

How can today's technology help us take care of nature in ways similar to the Wabanaki?

_____

_____

_____

4. Climate & Data Connection

Using local or provided climate data:

How might changing temperatures affect sap flow in the future?

_____

_____

_____

5. Reflection Project Planning

Choose your project:

- □ Poster
- □ Slideshow
- □ Digital journal
- □ Video
- □ Other: _____

Answer these in your project:

A. What did I learn about Wabanaki syrup traditions?

_____

B. What data did we collect with micro:bits?

_____

C. How does technology help us connect with nature?

_____

_____

6. Final Reflection

One connection I made today between culture, science, and technology is:

_____

_____

_____