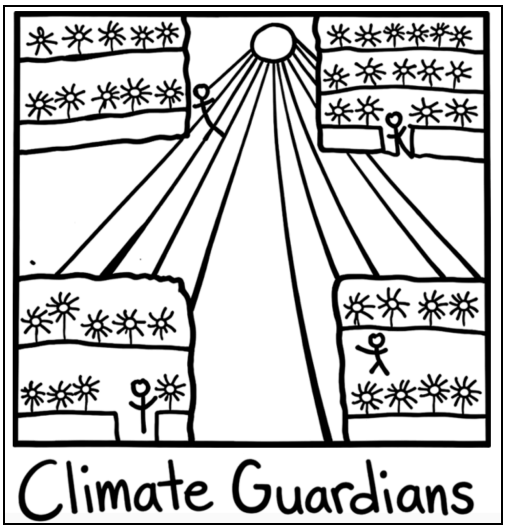


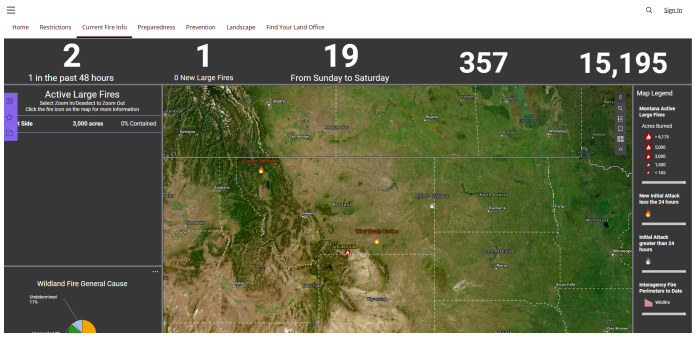
Title: Roots and Stories: Our Climate Discovery

Developed by: Acer Ann Pitas-Pilo

Grades or Range: 3rd-5th

Unit Summary	
Description: (What will students do in this lesson/unit)	In this unit we will investigate how fire affects soil by comparing burned and control soil. Students will observe physical changes, build MudWatt systems to model microbial activity, and collect CO_2, and moisture data. Using our investigation data, we will analyze patterns, read scientific and Indigenous stories, write evidence-based explanations, revise with AI, and create a Community Soil and Air Stewardship Presentation through a book, or use a Makey Makey kit to design an interactive presentation that communicates their data, explanations, and recommendations.
Learning Goals: (Broad, generalized statements about what is to be learned, written from the educator's point of view)	At the end of the activity, the students will be able to: A. Understand soil as a dynamic system that includes living organisms, air, moisture, and human influence. B. Learn how scientific models and tools provide partial but meaningful evidence about ecosystem processes.

	C. Communicate scientific findings clearly using writing, data, and interactive technology. D. Understand how soil conditions and environmental variables influence plant growth and survival. E. Learn how to carry out and monitor a living-system investigation through consistent care, measurement, and observation over time.
Performance Expectation/Learning Objectives: (Concrete, tangible statement about what will be learned or performed. Can be validated or measured, written from the learner's point of view)	*Students perspective:* A. I can collect and record soil, air, and microbial activity data using scientific tools. B. I can explain what MudWatt data does and does not show about microbial activity. C. I can organize data using tables and graphs. D. I can design an interactive Makey Makey presentation that accurately represents my findings. E. I can justify a stewardship recommendation using evidence from data and texts. F. I can plant and care for seeds using controlled conditions and explain why those conditions were selected. G. I can measure and compare plant growth over time and use my observations as evidence in scientific explanations.
Unit Sequence: (Days/Class periods, class length, total time of lesson)	This unit is designed to be conducted in 7 class periods spread out over the course of several weeks. (You will need time for observations in lessons 3-5 that will take several days - including plant germination and sprouting) *Teachers may teach the full sequence or use any section as a stand-alone mini-lesson, short inquiry, or project extension. **Full investigation unit:** 5 sessions plus ongoing plant monitoring • **1-week condensed inquiry:** select core lessons only • **Single lesson resource:** each module works independently • **Science center rotation:** observation, reading, planting, or data work • **Intervention friendly pacing:** repeat routines,

	shorten writing, use visuals
Evidence/Monitoring Student Progress: (How will you assess learning objectives? If possible, consider including formal/ information/ alternative options for assessment)	1. Soil observations, predictions, variable identification, data tables, draft explanations, Makey Makey planning sketches. 2. Observation of tool use, collaboration, reasoning, and troubleshooting during Makey Makey design. 3. Planting setup and care documentation, including container preparation, labeling, condition selection, and recorded rationale for chosen variables. Student journals and digital logs will show consistency in watering, observation routines, and responsibility for maintaining living systems. 4. Plant growth data collection and analysis, including height measurements, leaf counts, visual observations, comparison charts, and written or verbal explanations connecting growth outcomes to soil and environmental conditions. Students will revise hypotheses and justify conclusions using collected evidence. 5. Use monitoring checklists.
Phenomenon or phenomena you will explore: (A phenomenon is an observable event that occurs in the universe and that we can use our science knowledge to explain or predict with evidence. Educators may choose to use a single, grounding/anchoring phenomenon for an entire unit, or choose lesson-level phenomena for individual lessons in a unit)	When land in eastern Montana burns, the soil, plants, and tiny microbes in the ground change in ways we can see and measure. Students explore https://www.mtfireinfo.org/pages/current-fire-info on shared classroom screen and share what they noticed and what they wondered about fires across Montana.  Teacher can show several screenshots, taken in different months. Students work in small groups to tell the “story” of the data they see. What does it

	mean? What do they want to know?
Essential Question(s): (Essential questions are the key questions that learners should be able to answer about the phenomenon by the end of the lesson or unit. These can be posed by the teacher or generated by the students)	How does fire change soil systems, and how do those changes influence the plants that grow afterward? How do interactions among soil, microbes, air, and moisture affect living things in an ecosystem? How do environmental conditions shape the growth and survival of a seed over time? What kinds of evidence from tools, observations, stories, and data help us explain environmental change?
*Subject Matter Integration: (Optional: What connections to Language Arts, Social Science, Math, or Art are included in your lesson?)	This unit connects multiple subject areas through an investigation of how fire affects soil, microbes, air, and plant growth. Students explore the phenomenon through hands-on experimentation, data analysis, reading, writing, and communication with their community. **Science** Students compare burned and control soil, build MudWatt systems to model microbial activity, measure environmental conditions, and conduct seed growth experiments. **Mathematics** Students measure and record moisture, air data, and plant growth. They organize results into tables, create graphs, compare patterns, and use numbers as evidence when explaining their findings. **English Language Arts** Students read scientific and Indigenous texts, document observations, write explanations supported by evidence, revise their work using feedback and digital tools, and publish their learning through a storybook and presentation. **Indian Education for All** Students connect their learning to tribal perspectives by reading American Indian stories that highlight relationships with land and respect for natural balance. They explore how Indigenous knowledge aligns with and deepens their understanding of

	ecological systems. **Technology and Engineering** Students use sensors to collect environmental data, construct MudWatt models, and design interactive Makey Makey presentations. **Art and Design** Students create logos, scientific illustrations, and visual layouts for their storybooks and presentations.

*NGSS 3D Design		
Science and Engineering Practices	Disciplinary Core Ideas	Cross Cutting Concepts
Lesson 1: Ecologist Visit & Questioning • Asking Questions and Defining Problems • Obtaining, Evaluating, and Communicating Information	LS2.A: Interdependent Relationships in Ecosystems Organisms, including plants and microbes, depend on interactions with soil, water, and environmental conditions. LS2.B: Cycle of Matter and Energy in Ecosystems Matter and energy move through ecosystems as microbes break down organic material, releasing nutrients and energy. LS2.C: Ecosystem Dynamics and Resilience Ecosystems respond to disturbances such as fire, and recovery depends on environmental conditions and biological activity. ESS2.A: Earth Materials and Systems Soil is a dynamic system shaped by interactions among air, water, and living organisms. ESS2.E: Biogeology Living organisms and Earth materials interact to influence land processes and ecosystem recovery.	• Cause and Effect • Systems and System Models • Energy and Matter • Patterns
Lesson 2: Soil is Alive • Planning and Carrying Out Investigations • Asking Questions • Constructing Explanations		
Lesson 3: MudWatt Investigation • Developing and Using Models • Planning and Carrying Out Investigations • Analyzing and Interpreting Data • Using Mathematics		
Lesson 4: CO_2 and Moisture • Planning and Carrying Out Investigations • Analyzing and Interpreting Data • Using Mathematics		

Lesson 5: Seed Investigation • Planning and Carrying Out Investigations • Analyzing and Interpreting Data • Constructing Explanations	ETS1.B: Developing Possible Solutions Design solutions are developed and tested to model and communicate how systems work.	
Lesson 6 and 7: Storybook Creation and Makey-Makey • Constructing Explanations • Communicating Information		

Roots and Stories: Our Climate Discovery Pre-Activity	
Lesson Phenomenon	Scientists use identity, tools, and prior knowledge to understand environmental change.
Learning Goals	Students will: • Reflect on what they already know about climate, weather, soil, and plants. • Reconnect with their scientist identity and team name.
Lesson Preparation (What should the educator have prepared before the lesson?)	Needed Materials/Resources: • Chart paper • Student logos rubric/guide for students • Sample Group Names • NASA CLimate Kids Video: What's the Difference Between Weather and Climate? • Climate Change Story: *A Threat to Our Health* and *Greenhouse Gases* - ReadWorks • Markers • Anchor chart: How is Our Land in Montana Used?
Lesson Sequence (How should the learning session unfold?)	1. Students share about the weather. After students sharing, teacher may direct students to weather report apps. 2. Students watch the NASA Climate Kids Video. Class discussion are centered on this questions: a. What is the difference between weather and climate? b. What is the weather and climate in our place? 3. Students will read by pair the passage: Read Climate Change: *A Threat to Our Health* or *Greenhouse Gases* 4. The whole class will answer the questions about the passage.

Lesson 1: Ecologist Visit & Expert Learning	
Lesson Phenomenon	Ecologists use real data and observations to understand soil, fire, and plant recovery
Learning Goals	Students will: • Understand how ecologists use real data and observations to study soil, fire, and plant recovery. • Gather information from an expert, ask meaningful questions, and begin thinking like scientists by observing, recording, and reflecting.
Lesson Preparation (What should the educator have prepared before the lesson?)	Needed Materials/Resources: • Student-generated questions • Chart paper (anchor chart - continue from previous lesson or build a new chart): What do we notice about our land? • Drawing materials for t-shirt design • Optional AI tool
Lesson Sequence (How should the learning session unfold?)	**1. Engage/Preparation** Ask: "How do scientists figure out what happens to land after a fire?" Introduce: Ecologists use real observations and data, not guesses. 2. **Guest Ecologist Session** a. Introduce Guest b. Scientist explain the relevance of their work. c. Students ask questions they generated. **3. Debrief Discussion** Ask: "What did we learn that will help with our activity?" "What causes plants to grow back?" 4. **Anchor Chart Update** Title: What Do We Notice About Our Land? Students add: • Observations about surrounding • Plants, trees, houses, etc. 5. **Scientist Identity Activity: T-Shirt Design** Students design a logo and name representing themselves as: Scientist They must include: a. A connection to land or ecosystems b. *Optional:* Use AI to refine final design.

	6. **Closure** Ask: "How do scientists learn about our land?" Students should respond with: • Observations • Data collection • Asking questions **Assessment** Formative • Quality of student questions • Notes using sentence frames • Participation in discussion Summative • T-shirt design with explanation • Contributions to anchor chart Differentiation • Sentence frames for writing • Visual sketch-notes • Partner talk before sharing • Teacher modeling throughout

Lesson 2: The Soil is Alive	
Lesson Phenomenon	Burned soil and unburned soil support plant growth differently. STORY BOOK: *The Land Knows Me: A Nature Walk Exploring Indigenous Wisdom*
Learning Goals	Students will: • Explain how soil connects to fire, air, and living organisms • Observe and ask questions like a scientist • Use evidence from observations to make predictions about microbial activity • Connect expert knowledge to real-world soil investigation
Lesson Preparation (What should the educator	Needed Materials/Resources: • Trays/Containers, burned and control soil ○ Observation Sheet: Soil Investigation: Observation and Hypothesis • Mudwatt Video 1

have prepared before the lesson?)	• Mudwatt Video 2 • Mudwatt Sample • Mudwatt Guide • Earth Science Rocks! Soil (Login to Epic required) • Microscope
Lesson Sequence (How should the learning session unfold?)	[Students read the story during their reading class and continue with their worksheet during writing and math class] 1. **Activate Prior Learning** Students revisit one idea from the ecologist. Prompt: • "What did the ecologist say about soil or recovery?" • How does "*The Land Knows Me*" help us understand how people and nature work together to keep the land in balance? Then connect to identity: • "How does that idea show up in your group logo as scientists?" 2. **Engage with Phenomenon** Show both soil samples. Have students use microscope. Ask: • What differences do you notice?" • "Which soil do you think would grow plants better? Why?" 3. **Investigation: Soil Observation** Students observe using: • Sight and Microscope • Smell They record: • Color • Texture • Smell • Visible materials 4. **Introduce Key Concept: Soil is Alive** Teacher explains: • Soil is not just dirt. It contains **microorganisms** that help break down materials. For support/review you may use this simple story from Get Epic website: STORY:SOIL • Show MudWatt videos. • Clarify an important idea: • Microbes release energy as they break down organic matter. • That energy can be captured in a MudWatt device. Guide students to think: • Fire **changes** soil, but does not always completely destroy life • The level of heat matters

5. **Prediction Writing**
   Students write one prediction for each soil type:
   Prompt:
   - "Which soil will have more microbial activity?"
   - "What is your evidence?"

   Require justification:
   - Based on observations
   - Based on prior knowledge

6. **Hypothesis Development**
   Students complete a hypothesis worksheet.
   Structure:
   - If (soil type)...
   - Then (microbial activity)...
   - Because (reasoning tied to evidence)

7. **Closure**
   Return to phenomenon:
   Ask:
   - "Why might burned and unburned soil support plant growth differently?"

   Students should include:
   - Microbes
   - Soil changes from fire
   - Energy and matter

Assessment

Formative
- Observation sheet quality
- Student questions
- Prediction reasoning

Summative
- Hypothesis worksheet
- Ability to explain differences using evidence

Differentiation
- Sentence frames for predictions
- Visual observation supports
- Teacher modeling examples
- Drawing instead of writing sentences

Lesson 3: Building MudWatts and Setting up Soil Systems (Pre-experiment)

Lesson Phenomenon	Soil microbes create electricity, and conditions influence their activity.
Learning Goals	Students will: • Build a model (MudWatt) to study microbial activity in soil • Explain how microbes generate energy • Understand why scientists control variables • Collect and record accurate data • Compare results across conditions
Lesson Preparation (What should the educator have prepared before the lesson?)	Needed Materials/Resources Per Group • 2 MudWatt kits • Burned or unburned soil (1 cup) • Labels or markers Teacher • Gloves • Paper towels • Plastic cups • Experiment sheet • Recording Sheet (this will be needed after the initial lesson for daily observations)
Lesson Sequence (How should the learning session unfold?)	1. **Connect to Prior Learning** Ask: • "What did we learn about microbes in soil?" Expected student idea: • Microbes break down organic matter and release energy. Say: • "Today we are going to test that idea using a scientific model." 2. **Introduce the Investigation** Show materials: • Soil • Paper • MudWatt kit Ask: • "What might happen if we add paper to soil?" 3. **Define the Experiment** Explain clearly: **Independent Variable** • Presence of paper **Groups** • Group A: Soil only • Group B: Soil + paper

Controlled Variables

- Same soil type
- Same amount of soil
- Same amount of water
- Same container and setup

Dependent Variable

- Electrical output (microbial activity)

Say:

- "We only change one thing so we know what causes the result."

4. **Teacher Modeling**

   Demonstrate:

   - How to assemble MudWatt
   - How to add soil and paper correctly
   - How to label groups

   Highlight:

   Consistency matters for a fair test.

5. **Group Investigation Setup**

   Students:

   - Build MudWatt in groups
   - Follow assigned condition (with or without paper)
   - Label jars clearly

   Teacher circulates and checks:

   - Correct setup
   - Proper labeling
   - Consistent procedures

6. **Prediction and Hypothesis**

   Students complete an experiment sheet.

7. **Data Recording**

   Students record:

   - Starting conditions
   - Setup details
   - Observations

   Teacher reminds:

   Accurate data matters more than neatness.

   (Students will start recording sheet after 3 days or once mudwatt starts to light up. Create an extra mudwatt experiment just in case students set-up didn't work.)

Assessment

Formative

- Correct identification of variables
- Quality of predictions

	• Participation in discussion Summative • Experiment sheet (hypothesis + data) • Explanation using evidence Differentiation • Sentence frames: • "If..., then..., because..." • Visual setup modeling • Group roles (builder, recorder, checker) • Draw instead of write explanation

Lesson 4: Measuring CO_2, Air Moisture, and Microbial Activity	
Lesson Phenomenon	Plants grow better in some soil conditions than others because of differences in moisture, microbes, and CO_2 levels. STORY BOOK: *The First Fire: A Cherokee Story*
Learning Goals	Students will: • Collect and record data using scientific tools • Use simple math to compare data (greater than, less than, differences) • Explain how microbes, moisture, and CO_2 affect plant growth

Lesson Preparation (What should the educator have prepared before the lesson?)	Needed Materials/Resources:
	Whole Class
	• Vernier CO_2 sensor
	• Vernier moisture sensor
	• Computer or iPad with Vernier software
	• 8 soil jars:
	  ○ Burned soil
	  ○ Control (live) soil
	• Measuring CO2, Moisture Worksheet
	Book Reading: *The First Fire: A Cherokee Story*
	• 3 Summarized Leveled Reading
	Teacher-created guide to burning soil

Lesson Sequence (How should the learning session unfold?)	[Students read the story during their reading class and continue with their worksheet during writing and math class] 1. **Activate Thinking** Students respond to the prompt: • "Is soil alive?"

- "What happens to the CO_2 'breath' if soil is burned?"

Students use sentence frames:

- "I think the control soil will have more CO_2 because..."
- "I think the burned soil will have less CO_2 because..."

2. **Teacher Modeling and Setup**

Introduce:

- Burned soil vs control (live) soil
- Different locations (heater, window, cabinet, table)

Demonstrate:

- How to use the CO_2 sensor to capture peak readings
- How to use the moisture sensor
- What the numbers mean:
  - ~400 ppm = normal air
  - Higher ppm = more microbial "breathing"

Emphasizes:

Same moisture = fair test condition

3. **Data Collection Across Locations**

Students rotate or observe jars placed in different conditions:

- Top of heater
- By the window
- Cabinet
- Table (control location)

Students record:

- CO_2 readings for burned and control soil
- Moisture levels for each jar

They complete Part A and Part B of their Measuring CO2, Moisture Worksheet

Teacher checks:

- Accurate recording
- No skipped data

4. **Identify Patterns**

Students answer:

- Which jar has the highest CO_2?
- Which jar has the lowest CO_2?
- Which jar has the most moisture?
- Which has the least?

Then compare:

- "Does higher moisture connect to higher CO_2?"

5. **Compare Conditions for Plant Growth**

Students decide:

- "Which jar has the BEST condition for plant growth?"

They must justify using:

- CO_2 data

	• Moisture data **6. Guided Discussion** Teacher asks: • "Why did the control soil produce more CO_2?" • "Why didn't the burned soil respond the same way, even in the same environment?" • "What role does moisture play?" Push students toward: • Microbes produce CO_2 • Moisture supports microbial activity • Environment affects how active microbes are **7. Conclusion Writing** Students complete: "The best soil is _____ because it has _____ moisture, _____ and _____ CO_2." They explain or draw their thinking. Teacher checks for: • Use of data • Cause and effect reasoning

Lesson 5: Environmental Changes and Seed Investigation	
Lesson Phenomenon	Seeds grow differently depending on soil condition, moisture, and temperature shaped by fire and microbial activity.
Learning Goals	Students will: • Design and carry out a controlled planting investigation • Explain how environmental variables affect plant growth • Connect plant growth to soil, microbes, moisture, and CO_2 • Collect and monitor data over time
Lesson Preparation (What should the educator have prepared before the lesson?)	Needed Materials/Resources: • Burned soil and control soil • Planting cups or pots • Seeds (radish or green beans) • Water • Tools (spoons, trowels) • Labels and markers • Monitoring sheets or journals • Vernier sensors (CO_2, moisture, temperature) • Devices (iPads/computers)

Lesson Sequence (How should the learning session unfold?)	**1. Connect to Prior Learning** Revisit: • MudWatt results (Lesson 3: Building Mudwatts and Setting up Soil Systems) • CO_2 and moisture data (Lesson 4: Measuring CO_2, Air Moisture, and Microbial Activity) Ask: • "Which soil had more microbial activity?" • "Which soil do you predict will grow plants better?" **2. Define the Investigation** Model: Control vs Treatment • Control: unburned soil • Treatment: burned soil Explain: "We only change one variable so we know what causes the difference." **3. Identify Variables** Students record: Independent Variable • Soil type Controlled Variables • Seed type • Water • Light • Soil amount • Planting depth • Location Dependent Variable • Plant growth (height, leaves, health) **4. Setup and Planting** Students: • Measure soil amounts • Fill containers • Plant seeds at same depth • Label clearly (color coding helps) Teacher checks: • Consistency • Accurate labeling **5. Prediction Writing** Students write: "If the soil is _____, then the plant will _____ because _____." Strong example:

"If the soil is unburned, then plants will grow taller because it has more microbes and nutrients."

6. **Create Monitoring Plan**
   Students assign roles:
   - Water manager
   - Data recorder
   - Growth checker

   They set a schedule:
   - Daily or every other day
7. **Data Collection (Ongoing over days/weeks)**
   Students measure:
   - Plant height
   - Number of leaves
   - Color/health

   Optional:
   - CO_2
   - Moisture
   - Temperature

   Important:
   Collect baseline data on Day 1.
8. **Data Tracking and Organization**
   Students record in observation sheets.
9. **Analysis and Discussion**
   Ask:
   - "Which plants are growing better?"
   - "What patterns do you see?"
   - "How does this connect to microbes and soil?"

   Push students to connect:
   Soil → microbes → nutrients/CO_2 → plant growth
10. **Final Explanation**
    Students explain:
    - Which soil supported better growth
    - Why (based on data and prior lessons)

Assessment
Formative
- Correct setup and labeling
- Identification of variables
- Quality of predictions

Summative
Students must include:
- **Claim:** Which soil grew better plants
- **Evidence:** Data (height, leaves, observations)

	• **Reasoning:** Connection to microbes, moisture, CO_2 Differentiation Support • Sentence frames: ○ "The plant grew more because..." • Visual measurement guides • Partner roles

Lesson 6: Telling Our Science Story	
Lesson or Unit Phenomenon	Human land stewardship practices influence ecosystem health and recovery after fire.
Learning Goals	Students will: • Synthesize scientific data into a coherent explanation • Use evidence from multiple lessons to explain ecosystem recovery • Create a structured scientific storybook • Revise writing using feedback and digital tools
Lesson Preparation (What should the educator have prepared before the lesson?)	Needed Materials/Resources: • Reading on controlled burns • Book Template • Rubric • AI tool access • Headphones for speech-to-text options (edit written works) • Indigenous text - *The First Fire: A Cherokee Story* • Data and observations from previous lessons
Lesson Sequence (How should the learning session unfold?)	1. **Reconnect to Unit Storyline** Revisit key questions: • Who are we as scientists? • How does fire change soil? • What happens inside soil? • How does soil affect plants? • How do people protect land? Ask: • "What evidence do we already have for each part?" Students reference: • MudWatt data (Lesson 3: Building Mudwatts and Setting up Soil Systems)

	• CO_2 graphs (Lesson 4: Measuring CO2, Air Moisture, and Microbial Activity) • Plant investigation (Lesson 5: Environmental Changes and Seed Investigation) • Indigenous text - *The First Fire: A Cherokee Story* 2. **Organize Evidence for the Book** See Book Template Push: Students must choose important evidence, not everything. 3. **Book Parts Completion** Students will continue with book parts creation. 4. **Final Draft Preparation** Students use a checklist for final draft preparation. **Assessment** Formative • Evidence selection • Draft writing quality • Participation in revision Summative • Scientific Storybook Sections Support • Section templates • Sentence frames: ○ "This shows that..." ○ "The data tells us..."

Lessons 7 & 8: Community Soil and Air Stewardship Presentation	
Lesson Phenomenon	Scientific knowledge gains impact when shared with a community audience.
Learning Goals	Students will: • Design and build an interactive Makey Makey board • Select and organize key evidence from their investigation • Communicate scientific ideas through an interactive system • Test and improve a working model
Lesson Preparation (What should the educator	Needed Materials/Resources: Per Group • Makey Makey kit • Alligator clips

have prepared before the lesson?)	• USB cable
	• Cardstock or poster board
	• Aluminum foil (touch points)
	• Device (iPad or computer)
	• Headphones
	• Book
	• Cardstocks
	• 6B Pencils
	Teacher
	• Example model (if available)
	• Timer
	• Storage bins
	• Step-by-Step: How to Make a Makey Makey Interactive Poster
	• Hello Light Optional (Pre activity)
	• Optional Hello Light Materials:
	  ○ Simple Circuit Template- Template for creating a paper circuit!
	  ○ Conductive Fabric Tape- Fabric tape that conducts electricity
	  ○ Coin Cell Battery (CR2032) - Battery used to power our circuit
	  ○ 5mm Red LED- The LED that we will light up!
	  ○ Scotch Tape (Optional)- Used to tape down the LED!
	
	OPTIONAL BACKGROUND FOR THE MAKEY-MAKEY:
	• Makey-Makey How to
	• Drawable Makey-Makey YouTube Video
	• See Interactive Poster App Plug and Play Makey Makey Apps – Joylabz Official Makey Makey Store
	
	Resources Students Will Use
	Students will pull from:
	• Plant growth data (Lesson 5: Environmental Changes and Seed Investigation)
	• CO_2 and moisture data (Lesson 4: Measuring CO2, Air Moisture, and Microbial Activity)
	• MudWatt results (Lesson 3: Building Mudwatts and Setting up Soil Systems)
	• Graphs created in previous lessons
	• Photos, drawings, and notes

Lesson Sequence (How should the learning session unfold?)	1. **Set the Purpose** Talk about building an interactive board that allows someone to explore your investigation by touching different parts. 2. **Plan the Board**

Students will watch sample videos. Students brainstorm what their kit will look like. Students sketch their layout.
Sample sections:

- Fire and Soil
- Microbes and Energy
- Soil and Plant Growth
- Data Evidence
- Stewardship Idea

3. **Build the Physical Board**
   Students create their board drawing or poster depending on what they chose.
4. **Makey Makey Setup (Step-by-Step)**
   See: Interactive Poster Steps
   See link for Drawable Makey
5. **Revise and Improve**
   Students fix:
   - Weak explanations
   - Missing evidence
   - Connection issues
6. **Closure**
   Ask:
   - "How does your board help someone understand your investigation?

Assessment
Formative

- Board organization
- Correct setup of Makey Makey
- Evidence selection

Summative (Preparation for Presentation)
Students must have:

- At least 4 working touch points
- Clear connection between section and evidence
- Accurate science explanation

Differentiation
Support

- Provide section templates
- Assign roles:
  - Builder
  - Connector
  - Checker
- Use sentence starters:
  - "This shows that..."