**Materials**

* [Disaster Cards](https://www.canva.com/design/DAGnGNAFvbs/3fPB0pZk5TNXZRWa-5o8-Q/edit?utm_content=DAGnGNAFvbs&utm_campaign=designshare&utm_medium=link2&utm_source=sharebutton)

**Workshop Title:** From Satellites to Seeds: Mapping the Future of Food

**Length:** 90 minutes

**Audience:** Middle school students (Title I, WCPSS/WCPL)

**Focus:** Agriculture, Environmental Science, AI, GIS

**Goal:** Introduce students to the role of AI and GIS in agriculture, teach responsible AI use, and build interest in STEM and 4-H pathways.

**Workshop Agenda:**

**SECTION 1 – AI in Education & Ethics (10–15 minutes)**

* Welcome & Icebreaker (3–5 min)  
  Prompt: “Where does your food come from?” Map activity or quick poll.
* AI in Education Discussion (5–7 min)
  + What is AI?
  + Good uses: accessibility, tutoring, prediction
  + Risks: misinformation, bias, cheating
  + Question for group: “Where should we trust AI — and where should we not?”
* Bridge to Farming (2 min)
  + “Today, we’ll use AI and maps to make smart farming decisions — but *you* stay in control.”

**SECTION 2 – GIS in Agriculture (45 minutes)**

### **1. Real-World Farming 101 (5 min)**

* **Prompt:** *“What do farmers need to grow healthy food?”*(Students respond: sunlight, water, soil, climate, no disasters, etc.)
* **Transition:** *“Today, you’re going to think like climate-smart farmers — and design your own resilient farms.”*

### **2. Climate & Soil Mapping Demo (5 min)**

* **Show** real NC map layers (temperature, rainfall, soil types) via ArcGIS Online, StoryMap, or printed visuals.
* Introduce the idea of **crop suitability**: *“Strawberries like well-drained soil and cool weather — where would you plant them?”*

### **3. Activity – Map the Future Farm (10 min)**

**Paper Option:**

* Students receive a paper map of NC (3or local region) with soil and climate zones shaded
* They **circle an area** where they’d grow their chosen crop (strawberries, blueberries, sweet potatoes)

**Digital Option:**

* Students explore a **pre-set Felt map** or **ArcGIS Online viewer** with those same layers
* Individually or as a class, they **drop pins** or use emojis to mark potential farm zones
* Discuss: *“Why here?”* (Good rainfall, less risk of frost, close to water)

### **4. Environmental Risk Mini-Lesson (5 min)**

* **Overlay or pass out data** on:
  + Drought risk
  + Hurricane zones
  + Flood plains
* Ask: *“Would your farm survive a big storm or dry season?”*

### **5. Activity – Disaster Strikes! (10 min)**

* Students receive a **Disaster Card** (e.g., drought wipes crops, flooding destroys field access)
* They must:
  + Re-map or move their farm
  + Write or explain: *“What would you change to protect your farm?”*

### **6. AI Demo – Teachable Machine (5 min)**

* Live demo (projected): Classifies images of crops or land types (healthy vs unhealthy plants)
* Frame it as:
  + *“This is how AI helps farmers monitor crops from the sky.”*
  + *“But AI doesn’t farm —* ***you*** *still make the decisions.”*

**SECTION 3 – Recruitment & Conclusion (20 minutes)**

* How to Get Involved (5 min)
  + Invite to Wake 4-H GIS Team, SparkNC badges, National 4-H Geospatial Team
  + Hand out flyers or share QR codes.
* Q&A + Stay-Back Time (10–15 min)
  + Explore tools further, answer questions, help students sign up or learn more.

**Materials & Tools:**

* Teachable Machine (AI demo)
* ArcGIS Online or Felt Maps (GIS tools)
* NOAA/Esri data overlays (climate, risk)
* Paper map templates (backup if no devices)
* Disaster scenario cards
* Reflection slips
* 4-H recruitment flyer with QR codes

Absolutely, Brandon — here’s a **deeper dive into Section 3: GIS Activities** from *From Satellites to Seeds*, focused specifically on **Activity 1 (Map the Future Farm)** and **Activity 2 (Disaster Strikes!)**, plus a refined version of the overall section so it’s airtight for both facilitators and students.

## **🌍 SECTION 3: GIS Activities (Total Time: ~45 min)**

This section transforms students from passive learners to decision-makers. They’ll think like farmers, use map data to choose where to plant, and then adapt when disaster strikes.

### **🌾 Real-World Farming 101 (5 min)**

**Goal:** Ground students in the real challenges of farming.

**Prompt Questions:**

* “What do farmers need to grow healthy food?”
* “What challenges do they face each season?”
* Show 2–3 pictures of real farms (urban rooftop, coastal NC, rural cornfield).

💬 Wrap-up phrase:

*“Today, you’ll use data to plan a farm — and see if it survives.”*

### **🗺️ Climate & Soil Mapping Demo (5 min)**

**Goal:** Show students how farmers use data before planting.

**Demo Format:**

Use ArcGIS Online or a projected paper map to show:

* NC climate zones
* Soil types (loamy, clay, sandy)
* Optional: annual rainfall or elevation

🧠 Ask:

*“If I want to grow strawberries, where should I NOT plant them?”*

👀 Then show:

* “Strawberries need cool weather and loamy soil.”
* “Sweet potatoes love sandy soil and warm zones.”

📍 Use live map click or sticker on paper to show a sample spot.

## **🚜 ACTIVITY 1: Map the Future Farm (10–15 min)**

### **OBJECTIVE:**

Students will choose a crop and use environmental data to decide **where** and **why** to plant.

### **OPTION A: Paper-Based (great for large groups or limited tech)**

**Materials:**

* Small maps of NC with pre-colored zones for:
  + Soil type
  + Climate zone
* Crop cards (strawberries, blueberries, sweet potatoes)
* Planning worksheet (includes key & crop needs)
* Dot stickers or markers

**Steps:**

1. Each team picks a **crop** card.
2. Using their **paper map**, students find the best location.
3. Circle/mark their chosen farm zone.
4. On worksheet: explain 2 reasons why they picked this location.

**Sample Prompt:**

* “We picked Zone B because it has loamy soil and moderate rainfall — good for strawberries.”

### **OPTION B: Digital Map (small group tablet/laptop or projected class version)**

**Tools:**

* Preloaded ArcGIS Online or Felt map
* Climate + soil layers activated
* Addable emoji pins or drawing tools

**Steps:**

1. Choose a crop.
2. Add a pin for your chosen location.
3. Type in the sidebar: “We chose this spot because…”

### **🧩 Wrap-Up:**

Show a sample “class farm map” with everyone’s farms posted — look for clusters or outliers.

Ask:

*“Who picked the same zone? Why?”*

## **🌪️ ACTIVITY 2: Disaster Strikes! (10–15 min)**

### **OBJECTIVE:**

Students respond to an environmental disaster using reasoning and map adaptation.

### **SETUP:**

Each group keeps their farm map from Activity 1.

**Materials (Paper):**

* Disaster Cards (e.g., flood, drought, pest, hurricane, heatwave, supply chain failure)
* Markers/stickers
* Protective Measures sheet (windbreaks, relocation, crop switching)

**Materials (Digital):**

* Disaster overlay toggles (ArcGIS: floodplain, drought zone)
* Pop-up challenge prompt: “How will you respond?”

### **STEPS:**

1. **Receive a Disaster Card:**
   * “A hurricane destroyed your edge crops and damaged irrigation.”
   * “Your area is hit by drought — rainfall drops by 60%.”
2. **Analyze:**
   * “What crops are most vulnerable?”
   * “Can you move to a safer zone?”
3. **Adapt:**
   * Redesign farm placement, add new features, or switch crops.
   * Use overlays or stickers to “protect” parts of their map.
4. **Reflect (on back of worksheet or via group share):**
   * “What did we change?”
   * “Would this plan work in real life?”

Then step back and look at the class-wide pattern.

## **🤔 Should You Cut or Adjust Anything?**

Here’s the quick take:

✅ **KEEP:**

* Activity 1 (Map the Future Farm): foundational for spatial reasoning
* Activity 2 (Disaster Strikes): brings urgency and real-world systems thinking
* Teachable Machine Demo: short, sweet, high “wow” factor

⚠️ **TWEAK:**

* Climate & Soil Mapping Demo could be blended **into** Activity 1.
* AI Demo might work better **after** the two map-based activities so students understand context.

## **🔧 Finalized Materials Checklist (For Print or Prep):**

### **For Activity 1 –**

### **Map the Future Farm**

### **:**

* Student-sized soil & climate zone map of NC
* Crop Cards (Strawberries, Blueberries, Sweet Potatoes)
* Planning worksheet (with crop key + “Why Here?” prompt)
* Dot stickers or markers (3 colors)

### **For Activity 2 –**

### **Disaster Strikes!**

### **:**

* Disaster Cards deck (cutouts or digital prompts)
* Protective Measures Sheet (e.g., “move uphill,” “switch to rice,” “build windbreak”)
* Same map from Activity 1 reused
* Reflection prompts or slips

### **For Demo/Visual:**

* ArcGIS or Felt Map (projected or on device)
* Teachable Machine: Live AI plant health or image detection
* Class-wide poster or big laminated map (for placing final farm markers)