Teacher Guide (pages 1-3) & Rubric (Pages 4-5) for Module 1 HOA A

1. Overview & Purpose

In this HOA, students **select one food** (e.g., hamburger, tomato, rice) and map its journey through the **agri-food system**, from inputs to waste. They then:

- choose **one focus category** (Inputs, Production, Processing & Distribution, Consumption, or Waste & End-of-Life),
- link it to **Planetary Boundaries** (PBs; Earth's environmental safety limits, like climate and biodiversity),
- connect it to relevant **United Nations Sustainable Development Goals** (UN's 17 SDG goals to protect people and the planet), and
- highlight **feedback loops** and **leverage points** for change.

The activity reinforces key Module 1 ideas:

- Food systems are complex**, interconnected systems**, not simple chains.
- How food drives multiple **Planetary Boundaries** (land, water, climate, biodiversity, N & P flows, novel entities).
- How actions in one part of the system relate to **SDGs** (2, 6, 12, 13, 14, 15, etc.).
- The importance of **systems thinking** (understanding how parts of a system influence each other over time) and **visual modeling** for sustainability.

This HOA lays the conceptual foundation for all subsequent modules (waste-to-resource, soil health, plant health, water, etc.).

---

2. Setup & Materials (Quick Reference)

- **From student instructions:** poster paper, markers, sticky notes, pre-printed icons for food-system stages, Planetary Boundaries, and SDGs; tape/glue; optional yarn/string.
- **Optional teacher prep:**
  - Print the **Food-System Components Table** and PB/SDG icons in color.
  - Prepare a sample partial map to model expectations (without giving away full answers).
  - Decide whether you want groups pre-assigned or student-selected.

Timing:

- Day 1: 45–55 minutes (Steps 1–5)
- Day 2 (Optional): 15–25 minutes Gallery Walk + debrief

---

3. Expected Student Products

Each group should produce:

1. **A systems-map poster** for their chosen food, showing:
   ○ food name and selected focus category;
   ○ components from inputs → waste;
   ○ icons/labels for **all Nine Planetary Boundaries**;
   ○ icons/labels for **relevant SDGs**;
   ○ arrows and labels showing cause–effect and at least one feedback loop;
   ○ one clearly identified **leverage point**.

Each student should submit:

2. **Completed Data Collection & Reflection Sheet**
   📄 MOD1_HOA1_TCH_DATA COLLECTION_12052025 , including:
   ○ tables for components, PB connections, and SDG links;
   ○ list of key arrows/loops;
   ○ written responses to the 4 reflection questions.

---

4. Guiding the Activity & Discussion

During Step 1–2:
   ● Circulate and **check food choices** for variety (mix plant-based and animal-based where possible).
   ● Prompt students to move beyond the obvious ("farm → store → home") and think about: fertilizers, feed, energy, cold storage, labor, regulations, cultural demand.

During Step 3 (Planetary Boundaries):
   ● Encourage **prioritization**: students should connect all nine boundaries but star the 3–4 strongest.
   ● Ask: *"Which boundary is most stressed by your food? How do you know?"*

During Step 4 (SDGs):
   ● Push students to differentiate **positive vs. negative** impacts
   ● Ask: *"Where is this food helping a goal, and where is it working against one?"*

During Step 5 (Connections & Leverage Points):

   ● Look for **at least one feedback loop** (e.g., climate → crop yields → production choices → more emissions).
   ● Look for a **plausible leverage point** (e.g., reducing food waste, changing feed, different packaging, local sourcing).
   ● Ask: *"If we changed this one thing, what else would shift in your map?"*

Gallery Walk:

- Have each group quickly present: food, focus category, 1 key PB, 1 key SDG, and 1 leverage point.
- Encourage peers to ask clarifying questions or propose additional connections.

---

5. Sample Ideas for Reflection Answers (Not for students)

These are **examples of strong thinking**, not the only correct answers.

- **Q1 – Planetary Boundary most affected:**
    - Beef hamburger (Production focus): *Climate Change* and *Land-System Change* due to deforestation, enteric methane, feed production.
    - Tomato (Distribution focus): *Climate Change* from transport and cold chains; *Freshwater Use* if grown in water-scarce areas.
- **Q2 – SDG most relevant:**
    - SDG 12 (Responsible Consumption & Production) for waste-heavy foods.
    - SDG 2 (Zero Hunger) for staple crops; SDG 13 (Climate Action) for high-emission foods.
- **Q3 – Surprises:**
    - "I didn't realize how much packaging and transport mattered compared to just the farm."
    - "Waste and leftovers affect the climate through methane."
- **Q4 – Leverage point:**
    - Reduce overproduction/over-ordering in cafeterias → less food waste → fewer land, water, and emission impacts.
    - Shift to plant-based protein in school meals a few days per week → lower emissions and land use.
    - Improve cold-chain efficiency or shorten supply chains → reduced energy use and refrigerant emissions.

You can use such ideas to **coach** students, especially if they struggle to identify leverage points.

Grading Rubric – Short Version (Suggested 4-point scale)

You can use this rubric for the **poster + worksheet + participation** (20 points total, or adjust weightage as needed).

Criteria	Exemplary (4)	Proficient (3)	Developing (2)	Beginning (1)
1. System Map Completeness & Accuracy	Map includes a clearly labeled food, focus category, and components across the system; shows an accurate, detailed journey from inputs to waste & influencers.	Map includes food and main stages with mostly accurate components; minor gaps or simplifications.	Map includes some stages but is missing key components or has noticeable inaccuracies.	Map is very incomplete, highly inaccurate, or missing major parts of the food system.
2. Planetary Boundaries & SDG Integration	All 9 PBs are placed; strongest ones for this food are clearly emphasized; SDGs are accurately matched to specific parts of the system with correct positive/negative framing.	Most PBs placed; main ones for this food are identified; SDGs mostly accurate, with some minor mismatches or missing details.	Few PBs or SDGs shown; links are vague or partially incorrect; positive/negative impacts not clearly distinguished.	Little or no evidence of PB or SDG understanding; icons placed randomly or not at all.
3. Systems Thinking (Connections, Feedback Loops, Leverage Point)	Multiple clear arrows show cause–effect and at least one feedback loop; leverage point is realistic and well-justified in terms of its wider impacts.	Some clear arrows and at least one plausible leverage point; feedback loops may be simple or partially explained.	Limited arrows; relationships mostly linear; leverage point vague or weakly justified; no clear loop.	Almost no arrows or connections; no leverage point identified; map is more a list than a system.

4. Reflection & Reasoning (Worksheet)	Written answers use evidence from the map and class; clearly explain which PB and SDG are most affected and why; show insight about surprises and system redesign.	Answers address all questions with mostly correct reasoning tied to the map; some explanations may be brief.	Answers are partially complete; reasoning is vague, general, or not strongly linked to the map.	Few or no questions answered; responses are off-topic or show major misunderstandings.
5. Collaboration & Communication	Group collaborates effectively; poster is neat, readable, and well-labeled; Gallery Walk explanation is clear and engaging.	Group works together with minor issues; poster is readable; oral explanation is understandable.	Collaboration uneven; poster or explanation is somewhat disorganized or unclear.	Minimal participation or disruptive behavior; poster incomplete; little effort to communicate ideas.

Tip: You can score each criterion 1–4 and sum (max 20), or give more weightage to some criteria (e.g., Systems Thinking + Reflection = double weight).