Module 6: Agri-Systems Across the City-Rural Gradient
Instructor Guide Quiz

Quiz Administration Instructions

1. Quizzes are aligned to each of the three module lessons (A, B, C). Administer them after completing the corresponding lesson or use it as a cumulative exam.
2. Questions are a mix of multiple-choice, short-response, true/false, short-essay, and design-based prompts.
3. Provide students with 20-25 minutes per quiz, depending on question type and depth. Can be tailored depending on how long each presentation takes.
4. Use student responses for formative assessment and discussion prompts in class.
5. Consider a group review of answers after submission to promote peer learning and reinforce content.
6. Lesson A short response and short essay do not have key words to lookout for, making it easier for students to gain points early on. Lesson B and C DO have key words to look out for, and should be more specific and detailed with their answers.

Question-Based Suggestions

1. The short essay questions are optional for the instructor to use and can be administered based on expectations.
2. True or false questions can be bonus questions or a normal question, depending on how much time the instructor has allotted for each quiz.
3. The design question should ideally be a requirement, since it should be encouraged to provide an assignment that can use critical thinking and problem solving, especially at the end of the module.
4. The design question can be an open note activity.
5. If the instructor decides to do a review of answers after submissions, encourage students to explain why incorrect answers were incorrect for participation.

Grading Rubric

Use this expectations rubric to assess short response, short essay, and design-based responses:

Criteria	Exceeds (3 pts)	Meets (2 pts)	Needs Improvement (1 pt)
Content Accuracy	Response demonstrates deep understanding with specific examples and accurate terminology.	Response addresses the question with mostly accurate content.	Response contains inaccuracies or lacks sufficient explanation.
Clarity & Organization	Response is clearly organized and easy to follow.	Response is mostly clear with minor lapses in structure.	Response is disorganized or difficult to interpret.
Use of Evidence/Data	Provides clear evidence or references to concepts discussed in class/maps/resources.	Some supporting detail or evidence is provided.	Little or no supporting evidence included.
Creativity/Insight (for design prompts)	Innovative, thoughtful, and feasible solutions with clear logic.	The solution is appropriate and meets basic requirements.	Lacks originality or feasibility; vague or incomplete solution.

Lesson A Quiz

Quiz Links:

Module 6 Lesson A Quiz - Editor Link
Module 6 Lesson A Quiz - Responder Link

Multiple choice:

Over ____ of the world's population now lives in cities.

A. 60%
B. 55%
C. 50%
D. 30%

Which is the correct definition of a peri-urban zone?

A. Areas on the edge of cities that support food production, like greenhouse belts and small farms near urban markets.
B. City centers converted into industrial farming zones for mass food export.
C. Rural regions far from cities, where farming has no connection to urban markets.
D. Designated wildlife reserves where no food production is allowed.

Which of the following are NOT characteristics of *rural agriculture*:

A. Large scale farming
B. Sparsely populated areas
C. Ekstensification
D. Dominance of legal status

Urban farm labor is mostly from:

A. Corporate executives on rotational assignments
B. Imported robotics operated remotely
C. Volunteers, local community members
D. Retired airline pilots transitioning to agriculture

Which of the following is the correct definition of food miles?

A. The distance food travels from production to consumer, impacting emissions and freshness.
B. The number of calories burned while transporting food to market.
C. The amount of money spent on food per mile of transportation.
D. The weight of food transported divided by the number of miles it could travel without spoiling.

Which of the following is an urban agriculture example?

A. Large-scale almond orchards in the Central Valley
B. Shipping container farms
C. Cattle ranches in the Sierra foothills
D. Row crop farms spanning thousands of acres in the Imperial Valley

What is a key feature of orchard agriculture in California's Central Valley?

A. Rooftop planting and vertical farming
B. Hand-harvested mixed crops near cities
C. High-altitude grain and livestock farming
D. Use of advanced machinery and large-scale monoculture

True or False:
Peri-urban greenhouse clusters help reduce food waste and heating costs by capturing waste heat from nearby compost sites or biodigesters.

True

Short Answer:
Describe two features of large-scale orchard farming in California's Central Valley and explain one challenge these farms face.

Answer Should:
- Describe two key features of orchard farming in California's Central Valley (e.g., use of advanced machinery, large-scale monoculture, cost efficiency)
- Identify and briefly explain one challenge (e.g., pest pressure, reliance on long-haul transport)
- Be 2–3 sentences long

Sample Answer (Exceeds): Large-scale orchards in California's Central Valley use advanced machinery like GPS-guided tractors and mechanical shakers to harvest efficiently. They often grow just one crop, like almonds, across hundreds of acres, which helps lower costs. However, this monoculture increases pest pressure, so farmers need strong integrated pest management to protect their crops.

Short Essay:
Explain how peri-urban greenhouse clusters contribute to sustainable and resilient food systems. In your response, describe at least two environmental or economic benefits and give examples of how these systems reduce resource use and support local communities.

Requirements:
- Clearly explain how peri-urban greenhouse clusters support sustainability and resilience
- Mention **at least two benefits**, such as reduced transport emissions, lower heating costs, efficient water use, or job creation
- Include **specific examples**, like stormwater irrigation, use of waste heat, or proximity to compost sites
- Be approximately **1–2 paragraphs (5–8 sentences)** long

Relevant Vocabulary for short essay/response (Lesson A):
- *Agri-System*
- *Urban Agriculture*
- *Peri-Urban*
- *Rural Agriculture*
- *Food Desert*
- *Food Miles*
- *Food Sovereignty*
- *Zoning*

Sample Answer (Exceeds): Peri-urban greenhouse clusters support sustainable and resilient food systems by growing food close to cities, which cuts down on food miles and transport emissions. Because these greenhouses are near urban areas, they can use local resources like compost from city waste and stormwater from warehouse roofs. For example, some farms collect rainwater, store it in ponds, and use drip irrigation to water crops more efficiently, reducing reliance on city water. Others pipe heat from compost piles into greenhouses at night, lowering heating costs in winter. These systems create a circular economy by reusing waste and saving energy. They also support local jobs and provide fresh, healthy food to nearby communities.

Overall, these clusters help cities become more climate resilient by producing food year-round, even during droughts or supply chain problems.

Relevant Vocabulary for short essay/response (Lesson A):

- *Peri-Urban*
- *Greenhouse belt*
- *Climate-Smart Agriculture (CSA)*
- *Closed-loop system*
- *Resource loops*
- *Composting piles*
- *Food Miles*
- *Circular Agriculture*

Module 6: Energy Use & Technology in Agriculture- Extended Learning

Lesson B Quiz

Quiz Link

Module 6 Lesson B Quiz - Editor Link
Module 6 Lesson B Quiz - Responder Link

Multiple choice:

What is the correct definition of passive heat distribution?

A. A system of heat lamps controlled by timers to warm greenhouse crops overnight
B. The use of heated water pumped through radiators powered by diesel generators
C. Manually placing hot bricks inside greenhouses each night to retain warmth
D. Small solar powered fans which move compost air through under-bench tubing

How much does pulse drip irrigation save?

A. 30%
B. 10%
C. 35%
D. 20%

Which is NOT a feature of rural renewable dryland farming?

A. Cloud data and remote control
B. Wind powered pump
C. Heated concrete planting beds
D. Soil moisture probe

What is the social impact of urban farms?

A. Hyper-local farming can improve dietary health in under-served neighborhoods.
B. Urban farms increase industrial crop exports to foreign markets
C. They primarily serve as storage areas for imported fertilizer supplies
D. Urban farms are designed to reduce traffic congestion during rush hour

Urban closed loop micro farm cuts water and waste by ____:

A. 50%
B. 35%
C. 60%
D. 40%

Which of the following are climate smart agriculture goals?
A. Maximize fertilizer use, expand monocultures, increase export volume
B. Increase productivity, enhance resilience, reduce greenhouse emissions
C. Prioritize aesthetics, reduce farm labor, eliminate crop diversity
D. Replace natural pollinators with drones, focus only on high-income markets, increase irrigation runoff

Which of the following best describes a feedback loop in agriculture or climate systems?
A. A process where an initial change causes effects that either reinforce or reduce that change over time
B. A method for collecting customer reviews about farm produce
C. A government form farmers fill out to request subsidies
D. A routine for checking tractor engine performance each season

Short Answer:
Describe two core goals of climate smart agriculture, and briefly explain the benefits they will provide.

Answer Should:
- Clearly identify **two core goals** mentioned from the beginning of Lesson B
- Briefly explain the definitions of each goal that was provided in the lesson
- Be **2–3 sentences long**

Sample Answer (Exceeds): One core goal of climate smart agriculture is to increase productivity, which means growing more food to feed a growing population. Another goal is to enhance resilience, or help farms better handle challenges like droughts, floods, or extreme weather. These goals make sure farming stays reliable and efficient, even as the climate changes.

True/False:
Ideal crops for compost-heated hoop houses include slow-growing tropical fruits like mangoes and avocados, which require high heating year-round.
False

Short Essay:
How do peri-urban hoop houses use city resources to save money and reduce waste? Give two examples and suggest one more idea of your own and how it would work.

Requirements:
- Describe **two examples** of how peri-urban hoop houses use urban resources
- Explain **how these strategies save money or reduce waste**
- Suggest **one additional urban by-product** that could be reused (e.g., brewery CO_2, shredded cardboard)
- Be **2–3 sentences long**

Sample Answer (exceeds): Peri-urban hoop houses use compost heat from city green waste piles to warm greenhouses at night, which cuts heating costs and reduces landfill waste. They also collect stormwater from nearby roofs to use for irrigation, saving money on city water and reducing runoff. Another idea could be reusing CO_2 from local breweries to help plants grow faster in the greenhouses.

Relevant Vocabulary for short essay/response (Lesson B):
- *Climate-Smart Agriculture (CSA)*

- *Wicking Bed*
- *NFT (Nutrient Film Technique)*
- *Compost-Heat Greenhouse*
- *Pulse Drip Irrigation*
- *Soil Moisture Probe*
- *Variable-Frequency Drive (VFD)*
- *Circular Agriculture*
- *Biochar*
- *Food Miles*
- *Gentrification*
- *Digital Divide*

Lesson C Quiz

Quiz Links:

Module 6 Lesson C Quiz - Editor Link
Module 6 Lesson C Quiz - Responder Link

Multiple choice:

Hydroponics use ____ less water per kilogram of of lettuce than traditional soil farming

A. 80%
B. 70%
C. 75%
D. 40%

Due to _____, stacked systems use more LEDs, increasing energy use per unit of biomass

A. Light decay curves
B. Limited root zone volume
C. Nutrient runoff rates
D. Airflow restrictions

The best balanced design for efficiency includes:

A. Crop height, greenhouse color, and harvest time
B. Fertilizer brand, tractor speed, and plant spacing
C. Packaging style, shelf labels, and delivery route
D. Water use, energy use, and yield

Energy-use efficiency use which of the following units:

A. kWh/kg
B. kg/kWh
C. kWh/acre
D. lumens/kg

In a vertical farming system, roughly how much light will reach the third tier?

A. 70%
B. 45%
C. 60%
D. 20%

Short Answer:

Briefly explain why there is no perfect solution in agriculture when creating a sustainable design.

Answer should:

- Acknowledge that **every farming system involves trade-offs**
- Be **2–3 sentences long**

Sample Answer: There is no perfect solution in agriculture because every sustainable design involves trade-offs. Farmers have to balance things like water use, energy costs, and crop yield, and what works well in one location might not work in another due to resource limits. Sustainability means finding the best balance, not a one-size-fits-all answer.

Design Prompt (Content from Lesson B):

You are tasked with designing a peri-urban compost-heat hoop house. What urban by-product will your house utilize, and illustrate how it can be a closed-loop system using a simple arrow diagram.

Answer Should Include:

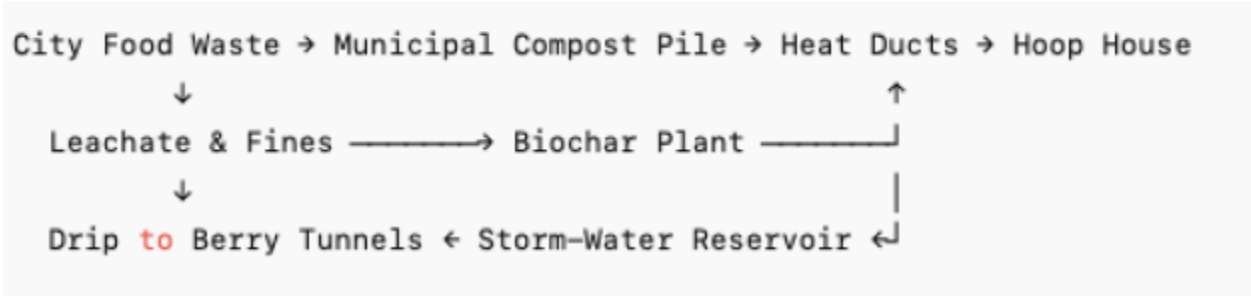
- Clearly identify **one urban by-product** (e.g., compost, stormwater, waste heat, CO_2 from breweries, cardboard)
- Explain how that by-product is **captured and reused** in the hoop house system
- Describe how the system forms a **closed-loop**, reducing waste and relying on local resources
- Mention at least **one benefit**, such as **energy savings**, **water conservation**, or **reduced emissions**

Additional Expectations (Teachers only):

- In this particular prompt, students will ideally create a quick visual similar to an arrow diagram, indicating how their hoop house will be a closed loop.

Sample Response: My compost-heat hoop house will use waste heat from a nearby municipal compost site. At night, hot air from compost piles—often around 140°F—is piped into the greenhouse to keep plants warm without burning fuel. This creates a closed-loop system by reusing local waste instead of adding more emissions. It saves money on propane and supports a circular economy by turning city waste into a useful farm resource.

Separate Illustration Example:



Relevant Vocabulary for short response/design prompt (Lesson B/C):

- *Liters per Kilogram (L/kg)*
- *Biomass per kWh*
- *Input-Output Ratio*
- *Hydroponics*
- *Vertical Farming*
- *Biochar*
- *Controlled Environment Agriculture (CEA)*
- *Electrical Conductivity (EC)*
- *pH*
- *(Reference relevant vocabulary from Lesson B as well)*