

Instructional Scenario



Increasing Strawberry Production Using Environmental Control Technology

Course/Duty Area: Introduction to Plant Systems/Understanding Plant Processes

Scenario:

You are a plant producer in Virginia who wants to increase the amount of strawberries your farm produces each year. Currently, your farm uses traditional field production methods and harvests one crop per year. You have learned that some producers grow strawberries year-round or produce multiple crop cycles by using controlled environment agriculture, greenhouse production, supplemental lighting, and automated environmental control systems. You are considering changing your production system to increase yield, improve crop quality, and make your farm more profitable. Before deciding, you must research current and emerging environmental control technologies used in plant production systems.

Big Question:

How can environmental control technologies be used to increase plant growth, yield, and production efficiency?

Focused Questions:

- What environmental factors affect plant growth and development?
- How does light influence photosynthesis and crop yield?
- What technologies can be used to control temperature, light, and moisture?
- What are the advantages and disadvantages of greenhouse production compared to field production?
- How might automated systems improve plant production efficiency?
- What economic factors should a producer consider before investing in new technology?
- Where can producers find reliable information about new agricultural technology?
- How could controlled environment agriculture allow multiple crop cycles per year?

Student Project or Outcome:

Students will research current and emerging environmental control technologies used in plant production and recommend a production system that would allow a Virginia strawberry producer to increase the number of crop cycles per year.

Students will present their findings in one of the following formats:

- Written explanation
- Slide presentation
- Poster or diagram
- Production plan
- Short report with supporting data

Project-Based Assessment:

Students will be evaluated on their ability to:

- Explain plant growth processes including photosynthesis, respiration, and transpiration
- Describe how environmental factors influence plant development
- Identify technologies used in controlled environment agriculture

- Analyze advantages and disadvantages of different production systems
- Justify their recommendation using scientific and economic reasoning
- Use information from agricultural articles, research sources, or technical publications

Assessment may include

- written response
- presentation
- diagram or diorama of the production system
- group discussion
- rubric-based project.

Teacher Resources:

- Agricultural news articles (e.g., Hortidaily, Greenhouse Grower, FloralDaily)
- Extension publications (e.g., from Virginia Cooperative Extension, U.S. Department of Agriculture [USDA])
- Greenhouse production manuals
- Plant science textbooks
- Industry videos on greenhouse and vertical farming
- Data charts showing yield differences in controlled environments
- Articles on LED lighting, hydroponics, glazing, and season extension
- Interviews/field trips to local production facilities

Teachers may select current resources to keep instruction relevant to industry trends.

Scenario submitted by Heidi Davis, Massaponax High School, Spotsylvania County Public Schools