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WRITTEN LESSON PLAN

# DESIGN A SMART GREENHOUSE WITH LESS CHEMICAL USE

**Grade:** Grade 5
**Module:** Rejection of the Use of Chemical Products
**Suggested duration:** 45 minutes

## Lesson focus

- A design challenge lets students apply the module's ideas about monitoring, early pest detection and precision agriculture to a tangible solution.

## Learning objectives

- Describe two problems that can arise from excessive chemical use in greenhouses.
- Propose at least two technologies or practices that could reduce reliance on chemical products.
- Explain how each design choice addresses a particular greenhouse problem.

## Materials and preparation

- Paper (A3 if possible), pencils and coloured markers
- Greenhouse design worksheet and scenario cards
- Board or projector; optional images of greenhouse sensors and pest-monitoring systems

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# LESSON PROCEDURE

## Engage | The greenhouse problem (6 min)

- Present the scenario: 'Our greenhouse grows vegetables, but we want to reduce unnecessary chemical treatments while keeping plants healthy.'
- Invite students to name possible challenges: pests, poor growing conditions, wasteful watering.

## Explore | What can help? (9 min)

- Explain in simple terms how sensors monitor temperature and humidity, image-based systems may flag pests, and targeted irrigation can reduce waste.
- Clarify that AI supports decisions; it does not guarantee that chemicals can always be eliminated.

## Design | Smart greenhouse (18 min)

- In groups, draw a greenhouse and label at least two solutions.
- For each solution, complete: 'Problem → Technology or practice → How it helps'.
- Include one non-digital practice such as checking plants regularly or encouraging beneficial organisms.

## Present | Explain choices (8 min)

- Each group gives a one-minute explanation of its design.
- Classmates ask one question about feasibility or environmental impact.

## Reflect | One useful improvement (4 min)

- Students finish: 'Our most useful idea is ___ because ___.'

# STUDENT ACTIVITY SHEET

Copy or print this page section for each group or student. The prompts can also be completed in a notebook.

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## Challenge

- Which greenhouse problem will your team solve first? _____

## Solution A

- Problem: _____
- Tool or practice: _____
- How it reduces unnecessary chemical use: _____

## Solution B

- Problem: _____
- Tool or practice: _____
- How it reduces unnecessary chemical use: _____

## Check

- What might be difficult, costly or unreliable about your design? _____

## Assessment / success criteria

- Design shows two relevant solutions and explains their intended effects.
- Group presentation connects a problem to a practical response.
- Reflection acknowledges at least one trade-off or limitation.

## Differentiation

- Support: Offer a labelled greenhouse outline and solution cards (humidity sensor, pest camera, drip irrigation, regular plant inspection).
- Additional challenge: Ask groups to prioritise their solutions under a limited budget and justify the order.

## Extension activity

- Research one real greenhouse-monitoring technology and identify the information it needs to work.

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