Data Collection Worksheet for HOA Module 4 Lesson C - HOA C1
Grouping: Small groups (3–4 students)
Time Required: 35-40 minutes (one class period)

Team & Game Selection
- Class / Period: _____ Date: _____
- Team name / ID: _____
- Team member names: _____
- Pipeline (circle one):
    - Prevent a Disease – Save our citrus trees!
    - Cell Factory – Turn microbes into microscopic factories
- **Specific Game Chosen:**
    - Prevent a Disease: ☐ Produce citrus defense ☐ Kill the bacteria
    - Cell Factory: ☐ Biofuel ☐ Shark-friendly vaccine (squalene) ☐ Biodegradable plastic
- Goal (circle): ↓ Disease risk | ↑ Useful product output
- Metric tracked (what the game shows): _____
- Tutorial completed? Yes / No

Your Task:
1. **Run Log – What Did You Change? What Happened?** Goal: Use at least 2 runs (3 if time) to explore how changing cell-level processes changes disease risk, plant growth, and/or product yield.

Game Level-1 Run Log:

Try #	No. of Arrows changed	Moves used / Move limit	Time (use phone)	Outcome (Pass/Fail)	What changed inside the cell? (mechanism)	Trade-offs / Hints noted
1						
2						
3						
4						

Run 1 – Baseline or First Strategy. Settings / Strategy Chosen

- What did you change inside the cell? (pathways, enzymes, transporters, resources)
- Briefly describe your strategy:

Level-1 winning layout:

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Key Outputs from the Game RUN 1. *(Use language from the app: defense levels, disease risk, infection spread, product yield, waste, energy use, etc.)*. **Examples:**

2. Disease risk/infection outcome: _____

3. Plant health or growth indicators (if shown): _____

4. Product yield or quality (Cell Factory games): _____

5. Any red warnings / "costs" or side effects? _____

RUN 1 Quick Interpretation – Was this strategy good? Why or why not?

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Run 2 – Improved Strategy
Game Level-2 Run Log:

Try #	No. of Arrows changed	Moves used / Move limit	Time (use phone)	Outcome (Pass/Fail)	What changed inside the cell? (mechanism)	Trade-offs / Hints noted
1						
2						
3						
4						

What did you change compared to Run 1?
(Be specific about what you tuned or turned up/down.)

Level-2 winning layout:

Key Outputs Run 2

- **Disease risk / infection outcome: _____**

- **Plant health / growth indicators: _____**

- **Product yield / waste / energy (Cell Factory): _____**

- **Any new trade-offs or side effects: _____**

Better or worse than Run 1? Explain using evidence from the game.

Optional Run 3 – Balanced Strategy
Game Level-3 Run Log:

Try #	No. of Arrows changed	Moves used / Move limit	Time (use phone)	Outcome (Pass/Fail)	What changed inside the cell? (mechanism)	Trade-offs / Hints noted
1						
2						
3						
4						

Run 3 Strategy goal:

- **Try to balance protection (or product yield) with growth and sustainability.**

Level-3 winning layout:

Run 3 - What did you change?

Run 3 - Key Outputs & Trade-Offs:

From Model to IPM Strategy

Now step back and think like a grower + scientist.

1. Choose a Cell-Level Target

- Based on your best run(s), what **cell-level target** would you focus on in real life?
    - (e.g., a defense compound, a pathogen enzyme, a transport protein, a microbial product)

Cell target / product: _____

What it does in the game: _____

Why is this a **good target** for disease management?

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2. Benefits & Trade-Offs

List at least **two benefits** and **one trade-off** of this strategy if a grower used it.

- **Benefits (disease/yield / sustainability):**

    1. _____
    2. _____
- **Trade-Offs / Risks:**

    1. _____

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3. Place It on the IPM Pyramid

Where would your strategy fit? (Check and explain.)

- ☐ **Prevention / Cultural Practices** (e.g., making plants inherently more resistant)
- ☐ **Biological Control** (e.g., using beneficial microbes or microbial products)
- ☐ **Mechanical / Physical / Monitoring**
- ☐ **Chemical Control / Last Resort**

Why here?

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4. Final Reflection (Individual or Group)

1. What surprised you most about how **small cell changes** affected **big outcomes** (disease, yield, sustainability)?