



## **Plants v. Profits**

**Grow, Profit, Win!**

# **Facilitators' Guide**

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**1–5 Players | 40–60 min. | Ages 11+**



## Introduction to the Facilitator's Guide

This guide is written to help teachers and 4-H or other group leaders use *Plants v. Profits*, a game for players ages 11 and up. The game can be used successfully with younger players when they have assistance, but you are always the best judge of how to ensure success for your group.

The first section of this guide is a copy of the instructions with facilitator guidance for each step provided in red.

The second section of this guide provides notes on how to scale the game up or down for players of different ages.

This game was designed with the following educational goals in mind. Players should learn:

- what cover crops are and how they benefit soil health,
- some factors that affect soil health,
- that soil health affects future crop growth, and
- that soil health is most visible in the long term.

This game does NOT require any previous knowledge about soil health, cash crops, or cover crops. Players will learn about each of these ideas while playing, especially if they find the path to success on their own.

**Avoid directing players to grow cover crops in Year 1—it is always more powerful for players to see the impact of cover crops (or the lack of cover crops) when they make their own decisions. Keep this in mind if you decide to do a walk-through of Year 1 or if you find that more assistance is needed in facilitating gameplay for some groups.**

## Game Instructions with Notes

**Background:** You have a 10×25’ garden—about the size of an average living room. The local farmer’s market has invited you and your team to sell produce!

You have unlimited money, so your only goal is to have more money at the end of each year. Be careful—only happy soil will make money for many years!

***Notes on Background:*** This game was set in a garden rather than in a larger agricultural setting to keep numbers smaller and to bring the game closer to players’ lived experiences.

The words “you and your team” are an early hint that the game is designed for players to work together in small groups. Groups should share their findings after completing each year. By comparing notes, each team has more information and can make higher profits while maintaining better soil health. They can also assist each other in gameplay and explain concepts that other group members may be unfamiliar with.

Groups often have one person who reads the instructions aloud and will refer back to them when questions arise. Depending on your group or setting, it may help to assign this role to a detail-oriented team member.

**Setup:** Spread the crop cards on the table so all players can see them. You may want to separate the cards with a green backdrop (🍏 cash crops) from cards with a brown backdrop (🍎 cover crops).

Make sure each player has a 📄 Planning Sheet and a 💰 Profit Sheet. You can print them at <https://pvp.cemastprojects.org/>.

If this is your first time playing, welcome! We suggest you read and complete each step before moving to the next one.

**Notes on Setup:** We highly recommend that groups read and play through each step of the instructions sequentially. Groups who read through each step of the instructions together and execute that step before moving on have proven to stay more engaged and stumble less. Groups who read through the complete instructions first usually go back step by step anyway, but they are more likely to overlook important information.

**Step 1: Choose 1–2 🌱🌿 Crop Cards. Record Termination Cost on the 📝 Planning Sheet if Needed (Year 2 and Beyond).** Each player can choose 1–2 crops to grow this year, but only harvest 1. It's okay if you can't predict how a crop will do—use Year 1 to experiment!

*In Year 2 and beyond, if you do not want to harvest a crop, you may terminate it. This allows you to stop a crop and plant a new one. (If you let a crop reach the end of its growth period, pay no termination cost.)*

*If you terminate, circle the \$20 cost on the Planning Sheet.*

**Notes on Step 1:** Players can choose to grow one or two crops per year, as long as those crops are not growing simultaneously. If players grow two crops, only one should be a cash crop. Players can only harvest one crop.

Although termination is explained here in the instructions, some players may not realize they can terminate a cover crop early, or they may accidentally pay a fee each year just because it is listed. There is a reminder in Step 8, but you may want to cue players to think about termination as they start Step 1 in Year 2.

**Step 2: Use the 📅 Planning Sheet to Verify Crop Timing and Record Seed Costs.** Shade in the color-shifting boxes on the Planning Sheet to show each half month of crop growth. (Planting and harvesting dates are on the upper left of each crop card.) If a crop is still growing at the end of the year, follow the rainbow to shade in the boxes for next year.

You cannot have 2 crops growing at the same time.

Record **seed cost(s)** on the Planning Sheet in the month you plant it. Seed cost is in the top right corner of each crop card.

*Notes on Step 2:* It is possible for cover crops to grow into the next year. If so, it should grow into April of Year 2. (This game does not include time travel!)

Seeds are sold by the packet. Players do not need to multiply costs by the number of seeds.

**Step 3: Record Harvest Cost on the 📅 Planning Sheet for 1 Crop Per Year.** If you harvest a crop, record its **harvest cost** on the Planning Sheet. It is next to the photo on the crop card. Write the cost in the month the crop will finish growing.

*Notes on Step 3:* Players can only harvest one crop per year, but they can plant a crop that will not be harvested. Cover crops are not meant to be harvested; if a player were to harvest most cover crops in a garden setting, they would lose money.


**Step 4: Record Tillage Costs on the 📅 Planning Sheet and Yield on the 💰 Profit Sheet.** Look at the crop card you are harvesting. Compare the yield for each till option. Make a choice and write the **tillage cost** on your Planning Sheet in the month you plant it.

Tillage prepares the land for crops by:



- Full-Till: Turning up all the soil
- Low-Till: Breaking up soil only where the seeds go
- No-Till: Not disturbing the soil at all

With tillage in mind, write the yield and market price for your harvested crop in Step 2 of your Profit Sheet.

***Notes on Step 4:*** Just like in the real world, full-till can sometimes improve yield, but it always degrades soil health. Although four years is not long enough to see a large decrease in revenue as soil health declines, it should be clear that soil health will continue to decline and affect profit in the long term. This is clearest if a player plants the same crop twice: they will almost certainly make less money the second time.

**Step 5: Calculate Revenue, Total Cost, and Profit on the  Profit Sheet.** To find out your profit and soil health, work your way from the top to the bottom of the Profit Sheet. When you finish, put your crop cards back in the middle of the table.

***Notes on Step 5:*** Some players may get caught up in filling out the Planning Sheet for all four years and forget about the Profit Sheet. Encourage players to complete both sheets one year at a time.

**Step 6: Collect  Sad Soil using the  Profit Sheet.** Keep your sad soil tokens—you will add to them each year.

***Notes on Step 6:*** Some common mistakes to look out for are not treating soil health as cumulative and overlooking one of the soil health questions, especially the question about growing the same crop two years in a row.

**Step 7: Share Your Results with Your Team.** What crops performed well? What effect did soil health have on their success?

*Notes on Step 7:* Players within each group should share their findings after completing each year, particularly Year 1. Comparing profitable or unprofitable crops is valuable, as is sharing how their decisions affected their soil health. By working together, each team has more information and can make higher profits while maintaining better soil health.

Players may not understand why their crop was unprofitable. There are two cash crops that are not profitable when harvested manually in a small garden plot, but they would be profitable in a larger setting that allows for mechanical harvesting.

**Step 8: Repeat.** Repeat Steps 1–7 for three more years.

Remember, you can choose to terminate to plant a cash crop earlier.

*Notes on Step 8:* After players have completed Year 1, the following years go much faster (usually half the time or less).

Termination was introduced in Step 1 because players will decide whether to terminate a crop when choosing crops for the year, but we also include a reminder here because termination comes into play in Years 2–4.

As a facilitator, you can make Years 2–4 run more smoothly by pointing out that there are two blanks on the Profit Sheet that will come into play during Year 2: termination and crop repetition.



## **Step 9: Calculate Total Profit and End Soil Health.**

Finally, add each year's profit to find how much money you made! How healthy is your soil?

If your team is competing with another, average all your team members' soil health at the end of the game. Also average all team members' profits.

Compare your team's averages with other teams.

- Who won based on soil health?
- Who won based on profit?

*Notes on Step 9:* Although total profit is a sum of all four years, end soil health is calculated as it is every other year. After adding the number of sad soil tokens collected at the end of Year 4 to the cumulative total, soil health is converted to a percent. (This is a good time to point out that these decimals can be read as a percent, since percents may have more meaning for players.)

## **Food for Thought:**

1. Not all of the crops in this game will make money. Usually this is because harvest costs are too high. Would these crops make money if you were harvesting with a machine instead of by hand?

*Notes:* The two cash crops that are not profitable in this game can be profitable in a larger setting when machine harvested. Even the cover crops could be profitable with mechanical harvesting in the real world: they can be used as forage (for grazing), sold as hay, or made into other products. For instance, pennycress is an oilseed that has a variety of uses, particularly as a biofuel, and the USDA is funding research to develop it into a cash crop.

2. What was the best benefit brought by cover crops? (What is a cover crop?)

**Notes:** Players will find that not planting a cover crop negatively impacts their soil health—they gain one sad soil token for each month their land is fallow. The primary benefit of planting cover crops is that they keep the soil in place, preventing soil erosion. Cover crops can also benefit soil health in other ways (e.g., replenishing soil nutrients, improving soil moisture, and reducing weeds or pests).

3. To simplify the game, there is no way to restore soil health. What can farmers do to restore soil health in the real world?

**Notes:** The best way for farmers to restore soil health is by planting cover crops. Farmers also use soil additives such as fertilizers and soil conditioners, such as aglime. (Aglime is often required when using fertilizers to prevent soils from becoming too acidic.)

4. This game does not consider weather. Could weather affect yield? Market price? Costs?

**Notes:** Weather certainly affects yield, market price, and costs. Yield and market price are the two most likely to be affected, which is why they are included in the advanced gameplay option that follows.

## **General Facilitation Notes**

### **For Younger Players or Faster Gameplay**

For younger players or players who have difficulty following instructions independently, it can be helpful for the facilitator to do a walk-through of Year 1 aloud with the whole group. The simplest (and fastest) walkthrough would involve all players growing the same crop in Year 1, with the chosen crop card in view of all players.

In an intermediate walkthrough, each player would choose their own crop, weigh each decision together, and work through the Planning and Profit Sheets together. This option will not be faster than an unmodified game.

### **For Advanced Gameplay**

To increase engagement in Years 2–4, you might consider adding an element of chance that affects players' profits for that year. An easy way to do this is to roll two standard six-sided dice to represent changes in weather or other events that could affect yield or market price. (Players will roll the dice to determine how yield or market price is affected.) Alternately, a graphical randomizer of events is available at <https://pvp.cemastprojects.org/>.

## Advanced Gameplay Event Listing

Roll	Event	Effect
2	<b>Aliens?! Aliens!!!</b> - Alien visitors did not affect yield or price, but they did make for great friends!	None
3	<b>Investors Galore!</b> - A new trend toward green investments rewards vegetable growers.	+\$0.40 market price
4	<b>Rain, Rain, Go Away</b> - Crops were flooded by heavy rains.	-10 lbs yield
5	<b>Grants Fund Irrigation!</b> - A government grant pays growers to try a new system for watering plants.	+20 lbs yield
6	<b>Perfect Skies: The New Norm?</b> - Growers are hoping every year is as good as this one!	+10 lbs yield
7	<b>Pleasant Skies Win the Prize</b> - Skies were the perfect mix of sun and rain this year.	+10 lbs yield
8	<b>Brrrrrr!</b> - Cool weather kept growers' yields down this year.	-20 lbs yield
9	<b>Bumper Crop of Worms</b> - This year saw good yields. Scientists think growers may have worms to thank!	+10 lbs yield
10	<b>An Era of Healthy Eating</b> - Greater demand for healthy foods leads to higher prices.	+\$0.20 market price
11	<b>Market Conditions Worsen</b> - Despite high yields, investors fear a recession.	+20 lbs yield / -\$0.20 market price
12	<b>Bugs Take Over</b> - Farm yields were low this year as bugs devoured crops.	-20 lbs yield

A graphical randomizer of these events is available at <https://pvp.cemastprojects.org/>.