**Lesson Name:** Heavy Lifting—Rest and Recuperation for your soil

**Main message:** Don’t plant too many things, too frequently in a bed without letting it rest and replenish its soil fertility

**Time:** 30-60 minutes depending on number of rounds or variations

**Location (classroom/field):** either

**Audience (Level):** all levels of farmers/gardeners

**Literacy/Numeracy level:** Literacy-0, basic English numeracy (0-100) is helpful but numbers will be counted out loud as well

**Area of learning/Subject:** Soil Fertility

**Competencies/Skills/Core Knowledge:**

* Counting in English
* Higher levels: decision making/crop planning

**Learning objectives**

***By the end of the lesson farmers will…***

* Understand that their soil/bed’s can get tired just like muscles can get tired from being used too much.
* Understand that there is an impact on their soil fertility if they plant multiple things in one bed throughout the season.
* Understand that decisions they make in how they treat the soil and what they put into it will directly affect the output of the soil in production of vegetables.

**Assessment evidence**

***Farmers will demonstrate their learning by…***

Sharing in discussion and answering questions throughout the activities

**Pre-teaching Concepts:**

Definition of soil fertility

Definition of heavy and light feeder crops if you are doing the alternate version

**Teaching Tips:**

Scattered throughout in “comments”

Note: the first two activities do not deal with the concept of heavy vs light feeders, but more the concept of fallow, letting a bed rest vs. continually planting from the earliest time through the latest time in the season. The third activity is an alternate round that includes the concept of different effects of different crops on soil fertility.

**Background Notes:**

It is helpful for the instructor to know a bit about which crops might be heavy feeders or light feeders and types of successions.

**Materials:**

Stopwatch

2 weights

White/chalk board and writing instruments

Pictures of 4 vegetables—tomatoes, mustard, cucumbers, beans

**Set-up:**

Stand in front of or have handy a whiteboard and markers

**Steps:**

**Introduction**

Staff explains that this a competition to see how many times you can lift a weight in the air for 30 (or 60) seconds. Storyline: The volunteer’s arm muscles are their plot/soil and the number of times they lift the weight is how many pounds of vegetables their bed will produce during that season.

**Round 1**

* Staff: “It is springtime and we are starting the growing season! Our farer is going to grow tomatoes in their bed, and when they are done, they are going to rest their bed for winter time.”
* Tape a picture of tomato on the board.
* Volunteer 1 steps up. Staff: “Our farmer “insert name” is going to grow tomatoes in their bed this year.”
* Staff: “You will have 30 (60) seconds to produce your tomatoes and we will count how many pounds you harvest.”
* Staff times participant for 30 (or 60) seconds, as the volunteer lifts the weight and everyone counts.
* Write the number on the board and explain the number of times is the number of pounds that that bed produced this year.
* Staff explains that it is now fall time, and the volunteer can rest for 1 minute before the next year’s growing season.
* Time the volunteer for 60 seconds of rest
* Announce, “It is now springtime again, get ready to plant your tomatoes again.”
* Repeat the exercise and write the number on the board.
* Theoretically, as the volunteer’s arms get tired, the number they can lift will go down to illustrate that soil fertility can decrease over time if care is not given to the soil, in either fallow time or ammendments.

***Discussion Questions***

*Why does the number of pounds produced go down?*

* *Because the arms are tired, all the strength is used up*
* *Because the bed fertility is gone*

*What is a way to make it so the bed is less tired?*

* *Letting it rest*
* *Giving it fuel (cover crops and fertilizers)*

*Discussion question: Why do we want to rest the soil?*

* *So that we have more produce*

**Version two**

* Ask for another volunteer
* Staff explains, this farmer wants to plant three things in their bed this year. They are going to plant mustard in the spring, then they are going to plant cucumbers, then when the cucumbers finish they want to plant mustard again before the season ends.
* Tape all three vegetables in a row on the board.
* *Question*: What do you think is going to happen to their bed? Instead of letting the arms rest, you are going to keep lifting.
* Volunteer 2 steps up
* Staff times participant for 10 seconds.
* Everyone counts as the volunteer lifts the weight.
* Write the number on the board and explain the number of times is the number of pounds of mustard that that bed produced this year.
* Then let the volunteer rest 5 seconds and repeat for 20 seconds.
* Write the number on the board.
* Then let the volunteer rest 5 seconds and repeat for 10 seconds.
* An alternate version of this would have another person planting cover crop between the two mustards, and thus resting during the period. Using these two examples, you could compare the production of mustard at the end of the season for both beds—the one that rested with cover crop and the other that produced cucumbers.

***Discussion Questions***

*What happens when you have to lift the weights a lot without any rest?*

*How would this scenario differ from someone who is only planting one thing in their bed?*

**Alternative Version—Heavy vs Light feeders**

* Use different crops to illustrate the concept of heavy and light feeders, prescribing an individual to lift 3-4 times in a minute for a light feeder or to lift 60 times in a minute for a heavy feeder, and asking them how tired their arms are afterwards.
* Choose three volunteers and give each a card (or tape them to the board) representing the crop they will grow in their bed that year.
* Bed/volunteer one will grow tomatoes in the summer; bed/volunteer two will grow mustard; bed/volunteer three will grow beans.
* Each one will have a different number they have to lift for the season, depending on whether they are a heavy or light feeder. In the 60 second season, the beans will have to lift 4 times, the mustard will lift 15 times, and the tomato will lift 60 times.

***Discussion Questions***

*Whose arms would be the most tired*?/*Which ground might be the most tired?*

*How this might relate to soil nutrients and soil fertility?*

**Alternatives:**

* **Advanced Crop planning and decision-making**: For a more advanced group, farmers could plan out what they are going to do for three years ahead of time and choose whether they are going to rest their soil or add compost, which would be illustrated in taking longer breaks to rest their muscles. This could be useful especially if one farmer does not want to do this and decides instead to plan many successions of something for as long as they can.
* **Compare multiple crops at one time:** To illustrate differences between crops and how it affects muscles/soil fertility, you could have three volunteers go through the same year together, but start at different points depending on when the crop is planted and/or how much it takes out of the soil. In this version, you would not compare pounds of food produced, but would only ask volunteers how tired their arms are, specifically if they were in a bed where there was a spring, summer, and fall crop planted successively. Potential options for this version: Bed 1—spring crop, summer cover crop/rest, fall crop; Bed 2—long summer crop (later start than the others); Bed 3—spring crop, summer, crop, fall crop, no rest, very tired.

**Reflection***What did farmers learn? How do I know? What did I learn? How will I improve my lesson next time?*:

* 30 seconds might be too short of a time to really tire the arm muscles, especially if it is a super competitive individual who has “caught on”. Starting with 45-60 seconds might work out better. It was still effective and fun with 30 seconds however.

**Accompanying Photos:**

