



Permaculture Gardening with Simple Materials

OBJECTIVES

Students will be able to:

explain the basics of permaculture gardening and compare and contrast how this method may be used in place of traditional tilling & planting methods

explain how companion planting may help plants and animals thrive in a garden

ESSENTIAL QUESTIONS

- How does permaculture lead to overall sustainability?
- How does permaculture work to restore soil health, improve plant yields and overall ecosystem health?
- What types of plants would be best grown in our local environment?
- Where should we plant our own school garden? What species would we like to grow and which plants would grow well together?

MATERIALS NEEDED

- To set up the permaculture garden: cardboard, compost, topsoil, straw, dried leaves
- To learn about permaculture:
The Basics of Permaculture Design
<https://bit.ly/Basics-Perm-Design>

MA STATE FRAMEWORKS

Biology: HS-LS2-1, HS-LS2-2

LESSON

Teachers should start by asking their class to think about the types of gardens or farms they have seen before. What types of foods grow there? How are these foods grown? (Students will likely discuss types of monocultures, such as fields of corn or tobacco grown in isolation from other plants)

Teachers should then ask how plants grow in natural fields or forests. Students should come to the conclusion that these natural forests have a variety of plants, not grown in isolation of other plants. At this time, teachers should introduce students to permaculture gardening by explaining the importance of soil health, companion plants, and sustainability. Resource: <https://growmyownfood.com/what-is-permaculture/>

Teachers should introduce the idea of companion planting with students. At the high school level, students should be able to think how they can design an investigation to test this concept, for example, growing beans, corn and squash together as "sister crops" compared to growing these on their own. This could be another laboratory experiment, if teachers have time in class for students to investigate this. Otherwise, students can simply research and complete a worksheet to analyze why some plants grow well together. One example of a quick lesson on this can be found here: [Three Sisters Gardening](https://bit.ly/3ORcVo4) (<https://bit.ly/3ORcVo4>).

Have students prepare to create a permaculture garden at their school by planning the area, making sure administration is aware and the area can be used without disturbance by other groups. Using the methodology on the following site provided, teachers should take the class outdoors to layer cardboard, leaves,

compost and prepare the ground for the new garden for the winter. Over the winter, the degradation of the cardboard will insulate the soil below, provide food and shelter for the microorganisms, and create a garden site for planting in the spring. Resource: [Gorgeous Gardens From Garbage: How to Build a Sheet Mulch](https://bit.ly/3CaTDCm) (<https://bit.ly/3CaTDCm>).

Teachers should then follow up the next time class meets to discuss what the students would like to plant, given their space available, soil, and location. Students may brainstorm their favorite crops, also considering when they will grow, who can harvest and how available they may be in coming years. Thinking about perennial trees, shrubs, or crops, students can plan the garden to be sustainable for the environment, but also easy to maintain for the students and staff. Students may use the following plant info cards to help them make these decisions: [Garden Cards](https://bit.ly/45Pjavy) (<https://bit.ly/45Pjavy>).

Teachers and students should observe the area of their garden through the winter, so they can compare how the cardboard and natural materials broke down and added nutrients to the soil. In the spring, they should revisit this lesson for planting and gardening as they see best fit.

EXTENSIONS & VARIATIONS

For students to learn more about tilling compared to regenerative agricultural practices like permaculture, teachers may choose to show the documentary, "Kiss the Ground" (available on Netflix) so students can learn more about these methods & how to improve sustainability of our lands

Teachers may contact local schools or universities, such as UMASS Amherst, which is using food from their permaculture gardens in their cafeterias and as an ongoing lesson for many students on campus. Field trips or tours may be arranged, if interested.