



“GROW YOUR OWN!”

LESSON FOUR GARDEN COMPANIONS

Permaculture Principles



Lesson Overview:

This lesson covers basic permaculture principles including – companion planting, hugelkultur, resource conservation, health and wellness.



Lesson Objectives:

Participants will learn the fundamentals of permaculture, learn the basics of companion planting and be able to identify at least two plants that like to grow together, learn how to use common garden plants for basic first-aid, and learn about conserving our resources and creating low and/or zero waste systems.



Key Terms

Permaculture

Permaculture is a philosophy of working with, rather than against nature; of protracted and thoughtful observation rather than protracted and thoughtless labor; and of looking at plants and animals in all their functions, rather than treating any area as a single product system. (Taken from Permaculture.org)

Sustainability

Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. Sustainability creates and maintains the conditions under which humans and nature can exist in productive harmony, that permit fulfilling the social, economic and other requirements of present and future generations. Sustainability is important to making sure that we have and will continue to have, the water, materials, and resources to protect human health and our environment. (Taken from U.S. Environmental Protection Agency)

Biodiversity

Biodiversity comprises all the millions of different species that live on our planet, as well as the genetic differences within species. It also refers to the multitude of different ecosystems in which species form unique communities, interacting with one another and the air, water and soil. (Taken from World Wildlife Fund)

Hugelkultur

Hugelkultur is an old German concept/word meaning “hill-culture”. Wood is buried under topsoil (either in a hole or right on the ground) and as it breaks down, it holds lots of moisture and provides sustained nutrients for plant growth. (Taken from Midwest Permaculture)

Conservation

Preservation, protection, or restoration of the natural environment, natural ecosystems, vegetation, and wildlife.

Renewable Resources

Any resource, such as wood or solar energy, that can or will be replenished naturally in the course of time.

Non-renewable Resources

Any natural resource from the Earth that exists in limited supply and cannot be replaced if it is used up.



Introduction

This lesson is all about systems and cycles. It will give garden participants a chance to step back from the day to day tasks of caring for their garden (weeding, watering, planting, harvesting) and look at the bigger picture. We want to help participants understand the basic concepts of permaculture and permaculture design, as well as pay special notice to the resources we are using in the garden.

Key concepts include –

- Helping participants understand the difference between renewable and non-renewable resources
- Helping participants think about daily lifestyle choices and how they affect nature and our ecosystem
- Helping participants understand how biodiversity is essential to life on the planet
- Helping participants learn some basic permaculture designs such as: companion planting, herb spirals, swales, double-digging, hugelkultur, and rubbish towers.

Permaculture Definitions

There is a great deal to permaculture, so much it is difficult to explain in brief. Below are some thoughts about permaculture that may be helpful when approaching permaculture as a topic as well as permaculture-related activities in the garden with children and youth. The term permaculture combines the words permanent and culture, or permanent and agriculture, and that is the first hint to what it's all about. But permaculture is *more* than agriculture.

“Permaculture is an all-encompassing “Design System” with guidelines, principles, and ethics to guide its implementation. It can be as simple as the way that you “grow tomatoes”, or as complex as the planning of an entire urban city. It can be as large as a commercial farm or as small as an individual apartment. It can be used in development work when working with communities or in a child’s classroom to increase learning potential; it is even capable of recognizing regional differences while continuing to adhere to global “commonalities”.” (From Neverendingfood.org)

“The aim is to create systems that are ecologically-sound and economically viable, which provide for their own needs, do not exploit or pollute, and are therefore sustainable in the long term. Permaculture uses the inherent qualities of plants and animals combined with the natural characteristics of landscapes and structures to produce a life-supporting system for city and country, using the smallest practical area.” (Taken from Introduction to Permaculture by Bill Mollison)

Questions to ask –

- What is happening in our garden (on all levels)?
- Invite participants to use their senses – sight, sound, smell, touch, taste in the garden.
- What are our inputs? What do we need to make our garden grow? Can we find ways to use things that are already available to us here rather than using outside inputs?
- What resources do you use daily? What choices could you make that will reduce the resources you use?
- How can we make our garden more sustainable? How can we make sure our garden will be here for years to come, producing abundance?

EXPLORE ACTIVITIES

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Materials

This Companion Planting Map or Chart, Large paper or poster board, markers, rulers

Activity: Companion Plant Map (Ages 5 – 18)

About Companion Plants

Gardeners and farmers have been using companion planting techniques for many years to grow healthy crops. Companion planting is a method of arranging different types of plants together in a way that will allow them to grow harmoniously, prevent pest damage, and in general use each plant's particular adaptations to assist their neighboring plants. Plants can release chemicals into the soil that can be beneficial or harmful to their neighbors. They may deter pests that are harmful to their neighbors. In a sense, plants "communicate" through chemistry. Rosemary, cabbage and carrots are friends because bugs that like to eat cabbage and carrots hate rosemary. Plant them with rosemary and the bugs will stay away.

METHOD This activity will differ depending on whether the garden is planted or not. One way to do this activity is to bring a large sheet of paper and invite participants to draw out the entire garden without plants. Then look at the Companion Planting Map or Chart and start to draw in which vegetable, herbs, and fruits like to grow together. Try to plant your garden beds accordingly. Use the Companion Plant Map or Chart and explain the reasons why certain plants like to grow together and what their functions are.

Many companion plants work together by deterring pests, or attracting beneficial insects to the plants for pollination. If the garden is already planted, walk around and try to identify which companions are already working together. Make a list of a few transplants or seeds that could be added to create a more companion-planted garden. For example, is there space to incorporate onions or marigolds around the edges of vegetable beds. Marigolds really like to grow near tomatoes, peppers, and basil. Onions are a companion for everything and grow well as a barrier around all garden plants.

Materials:

Set of Companion Plant Flash Cards

Activity: Companion Plant Flash Card Game (Ages 5 – 10)

Follow the directions that come with the flash cards! A fun game to play when you need a little rest from the garden work or break from the heat.

Materials:

Paper, Chalkboard and/or Whiteboard, Poster markers

Activity: What Is Permaculture? (Ages 5 – 18)

Ask participants if anyone has heard of “permaculture” before?

Describe that permaculture is a way of designing things to mimic nature. That means we want to do things in a sustainable and renewable way. We don’t want to deplete our resources or have to use external inputs.

This is an exercise to explore and observe the way nature works. This is the first step in permaculture **observe your surroundings**. Invite participants to think about designs or systems in nature, invite them to look around the garden. How is nature working? What do the insects or animals or plants do? What about other parts of nature? Collect your reflections or findings on a large sheet of paper, whiteboard, or chalkboard. Have a discussion about the importance of mimicking nature in our garden, being observant, etc.

Then, use the Handout “**Kids Permaculture Principles Explained**” to go through the permaculture principles. Throughout this curriculum it is a good idea to refer to these. If there are older participants at your class you can invite them to make a poster of all the principles so you can remember them each time you have a class.

Permaculture Principles

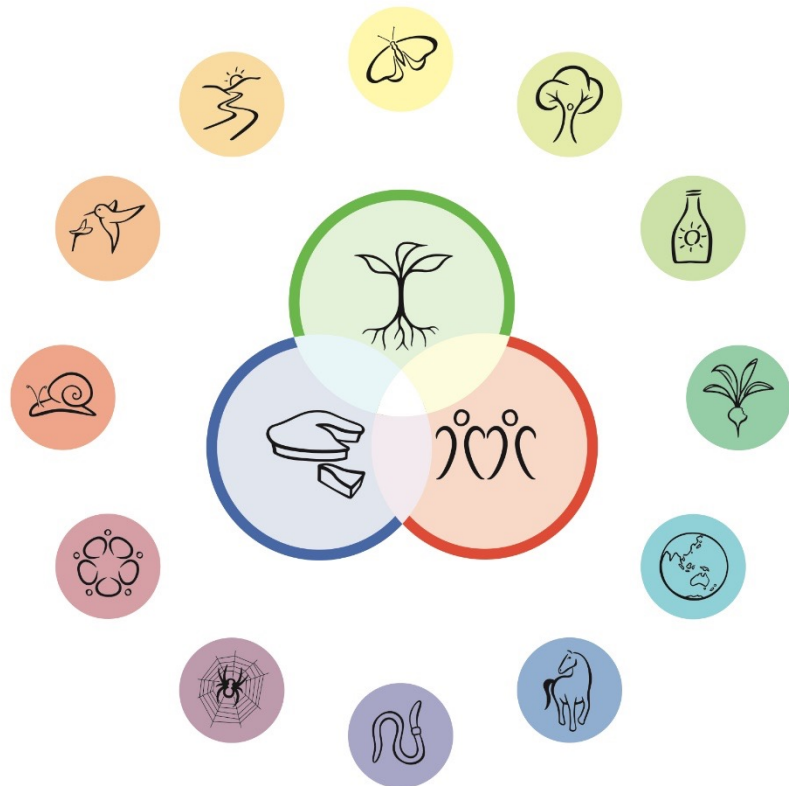
1. Observe & interact
2. Catch & store energy
3. Obtain a yield
4. Apply self-regulation & accept feedback
5. Use & value renewable resources & services
6. Produce no waste
7. Design from patterns to details
8. Integrate rather than segregate
9. Use small & slow solutions
10. Use & value diversity
11. Use edges & value the marginal
12. Creativity use & respond to change

Permaculture Ethics

-  Care of the Earth
-  Care of People
-  Fair Share

& Design Principles

-  1. Observe & interact
-  2. Catch & store energy
-  3. Obtain a yield
-  4. Apply self-regulation & accept feedback
-  5. Use & value renewable resources & services
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Activity: Conserving Resources Game (All Ages)

Go around and make a list of the resources that are used in the garden. Resources are any “inputs” we use in our garden. For example --
Water, Soil, Compost, Seeds or Plants, Sunlight

Determine which resources we can create and which we cannot in the garden. Ask participants if there are better ways we could conserve our resources. Have a large sheet of paper, invite participants to come up with creative ways to make our resources go further. Next, look for things in and around the garden that could be useful – ask, what will we make with these things? Create a project based on what the participants are interested in making. This could be – garden markers, an art project, or anything else useful and beautiful.



Garden Companions

Summer

MOVE ACTIVITIES

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Materials:

Laminated signs with strings attached – Tall trees, low trees, shrubs, herbs, ground cover, and vines

Activity: Sun Beams and Plants (Ages 3 – 10)

***Adapted from Permaculture Principles Lessons**

Talk about the basil in the garden that is planted between the tomatoes and say forests grew because a forest knows how to capture the maximum amount of sun. How? Let us hold up the signs: tall trees, low trees, shrubs, herbs, ground cover, and vines. Tall and short plants, climbing vines make sure to catch as much sun before it hits the ground. We are going to play Sun Beams and Plants, (Sharks and minnows). The first plant picks a sign to wear and each time someone joins the plant side the player picks a sign to wear until everyone is caught and we declare ourselves a 'Forest Garden' that catches all the sun beams.

Have students form six layers of forest garden together with their bodies and/or holding signs. What are the plants catching? (Teacher pretend to send sunbeams) Sun! to what? Turn into energy for people and animals.

Garden Companions

Summer

CREATE ACTIVITIES

**The Big Garden Children & Youth Sustainable Ag
Curriculum**

Materials

Rain barrels, screens for rain barrels

Activity: Install Rain Barrels, Build Screens & Talk About Rain Catchment (Ages 10 – 18)

Rain barrels are a great way to conserve water at the garden. The most common DIY rain barrels are large food grade plastic drums. They can easily be found on local listings such as Craigslist or through local companies. It is important they are food grade so that they are clean and safe to use for water catchment.

Participants can paint the barrels, and place screens on the top to keep debris from getting in the barrel. Also “mosquito dunks” can be used to prevent mosquitos from breeding in the barrels. Participants can retrieve water by using water cans.

Materials

Herb starts both annual and perennial, bricks, soil

Activity: Build An Herb Spiral

This is a great activity to introduce companion planting to all ages, it also brings color to the garden and plants that are great for cooking. Introduce participants to the different types of herbs and ways to use them (for example: basil is often used in pasta sauces or on pizza and can be used fresh or dried). Make sure to help them identify which plants are perennials and which are annuals. Discuss the meaning of those words. Then lay out your plants in a garden bed or area of the garden that allows for easy harvesting. Water loving perennials should be at the bottom of the spiral, and heat loving herbs can be toward the top.



Materials:

Woody material, sticks, leaves, brush, mulch, etc. , soil,

Activity: Build a Hugel Kultur Mound

About Hugelkultur

A Hugelkultur mound is a great way to demonstrate a design that uses resources and materials we already have available to make something functional, productive, and sustainable. Hugelkultur beds act like sponges and are highly absorbent, which means you won't have to water your plants as often. Water will seep into the trench, and decomposition will take place with all the woody material creating a garden bed that needs little maintenance and will be very nutrient-rich.

METHOD

The basic steps for making a highly productive hugelkultur mound are –

- Dig a trench (it can be any size, depending on what you desire in your garden)
- Fill and pile up with woody matter (mulch, brush, logs, leaves, sticks, etc.)
- Pour dirt on top of this woody pile and maybe more mulch
- Plant it!

Taken from Dirtiestkidintheworld.com “A hugelkultur is a high raised bed filled with organic matter that can include bulky wood, compost, sticks, leaves, sod, brush and more. The idea is you dig a trench and fill it with organic material and then some so the trench will be full plus a mound above ground. Then you use the dirt you dug up to cover the whole mound. You want the hill to be steep. It is suppose to have sloping sides. That keeps the soil on top from getting compacted because the whole pile will be decomposing and settling as you go. Then you seed a mix of plants to help tie it all together. The growing roots will help hold the loose pile together. Tubers such as potatoes or Jerusalem artichokes are good option for this. Then you can plant it as you would a regular raised bed or you could continue to seed it polyculture style.

Polyculture style means keeping all your seeds mixed together and throwing them out in a mumble jumble on the bed. Kids love doing this.”

Materials:

Extra Virgin Olive Oil, Herb Tin salve containers (1 ounce), saucepot, small jam glass jars, water, access to a stove or outdoor cooking stove, beeswax, essential oils (peppermint, lavender are kid friendly), olive oil, almond oil, coconut oil, calendula and/or arnica infused oils, cheesecloth dried calendula and arnica to show.

Activity: Making Homemade Herbal Medicine (All Ages) Calendula and/or Arnica Salve for Cuts & Bruises

This activity gives you the opportunity to talk about different ways plants can be used. For example, plants can be used for medicine. The two plants you will be working with are calendula and arnica, both are herbs and are very safe to use with children.

METHOD

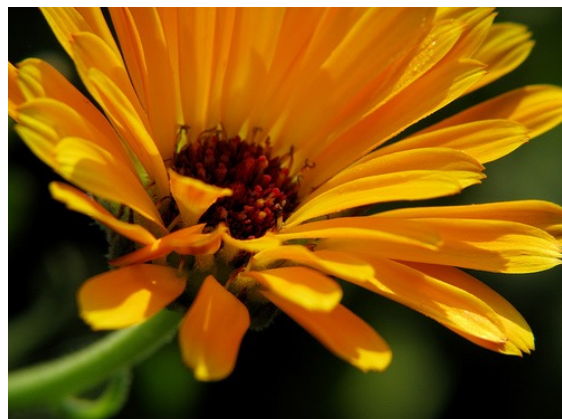
Step One: The first step is to pour your chosen oil or oils into a jar. You want to use calendula or arnica infused oils (that you've been steeping in Extra Virgin Olive Oil for at least two weeks), but you can also mix in other oils if you like. which will then go into your saucepot filled with water (like a double boiler). You will bring the water to a boil, add beeswax, and stir with a spoon.

Step Two: Place another spoon in the freezer to cool it down, remove and dip in the heated oil and beeswax, when you take it out the ointment will harden, and this will tell you what consistency it will be. If it seems too soft add more beeswax to your liking.

Step Three: After it is done, use a jar grabber to remove it from the boiling water, put 8 – 15 drops of your chosen essential oil, then pour it into your tin salve jars. Let it set for a few hours, then cover with lids and label.

Calendula and Arnica Salves are great for --

Rashes
Chapped Lips
Cuts and scrapes
Dry skin
Minor burns
Sunburn



Garden Companions

Summer

EAT ACTIVITIES

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Wild Edible Salad

Early Summer is the perfect time to look around the garden and see what is growing, that is also edible. Correct identification of plants is key before they are used. Only stick with things you are certain about. Also Remember! – if you are at a garden site where the soil is contaminated, or should not be grown it make sure not to harvest anything from outside raised beds or garden area where the soil has been remediated. Never harvest plants near roads, sidewalks, trash areas, or any other contaminants!

METHOD

Here are some common wild edibles that can be harvested and used in a salad --

Dandelion leaves

Red Clover (green leaves and blossoms)

Lambs Quarters

Chickweed

Plantain

Pick small amounts and toss them in a bowl. Add in any herbs from the garden, other greens such as lettuce or spinach, and any edible flowers like nasturtiums for a pop of color. Then, make homemade salad dressing – Salad dressing is really easy and there are a variety of simple recipes. Bring a variety of ingredients so the students can make their own. Here are some examples

Easy Italian-style dressing

3 tbsp white wine vinegar

1 tbsp Dijon mustard

¼ cup olive oil

½ tsp onion powder

1-2 cloves garlic finely minced

½ tsp thyme

salt & pepper to taste

Put ingredients in jar & shake vigorously!

Raspberry Vinaigrette

½ cup white wine vinegar

¼ cup olive oil

¼ cup fresh or frozen raspberries

2 tsp honey

Put all ingredients in blender or food processor and blend until mixed!

GARDEN CARE



Watering

The garden needs to be watered at least 3 times a week, especially if it is not raining. Watering the garden seems like it would be an easy skill, but we have found it can be a little difficult for young gardeners – the reason being that it most participants want to water the plants on the foliage. Help all participants use watering cans or hoses to water their plants at the base of the plant. Explain that the roots are the part of the plant that needs the water most. Talk about run off and soil erosion, and how to make sure we are watering our plants just enough, but not too much.

Drip Irrigation

As far as water conservation goes drip irrigation (next to rainfall, of course) is the best option. Not every garden may have access to a drip irrigation system, but you can explain the participants how it works. Small holes in a line just like a hose are placed on top of the garden beds near the plants or seedlings, and connected to a hose. The hose is turned on and water slowly soaks into the soil in the area around the plants.

Rain Barrels

Rain water collection is another great option for water conservation. Rain barrels can be constructed in a variety of ways, but the easiest is purchasing a large food grade container and repurposing it with a small mesh or wire screen on top to keep insects, leaf litter, and other debris from entering the rain barrel.



Harvesting Crops & Replanting/Continuous Planting

It may be time in the garden to harvest and replant some seeds. Many vegetable seeds require continuous planting – such as lettuce, arugula, radishes, carrots. This means that you can sow some seeds each week so that when they are ready you will have a steady stream or continuous harvest of these crops. When you harvest your spring crops, clear the beds, rake them until they are even again, remove any large debris (like rocks or branches), and replant with summer crops like – tomato, cucumber, or summer squash transplants.