



# Companion Planting

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# What is companion planting?

- Also known as “interplanting” or “intercropping”
- Plants have friends and enemies
  - Some plants **facilitate** each other’s growth
  - Others **inhibit** each other’s growth
- Plant certain plants together to form symbiotic relationships
  - Repel pests from one another
  - Facilitate one another’s mutual uptake of soil nutrients
  - Enhance health and taste
  - Attract pollinators
- Companion planting maximizes the efficiency of your garden and can allow you to grow a more diverse number of plants in a smaller area

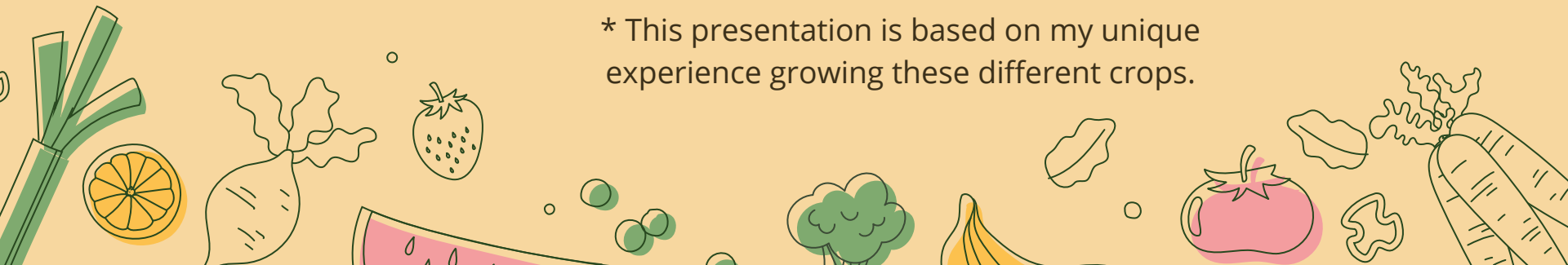


A decorative border at the top of the slide features various fruits and vegetables in a simple, stylized line-art style. From left to right, it includes a radish, an avocado, a banana, a heart-shaped vegetable, a green leaf, a small green circle, a broccoli head, a bunch of yellow bananas, a tomato, and another avocado.

# Keep in mind

Companion planting is not an exact science. Use your own experience, resources, and the advice of other gardeners to find successful plant partnerships.

\* This presentation is based on my unique experience growing these different crops.

A decorative border at the bottom of the slide features various fruits and vegetables in a simple, stylized line-art style. From left to right, it includes a bunch of green leeks, a slice of orange, a radish, a strawberry, a slice of watermelon, a green leaf, a small green circle, a broccoli head, a yellow banana, a tomato, and a carrot.

# The Three Sisters



- Historical practice among Native Americans in North America: Three Sisters
  - Corn, beans, squash
    - Beans fix nitrogen
    - Corn stalks provide supportive structure for beans to climb
    - Squash acts as a living mulch to shade soil to reduce evaporation and germination of weeds
  - Crops have similar environmental requirements
  - When planted with adequate space between them, do not compete with one another

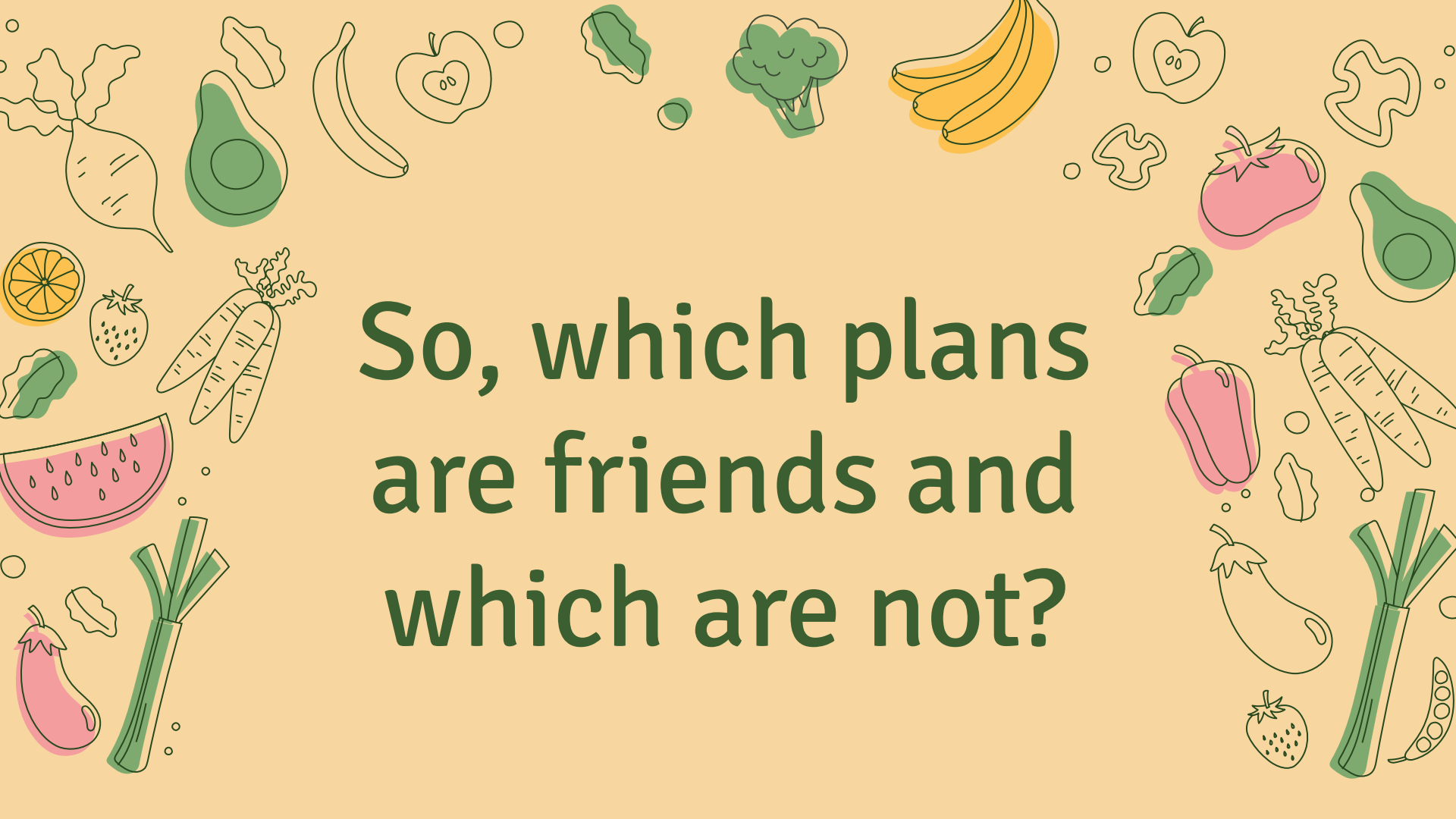


# The Famous Antagonist

- **Black walnut** and butternut squash have an antagonistic relationship with tomatoes
  - The toxin, juglone, secreted from black walnut roots is toxic to members of the nightshade family like tomatoes, peppers, and eggplants
  - Juglone is what is known as an allelopathic compound, or a substance produced by a plant to stunt the growth of another plant
- Some vegetables will grow quite well under walnut trees
  - Squash, melons, root crops, lima beans, snap peas, onions, garlic, leeks, cauliflower, soybeans, parsley, Jerusalem artichoke
- Avoid planting under pine trees
  - Acidic needles







So, which plans  
are friends and  
which are not?

# Asparagus



- Asparagus is a perennial that likes full sun
  - Takes 2-3 years to reach a full yield, but will then produce spears for the next 10-15 years
- Friendly with basil; carrots; coriander (cilantro); dill; marigolds; nasturtium; members of the Aster family (like lettuce); parsley; and tomatoes and other members of the Nightshade family
- Enemies with garlic, onions, and potatoes
- Planting asparagus with parsley, marigolds, and tomatoes will protect asparagus from asparagus beetles
  - Tomatoes are notoriously excellent asparagus companions: they emit **solanine**, a chemical that repels asparagus beetles and, in turn, asparagus yields a chemical that deters root-feeding nematodes from tomatoes





# Basil

- Grows best near most garden crops, particularly vegetables
- Generally enjoys the company of vegetables over herbs
  - You can plant basil next to chamomile, oregano, and chives
  - Keep away from rue or sage
- Enhances the flavor and growth of garden crops, particularly tomatoes and lettuce
- Basil repels flies, including mosquitos and carrot flies, whiteflies, and asparagus beetles
- The combination of basil and asparagus appeals to ladybugs, a voracious predator of aphids and other soft-bodied, larval stages of garden pests



# Bush Beans

- If you typically grow pole beans, try bush beans for easier management
- Plant near beets, cabbage, carrots, celery, cucumbers, chard, catnip, eggplant, cauliflower, corn, marigolds, potatoes, radishes, savory, and strawberries
- Make sure they steer clear of fennel, garlic, leeks, onions, and shallots (members of the *Allium* family)
- Sunflowers yield a chemical compound that inhibits the growth of beans, making them incompatible
- Plant with potatoes or marigolds to repel Mexican bean beetle; catnip to repel flea beetles



# Beets

- Plant with broccoli, brussels sprouts, bush beans, cabbage, cauliflower, chard, kohlrabi, and onions
- Plant away from charlock (wild mustard), field mustard, and pole beans
  - Pole beans will compete with beets for growth
- Composted beet leaves add magnesium to soil, which plays a significant role in photosynthesis
- Encourage parasitic wasps like the Braconid wasp, green lacewings, soldier beetles, and syrphid flies to your garden to control for common beet pests
  - Grow a plethora of sweet-smelling flowers and herbs that produce nectar from numerous small florets, like sweet alyssum, chamomile, feverfew, catnip, and buckwheat; allow dill, fennel, and wild carrot to flower



# Borage

- Borage is an easy, fast-growing annual herb with bright blue flowers and the scent and flavor of cucumbers
  - Prized for its benefits to health: especially rich in gamma linoleic acid (GLA), an omega-6 fatty acid known to decrease inflammation
  - Borage may also aid in the treatment of asthma, rheumatoid arthritis, and atopic dermatitis
- While an herb, borage is often grown to attract pollinators and deter tomato hornworm
- Plant near squash, strawberries, and tomatoes
- Improves the flavor and growth of its companions
- Flowers make a wonderful salad garnish





# Broccoli and Brussels Sprouts

- Plant with beets, buckwheat, calendula, carrots, celery, chamomile, dill, hyssop, marigolds, mints, nasturtiums, onions, rosemary, sage, thyme, fennel, and wormwood
- Steer clear of strawberries, peppers, and squash
- Marigolds repel cabbage moths and nasturtiums repel aphids
- Plant sweet-smelling flowers with small florets to attract parasitic wasps that will prey on cabbage moth larvae, as well as calendula, dill, and fennel to attract ladybugs
- Plant aromatic herbs like rosemary, sage, oregano, and mint to lure leaf-munching cabbage worms (the larvae of adult cabbage white moth)



# Carrots

- Plant near cabbage, chives, early potatoes, leeks, onions, peas, radishes, rosemary, sage, salsify, wormwood
- When grown near carrots, chives improve the taste and texture of carrots
- Leeks are an excellent companion for carrots because they detract carrot flies and carrots repel leek moths
- Dill produces compounds that stunt carrot development
- Onions, leeks, and wormwood repel carrot flies
- I like to broadcast carrots in between two rows of onions, chard, or other leafy green crops as a green mulch so I don't have to weed as much





# Chives

- Chives grow well with just about any crop
  - Grapes, tomatoes, carrots, broccoli, cabbage, eggplant, kohlrabi, mustard, potatoes, rhubarb, roses, squash, and strawberries all do better when growing near chives
- Asparagus, beans, peas, and spinach have a harder time growing next to chives
- Improves flavor and growth of companions
- Deters carrot flies, aphids, and Japanese beetles



# Cucumbers

- Plant near beans, cabbage, corn, early potatoes, dill, radishes, nasturtiums, and sunflowers
  - Sunflowers and corn act as a natural trellis for cucumbers, which like to climb
  - Trellising cucumbers can help save space in your garden
- Cucumbers can suffer from bacterial wilt, powdery mildew, and mosaic virus, and are prone to attack from striped cucumber beetles
  - Plant nasturtiums and dill to attract beneficial insects that prey on striped cucumber beetles
  - Radishes can act as a trap crop to keep pests off of your cucumbers
  - Planting dill near cucumbers will enhance the taste of your crop
    - Dill improves the flavor and growth of all plants in the cabbage (*Brassicaceae*) family



# Eggplant

- Eggplant can be considered a high-maintenance crop
  - Requires a lot of sun and enjoys soil with higher nitrogen levels than other crops
- Grow bush beans with your eggplants to deter Colorado potato beetles and fix nitrogen
- From a management perspective, peppers make a great companion plant to eggplants because they require similar growing conditions and are susceptible to the same pests and diseases
- Spinach can also be a great companion plant for eggplant because the broad leaves of eggplant create shade for spinach, which dislikes heat



# Garlic

- Insect pests are repelled by the odor of garlic
- The sulfur in garlic bulbs repels many types of soil-borne pathogens
- Garlic flowers (with their many small, individual florets) attract predatory, beneficial insects like ladybugs, wasps, and lacewings
- The only crops that should not be grown next to garlic are asparagus, beans, parsley, peas, and sage
  - Garlic is known to inhibit the growth of these plants or compete with them for resources





# Kale

- Plant near aromatic herbs (like cilantro, dill, and lemongrass), beets, celery, cucumbers, onions, spinach, chard, buckwheat, marigolds, and nasturtiums
- Avoid planting near strawberries, beans, and tomatoes
  - In companion planting, herbs act as “insectary” plants that provide nectar, pollen, and shelter for beneficial and predatory insects as well as pollinators
- Remember: companion planting isn’t an exact science and many gardeners differ in their opinions on which species to interplant
  - A 2003 study conducted in Kenya published by the International Center of Insect Physiology and Ecology found that tomatoes interplanted with kale reduced the presence of diamondback moths, as well as other pests and diseases
  - Both plants require heavy nitrogen, so be sure to fertilize with a natural fertilizer like worm castings or fish hydrolysate







# Lettuce

- Plant with arugula, asparagus, basil, beans, beets, borage, calendula, carrots, catnip, chervil, chives, cilantro, corn, cucumbers, dill, eggplant, hyssop, lavender, leeks, marigold, marjoram, mint, melons, nasturtium, okra, peas, peppers, potatoes, sunflowers, and sage
- Avoid planting next to members of the cabbage family (cabbage, broccoli, cauliflower, brussels sprouts, kohlrabi, collards, and kale)
  - Some gardeners don't take this stance and say you can plant Brassicas (cole crops) and lettuce together, but since they attract similar pests (like aphids) I don't personally recommend it
- Lettuce makes summer radishes more tender
- Marigolds are especially effective in fending off aphids and attracting hoverflies, which prey on aphids



# Marigolds

- Plant near all garden crops
- Stimulates vegetable growth and deters bean beetles, aphids, potato bugs, squash bugs, root-feeding nematodes, and maggots
  - African and French marigolds produce alpha-terthienyl, a compound that suppresses root-feeding nematodes
  - Strong scent can mask the smell of cabbage and other cole crops, making them harder for cabbage moths to detect
  - Make a compost tea with marigold flowers to suppress nematodes and soil-dwelling pests
- Newer, hybrid marigolds do not have the same pest-repelling qualities
- Bright petals contrast well with green foliage and attract many pollinators





# Onions

- Plant near beets, **cabbage family**, carrots, chamomile, lettuce, parsnips, strawberries, tomatoes, swiss chard, marigolds
- Onions make excellent companion plants because they improve the flavor of their companions
- Large-leaved chard plants shade the soil and keep it cool for onions
  - Swiss chard can be planted near most members of the allium family for a mutually (shallots, chives, garlic, scallions) beneficial relationship
- Keep away from beans and peas
- Deters most pests, especially maggots (fly larvae)











# Peppers

- Plant near dill, basil, carrots, eggplant, chives, onions, parsley, beets, radishes, chard, spinach, and tomatoes
- Plant away from fennel and kohlrabi
- Do not plant hot and sweet peppers near one another, unless you want your sweet peppers to taste hot!
  - If pollen from a hot pepper fertilizes a sweet pepper flower, all of the hot pepper genes from the father plant will be transferred to the embryo and seed
- Eggplants and other members of the nightshade family grow particularly well with peppers
- “Low growers” like spinach, radishes, beets, and carrots are great to interplant between peppers
  - Peppers enjoy full sun and root crops and spinach can bask in the shade of an established pepper plant’s leaves





# Spinach

- A great companion for Brassicas, eggplant, leeks, lettuce, peas, radishes, and strawberries
- Keep spinach away from potatoes
- Spinach likes cooler conditions, so plant it in the shade of taller crops with broad leaves
  - I like to broadcast spinach between taller plants like chard and eggplant
  - Different varieties of spinach grow to different heights
    - Some are more and less heat tolerant, so be sure to pick your variety accordingly



# Tomatoes

- Plant with amaranth, asparagus, basil, Brassicas (cabbage family), calendula, carrots, celery, chives, cucumber, garlic, lemon balm, mint, marigolds, nasturtium, peas, gooseberries, mustard, parsley, onions, rosemary, sage, squash, and stinging nettles
- Keep away from potatoes, fennel, kohlrabi
- Basils and tomatoes enhance one another's flavor profiles
  - We typically plant five plants around each tomato plant and trellis our tomatoes so they don't crawl on our basil plants
    - A tomato cage can achieve the same effect
- Borage: Deters tomato horn worm and improves taste and flavor
  - We interplant one borage plant between each tomato down a row
- Plant lettuce underneath tomatoes
  - Enjoys shade of taller tomatoes and acts as living mulch to keep soil and moist





