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Welcome

About this evening's class:

- 90 minute class
- Designated question times
- · Questions can be put in chat

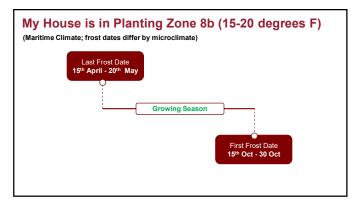
Agenda:

- General Information
- Peas
- Lettuce
- Carrots
- Spinach
- Beets

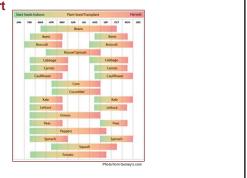


Hardy plants survive 15-20° weather. Check with seed company where you purchase your seeds (or the map on the back of seed packets) to confirm zone. Isolated coastal and foothill pockets Enter zip code for your hardiness zone: https://planthardiness.ars.usda.gov/

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Phenology

The use of indicators from nature and other plants to know when it is time to plant.

- · Snow melt on mountains
- Return of migrating birds
- Blooms or leaf buds on plants
 - Plant peas, lettuce when forsythia bloom and Rufus Hummingbirds return.
 - Plant carrots, radishes, spinach, beets when the dandelions and crocus start to bloom, and lilac leaves appear.
 - Fall crops 8 weeks before last frost, when Oso berries start to turn yellow.

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The Back of a Seed Packet

- What to read
- What is important to note and to know
- Germination times
- Days until harvest or days to maturityshorter is better for our area.



Early Preparation



Start Some Varieties Indoors & **Prepare Outdoor Beds**

- Heated mats not necessarily needed for crops that can tolerate coolness
- Grow lamps

Outdoors:

- Cover with burlap or sheet of plastic to dry and warm soil
 Direct sow under row cover
 Control slugs
 Protection from "shared habitat"

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Crop or Floating Row Covers



- Gently place on transplants or over seeded rows.
- Leave slack to allow for growth expansion.

- Protects from frost and gives earlier yields. Works as an insect screen. Allows air and water to freely pass.
- Allows air and water to freely pass. Some brand names are Reemay, Agribon. Heavier weights protect from frost but limit light transition to 75%. Protect to 30 degrees. Those sold as frost blankets limit light to 50%, and protect to 26 degrees.
- Lightweight ones are sometimes sold as summer insect barriers. They protect plants from insects and allow for over 90% light to
- pass though.

 Many different sizes to suit your needs.
- Reusable. Last about three years.



Peas

Peas are part of the Fabaceae or Leguminosae family. This also includes beans, lentils and peanuts.

- Cool weather crop
- Quick and easy to grow
- Early spring planting
- Many varieties to choose from
- Delicious and nutritious
- Peas please



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Pea Diseases

Pea Enation Mosaic Virus, Pea Seedborne Mosaic Virus, and Pea Streak Viruses Are the Enemies!

- Unavoidable regional pea diseases.
- Caused by hot and sunny weather.
- Virus spread by aphids and weevils make it worse.
- Pods look mottled, warty, flowering and pod setting stops and vines die
- Brown spots with leaf curl
- Brown to purple spotting, streaking and fast death
- Planting before March 31 helps avoid aphids.



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Choosing Your Peas

Plant Types

- Bush- Free Standing
- Vine or Pole- Need Support
- Determinate yield for a short time, then quit
- Indeterminate keep producing for a longer time

Varieties

- Time to harvest varies from 50 to 80 days, shorter is better
- Pick varieties resistance to pea diseases, especially enation viruses





Types of Peas

Shelling Peas

- Used for cooking, pea soup
- Remove peas from inedible pod
- Freeze, dry or can
- Alaska Early, Maestro produce in 60 days
- Prospector, Corvallis, Citatin, Aspen, Trident, Knight, Mohawk are some enation resistant varieties



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Types of Peas (continued)



- Flat, edible pods not shelled
- Oregon Sugar Pod 11 enation resistant
- Most are short duration

Sugar snap

- Cross between shelling and snow peas
- Typically, not shelled
- Oregon Sugar Pod, Cascadia, Green Sugar are enation resistant

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Peas - Where to Plant?

Well-drained and fertile soil

- Soil testing? pH 6-7.5
- Raised beds? Containers?

Full-sun - 6-12 hours daily

Space - Many size choices

Rotation - once every 3 years



Peas - When to Plant

Cool weather crop, check your soil:

- Soil temperature 50 degrees or 4-6 weeks before last spring frost
- Soil dry enough to pass the "fist" test or not stick to garden tools
- Forsythia blooms or Rufus Hummingbirds return





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Sowing Pea Seeds

Directly sow

Soak 12-24 hours before planting

If starting indoors,

 start 10 days to 2 weeks prior to transplanting in garden but wait until after threat of last killing spring frost



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Sowing Pea Seeds (continued)

Bush peas

- Sow 1" deep; 2" apart
- Rows 18-24" apart

Vining peas

- Sow 6 to 8 seeds around base of circular or teepee trellis
- Sow 1" deep, 1" apart for straight line trellis
- Rows 3 feet apart

Germination: 5-10 days.



Pea Inoculant

- Nitrogen fixation!
- Pea inoculant (Rhizobia bacteria mixture)



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Peas After They are Planted

Watch carefully during first few weeks!

Low soil fertility

- Bone meal
- · Avoid high nitrogen fertilizer

Flower bloom

- Self-pollinating
- Need bees and other insects



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Growing Peas

Ongoing care

- Water regularly 1" per week
- Weed carefully shallow rooted
- Mulch after plants established
- Do well with deep-rooted and other cool-season plans



Harvesting Peas

Harvest

Frequent picking essential for optimum quality and continued production

After harvest

- Remove debris if diseased
- Turn over healthy material under soil in fall or compost it
- Leave roots in soil



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Peas - Pests and Diseases

Reduce diseases by....

- Plant good quality, short season, disease-free seed
- · Plant in well-drained soil
- Avoid overhead watering
- Avoid plant overcrowding
- Clean up plant debris; remove diseased or dying plants

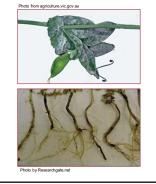


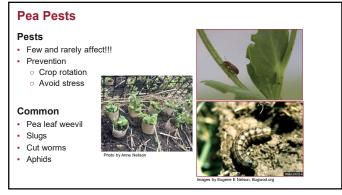
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Pea Diseases

Common diseases:

- Powdery mildew
- Root rot
- Seed rot/damping off
- Viruses









Growing Lettuce (Lactuca sativa)

Lettuce is a member of the Asteraceae (ass-ter-AY-see-eye) (Compositae) family which includes:

- Chicory/Endive
- Jerusalem & Globe Artichoke
- · Tarragon, Artemisia
- Marigolds, Chamomile, and Chrysanthemums
- Daisy



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Grow What You Like!



- Many types and varieties
- Want perfectly straight rows of lettuce? Consider seed tape (Territorial Seeds)
- Pelleted Seeds are coated with clay to make planting easier.
- Bolting is the enemy! Use slow to bolt varieties.
- This is a lettuce bed at the Bellevue Demo Garden!

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Loose-leaf Lettuce

- Continuous leaf growing rosettes of many colors.
- Some slow to bolt varieties are Red Sails, Green Deer Tongue, New Red Fire, Simpson Elite, Green Star, Salad Bow, Cherokee, Hampton.





Romaine Lettuce



- Upright, cylindrical shape of tall growing leaves
- Well known for use in Caesar Salads
- Matures in 50-80 days
- Valmaine and Parris Island are slow to bolt
- Direct seed or transplants

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Butterhead Lettuce

- Delicious and buttery
- Small loose heads
- Some slow to bolt varieties are: Buttercrunch, Optima, Tom Thumb
- Skyphos has good disease resistance





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Crisp Head Lettuce

- Sweet and crunchy; larger tight heads
- I have had the best luck with Great Lakes, Superior 1





Lettuce Preparation



- Spring, late summer (fall crop)
- Well drained, moist, fertile soil
- Dig in compost or well-rotted manure, 1-2"
- Raised beds help
- Work with fork-avoid compaction
- Lettuce can withstand some shade

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Sowing Lettuce





- Temperatures between 45-65 degrees Forsythia blooms or Rufus Hummingbirds
- return
- If direct, sow thick in rows 12-14 inches apart
- Cover seed with 1/8 to 1/4 inch soil/media
- Add slug prevention
- Row covers help in early spring
- Up in 4 to 10 days
- Thin (and eat) to 6-12 inches apart, depending on variety

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Spacing





Growing Lettuce



- · Ensure at least 1 inch of water per week; keep moist, not soggy
- Weed to eliminate competition
- Mulch with straw
- Row cover in cold temps to extend harvest
- Easy to seed/plant/harvest multiple crops in one bed
- Interplant with large crops as crop fills in (tomatoes, corn, etc.)

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Harvesting Lettuce





- All lettuce types should be harvested when full size but young and tender. Over-mature lettuce is bitter and woody.
- Leaf lettuce is harvested by removing individual outer leaves so that the center leaves can continue to grow.
- Butterhead or romaine types can be harvested by removing the outer leaves, digging up the whole plant or cutting the plant about an inch above the soil surface. A second harvest is often possible this way.
- Crisphead lettuce is picked when the center

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Lettuce Problems and Solutions

Pests

Slugs and snails!

- Iron phosphate bait
- Handpicking
- Wooden boards with bait underneath

Cute little mammals

Birds

Disease

Downy mildew and white mold

- Soil borne
- Rotate crops each season
- Drip irrigation = no wet leaves









Carrots

Apiaceae:

A family of crops that attract pollinators because of their broad carpet of tiny flowers on which bees and flies can walk.

Why grow them?

- · High levels of several carotenoids, giving carrots their color and what makes them healthy for humans
- Vitamin A, bioactive phytonutrients, low glycemic load



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Also...

- A great late season crop that tolerates frost.
- 2-4 months to harvest.
- Store in dry and airtight containers in fridge or you can leave them in the ground until the ground freezes.
- Perfect wash-and-go snack that kids (and dogs) will eat (but probably not cats).



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Types of Carrots for Loose, Sandy Soil

Imperator

- Supermarket type- needs deep, loose, sandy soil
- Less sweet, fibrous



- High sugar content
- Best for early sowing and eatingLow fiber so tender but split easily
- Do not over winter



- 6-7",
- Loose, sandy soils High fiber content
- Can over winter
- Use for juice



Types of Carrots For Heavier Clay Soils

Chantenay

- Best for clay soil and store well.
- Thick and conical.



Globe or Oxheart

Round, short seasonDo not store well.



Image by Marde Ross & Company

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Sowing Carrot Seeds



- Soil temperature above 50 degrees F
- When the dandelions and crocus start to bloom
- Keep moist in the germination process
- Sowing in rows is easy for weeding, but you can scatter or broadcast seeds.
- If soil crusts on the top layer, that can hamper germination; try fine sand, potting soil, coconut coir or fine compost to cover seeds

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Growing Carrots



- Water deeply and frequently to avoid cracking, woodiness, and bitter flavor.
- Thin seedlings, as the carrots need room to expand/grow.
- Pull when thinning. The odor from snipped leaves can attract carrot fly!
- Weed regularly; that's where the pests are hiding.

Harvesting Carrots

- Carrots can be harvested for fresh eating any time they
- If carrots are to be stored, they should be harvested when they are fully mature.
- When thinning or harvesting carrots, pull out baby types by their tops and dig out longer types.
- Longer carrots and Nantes frequently break if pulled, so it's best to use a digging fork to loosen and lift the carrots out of the soil.
- Wash soil off the carrots with clean water and trim off the
- Carrots can be stored for several months at 32°F to 36°F with high humidity (95 to 100%); although their flavor and nutrition is best if not stored for long periods.



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Carrot Pests



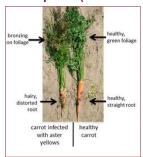


Carrot rust fly:

- Wide range of weed hosts, so control
- Don't overwinter/store in the ground
- · Also attacks parsnips, celeriac, and celery
- Floating row cover is your best friend

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Carrots pests (continued)



Leaf spot:

· Rotate crops, don't plant carrots in the same place.

Root knot nematodes:

Rotate with crops not susceptible.

Aster yellows:

 Caused by bacteria-like phytoplasma organism spread by sucking insects such as leafhoppers.



Other Problems with Carrots

Sunburn or "Green shoulders"

 Mulch carrots to cover shoulders but not growing point

Forking

- Occurs in rocky or clumpy soil
- Try raised beds
- Cultivate the soil BUT avoid damage by hoeing/cultivating too close

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Other Problems with Carrots (continued)



Cracking

 Caused by uneven watering; some cultivars are more prone than others

Powdery mildew

Nantes and Imperator cultivars are more susceptible

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Types of Spinach Flat Leaf



- Most popular in US Smooth, spade shaped leaves Tender texture, and slightly sweet flavor Best eaten raw (salads) Cooler weather



- "Curly leaf" spinach Dark green, crinkly, curly
- leaves
 Crisp texture and slightly
 bitter flavor
 Best used for cooking
 (vs. raw)
 Warmer weather

Semi-Savoy



 Semi-crinkly leave
 Same crisp texture as
 Same crisp texture as savoy spinach

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Recommended Slow to Bolt Varieties of Spinach

Туре	Varieties	
Flat Leaf	Winter Giant, Space F1, Matador, Melody, Tyee F1, Olympia F1, Red Tabby	
Savoy Photo Credit: westcoastseeds.com	Bloomsdale Savoy, Regiment	

Spinach Varieties



- Buy ones designed for your growing zone
- Use disease resistant varieties:
 - o Bloomsdale*
 - o Olympia*
 - Space*
 - o Tyee*
 - Winter Giant*
 - o Palco*
 - o Red Tabby*
 - o Patton
 - Tundra

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Sowing Spinach



- Soil temperatures 45°F-75°F
- When the dandelions and crocus start to bloom.
- · Germinates faster in cool vs hot soil.
- Germination days 3-7 days
- Direct sow under cover
- Resist thinning until seedlings have true leaves

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Growing Spinach



Maintenance:

- Thin 2" 4" apart
- Soil should be evenly moist
- Keep beds weed free to eliminate competition for resources



Harvesting:

- Follow instructions on seed packet for days to maturity (30-40 days)
- Spinach leaves can be harvested when 5 to 6 leaves are on the plant

Growing Spinach (continued)



- Succession planting every three weeks (until temperatures reach 75°F)
- Bolt resistant varieties can be planted in April
- Restart planting late summer for fall crop – 8 weeks before first frost
- Use shade cloth if it gets too hot to prevent bolting

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Spinach Common Problem



Bolting (the enemy)

- Caused by heat
- Plant seeds by early spring (for early crop) or in late summer for fall or winter crop
- Use slow to bolt varieties

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Spinach Common Diseases

Damping Off



- Use quality seeds
- Prevent overwatering
- Plant in well-drained soils during dry weather

Downy Mildew



- Space plant at recommended distance to allow air circulation
- Water soil to keep plant dry
- Remove infected plant
- Rotate crops

Spinach Common Pests

Aphids



- Use strong stream of
- Encourage natural enemies including ladybird beetles



Use baits and traps



- Cut infected leaves,
- check for eggs Screen plants with a floating row cover prior to emergence of flies in spring

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Mangel Beet



- Tough, hearty beets for stock feed.
- They make great winter chicken feed.

Types of Beets



 Large, coarse beets used for beet sugar

Garden Beet



 Smooth and sweet, cultivated for human consumption

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Beets-Fun Facts

- 2-4 viable seeds per "seedball" with low germination rates.
- Biennial, first year root, 2nd year stalks and flowers.
- Growth and taste affected by temperature but grows in soil temperatures from 40°F to 80°F
- They are a matter of taste, as some people taste sweetness while others taste earthiness due to a substance they contain called geosmin.
- Swiss Chard is a type of beet that does not produce an edible root.



Photo by Anne Neilson

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Beets Preparation,



- Select disease resistant, slow to bolt varieties.
- Some recommended varieties are Red Ace, Early Wonder Tall Top, Detroit Dark Red, Cylindra, Golden, and the mellow Chioggia.
- Best direct sowed but OK to start indoors too, but do not disturb roots.
- Beds should have loose, fertile soil.
- Too much nitrogen causes more leaves and small roots.
- Not fussy over soil type
- PH 6.0 to 7.0

Sowing Beet Seeds





- Full sun
- Row covers for frost & pest protection
- Follow seed packets for sowing directions
- Germinates 5-15 days, slower in colder soils.
- Direct sow under cover, March to end-May for summer crop, after dandelions bloom.
- Best color and flavor when cool temps and bright sun
- Can interplant with fast growing radishes, or shallow rooted plants such as lettuce, peppers

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Growing Beets



Maintenance:

- Thin early 1-2" apart
- Thin later 3-5" apart to harvest baby beets and greens when plants are 5 inches tall.
- Cut seedlings off and do not pull.
- You can eat the seedlings.
- Keep beds weed free to eliminate competition for resources

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Growing Beets (Continued)



- Succession planting every three weeks (until temperatures reach 80°F)
 Restart planting late summer for fall
- crop 8 weeks before first frost.
- Use row covers if temps drop below 45.
- Use shade cloth if it gets hot to prevent bolting.

Harvesting Beets



Harvesting

- Follow instructions on seed packet for days to maturity (~45-60 days)
- Beets can get woody if left too long, or temperatures get too high. Picked too early is better than too late.
- You can eat the leaves. Saute them,or add to salads for some color and sweetness.
- Cook by oven roasting, steaming or in a pressure cooker to bring out the sweetness. Do not overcook.
- They can be pickled, made into soups or beet
- Enjoy!

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Beet Pests

Leafminer

- Cover plants with fine netting or cheesecloth or floating row cover to protect them from adult flies.
- Handpick and destroy infested (mined) leaves.
- Control weeds

Aphids

- Use strong stream of water,
- Encourage natural enemies including ladybird beetles







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Beet Diseases

Cercospora leaf spot

- Avoid wetting foliage if possible.
- · Avoid crowding and eliminate weeds to allow for good air circulation.



Scab

- Avoid wetting foliage if possible.
- Water early in the day so above ground plant parts dry as quickly as possible.
- Avoid crowding plants, thin to allow air circulation







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Resources

For zones

- Home Vegetable Gardening in Washington, #EM057E shows the USDA plant hardiness zone map with our area as zone 8a (minimum temp 10-15°F), with some variations depending on elevation and microclimate.
- https://www.plantmaps.com/interactive-washington-usda-plant-zone-hardiness-map.php
- https://planthardiness.ars.usda.gov

For frost dates

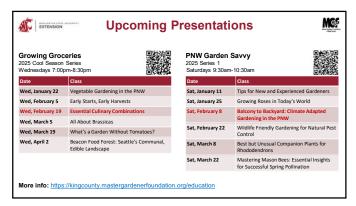
 $\bullet \ \underline{\text{https://www.plantmaps.com/interactive-washington-last-frost-date-map.php}\\$

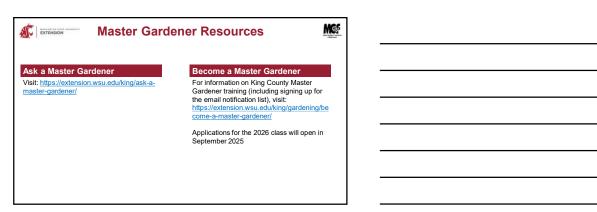
For WSU Phenology

- https://wp.wsu.edu/uploads/sites/2073/2014/03/010413.pdf
- https://s3.wp.wsu.edu/uploads/sites/2073/2014/03/010413.pdf
 https://s3.wp.wsu.edu/uploads/sites/2079/2014/02/Phenology.pdf

Resources, cont. For Diseases and Pests • https://hortsense.cahnrs.wsu.edu/Search/SeachByPlantCategory.aspx • https://pnwhandbooks.org For Soil Testing • https://kingcd.org/programs/better-soils/healthy-soil/ Info on Growing Specific Vegetables • https://extension.wsu.edu/snohomish/chenopods/ • https://extension.wsu.edu/snohomish/asteraceae/ • https://s.3.wp.wsu.edu/uploads/sites/2071/2014/04/Green-Peas-FS116E.pdf • https://pubs.extension.wsu.edu/growing-carrots-in-the-home-garden-home-garden-series • https://s.3.wp.wsu.edu/uploads/sites/2073/2014/09/Home-Vegetable-Gardening-in-Washington.pdf

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