

Garden Task

Plant Growth and Development

Plant Growth and Development is a critical task in the garden because it connects the gardener to plants. Through the use of human-built structures, plants can be trained to grow in a way that may benefit the plants as well as the gardener. Staking or trellising plants can minimize pests/diseases, increase productivity, and ease harvest methods. By supporting plant growth and development gardeners can see the reciprocal relations; the ways that plants support humans, other animals and other plants!



Connections to Science Content

What do we need to know in order to do the garden task?

Plant Life Cycle: Become aware of a plant's life cycle, styles of growth (indeterminate/determinant), and its particular needs at certain times of development. This information will indicate the right time to physically support a plant.

- For example, it's better to trellis the peas during the beginning of its life cycle when the stems and leaves are shorter, and before flowering and developing pods.

Plant Structure and Function: Different parts of plants serve different purposes that will help you determine the best action to take to maximize its growth. Knowing the maximum height of a plant or tree, or the potential weight of its harvest, will determine what could be engineered and built.

- For example, the pea plant has tendrils that wraps around anything less than 1/4" to support it as it climbs up a trellis, so I should use thinner material like smaller gauge wire or twine.

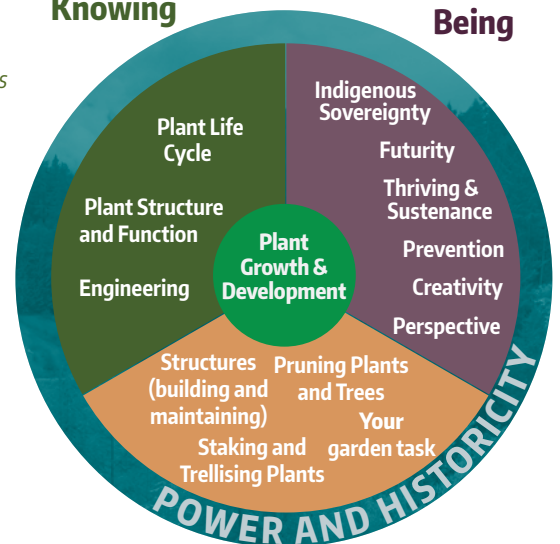
Engineering: Designing and building supports for plants requires understanding what kinds of materials have enough strength, flexibility, or longevity in relation to the plants' needs. Creativity and ingenuity are important when repurposing materials and designing unique configurations

- For example, I know that bamboo is a strong material for an A-frame trellis that can manage the weight of fully grown winter squash.

Pruning: Where and when to prune to promote growth in relation to the plant/tree life cycle and season.

Knowing

Being



Doing

Garden Methods

What are methods we use to do this garden task?

Staking and Trellising Plants

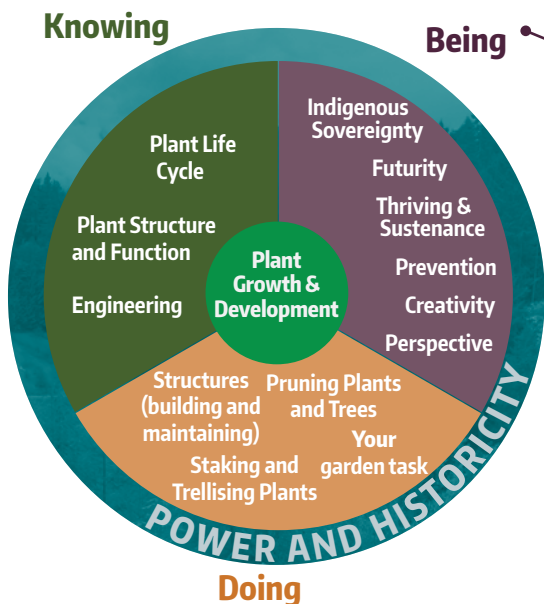
- Tying plants to stakes as they grow
- Securing/reinforcing trellises to accommodate weight & height of plants, vines, and fruit as they develop
- Placing tomato cages
- Espalier - training a fruit tree along a large wall trellis that supports and forms fruit trees
- Planting certain plants together that will support one another
- Thinning

Pruning Plants and Trees

- Pruning fruit trees, raspberry canes, perennial shrubs
- Removing deadwood
- Prune vines or roses that will damage themselves in wind
- Removing suckers from tomatoes to encourage fruit growth
- Pruning diseased leaves

Structures (building and maintaining)

- Cold frame/cloche/hoop house to protect plants from frost
- Greenhouse
- Arbor - to support vines
- Raised garden beds
- Constructing trellises
- Shade structures for season extension



Being Importance/Intent

Why does it matter to me/my family/our broader community to do this garden task?
How does this garden task affect people outside of my community?

Our garden decisions are driven by the values of our communities and families:

Indigenous Sovereignty:

How is the way you are gardening supporting Indigenous livelihoods and rights? Whose land are we on? What is our ethical responsibility to Indigenous peoples and relationships to this land?

- For example, In the Pacific Northwest, treaties protect tribal members' rights to access usual and accustomed gathering sites. How can we garden in a way that protects tribes' treaty rights to access traditional foods?

Futurity:

It is important to consider the lasting impacts of the garden method (5 years, 20 years, 100 years). Are you supporting plant growth and development in a way that ensures the plant community will thrive into the future?

- For example, some typical Coast Salish growing techniques include burning prairies to promote camas bulbs, pruning berry bushes and piling boulders to build clam gardens. These techniques support current and future harvests.

Thriving & Sustenance

Supporting plant growth and development can maximize limited space. Deadheading and pruning can encourage plant productivity and spur new growth.

Prevention of disease and loss of harvests

Adding supports for plants can help prevent the loss of tree limbs, particularly in windy winters or seasons of heavy fruit. Pruning can also increase the airflow for disease prevention.

Creativity

Each season and plant requires creative solutions to support their growth. Vertical gardening can be a way to creatively use limited space. Structures enhance aesthetics to gardens.

Perspective

Supporting plant growth and development can help gardeners to shift perspective. Gardeners can learn from plants how they support one another. Plant model reciprocal relations, gardeners can support the plants and plants can support gardeners. Humans need structures to grow too!



CONNECTING TO OTHER GARDEN PRACTICES

- **Garden Planning:** being aware of what structures certain crops will need and how much space that will require, gathering supplies, care of tools, anticipating when to prune during winter months
- **Seeding and Transplanting:** Spacing seeds and transplants so that there will be enough room for tomato cages and trellises as plants grow to size, setting up cold frames or hoop houses to protect seedlings from frost, starting seeds inside a greenhouse during winter months to plant transplants outside earlier in spring
- **Supporting Healthy Ecosystem:** trellising, staking, and pruning plants to increase airflow to reduce disease
- **Phenology:** Pruning plants and trees during the appropriate season and stage of plant life cycle, lengthening growing time for crops using season extension methods, growing hot weather crops in cooler climates using hoop houses to create a "greenhouse effect"

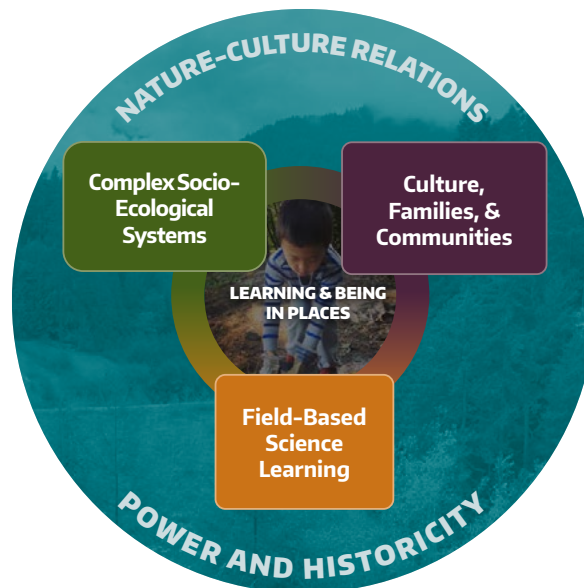
Engaging the Learning in Places Rhizome with Practice

Power and Historicity; Nature-Culture Relations:

- Whose methods of gardening and agricultural practices for supporting plant growth are we using? Why?
- In what ways can humans learn from plant and tree growth and development?
- Take the perspective of a cucumber plant. Would you prefer to grow along the ground, or climb up a trellis? Why?
- How are plant and human relationships reciprocal?
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Complex Socio-Ecological Systems:

- Relationships between humans and plants: using human-built structures to train plant growth, and how plants may benefit



Culture, Families, and Communities:

- What methods does my family and culture use to support plant growth?
- What ideas can I learn from my neighbors or other gardeners?

Field-Based Science Learning:

- How can we use the engineering design cycle to create a garden structure?
- How does the growth of a pruned tree compare to a tree that has not been pruned?
- Observing structure and functions of different plants as they grow

Storyline Examples for Plant Growth and Development

LE 2: Common “Should We” questions

- » Should I prune this plant?
- » Should I plant a companion plant? (example: corn supporting beans)
- » Should we support this plant with a trellis?
- » Should I leave plants out in the fall for nesting birds?

LE 4: Garden Methods

- » Types of trellis (poles, cages, fencing, bamboo, other plants, PVC pipe, wooden stakes)
- » Styles of pruning

LE 6: Data Collection Connections

- » Measuring plant growth
- » Observing for “suckers”
- » Design and test different types of trellis structures/ materials

LE 6: Sample Investigation questions

- » How does plant height change over time?
- » How is the number of fruit sets different from a plant that has been pruned versus a plant that has not been pruned?