



TEA TIME: EXPLORING ORCHARD HERBS THROUGH THE SENSES

<p><u>Lesson Title:</u> Tea Time: Exploring Orchard Herbs Through the Senses</p> <p><u>Topic:</u> Medicinal and practical uses of orchard herbs; exploring plants through the palette.</p>	<p><u>Ages/Grade Level:</u> 6-12</p> <p><u>Subject Area:</u> Nutrition & Health; Ecology; Environmental Science; Entrepreneurship</p>
<p><u>Materials:</u></p> <ul style="list-style-type: none"> - 5 mason jars of prepared teas made with herbs from POP orchards representing flavors: <ul style="list-style-type: none"> - sweet (<u>fennel seed</u> - other choices: mallow, catmint, anise hyssop), - salty (<u>dandelion leaf</u> - other choices: cleavers, chickweed, comfrey), - sour (<u>rose hips</u> - other choices wood sorrel, yellow dock leaf, hibiscus), - bitter (<u>yellow dock</u>, burdock, oregano) - pungent (<u>thyme</u>, echinacea, bee balm, peppermint) - Paper lunch bags - Scissors/pruners for harvesting - Gluesticks/tape for attaching plant images to herb info cards - Drawstring tea bags, or, tea bags & stapler, string, paper tags - POP-prepared handouts for exploring tea tasting observations/experience; and for recording info 	<p><u>Prep Time:</u> 15 minutes to prepare teas.</p> <p><i>To prepare individual teas, steep 1TB dried herb: 8 oz boiling water. Cover and let sit for 10 minutes. Remove the herbs and label each jar by number 1-5 (teacher reserving the key).</i></p> <p><u>Lesson Time:</u> 70 min. (can be abbreviated by reducing number of plants to taste and learn about, or adjusting harvest and tea bag making time)</p> <ul style="list-style-type: none"> - 30 min - tea tasting, sharing responses & info on the plants to fill in plant info cards - 20 min harvest & discussion on drying methods - 20 min assembly of tea bags
<p>DESIRED RESULTS</p>	
<p><u>Established Goals:</u></p> <ul style="list-style-type: none"> - Students will sharpen their sensory awareness as a way of building relationship with nature and their inherent body wisdom - Students will understand 5 orchard herbs that POP plants, their tastes, and the plants' role in the orchard ecosystem and use medicinally . - Students will gain practice harvesting herbs, drying by two methods, and assembling tea-bags. 	



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Standards: 4.1.4.B. Identify how matter cycles through an ecosystem.

4.3.3.B. Identify local natural resources

4.4.3.B. Explain how agriculture meets the basic needs of humans

4.5.4.A. Identify how people use natural resources in sustainable / unsustainable ways

Understandings...

Students will understand that...

- What specific understandings about them are desired?
- Herbs are any plant with leaves, seeds, flowers, roots, or barks, used for flavoring food, medicine, or perfume.
 - Some, are seeded year after year (**annuals**), some come back annually (**perennials**), and some go through a 2-year life cycle (**biennial**).
- Herbs have specific roles within the ecosystem - some act as **nutrient accumulators or soil buliders** (building soil fertility by accumulating vital soil nutrients), some act to **attract beneficial insects as pollinators**, some are planted to **deter pests**, some are used to **create aromatic and attractive borders**, and some are chosen for their **culinary and medicinal value**. Many plants serve multiple roles!
- One way we can learn of plants' culinary or medicinal use is through **direct, sensory experience**.
 - Our taste buds have receptors to communicate to our brain the experience of **sweet, salty, sour, bitter, pungent, and (savory)** flavors.
 - **Experience of flavor is meaningful** and can give us insight into how we might choose to apply herbs to alleviate particular physical, or emotional conditions -- that's rooted in plants' complex **phytochemistry (web of secondary**

Essential Questions:

- What provocative questions will foster inquiry, understanding, and transfer of learning?
- *What is an herb?*
- *Why might we plant herbs in the orchard?*
- *How can we acquire knowledge of the natural world?*
- *How can we preserve herbs through the seasons for use?*
- *What seasons are the best for harvesting medicinal leaves? Stems? Flowers? Fruit? Seeds? (Encourage students to think about the maturation of plants through the seasons).*



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<p>metabolites).</p> <ul style="list-style-type: none"> - <u>What misunderstandings are predictable?</u> - Students might believe they can know a plant's actions, temperament, and use just through direct sensory experience - important to enforce that knowledge and use is determined not only by direct experience, but also by testimonial, collected evidence, and scientific testing. - Students might believe they can go out and harvest any vegetative plant or weed to test through taste - important to enforce safety precautions and the need for a knowledgeable guide, I.D. book, and harvest from a safe and well established growing area. Some plants are poisonous, so don't harvest what you don't! 	
<p>Students will know...</p> <ul style="list-style-type: none"> - <i>What knowledge will students acquire as a result of this unit?</i> - An herb is a seed-producing annual, perennial or biennial that does not develop persistent woody tissue but dies down at the end of the growing season and has plant parts (stem, leaves, fruit, flower, root) favored for its medicinal, culinary or aromatic qualities. - Annual - plants with a life cycle that lasts only one year and has to be planted again each growing season. - Perennial - a plant that completes its life cycle yearly and returns after dying back in winter. - Biennial - a flowering plant that takes two years to complete its biological life cycle. - Primary plant metabolites - organic compounds that are directly involved in 	<p>Students will be able to...</p> <ul style="list-style-type: none"> - <i>What key skills will students acquire as a result of this unit?</i> - Identify 5 orchard herbs, describe their taste and their medicinal use. - Harvest herbs in a way that honors the plant -- allowing it to regenerate <ul style="list-style-type: none"> - (ex. <i>Lamiaceae</i> family plants - cutting stems above the node where two new leaves emerge along the stem) - Discuss and demonstrate methods for herb drying - paper bags after stripping leaves from stems; drying by bundle. - Assemble tea bags and provide rationale for blends depending on flavor combination and plant actions.



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the growth, development, and reproduction.

- **Secondary plant metabolites** - organic compounds **that are not** directly involved in the growth, development, and reproduction but which aid the plant in its defense against predators and give the plant its medicinal and flavoring constituents.
- There are 2-8K **taste buds** on the human tongue, soft palate, upper esophagus, cheek, epiglottis. Taste buds contain **taste receptor cells** on small structures called **papillae**.
- **Microvillae** - small hairs on the taste buds - send signals to the brain about perceived flavor.
- **Flavors and their signaling:**
- The flavors we taste relate to a plant or substances' chemistry.
- The following flavors relate to these qualities of **constituents of the plant's phytochemistry**.
 - **SWEET** - sugars, polysaccharides, glucose, fructose, sucrose
 - **SOUR** - acetic acid, vinegar, citric, malic acid
 - **SALTY** - sodium chloride
 - **BITTER** - alkaloids, glycosides
 - **PUNGENT** - volatile oils

LEARNING PLAN

Background Info (See attached **TEA TIME: EXPLORING ORCHARD HERBS THROUGH THE SENSES - TEACHER GUIDE**).

Intro: (15 minutes)

Opening/Hook

- Teacher will ask students what is an herb and why we might plant them in an orchard?



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- Based on student responses, teacher will share ecological, pollination, aesthetic, and culinary value of herbs.
- ***Situate students seasonally*** - walk through orchard space (if available) and ask them to observe the dominant stage of the plant life cycle as determinant by season. Ex. -- fall (late season fruits, roots), winter (dormancy, roots), spring (new growth, leaves, stems, shoots), summer (flower, fruit).
- Explain that the dominant energy of the plant is accumulated in those stages - to be most active, medicinal, nutrient dense. i.e. rationale for eating seasonally (cite other garden work the students might be doing or familiar with).
- Ask / explain the rationale for designing with plants with a variety of bloom periods? In the orchard, varied bloom times ensures pollination for fruit trees / shrubs (mostly insect pollinated) throughout the year and encourages pollinators to stay and reproduce on site, becoming an ongoing part of the ecology.
- ***Today, we will be exploring the world of the orchard's herbal understory and how we can grow to know their use. We'll also be learning how to harvest and dry herbs and make tea bags.*** Herbs have been used as medicine for thousands of years. Nearly 25% of modern pharmaceutical medicine derives from plant origins. Traditional medicine practices such as TCM (Traditional Chinese Medicine) believe plants, foods, organs of the body, and flavors correspond to the seasons: summer, fall, winter, spring - mid-summer and to the elements fire, earth, air, water, metal.
- Ask: what are some ways of acquiring knowledge of nature?
- ***We will be using our senses to explore the flavor of herbs and draw inferences on how they might act in the body.***
 - ***Orient the students to the flavors and the palette. Have students name the main flavors, give examples of each, and draw connections seasonally and botanically to the parts of plants where they tend to experience those flavors.***
 - ***Sweet (roots, tubers) ex. Sweet potatoes, apples - fall***
 - ***Sour (rind, citrus peel) ex. Citrus, trifoliolate orange - summer***
 - ***Salty (leaves, stems) ex. Seaweed, spinach, celery - spring***
 - ***Bitter (bark, roots, seeds) ex. Dark chocolate, coffee - winter***
 - ***Pungent (seeds, leaves, roots) ex. Garlic, cinnamon - fall/winter***

Also explain who will be teaching the other group(s) and how the rotation of activities will work.

- Teacher moves group inside or the classroom area - where the 5 jars of teas are set up, labeled by number, and a stack of cups.
- Each student will be given a handout to record their observations and in the second part to write down what they learn through testimonial, evidence, experiment.



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Activity: (25 minutes)

- Teacher can choose what method works best for dividing students in groups to rotate through blind-tasting of the numbered teas. I.e. small groups of 4-5 to sit with each jar - pouring small sips - giving the students 3-4 minutes to sample each one quietly and recording their experiences.
- Teacher walks students the process of observing and noting characteristics of each plant preparation as outlined on the worksheet.
 - What color, smell, initial flavor, texture on the palate, where it travels in the body, sensation, etc.

The Plan/Procedure/Lesson Activities *(What steps will the students go through to learn the lesson? Please be specific as you can and number all of the steps required)*

- After students have been moved through and sampled all the teas, the teacher will go through each of the 5 herbs to have the students to share their observations.
- After each plant, the teacher will describe the herb it was, showing pictures, plant samples, and having students note-take on the worksheet provided.
- Asking: how does the flavor relate to the action of the plant? Students draw that connection.
 - Students will get a set of plant images cut up to glue or tape to their worksheet which will be a document of both observed-experienced and learned facts about each plant.

Conclusion: (10 minutes)

Wrap up and Reflection *(How will you bring the lesson to a close and assess your students understanding of what was taught?)*

- **Students reflect on experience** - which were they most drawn to, the least?
- **Teacher can run students through optional scenarios to cement learning** - running through scenarios and having the students determine which herb they'd choose to use.

Additional Activity: HARVEST, DRYING, AND TEA BAG ASSEMBLY (25 minutes)

- **Students will demonstrate learning of the plants through field I.D. and harvesting.**
- Full class & teacher will approach first plant together (ex. thyme). Teacher will demo proper harvesting practices.
- Divide students into small groups in the orchard (3-5) and have them walk through the space to identify the 5. *You're on a mission to find X... and they can flag with*



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landscape flags. Each student group is given scissors and a basket. Teacher walks around to ensure proper I.D.

- Students harvest a small amount and bring into the classroom or activity space.
- **Teacher demos drying methods (paper bag) and bundling.**
- Students assemble tea bags with string and handwritten labels with dried herbs of those identified.
- Drying herbs can be used for a follow up activity.

ASSESSMENT EVIDENCE

Performance Tasks:

- Students will identify taught herbs in the field.
- Students will work in groups to harvest plant materials to dry.
- Students will assemble tea bags - they can choose to make a single bag or blend.

Other Evidence:

- Reflection exercise - what did you learn from this exercise? Which plant were you most connected to? Least?
- Role play scenarios.
- 5 min wrap-ups: what herbs did you connect with or make tea bags from and why?

ADDITIONAL RESOURCES

Lesson Resources and/or Credit for Adaption (*Did you refer to any websites, curriculum, handouts or books to help develop this lesson?*)

<http://www.pfaf.org/user/Default.aspx>

<https://www.agclassroom.org/teacher/matrix/lessonplan.cfm?lpid=114>

<https://www.ncbi.nlm.nih.gov/pubmed/>

http://www.itmonline.org/articles/taste_action/taste_action_herbs.htm

POP Plant Index Illustrated Signs