RESOURCES

TITLE | ANNUAL CARE WITH STUDENTS IN THE OUTDOOR CLASSROOM

CATEGORY | Garden Educator Training

SUB-CATEGORY | Outdoor Classroom Design

OVERVIEW | This document outlines an introductory training on edible, annual gardens and best practices for involving students in their care and maintenance.

Training Rationale:

An edible garden is an invaluable resource for connecting students to the natural world. Planting, caring for, harvesting, and finally eating edible crops is an amazing and rich experience for the senses. The community created among students when working to grow and eat food together is also an important part of the impact of edible gardens. For a new or returning garden educator, it is important to know the basics of growing annual plants as well as how to rehabilitate a space quickly after the summer season when these spaces are often neglected. This work can be done with students in the first month of school. When facilitated effectively, student participation can increase buy-in, build community, and make the workload lighter. It is important for educators to consider which garden tasks should be done with or without student help, and how to embed tasks in their lessons.

Suggested Time of Year:

We suggest conducting this training in August or September, before school starts, so that garden educators are 1) prepared to revitalize their garden after a summer of neglect, 2) acquainted with basic annual plant care and maintenance, and 3) ready to incorporate student involvement into the maintenance of the garden. It is also important to review annual care in December or January, prior to spring planting.

Suggested Workshop Length:

3 hours for the first training, with an additional 2-3 hours midyear.

Training Objective:

Garden educators will review best practices for maintaining an annual garden and how to include students in its care.

Training Overview:

This training is most effectively hosted in an established outdoor classroom with a majority of the Top 10 Infrastructure (see *Building Your Outdoor Classroom: The Top 10* in the Table of Contents), and space for preparing and planting an edible bed. Utilize existing school gardens and/or local demonstration gardens to host or facilitate outdoor classroom design and horticulture trainings. This gives educators an opportunity to see a variety of green spaces, network with similar programs and professionals, and gain inspiration for their own outdoor classrooms.

This training covers best practices for maintaining and managing an edible school garden and should include topics such as understanding annual plant needs, revitalizing soil, planting practices, and navigating local gardening resources. It is likely that participants will have varying degrees of garden knowledge, so it will be most successful to create content-specific stations and divide by self selecting into groups based on experience. Each station should then cover the information most relevant to the group's needs, rather than trying to fit all of the content included here into one training. Topics can be introduced, reviewed, or expanded upon throughout the year, or resources can be shared outside of trainings in order to build on the content initially covered.

The activity ideas section below outlines potential stations, content, and hands on activities. It is effective to model garden maintenance in ways educators might lead these activities with their students. After going through the activities, this training then directs educators to reflect on considerations and practices for involving students in care and maintenance of annual gardens, and provides educators an opportunity to plan some of their garden lessons.

Activity Ideas:

Annual Gardens

Below are recommended stations that showcase approaches to caring for annual gardens that educators can rotate through during training. Trainers can pick and choose stations, content, and activities that best fit the group's knowledge and skills.

They are formatted as:

1. **STATION TOPIC**
   Content
   - *Content is listed as Level 1 (beginner), Level 2 (intermediate), or Level 3 (advanced).*
   - *Trainers should choose 2-4 content areas to cover per station.*
   - *Content should be adapted based on group prior knowledge, time allotted, and available resources.*
   - *Content can be covered through group discussion, lecture, or demonstrated through the activities listed below.*
     - Activities or visuals to demonstrate a concept or model a practice

Stations

1. ANNUAL PLANT NEEDS AND CARE

- What is an annual? *(Level 1)*
  - Discuss the differences between annuals, which complete their life cycle and die after one season, and perennials, which live for more than 2 years and have a dormant period each year (which is often either in winter or summer depending on geography).
  - Take a tour of the outdoor classroom and practice identifying annuals and perennials currently growing.
  - Look at the "Plant Life Cycle" poster in Curriculum Visuals, linked in the Table of Contents. During your tour, practice identifying which stage of the life cycle each plant is currently in.
- Plants need sun, soil, water, and air (*Level 1*)
  - Look at the "What Do Plants Need?" poster in Curriculum Visuals, linked in the Table of Contents
  - See Education Outside Curriculum, 1st Grade: Unit 1: Plant Structure and Function or 5th Grade: Unit 1: Plants and Energy Flow for lessons or activities that could be modeled for educators.
- Lifecycle of an annual (*Level 1*)
  - Look at the "Plant Life Cycle" poster in Curriculum Visuals, linked in the Table of Contents
  - See Education Outside Curriculum, 2nd Grade: Unit 1: Life Cycles for lessons or activities that could be modeled for educators.
- Annual planting: direct seeding, starting seedlings or starts, transplanting *(Level 2)*
  - Divide into various sized groups and model planting with students in different ways (entire group at once, small groups, individuals, with popsicle stick markers or visual instructions). Discuss observations.
  - Practice planting with different types of seeds and plants. Examples: direct seeding radish and/or fava beans, starting lettuce in trays, transplanting onion/arugula (tightly packed) and brassica starts (not tightly packed) to explore differences.

- If available, pass out seed packets, catalogs, or vegetable gardening books to read and share-out differences in planting needs.

- Harvesting: roots, stems, leaves, flowers, fruits *(Level 2)*
  - Look at the "Parts of a Plant" poster in *Curriculum Visuals*, linked in the Table of Contents, and discuss techniques for harvesting each plant part.
  - Make a snack by harvesting and using one of each plant part. See *Recipes for Cooking in the Outdoor Classroom* in the Table of Contents for simple plant part recipes.
  - If available, pass out seed packets, catalogs, or vegetable gardening books to read and share out differences in mature plants.
- Water needs and watering practices (*Level 2*)
  - If available, pass out seed packets, catalogs, or vegetable gardening books to read and share out differences in plant needs.
  - Practice identifying plants that require very little water or heavy water (use online or local gardening resources for tips and tricks).
  - Have educators share out examples of watering stations, rules, and routines in their own outdoor classrooms, or ideas for implementing them
  - See *Education Outside Curriculum*, 3rd Grade: Unit 1: Plant Adaptations for lessons or activities that could be modeled.
  - Make signs for watering stations in educator's gardens: "Watering station," "Low and slow like a pro," "Water here for x seconds," "Thirsty plants live here," "No water needed here," etc.
- Hydrozones and irrigation *(Level 3)*
  - Map out existing water sources and known plants in the outdoor classroom. Make a plan for where water is and is not available and how that will affect planting throughout the year.
  - Practice laying irrigation, calculating watering schedule based on plant needs, and/or setting programs on an irrigation system.

2. SOIL

- Soil components: 45% minerals, 25% water, 25% air, 5% organic matter *(Level 1)*
  - Look at the "Soil Composition" poster in *Curriculum Visuals*, linked in the Table of Contents,
  - See Education Outside Curriculum, 2nd Grade: Unit 2: Soil and Decomposition for lessons or activities that could be modeled.
- Revitalizing after summer neglect *(Level 1)*
  - Observe hydrophobic soil and then rehydrate
  - Practice double digging by loosening soil and then digging in compost
- Soil/mineral types: sand, silt, clay, loam *(Level 1)*
  - Put an example of each soil type into a funnel and pour water through to observe the different infiltration rates.
  - See *The Growing Classroom*[1] for "The Nitty-Gritty" lesson and "Clay, Silt, and Sand Chart"
- Amendments *(Level 2)*
  - Chop, turn, and sift compost in a 3 bin system to observe how plant material is recycled in a garden
  - Prepare, overview, or interact with a worm bin
  - Discuss various soil amendments (humus, worm castings, natural fertilizers etc.), their benefits to soil composition and annual plants, and where/how to find them locally
  - Introduce macro-nutrients (NPK=Nitrogen, Phosphorous, Potassium) and their benefits to various stages of an annual plant's life cycle. Match crops with their preferred ratio of macronutrients in a natural fertilizer.
- Soil testing *(Level 3)*
  - Identify which nutrients can be tested for, and why it is important.
  - Demonstrate various commercial soil testing kits or techniques.
  - Identify potential sources of soil pollution in your area and discuss the process for getting a professional lab test done (reach out to your local extension office).

3. PLANNING AN ANNUAL GARDEN

- Choosing the right plant for the right place *(Level 1)*
  - Discuss and chart out local specifics for the path of the sun, hours of sunlight, annual rainfall, wind, fog, or other regional patterns.
  - Have educators create a map of their outdoor classroom, filling in the path of the sun, soil types, water access, microclimates, dimensions, planting plans, etc. Talk with them to fill out unknown information while on site.
- Regional specifics and resources (*Level 2*)
  - Review a variety of local resources, such as regional garden books, classes, stores, etc.
  - Read through regional gardening books (such as *Golden Gate Gardening*[2] in the Bay Area) to become acquainted with local plant hardiness zones, microclimates, native plants, or planting calendars.
- Planning *(Level 3)*
  - Create your own planting calendars for the first part of the school year, and add crop labels to the map of the outdoor classroom and the annual/food planting area.
  - Discuss crop rotations for maintaining soil health, and plan your next rotation of crops for each area in the annual garden.
  - Schedule planting into educators' curricular scope and sequence calendar (see *Learning and Teaching Outdoors Training Overviews* in the Table of Contents for an example scope and sequence), determine days until maturity, and include a harvest or cooking lesson when crops will be ready.
  - See *The Top 10: An Extended Picture Guide* in the Table of Contents for more ideas and considerations when planning your Food Garden area.

Gardening with Students:

After going through the stations above, have educators reflect on what activities, resources or topics are appropriate for student involvement. Discussion questions can include:

- What are some behavior management considerations in a school garden?
  - This discussion can be made engaging through skits performed by the educators. Below are some skit prompts that demonstrate challenges that can arise in a school garden. This is an effective way to compel educators to think about how to respond to those challenges.
    - Plants that get stepped on, pulled out, or picked from by students
    - Rocks, irrigation tubes, or other infrastructure getting pulled out
    - Hot, cold, wet, or otherwise uncomfortable weather (more examples: sun in their eyes, no shade, etc.)
    - Digging, watering, or weeding in the wrong areas
    - Fear of dirt, bugs, or plants
    - Having only 1 strawberry (or other food) growing for a whole class or school
    - Plants that bolt or have pests
    - Vandalism
  - Some points to highlight:
    - Be patient with students and mindful of their child development stages (such as motor skills)
    - Let go of the idea of a perfect garden and expect the unexpected (i.e. starts will be pulled out, moveable items will be moved, food will be picked before ready, pests will appear.) Always find the learning opportunities in these moments.
    - Setting up routines and tasks early in the year will increase students' sense of responsibility for the space. For tips, see "Building Classroom Culture" in *Education Outside's Best Practices for Teaching*, linked in the Table of Contents.
    - Is a gardening activity best done on your own, with students, or with other adults? Some activities may be fun to do with students, but might need to be re-done for ideal plant/garden success (i.e. replanting starts if they were planted too close together by students, or thoroughly watering again after a class).
    - Consider how many students can feasibly participate in certain activities or areas of the garden at a time. Some garden tasks can be done simultaneously and/or autonomously if expectations are set and clear.

- What garden tasks can be done with students? What are some tasks that can be adapted to suit students?
    - Some examples of appropriate student garden activities:
        - Rebuilding soil by watering, adding compost, or double digging
        - Mapping the garden for sun, soil, and water conditions
        - Deciding what seasonal crops to grow (for example, by student vote)
        - Direct seeding, starting, and transplanting
        - Choosing the right plant for the right place based on specific plant needs
        - Chopping, turning, and sifting compost
        - Feeding or harvesting from worm compost systems
        - Harvesting, preparing, and cooking from annual beds
- How and when can gardening tasks be incorporated into your scope and sequence? What are some challenges educators can expect to encounter when trying to connect their curriculum with the needs of their garden space?
- This conversation is most productive if educators are already acquainted with lesson planning (see "Backwards Planning, The Learning Cycle & Lesson Adaptation" in the *Learning and Teaching Outdoors* Training Overviews in the Table of Contents).
- Activities and considerations for educators:
    - Plan your annual garden with cooking lessons in mind
        - Backwards plan from recipe (harvest) to planting while making a planting plan.
        - Create a budget for purchasing fruits or veggies from the store to supplement crops from the garden.
    - If the scope and sequence is already planned, determine which plants or plant parts are desirable for certain lessons and add them to the annual planting plan
    - Develop garden routines and create lessons to set expectations and practice expected behavior. Be sure to consider age appropriateness, behavior management tools, and seasonal garden needs.
        - Example Routines: incorporate one garden maintenance lesson per month; include a standard amount of time per class for maintenance; incorporate maintenance as a job to do once students are finished with a lesson; incorporate maintenance as a station within a lesson.
    - Review the posters available in *Curriculum Visuals*, linked in the Table of Contents, and identify how students can connect science content with garden activities.
        - Example of connecting science to garden tasks: Composting: use the "Soil Composition" visual in the *Education Outside Curriculum*, 2nd grade: Unit 2: Soil and Decomposition, and engage students in garden composting jobs while discussing soil composition.

Assessing Understanding:

- Exit Ticket: Have educators create a two week plan for revitalizing their annual gardens with student assistance
- Throughout the year, utilize the Best Practices Rubric in Education Outside's Best Practices for Teaching, linked in the Table of Contents, to help educators develop systems for planning garden-based lessons that maximize student experiences in the outdoor classroom

References:

1. Jaffe, Roberta. Appel, Gary. (2007) *The Growing Classroom: Garden-Based Science*. Vermont: National Gardening Association.
2. Peirce, P. (2010). *Golden Gate gardening: The complete guide to year-round food gardening in the San Francisco Bay area and coastal California*. Seattle, WA: Sasquatch Books.

RESOURCES

TITLE | DESIGNING OUTDOOR CLASSROOMS FOR EFFECTIVE TEACHING

CATEGORY | Garden Educator Training

SUB-CATEGORY | Outdoor Classroom Design

OVERVIEW | This document outlines a training for garden educators on how to design an effective and engaging outdoor classroom.

Training Rationale:

Education Outside garden educators were trained to use the Top 10 as an assessment tool at the beginning of the year to determine what infrastructure was missing or needed improvement in their outdoor classroom (see *Building Your Outdoor Classroom: The Top 10*, in the Table of Contents). Garden educators referred back to it throughout the year as a reference or for inspiration.

Suggested Time of Year:

Conduct this training in August or September after the ***Annual Care with Students*** training so educators will already be comfortable with their garden knowledge and skills before assessing their classroom infrastructure. This training should also be paired with the ***Construction Basics*** training so educators will have the skills to tackle major infrastructure projects.

Suggested Workshop Length:

2 hours, with scheduled check-ins throughout the year to assess outdoor classroom design, development, and use during lessons.

Training Objective:

Garden educators will learn that infrastructure and design play an important role in classroom management and student engagement in outdoor classrooms (as it does in all classrooms) and have the resources to improve their outdoor classroom design.

Training Overview:

In this training, garden educators will be introduced to The Top 10 infrastructure recommendations for an effective outdoor classroom (see *Building Your Outdoor Classroom: The Top 10*, in the Table of Contents). They will assess their current classroom design and infrastructure, and begin plans to add to or improve their space. This training can either be held indoors with a projector or outdoors with printouts, to show The Top 10.

Trainers should have garden educators:

1. Review their existing outdoor classroom design, including the natural and built structures.
2. Reflect on standard elements of an indoor classroom. How does the design of the classroom support student learning, student outcomes, and teacher effectiveness?
3. Reflect on how outdoor classrooms can mirror indoor classrooms to support learning and teaching. What are some special considerations to take into account when designing and using an outdoor classroom?
4. Assess their current space by using the Top 10: An Extended Picture Guide, linked in the Table of Contents, and answer these questions:
   - What is already there?
   - What is missing?
   - What could be improved?
   - What would I like to change?
5. Develop a project plan to install or improve one or more elements.
6. Review the Best Practices Rubric, linked in the Table of Contents, as a tool for integrating the outdoor classroom space into lesson planning and answer the following questions:
7. How can infrastructure support or hinder the Best Practices?
8. What practices should I integrate into all classes due to the current infrastructure (e.g. a routine that gathers all students at the meeting place that is clearly designated)?

Activity Ideas:

- Have educators draw or bring a map of their outdoor classroom. Label natural, built, and/or artificial elements and include labels and descriptions of existing teaching elements (e.g. seating area, perennial and annual growing spaces, storage, etc.). With a partner or in groups, have educators compare and contrast their existing space with the Top 10 infrastructure elements list to determine what is missing or could be improved. Begin an initial plan for adding or improving infrastructure.
- Create worksheets or tools that help assess varying aspects of outdoor classroom design during or after the presentation of the Top 10. See the following worksheets for examples of those used by Education Outside educators to assess their classroom design:
  - **Assessing Outdoor Classroom Design**
  - **Getting Your Outdoor Classroom Up and Running**
  - **Landscape Design Consideration Worksheet**
  - **Assessing Outdoor Classroom Design, Part 2**

Assessing Understanding:

Exit Ticket:

- Have educators list their top two strongest infrastructure elements, two that are missing, and one that exists but needs improvement.

Assessing Outdoor Classroom Design

INSTRUCTION AREA	
☐ Seating	☐ Every student has a seat ☐ Seating options can accommodate different class sizes ☐ Seats are facing away from the sun ☐ Seats are in good condition (no protruding nails/sharp edges, no paint peeling, no wobbles, no rotting, graffiti-free)
☐ Whiteboard	☐ Board is of adequate size (space to post visuals) ☐ Board is mounted safely (will not fall over in the wind) ☐ Board is visible to all students ☐ Board is in good condition (no graffiti, erases adequately)
☐ Teaching Table	☐ Table is large enough to include a staging area for materials in use ☐ Table has space to store materials not in use (if necessary) ☐ Table is in good condition and structurally sound (no protruding nails/sharp edges, no paint peeling, no wobbles, no rotting, graffiti-free)
☐ Garden Agreements	☐ Garden agreements are clearly written and visible from the seating circle ☐ Incentive system is clearly posted and used (if relevant) ☐ Sign is in good condition (no protruding nails/sharp edges, no paint peeling, no rotting, graffiti-free)
☐ General	☐ The teaching circle is protected from the elements (sun, wind, noise) to minimize distraction ☐ Instructor has an established system for written student work (worksheets, science folders/journals). If student work is stored, folders/journals/notebooks are stored neatly and are easy for the instructor to find when needed

GARDEN AREA	
☐ Food Garden	☐ There is space in the garden to grow annuals showcasing at least 3 of the plant parts/life cycle stages ☐ Raised beds are in good condition (no protruding nails/sharp edges, no paint peeling, no rotting, no rust, graffiti-free)
☐ Exploration Area	☐ Garden has the healthy perennials needed to teach successful lessons (based on scope and sequence) ☐ A diversity of plant and animal life is found throughout the year ☐ Students have opportunities to engage all of their senses
☐ Storage	☐ Shed has enough space to store all tools safely ☐ Shed has a lock ☐ Shed is in good condition (no protruding nails/sharp edges, no paint peeling, no rotting, graffiti-free)
☐ Stations	☐ Minimum of two stations (dig zone and watering station) exist ☐ Station “zones” are clearly defined ☐ Stations have storage for necessary materials
☐ Worm Bin	☐ Bin is in good condition (not broken/rotting, no sharp edges) ☐ Bin is stored in a place with sun/rain protection ☐ Bin has accompanying materials for students to interact with the worms (magnifying lenses, worm bin bingo cards)

☐ General	☐ There are areas of low and high stimulation (i.e. peace corner and dig zone) ☐ Students have opportunities to engage all of their senses ☐ Signs/murals/diagrams are posted to invite students into the space and help them engage ☐ There is space for small group work and individual work

Getting Your Outdoor Classroom Up And Running

Use this checklist as a guide during your first outdoor classroom walk-through.

Annual Beds

☐ I.D. existing plants in annual beds. Weed/remove undesired plants.
(Note that existing plants in beds might not all be annuals! Plants that have gone to seed can be used for seed collecting with kids, or can be removed to make bed amendment easier.)
- What should stay?
- What can be removed?

☐ Add compost (~2-4 in.)
- Do a basic assessment of the soil. What do you notice? Is it hydrophobic?

☐ Add water
- Highlight areas that need immediate attention
- Make a basic watering plan

Perennial Spaces/General Garden

☐ Check the health of your perennials. Water if needed.
(Plastic milk jugs or buckets with holes are great for adding water slowly!)
- Did any perennials die over the summer? Are there any that need to be pruned?

☐ Check for safety precautions and clutter. Resolving safety precautions is the highest priority at the beginning of the year!

Prep Your Teaching Circle

☐ Take an inventory of your teaching materials
- What's available? Sharp pencils, erasers, name tags, coloring (crayons/pencils/markers), etc.
- Where might you set up materials during a lesson? Is there existing infrastructure you could use?

☐ Figure out where students will sit, ensuring that every student will have a seat
(Temporary seating solutions, such as a tarp or PE poly spots, are definitely okay, especially for new sites!)
- Find a north-facing seating area if one isn't set up
- How might students enter and exit the garden/seating area?

☐ Locate or write garden agreements

Landscape Design Consideration Worksheet

For each of the design considerations below, find an element or area in the garden that represents the described consideration. Draw a representation of your findings and write a short note on how you think it influences your experience of the space.

SIGHTLINES	Vista with clear view of a large area	Blocked sightlines
CIRCULATION	Wide, straight path	Thin, curving path
LEVELS	Low, horizontal shapes	High, vertical shapes
SLOPE	Steep slope, flow	Valley, pool
EXPOSURE	Open to sun and wind	Protected, covered
GATHERING	Space for a group	Space for an individual
FOCUS	Single focal point	Accents and competing elements

UNITY	Unique Form	Repeated Forms
ENGAGEMENT	Element with an immediately clear use	Element with varied or ambiguous use
FLEXIBILITY	Stationary object	Moveable object (can be relocated)
STORAGE	Separate storage space	Integrated storage space
SHAPE	Angular, formulaic shape	Curving, naturalistic shape
MOVEMENT	Rigid	Moving
COLOR	Warm (Reds, Yellows)	Cool (Blues, Greens)
SEASONAL CHANGE	Mostly unchanging over time	Changing with seasons

Assessing Outdoor Classroom Design, Part 2

To form a design improvement plan, use this worksheet mid-way through the year after becoming familiar with the intricacies of your outdoor classroom.

What challenges do I have at my site?

1. Unused space
2. Current activity or space that isn't working
3. Desired activity with no dedicated space

What are my needs?

1. Answer the 5 W's and develop a needs statement:
   - Example: I need a system for multiple students (**who**) to water (**what**) during class time (**when**) using the rainwater cistern (**where**) so they can work at this station independently while I'm helping students at another station (**why**).
2. Consider the three motivations: classroom management, student engagement and aesthetics. Example below.

Area/Activity	**Needs**		
	Management	**Engagement**	**Aesthetics**
Sand Pit *(unused space)*	**Need** something to indicate where sand pit 'starts' and 'ends'- this will help when I tell students "everyone needs to be out of the sand pit in 10 seconds"	**Need** a space for students to easily access and store sand pit play tools so I don't have to haul them out every day and they have more ownership	**Need** plants along the fence lines to make the area more attractive
Watering *(current activity or space that isn't working)*	**Problems**: Bottleneck created because only one student can fill watering can at a time; not enough watering cans and the cans we have are too big and heavy Need smaller watering cans and a way for more than one student to fill at once.	**Problems**: Need adult assistance to fill watering cans- students can't easily regulate water flow and it's hard to get the water in the can without spilling **Need** a way for students to funnel water into cans	**Problems**: Currently no good place to store 22 watering cans **Need** a space to neatly hang 22 cans.

RESOURCES

TITLE | CONSTRUCTION SKILLS AND SAFETY BASICS

CATEGORY | Garden Educator Training

SUB-CATEGORY | Outdoor Classroom Design

OVERVIEW | This document outlines basic construction safety and skills for garden educators.

Training Rationale:

In order to improve or install infrastructure in an outdoor classroom, it's important that garden educators know how to use tools safely and correctly, understand various measurement systems and lumber dimensions, and have an opportunity to practice using these skills.

Suggested Time of Year:

We suggest conducting this training a few months into the school year, usually around November. This gives educators time to get familiar with their space and their teaching practice in order to begin devoting more time and energy to classroom improvements. This training is best conducted after, "**Designing Outdoor Outdoor Classroom for Effective Teaching**," as educators will have already considered possible infrastructure improvements to their space.

Suggested Workshop Length:

3 hours

Training Objective:

Educators will understand various lumber types and dimensions, basic construction safety, and common tools and how to use them. They will also have an opportunity to practice using these skills.

Training Overview:

The following list outlines the topics to cover during a construction basics training. The list is reflective of the tools most commonly used for building outdoor classroom infrastructure, but is not comprehensive and should be adapted to the tools available for use. This training should be led by someone with some construction experience. We recommend presenting these topics in a slideshow before participating in the activity ideas listed in the next section.

Topics:

- Wood type
  - Dimensional lumber:
  - Always choose untreated wood. Pressure treated wood contains chemicals and should not be used in school gardens.
  - In California, use redwood for outdoor structures. "Construction Heart" will last the longest, but is more expensive than "Common."

- Plywood:
  - Usually purchased in 4'x8' sheets, ¼" to 1" thick
  - Medium Density Overlay (MDO) plywood will last longest outdoors, will not warp and provides a smooth surface for detailed painting. However, it can be expensive.
  - You can also look for salvaged plywood from salvage yards, Craigslist, other schools, etc.
- Wood size
  - The actual size of the wood you buy at the hardware store is slightly smaller than it says it is, due to being dried and planed (flattened and smoothed). For example, a 2" x 4" board is actually 1.5" x 3.5".
  - You can find dimensional lumber guides online to help you clarify the actual size of lumber before purchasing.
- Tools
  - The basics:
    - Utility knife
      - Useful to have handy for trimming, cutting, etc. Also used to sharpen carpenter's pencils.
    - Speed square
      - Most often used for drawing right angles for cuts, and "checking for square." They come in many sizes.
    - Clamp
      - Use to attach wood to saw horses/workstation, etc.
    - Carpenter's pencil
      - Any pencil will do, but carpenter's pencils are flat so they won't roll and can be used as standard spacers (they're usually ¼" x ~½").
    - Tape measure
      - The silver tab on the end is meant to move slightly, allowing you to measure both by pulling on the end of a board or pushing against a board.
  - Measuring
    - Measure twice, cut once!
    - Increase your accuracy by marking your measurement with a carrot (looks like: ^). The apex gives you a single point from which to draw a line.
    - Align a speed square with your mark to draw a straight line across your board. Draw an "X" on the waste side of your board.
  - Safety
    - Always use eye, ear, and respiratory protection when operating power tools.
    - Be aware of your surroundings at all times (such as cords, students, or other tools).
    - Keep hands, fingers, hair, and clothing away from moving tool parts.
    - Make sure all tools and parts are in working order before using them.
    - Look up specific tool safety guidelines based on what tools you plan to use.
    - *Always read the instruction manual or receive a tutorial from someone before using unfamiliar power tools.*
  - Cutting
    - No matter which saw you use:
      - Cut on the waste side of your line, and expect to lose ~⅛" to sawdust (depending on the width of your blade).
      - To ensure accuracy, measure, cut, then measure again, instead of measuring out all cuts ahead of time.
    - Japanese pull saw
      - Your very efficient, "quick cuts" hand saw! Great for making a few cuts, but labor intensive for larger projects.
      - See online tutorial listed in the references below[1].
    - Circular saw
      - More portable than a miter saw and easy to use. Cutting perfectly straight lines takes practice, but in most cases this isn't a problem for school garden infrastructure.
      - While the saw is off or unplugged, adjust the blade height so that only ~¼" is exposed beneath the wood.
      - Clamp the board in two places, but leave the end that you're cutting free to fall off.

- If splintering is a concern, ask someone to support the board, but do not clamp it. Wood supported on both ends will pinch the blade, causing kickback.
- Always start the saw at full speed before touching it to wood.
- See online tutorial listed in the references below[2].

- Miter saw
  - Quite large and heavy, making it hard to transport, but very accurate.
  - Great choice if precision or angled cuts are required.
  - Four ways to cut: cross cut, miter cut, bevel cut, and compound cut (bevel and miter)
    - The Education Outside bench plans (see *Basic Construction Plans for School Garden Infrastructure* in the Table of Contents) includes bevel cuts for the leg supports.
    - See online resource listed in the references below[3].

- Fastening
  - Cordless drill
    - One of the most useful tools in the toolbox! Can be used to drill holes and to fasten screws, using different bits.
    - Use the forward/reverse toggle to operate the drill in both directions (use reverse to remove screws). Centering the toggle locks the drill.
    - Cordless drills often have a battery indicator. Check for charge, and make sure you have a backup battery charged ahead of time.
    - See online tutorial in the references section to determine how to change the bit on your drill[4].
  - Impact driver
    - Impact drivers look very similar to drills but are specifically designed to fasten screws. While drills can also be used to fasten screws, impact drivers are faster, less likely to strip screws, and put less impact on your hand.
    - They are handy for big projects, but not necessary in many cases.
  - Using Screws
    - There are many different kinds of screws. Deck screws are a good choice for most garden projects.
    - Head type:
      - Slotted- driver can slip out easily; not recommended
      - Phillips- commonly used. Can strip easily but otherwise fine, and driver sets should all have the appropriate bit.
      - Star/Square- Good alternatives to Phillips. Usually don't strip as easily, but make sure you have the appropriate driver bits. A box of these screws often come with a driver bit included.
    - The screw should be long enough to extend about halfway through the second of two pieces of wood being fastened; not so long that it protrudes through.
    - A pilot hole is a hole drilled before fastening, to help guide the screw straight into the wood and prevent wood from splitting. It is not always necessary to drill a pilot hole, but it should be done near edges, where wood is prone to splitting.
    - Choose a drill bit for your pilot hole that matches the diameter of the screw (not including the threads).

- Finishing
  - Sanding
    - Use a power sander or sand by hand.
    - Sandpaper comes in different grit numbers. Lower numbers are rougher, removing more material. Higher numbers are finer and best for finishing and reducing scratch marks. It's common to use lower grit numbers first and follow with a higher grit number.
  - Redwood is resistant to decay so it can be left unsealed if desired. However, it will rot eventually, especially if wet. Different exterior wood finishes can help slow moisture/UV damage.
  - Clear finish:
    - Exterior oil finish is quick to apply, but requires re-applying every year
    - Exterior varnish /urethane requires multiple coats, but will last 2-3 years

- Painting
  - Paint provides very good water and UV protection
  - First: Prime
  - Smoothes painting surface
  - Prevents paint from peeling
  - Prevents water damage
  - Apply 2 coats to front, back and sides, drying in between
- Second: Paint
  - Choose a water-based (latex) exterior paint.
  - Paints that have a higher acrylic resin content (i.e. labeled 100% acrylic) are more expensive, but will last longer and won't fade as fast as paints with less acrylic/more vinyl resins.
- Third: Seal (for big projects and longevity)
  - Choose clear, waterproof varnish.
  - For signs, use a waterproof sealer that provides UV and graffiti protection.

- Remember that construction doesn't have to be hard; fasten 4 boards together and you've got a raised bed!

Activity Ideas:

- Have educators bring an idea or sketch of a construction project they might like to complete in their outdoor classroom, and work on creating construction plans for it (i.e. draft dimensions and building plans, develop budget and purchase list, and identify tools needed)
- Begin with a group share-out of construction experience. Pair novice and experienced educators in order to facilitate peer learning.
- Create outdoor activity stations to practice measuring, cutting, fastening, and finishing. You will need tools, hardware, safety supplies, and scrap wood.
  - Measuring station: prepare a cut list based on the wood available and have educators use a measuring tape, carpenter's pencil, and speed square to accurately measure wood before a cut.
  - Cutting station: practice using saw horses, clamps, pull saws, a circular saw, and/or a miter saw. Make sure to have accurate measurements, safety gear, and proper technique. If a miter saw is available, practice the different cuts this saw can perform.
  - Fastening station: use a drill and/or driver to practice changing bits, making pilot holes, fastening with screws, and removing screws. Provide various screw types and lengths for variety and comfortability with the hardware.
  - Finishing station: provide various grits of sandpaper and sanding tools (such as a hand, orbital, and belt sanders) to practice on scrap wood. Show examples of various outdoor paints, sealers, and varnishes.
- Use *Basic Construction Plans for School Garden Infrastructure* (see Table of Contents) to build a teaching table, bench, or raised bed. Practicing adapting the plans to build customized sizes.

Assessing Understanding:

- Exit Ticket: Have educators share a new skill they acquired or how they plan to use this training at their site. If they have recently assessed their classrooms infrastructure with Education Outside's The Top 10: An Extended Picture Guide (see Table of Contents), have them discuss ways they can use construction skills to improve their site infrastructure.

References:

1. Beemer, W. (2019, February 19). Use a Pull Saw. Retrieved from https://www.finehomebuilding.com/2011/11/10/use-a-pull-saw
2. The Family Handyman. (2018, January 17). Circular Saw Tips and Techniques. Retrieved from https://www.familyhandyman.com/tools/circular-saws/circular-saw-tips-and-techniques/
Journal, C. (2019, January 24). Home. Retrieved from https://www.chainsawjournal.com/miter-saw-uses/

4. Hardware, R. W. (2016, November 10). How to Change a Drill Bit | Rockler Skill Builders. Retrieved from https://www.youtube.com/watch?time_continue=3&v=z9hdV5dMaLQ

Additional Training Resources:

- Many high schools, technical schools, or community colleges offer construction or woodworking classes. These may be good resources to find experienced teachers/trainers, tools, or construction volunteers.

RESOURCES

TITLE | PERENNIALS IN THE OUTDOOR CLASSROOM

CATEGORY | Garden Educator Training

SUB-CATEGORY | Outdoor Classroom Design

OVERVIEW | This document outlines a training on identifying, maintaining, propagating, and planting common perennials in an outdoor garden classroom.

Training Rationale:

Perennial plants are an essential component of an outdoor garden classroom as they provide year-long opportunities for exploration, learning, and observation, add aesthetic value, and create habitat for wildlife. It's important that garden educators are familiar with the perennial plants in their outdoor classroom, feel comfortable caring for and maintaining them throughout the year, and understand how to propagate and plant new perennials.

Suggested Time of Year:

Early fall or a region-appropriate time for pruning, propagating, and/or planting perennial plants

Suggested Workshop Length:

3-4 hours or separated into two shorter trainings with an opportunity to review pruning techniques again later in the year

Training Objective:

Garden educators will identify common perennials in outdoor classrooms, review basic perennial maintenance, and learn how to propagate and plant their own perennials.

Training Overview:

This training is most effective when hosted in an established outdoor garden classroom with a majority of the Top 10 infrastructure (see *Building Your Outdoor Classroom: The Top 10* in the Table of Contents) already in place, especially a perennial/exploration area.

This training should introduce garden educators to common perennials in an outdoor classroom, ongoing perennial care, and skills for propagating and planting perennial plants. Because common perennials, perennial maintenance, and ideal planting times will vary by region, it is important that the facilitator(s) of this training have knowledge of the local area. The trainer(s) should choose topics appropriate and relevant for the educators' location and prior knowledge and determine how deep to go while discussing a topic.

Much of the content in this training overview comes from various gardening books, online resources, and local educational gardens and classes. It is recommended that trainers utilize local and regional resources and partner organizations to support horticultural trainings. See **Additional Training Resources** at the end of this document for a list of resources and organizations that were helpful to Education Outside.

Topics and questions to cover during the training:

Common Perennials

- What are perennials and why are they beneficial to school gardens?
- What common perennials do we see in our area and how can they be used effectively in a school garden?
  - Examples: Which perennials have edible plant parts? Which perennials are native or provide native pollinator habitats or attract local fauna? Which perennials can stimulate the senses (texture, smells, etc.)?
  - See the activity section below for some plant guide examples.
- What perennials should not be added to a school garden?
  - Examples: Are there ornamental perennials in your area that are toxic if consumed? Are there invasive species to avoid?
- What major factors affect perennial viability? What are the existing sun, soil, and water conditions in the outdoor classroom that help or hinder the success of perennial plants?
- How does the regional climate affect perennial plants?
  - Examples: When are plants typically dormant? When does the rainy season start? What are the average chill hours (if working with fruit trees)?

Perennial Care

- What are the best practices for pruning perennials throughout the year?
  - The “4 Ds” (dead, dying, diseased, damaged) and the “3 Cs” (crossing, competing, crowded)
  - Categories for pruning (crown-rejuvenation, base-cleaning, budding back)
  - Hard prune timing and prune amount depending on the plant and the season
- What are the five different techniques for pruning?
  - Thinning
  - Heading
  - Shearing
  - Pinching
  - Dead heading
- Where and how are certain pruning cuts made?
- What are the best tools to use for pruning, when is the appropriate time to use them, and how are the tools cared for?
- How much water do the common perennials in school gardens need throughout the year? What are the different needs between young and established perennials?
- When and how does the soil around common perennials need to be amended?
- What are some common characteristics of an unhealthy perennial?

Perennial Propogation

- What does propagation mean and what are the primary methods for propagating plants by hand?
  - Plant reproduction through seeding
  - Cuttings
  - Divisions
  - Layering
- How do you choose the proper method for propagating a plant, ideal season, and correct plant material? What are the intended results?

- What are the easiest/most successful perennials to propagate that are commonly found in school gardens?
- When is a propagated plant ready to be transplanted?

Perennials Planting

- When is the best time of year to plant perennials?
- How established should a perennial be before transplanting from a pot?
- What are the best practices for planting perennials?
  - Right plant, right place (determining location based on sun, soil, water availability and plant needs)
  - Special considerations based on region/microclimates/sun exposure
  - Planting process: dig a hole, assess drainage, amend, place plant at crown level, backfill, tamp, water.
- What are other factors to consider when planting perennials?
  - Rodents and plant protection (gopher wire)
  - Spacing and planning for the mature plant
  - Irrigation systems/programs

This list is not exhaustive of all perennial gardening topics, but it covers the information most relevant to garden educators. For example, this training does not cover fruit tree care. If educators have fruit trees, it will benefit them to attend an additional training specific to fruit tree care.

Activity Ideas:

- Stake out various perennials in an outdoor classroom and have garden educators rotate through each while determining the sun exposure throughout the year, the water sources, and the soil quality. Have them look up the appropriateness of each plant for its place by referencing local gardening books.
- Use regional planting guides while touring an outdoor garden classroom and practice identifying common perennials. See below for some planting guides specific to the Bay Area.
  - **Large perennial shrubs**
  - **Shade tolerant plants**
  - **Ground cover plants**
  - **Five senses garden**
- Develop a list of common perennials for your region. Create a chart and include: common and botanical names, varieties, size, bloom time, common uses, and pruning/care tips. Pre-fill some of the information while leaving some blank (the trainer should have experience and knowledge with these common perennials). During a tour of an outdoor garden classroom, have educators use the chart to take notes in the blank areas. Leave space at the bottom of the chart for educators to add information about perennials specific to their own outdoor garden classroom.
  - **See this example for Bay Area school gardens**
- While touring the outdoor garden classroom's perennials, discuss the pruning techniques and/or the propagation methods best suited for those plants. Have educators then rotate to each plant while practicing the correct technique. (Trainer should provide materials for plant propagation if they want educators to leave with plants.)
- Create a tool cleaning and sharpening station and have educators bring tools they need to clean/sharpen and practice using. (Trainer should provide materials.)
- Have educators plan a small planting project. How can they make a small space fun and engaging for students?
  - Examples:
    - **Five senses garden**
    - Zoo garden
      - Plants named after animals, such as: lion's tail (*Leonotis leonurus*), lamb's ear (*Stachys byzantina*), and tiger lily (*Lilium lancifolium*)
    - Herb garden
      - Various fragrant or edible herbs

- Pizza bed
  - Plants that are used to make pizza, such as: tomatoes, basil, oregano, and wheat
- Herbal tea bed
  - Plants that can be added to hot water to make "garden tea," such as: lemon balm, various mints, and chamomile
- Native/drought tolerant garden
  - Plants that can be seen throughout the region and/or plants with indigenous purposes to share with students. Provide informational signage for visitors.
- Pollinator garden
  - Plants that attract local butterflies, bees, and birds

- Have garden educators plan a lesson that includes students in the care of the perennials in the outdoor classroom. How will they set expectations, use tools, and group students?
  - Example: deadheading flowers with scissors is an easy activity, and can be used for nature art afterward.
- Have garden educators brainstorm perennial plant activities to do with students, along with their age appropriateness. See additional ideas in *Back Pocket Activities, Art Projects & Celebrations, and Icebreakers* in the Table of Contents.
  - Flax weaving
  - Flower/leaf bling bracelets/boutonnieres (using painters tape, with the sticky side out)
  - Fairy houses/habitat building
  - Nectar tasting/flower eating
  - Herb bundles/bouquets
  - Flower tattoos
  - Boat building
  - And more...

Assessing Understanding:

- Exit ticket:
  - Have educators share, with a partner or group, three important things to remember about perennial care.
  - Have educators share the 4 Ds of pruning or the five pruning techniques.
  - Have educators share the steps they would take to learn about an unfamiliar perennial in their outdoor garden classroom.

Additional Training Resources:

- Appel, G. (1982). The Growing classroom: A living laboratory science and nutrition curriculum for 2nd through 6th grades. Santa Cruz, CA: Life Lab Science Program.

Bay Area-Specific Resources:

- Harlow, N., & Coate, B. D. (2004). *Plants and landscapes for summer-dry climates of the San Francisco Bay region*. Oakland, CA: East Bay Municipal Utility District.
- Hill, L., & Sears, E. (1998). *Pruning made easy*. London: Storey Communications.
- Peirce, P. (2010). *Golden Gate Gardening: The complete guide to year-round food gardening in the San Francisco Bay area and coastal California*. Seattle, WA: Sasquatch Books.
- *Sunset Western Garden Book*. (1995). Menlo Park, CA: Sunset Pub.
- Garden for the Environment: https://www.gardenfortheenvironment.org/
- San Francisco Botanical Garden: https://www.sfbg.org/

Large Perennial Shrubs

Copper Canyon Daisy *Tagetes lemmonii*

California Lilac *Ceanothus*

Chinese Fringe Flower *Loropetalum chinense rubrum*

Devil's Bush *Leucadendron salignum*

Jerusalem Sage *Phlomis fruticosa*

Lion's Tail *Leonotis leonurus*

Mexican Sage *Salvia mexicana*

New Zealand Tea Tree *Leptospermum scoparium*

Pineapple Sage *Salvia elegans*

Red-flowering Currant *Ribes sanguinium*

Rose Geranium *Pelargonium graveolens*

Princess Flower *Tibouchina semidecandra*

education OUTSIDE

Shade-Tolerant Plants

Creeping Raspberry *Rubus pentalobus*
The creeping raspberry is a low-growing ground cover with deep green, semi-evergreen leaves and bright white flowers. Use creeping raspberry in rock gardens or to fill in among taller flowers in decorative planters.

Native Strawberry *Fragaria chiloensis*
A superb evergreen ground cover, Coastal Strawberry does well in sun or partial shade. It spreads by runners to form low, compact mats, 6 - 12" high. The leaves are leathery with red tints in winter. Large white flowers in the spring are followed by delectable berries.

Silver Shield *Plectranthus argentatus*
Large velvety gray succulent leaves make the show. Gets to 3 feet tall by 6' across. It prefers some shade and can take dark shade. Not too much water is required. Brings a great light to dark spaces.

Blue Fox Tail Agave *Agave attenuata 'Nova'*
A large rosette succulent that forms a large cluster 4 to 5 feet tall by about twice as wide. The wide blue gray pliable leaves lack any teeth along the margins and emerge from a tight central spear to arch gracefully back, looking like large open gray-blue flower.

Kangaroo Paw *Anigozanthos 'Big Red'*
An evergreen perennial with fuzzy rich red flowers that look like claws that rise high above the iris-like foliage from spring through fall (nearly year round along coast). Grows 4-6 feet tall and 2-3 feet wide.

Shasta Daisy *Leucanthemum x superbum*
Shasta daisies tend to bloom in clumps from 2 to 3 feet tall and 1 to 2 feet wide. They bear all-white daisy petals, yellow disk florets, and contrasting glossy, dark green leaves.

Society Garlic *Agapanthus (Tulbaghia violacea)*
This easy-to-grow perennial produces colorful globes of blue or white trumpet-shape flowers in summer and fall. Its evergreen strappy leaves add texture to beds, borders, and containers.

education OUTSIDE

Ground Cover Plants

Blue Fescue *Festuca glauca*

One of the most versatile ornamental grasses, blue fescue can be used in many different ways. Plant it at the base of leggy shrubs or tall perennials to help them blend with the landscape and offset the other plant's flowers or foliage. Plant in masses as a groundcover or in rows as an edging plant. Use as an accent in a rock garden or flower border. It even looks fabulous in containers!

Flat Ceanothus *Ceanothus hearstiorum*

Ceanothus hearstiorum has small, soft, dark green leaves and flowers are blue and show up in late spring. A flat Ceanothus, no higher than 2-3 inches. Needs part shade in the interior and some summer water. When this plant is happy it is one of the best looking groundcovers I have ever seen. It loves adobe soil. It is not so good in beach sand.

Fleece Flower *Persicaria affinis*

Persicaria affinis is an evergreen perennial with a mat-forming habit. Its foliage is narrowly elliptic and dark green in colour, turning bronze in winter. In late summer to autumn it bears dense spikes of small, funnel shaped, rose red flowers which are up to 10cm above the foliage.

Lamb's Ear *Stachys byzantina*

Lamb's Ear works well when filling an area of your landscape and as a border perennial, with pink-purple flower spikes during the summer season. The foliage provides striking silvery color and velvety soft textural qualities.

Plumbago *Ceratistigma plumbaginoides*

Plumbago (also commonly called leadwort) is a wiry, mat-forming perennial which spreads by rhizomes to form an attractive ground cover. Typically grows 6-10" tall on generally erect stems rising from the rhizomes.

Slender Sedge *Carex praegracilis*

Nice evergreen sedge for moist location. Spreads by underground roots. Tough and easy to grow. Very happy in clay hardpan soils.

Yarrow *Achillea millefolium californica*

Plant in the spring in well-drained, average to poor soil. Yarrows thrive in hot, dry conditions; they will not tolerate wet soil.

education OUTSIDE

Five Senses Garden

Sight

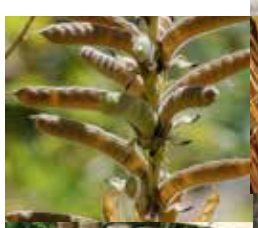
Everthing!
Sunflowers
Chinese Fringe Flower
Lion's Tail
Jerusalem Sage
California Poppies
Hen and chick





Sound

Grasses
Bamboo
Poppy pods
Lupine
Wind Chimes
Water features
Sound features


Touch

Mint geranium (fuzzy)
Succulents (smooth)
Soft-spiked cactus
Chamomile (soft)
Mexican Sage (fuzzy)
Lamb's Ear (fuzzy, soft)
Artichoke Flowers
Lion's Tail
Ceanothus (soap!)




Smell

Lemon verbena
Lemon balm
Pineapple sage
Sweet pea
Peppermint
Spearmint
Lime mint
Lavender
Thyme
Rosemary







Taste

Sorrel (sour)
Snap peas (sweet)
Fava beans
Honeysuckle (sweet)
Tree strawberry (sweet)
Borage (edible flowers)
Nasturtium (edible)
Mint





education OUTSIDE

Essential Bay Area School Garden Vegetables

Plant Type	Direct Seed or Transplant?	Spacing	Time (West)	Time (East)
Radishes	S	~3”	Any time	Any time
Fava beans	S	~8-10”	Any time	Any time before Apr
Onions	T	~3” (harvest as green onions)	Any time	Any time
Peas	S	~3-4”	Any time, avoid Dec/Jan	Any time before Apr, avoid Dec/Jan
Leaf Lettuce	S/T	~7-9”	Any time	Any time
Head Lettuce	S/T	~10-12”	Any time	Any time
Kale	T	~12”	Sept, Feb-Summer	Sept, Feb-Summer
Collard Greens	T	~12”	Sept, Feb-Summer	Sept-Oct, Feb-Summer
Mustard Greens	T	~8-12”	Any time, avoid Nov-Dec	Aug-Oct, Jan-Apr
Swiss Chard	S/T	~10”	Dec/Jan (S); After winter break (T)	Dec/Jan (S); After winter break (T)
Leeks	T	~6”	After winter break	Feb-Apr
Turnips	S	~4-6” (closer if just harvesting greens)	After winter break	Feb-Summer
Carrots	S	~3”	Feb-Summer	After winter break
Beets	S	~6”	Feb-Summer	Feb-Summer

Essential Bay Area School Garden Herbs

Plant Type	Annual/ Perennial	Good For	How to Obtain
Sorrel	Perennial	Nibbling year-round; Cooking	Nursery
Chives	Perennial	Cooking, Scent	Nursery, Division
Lavender	Perennial	Edible flowers, Cooking, Tea, Scent	Nursery, Division, Stem Cuttings
Lemon balm	Perennial	Tea, Scent	Nursery, Division
Mint	Perennial	Tea, Scent	Nursery, Rooted runners (It spreads! Good in a container!)
Rosemary	Perennial	Cooking, Scent	Nursery, Cuttings
Pineapple sage	Perennial	Edible flowers, Scent, Attracting hummingbirds	Nursery, Stem Cuttings
Lemon verbena	Shrub	Tea, Scent	Nursery, Stem Cuttings
Borage	Annual	Edible flowers, Attracting bees	Seed

Perennials For SF Bay Area School Gardens

Name	Varieties/ Size	Bloom Time	Good For...	Pruning/Care Tips
Copper Canyon Daisy *(Tagetes lemmonii)* 	3-6′ x 4-6	Year-Round	• Strong scent • Year-round flowers	• Will get quite large, especially if located near additional water/fertilizer.
Ceanothus *(Ceanothus)* 	Many varieties and sizes, groundcover to large shrub. *C. arboreus*, ~15′ x 10′ *C. hearstiorum, 6″ x 8′*	Spring	• Flowers for soap-making • Attracts bees •	• No additional water or fertilizer once established.
Jerusalem Sage *(Phlomis fruticosa)* 	4′ x 6′	Spring	• Flowers for nectar tasting • Fuzzy leaves	
Lion's Tail *(Leonotis leonurus)* 	4-6′ x 4-6′	Fall	• Flowers at the beginning of the school year	• Cut back to the ground after it has finished blooming in late fall. • Root ball will grow every year and may need root pruning.
Lavender *(Lavndula)* 	Many varieties, including: English *(L. angustifolia)* 1-2′ x 2-3′ French *(L. dentata)* 3-4′ x 4-6′ Spanish *(L. stoechas) 3′ x 2-3′*	Spring/ Summer	• Herb bundles • Cooking activities	• Cut back by ½ in winter to prevent from getting woody

Name	Varieties/ Size	Bloom Time	Good For...	Pruning/Care Tips
Mexican Sage *(Salvia leucantha)* 	3-4' x 3-4' --- *These are just two of many salvias- others include:* • White Sage *(S. apiana)* • Bee's Bliss Salvia *(S. leucophylla)* --- 3-4' x 3-4'	Year-round if cut back	• Year-round flowers	• Spreads easily • Cut back to the ground after blooming to promote flower growth
Pineapple Sage *(Salvia elegans)* 		Year-round	• Attracts hummingbirds • Nectar tasting • Scented leaves	
Rose Geranium *(Pelargonium graveolens)* 	~2'x1' --- *These are just two of many scented geraniums* --- ~1-3' x 1-3'		• Scented leaves	
Peppermint Geranium *(Pelargonium tomentosum)* 			• Scented fuzzy leaves	
Sweet pea shrub *(Polygala dalmaisiana)*	3-5' x 4-6'	Year-round	• Year-round flowers, example of seed "exploders". • NOT edible	

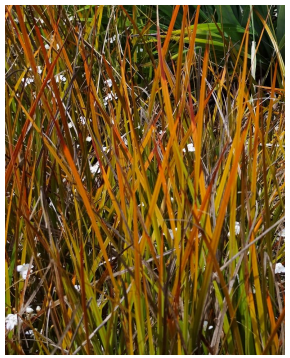
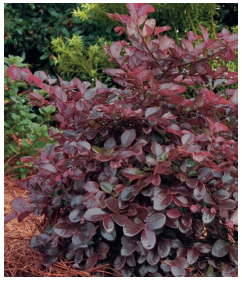
				

Name	Varieties/ Size	Bloom Time	Good For...	Pruning/Care Tips
Sticky Monkey Flower *(Mimulus aurantiacus)* 	3-4' x 3-4'	Spring/ Summer	• Sticky leaves- can make dirt "tattoos" • Attract hummingbirds	
Princess Flower *(Tibouchina semidecandra)* 	5-15' x 3-10'	Winter/ Spring	• Showy flowers	
New Zeland Flax *(Phormium)* 	Many sizes and varieties- can get quite large. *P. tenax* 'Tom Thumb' & Tiny Tiger are both on the smaller size (~2' x 2')		• Weaving crafts (bracelets, bookmarks, etc.)	
Hummingbird fuchsia *(Epilobium canum)* 	1-2' x 2-3'	Summer/ Fall	• Attract hummingbirds	
Tree aloe *(Aloe arborescens)*	6-8' x 5-6'	Winter	• Providing a barrier	

				
Devil's Bush *(Leucadendron salignum)* 	3-5′ x 3-6′	Winter	• Slow growing but beautiful red foliage- fun to add to flower bouquets	• Very sensitive to additional water or fertilizer once established

Name	Varieties/ Size	Bloom Time	Good For…	Pruning/Care Tips

Others Drought-Hardy Plants to Consider:

Hebe variagata 	New Zealand Iris (*Libertia peregrinans*) 	Green smoke bush *(Cotinus coggygria)* 	Red Dragon *(Lophomyrtus x ralphii)* 
New Zeland Tea Tree *(Leptospermum scoparium)* 	Chinese Fringe Flower *(Loropetalum chinese rubrum)* 	Red Flowering Currant *(Ribes sanguinium)* 	Red lantana *(Lantana camara)* 
Rock Rose		Silver Plectranthus	Flowering Maple

(Cistus x purpureus) 		*(Plectranthus argentatus)*  *shade tolerant!	*(Abutilon)*  *shade tolerant!