





Ideas and Planning for School Gardens and Outdoor Learning Centers

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A collaborative project of

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Why a school garden?

- The Benefits of School Gardens

SECTION 2

So you think you're ready for a school garden?

- Checklist
- Square Foot Gardens
- Spacing
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The Benefits of School Gardens

- Provides unique learning environments allowing children to practice new skills
- Addresses different learning modalities
- Presents a variety of activities that relate to the child's own experiences
- Intrinsically motivates and excites students to learn, recognize, and address prior knowledge
- Provides students with choice and control over their learning
- Provides hands-on learning in a variety of subjects
- Improves test scores and behavioral/emotional issues when working with nature/plants
- Helps develop healthy eating habits as students taste and prepare foods they grow
- Teaches students to focus and grow in patience, cooperation, teamwork and social skills
- Allows students to gain self-confidence and a sense of "capableness"
- Provides non-readers with opportunities to bloom in a garden setting
- Diversifies and beautifies the schoolyard
- Decreases vandalism and graffiti because students feel ownership in their school

How Can We Use the Garden

⇒ Life Science (relationships between producers/consumers, decomposers, etc.)

⇒ Earth Science (weather monitoring, soil investigations, etc.)

⇒ Physical Science (pH in soil, water cycle, etc.)

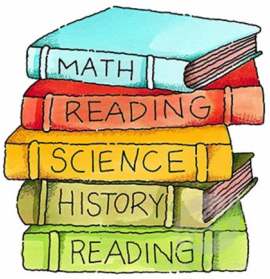
⇒ General Science (observation, communication, comparing, ordering, categorizing, etc.)

⇒ Math (measurement of plants, calculating perimeter/area/volume, etc.)

⇒ Language Arts (journaling, letter writing, following written directions, etc.)

⇒ Social Science (inspiration/venue for visual and performing arts, etc.)

⇒ Health & Nutrition ('bout everything!)



CHECKLIST

Creating a school garden or outdoor learning center starts with an idea—a vision—and the willingness and ability to pull together a team to make it happen. If this is something you are contemplating, here are some things to consider before you start:

HAVE YOU SECURED ADMINISTRATION SUPPORT AND APPROVAL?

Your school principal is key in having your project succeed. If he/she is behind the project, the likelihood of teacher involvement is almost a certainty. Your school principal will also be a go-between with the school district in making certain that the site is approved and a water source will be available. The school principal will also be instrumental in working with the school maintenance department.

DO YOU HAVE TEACHER BUY-IN?

It is crucial that you have the support of your teachers. While you may not be able to get everyone on board, a few committed to the idea will eventually bring in others as they share their ideas and demonstrate how they use the garden.

ARE THE STUDENTS INVOLVED?

The students should be involved with the project from its inception. The more ownership they have in the project, the more successful it will be.

DO YOU HAVE A DEVELOPMENT TEAM COMMITTED TO THE PROJECT?

You should have a committee of at least 4-5 people who are willing to take on certain aspects of the project. These can be parents, PTA, teachers, students.

HAVE YOU SELECTED THE SITE?

Your site selection will depend on what type of garden you want to develop. Sun/shade patterns will have to be observed and based on those observations, the type of garden you plant. For example, vegetable gardens require at least 6-8 hours of full sun.

WHAT IS YOUR FUNDING SOURCE?

You will need to put together a preliminary budget depending on what your initial goals are. Some funding sources to consider are: grants, donations of both labor and materials, PTA fundraisers, inclusion in the school budget.

WHAT IS YOUR MAINTENANCE AND LONG-RANGE PLAN FOR SUSTAINABILITY?

Have you considered what will happen to the garden during the summer months? Will you let it go fallow or will there be teams to maintain and harvest through the summer months when school is not in session.

HOW WILL YOU PROMOTE THE PROJECT?

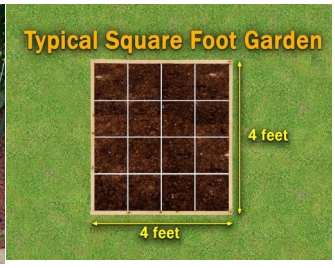
TIME-LINE/SCHEDULE

Develop a time-line with realistic goals and stick to it.

Square Foot Gardens
growing more in less space

What can you grow in a small space?

- Leafy greens like lettuce, spinach, kale, and chard.
- Root veggies such as carrots, radishes, potatoes, onions, shallots, and garlic
- Many different herbs including annuals like basil, dill, parsley, and cilantro or perennials such as oregano, thyme, marjoram, and sage
- Warm season vegetables including cherry tomatoes, green beans, eggplant, and peppers
- Add vertical support and you can grow cucumbers, pole beans, and peas

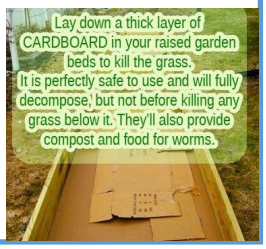


Building a Simple Square Foot Garden Bed

While you can buy ready-made Square Foot Garden boxes in a variety of forms, with few simple supplies you can construct your own for about $20 a box.

Materials you'll need:

- (4) 2x6 in. boards, 4 ft. long, untreated (cedar is a good choice)
- (12) 4 in. wood screws
- (6) 4 ft. lattice strips *(optional)*
- Power drill
- Screws & Nails
- Cardboard

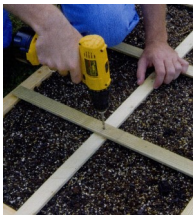


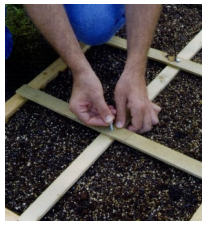
Screw 3 large wood screws through pre-drilled holes, overlapping board ends until you have a complete frame.

Attaching the Square Foot Garden Grid

Grids are optional, but they give your Square Foot Garden its unique, attractive and unusual quality, while providing you with a planting/spacing template.

Cut the weed cloth to the outside dimensions of the frame or line frame with cardboard. Add a good, rich growing soil.





Drill holes at the intersections of all the grid lath pieces. Next, insert a pin or bolt to hold the grid together. Secure the lath strips to the box with screws.

Water as you add each layer of soil until your box is full. Add the grid and plant!

MATH IN THE GARDEN SPACING

PLANTS NEED THE PROPER AMOUNT OF SPACE TO GROW!

PAPER TOWEL GARDENING (K- 3 RD)

Materials: Rolls of 1-ply (white-only no inks) paper towels, seeds, water-soluble glue, markers

- Each student will write their name and type of seed on the paper towel.
- If the seeds are to be planted 12" apart– put the seed in the middle of the paper towel.
- If seeds are to be planted 6" apart—fold paper towel in half, mark the center of each half of the towel for a seed.
- If seeds are to be planted 4" apart—fold paper towel in fourths, mark the center of each quarter of the towel for a seed.
- If seeds are to be planted 3" apart— fold paper towel in thirds and again in thirds (tic-tac-toe board), mark the center of each ninth of the towel for a seed.
- After the seed is placed, drop a dot of glue to adhere the seed to the paper towel.
- Let dry.
- They can be planted the same day or until it is time to plant.
- When ready to plant, place squares (follow garden plan). Sprinkle about 1/2" soil (or fine compost) evenly to completely cover the paper towel.
- Carefully moisten by sprinkling.
- Keep moist with daily watering until sprouts appear.
- The paper towel will decompose into the soil.

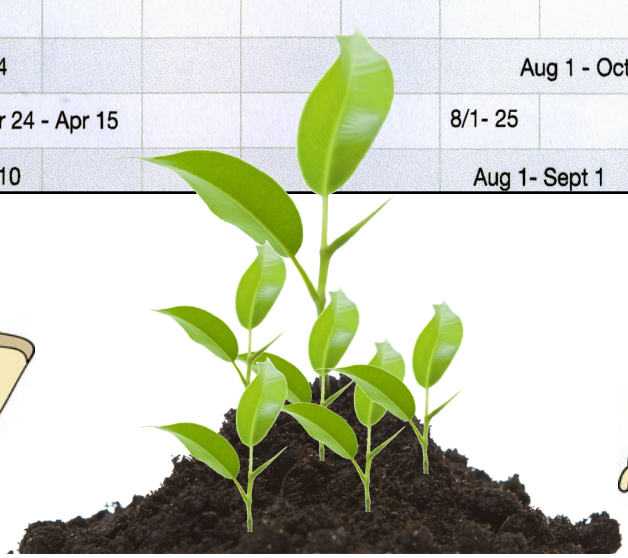
"FINGER" METHOD OF SOWING SEEDS (4TH-7TH)

- Supply student with material to serve as a plant sign (cut up metal blinds, popsicle sticks, etc.)
- Each student will have a "square" of the garden

- If the seeds are to be planted 12" apart– put the seed in the middle of the square
- If seeds are to be planted 6" apart—use 1 finger to draw a line from the top, place see in the middle of each section
- If seeds are to be planted 4" apart—use 1 finger to draw 1 line from the top and 1 line from the side, place deeds in each middle section
- If seeds are to be planted 3" apart— use 2 fingers to draw 2 lines from the top and 2 lines from the side, place seeds in each middle section (tic-tac-toe board)
- If planting seedlings—follow the same spacing requirements as above

Number of Seeds Per Square Foot Space

Vegetable	Seeds/ Sq Ft	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC
Bush Beans	9			Mar 15- Apr 1					Aug 1 - Sept 1				
Beets	9		Feb 10 - Mar 1							9/1-15			
Broccoli (transplants)	1		Feb 15 - Mar 1						Aug 20 - Sept 15				
Cabbage (transplants)	1		Feb 15 - Mar 1						Aug 20 - Sept 15				
Cauliflower (transplants)	1		Feb 15 - Mar 1						Aug 20 - Sept 15				
Carrots	16		Feb 10 - Mar 1						8/1 - 15				
Corn	4								8/1 - 15				
Cucumbers	1			Mar 20 - April 1					8/1 - 15				
Garlic	8										10/1 -31		
Kale	4								Aug 25 - Oct 1				
Lettuce	4		Feb 10 - Mar 15						Aug 15 - Sept 15				
Onion Sets	16	Jan 18 - Feb 19											
Peas	8	Jan 18 - Feb 19								Sept 1- Oct 1			
Radish	16		Feb 1- Apr 1								Sept 1- Nov 1		
Potatoes	4	Jan 18 - Feb 17											
Spinach	9		Feb 2 - Mar 4						Aug 1 - Oct 15				
Squash	1			Mar 24 - Apr 15					8/1- 25				
Swiss Chard	4		Feb 10 - Mar 10						Aug 1- Sept 1				



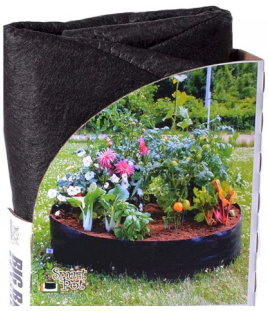
Don't cramp my style!

Containers: Instant Gardens

You're excited about starting a garden...maybe you want to get a small after school garden club going, but you're not sure if the idea will take off. The quickest way to find out is to invest in one or more fabric grow bags.

Unfold, Fill With Soil, Add plants

It's that simple!



- Easy to set up: just unfold, fill and grow
- Warms quickly in the spring, releases excess heat in the summer and provides excellent drainage for healthy plants
- Provides aeration, air pruning roots for vigorous root systems

For a small club, each student can have his/her own smaller grow bag.

For multiple classes, each classroom have their grow bag.

Pre-fabricated beds assemble easily by sliding the boards securely into the corner posts without tools.

Concrete cinder blocks are an inexpensive alternative.

Cap it for seating; paint it for fun!

ALL MATERIALS SHOWN CAN BE PURCHASED IN LOCAL BIG BOX STORES OR ONLINE.

Accessible Gardening

A study of children with disabilities who participated in gardening found that their nonverbal communication skills and situational awareness improved. This helps them better interact with peers, allowing them the opportunity to make connections and form relationships.

Square foot gardening principles can easily be applied by simply putting a “floor” on the garden bed and raising it enough that wheelchairs can easily slide under the table giving the students easy access.

Don't Forget to Check Garden Pathways

Are pathways to and around the garden suitable for use by a student in a wheelchair or ones using other mobility aids? Grass, gravel and other uneven surfaces make it very difficult and sometimes dangerous for these students to navigate safely.

Rollout pathways covers grass, gravel and other uneven surfaces for easy wheelchair and pedestrian access

A few things to think about:

- Use non-slip paving or rollout pathways.
- Make sure your paths are wide enough to take a wheelchair with places to turn or two people walking side-by-side.
- Gradual corners, handrails and gradual slopes are essential for both people with restricted movement and wheelchair gardeners.

Spring Herb Garden

Basil

Several types of basil including Sweet Italian, Genovese and Thai do well in North Texas. Basil is NOT frost or freeze tolerate. Plant in late March or early April from seedlings in full sun. Begin harvesting leaves when plant has at least 6 sets of leaves. Remove flowering stalks to maintain growth.

Oregano

A perennial best added as a transplanted seedling. Varieties include Greek and Italian. Plant in late February or early March in partial to full sun. Harvest when flowers begin to appear. Do not overwater.

Parsley

A biennial herb usually treated as an annual. Varieties include flat-leaf or Italian and curly leaf. Plant seedlings in early March in partial to full sun. Harvest mature leaves as needed.

Thyme

Perennial. Grow seedings in full sun. Several varieties of thyme grow well in North Texas including French and English. Plant in early March. Harvest leaves and flower clusters before first flowers open. Do not overwater.

Spring Flower Garden for Pollinators

Pollinators like open faced flowers that make it easy for them to collect nectar. In North Texas, these desirable pollinator plants include:

- Coneflower
- Engelmann's daisy
- Lantana
- Cedar sage
- Autumn sage
- Bee balm
- Black-eyed Susan

Coneflower

Engelmann's daisy

Lantana

Cedar sage

Autumn sage

Bee balm

Black-eyed Susan

Texas Gold columbine

Marigold

Zinnia

Let's Talk About Water

Students may not have the opportunity to access the garden on a daily basis, but gardens require regular watering for plant growth. Keep in mind that an irrigation system can't typically water every single plant in a garden, so some manually watering will always be necessary, but the amount of manual watering will be much more manageable and enjoyable.

Irrigation system sounds complicated, but it really can be as simple as:

Soaker hoses strategically placed to ensure certain plants stay watered. Soaker hoses are best suited for plants that are arranged in a row, such as vegetables. If a soaker hose will run to a raised garden bed, then try to install the hose as inconspicuously as possible

Drip irrigation kits are practical and relatively inexpensive. Your beds should be located near a water source that you can easily tap into. ***Be sure to check with your school district property management/maintenance department before putting in a drip irrigation system.***

Pre-configured drip irrigation grids set up in just minutes. All that's necessary to install it is to lay it out and connect it to a garden hose, with no need for cutting tubing and adding connectors or inserting emitters (or the use of soaker hoses). In addition to providing an effective watering system, the drip system also serves as a planting grid for laying out garden beds. While this is an easy alternative, it is more costly. Let your budget be your guide.

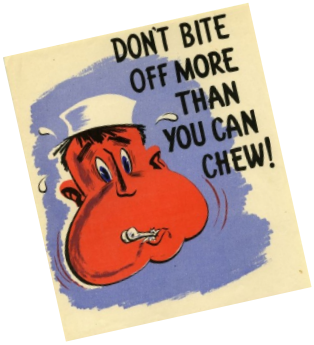
Programmable timers and smart controls really bring an irrigation system to new levels. A spigot timer allows users to water their gardens on a pre-programmed schedule: set it and forget it! These come in all shapes and sizes...and prices.

Don't forget to ask who will water over the holidays/summer? If no one will, pull everything up and put down 3"-4" of mulch.

All materials needed: hoses, drip kits, pre-configured grids and programmable timers can be purchased in any big box store or online.

When plants need a little extra TLC...

never underestimate the power of a kid and his/her watering can.



Downsizing a School Garden/ Outdoor Learning Center

➡ Have you secured administration support and approval?

There were probably several dollars initially put into the garden. He/she will want to know **how** you plan on downsizing and what will be left of an initial big project. It is hard to watch it not work.

➡ Do you have teacher buy-in?

If they haven't been out there because of its unsightliness, would they go out there with their classes if it were smaller and more beautiful?

➡ Are the students involved?

They will have more ownership in this new smaller project if you include them on getting ideas of how to downsize and have them help!

➡ Do you have a development team committed to the project?

Much easier to get a committee of at least 4-5 people who are willing to take on certain aspects of the project. These can be parents, PTA, teachers, scouting programs and students.

➡ What is your funding source?

The garden will still need funds to keep up the part you want to continue to use.
Some funding sources to consider are grants, donations of both labor and materials, PTA fundraiser, inclusion in the school budget.*

➡ What is your maintenance and long-range plan for sustainability?

Have you considered what will happen to the garden during the summer months? Will you let it go fallow or will there be teams to maintain and harvest through the summer months when school is not in session?

➡ How will you promote the project?

Some will be sad to see it go, but maybe just as many to see it downsized so it can be useful again!

➡ Timeline/Schedule

Develop a time-line with realistic goals and stick to it.

**** Fundraiser could be opening up the garden to others who could pay for plants they dig up and take home in the area being phased out the initial garden. Less work for you to do taking it all out yourself and neighbors getting some very inexpensive plants!!***

You've Downsized…Now What?

What do we do with the space we don't need?

Work with your district maintenance department to plant grass in the areas you will no longer use in the garden area. Ask district maintenance department to take back the care of this area.

How do I manage weeds around planting beds?

- Create a walkway around your plant beds with mulch or small pebbles/decomposed granite.
- Cut the weeds/grass down to the soil level with a string trimmer.
- Cover bare ground with cardboard (to discourage the continued growth of grass and weeds).
- Water the cardboard until slightly damp.
- Cover with 3-4 inches of mulch or small pebbles/decomposed granite.

How do I manage the weeds in the flower and edible beds?

Mulch! Cover your flower and vegetable beds with 2-3 inches of mulch to help prevent weeds. Have students work regularly in the garden doing maintenance like pulling weeds. This helps build excitement and community for your school garden. If you have an empty bed (over the summer/winter), fill with 4 inches of mulch. You can also lay cardboard over the top of your soil before adding the mulch.

How do I manage pest issues?

- Insects in the City https://citybugs.tamu.edu/ *is a wonderful resource for your pest problems.*
- Work with your Integrated Pest Management district, campus representative to find out how they can help you with any pest issues. We recommend you work with this department for rodent and fire ant issues.
- For pond pests: put in a mosquito dunk in the pond March-November.
- Aphids on your plants: spray the affected area with a high pressure stream of water; release lady bugs in the garden
- Powdery mildew: spray a mixture of liquid dish soap and water to affected plants.
- Squash vine borers: sprinkle diatomaceous earth at the stem of the plant.
- Neem oil spray can be used to treat whitefly, aphids, Japanese beetles, moth larvae scale, and spider mites. It can also be used as a fungicide rust, black spot, mildew, leaf spot, scab, anthracnose and blight.

How do I maintain the smaller space?

Add compost and mulch in the fall . Add new soil to your vegetable beds in the spring.

Garden in the summer

Have garden work hours in every week or every other week in the summer helps keep the garden in shape throughout the summer. If people come help harvest, trim plants, water, weed, etc. —they get to take home produce! If you don't have summer work hours, then pull all veggies and put down a ton of mulch in the beds.

Workdays

National Junior Honor Society and National Honor Society kids need hours and they work hard when they come to workdays. Reach out to your feeder middle schools and high schools for the sponsor information. During workdays, have a board with jobs posted so you can have people pick something off the board to work on—much easier to manage. Make sure to spell out that an adult must stay for the workday—not a kiddo drop off. Keep work days to 2 hours max, come and go. For scheduling workdays, stick to weekends during the school year. For summer workdays, early morning or evening workdays are best to avoid the heat.

Junior Master Gardener®

growing good kids

The Junior Master Gardener program is an international youth gardening program of the university cooperative Extension network. JMG engages children in novel, "hands-on" group and individual learning experiences that provide a love of gardening, develop an appreciation for the environment, and cultivate the mind. JMG also inspires youths to be of service to others through service learning and leadership development projects, and rewards them with certification and recognition.

WHY should I use the JMG program?

JMG offers proven curriculum written by teachers for teachers. To learn more about research and evidence based program, go to: www.JMGkids.us/RESEARCH

WHAT are benefits of enrolling my class today?

1. It is FREE and without obligation.

2. Students are eligible for JMG certifications and other recognition.

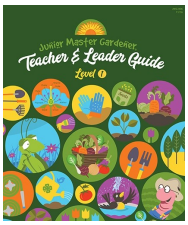
3. Your class is eligible for state and national JMG awards and contests.

4. You are eligible for winning special giveaways of books, garden supplies or other cool stuff!

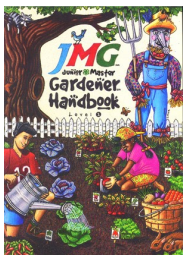
HOW can I start using JMG with my kids ?

If you are a teacher/leader interested in using garden-related content with your students, JMG has a host of curriculum options for you. Once you get your curriculum, you can register your class/group for free. For more info on getting started, go to: www.JMGkids.us/GettingStarted

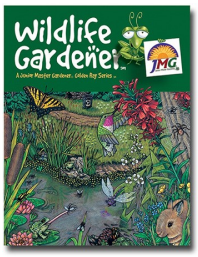
LEVEL 1: Elementary School



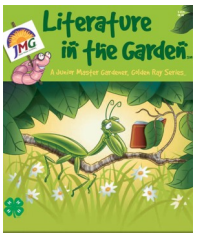
Provides novel, hands-on and proven lessons for elementary-aged youths.



Complements the Level One Teacher/ Leader Guide with independent, discovery learning activities .



Youths are able to become Certified Wildlife Gardeners while strengthening their skills in math, science, language and social studies.



Using quality children's literature to connect kids to gardening and the natural world

Created by teachers and provides multi-faceted garden, nutrition, and physical activities curriculum

LEVEL 2: Middle School

Operation Thistle This module focuses on Plant Growth and Development.

Operation Water: This module focuses on Soil & Water concepts.

Funding Sources

There are a number of ways to raise funds for your garden project for both start-up and sustainability. Below are a few ideas for you to consider.

- ◊ **PTA and Other Parent/Teacher Groups**
- ◊ **Fund Raisers**
- ◊ **Inclusion in the School Budget**
- ◊ **District Education Funds**
- ◊ **Donations**
- ◊ **Grants**

Keep Denton Beautiful Neighborhood Beautification Grants Program provides up to $2,500 in project funding each year for neighborhoods, nonprofits, and other community groups seeking to achieve one or more of the following: Improve neighborhood public spaces; beautify the community; nurture a shared sense of neighborhood identity and community pride.

Kids Gardening Grants: learn more at kidsgardening.org

Youth Garden Grant - Any nonprofit organization, public or private school, or youth program in the United States or US Territories planning a new garden program or expanding an established one that serves at least 15 youth between the ages of 3 and 18 is eligible to apply.

Gro More Good Grassroots Grant - The Gro More Good Grassroots Grant presented by The Scotts Miracle-Gro Foundation and KidsGardening is designed to bring the life-enhancing benefits of gardens to communities across the United States. Grants will be awarded to schools and non-profit groups across the country for impactful, youth-focused garden projects.

Annie's Grants for Gardens - Annie's Grants support new and existing school garden programs.

Bonnie Plants 3rd Grade Cabbage Program - Bonnie's provides free mega-cabbage plants to 3rd grade teachers who want to participate. Students grow the cabbages and submit pictures and measurements of their harvest to be considered for a $1,000 scholarship.

Captain Planet Foundation, Project Learning Garden - Offering many different types of environmental education grants, Captain Planet supports garden programs through Project Learning Garden grants that provide garden supplies and a mobile cooking cart.

Fiskars Project Orange Thumb Grants - Project Orange Thumb provides grants to school and community gardens.

Lowe's Toolbox for Education Grants - Offering a spring and fall grant cycle, Lowe's Toolbox for Education Grants funds a wide range of projects for schools, including support for gardening programs.

Mulch

Tree Shepards

Highland Village

972-317-9598

treeshepards.net

Seeds

- **Dennis' Farm Store:**
  320 Bell Place, Denton 76209
  940-382-1235
- **Baker Creek:** seeds@rareseeds.com
- **Dollar Tree**
- **Home Depot**
- **District "Science" Store**

Art in the Garden

Garden beds don't have to be boring. They can be a wonderful canvas for students to display their artistic creativity. Paint them for fun, make garden signs and plant markers. There are lots of fun things to do while you're waiting for those seeds to sprout! GO CRAZY WITH COLOR! Let the garden be a fun place...ADD A BIT OF WHIMSY!

Thematic Gardens

Salad Garden

- Lettuce
- Spinach
- Carrots
- Radish
- Peas (snow or sugar snap

Pizza Herb Garden

- Basil
- Onions
- Garlic
- Oregano
- Parsley

Butterfly Garden

- Aster
- Milkweed
- Sage
- Summer Lilac
- Coneflower
- Phlox
- Zinnia
- Black-Eyed Susan
- Tickseed
- Lantana

Herb Garden

- Basil
- Oregano
- Parsley
- Thyme

Sensory Garden

- Lamb's Ear
- Cactus
- Sunflowers
- Love-in-a-Mist
- Chameleon
- Swiss Chard
- Mint (in a pot)
- Rosemary
- Chives
- Basil
- Curry
- Lavender
- Oregano
- Silver Sage
- Jerusalem Sage

Pollinator Garden

- Coneflower
- Englemann's Daisy
- Lantana
- Cedar Sage
- Autumn Sage
- Bee Balm
- Black-Eyed Susan
- Texas Gold Columbine
- Marigold
- Zinnia

Adding a pond or water feature to your garden

A pond is a great addition to a garden. It adds beauty, variety and the opportunity to add native aquatic plants and fish to your garden. The sound and vision of running water is pleasant and relaxing. However, it is a lot of work and needs to be carefully thought out and properly constructed. A pond needs a commitment to maintenance, and if not properly designed and constructed, can become a maintenance nightmare and an eyesore.

Things to Consider Before You Decide to Build a Garden Pond

- You must have District and school administration approval prior to beginning your project.
- The pond area may need to be fenced for safety and liability issues. This would be an additional cost.
- A pond needs to be located properly to allow for ample sun and proper drainage.
- Smaller is better for most locations and purposes.
- Access to electricity is a necessity for operating a pump.
- Cost can be significant, a small pond likely would cost upwards of $2000, not including labor.
- You need the advice of someone experienced in construction and maintenance.
- If you decide a pond is worth the effort, be sure some group is committed to regular ongoing maintenance.
- There are many sources of information on ponds. The following link has good general information:

https://www.familyhandyman.com/landscaping/backyard-ponds/build-a-backyard-pond-and-waterfall/

Alternatives to ponds

If constructing a pond is not an option because of monetary constraints, consider other water features for your school garden. Bird baths and drinking bowls will help wild birds and animals in your locality. Students can paint and decorate clay pots, which gives them real ownership of the garden space. Alternatively, there are safe water features using a pump and re-circulated water bubbling through pebbles or round metal balls. Wall fountains and pools in large pots will add extra sensory interest to your school garden without the potential danger of a pond. Prefabricated liners and pump kits are also available in most big box stores.