



# WATERING YOUR SCHOOL GARDEN

Sustainable Gardening Tips for Educators



**Every plant needs water to live, and providing the right amount in the most efficient way possible is an important job for any gardener. Although rain may provide some moisture, you will likely need to provide supplemental water at various times throughout the growing season.**

**Fresh, clean water is not a limitless resource, and water shortages have become common. Climate change is exacerbating the problem, with some regions repeatedly experiencing below-average rainfalls and extended periods of drought. Using efficient watering practices conserves water, boosts plant health, and empowers kids to help protect this precious resource.**

## HOW MUCH WATER DO PLANTS NEED?

Plants use water for important life processes, including photosynthesis and transpiration. Water also aids in the absorption of some nutrients. How much water plants need depends on many factors, including plant species, plant size, maturity level, and environment.

Your plants' water needs will vary. Young plants have shallow roots that are prone to drying out; they need light, frequent watering. Larger plants usually benefit from deep but less frequent watering to sustain healthy growth. Plants growing in sunny, warm, arid, and windy conditions will lose water to

transpiration faster — and thus need more water — than plants growing in cool, humid conditions.

Because too much water or too little water will impact growth, you'll need to monitor water needs. Too little water causes wilting and slow growth and can lead to early fruit and leaf drop. Too much water can lead to root suffocation and promote disease. Tracking rainfall and monitoring soil moisture along with careful observation of your plants is important and will help you determine when supplemental watering is needed.

## COMPARING IRRIGATION TECHNIQUES

The most common irrigation techniques associated with school garden programs are hand watering, sprinklers, and drip irrigation.



### HAND WATERING

Although time-consuming and not always practical, hand watering can be a waterwise and low-cost option, requiring just a hose and/or watering can. It allows you to selectively apply water only to the plants that need it, observe if water is being absorbed by the soil, and alter the flow to prevent runoff.

#### ✓ Benefits and Considerations

- **Selective Watering:** Hand watering allows you to be precise, ensuring that each plant gets the right amount of water.
- **Observation:** This method provides a chance to closely observe your plants and the soil, allowing you to make adjustments as needed.
- **Fun Activity:** Hand watering can be an enjoyable task for students, fostering a sense of responsibility and connection to the garden.

#### ✗ Challenges

- **Time Consuming:** Hand watering may not always be practical. It can be a time-consuming activity, especially when ensuring the garden receives adequate water.
- **Managing Breaks:** Hand watering during school breaks may require significant coordination to prevent the soil from becoming hydrophobic and difficult to rehydrate when school resumes.

#### 💡 Tips for Effective Use

- **Appropriate Equipment:** Choose equipment that is appropriately sized for your gardeners. Remember, a gallon of water weighs 8 lb, so watering cans can get heavy!
- **Adjustable Hose-End Spray Nozzles:** If using hoses, select adjustable hose-end spray nozzles that allow you to stop the flow, control the flow rate, and change the spray pattern.
- **Soil Absorption:** Pay attention to whether the soil is absorbing the water. Adjust your watering technique as needed to ensure the water penetrates the soil rather than running off.
- **Schedule:** Develop a watering schedule to ensure all plants receive enough water, especially during hot or dry periods.
- **Team Effort:** Encourage teamwork by assigning different students to watering duties on different days.
- **Off-Season Care:** Plan for watering during school breaks. You might organize a volunteer schedule or use self-watering systems to keep the garden healthy.



By following these guidelines, hand watering can be an effective and enjoyable way to maintain your school garden, ensuring it remains healthy and vibrant year-round.



## SPRINKLERS



Overhead application sprinklers provide convenience for garden irrigation, although this convenience does come at a cost. Hose-end sprinklers can be an affordable and handy option. Built-in sprinklers, while more costly and requiring additional education for installation, are most commonly used for permanent garden beds. Irrigation controllers may be installed and programmed to provide automated irrigation, ensuring consistent water application to the garden year-round. Some of these controllers can even adjust irrigation schedules to align with plant needs and suspend irrigation during rain.

### ✓ Benefits and Considerations

- **Convenience:** Overhead sprinklers offer the convenience of automated watering, freeing up time for other gardening activities.
- **Uniform Water Distribution:** These systems are designed to distribute water evenly, making them ideal for large garden areas.

### ✗ Challenges

- **Mixed Water Needs:** Gardens with plants that have different water requirements may struggle with overhead sprinklers as water is typically distributed evenly across the area.
- **Fungus and Disease:** Some plants are susceptible to fungus and disease issues caused by continuous wet leaves. Overhead sprinklers can add to this problem.
- **Maintenance:** Regular maintenance is necessary to ensure that spray patterns are not blocked by growing plants, sprinklers are clean and operating properly, and water is not being wasted due to wind drift or overspray onto nearby areas.
- **Efficiency:** Sprinklers are moderately efficient, meaning that water is easily lost through evaporation, wind drift, and inefficient delivery patterns.

### 💡 Tips for Effective Use

- **Assess Plant Needs:** Evaluate the water requirements of different plants in your garden to determine if overhead sprinklers are suitable.
- **Conduct Regular Inspections:** Check sprinklers regularly to ensure they're not blocked or damaged and that they're delivering water efficiently.
- **Adjust Settings:** Use irrigation controllers to adjust watering schedules according to the specific needs of your garden and weather conditions.
- **Monitor for Issues:** Keep an eye out for signs of fungus or disease, and adjust your irrigation practices as needed to minimize these risks.

By considering these factors, you can make the most of overhead sprinklers while minimizing potential downsides, ensuring your garden remains healthy and vibrant.

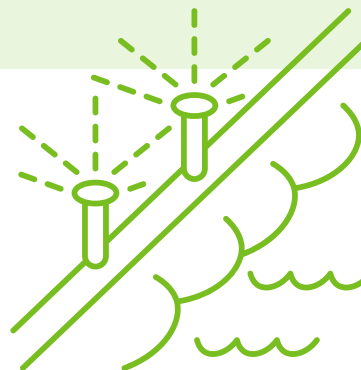


Photo courtesy of Hunter Industries



## SOAKER HOSES AND DRIP TAPE

Soaker hoses apply water through small pores, allowing it to soak in from the soil surface. As a low-cost option for rows and beds of vegetables and annual plants, they can be installed in various patterns within a garden space, from winding shapes to straight rows. Similarly, drip tape releases water through slightly larger, regularly spaced holes that are less likely to clog in regions with mineral-rich water but need to be replaced seasonally.

### ✓ Benefits and Considerations

- **Cost-Effective:** Both soaker hoses and drip tape are relatively inexpensive options for garden irrigation.
- **Flexible Installation:** They can be installed in a variety of patterns, making them a versatile option for different garden layouts.
- **Convenient Automation:** Irrigation controllers can be used to automate the watering schedule, ensuring consistent and timely irrigation.

### ✗ Challenges

- **Pressure Compensation:** Soaker hoses and drip tape are typically not pressure-compensating, meaning that more water is applied closer to the water source than to the end of the hose. This can result in uneven watering of garden beds.
- **Maintenance:** Regular maintenance is required to prevent clogging and ensure that holes are not punctured through the hose during gardening activities.

### 💡 Tips for Effective Use

- **Even Distribution:** Be mindful of the length of the soaker hose or drip tape used. To ensure even watering, avoid using excessively long lengths from a single water source.
- **Regular Inspection:** Check regularly for clogs or punctures. Clean or replace clogged sections as needed.
- **Controller Integration:** Use irrigation controllers to automate and improve watering schedules, adjusting based on plant needs and weather conditions.
- **Proper Installation:** Install soaker hoses and drip tape in patterns that maximize water delivery to plant roots while avoiding excessive overlap that could lead to water waste.



By using soaker hoses or drip tape, you can achieve efficient and effective irrigation for your garden, supporting healthy plant growth and water conservation. Regular maintenance and thoughtful installation will ensure effective, long-term operation.





## DRIP IRRIGATION: POINT-SOURCE DRIP EMITTER IRRIGATION

Point-source drip emitter irrigation slowly delivers water directly to the soil at the base of plants, minimizing water loss from evaporation and wind drift. Offering flexibility in plant type and spacing, this method allows you to customize your irrigation to ensure each plant gets the right amount of water based on its specific needs.

### ✓ Benefits and Considerations

- **Water Efficiency:** By delivering water directly to the root zone, drip systems significantly reduce water waste.
- **Flexibility:** Drip emitters can be spaced according to the specific needs of the plants, allowing for tailored irrigation.
- **Disease Reduction:** Reducing water splash on leaves helps minimize the risk of fungal diseases.
- **Automation:** Like sprinklers, irrigation controllers can be added to drip systems to automate watering schedules, ensuring consistent and timely irrigation.

### ✗ Challenges

- **Cost:** While a drip system is more expensive than a hose and watering can, it's far less costly than installing an underground sprinkler system.
- **Maintenance:** Regular maintenance is required to ensure that drip emitters are functioning properly and have not popped off the distribution tubing, which could create wasteful water jets.

### 💡 Tips for Effective Use

- **Regular Checks:** Inspect the system regularly to ensure all emitters are working correctly and that there are no leaks.
- **System Setup:** Customize the spacing of drip emitters based on plant water requirements and available space.
- **Controller Use:** Use irrigation controllers to automate the watering schedule, adjusting it according to the needs of the plants and weather conditions.
- **Emitter Maintenance:** Keep emitters clean to prevent clogging and ensure efficient water delivery.

By implementing a drip irrigation system, you can achieve efficient and effective watering of your garden, supporting healthy plant growth while conserving water.

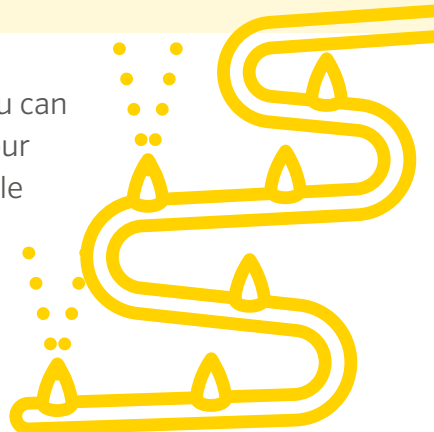
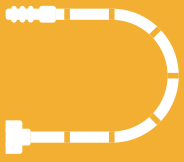


Photo courtesy of Hunter Industries



## DRIP IRRIGATION: INLINE DRIP TUBING

Inline drip tubing combines the technologies of drip emitters and soaker hoses, offering a highly efficient irrigation solution for garden beds. Drip emitters are preinstalled inside a flexible distribution tube at specific intervals to provide even water application throughout the garden bed. This not only enhances irrigation efficiency but also reduces installation and maintenance requirements as the emitters are safely enclosed and less prone to damage from gardening activities.

### ✓ Benefits and Considerations

- **Efficiency:** Preinstalled drip emitters deliver water precisely where it's needed, reducing water waste and ensuring that each plant receives adequate moisture.
- **Flexibility:** Inline drip tubing is highly flexible and can be installed in various patterns, such as rows, winding shapes, or circular layouts, to accommodate different garden bed shapes.
- **Easy Installation:** With emitters already integrated into the tubing, installation is straightforward, saving time and effort.
- **Reduced Maintenance:** The enclosed emitters are protected from physical damage, leading to fewer maintenance issues compared to other drip systems.
- **Automated Irrigation:** When paired with irrigation controllers, inline drip tubing can be part of an automated irrigation schedule, ensuring consistent soil moisture levels for healthy plant growth.

### ✗ Maintenance Considerations

Although inline drip tubing is less prone to maintenance issues compared to other drip systems, some maintenance is still necessary to ensure optimal performance:

- **Regular Inspections:** Periodically check the system for clogs or blockages in the emitters. Clear any debris that may have accumulated.
- **Water Quality:** Use filtered water, if possible, to prevent sediment from clogging the emitters.
- **Winter Preparation:** In regions with freezing temperatures, ensure that the tubing is properly drained or removed to prevent damage from ice growth during the winter months.

### 💡 Tips for Effective Use

- **Plan the Layout:** Design the layout of the inline drip tubing to match the specific needs of your garden bed, ensuring that water reaches all plants evenly.
- **Use an Irrigation Controller:** Incorporate an irrigation controller to automate the watering schedule, adjusting for plant needs and weather conditions.
- **Monitor Soil Moisture:** Regularly check soil moisture levels to ensure that plants are receiving the right amount of water.

Using inline drip tubing, you can achieve a high-efficiency irrigation system that supports healthy plant growth while conserving water. Regular monitoring and maintenance will ensure the system remains effective and reliable over time.







## OLLA POTS

Olla pots have been used for thousands of years to provide supplemental irrigation to plants and crops. These porous, clay pots are buried in the soil and filled with water, allowing the water to slowly absorb into the surrounding soil to support nearby plants. This ancient method offers an excellent educational opportunity for students, demonstrating how traditional irrigation techniques can effectively conserve water.

### ✔ Benefits and Considerations

- **Water Efficiency:** Olla pots provide a slow and steady release of water directly to the plant roots, reducing water waste from evaporation or runoff.
- **Educational Value:** Students can learn about early irrigation methods, water conservation, and the importance of efficient watering techniques.
- **Low Cost:** Olla pots are relatively inexpensive to use, making them perfect for small garden projects.

### ✘ Challenges

- **Impactical for Large Gardens:** While effective for small plots, olla pots are not suitable for larger garden beds, as they can't cover large areas efficiently.
- **Manual Maintenance:** This method requires regular attention to refill the pots, which can be labor-intensive, especially during dry seasons.
- **Limited Coverage:** Each olla pot can only irrigate a small area around it, so multiple pots are needed for even moderate-sized gardens.

### 💡 Tips for Effective Use

- **Strategic Placement:** Place olla pots near plants that benefit most from consistent moisture. This is particularly useful for plants with deep root systems.
- **Regular Monitoring:** Check the water levels in the pots frequently to ensure they are consistently filled, especially during hot or dry periods.
- **Educational Activities:** Incorporate the use of olla pots into classroom activities, allowing students to observe and measure the effects of this irrigation method on plant growth and soil moisture.

Olla pots offer a unique and educational approach to garden irrigation, teaching students valuable lessons about water conservation and traditional farming practices. However, due to their limitations in coverage and need for regular maintenance, they're best suited for small garden plots and educational demonstrations rather than sizable gardening projects. For larger areas, consider using olla pots with other irrigation methods to maximize efficiency and coverage.



# SUSTAINABLE WATERING PRACTICES

However you decide to water your gardens, there are numerous practices and techniques that will help you use water efficiently.



## Carefully Select Planting Locations

Observe the way your site slopes and take note of where water naturally flows downward after rainfall. Place plants with higher water needs at the base of the slope while placing more drought-tolerant plants higher up the slope. Choosing locations where plants are protected from direct sun during the hottest part of the day reduces water loss. Windbreaks protect plants from drying winds.

## Know (and Improve) Your Soil

Clay soils are slow to absorb water, but they tend to hold moisture longer and can become oversaturated. Sandy soils drain quickly, so they dry out faster. Both can be improved by adding compost. Organic matter like compost improves water infiltration in clay soils and boosts water-holding capacity in sandy soils.

## Select Appropriate Plants

Different plants are adapted to differing amounts of moisture, depending on their natural ecosystem, so select plants that match your conditions. Plants that are native to your region are usually a good choice.

## Plant in Zones

Group plants with similar water needs together. That way, it's easier to water all the thirsty plants more frequently than those with lower water needs.

## Apply Mulch

A layer of organic mulch, such as bark chips or pine straw, keeps soil cool, conserves moisture, and helps keep weeds at bay. Plus, as the mulch breaks down, it adds nutrients and organic matter to the soil, supporting the soil ecosystem and improving the soil's ability to absorb water. Mulch also helps prevent erosion during heavy rain.

## Water Only When Needed

Track weather and environmental conditions to better monitor when you need to apply supplemental water. Your garden will need more water during the hot and dry times of summer than it will need in spring, fall, or winter.

## Avoid Watering with Sprinklers on Windy Days

Watering during windy periods increases water loss due to drift and evaporation.

## Apply Water to Soil

Since plants absorb moisture through their roots, it makes the most sense to apply water to the soil. Watering the foliage is inefficient and can lead to disease problems.

## Prevent Runoff

Avoid letting your irrigation water run off onto paved areas or down storm drains.

## Water in the Morning

Irrigate during early morning hours, when temperatures are cool. Much of the water applied in the heat of the day is lost through evaporation. Evening watering can contribute to disease problems because plant leaves stay wet longer.

## Water Deeply

It's better to water plants thoroughly a few times a week rather than a little bit every day. Apply enough water so it soaks in to a depth of 6" to 8" to encourage roots to grow deep into the soil. The exceptions to this are seedlings, shallow-rooted plants, and some fast-growing plants growing in hot climates that benefit from consistently moist surface soil.

## Water Slowly

Even soils with excellent water-holding capacity can only absorb so much water at a time. Applying water slowly allows it to percolate into the pockets of pore space in the soil.

## Water Consistently

Vegetable gardens require consistent moisture to perform and produce. Consider providing adequate water to ensure a healthy garden and learning opportunity.