

Garden Lesson

Topic: Maintaining the Garden

Learning Points:

- The proper amount of water is important to plant growth. Too little or too much will harm the plant.
- How to determine proper watering is important to ensure successful plant growth.
- How to thin seedlings to obtain proper spacing is very important to producing quality crops.
- How to properly remove unwanted weeds reduces plants' competition for water and nutrients.

Common Core Standards:

Science: K-LS1-1: Use observations to describe patterns of what plants and animals need to survive.

Science: K-ESS3-3 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

Science 2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats.

Science 3-LS3-2: Use evidence to support the explanation that traits can be influenced by the environment.

(Apply to the method used in watering and caring for plants and its impact on plant development)

Speaking and Listening K-SL3 thru 3-SL3: Ask and answer questions.....for understanding.

Items Needed:

Soil for soil samples

Measuring cup to measure amount of soil samples

Measuring spoon to measure amount of water placed in each soil sample

5 containers for soil samples

Handwipes/paper towels

Water moisture meter

Bucket of water and watering can for garden in case you need to water or clean tools

Bucket to collect removed weeds

Small container for garden soil sample

Trowel to obtain subsurface soil sample in garden bed(s)

Small scissors for thinning seedlings

Weeders in case you decide to weed areas that have more compacted soil

Planting guide to determine spacing of seedlings

Preparation:

- Place equal amounts (about 1 cup or 250 ml) of the same soil in 5 separate containers
- Using measuring spoon place incrementally greater amounts of water in samples 2 through 5. Sample 1 is kept dry. Refer below for amount of water to add and corresponding moisture level readings. Be sure to mix up soil samples well when you add the water before measuring with moisture meter.
 - Sample 1: Dry soil : No water added. Soil will range from 0 to 1 on the moisture meter.
 - Sample 2: Slightly wet soil : Add 5ml of water. Soil will range from 1 to 3 moisture meter.
 - Sample 3: Moist soil: Add 30ml of water. Soil will range from 4 to 7 on moisture meter.
 - Sample 4: Wet soil: Add 70ml of water. Soil will range from 8 to 10 on moisture meter.
 - Sample 5: Soaking wet soil: Add 100ml of water. Soil will range from 10 or more on moisture meter.
- Decide how you plan for students to see and touch the various samples. You can rotate them, or create more than one set of soil samples, or just have one group designated to handle the soil.
- Decide whether you want to conduct soil sample activity in the classroom or outside.
- Have a procedure for students handling the soils to clean hands.
- In the garden area students will watch a demonstration about how to test for soil moisture (see Demonstration entitled: “Determining Soil Moisture Level”).
- Time permitting in the garden area, students will watch demonstration on how to thin seedlings. See demonstration entitled: “Thinning Plants (and cats)”.
- Time permitting in the garden area, students will watch demonstration on how to pull weeds (see activity description on page 5).
- Decide whether you want to divide class into 3 groups and have 2 or 3 assigned leaders, each presenting one of above topics with students rotating every 5 to 10 minutes.
- **NOTE:** If you plan to do any further seed sowing or seedling transplanting during this session, refer to lessons on planning the garden and planting.

Begin Class Lesson (In the classroom or outdoors):

Questions to create attention/interest: (2 minute)

- Do we know how much water the plants in the garden beds need?
- How are we going to know how much water to use and how often we must water?

Introductory Statements: In classroom or garden (2 minutes)

- Those are the questions we need to answer today. We know that water for plants is critical for their survival as well as our survival. We will learn how much is the correct amount of water for our plants.
- We also want to guard against any unwanted plants stealing needed water and nutrients from our crops. These unwanted plants may be weeds and additional crop seedlings that are growing too close together. Time permitting today we will learn the proper way to remove weeds and thin any crop seedlings that are too close together.
- But first, let's take a look at different samples of soil that have different amounts of water in them. Then you can decide which soil sample has the correct amount of water and which have too little or too much water.

Watering Activity (indoors or outdoors): (15 minutes)

Show students five soil samples that range from dry to soaking wet. They can be described as follows:

- Sample 1: Dry soil feels dry and when you pick some up it will not clump together and will crumble immediately even when you squeeze it. It will read zero on the moisture meter.
- Sample 2: Slightly wet soil feels somewhat wet and when you pick some up it may clump together somewhat, but will easily crumble. It will range from 1 to 3 on the moisture meter.
- Sample 3: Moist soil feels moist, but not soggy and when you pick some up it stays clumped together, but will crumble apart when poked with your finger. It will measure between 4 to 7 on the moisture meter.
- Sample 4: Wet soil does not have standing water, but when you pick some up it forms a wet ball and the water may ooze through your fingers if you lightly squeezed the soil. It will measure between 8 to 10 on moisture meter.
- Sample 5: Soaking wet soil has standing water and when you pick some up the water oozes through your fingers without even squeezing the soil. It will measure from 10 or over on moisture meter.

Let students pick up a small amount of each sample (one at a time) and see/feel the difference in the amount of water, weight and texture of each soil sample. It is suggested they start with the driest sample and work toward the wettest sample. Have paper towels available.

Question:

After students have experienced each soil sample, ask them what sample would be best for most plants. (Best answer is Sample 3 – Moist soil).

Use the moisture meter and place its probe into each soil sample and note the reading. Be sure to wipe the moisture meter probe off after each measurement. You should find that the soil sample labeled number 3 – Moist falls into the middle range (4 to 7), which is our most desirable range for most plants.

Statement:

If you have already conducted the lesson on soil, remind students about soil pores and how pores in the soil is where water and air are stored, but too much water (range 8 and above) may compact the soil and destroy the pores, which threatens the plant's survival. Look at the soaking wet soil sample and note how the soil is compacted compared to the dry soil and even the moist soil. Remind students that too little water (range 0 to 4) may not provide enough water for roots to grow and provide needed nutrients to plant.

Garden Activities:**Statements:** (2 minutes)

While in the Garden remind the students:

- Not to sit or stand in the garden beds. This compresses the soil which makes it more difficult for the plants to grow (less soil pores).
- If students are using gardening tools (may not be needed for this activity) they should hold the tool(s) below their waste and use the tools as intended.
- If there is any electrical wiring, outlets, or panels nearby, remind students to stay away from them.
- Return all garden tools to designated location(s). Note: could have a bucket of water for students to wash dirt off the garden tools before turning them in.

Demonstrations (Total time for all demonstrations = 20 minutes)

The majority of this lesson is having the students check for adequate watering. If time permits they can learn how to thin seedlings and properly remove weeds. You may choose to break into smaller groups and rotate groups from one demonstration station to another to accomplish all three demonstrations.

Measuring Soil Moisture level Demonstration: (10 minutes)

Statement: We just measured 5 different soil moisture levels using the sample soil taken from our garden.

Question: How can we determine what the present moisture level is in our garden beds? (possible answers: Use the moisture meter and/or dig up some of the soil and look and feel it to see how wet it is).

Statement: If we have a moisture meter, but have never determined what the moisture meter numbers mean, i.e. how wet is a number 5 or a number 10, then we may want to manually check the actual soil moisture against what the moisture meter tells us. Then in the future we will know whether the moisture meter is accurate. Here is how we do that.

Refer to the photos and instructions entitled: "Determining Soil Moisture Level"

After demonstration:

Question: What did we learn from the soil moisture testing? (possible answers: soil is too dry, soil is within an acceptable range, soil is too wet). If soil is too dry, time permitting, you can choose to add some water. If so, add the water to the side of the plants, not over the top of them.

Thinning Plants Demonstration: (5 minutes)

Statement: When you plant seeds, especially ones in a row like carrots and radishes, they often will need to be thinned out as the seedlings sprout above the surface of the soil. Once they are about an inch or so above the soil surface you can start thinning them so that your spacing between plants is what you want or what your planting guide or seed packet recommends.

Refer to the photos and instructions entitled: “Thinning Plants (and cats)”.

Pulling Weeds Demonstration: (5 minutes)

1. Let students know that success in pulling a weed is when the entire weed including its complete root system has been extracted (removed) from the soil.
2. The student needs to place his fingers on the ground, grip the base of the weed, and gently pull up at an angle (perhaps even having to pull from different angles) until roots loosen from the soil.
3. If you plan to use tools (hand weeder, trowel, shovel, hoe, etc.) reinforce proper use of the tools.
4. If using a tool insert it near the weed but be cautious not to cut the root off. You want to loosen the soil enough so the weed comes out of the ground more easily.
5. Once removed gently tap the roots on the ground to dislodge any remaining dirt from the root system.
6. Weeds that have flowers or seeds should be placed in your garden trash bins. Weeds that do not have flowers or seeds can be placed in the compost bin.

Wrap Up

Questions: (3 minutes)

- Any questions about what we have done today?
- What is our goal in this garden? (have a good harvest)

Statements: (3 minutes)

To reach our goal of having a good harvest in the school garden or in your home garden requires that you take all the right steps along the way. That means:

- Properly sowing the seeds at the correct depth in good soil
- Properly spacing the seeds and plants
- Choosing locations in the garden bed that protects the more sensitive plants and makes use of companion plants
- Keeping the soil moist, but not too wet
- Giving the seedlings proper lighting
- Thinning the seedlings in rows to ensure proper spacing
- Check for and remove any unwanted weeds
- Check for any problems like pests, which we will talk about later.

Clean Up

Return to class