



GMFTS Summer Garden Activity Guide



Developed by:
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Table of Contents

ABOUT THIS GUIDE	5
GARDENS ARE OUTDOOR CLASSROOMS.....	6
KEEPING THE GARDEN SAFE	7
SUMMER ACTIVITY GUIDE	9
General Activity Ideas	10
Adopt a Plant.....	11
Garden Scavenger Hunt	12
Plant Persona	14
Garden Hand Spans	15
Leaf Spatter Prints	18
Tomato Planet	19
Worm Hunt.....	21
Insect Investigations.....	24
What’s Bugging You?: Performing an Insect Opera	27
Harvest Blanket	28
RESOURCES	29
Garden Chores.....	30
How to Harvest.....	30
Freezing Guide.....	31
Blanching Guide.....	33
Common Garden Pests	35
Other Curriculum & Websites.....	36

ABOUT THIS GUIDE

This guide is a resource for school staff to use during the gardening months. It contains the safety tips we have found most useful when working with children, a garden chore list, a freezing guide for your harvests, and some helpful resources. We have also hand picked some of our favorite activities and adapted them to work at any school. The activities and lessons require few, if any, materials and very little prep time. We hope you find this guide useful.

Enjoy this gardening season!

If you have any questions or comments about this guide, please feel free to contact:

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GARDENS ARE OUTDOOR CLASSROOMS

The garden is an interactive place with purple beans, colorful flowers, and bursting fruits. It's a place for snacks and exploration. Kids have fun and eat a veggie or two, but what are they really learning from digging in the dirt?

- **Curiosity:** The garden is a wonderful place to ask questions that satisfy children's natural curiosity. What do worms do in the garden? Why do plants have roots and how do they work? Why do we have to water plants?
- **Patience:** Seeds and plants take time to grow and change. Tending to tiny seedlings will help children gain patience and understand the rhythm of each day, season, and year.
- **Eye-hand coordination:** There is nothing like digging, planting, and weeding to improve your fine motor skills.
- **Classification:** Compare and contrast plants, group them by color, type of plant, purpose (flower vs. food), and which bugs like which plants.
- **Budding scientists:** As children come up with questions, allow them to work on experiments that tackle those questions. This is the basis of the Scientific Method. What happens if I plant a pansy upside down? How long will it take for a tomato plant to grow?
- **Observation:** Encourage children to comment on what they observe in the garden. Focus on what's changed, what's stayed the same, and what's going on at that moment.
- **Tracking:** Allow students to keep track of rainfall, how fast plants are growing, and temperatures. Eventually, they'll see patterns and consequences, like what happens when it doesn't rain in the garden for a week.
- **Sorting, Counting, and More:** Basic math skills can all be practiced in the garden--sort leaves by shape, count the number of leaves on each plant and compare them, weigh the harvest, measure the length of bean plants, and find basic shapes in the plants.

KEEPING THE GARDEN SAFE

Before students venture into the garden, they need to be aware of the expectations of the garden. All school rules apply in the garden and here are some additional guidelines that we recommend:

1. Respectful Behavior:

- People: Use kind words, be honest, and keep your hands to your self.
- The Garden: The garden is a living thing so we need to make sure it stays alive by walking on the paths, keeping all plants in the ground unless told otherwise, and only eating things an adult says are okay to eat.
- Animals: Insects and animals all play a role in the garden. No insect or creature should be hurt or killed unless told otherwise. If a student finds an insect, they should bring it to an adult for identification. If it is a pest, the adult may give permission to collect or kill the insect.

2. Safety:

- Students should only be allowed to eat fruits or vegetables an adult knows are edible.
- Students should ask an adult before picking or eating any garden plants.
- Students should not climb on garden structures.
- Students should remain within eyesight at all times and not be left unattended.
- Establish garden boundaries that keep a safe distance from roads.
- Be aware of weather conditions and use your best judgment for the health and safety of the students.

3. Safely Use Garden Tools:

- All students must review proper tool safety before each time tools are used.
- Students should use tools for their appropriate jobs in the correct manner.
- The tools are for use in the garden only.
- Students should keep the points of their tools below their waists.
- Walk with the tools pointing down.
- Set the tools face down when they are not being used.
- Students should maintain a "safety circle" (a safe distance from other students) when using tools.
- Closed toed shoes must be worn when using garden tools.
- Clean all tools before putting them away.
- Students should use a watering can to water the garden. Adults should use a garden hose to fill the cans for the students.

4. Wear Appropriate Attire:

- Students and adults must wear shoes all times.
- Shirts must be kept on.
- Closed toed shoes are recommended. If students have open toed shoes, they should be restricted from using tools.

SUMMER ACTIVITY GUIDE

General Activity Ideas

Use the following activities to enrich your class's time in the garden. You can group several together to make your own lesson or pick one to fill 5 minutes between other summer programs.

IN THE GARDEN

Transplanting
Weeding
Sowing Seeds
Harvesting
Seeding in flats
Planting seeds in containers to take home
Search for insects & draw them
Eating edible flowers
Eating edible weeds
Recording weather observations, rainfall
Staking and tying up tomatoes
Removing tomato "suckers"
Seed saving
Mulching
Making compost tea
Watering plants
Thinning plants
Making a scarecrow

GAMES & ACTIVITIES

Food web
Vegetable tag
Carrot, Carrot, Beet! (Duck Duck Goose)
Scavenger Hunt
Trust Walk
Human Knot
Mystery Bag
20 inch hike
Storytelling
Blindfold taste/sniff test
Human Camera
Food Pyramid Games
Make a poster sized puzzle out of the parts of a plant or different vegetables
Puppet worms
Skits
Setting the table and making a bouquet for the table
Make a food systems map of where your food comes from

ARTS & CRAFTS

Making journals
Writing, drawing in journals
Poetry
Making a cookbook
Making paper
Flower crowns or wreaths
Seed jewelry
Making gnomes or fairies
Fairy houses
Mask making
Murals
Banners
Garden flags
Mobiles
Root prints
Leaf rubbings
Pressed flower bookmarks
Bug ornaments
Garden decorations
Make top and bottom pictures for parts of plants
Thumbprint garden creatures

Adopt a Plant

Objective:

Students will observe a plant growing through it's developmental stages.

Students will identify a plant's needs and meet those needs.

Grade Level: K-6

Materials Needed:

- popsicle sticks
- permanent markers
- note paper for journals
- pencils
- gardening tools
- watering cans

Time: 30 minutes every day or once a week

Directions:

Students will "adopt" a plant and care for that plant throughout camp week or the summer. Students can keep track of their plant growth and its needs in a plant journal. You'll find that the students are excited to be a part of the garden and have a role in caring for it.

1. Explain to students that they will "adopt" a plant in the garden. Talk about what a plant needs in order to grow big and strong. What kinds of things can the students do to help the plant grow? Water the plant, weed around it, thin out a row, pull off dead leaves, and harvest when needed.
2. Having each student write their name with permanent markers on a popsicle stick. Walk out to the garden and have them place their popsicle stick in the plant they will "adopt." They will tend to this plant for the week or the summer (depending on the time frame).
3. After the students pick a plant, let them tend to it however they see fit: weeding, watering, etc.
4. When students have looked after their plant, give them paper to make a journal, or give them papers that have been folded over and stapled to make a journal. Allow them to draw their plant and write down their observations. Things to observe and record:
 - a. How the plant is growing
 - b. When you water it
 - c. Changes in the plant as it grows
 - d. Number of leaves
 - e. Color and shape of leaves
 - f. Number of flowers
 - g. Height of the plant
 - h. Movement of the plant
 - i. Signs of pests and diseases
 - j. Taste (if it's edible)
5. Allow time every day or once a week for the students to tend to their plant and record new information.

Garden Scavenger Hunt

Objective:

Students will become more familiar with the outdoor garden area.

Students will use their senses to find new things.

Grade Level: K-6

Materials Needed:

- copies of the Scavenger Hunt worksheet
- pencils or markers

Time: 20-30 min

Directions:

This is a fun activity to help the students explore the garden space on their own or with a partner. Giving your kids a list for a nature scavenger hunt can be fun and educational.

1. Gather the students near the garden and introduce them to the scavenger hunt. In this hunt, they will NOT collect the items on the list; just check them off the list as they find them. Each item has a point value and they will add up the points when they are done. Ask students not to damage or injure any of the plants or insects on the list. You can divide students into pairs or have them work on their own.
2. Go over the boundaries they are allowed to explore and the time they have before giving them the scavenger hunt list and a writing utensil. Wish them luck and send them off. Adults should walk around the area helping students, answering questions, and making sure plants and insects aren't being injured.
3. After a predetermined amount of time, gather all of the students and let them add up their points. The winner/s should be given a prize of some kind such as first in line at snack, title of chief garden master of the day, helper for another activity, something tangible, etc.

NOTE: You can add any items to this nature scavenger hunt list that you think will get your kids looking at the garden and yard in a new way.

Other Items for Hunt:

- Ant
- Beetle
- Berries
- Butterfly or moth
- Caterpillar
- Clover
- Dandelion
- Dragonfly
- Feather
- Flower
- Frog or toad
- Grasshopper
- Insect or bug
- Maple leaf
- Moss
- Mushrooms
- Pine cone
- Rock
- Root
- Sand
- Slug
- Smooth rock
- Snail
- Spider web

Name: _____

Garden Scavenger Hunt

Check off ✓ the items as you find them. When time is up, add the points together for the items you found.

	Item	✓	Point(s)
1.	Bird Feather		2
2.	Pine Cone		1
3.	Moth or Butterfly		3
4.	Caterpillar		2
5.	Largest leaf you can find, 6 inches or bigger		1
6.	Flower-What kind is it?		1
7.	Earthworm		1
8.	Insect Feeding on a Plant-Can you Identify it?		2
9.	Slug		2
10.	Grasshopper		3
11.	Rabbit		4
12.	Hand Gardening Tool		1
13.	Plant with disease or spots on the leaves		3
14.	Snake Skin		5
15.	Seeds from a vegetable or flower		2
16.	Something you could put in a compost pile		1
17.	Weed-What kind is it?		3
18.	Lady Bug		1
19.	A Plant with Fuzzy or Hairy Leaves		4
20.	Vegetable-What kind is it?		1
Total Points:			

Plant Persona

Objective:

Students will use descriptive words and/or drawings to describe a plant

Grade Level: K-6

Materials:

- paper
- colored pencils
- regular pencils
- popsicle sticks
- permanent markers

Time: 20-30 min

Directions:

Students use their senses and practice writing creativity as they invent a name and character for a plant of choice in the garden.

1. Have each child find a plant that is growing in the garden that is interesting to them. Without telling the students about each plant, invite the kids to make up a name for their plant based on the plant's characteristics that they observe. Also, invite students to imagine what the plant is like and what all of its parts are for. Encourage creativity.
2. Each child can draw their plant, write the plant's new name, and describe the many characteristics that they observe and imagine.
3. When kids are finished, have them share their ideas with the rest of the group.
4. You can have the student make new plant markers with their plant's name to place next to the plant.

Garden Hand Spans

Adapted from Math in the Garden: Hands on Activities That Bring Math to Life, by Jennifer White, Katharine Barrett, Jaine Kopp, Christine Manoux, Katie Johnson, and Yvette McCullough, 2006.

Objective:

Students will explore using a hand span, a nonstandard and nonuniform unit of measure.

Grade Level: K-6

Materials Needed:

- Ruler (inches or centimeters)
- Paper
- Pencils

Time: 30 minutes

Directions:

Gardeners often use hand spans, paces, and other nonstandard measures to plant. In this activity, children use their hands and rulers to estimate and measure the length of objects in the garden.

1. Before beginning the lesson, walk through the garden and plan what objects and plants the children will measure using their hand spans. Gather rulers that have a zero labeled at the starting point. For younger children, use rulers that show inches; for older children use a centimeter ruler. If your rulers show both measurement systems, tape over the side you don't want the children to use.
2. Tell the children they will learn methods that farmers have used for thousands of years to measure objects in the garden. Ask, "What do you use to measure the length of an object?" and "What kinds of things might you measure in the garden?"
3. Using your hand, demonstrate the length of a hand span:
 - a. Spread your hand on the surface of a piece of paper and mark the outer tips of your thumb and pinky finger.
 - b. Using a ruler, connect the two points with a straight line and label the length "My Hand Span."
4. Have children demonstrate their hand spans with a partner by holding up their hands (with fingers spread apart), palm to palm, fingers lined up. Do children have the same hand span? Some may; however, many will differ slightly in length.

5. Model how to measure an object using your hand span. Ask a volunteer to measure a second object that is longer than one hand span. Remind the individual to have a fully extended hand span while measuring. As a group, determine how to count partial spans, such as "about half" a span or "a bit more" than a span.
6. Have the children go into the garden on a "Hand Span Hunt" to find three things that are approximately the same length as their hand spans.
7. Regather the group and have the children share what they measured. Ask them how their hand span measurements could help them in the garden. If no one mentions it, point out that gardeners often use their hand spans as a quick way to estimate lengths of things in the garden, such as how much room to leave between plants, stepping stones, and garden beds.
8. Tell the children they will measure the length of their own hand span with a ruler. Knowing their hand span length will allow them to compare hand span measurements among their group.
9. Ask if anyone has used a ruler to measure things and if they used inches or centimeters. Distribute the rulers and ask the pairs to identify the "0" starting point. Depending on the age of your group, ask them to find the 1 inch mark (or the 1 centimeter mark), the 6 inch mark (15 centimeter mark), and 12 inch mark (30 centimeter mark).
10. Have children, with a partner's help, trace their hand spans on a paper, measure their hand spans with a ruler, and record the results. Ask children to report the lengths of their hand spans and compare hand span measurements among the group.
11. Have the pairs go on another hunt to measure three things using their hand spans. Ask them to draw the items in their journals and record the number of hand span lengths. For example: leaf = half a hand span, brick = 1 hand span.
12. Gather the group and have the pairs share what they measured. Show them how to determine the number of inches (or centimeters) for each item by converting their hand spans to the standard units.
13. To give children practice using their new hand span "measuring tool," hold up an item from the garden and ask them to estimate its length. Ask them to record their estimates on their paper in hand spans and in inches or centimeters.
14. As a group, measure the item with a ruler. Have the children record the actual measurement on their paper and compare with their estimate.

15. Give additional objects to the pairs to measure with the rulers. Encourage them to share and discuss their estimates and measurements.
16. Ask the group why knowing how to measure with your hand span is a useful skill. What are some things at home you could measure with your hand span? Dinner plate, television screen, pet, height of a stair, pillow.

Additional Activities:

- Hand Span Planting: Have the children use their hand spans to measure the length of a planting bed. Use hand spans to space the seedlings in the bed.
- Brown Bag Secret: Hide a long vegetable like a zucchini in a brown bag. Tell children that the mystery vegetable is safe to touch. Pass the bag around so that everyone has a chance to reach in and feel the object. When they touch it, they are not to say what it is, rather they are to silently estimate how long it is in inches. After everyone has had a chance to estimate its length, ask what they think is in the bag. Reveal the object and ask a pair of children to measure it. How close were they in their estimates?

Leaf Spatter Prints

Adapted from Shelburne Farms Project Seasons: Hands-on activities for discovering the wonders of the world., by Deborah Parrella, 1995.

Objective:

Students will outline the edges of garden leaves with a splatter painting technique.

Grade Level: K-4

Materials Needed:

- Painting smocks or old t shirts
- leaves from trees or garden
- newspaper as a drop cloth
- large pieces of white paper
- cardboard
- tape
- straight pins
- old toothbrushes (one for each student)
- Popsicle sticks
- Paint and paint containers or plates

Time: 15-20 mins

Directions:

Using a special painting technique, students will "paint" the outline of a leaf or set of leaves they arrange.

1. Students should wear smocks and cover the surrounding work area with newspapers for this activity.
2. Have the students tape a sheet of white paper to a board of large piece of cardboard. Next the student or adult can pin a leaf or leaves securely to the paper.
3. Show students the painting technique and then allow them to do it. First, you dip an old toothbrush in paint. With the bristles pointing downward towards your paper, use a Popsicle stick to scrape across the bristles to spatter the paint. Using this technique, work around the edges of the leaf and over the surface of the paper. Encourage them to experiment with different colors of paint.
4. When the paint has dried completely, they may remove their leaf.

Adaptation: Make spatter prints on cloth to create garden banners.

Tomato Planet

Adapted from Shelburne Farms Project Seasons: Hands-on activities for discovering the wonders of the world., by Deborah Parrella, 1995.

Objective:

Students will learn about seed survival rates and what seeds need to grow.

Grade Level: 2-4

Materials Needed:

- Cherry tomatoes
- plastic knives
- paper plates
- index cards
- marker

Time: 30 minutes

Directions:

Students will learn about the environmental conditions that lead to successful seed germination in a fun activity using cherry tomatoes.

1. Ask the students what is inside the fruit of plants. (Seeds.) How many seeds are inside? Is there the same number of seeds inside similar fruits? (It can vary from plant to plant.) Explain that they will do an activity to find out about the number of seeds produced by a plant and how this relates to seed survival.
2. Group the students in pairs. Each student gets a cherry tomato. Ask how many seeds they think are inside. Have them each record their guess. Review the guesses as a class.
3. Have the students cut their tomato in half and count the seeds inside one half of their tomato and then the second half. Have them add up the numbers in each half. How do these numbers compare to their predictions?
4. Ask the students how many seeds it takes to grow one tomato plant? (Just one seed.) Write the word *seed* on an index card. Ask the students what kinds of things will help this seed to germinate and grow into a healthy plant. (Sunshine, space, good soil, water, fertilizer, weeding, warm weather, clean air, time, etc.) Record each idea on a separate index card. When you have listed as many positive growth conditions as the class can generate, duplicate or triplicate some of the ideas until you have used 2/3 of the cards.
5. How many tomato plants could they potentially grow? (The same number of plants as there are seeds.) Explain that one cherry tomato plant can have as

many as 50 cherry tomatoes. How many plants could they grow from the seeds of all those cherry tomatoes, assuming they all have the same number of seeds? (The number of seeds multiplied by fifty.)

6. That's a lot of tomatoes! Why tomatoes aren't growing everywhere? Record possible hazards to the seed germination and growth on the remaining index cards. (Drought, too cold, too wet, weeds, disease, cold, animals eating seeds, etc.)
7. Explain that they will now be enacting the risky life of a little seed. Pass out the index cards to the students. Explain that one or two students are seeds and the rest are positive and negative growth conditions. Explain that they should look at their card but keep the information on it a secret. In a large space set up four bases equally spaced apart or use a baseball diamond. Explain to the students that when you say "Go!", they should run around the bases in a circle. When you say "Stop!" they could run to the nearest base.
8. Ask the "seed" to reveal where it has landed. Ask the other students to reveal the conditions on their cards. Have the students determine whether or not the seed is able to survive and grow in this spot. Check the conditions on the other bases to see if the seed could have possibly germinated.
9. Collect the cards, reshuffle and distribute them again to play another round. Was the seed able to survive this time? Play the game a few more times and be sure to keep a tally of the seeds survival rate. As a conclusion, ask the students why high numbers of seeds are produced.

Worm Hunt

Objective:

Students will learn the anatomy of the worm and how it helps them live in the soil.

Students will observe worms and how they interact with their environment.

Grade Level: K-6

Materials Needed:

- Containers to hold worms
- Wet paper towels
- Paper
- Pencils or colored pencils
- Magnifying glasses

Time: 30-40 min

Directions:

During an earthworm hunt, students will get to see earthworms and where they live. Back inside, they will get an up close look and learn about their anatomy.

1. Take students outside near the garden and explain to them that they will be searching for worms. Review respectful behavior in garden and towards garden animals.
2. Identify areas with different soil types, terrain, rocks etc.
3. Split the students into groups and have each group dig in different places in search of earthworms. Have containers with soil for them to carefully place their earth worms in. *If you place a worm in a container without soil, they will dry out quickly and die.
4. Explain that they might have to dig kind of deep; earthworms are nocturnal feeders and typically spend their days with their heads just below the soils surface often with a pebble or piece of leaf drawn over the opening of the burrow for protection. However, if it is really cold the earthworms will retreat below the frost line where they lie coiled up in an enlarged soil chamber.
5. Compare the different amount of worms found in different locations.
6. Take the worms inside. Ask: *Where did we find the most worms?* Healthy, good soil with lots of organic matter for them to eat. *What was the soil like there? Where do worms like to live the best?* In deep, dark, long, and narrow tunnels or burrows under the ground.
7. Have each student take a seat at a table.
8. Pass out moistened paper towels for the desk surface.
9. Pass out a worm to each student to place on the paper towel so they do not dry out. If a worms skin dries out it will die because earthworms' blood absorb oxygen through their moist skin.
10. Pass out papers if you wish to have the students draw their worms.

11. Now let's take a closer look and add more details! Pass out magnifying glasses.
12. Tell students that there are four main types of worms: Flatworms, Ribbon worms, Roundworms, and segmented worms.
13. *Which type do you think we are looking at?* Segmented. If they look really closely they can see the segments. FUN Facts: Most segmented worms live in the sea. The leech or the "blood sucker" lives in fresh water and is also a segmented worm.
14. Have each student look through the magnifying glass and see how many parts of their worms they can identify. Have students add details to their drawings as they go. Here are some parts and interesting facts about worms:
 - a. **Body segments:** Worms are divided up into about 150 ring-like segments.
 - b. **Head:** The head end tapers to a point and the tail end is capable of broadening out. It is not necessarily true that if you cut a worm in half it will turn into two worms. It depends on the species and where it is cut. Depending on where you cut most worms, it may be able to regenerate one half of itself. For example, sometimes the worm holds on so tight and the robin pulls so hard that the worm comes apart! The robin keeps the front end and the hind end wriggles back into its burrow. If the bird pulled off the first 7-8 rings of the worm's body, new segments will grow back.
 - c. **Mouth:** Worms have an overhanging lip like a flap that protects the mouth until its ready to eat. The flap helps pull food into the mouth.
 - d. **Setae:** Each segment on the worm has 2 pairs of special bristles called setae (pronounced SEE-tee). They help the worm move through the soil. Imagine a robin tries to pull an earthworm out of its burrow, the worm will use the bristles to hold on tight to the walls of its tunnel in the soil. If students wet their fingers and run them down both sides of the worm, they may feel the short stiff bristles. You can also pass out a dry paper plate and have each student be completely silent as they place their worms on the plates to wriggle around they listen to the sound that the bristles make, it is a faint scratching noise.
 - e. **Clitellum:** The clitellum is the fleshy band around the worm's body. Worms are hermaphroditic, they have both male parts and female parts, but still need another worm to reproduce. Two worms line up next to each other facing opposite directions where they have a swollen band, or clitellum, around them. They trade mucus and then wiggle off. The clitellum will then begin to swell. The worm will wiggle out of the clitellum and it will close up on each end, forming a cocoon. Inside of each cocoon are 2-20 baby worms! You can find the clitellum closer to the head than the tail.
 - f. **Muscles:** Although you cannot see the muscles, they are the secret to how earthworms move. While the worm is wriggling and moving around notice how it moves. The worm has 2 layers of muscles; ring shaped ones that stretch around its body like many belts, and strong muscles that run

from one of its ends to the other. The ones running around the body make it thinner and longer, and those running end to end make the worm shorter and thicker.

- How it moves in detail: using its ring like muscles it makes itself longer and thinner, then it anchors the front of its body with its setae and then it pulls its rear end forward with the end to end muscles that make it shorter and thicker, then its repeated over and over!

- g. **Eyes:** Ask the students if they see any eyes on the earthworms. They do not have any! Instead they have light sensitive cells scattered in their outer skin. The cells do not allow worms to see images, or forms, but they do give their skin the capacity to detect light and changes in light intensity. So, although the earthworm cannot see the robin, he can still avoid the robin all together because he can feel the vibrations of the bird as it touches the surface of the ground.
 - h. **Hearts:** Find a light colored worm. Wet its upper surface and use a magnifying glass to observe the surface that is near the head. Look close enough and you will be able to see the worms FIVE beating hearts through its skin.
 - i. **Brain:** Earthworms have simple brains which only specialize in directing its body movement in response to light.
 - j. **Lungs:** Earthworms have no lungs, as stated before they breathe through their moist skin, and their blood absorbs oxygen. Their skin must be moist for this to happen. If worms dry out, they die.
 - k. **Gizzard:** When a worm eats soil or organic matter what happens to it? Does it have a stomach, esophagus, intestines, etc? The earthworms' digestive system is very different from ours; it is more like that of a chicken. A worm needs to eat sand or small pebbles to crush its food up.
 - l. **Lifespan:** Most worms live about 1 year.
15. When students are done observing the worms, safely put them back in the containers with soil and release them in the garden. They will bury themselves. Make sure students wash their hands when they are through.

Insect Investigations

Objective:

Students will learn the anatomy of an insect.

Students will explore the garden for insects.

Grade Level: K-4

Materials Needed:

- Sticky dots or colored paper dots with tape on back (at least 7)
- Pipe cleaner antennae (at least one set)
- Straws
- Paper wings (if wanted)
- Jars or containers with lids to catch insects
- Magnifying glasses if available
- Insect field guides or printed off insect pictures from the internet

Time: 30 minutes

Directions:

Students will learn about the parts of an insect by pretending to be one. Then, students go out to the garden to find their own insects and observe the anatomy they just learned.

1. Have students sit in a circle, then choose three students to come forward and stand in a line with their hands on each other's shoulders (like a train). Inform them that they are going to be an insect, and that each student will be one of the three segments of an insect's body.
2. Tell the first student in line that s/he is the head. Ask the group what parts of the insect's anatomy they think are located on the head. As they come up with answers, add the part to the "head" student.
 - Eyes: Insects have two kinds of eyes. The two big ones that are easy to see are called *compound eyes*. These are made up of many facets, so what an insect sees is similar to what we see if we look through a kaleidoscope. These eyes are good at sensing movement – especially important for hunting. Insects also have three *simple eyes* which look like little holes in the middle of their heads. You can add a sticky dot or circle cut out with tape to their head forehead. These eyes can only sense light and dark.
 - Antennae: Antennae are the noses and fingers of the insect. They use them to smell and feel the world around them (they do not have eyes on the tops!) Add a pipe cleaner antennae headband and place it on his/her head.
 - Mouth: Insects have different kinds of mouths depending on what they eat. Insects that suck plant juices, nectar from flowers, or blood have *piercing-sucking* mouth parts that are like straws (give them a straw for their mouth).

Insects that eat food that needs chewed up have *mandibles* which work like our mouths except they open in the opposite direction (have students turn their hands into chomping mandibles).

3. Tell the second student in line that they are the *thorax* or middle section of the insect. The thorax is where the action is! Ask students what parts they think might attach to the thorax.
 - Legs: The insect's legs attach to the thorax. Have the students count how many legs the insect has (6). All insects have six legs. Ask if a spider is an insect (no, it has 8 legs).
 - Ears: Insect's ears are little holes on their hind legs! (add a sticky dot or a cut up circle with tape to each knee of the third student in line)
 - Wings: The insect's wings (if it has any) are also attached to the thorax (add paper wings or have them use their arms).
4. Tell the third student that they are the *abdomen* of the insect. What important insect parts might be in the abdomen?
 - Internal Organs: The abdomen has all of the internal organs inside it. It's also where the insect breathes through a row of little holes called *spiracles* on each side of the abdomen (add 3 or 4 sticky dots or cut up circles with tape down each side of the third student).
 - Skeleton: insect's skeletons are on the outside of their body, instead of the inside like ours. They are called *exoskeletons* and look like a hard shell over the insect's body. The exoskeleton is made from the same material as fingernails.
5. Have the rest of the students make groups of three people, and form up into heads, thoraxes, and abdomens. Have them try walking around the room. Young children enjoy singing "The Ants Go Marching" while they walk. If time, you can play Simon Says with the students in "insect" groups.

Examples:

Simon says, "eat like a fly" (head student mimes vomiting on then sponging up food)

"Fly around the room" (run around the room)

"Listen to me whistle" (point knee "ears" at sound)

"Munch with your mandibles"

"Breathe through your spiracles"

6. Take the children to the garden to find their own insects to observe. Remind them to be considerate of the insects. They should observe the insects *without picking them up* if possible. If they need to catch their insect to make it hold still enough to watch, try to catch it without touching it. Demonstrate catching the

insect by chasing it into the jar using the jar lid. Ask them to find some of the body parts they just learned, and try to discover what the insect is doing.

7. Distribute magnifying glasses if you have them and/or bug collecting jars to students. Have students work in pairs if don't have enough equipment.
8. Bring along clipboards, paper, and pencils for drawing insects, and field guides or print offs for indentifying what you find.
9. Gather the children together and ask them what they found. Could they find three sections on the insect's body? Did they find any animals that were not insects? What kinds of insects did they find? What were the insects doing?
10. Take time to gently release the insects back into the garden. If they are pests and harmful to the garden, release them away from the garden.

What's Bugging You?: Performing an Insect Opera

Adapted from Digging Deeper: Integrating School Gardens into Schools and Communities, by Joseph Kiefer and Martin Kemple, 1998. Lesson pioneered by Erik Nielson, music teacher at Waits River Valley School, VT.

Objective:

Students will use musical and theatrical skills to create an opera.

Students will use scientific knowledge about the anatomy, habits, and life cycle of both "harmful" and "beneficial" insects.

Grade Level: K-6

Materials Needed:

- Natural and prefabricated materials for costumes
- A set or stage
- props for recreating a garden on stage

Time: 1hr - One day

Directions:

The wonderful thing about this project is that there is something for every student: the observer of nature, the visual artists, the ham, the singer, the rhymer, the drummer, the carpenter -- each can have an important role in the creation and development of the opera. The process will teach children about problem solving and group decision-making.

1. Students create a simple narrative describing any aspect of the insect world that they would like to depict: a basic predator-prey relationship involving insects in the garden, a symbiotic relationship, etc.
2. Add elaborate variations to the story (i.e. other insects that are harmful to plant life could appear, or the garden could be sprayed with an insecticide, etc.)
3. Students choose which insects or plant to play and make costumes detailing the exact anatomy of the insect or plant.
4. Through improvisation, students make up their own movements, dialogue (if desired), dance, and music. This can be done in small group or individually - writing, brainstorming, or acting it out.
5. Students develop appropriate scenery.
6. Rehearse, rehearse, rehearse! Improve the script each time.
7. Perform for different types of audiences: students, parents, seniors, etc.

Harvest Blanket

Adapted from Shelburne Farms Project Seasons: Hands-on activities for discovering the wonders of the world., by Deborah Parrella, 1995.

Objective:

Students will learn examination and description skills by identifying fruits and vegetables without using their sight.

Grade Level: K-5

Materials Needed:

- A collection of different fruits and vegetables harvested from the garden
- A paper grocery bag
- A large blanket

Time: 30 minutes

Directions:

Before the activity, collect a variety of fruits, vegetables and seeds typically harvested in your area and store them in a paper grocery bag so the students can't see them.

1. Spread out the blanket and place under it one vegetable, fruit, or seed from the collection you have assembled in the paper grocery bag. Make sure that students can't see what's under the blanket.
2. Ask five or six children to sit or lie on their stomachs around the blanket. The rest of the children should make a circle around the outside of this group.
3. Have the children put their hands under the blanket. Explain that they will be passing a fruit, vegetable or seed around the circle underneath the blanket. Each student will get a chance to handle the object.
4. Explain that each student will feel the object and give an adjective or clue to describe it. With younger students, ask specific questions to elicit adjectives. Is it hard or soft? Long or short? Big or little? After all the student have given an adjective or clue, have the rest of the class try to guess what fruit, vegetable or seed it is. Does the group who felt the object agree? Why or why not?
5. Reveal the object and let another group of children take a turn feeling and describing a new object under the blanket.
6. Use the fruits, vegetables and seeds to make a snack.

RESOURCES

Garden Chores

- **Watering:** If the soil is dry, use watering cans and/or hoses to water the garden. You may need a key to the outdoor spigot or the garden shed. For safety purposes, only an adult should handle the outdoor spigot or hose.
- **Weeding:** Vegetable beds are labeled so you know exactly what is meant to be growing there. If there is a weedy patch, please show students the exact plants to pull and not pull. Getting the roots is the most important part so they don't grow back. It is fun to make a game out of it—pull the weed with the longest root! All weeds should be put in compost pile.
- **Tomato Trellising:** Tomatoes should be held up by twine. As tomatoes grow, weave them through the trellis or tie them up with more twine as support.
- **Pest Control:** Remove and squash potato beetles and other insects that are eating plants. Please leave insects that are not harming the garden. They make good friends. (See Common Garden Pest info sheet.)
- **Path upkeep:** Make sure pathways have mulch (hay or straw) and are clear of runaway plants.
- **Deadheading Flowers and Herbs:** Pinch below dried up flower to remove or, if on a long stem, cut at base of stem. If herbs such as basil develop flowers, deadhead them as well.
- **Harvest ripened fruit**



How to Harvest

The produce growing in the garden is for the school cafeteria. Most of the crops are planted to be fall-ready such as beets, carrots, winter squash, tomatoes, etc. There are a number of vegetables, though, that can be harvested throughout the summer. These include:

- **Broccoli and Cauliflower:** Slice with knife before flower buds open.
- **Cucumbers:** Pick when fruit is 4 to 6 inches long.
- **Herbs:** Pinch leaves or stems, leaving $\frac{3}{4}$ of leaves on the plant to encourage regeneration.
- **Kale and Swiss Chard:** Cut or snap off individual leaves at any stage, starting with the outer leaf. Leave at least 4-5 leaves so new leaves will grow.
- **Lettuce:** Pluck individual leaves or cut lettuce by gripping a bunch gently in one hand and cutting about 1-2 inches from base with knife. Leave some leaves for a continuous harvest.
- **Peas:** Harvest when peas enlarge in the pods.
- **Peppers:** Pick when they have reached full size and feel like they will crack when squeezed.
- **Radishes:** Pick when roots are the size of a large marble.
- **Spinach:** Pick individual leaves by pinching stem. Leave some leaves for a continuous harvest.
- **Tomatoes:** Pick when they are a deep red, orange, or yellow (depending on variety).
- **Zucchini and Summer Squash:** Cut or twist off young fruit (about 4 inches). Harvest regularly.

Please enjoy sharing and eating what you harvest from the garden with the students and other community members. Other vegetables not listed above will be harvested in the fall for the school cafeteria.

Freezing Guide

Freezing is an important step when preserving fresh foods for future use and to help extend the local harvest year round. We've included this guide on proper freezing techniques to help ensure that produce remains as nutritious as possible!



General Instructions

Choose vegetables that are young and tender. Wash well and rinse twice in fresh water each time to remove dirt. Trim away any bad areas, tough stems, and leaves. Cut into desired sizes. Work quickly in small batches.

Blanching

Although freezing slows enzyme action, it doesn't completely halt it. Blanching, a heat treatment to inactivate the ripening enzymes in vegetables, preserves their color, texture, and flavor for nine to twelve months in the freezer.

Most vegetables can be either water or steam blanched before being frozen. Start timing the blanching action when the water returns to boiling after putting in the vegetables (see following page for blanching times). After blanching, plunge the vegetables immediately into cold (preferably ice) water for the same time as you blanched the vegetable. *This cold bath stops the cooking action.*

Labeling and Storing

Label packages with the name of the product and the freezing date. To make the most out of your freezer space and to ensure that no frozen produce goes to waste, store your frozen produce in uniform packaging so that it stacks easily. Organize according to date, so that the things that expire the soonest are in the front of the freezer and easily accessible for everyday cooking.

Freeze at 0° F or lower. Most vegetables maintain high quality for 8 to 12 months at 0°F or lower. Longer storage will not make food unfit for use, but may impair quality. If you find that some vegetables did not freeze well, try using them for baking!

It is a good idea to post a list of the frozen vegetables near the freezer and to check off packages as they are used with the date that you run out. This list will serve as a good future reference for what your kitchen uses a lot of and how quickly each item gets used so that next year you can make the most of the harvest season!

Remember, frozen vegetables should be cooked without thawing.

Did You Know...?

Blanching time is crucial and varies with the vegetable and its size. *Underblanching* stimulates the activity of enzymes and is worse than no blanching. *Overblanching* causes loss of flavor, color, vitamins and minerals. **See the following page for correct blanching times.**

Blanching Guide

Vegetable	Preparation	Blanching Time (min)
Asparagus	Wash. Sort according to thickness. Compost tough part of stalk. Cut into even lengths. Blanch and cool.	Small: 2 Medium: 3 Large: 5
Beans Snap, green, or wax	Wash. Remove ends. Cut as desired. Blanch and cool.	3
Beets	Wash and sort according to size. Trim tops, leaving 1/2 inch of stems. Cook in boiling water until tender. Cool, peel, remove stem and root.	
Broccoli or Cauliflower	Wash. Trim flowerets to 1-1.5 inches across. Blanch and cool.	Water: 3 Stream: 5
Brussels Sprouts	Select green, firm and compact heads. Trim, wash, and sort according to size. Blanch and cool.	Small: 3 Medium: 4 Large: 5
Carrots or Parsnips	Remove tops, wash and peel. Cut as desired. Blanch and cool.	Whole: 5 Cut: 2
Corn On-the-cob Whole kernel	Husk, trim, remove silk and wash. Blanch and cool. Blanch corn on the cob. Cool, then cut about 2/3's the depth of the kernel	Small: 7 Medium: 9 Large: 11 4

Greens (all kinds)	Select young, tender leaves. Wash thoroughly. Blanch, cool and drain	2 Collards: 3
Herbs	Wash drain and pat dry. Freeze in a freezer bag to use in cooked dishes.	
Melons/Berries	Cut, seed. Slice as desired, spread on tray and freeze overnight. Transfer to a freezer bag for easy storage.	
Peas, green	Use young, tender peas. Shell, blanch, and cool.	1.5
Peas, edible pods	Select flat, tender pods. Wash. Trim. Leave whole. Blanch and cool.	Small: 1.5 Large: 2
Peppers, bell or sweet	Wash, stem and seed. Cut as desired. Spread on a tray and freeze overnight. Pack in a freezer bag for storage.	
Pumpkin or Winter Squash	Cut into pieces and remove seeds. Cook until soft. Remove pulp and mash. Cool quickly by placing pan in cold water. Package and freeze.	
Summer Squash	Wash and cut into 1/2 inch slices. Blanch and cool.	3
And Zucchini	Wash and grate. Steam blanch small amounts. Cool by placing containers in cold water.	Steam 1—2
Tomatoes	Wash and dip into boiling water for 30 sec. to loosen skin. Peel and core. Freeze whole or in pieces.	

Common Garden Pests

If you see any of these pests in the garden, please squash them and make a note in the garden journal. If there seems to be a massive invasion, please inform your GMFTS staff.



POTATO BEETLE and EGGS



WIREWORM



CABBAGE WORM



JAPANESE BEETLE and LARVAE



SQUASH BUG and EGGS



CUCUMBER BEETLES

Other Curriculum & Websites

CURRICULUM GUIDES

Jurenka, Nancy Allen & Blass, Rosanne J. *Beyond the Bean Seed*. Teacher Ideas Press, 1996.

Kiefer, Joseph & Kemple, Martin. *Digging Deeper*. Food Works, 1998.

Parrella, Deborah. *Shelburne Farms Project Seasons*. Shelburne Farms, 1995.

WEBSITES

Got Dirt? Garden Toolkit for Implementing Youth Gardens

- Produced by WI Department of Health Services
- Basic steps for starting a garden, gardening examples and resources

http://www.dhs.wisconsin.gov/health/physicalactivity/pdf_files/GotDirt_09.pdf

KidsGardening.org Activity Keyword Search

- Search for garden activities or classroom stories about a variety of topics

<http://www.kidsgardening.com/Dig/dig.asp?act=t>

The Lunch Box Curricula & Classes

- A list of garden curriculum to download (with or without cost)

<http://www.thelunchbox.org/resources/curricula-and-classes>

The Science Spot: World of Insects

- Several identification guide links to choose from

<http://sciencespot.net/Pages/kdzinsect.html>