# Garden Timeline

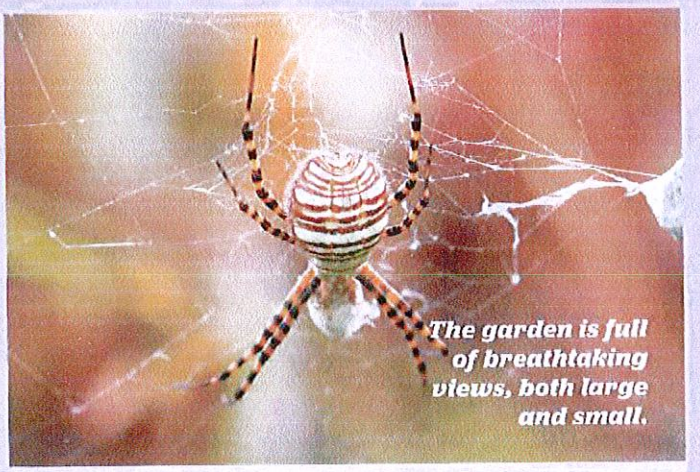
| Month | Garden Events | Learning Activities<br>K-2 | Learning Activities<br>3-5 |
|---|---|---|---|
| August | • Same as July<br>• Fall garden preparation should be started such as tilling the plot and fertilizing<br>• Some of the fall garden can be planted mid-August. | Norms<br>Scavenger Hunt<br><br>**Welcome to the Garden!**<br>**Rainbow Chips!**<br>**Finding Color in the Garden**<br>**Senses in the Garden** | |
| September | • Most summer crops will stop producing as well but can produce all the way up to first frost<br>• First of September should have fall garden planted | Got 1 & ½ dozen another<br>Rainbow Chips – see download<br><br>**Welcome to the Garden!**<br>**Observation and Senses in the Garden. "6 of one, half dozen of the other"**<br>**Need: Egg Carton programmed with antonymns . Team work**<br>**Norms and Safety** | |
| October | • Compost will be winding down as will most if not all summer crops<br>• Fall garden will be producing | Pumpkins<br>Bug Identification & Hungry Caterpillar<br>Insects and Bugs – wheat grass<br>Good Insects/Bad Insects<br><br>**Insect and bugs** | |
| November | • Plant garlic<br>• Plant all crops in a high tunnel so they can establish and overwinter | Stone Soup<br>Cooperation<br><br>**Root View Cups**<br>**Soils lesson-space travelers**<br>**Stone Soup** | |
| December | • Very little to do in the garden this time of year | Milk Jug Planting<br>Bird Feeders<br><br>**Milk Jug planting** | |
| January | • Reseed winter crops for constant harvest<br>• Start another round of winter seedlings in heated greenhouse for transplant<br>• Monitor weather for freezing temperatures, remove hose/faucet avoid damaged equipment | Measurement<br>Seed Tape<br><br>**Pine Cone Bird Feeders** | |
| February | • Reseed winter crops for constant harvest<br>• Plant brassica culitvars (kale, broccoli, cabbage), leafy greens (salad stuff), peas, etc in outdoor beds.<br>• Monitor weather for freezing temperatures, remove hose/faucet to avoid damaged equipment | Seed Sort<br>Measurement/Depth…<br>Plant Flats<br>Seed Bombs<br><br>**Make seed tape**<br>**Measurement Activities.** | |
| March | • Reseed winter crops for constant harvest<br>• Monitor weather for freezing temperatures, | Plant Potatoes<br>Plant Onions<br>Potato Prints<br>Read Tops and Bottoms by Janet Stevens | |

| | | | |
|---|---|---|---|
| | remove hose/faucet to avoid damaged equipment<br>• Restart composting<br>• Start summer seedlings (tomatoes, peppers, etc) in a heated greenhouse for transplant<br>• Plant white potatoes | **Plant potatoes, beets**<br>**Read Tops and Bottom and discuss plants that grow above and below.**<br>**Review plant parts** | |
| April | • Stop seeding winter crops<br>• Composting going strong with longer daylight hours<br>• Frost should be gone by the end of the month but keep non frost tolerant cultivars under row cover or in a high tunnel | Flower Pounding<br>Book Marks<br><br>**Weather Lesson and Watering Lesson**<br>**If weather is bad, make Garden stones for an Art project** | |
| May | • Transplant summer seedlings to the garden when temperatures at night are above 50 degrees<br>• Winter crops should still be producing but trailing off as temperatures rise.<br>• Also a good time to plant any herbs (basil, thyme, rosemary, etc.)<br>• Corn can be planted | Celebration Month<br>Stone Paper Weight<br><br>**Harvest greens and prepare a salad**<br>**Pounding Flowers: Make a book mark for students to give for Mothers Day.**<br>**Garden Stone Paperweights or markers can be done now as well.** | |
| June | • All summer crops should be out by now<br>• Composting is a continual process throughout the summer<br>• Weeding and watering | | |
| July | • Summer garden should be in full swing<br>• Harvesting, weeding, and watering is a full time job | | |

PROJECT

# Becoming Human Cameras

*(Adapted from Joseph Cornell's* Sharing Nature with Children II*)*



*The garden is full of breathtaking views, both large and small.*

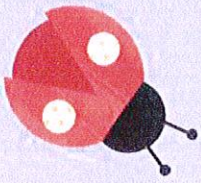
By pretending to be cameras and photographers, you and your kids will start to see the garden in a whole new light.

## HERE'S WHAT YOU'LL DO:

1. Show your child how you will guide her safely, and then have her close her eyes. Tell her, "Now I'm the photographer, and you're the camera."
2. Walk slowly, holding her hand and elbow in your own hands, until you arrive at a nice viewing point. You might be looking at a big sweeping vista of the surrounding area, or you might bring her face right up close to a sunflower petal catching the sunlight.
3. Now tell your human camera to open her eyes when you tug gently on her earlobe.
4. Tug gently to have her take a picture and then close her eyes again.
5. Do this a few times, taking pictures of various garden delights. Then offer to trade positions and let your budding photographer guide you around the garden.

## ALSO TRY THIS:

After being a human camera, your child may enjoy taking actual photos of the garden. Print up the nice shots for a garden gallery, a note card for a grandparent, or to use in a scavenger hunt, returning to try and find the exact spot in the garden.



PROJECT

# The Fine Art of Flower Pounding

*Pounded flower bookmarks make great gifts.*

What kid doesn't love hitting things with a hammer? In this activity, you will harvest flowers together and then pound them onto paper, leaving a beautiful flower print behind.

## HERE'S WHAT YOU'LL NEED:

- Cutting board
- Dishtowel
- Fresh flowers and leaves
- Hammers
- Wide painter's tape
- Watercolor paper cut into bookmarks or note cards

## HERE'S WHAT YOU'LL DO:

1. Place a cutting board on top of a dishtowel. Place a piece of watercolor paper on top of the cutting board.
2. Harvest a handful of fresh flowers and leaves. Note that some flowers work better for flower pounding than others, so harvest a variety to test out.
3. Cut the stems and as much of the green back off of the flowers as possible. If the flower has a large center, remove it and use only the petals.
4. Place the flowers and leaves face down on the watercolor paper. For large flowers, only place the petals on the paper.
5. To remove some of the tack from the painter's tape, stick it to your pant leg a time or two.
6. Now cover the flowers and leaves completely with a single layer of painter's tape.
7. Pound on the tape with a hammer, making sure to hit each section multiple times. You can place a phone book below the paper to dampen the noise.
8. Carefully peel off some of the tape and peek at the paper to see if any area needs more pounding.
9. When you're satisfied with the print, peel off all of the tape. The colors should have left a print on your paper.
10. Remove any flower or leaf pieces that are still stuck to the paper.
11. Now allow your paper to dry and use it for a note card, bookmark, or anything else you can think of. Laminating bookmarks makes for a nice finishing touch.

## ALSO TRY THIS:

You can do this same thing with fabric. Simply place the fabric over upright flowers and pound directly on it until you see the color of the flower coming through the cloth.

RECOMMENDED AGES: 4+ ✿ OUTSIDE ✿ ANY SEASON

# Human Cameras

(Adapted from Joseph Cornell's *Sharing Nature with Children, Volume 2*)

**DESCRIPTION**

In this activity, children explore the garden while taking turns pretending to be a photographer or a camera. This activity encourages children to learn to use their sense of sight as they study the details of their garden.

**BACKGROUND**

The world is full of information for children to discover using all their senses. The eyes are often the first way we learn about a place and the objects in it. By pretending to be cameras and photographers, children and adults can look at the garden in a new way.

**MATERIALS**

✿ *(Optional)* A working camera
✿ *(Optional)* Paper and painting supplies

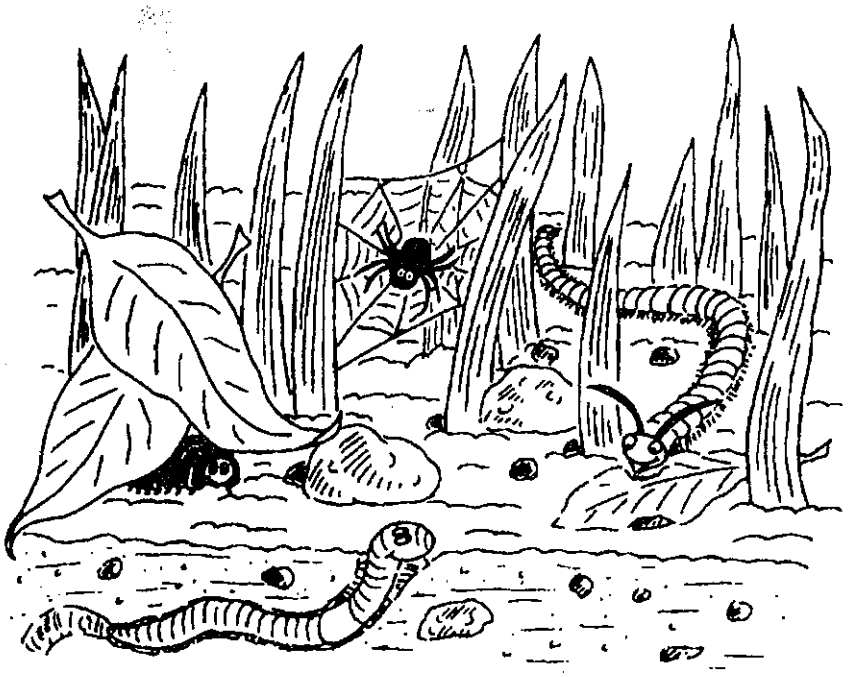
**PREPARATION**

Find an area of the garden where children can walk easily without tripping. If possible, pair up each student with an adult helper or, better yet, with an older child. This activity works well during the school day, and can also be a great activity to send home with parents.

**ACTIVITY**

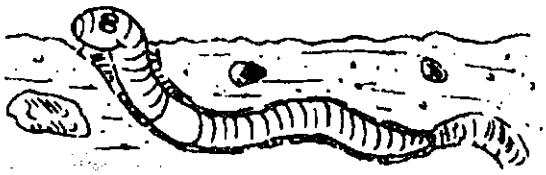
Invite the children to sit in a circle. Show them the camera and have a discussion about what a photographer is (someone who uses a camera to take a picture) and what a camera is (a tool for taking pictures). Ask the children, *Why would a photographer want to take pictures? Why are pictures important?* This conversation can be lively depending on the children's experiences.

Tell the children that today they will take turns pretending to be photographers and cameras in the garden. With their partner, they will visit the garden. The "photographer" will find something to take a picture of and the "camera" will take the picture.



Show your students a camera shutter. Ask, *How are your eyes like a camera shutter?* (When a camera's shutter is open, a picture is collected. When your eyes are open, the pictures you see are sent to your brain and kept there.) Have the children open and close their eyes and imagine they are camera shutters. Ask, *How important are your eyes to you?* Tell the children, *This game gives you a chance to think about your eyes and how they connect you to the world.*

Ask the children to pick who will be the photographer and who will be the camera. Explain that the camera will keep his or her eyes shut while the photographer points it at something in the garden that he or she thinks will make a good photo and then pulls gently on the camera's earlobe to take the picture. Using a volunteer, demonstrate how to lead a partner with his or her eyes closed. Hold the hand and elbow of one arm and guide your camera very slowly. Make a point of giving the camera clear directions, checking the ground in front of the camera's feet, and going around obstacles. When the camera feels a gentle tug on his or her earlobe, that person opens his or her shutter (eyes) for a moment, and then closes them again. After taking three pictures this way, have the camera and photographer switch roles.



One picture might be a close-up. Explain that a close-up photograph shows details, like dew on the petals of a flower, or the way the stem is attached to a vegetable. Encourage the photographer to spend a few minutes looking for an interesting garden detail. Then have him or her focus the camera on the detail and take the picture.

Another picture might be taken from an unusual angle. Suggest that the photographer look at the garden from a different perspective. For example, the photographer could lie on the ground and look up. Have the photographer try looking at berries and leaves from this angle, or flowers. If there is a tree in the garden, try looking up at the sky through the leaves. Once the photographer has chosen the picture, have him or her set up the camera and take the picture.

Other photographic possibilities might include: bright colors in the garden, interesting arrangements of shapes or objects, insects in the garden, or people in the garden.

After each photograph is taken, have each child and his or her partner hold a short discussion to stay focused and to help the child remember the photograph. If the child was the camera, have the photographer walk the child away from the picture, then challenge him or her to find where the picture was taken. Then have the photographer compare what he or she saw to what the camera saw. *How are the two "pictures" different?*

**TYING IT TOGETHER**

When each person has had a chance to be both photographer and camera, discuss what it was like to take the pictures. Ask the children, *What did you notice about your garden that you hadn't noticed before? What was it like to be the camera? The photographer? What was your favorite picture?*

Invite the children to show each other where their favorite picture was taken in the garden.

**DIGGING DEEPER**

Set up a painting station and have the children make a painting of their favorite "photo."

With close adult supervision, let each child take one special photo in the garden with a real camera. Print the photos and use them to make a class book or poster about the garden.

# Our nature walk!

**I see...**

**I smell...**

**I feel...**

**I hear...**

# Pine Cone Bird Feeders

**Objective:** Pose questions about objects, materials, organisms, and events in the environment.

**Time:** 20 min.

**Materials:**

- Pinecones
- String (cut in various lengths)
- Peanut Butter
- Bird Seed
- Chart Paper/Marker

**Vocabulary:**

**Activity:**

- Read Birds in Winter by Duff Gordon
- Display materials
- Ask students, "How can we use these objects to make a birdfeeder?" (hypothesis or prediction)
- List students' responses after they have turned and talked with a partner about their idea
- Next have students test their ideas or designs
- Hang finished product in the garden

## Potato Pancakes

Kids tend to enjoy finger foods. Potato pancakes, or latkes, can be eaten with a fork and knife or by hand. Latkes are associated with traditional Eastern European Jewish cuisine, although similar fare exists in Ireland, Sweden, India, and Korea. They are especially delicious when topped with a dollop of sour cream and warm applesauce.

ACTIVE TIME: *45 minutes* TOTAL TIME: *45 minutes*
*Makes 10–12 pancakes*

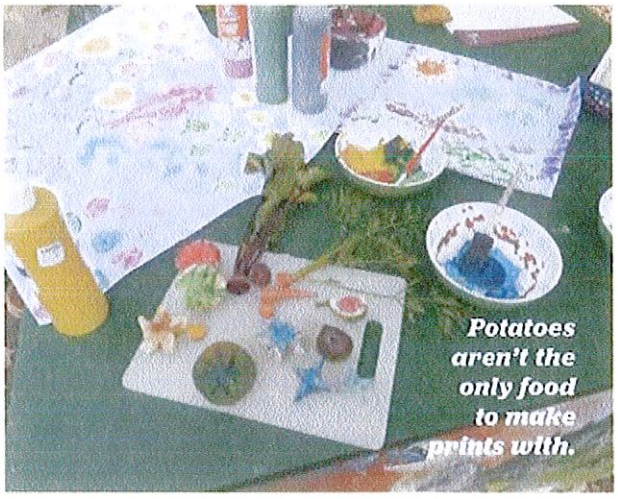
### Here's what you'll need:

Enough potatoes to fill 2 cups when grated
1 onion
3 eggs
1 ½ tablespoons all-purpose flour
1 ¼ teaspoons salt
Cooking oil
Large frying pan

### Here's what you'll do:

1. Grate 2 cups of potatoes.
2. Mince 1 tablespoon of onion.
3. Crack and beat 3 eggs.
4. Stir grated potatoes in with eggs.
5. Mix 1½ tablespoons flour and 1¼ teaspoon salt. Stir in with potatoes and eggs.
6. Stir in onion.
7. Heat cooking oil in skillet.
8. Use about 2 tablespoons of the potato mixture to create a pancake in the frying pan. Spread it out to about a 3-inch round. Cook until brown on a side, about 5 minutes. Then flip and cook until brown on the other side, approximately 5 more minutes.
9. Top with sour cream and warm applesauce or stewed apples or pears. Serve immediately.

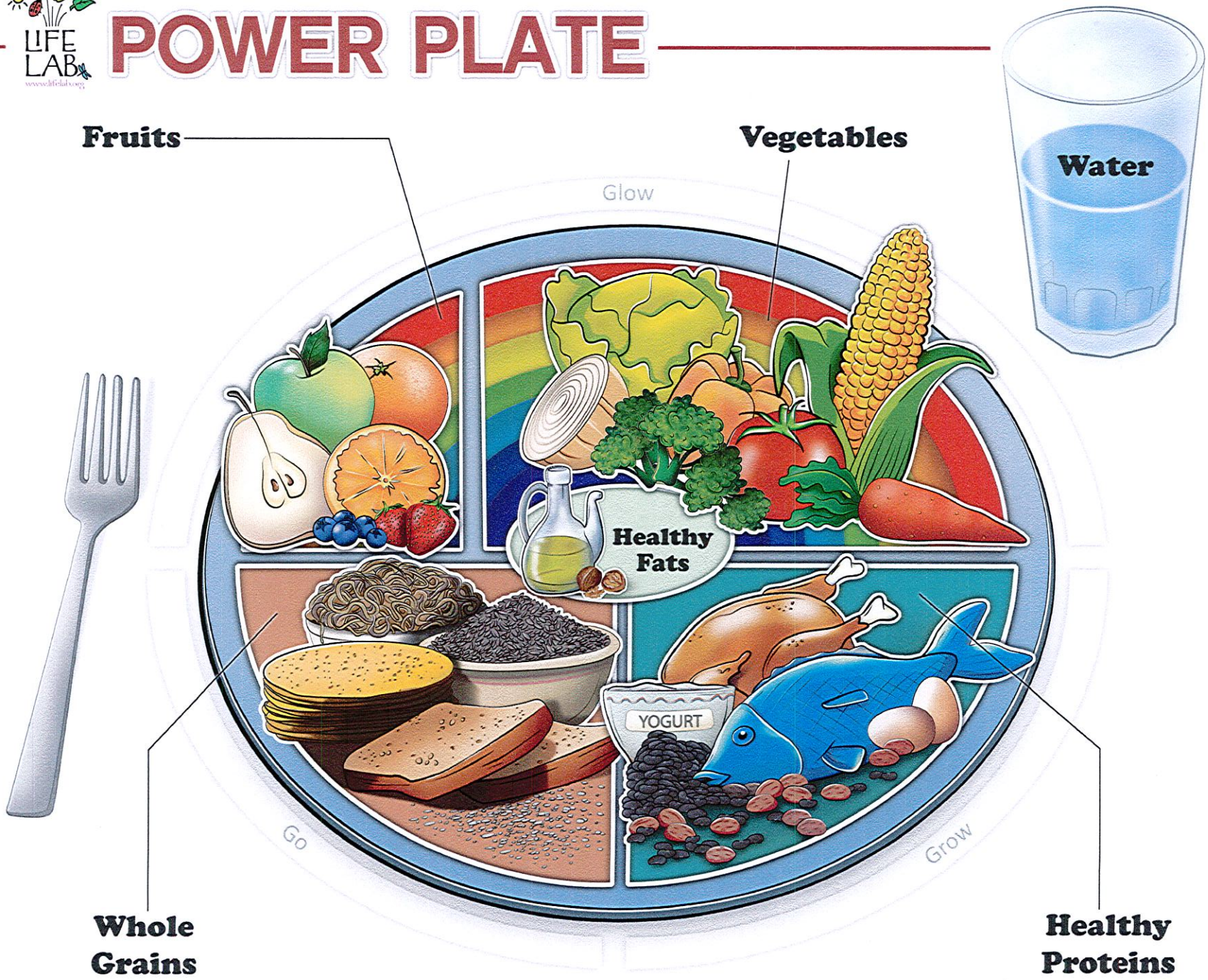
## Potato Stamps



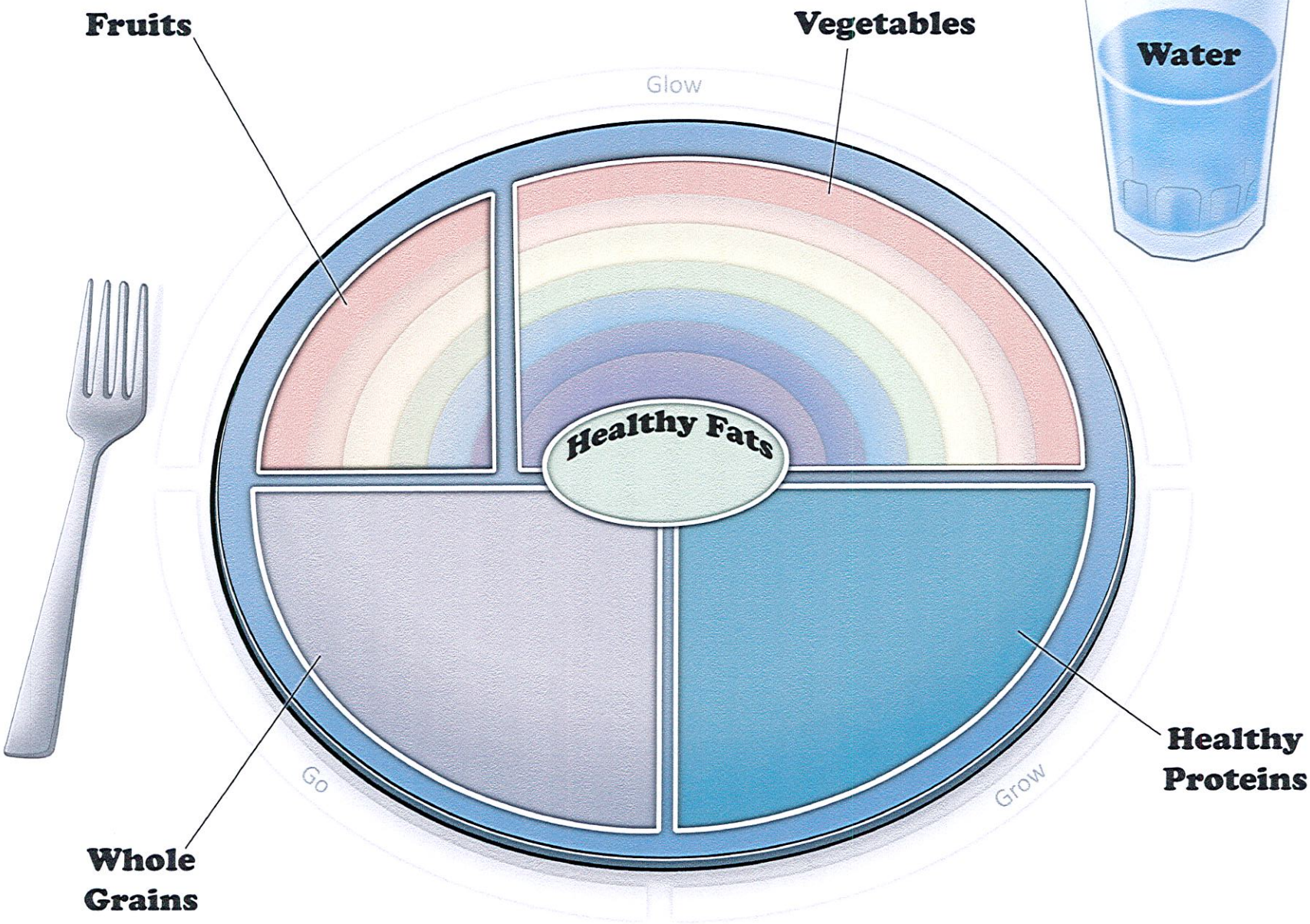

Older kids who are adept with X-Acto knives can use potatoes to make stamps. Younger children can draw designs that you can then carve into stamps for them to use. To make a potato stamp, simply slice a potato in half. Then, using an X-Acto knife, carve the flat surface of a potato half to make the shape you want for your stamp. Dip the raised design in a shallow dish of tempera paint or brush it on, and then press gently onto paper. You can use these potato stamps to create artwork, or to decorate wrapping paper, gift cards, or the like.

*Taken from The Book of Gardening Projects for Kids*
*www.lifelab.org/curriculum*

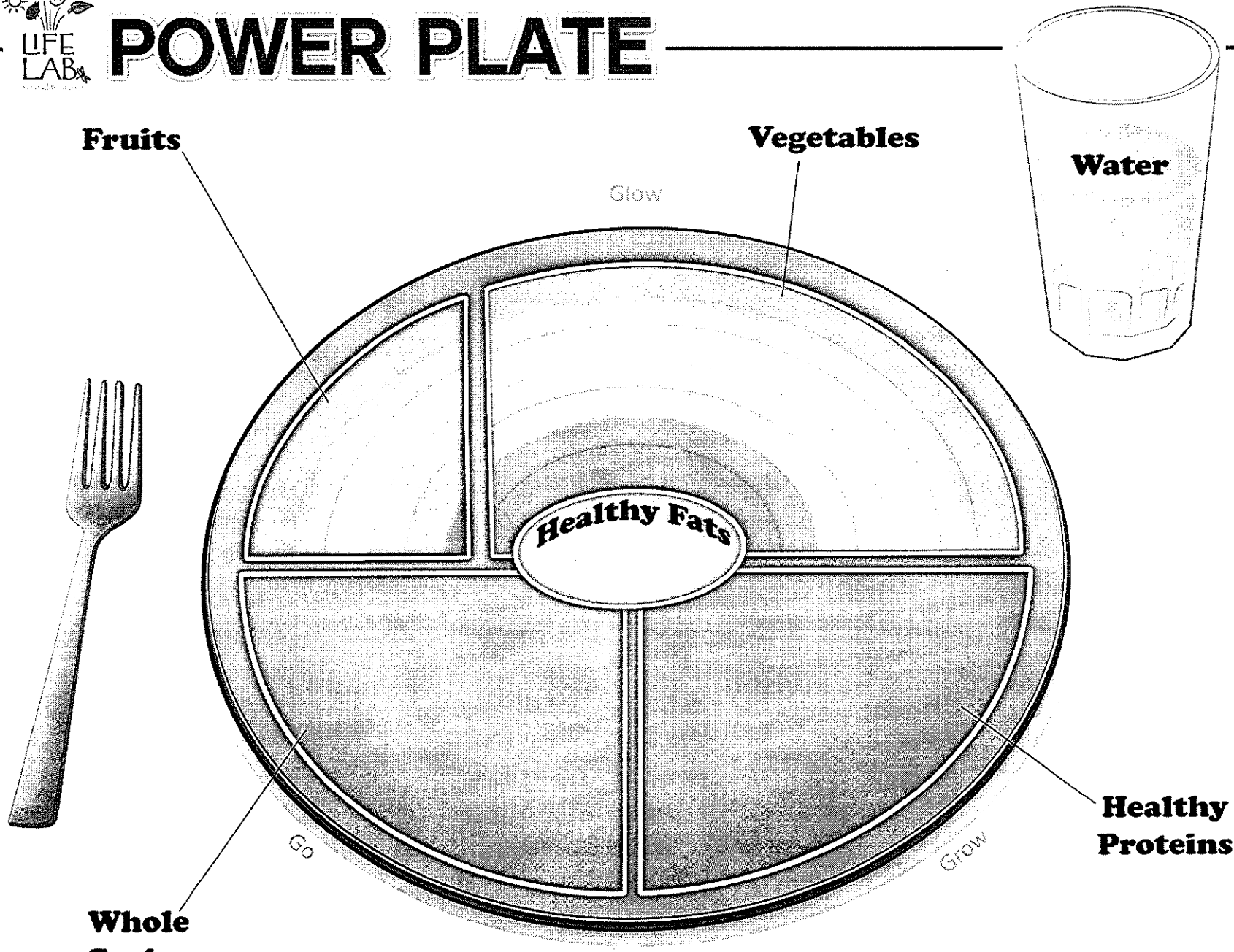
# POWER PLATE



# POWER PLATE



# POWER PLATE



RECOMMENDED AGES: 4+ ✿ OUTSIDE ✿ ANY SEASON

# Rainbow Chips

**DESCRIPTION** In this activity, children use paint chips to search the garden for corresponding colors. This is a great way to introduce children to the garden and prompt a close look at the diversity of color.

**BACKGROUND** The garden is teeming with color! Often we think of finding color only in flowers, but if we look closely at each plant, rock, and handful of soil, we can find every color of the rainbow. This activity is an excellent way to introduce young children to a garden and you can repeat it throughout the year as the seasons change. You can even talk about shades and tones of color. For example, there isn't just one green, there are many shades and tones of green. Pushing children's awareness of color in the garden helps them discover things they might otherwise overlook.

**MATERIALS**

- ✿ Variety of paint chip samples from a local paint or hardware store, cut up into individual color squares
- ✿ A bag or container in which to conceal the paint chips
- ✿ Tempera paints

**ACTIVITY** Start by telling this imaginary story (embellished as you like!) in a mysterious tone of voice:

> "One day I was walking through the garden, when it started to rain really hard. Soon enough, I was in the middle of a huge storm. With each step I took, I became more and more soaked. I continued to walk through the dark and wet garden, until I came to an open meadow. Above the meadow the sun started to peek out through the heavy clouds, and the rain settled down to a mist. Then, a huge double rainbow appeared over the hills in the distance. The colors were so vivid and bright. There were shades of red, orange, yellow, green, lime, peach, pink, purple, maroon, blue, turquoise, and cobalt. There were even colors in that rainbow that I hadn't seen before...colors without names. All of a sudden, the rainbow just shattered in the sky, and all the pieces fell to earth. I ran over to the pieces and began picking them up and putting them all in a bag. Would you all like to see the rainbow chips?"

Now have the students find a partner. If possible, assign an adult chaperone or older child to each group. Give each group a "rainbow chip" from your pouch and instruct the children to look for the exact color somewhere in the garden. Encourage them to look very closely at grains of soil, stripes in a tree's bark, and other places they might otherwise overlook and to try to find matches in the natural parts of the garden, rather than on signs or buildings. Show children how to hold the paint chip just behind the object to determine if they have a good match. Demonstrate how something red that they find could be a very different red from the color on the chip. *Does this match? How about this?* Then send students out with one color chip to look for their own good match. You may choose to have them show other students, or adults, their match in the place where they found it. Alternatively, you may ask students to bring their items back to the circle to share with the group. Either way, once they have found a good match, students can return the chip to your bag and select a new one. Repeat the activity four or five times per team.

**TYING IT TOGETHER**

Each time you do this activity, record the date and post all the colors the children found. Then ask, *What colors did you see most often in the garden? Is this different from the last time we did this activity?* The children may see more green in the spring and summer, but possibly reds, yellows, and browns in the fall and winter.

Is there a place in your garden where the children might find concentrations of bright colors? How about dark colors? See if they can point out those spots.

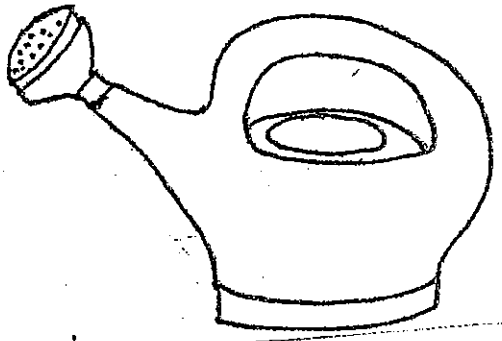
Ask, *Is there a place in the garden where you think there isn't any color at all?* Go with the children to this place and help them find colors!

**DIGGING DEEPER**

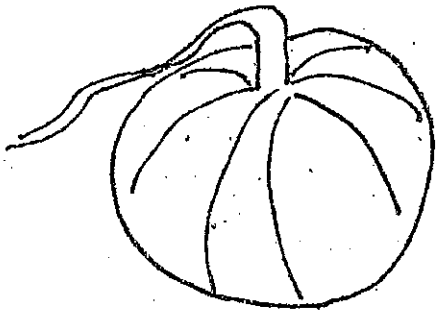
Set up the paints and paper. Put out one basic paint color — red, orange, yellow, green, blue, purple, brown — and one tint — black or white. Let the children finger paint with those two paints on a piece of paper to explore the spectrum of that basic color. When the paintings are dry, you can repeat the activity with these homemade paint chips!

# Fall in the Garden

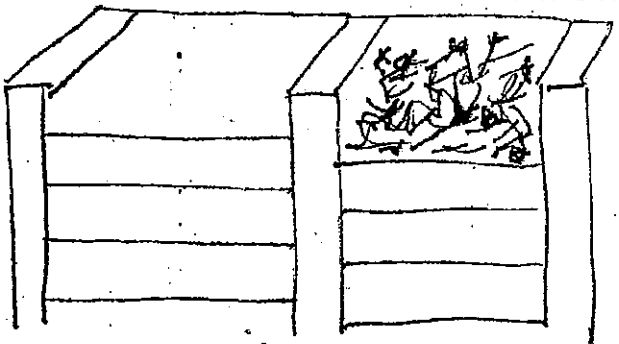
Name _____



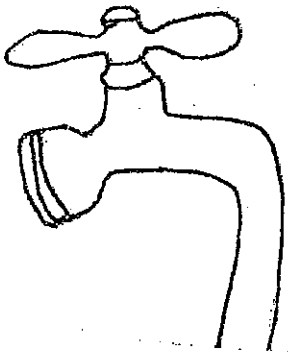
watering can



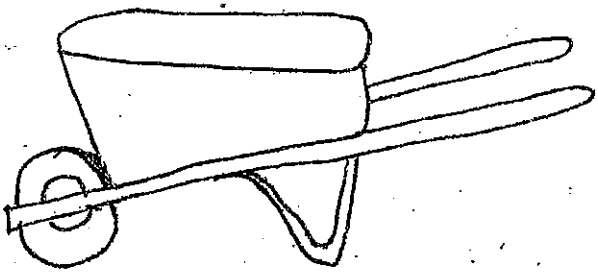
pumpkin



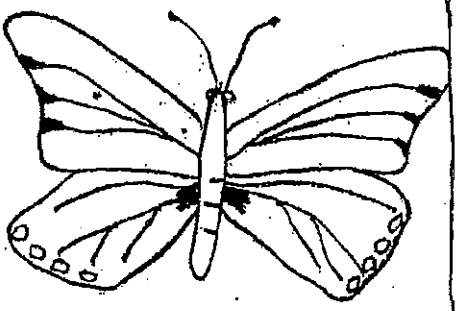
compost bin



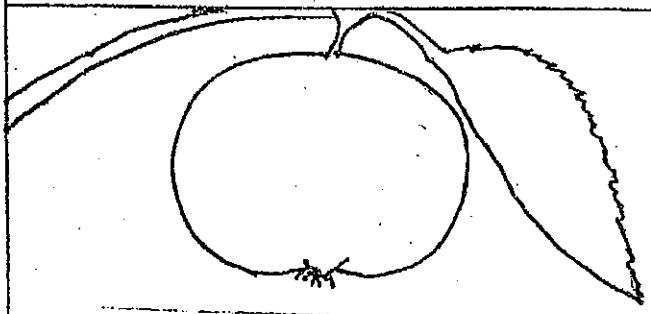
faucet



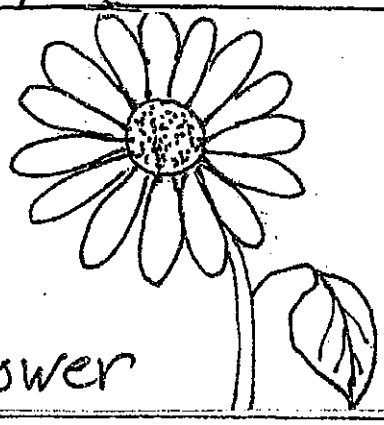
wheelbarrow



butterfly



apple

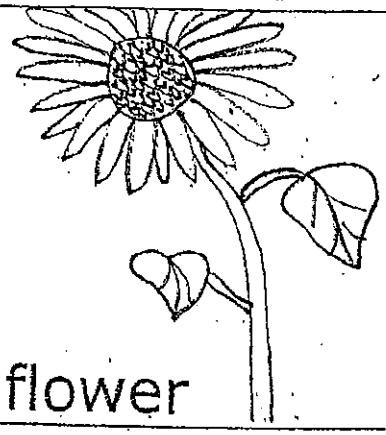


sunflower

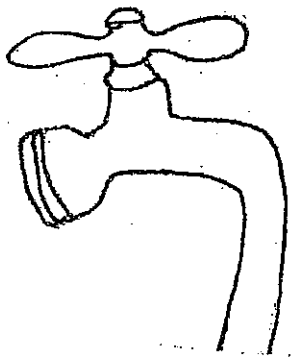
created by Susan Dahlgren - Gault School Life Lab - Santa Cruz, CA

# Fall in the Life Lab

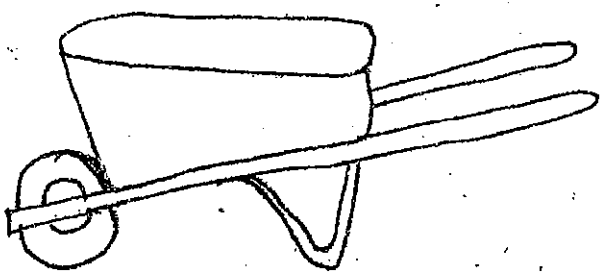
Name _____



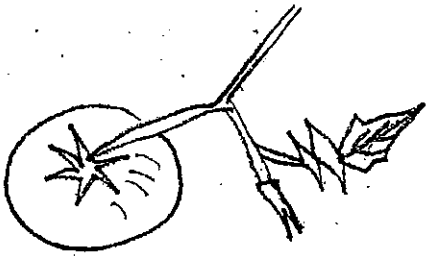
sunflower



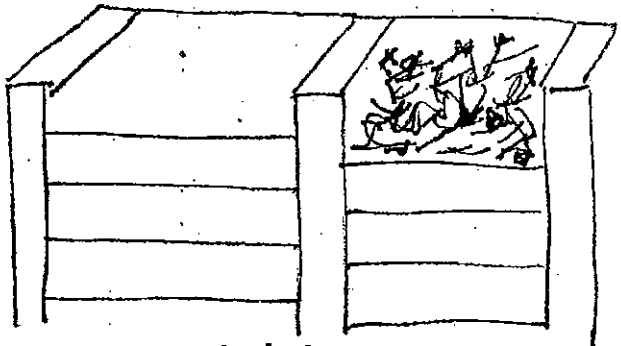
faucet



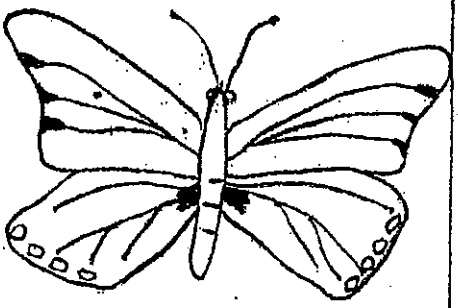
wheelbarrow



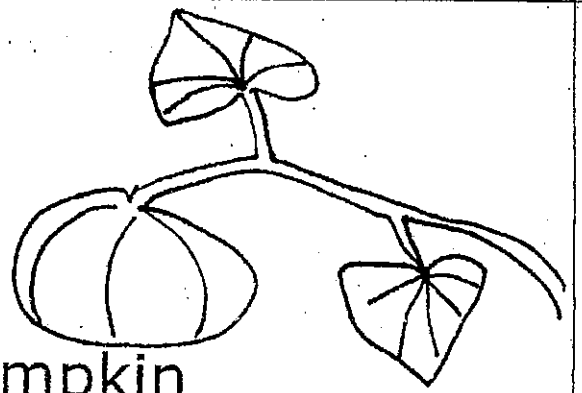
tomato



compost bin



butterfly



pumpkin

corn

# Leaf Scavenger Hunt

Find a plant with...

## Leaves that smell good

Why would a plant have leaves that smell good?
(To get the attention of helpful bugs such as bees.)

## Leaves that smell bad

Why would a plant have leaves that smell bad?
(So animals will not eat them.)

## Waxy leaves

Why would a plant have tough, waxy leaves?
(Some desert plants have waxy leaves to help keep water inside.)

## Thick leaves

Why would a plant have thick leaves? What might the plant store in its leaves?
(Some plants that live in dry places store water in their leaves.)

## Spiny leaves

Why would a plant have spiny leaves? Who are they protecting the plant from?
(Some plants have spiny leaves so animals will not eat them.)

## Big leaves

Why would a plant have big leaves? What might collect there? What happens to the soil underneath them?
(Some plants have big leaves to collect water, keep the soil underneath the plant moist, and collect more sunlight.)

## Leaves that trap insects

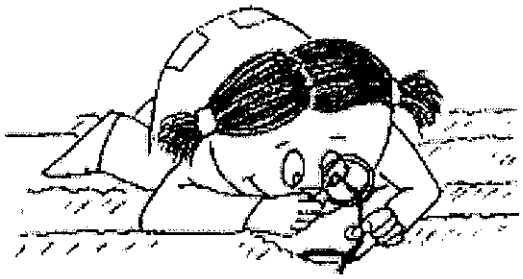
Why would a plant have leaves that trap insects? What does a plant do with the insects that it catches?
(The plant digests the insect and gets minerals from it. This is a way for plants to survive in soil with very few nutrients.)

## Leaves we like to eat

We eat food from plants every day! What are some leaves that we like to eat?

Option: Do this scavenger hunt as a blind/caterpillar walk. Ask students to get in a line with their hands on the shoulders of the student in front of them. Lead them through the garden, stopping at leaves with interesting textures, shapes, sizes, and smells. Help them feel and smell the leaves, and ask them what they notice and how these characteristics might help the plant.

Find more garden related scavenger hunts at www.lifelab.org/scavenger-hunt



## Inquiry in the Garden: Scavenger Hunt

1. A vine is a plant with a stem that is too weak to support its own vertical growth. Despite these weak stems, some vines grow way up high! Find three different vines. Draw them and write a brief description of how they manage to grow upwards.

2. Find a worm in the worm bin. Without moving or touching the worm, watch what it does. Write a hypothesis about why it is doing whatever it is doing.

3. Flowers are designed to attract bees and other pollinators to them. Find two different flowers. Draw or name each one and describe how you think each one attracts pollinators. (Use any of your senses other than taste … some flowers are edible, but not all of them!)

4. Find 4 different animals in the garden. For each one, record what it is, where you found it, and why it might be there.

| Animal | Location | Hypothesis: Why might it be there? |
|---|---|---|
| | | |
| | | |
| | | |
| | | |

5. Find evidence of an animal that was here earlier (a footprint, a hair, a feather, a scat, etc.) From the evidence, what can you infer about what animal it was, when it was here, what it was doing, etc.)?

6. Find the chickens. Watch them for a minute. What questions do you have about chickens?

# Garden Math Scavenger Hunt

Welcome to Life Lab's Garden Classroom! Enjoy your exploration, and good luck finding answers to the questions below! Near some of the answer sites, you will find relevant garden-based math lessons from Math in the Garden.

1. Find the Pizza Bed and look for the measurement string. Using the information there, find the area of the Pizza Bed.

   Area of a Circle = $\pi r^2$

   Area of the Pizza Bed =

2. We want to fill the Pizza Bed with tomatoes and they need 40 $cm^2$ each. Approximately how many tomato plants will fit? How many would we need to fill half the bed, leaving the other half for other pizza ingredients?

   # tomato plants for the whole bed = _____

   # tomato plants for half of the bed = _____

3. We plant wheat all around the circumference of the Pizza Bed. What is the circumference of the Pizza Bed?

   Perimeter of a Circle = $2\pi r$

   Perimeter of the Pizza Bed = _____

4. Find the very young apple orchard, just behind the Life Lab building. Use the graph on the ground to find the coordinates of the Gala apple. Record in the format (x,y).

   Coordinates of Gala apple tree: _____

5. What kind of tree is at (,)

   Kind of tree: _____

6. Find the tomatoes on the table in the Garden Kitchen. Estimate how many seeds are in each one.

   Estimated seeds in smaller cherry tomato: _____

   Estimated seeds in larger Roma tomato: _____

7. Draw and name 5 symmetrical objects from the garden. Use a line to demonstrate their symmetry.

8. Use the ruler on the table in the garden kitchen to measure the length of your hand, from the tip of your thumb to the tip of your pinky when outstretched. Farmers use their hands a lot to make rough estimates of distances in the garden. Now go out into the garden and find an object that is that length.

   Length of hand, from thumb to pinky: _____

   Object that is about the same length: _____

9. Use the ruler on the table in the garden kitchen to find a part of one of your fingers that is approximately one inch long (for example, the first knuckle of your fourth finger). Look at the seed packets and find a seed that you would plant to that depth.

Part of hand that is about 1 inch long: _____

Seed that would be planted to that depth: _____

10. Use the geometric shapes attached to this Scavenger Hunt. Next to each one, write or draw a garden object that is about the same shape.

# *Seed Saving*

Seeds aren't just things you buy in packets at the store. Almost every plant in your garden will produce its own seeds. You may have already noticed plants in your garden going to seed, because for many plants this is the time of year that it happens. These seeds can be harvested and saved for planting in the spring. Saving seeds is especially worthwhile if you have unusual or hard-to-find flowers or vegetables in your garden. Best of all, the seeds are free! It's fun to plant a seed that you have harvested and watch it go through the whole cycle from seed to plant to seed again. Even if you don't have a garden with plants making seeds, you can find plants going to seed in such places as vacant lots and weedy fields.

## Which Seeds to Save?

• Save seeds only from healthy plants.

• Save seeds from the plants that have the characteristics you like, such as a beautiful color, an early bloom, or delicious fruit. Here are some plants with seeds that are easy to collect and which will give good results:

beans
peas
corn
lettuce
tomatoes
squash
bachelor's-buttons
cosmos
columbines
poppies
calendulas
sunflowers
hollyhocks
morning glories

## Steps to Seed Saving Success

• Let the seeds dry on the plant. You may want to cover the seed heads with a paper bag to keep the birds from eating them, especially for large seeds like sunflowers and corn.

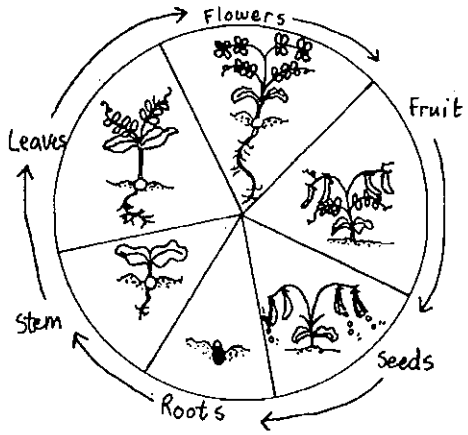
• Seeds which are inside soft fruit should not be harvested until the fruit is extra-ripe. Scrape out the seeds and soak them in water overnight until they can be loosened from the pulp, and then dry them on a paper towel.

• Dry all seeds in a warm room with plenty of air flow. Stir them regularly to keep them from molding.

• Store seeds in well-marked, tightly-sealed paper envelopes.

Packaged seeds make great gifts for people who have helped with your garden program!

**Life Cycle of a Plant**

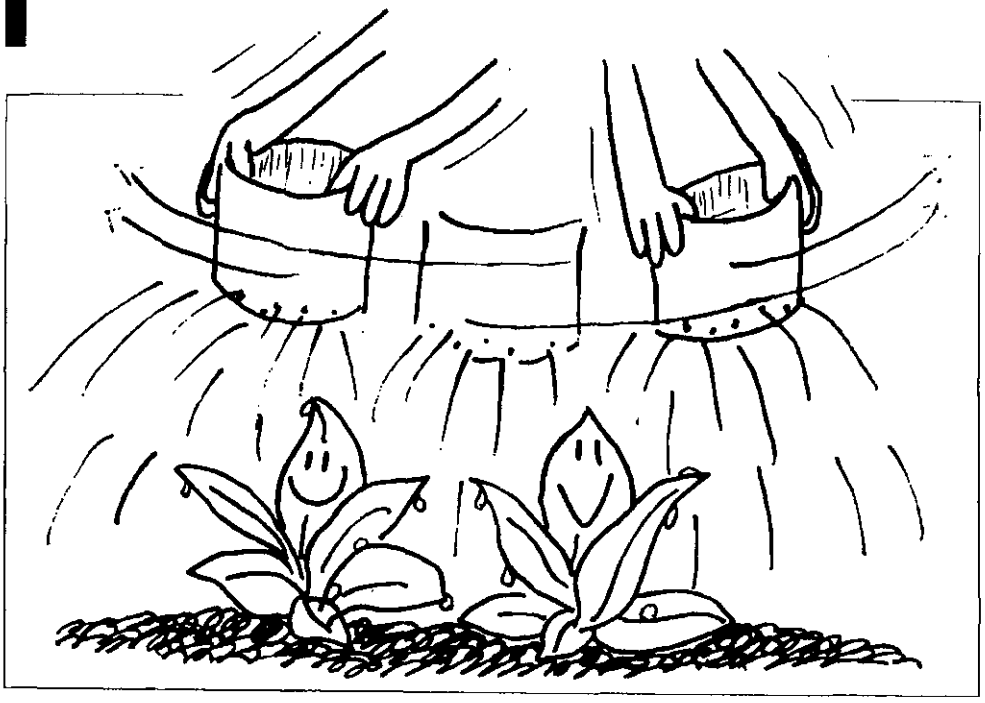



## Seed Dispersal

If all seeds just fell under the plant they came from, the young plants would grow up in the shade of the parent plant. Most seeds have a way of travelling or dispersing themselves. This helps plants move into new areas like the bare ground after a forest fire. To find travelling seeds, try this activity: Take an old sock and put it on *over* one of your shoes. Now take a walk through a weedy lot, a forest, or a brushy hillside. When you get back, take the sock off and look for "hitchhikers." How many different types of seeds can you find? How do they disperse themselves?

# Seed Showers

**Students observe different methods of watering seeds to discover which work best.**



## Outcome

Students apply what they know about water as they compare different methods of watering seeds.

## For the Teacher

Children can love their plants to death. They want to tend them and care for them, and so they consistently overwater seeds and seedlings. Too much water robs the soil of air and encourages the growth of fungi and soil disease agents. Ask children to help you set up a watering schedule, so each will get a chance to water the plants. Show them how to gently test the soil for moisture.

Once the plants are in the garden, do not water until the soil is dry an inch or two below the surface. Then water thoroughly so plants can develop the deep roots they need to absorb nutrients and survive hot weather. As plants mature, give them more water less frequently. See *Gardening Know-How for the '90s*, pp. 13–14, 45, 47, 72–4, for more information on watering.

Water is heavy for children to carry and manipulate. When students are using watering cans, remind them not to fill them too full. Demonstrate how to water by sweeping the can back and forth in a gentle, steady motion.

**Outdoor**

**Time**
20 minutes, or until students lose interest

**Related Subject**
Math

**Process Skills**
Applying
Communicating

**Materials**
*For Each Student:*
- 1 paper cup or ½-pint milk carton

*For the Class:*
- 1 paper cup
- 1 packet of small seeds, such as broccoli or lettuce
- 1 tub
- 1 plastic cup
- 3 yogurt or sour cream containers
- 2 lbs of potting mix
- 1 trowel
- 1 ice pick or nail
- 1 pitcher or bucket of water
- 6–8 marking pens

### Teacher to Teacher

*Sometimes a lot can be learned from little mistakes. To demonstrate the proper amount of water needed for the seed cups, I drew a line with a magic marker on an 8-ounce plastic measuring cup and showed children how to fill it up to the mark with water. Then I assigned one table the job of pouring water for the other groups each week. On the first day, one of the "pourers" decided to put extra water in the measuring cup for his seed and ended up flooding the cup. After he (and the rest of the class) noticed his seeds floating, he asked to replant his seeds and watered them with the correct amount of water the next time.*

–Dorothy Castellane, E. C. Blum School, Brooklyn, NY

### Preparation

1. Poke a hole with a pencil point in the bottom of each student's cup or carton.

2. Use some of the sieves from the previous lessons. Or make mini-watering cans by poking 8–10 small holes in the bottom of the plastic containers with an ice pick or nail. Make the holes big enough for the water to drip out like rain, but not so big that it comes out in a stream.

3. Fill the tub half full of potting soil, and fill the plastic cup a quarter full of water.

4. Teach in teacher-directed groups of 6–8.

### Getting Started

Show students the seeds and seed packet and ask for ideas about what a seed needs to grow.

**How can we make these seeds grow? What would happen if we dumped a whole bunch of water on the seeds? What could we use to water the seeds if we had no watering can?**


### Action

1. Fill a cup with soil, and ask students what they remember about how to plant seeds. Then demonstrate how to plant the seeds in the cup. (See *Gardening Know-How for the '90s*, pp. 37–40, for more information on sowing seeds in containers.)

2. Pour some water into the plastic cup and show it to the students. Ask them if you should water the seeds by dumping water on the soil. Encourage students to share ideas.

3. Pour the water in the cup with the planted seeds following students' ideas. Let students observe what happens. Point out any seeds that get washed out of the soil. Let students feel the soil, and share ideas about how it is different now that it has been watered.

4. Ask students for ideas about how they might use the cup and water differently to water the seeds.

5. Give each student a paper cup or carton, and ask them to write their name on the outside of it. Let students fill their cups loosely with soil.

6. Ask students to make a small hole in the soil. Give them each 3–4 seeds to plant.

7. When the seeds are planted, let students water them with one of the sieves or mini-watering cans. Encourage students to examine the soil to see if the seeds were washed out.

8. Place cups in a tray by a sunny window. Set up a daily schedule for students to check soil for watering.

## Assessment

Engage students in a discussion about watering plants.

**What are ways to water garden plants? How about plants in the classroom?** Have students help you record planting information on the Garden Log.

## Digging Deeper

- Plant some more seeds in another cup. Keep the soil so saturated that there is standing water in the cup. Make sure students do not overwater their seeds. Then compare the sprouting of the flooded seeds with those the students planted.
- Let students water in the garden using a hose with and without a spray nozzle. Compare the effects on the soil of the 2 types of watering.
- Make automatic drip water towers for seedlings. Cut off the top of 1-liter soda bottles, poke a hole the diameter of a pencil in the bottom of each bottle, and then bury the bottles next to the seedlings. Fill them with water every 2 or 3 days.
- In partners have children role-play good and poor watering techniques. Have the rest of the class respond with thumbs up or thumbs down and discuss why.

## Teacher Reflections

- Did students apply what they learned from the water activities to planting seeds?
- Did they understand that water can wash away seeds?
- Do you see them watering plants more gently?

# *Seed Sort*

**Students sort seeds to discover their properties.**

## Outcome

Students practice sorting.

## For the Teacher

A seed can be as big as a coconut or smaller than a poppy seed. It can be smooth, spiny, ribbed, or rough. It can drift, float, drop, or hitchhike. The different shapes and sizes have evolved due to the success of their design in protecting the embryo, providing a food supply, and dispersing the seed. All seeds have a hard, durable seed coat to protect the embryonic plant and its food supply inside. Some seed coats are so tough that they must be worn away by digestive juices, exposed to fire, or rolled in a stream bed before they can sprout. Children will enjoy sorting mixed seeds. Some, like sunflower seeds or peanuts, they will pick out because they recognize them; others they will sort by color or shape. Do not expect students to sort by more than one characteristic at a time, but do encourage them to expand their categories to include various textures and even smell.

**Indoor**

**Time**
20 minutes, or until students lose interest

**Related Subject**
Math

**Process Skills**
Observing
Comparing

**Materials**
*For the Class:*
(6 or 8 students at a time)

- 1 pint of seed mix from Seeds Explorer Post, p. 143, or a mixture of popcorn, peanuts, sunflower seeds, various dried beans, and one type aromatic seed (e.g., cumin, coriander, anise, fennel, dill)
- 12–16 lids from plastic containers of yogurt, cottage cheese, etc.
- 6 or 8 plastic containers from yogurt, cottage cheese, sour cream, etc.
- 1 shallow tub or pie plate

### Teacher to Teacher

*To help my children develop their sorting skills, I make sorting "mats" out of folded paper. For example, an 8½" x 11" piece of paper folded into fours will encourage the children to look for four different ways to sort. After we practice sorting, I integrate math by making a graph of the different ways children found to sort the seeds (color, size, shape, texture, edible/non-edible) and count how many children sorted by that characteristic.*

–Cassandra Thompson, Oakmont Elementary School, Columbus, OH

## Preparation

1. To help students connect seeds with plants, take them to the garden to collect ripe fruits, vegetables, or weeds like dandelions that have gone to seed. Or bring in a few apples, citrus fruits, winter squash, or other large-seeded fruits or vegetables.

2. Ask students to help you harvest the seeds. If they are wet, dry them in a sunny spot or slow oven. Add the seeds to the lesson's seed mix.

3. Mix the seeds together in the tub or plate.

4. Teach in teacher-directed groups of 6 or 8.

## Getting Started

Encourage students to examine the properties of seeds.

Give each student a handful of seeds. Tell each student to choose one seed to put on a lid, and ask how the seeds are alike and different. **Did any of you choose the same kind of seed? How can you tell? How are the seeds you chose alike? How are they different? How could we sort our seeds?**


## Action

1. Give each student a lid, and start with one student selecting a seed and placing it on the lid.

2. Ask the student to tell you something special about the seed. For example, the child might say, "It is black," "It is pointed," or "It is big."

3. Ask the others if any of their seeds have the same property. One at a time, let students place in the lid seeds with the same property as the first seed. Check to see if everyone agrees that the seed should go on the lid.

4. Repeat the sequence, encouraging another student to select a seed and describe a property. Then the rest of the group adds seeds with a similar property to the lid.

5. Continue with any other seeds that have not been categorized.

6. Pair up students. Each pair should have 2 lids, a container, and a magnifying lens. Let them each take a handful of seeds to put in the container.

7. Ask the pairs to agree on one property they will look for in their seeds. Tell them to put all the seeds with that property on one of the lids.

8. After they have sorted for a few minutes, ask the pairs to think of another property they

could use to sort more of the seeds. Ask them to sort seeds with the new property onto the second lid.

**9.** Record students' ideas about seeds as you hear them. After students have sorted for a few more minutes, ask each pair to tell the group how they sorted their seeds.

### Assessment

Show students a handful of seeds and review their discoveries.

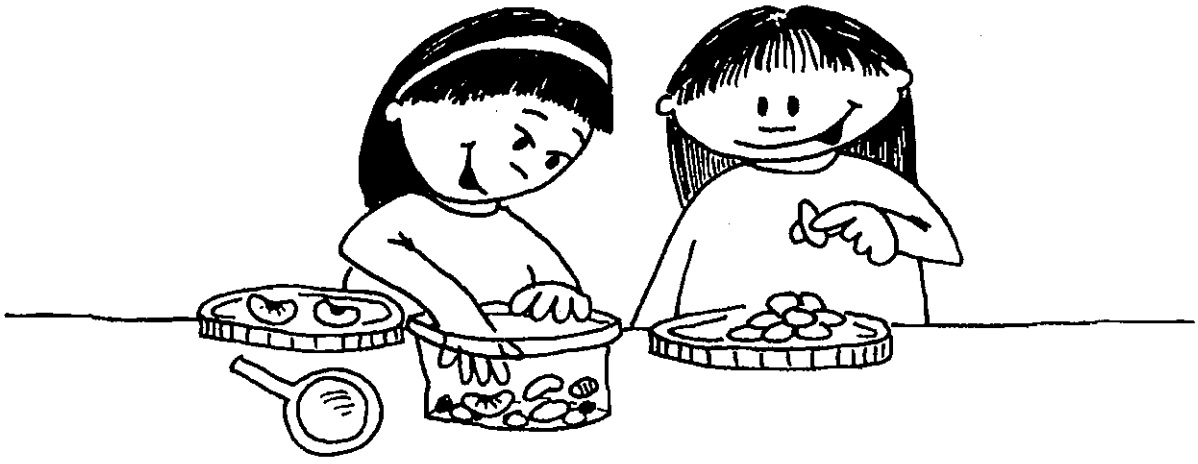
**How are the seeds the same? How are they different? How can you tell if something is a seed?**

### Digging Deeper

- Take students on a trip to the garden to collect seeds and discover where they come from. Display a collection of garden and other seeds at the Life Lab Center.
- Make a seed soup. Cook barley, rice, beans and other seeds along with garden vegetables. Add seed seasonings, such as cumin, dill or anise. While the soup is cooking, make a list of all the seeds we eat, and hang it in the Life Lab Center.
- Create seed mosaics. Let children write their names or make a pretty design by gluing seeds to construction paper.
- Plant some of the seeds the children sorted.

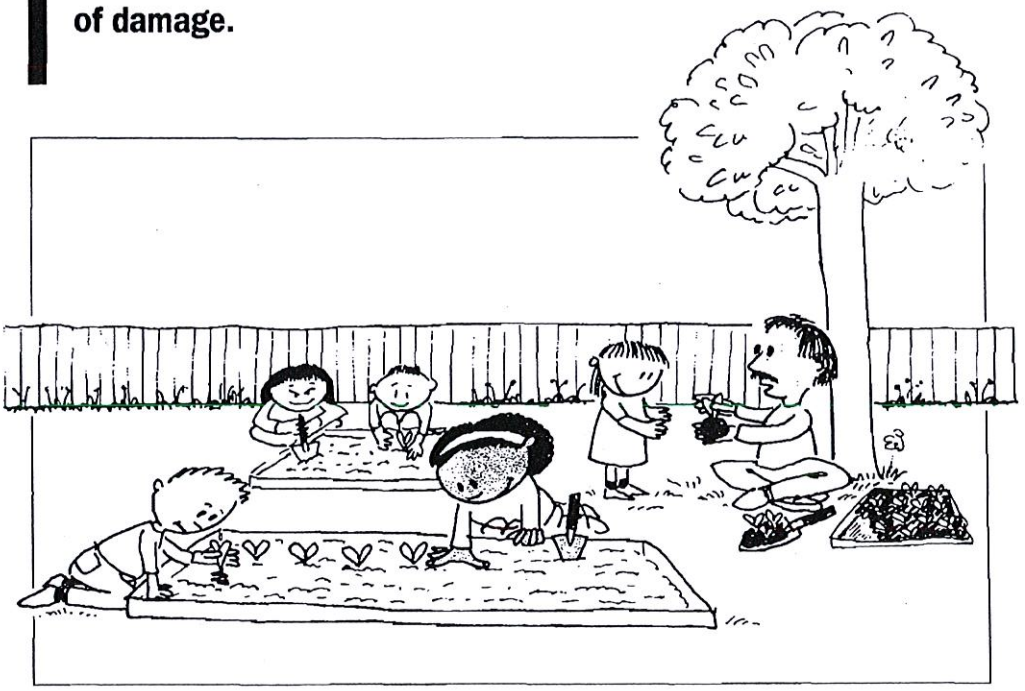
### Teacher Reflections

- Were students able to work together as they sorted?
- Were they aware that seeds come from plants?
- Were they interested in sorting the seeds in different ways?



# Seedling Home

**Students learn how to transplant seedlings with a minimum of damage.**



**Outdoor**

**Time**
60 minutes

**Related Subject**
Language Arts

**Process Skills**
Observing
Communicating

**Materials**
*For Each Student:*
- 1 seedling
- 1 label

*For Each Group of 6–8:*
- 2 or more practice seedlings

*For the Class:*
(6–8 students at a time)
- 1 watering can or hose with spray nozzle
- 1 tub soil
- 1 wax marking pen or permanent marker
- 6–8 trowels
- 1 ruler

## Outcome

Students practice transplanting seedlings into the garden.

## For the Teacher

This lesson is a good opportunity to review roots, stems, and leaves as your students transplant their seedlings into the garden. You can transplant seedlings started earlier, or start some seeds now. The seedlings and seeds planted now can be harvested for the garden celebration feast (p. 272)at the end of the school year. We recommend planting a variety of quick growing salad crops, such as lettuce, peas, radishes, carrots and broccoli. (Root crops like carrots and radishes cannot be transplanted.) Poke holes in paper cups for drainage, fill with soil, and have students plant the seeds of a quick growing plant like lettuce. Keep the soil moist, and move the seedlings to a bright spot after they germinate.

Seedlings need to be transplanted when they become overcrowded or after they grow their first *true leaves*, the fully photosynthesizing leaves that develop after the seed leaves. Treat seedlings gently during transplanting. Try to keep soil around the root ball, and avoid touching the roots. Handle the seedling by its leaves, not its stem. If the leaves are torn, they can grow back; if the stem breaks, the seedling will likely die. It is best to transplant seedlings later in the day to avoid the heat of the midday sun. If you plant on a hot, sunny day, try to shade the seedlings. See *Gardening Know-How for the '90s*, pp. 40–6, for more information on transplanting.

### Teacher to Teacher

*To help children realize that seedlings really need to be handled gently, we planted a few broken seedlings in a small plot and planted some others that were handled gently in an adjacent plot. After a few days we compared the general health and growth of the seedlings. The results of the experiment were worth a thousand words!*

–Dorothy Castellane, E. C. Blum School, Brooklyn, NY

## Preparation

**1.** If the seedlings have been grown inside and the weather is cool, consider putting them outside for a couple of days before transplanting. This process, called hardening off, allows seedlings to adjust to cooler temperatures, wind, and sun so that they can avoid shock when they are transplanted.

**2.** Lightly water the seedlings before teaching the lesson. The soil should be moist, but not soggy.

**3.** Prepare a garden bed for planting. The bed should be big enough for the plants when they mature. Consult the seed packet for information on how far apart to space the seedlings.

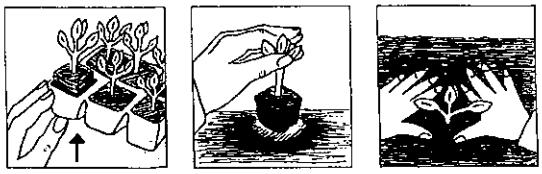
**4.** Arrange for aides, volunteers, or older students to assist you.

**5.** Teach in teacher-directed groups of 6–8 students.

## Getting Started

Take students to the garden. Show them a seedling and review its parts.

**Do our little plants have all the parts that big plants have? What parts does this seedling have? How can we plant the seedling in the garden? Should we take it out of the container? Why? How can we get it out without hurting it?**




## Action

**1.** Ask students if the seedlings should be handled by the leaves or stems. Let a student pull a seedling out of the soil instead of waiting to remove it gently. If it breaks or is damaged, discuss what happened. Save the seedling, and let the child plant it later with the other seedlings to discover how it will grow.

**2.** Share ideas about how to extract a seedling so that its roots stay intact. Demonstrate the proper method. If the seedling is in a six-pack, push up on the bottom of its compartment. If it is in a paper or cardboard container, tear away the container. If the seedlings are growing together in a flat, gently slide the tip of a trowel or spoon around the edges of the container, and carefully lift out a clump of seedlings. Slowly separate the seedlings from each other, keeping their roots shaded.

3. Ask students for ideas on how to plant a seedling. Let students use an extra seedling to demonstrate their ideas. Encourage them to consider how deep the seedling should be planted. If its hole is too shallow, the roots will be exposed and the seedling will fall over. If it is too deep, the leaves or growing tip of the stem will be covered. Most seedlings can be buried up to their first set of true leaves.

4. Let students share ideas on how to refill the hole. Should the seedling be held straight? Should the soil be packed down? Demonstrate how to gently firm the soil around the stem while holding the seedling upright by the stem.

5. Show some of the students how far apart the seedlings should be planted by spacing each of their hands the approximate distance apart. Let them show the others.

6. Arrange the group where you want the seedling planted. Give each child a trowel, and have them dig their hole first.

7. Remove a seedling from the container for each student and let them transplant it and put a label with their name by the seedling.

8. Ask students if anything needs to be done after planting. Discuss watering, and let students water with a spray attachment or watering can.

9. Ask students to help you set up a daily watering schedule to make sure the seedlings are adequately watered. Record the date of planting and student observations on the Garden Log.

## Assessment

Ask students to show each other their planted seedlings and compare how they were planted.

**Why did you plant your seedling the way you did? What do you notice about your seedling? How do you think it will change?**

## Digging Deeper

- Help students plant a tree or shrub in the garden.
- Make shading devices by cutting off the tops and bottoms of milk cartons or plastic bottles to make tubes to place over newly planted seedlings.
- Keep one seedling in its container, and compare its growth with that of the garden plants.
- Encourage students to draw their seedlings. Do they include all of the plant parts?

## Teacher Reflections

- Do the seedlings look as though they were handled gently?
- If not, how could you give students more experience in handling plants?

# SIMPLE STONE SOUP
# 6-Quart Slow Cooker – 5 Hours on High –
# Assemble Early in the Day

**The Stones:** 3 red small boiler potatoes for the stones. 3 students are selected to put one in apiece.

**Soup Ingredients (prepare ahead of time if need to) ((can be any vegetables out of the garden, including greens)):**

- 1 quart (4 cups) filtered water
- 4 chicken bouillon cubes
- 1 tbsp raw apple cider vinegar
- 1 medium onion, diced
- 6 red or white boiler potatoes, quartered
- 5 medium organic carrots, sliced
- 4 organic celery stalks, sliced
- 2 medium zucchini, sliced thick (or use 1 cup frozen green beans)
- 2 cloves garlic, sliced
- 2 tbsp chopped fresh parsley
- 1 tbsp crumbled fresh thyme

**Seasonings**

- 1 tsp sea salt (may have more to taste)
- 1 tsp freshly ground black pepper
- 1 tsp dried basil
- 1 tsp dried oregano

**Instructions**

1. Pre-chop and have ready all of the ingredients before inviting your children to help. (I use a one-quart jar to place the water and vinegar in. I also recommend placing the soup ingredients into separate bowls to make it easier for your kids to add them.)
2. Read the book Stone Soup together.
3. Then, have each of your children place one small potato piece for a stone into a 6-quart slow cooker. Sing the following Stone Soup song: https://www.youtube.com/watch?v=alkzLOkr_FI
4. Next, have your kiddos add each of the soup ingredients, starting with the seasonings.
5. To make it even more fun, place the pre-chopped veggies in various areas of the room. That way, as you call out what you need for the soup, your children can play-act the story and take turns running around to find the requested ingredient.
6. Cover and cook on high 5 hours.
7. Ladle soup into individual serving bowls and enjoy the magical taste of healthy homemade stone soup!

OUTDOORS ❀ GRADES 2-5 ❀ FALL, SPRING ❀ ACTIVITY

# Space Travelers

**DESCRIPTION**

Students work in small groups as space travelers trying to decipher the composition of soil.

**OBJECTIVE**

To explore the composition of various soils.

**TEACHER BACKGROUND**

Soil is something all of us take for granted. However, it is one of the necessary life-sustaining ingredients of our planet. And soil is exciting! It varies dramatically within a small area. When students explore the surface soil (topsoil) they will discover many living things, including roots, earthworms, and insects. In addition, the topsoil contains humus (the high-nutrient component of the soil that is formed by decayed organic matter) and rock particles. As students dig deeper, the soil composition changes.

Soil formation is a very slow process. Each inch (2.5 cm) of topsoil requires more than 100 years to form, by the processes of weathering and decomposition. Weathering, caused by rain, wind, freezing and thawing, glaciers, and plants, breaks down rocks into tiny particles — the inorganic part of the soil. Bacteria, fungi, and other living things slowly decompose nutrients, such as leaves and twigs, recycling them into humus — the organic matter in soil. Soil is alive: More than 100 billion microorganisms live in a pound (0.45 kg) of soil.

**MATERIALS**

- ❀ Two trowels per team of three
- ❀ One hand lens per team
- ❀ Tweezers
- ❀ Newspaper
- ❀ Science journals

**CLASS DISCUSSION**

Ask students to close their eyes. Read the following in your most alien voice:

> Imagine that we are scientists from the planet Zog, journeying to planet Earth on the Star Ship Zogma. We have been chosen to make an important journey. The people of Zog are growing tired of raiding other planets for food, and want to find out how to grow our own food. Our astronomers have detected a faraway planet called Earth, which appears to be covered in green plants. Our computers have analyzed the reason for this and it appears to be a combination of sun, water, air, and a brownish-gray substance called "soil." On Zog we have plenty of sun, water, and air, but no soil covering the rocky ground. It is difficult for us to believe that all their food comes from this substance. Our mission as scientists is to find this material called "soil," dissect it, and record each and every ingredient for our computer. This will allow us to learn the secret of this material so we can make soil back on planet Zog. Upon landing we will break into groups of three scientists, with two soil dissectors and a recorder in each team. Each team will use the specially designed tools that our engineers have created just for this purpose.

Remember: It is crucial to the success of our mission that each and every substance found in the soil be recorded. Good luck to all of you. Long Live Planet Zog!

**ACTION**

1. Divide students into groups of three and give each team a trowel, some newspaper, and a hand lens. Have them explore soil in different areas of the garden and schoolyard by digging up a trowelful and placing it on the newspaper. Have two students in each group dissect the soil, identifying each substance found. Have the third student in each group record the soil ingredients in his or her journal.

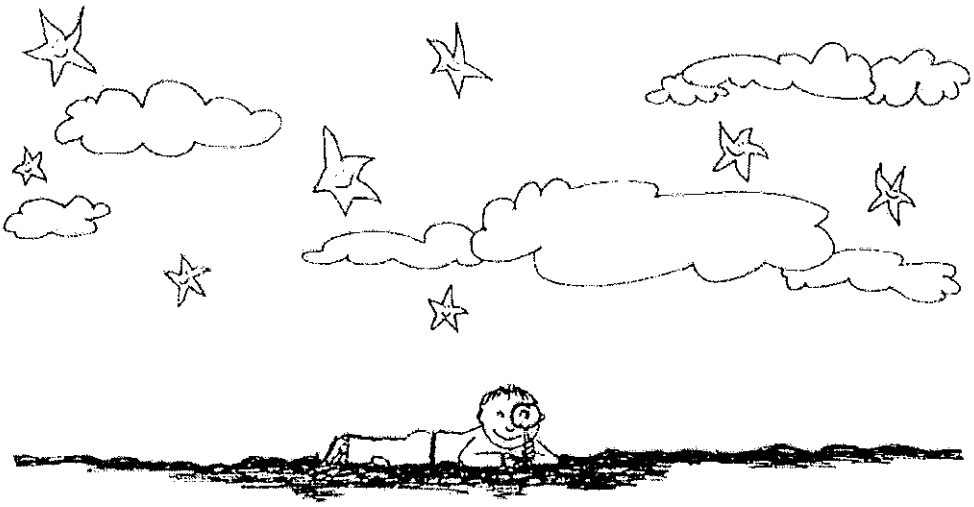
2. Upon completion of the task, ask teams to compare and contrast the soils they investigated. Ask them to report for the class the ingredients of their soil. Have the groups discuss the ingredients they found: crushed rocks, crumpled leaves, twigs, bugs, sand, and so on. Many groups will list among their ingredients "dirt" or "brown stuff." Challenge them to figure out what the brown stuff is. The simplest answer: It's just smaller pieces of all the other ingredients.

3. Assign some of the listed ingredients to each team and ask them to return with a small quantity of each ingredient.

4. Upon their return, challenge teams to use the raw ingredients to manufacture soil by scraping rocks together, breaking twigs apart, and so on. When the frustration level of the students is reached, ask them whether or not soil can be made by hand. Why not? Explain that each inch (2.5 cm) of topsoil requires more than 100 years to form, by the processes of weathering and decomposition. Our hands and tools cannot equal the power of weathering and decomposers! Also, soil is alive, with more than 100 billion microorganisms living in a pound (0.45 kg) of soil, in addition to the roots, insects, worms, and other living things we can see in the soil. There is no recipe that could duplicate this substance so full of life and so necessary for life!

**WRAP UP**

Will the super computer on planet Zog be able to manufacture soil? How is soil important to Earthlings' lives? Could Earthlings make more soil if we lose what we have to erosion or pollution? Is soil alive? How? Do all materials in soil decompose at the same rate? What do earthworms do for the soil?



CREATING GARDEN ART

# Stone Paperweights

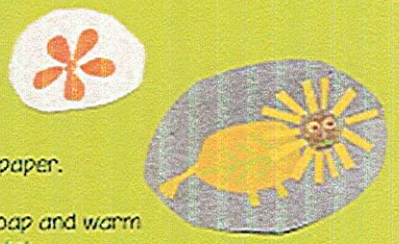
**Time: 1 hour  Any Season  Indoor/Outdoor**

Paperweights make delightful decorations for the home and great gifts for friends and family. Let's use the natural beauty of garden plants and stones to create our own paperweights.

## Let's Gather:

- newspaper
- soap and warm water
- flower petals
- a smooth stone that is heavy enough to hold down papers but small enough to hold in one hand
- blades of grass
- leaves
- a paintbrush
- decoupage (found in craft supply stores)
- glue

**ALWAYS ASK A GROWN-UP BEFORE YOU START**



## Let's Get Started:

1. Cover a table with newspaper.
2. Wash your stone with soap and warm water. Let it dry completely.
3. While your stone is drying, walk around the garden and gather flower petals, blades of grass, and leaves that can bend easily. You will use these to make a design on your stone.
4. Once your stone is dry, arrange the petals, leaves, and grass blades on your stone to make an image that you like. You can make a picture of something or create a whimsical design.
5. Set the flower petals and blades of grass aside. Use the paintbrush to cover the entire top of the stone with a thin layer of decoupage.
6. Place the petals and blades of grass onto your rock in the design that you created. If they do not stick to the decoupage, use the glue to make sure they lie flat.
7. With the paintbrush, paint decoupage over your entire stone again, this time gently painting right over the flower petals and blades of grass.
8. Let the decoupage dry completely. Add more layers of decoupage until all of the petals and grass blades lie flat. Allow each layer to dry before adding another one.

**Tip**

**You now have a paperweight that will bring the garden's beauty into any room!**

*From Life Lab's Kids' Garden Activity Cards www.lifelab.org*