


What's Happening?

Thread: WHAT'S HAPPENING?

What's *Happening?* is an opportunity to explore, observe, discover, and examine how people, plants, animals, and communities change over times. This Thread focuses on building understanding of human and natural life cycles, adaptations, and transformations, as well as the interplay between the human and natural world. By studying how someone or something changes over time, students learn that our world is cyclical and in a constant state of flux. By returning to a place or concept throughout the year, students form a deep understanding and appreciation of their place—which is foundational to cultivating stewardship.










WHAT'S THE Big Idea?

 **Cycles:** Every organism and every system goes through different stages.

 **Change over time:** All organisms, places, and systems are constantly changing.

Enduring Understandings

-  Change is part of life: all things change, and can adapt to change.
-  Change is always happening, but may not be seen as it occurs.
-  Change occurs at different rates and on different scales (change can happen fast or slow; it can be a big change or a little change).
-  By comparing the past to the present we can detect change.
-  Cycles have no beginning and no end; they are continuous.
-  There are all sizes and shapes, types and lengths of cycles (e.g., butterfly life cycle, seasons, a production chain, bus routes, phases of the moon).
-  We can impact cycles, and how things change or do not change.

Connecting beyond the Classroom

Family Connections

What's Happening? offers many easy and rich opportunities for families to continue learning with their children at home. Share with families the Essential Questions, Big Ideas, and Enduring Understandings of the Thread. Ask families to use this language at home with students to

facilitate transfer of children's learning. Invite families to send in photos of their child (or other family members) throughout years, showing how they've grown and changed. Seek stories and photos documenting changes in your community or neighborhood. Suggest that families talk with their child about how their family has changed over time (origins, location, new family members), or how the child's own bedroom has changed as they've grown (for example transitioning from a crib to a bed). Families may also be able to donate older digital cameras for children to use as they document "what's happening."

Service-learning Opportunities










Service-learning engages children in improving the quality of life in their community through meaningful curriculum and focused learning activities. As children explore What's Happening throughout the seasons, they can take part in caring for their environment by raking leaves, shoveling snow, spring clean-ups, or weeding gardens. Build a collection of child-sized tools for these tasks to give children the option of participating in this valuable service-learning work. Organizing a campus or neighborhood day of service (raking leaves in the fall, shoveling in the winter, cleaning up or planting in the spring) when your whole community works together also provides a great opportunity to learn about seasonal cycles and build community.

Community Connections

Children can discover the many ways their community has changed over time by connecting with local people and organizations. Partnering with a retirement community, historical society, or local museum can provide glimpses of the past while building and strengthening existing relationships. Your local newspaper or library can provide a record of community history through text and photos. To explore seasonal cycles in the community, check out seasonal programming offered by your local parks and recreation departments or YMCAs. Connect with a local meteorologist, and invite them to visit your classroom. Observe the trees in your neighborhood: how do they change over time? Set up a bird feeder that is easily visible from your classroom and observe what occurs. Daily or weekly civic routines can also offer opportunities to observe cycles in your community, and can lead to further inquiry: Bus routes: children can collect data on how often buses come, map the bus routes, and could even take a field trip to ride a bus route. Garbage and recycling pickups: children can discover when these pick-ups occur, and explore where the discarded materials go after they are picked up. As you focus on "what's happening?" many options for connecting to the community will emerge.

People *& groups* in your community

Connect with these people, organizations and places to explore changes and cycles in your community.

-  Retirement community
-  Historical society
-  Museum
-  Newspaper
-  Library
-  Town recreation department
-  Meteorologist
-  Bus systems
-  Garbage/recycling companies

Dear Families,

We are so excited to be embarking on an exploration of **What's Happening?**

We wanted to share our plans with you so that you might discuss what we are learning with your child. For this study, the question "What's Happening?" will guide us as we explore:

- how people, plants, animals, and communities change over time and throughout the seasons
- human and natural life cycles, adaptations, and transformations
- the relationship between our human and natural worlds

Our goal is to help your child develop a strong understanding of the **cycles** of life and how all things **change over time**. They'll come to understand that:

- Change is part of life: all things change, and can adapt to change.
- Change is always happening, but may not be seen as it occurs.
- Change occurs at different rates and on different scales (change can happen fast or slow; it can be a big change or a little change).
- By comparing the past to the present we can detect change.
- Cycles have no beginning and no end; they are continuous.
- There are all sizes and shapes, types and lengths of cycles (i.e. butterfly life cycle, seasons, a production chain, bus routes, phases of the moon).
- We can impact cycles, and how things change or do not change.

We invite you to send in photos of your child's (or other family members') life throughout years, showing how they've grown and changed. To extend our study at home, you can talk with your child about how your family has changed over time, or even how your child's own bedroom has changed as they've grown (for example, transitioning from a crib to a bed). Another great way to observe change together as a family is to watch the moon and record its appearance over the course of a month!

If you have an old digital camera that you'd be willing to donate to our classroom we'd greatly appreciate it. We'll be learning to take photos as we document how things change!

Thank you!

WHAT'S the "BIG IDEA?"

Cycles: Every organism and every system goes through different stages.

Change over time: All organisms, places, and systems are constantly changing.

Self-guided Opportunities

Loose Parts

Try including natural materials such as leaves from different seasons, seeds, and other seasonal outdoor artifacts such as helicopters (seed pods from maple trees), acorns, or burdocks. As always, building blocks should be offered, and can be a great tool for building three-dimensional maps. The classroom Explore Table can host the elements (water, ice, snow, soil, leaves). In your outdoor area, a mound of dirt and a variety of kid-sized tools can provide a great opportunity for children to effect change over time as they play in and redistribute it. Encourage children to add to the Loose Parts collection as they discover seasonal artifacts on their adventures, and notice with them how these treasures change with the seasons.

Dramatic Play

There are countless ways for children to play out “what’s happening”—your collection may include a stockpile of clothes for a variety of different weather conditions (don’t forget the sunglasses), mirrors, and dress up clothes from different eras. In the playhouse area, children can travel through time with historical or futuristic household props (rotary phones, cell phones). Kitchens of the past can easily be recreated with a cardboard box for a cooking hearth, and a few simple cooking pots and long-handled wooden spoons. Garlands of leaves (both summer’s green and fall’s warm spectrum) can be found at craft stores and serve as great props for imaginative play.



Outdoor Play

The outdoors provides an incredible canvas for observing cycles and change. Encourage the children to make observations and ask questions about what they experience, and help them make connections to the past and predict what they might experience in the future. Tools such as cameras and journals allow children to record their observations and practice their fine-motor skills. A variety of child-sized tools to move dirt, leaves, or snow will also allow children to engage directly with “what’s happening” outside. Once you’ve introduced the “Sit Spot” (see p.135), encourage children to return on their own to their spot and journal or simply sit.

Art

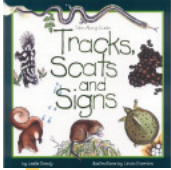
Watercolors are a great medium for children to capture the sky and weather on paper. Encourage children to collect seasonal treasures on their outdoor adventures and use these items in art projects. Explore

Linda's Picks

for WHAT'S HAPPENING?



Animals in Winter by Henrietta Bancroft and Richard G. Van Gelder. Harper Collins, NY, NY, 1997.



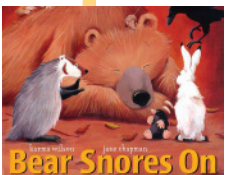
Tracks, Scats and Signs by Leslie Dendy. Northword, Merrimack, NH, 1995.



Leaf Man by Lois Ehlert. Harcourt Childrens Books, Boston, MA, 2005.



Planting the Wild Garden by Kathryn O. Galbraith. Peachtree Publishers, Atlanta, GA, 2011.



Bear Snores On by Karma Wilson. Simon and Schuster, NY, NY, 2002.



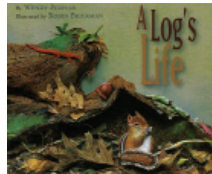
Two Old Potatoes and Me by John Coy. Dragonfly, 2009.



Flower Garden by Eve Bunting. Sandpiper, 2000.



Pumpkin Circle by George Levenson. Tricycle Press, Berkeley, CA, 1999.



A Log's Life by Wendy Pfeffer. Aladdin, NY, NY, 2007.




If You Find A Rock by Peggy Christian. Sandpiper, 2008.

the waste and recycling cycles as you transform “trash” into “treasures”—provide egg cartons, berry baskets, bottlecaps, strings, fabric scraps, anything really, for children to “upcycle” into new creations. Whatever their medium, encourage children to capture their observations of What’s Happening in their artwork.

Numeracy

With cycles and change at its core, *What's Happening?* is all about patterns: weather, seasons, calendar, bus routes. Encourage children to notice and name these patterns. Creating and using sequencing cards that help children write or create a sequence or cycle are great ways to understand changes and cycles. Recording the weather through measurement of the temperature, or collecting data about the amount of leaves left on a tree, provide opportunities to compare and contrast days, weeks, months, and seasons. Help children notice change, and the different rates and sizes of



changes. Record each child's height several times throughout the year so they can watch themselves grow! Create graphs and charts with children to organize and analyze the data you've collected.

 **Explore Table**

Set up a place in the classroom for children to investigate and explore. A plastic bin filled with worms and compost will allow them to observe and touch materials as they decompose and transform into soil. Provide cloud charts or other field guides to the natural world. Bring the elements into the classroom: snow, ice, leaves, and soil are all fantastic things for curious children to explore. Many classroom hatch chicks from eggs; use this as an opportunity to talk about life cycles and change.

What's Happening?

WHAT'S THE
Big Idea?
Cycles
Change over
Time

Facilitated Learning Experiences:

KEY: 🏠 Community • 🍎 Food & Farming • 🌿 Nature

EVERY SEASON	
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Owl Eyes

WHAT'S HAPPENING?

EVERY SEASON



WHAT'S THE
Big Idea?
Change over
Time

Enduring Understandings

- Observation skills help us detect change over time.
- Good observation skills can be perfected through practice.
- Everything changes.
- By comparing the past to the present we can detect change.

Materials

- photo, puppet, or image of owl posted somewhere visible in the room



Objectives

- Children demonstrate the ability to notice small physical changes.
- Children experiment with making small changes in their appearance and/or surroundings to help others perfect their observation skills.
- Children show interest and curiosity in how the natural and built worlds change.

Directions

1. Gather the children on your rug or meeting area. Explain that throughout the year they will be exploring their schoolyard and neighborhood. To explore, they will need to be good observers. Ask, “What is a good observer?” and “What does a good observer need to do?” After discussing the skills of looking carefully and slowly, ask if they know of an animal or bird that is a good observer. Tell them of all the animals they have mentioned, you would like them to develop “owl eyes.” Place your fingers around your eyes to make large owl eyes. Look slowly and carefully around the room; ask the students to do the same. Have an owl puppet or picture somewhere in the room and ask them to find the owl with their “owl eyes.” Once they have spotted it, ask them to hoot softly like an owl.

Extensions

- ***Can You Find Me? A Book About Animal Camouflage*** by Jennifer Dewey
- ***I See Animals Hiding*** by Jim Arnosky
- ***Sky Tree*** by Candace Christiansen and Thomas Locker
- Place five to ten objects relating to a topic (such as, rubber or plastic frogs, salamanders and dragonflies if you are exploring a pond habitat; or spiders, millipedes, and snakes if you are exploring the forest floor) on a tray or table, have children observe the objects, children close their eyes as you remove one of the objects. At the count of three, children open their eyes, raise their hand if they can identify the missing object.
- When outdoors in a familiar place, have children observe their surroundings, then walk away as two of their classmates make a subtle change in the area. The class walks back and tries to identify the change.
- On weekly walks, take photos of a tree, building, garden, etc. Compile the photos into a book where the children can identify the changes, if any, throughout the year.
- Look for animal tracks, tame and wild, around the schoolyard. Have children use their awesome observation skills to identify which animal left the tracks.

2. Explain that they will test their “owl eyes” again in the “Owl Eyes” game. They will be using their “owl eyes” to detect changes. Have a child stand in front of you and use their “owl eyes” to take a picture of you with their mind’s camera. Then have the child turn away from you while you change one small part of your physical appearance (e.g. take off your sweater, roll up a pant leg, put on a hat, or change your hairstyle).
3. Ask the child to turn around, look closely and make up to five “educated guesses” to deduce what has changed. Most people, children included, want to name the change right away. In an effort to put the focus on observation skills, encourage the observer to ask more general questions first. For example, “Did you change something from your waist up?” Have the observers keep track of the guesses by raising a finger for each guess. Encourage the use of all five guesses to build the practice of asking good questions that move from general to specific. This will help children focus more on learning to ask good questions rather than focusing on getting the “right” answer.
4. Once you have modeled the process, pair up the children to play “Owl Eyes” with their partner. The children can take turns being the “observed” and the “owl.” After the owl has guessed correctly or used up five guesses, they switch roles.
5. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- What do you see?
- What, if anything, has changed?
- How do you notice changes? (Help children think about strategies and process: do you scan from top to bottom, looking at specific areas, etc.)
- How do you keep in your mind what you saw and how it changed?
- What are some good questions you can ask to help you determine what has been changed?

Shake it, Shake it Shake it! (Buttermaking)

WHAT'S THE Big Idea?

Change over
Time

Enduring Understandings

- All things change.
- We can impact how things change or do not change.
- Change occurs at different rates and on different scales (change can happen fast or slow; it can be a big change or a little change).

Objectives

- Children discover that liquids can change into solids.
- Children experiment with turning heavy cream into butter.

Directions

This activity can be done on its own, as part of a study on solid and liquids, or as part of a dairy unit.

1. Discuss with children their ideas on how butter is made. Record their ideas.
2. Read the book, *Brown Cow, Green Grass, and Yellow Mellow Butter* by Ellen Jackson. Did anyone have the right method?
3. Gather your group into a circle, explaining that they will all need to help turn this heavy cream into butter. Heavy cream is the thick, fat-rich part of milk with a fat content of 36–40%. If fresh, unpasteurized milk is left to sit, cream rises to the top. Allowing the cream to reach room temperature will speed the transformation into butter.
4. Fill a small glass or plastic jar with $\frac{3}{4}$ cup of heavy cream. Make sure the lid is on tightly, and hold it with two hands as you begin to shake it up and down. After demonstrating how to shake, pass the jar around the circle.
5. As the first person is shaking, ask everyone to shake their hands as you all sing the first verse of the Butter Song. Pass the jar with each new verse.
6. As each verse is sung, shake a different part of your body. Sing it louder, softer, sing it in the language of cows, sheep, pigs!
7. Check the jar occasionally by opening the lid. Pass

WHAT'S HAPPENING?

EVERY SEASON



Materials

- *Brown Cow, Green Grass, and Yellow Mellow Butter* by Ellen Jackson
- heavy cream, at room temperature
- a jar with a lid, capable of holding one cup of liquid
- small colander, a bowl, and butter knife
- soda crackers

“Shake It” Song

Sung to the tune of “I Have Something in My Pocket” or the “Brownie Smile Song”

We're going to make some butter,
Rich and creamy too,
With milk from a cow's udder
Before you can “moooo.”

Chorus:

So shake, shake, shake it,
Shake it if you can,
Shake it like a milkshake
And shake it once again.

Pour some cream into a jar,
Get a friend or two,
Make sure the lid is on tightly,
That's all you have to do.

Chorus

We're learning while we're churning,
Hey, this is lots of fun,
It's easy to make butter,
Let's eat it when it's done.

Chorus

Oh, listen very carefully,
It's sounding different now,
Hooray, it's finally butter!
Be sure to thank a cow.

Extensions

- With older children, divide them into groups of 3–5. Give each group a sampling of utensils such as a bowl, colander, fork, whisk, egg beaters, small jar with a lid, and beaters without the mixer, along with a ½ cup of heavy cream. After looking at the utensils, have each group write a plan for turning cream into butter, specifying what utensils they will use. Once they have a plan, begin the process. As students enjoy the benefits of their inquiry, have them evaluate the success of their plan.
- Chill butter in old-fashioned butter molds. Decorate the butter with sprigs of fresh herbs or edible flowers.
- Make flavored butters such as honey butter. Add raspberries and a bit of sugar.
- ***A Cow, A Bee, A Cookie and Me*** by Meredith Hooper and Alison Bartlett

it around so everyone can see that something is happening. It will thicken into a whipped-cream consistency, but it is not butter yet.

8. After 5–10 minutes, listen for the sound of liquid sloshing in the jar. A pale, thin liquid—the buttermilk—will be surrounding the butter. Sing the final verse.
9. Carefully, pour the contents of the jar into the colander. As the buttermilk passes through, a beautiful lump of yellow butter will remain. Rinse the butter with cold water to remove all of the buttermilk if you plan to store it. This is not necessary if you plan to eat the butter immediately. The buttermilk can be reserved for use in baking.
10. Spread the butter on crackers and eat. As you enjoy the butter, process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- What did you expect would happen to the cream before we started?
- What happened to the cream?
- Can you think of anything else that changes from a liquid to a solid? Or a solid to a liquid?

Sit Spot

WHAT'S THE
Big Idea?
Change over
Time

Enduring Understandings

- Change is always happening, but may not be seen as it occurs.
- Change occurs at different rates and on different scales (it can happen fast or slow; it can be a big change or a little change), you have to be observant to notice.
- By comparing the past to the present we can detect change.
- Returning to the same location on a series of occasions gives us the opportunity to witness change over time.

Objectives

- Children discover what's happening as they cultivate their observation skills.
- Children show interest and curiosity in changes happening all around them.
- Children become aware of changes in their community, natural and built.

Directions

It can be helpful for children to develop their “owl eyes” (p.131) prior to beginning this experience.

1. Explain that today children will be finding a special spot that will be their “Sit Spot.” They will have a chance to visit their sit spot many times. While they are in their sit spot, their job is to quietly sit still as they use their “owl eyes” to notice everything they see, hear, and feel. Sometimes they will stay at their sit spot for only a couple of minutes, other times they will be there longer. Set any guidelines for choosing a sit spot, such as safety considerations, ability to see a teacher, etc.
2. Go outside to your sit spot area and encourage children to pick a spot. Ask them to sit silently and use their “owl eyes” to observe what's happening. Build children's capacity for sit spots by starting with a minute or two and eventually progressing to longer sits.
3. Gather the group together and process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.
4. Repeat the “Sit Spot” practice regularly.

Discussion Questions

- What did you notice? What did you see? Hear? Smell? Feel?
- What's happening?
- What has changed since the last time you visited your sit spot? What is the same?
- What are you wondering?

WHAT'S HAPPENING?

EVERY SEASON



Materials

outdoor space with enough places for children to spread out and find a spot where they are still visible for supervision

Extensions

- Let children bring a journal to their sit spot to record their observations. Share their journaling when you debrief.
- Change the focus of the sit spot from external to internal attention. Ask children to go to their sit spot and close their eyes while they pay attention to their breath as it enters and leaves their body.
- Could the children take turns using the class camera to take photos of their spot to record changes. Use photos in a book about their sit spot or a class book about the various sit spots.



Camouflage

WHAT'S THE Big Idea?

Cycles
Change over
Time

Materials

None

Enduring Understandings

- In order to survive, many animals have adaptations, such as camouflage, to aid their survival as either the predator (the hunter), or the prey (the hunted).
- Camouflage is the coloration or patterns that help an animal to appear to blend in with its surroundings to aid in its survival.
- Some animal fur changes colors in the winter to blend in with the white snow.
- Poisonous, brightly colored creatures provide a warning system to predators: "Don't eat me!"

Who Eats Who?

Camouflage: Adaptation that allows animals to blend in and hide from predators, or to be a well hidden predator that can sneak up on its prey.

Herbivores: Animals that eat only plants.

Omnivore: Animals that eat plants and other animals.

Carnivores: Animals that only eat other animals.

Predators: Carnivores and omnivores that hunt for prey.

Prey: Animals being hunted by other animals for food.

Objectives

- Children cultivate their visual discrimination skills.
- Children discover the meaning and role of camouflage.
- Children role play the predator/prey relationship.

Directions

1. Gather children into a circle. Invite them to look at their clothing. Which child would have the easiest time hiding in the winter woods? Who could hide in a summery flower garden? A muddy spring field? Discuss their color choices and combinations.
2. Have the children go and try to blend in with or match things in the room, the playground, or the forest. See how invisible they can make themselves. Encourage them not to hide behind their object, but rather try to blend in with it. If necessary, use a plastic creature to demonstrate the difference between blending in with the surface and hiding under or behind something.
3. Ask children if they can think of why an animal might want to hide or blend into their surroundings. Discuss the terms camouflage, prey, and predator.
4. After the children have practiced camouflaging themselves, pick one child to be the predator. With his or her eyes closed, the predator counts to twenty as the other children camouflage themselves in the room, playground, or forest.
5. The predator opens his or her eyes and looks around for camouflaged classmates. He or she cannot move, but may turn in circles. The predator calls out names as she spots others. Those spotted must come in and join him or her, but cannot disclose the location of those still camouflaged. The winner is the child closest to the predator who has not been spotted. The winner gets the reward for



great camouflaging, and gets to be the next predator.

6. If the children are so well camouflaged that they can't be spotted, the predator can close her eyes and count to twenty as children move even closer. The predator opens her eyes and begins the process again.
7. When the game is over, process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- What made it easy for you to camouflage yourself? What made it hard?
- Why do animals use camouflage?
- What would happen if animals couldn't use camouflage?
- What animals would be well camouflaged in winter/spring/summer/fall?

Extensions

- Play camouflage throughout the year. Have children discuss how their clothing changes through the seasons: colors, amount, or type of clothes. How do these clothing changes affect their ability to camouflage? How do the changes in the natural world affect this ability?
- Have the children create a forest creature out of sticks, grass, nuts, leaves, etc. Students then camouflage their creature on the forest floor and have the others try to find it. Discuss findings.
- Use small construction paper squares to set up a camouflage hunt in your room (make some obvious and some hard to find). See how many the children can find. Which were the easiest? hardest?
- Have the children camouflage small lengths of colored pipe-cleaners on top of a brightly colored quilt. Ask other classmates to find them.
- Set camouflage puppets, stuffed animals or rubber creatures in a wooded setting. Then, have the class stalk quietly along a trail and silently count on their fingers the creatures they spot. Discuss findings, go back and try again.
- ***What Color Is Camouflage?***
By Carolyn Otto
- ***Animals in Camouflage*** by Phyliss Linbacher Tildes
- ***Twilight Hunt: A Seek-and-Find Book*** by Narelle Oliver



Docu-Walk: What's Happening Now?

Materials

- digital camera(s) (optional)
- journals (optional)
- a large, handmade map of the school and neighborhood community (or the area in which you will take your walks)

Extensions

- Make books that document the changes you've observed with the photographs and drawings you collect on your walk.
- Gather historical photos of your community and compare the more distant past to the present day. What's changed? What has stayed the same?
- Invite elders in to tell stories of how the neighborhood has changed for them.
- If you are lucky enough to have some construction going on in the school neighborhood, document the changes through photos and children's drawings of the process.

WHAT'S THE
Big Idea?
Change over
Time

Enduring Understandings

- Change is always happening, but may not be seen as it occurs.
- Change can happen fast or slow; and be a big or a little change.
- By using our observation skills to compare the past to the present we can detect change.

Objectives

- Children cultivate their observation skills.
- Children demonstrate an awareness of the natural and human communities they are a part of.
- Children show interest and curiosity in what's happening all around them.
- Children discover that they can detect change by comparing the past to the present.

Directions

Consider taking Docu-Walks regularly. The more frequently children visit and observe what's happening around them, the more data they will have to compare the past to the present. It can be helpful for children to develop their "owl eyes" (p.131) prior to beginning Docu-Walks.

1. Look at the map of your community with children. Talk about the places they've been and the things they've seen. Once you have completed a couple of Docu-Walks, look at the photographs and drawings from previous trips.
2. Venture out on your walk. Stop along the way as children notice things. When you notice evidence of changes, point them out (i.e., "Look at this tree: all the leaves have fallen off." or "Look! This store is closed today but it was open last time we walked by.")
3. Document what you find as you walk, either in photographs or journals. When you return to the classroom, add pictures taken or drawn by the children to your learning wall. Documentation of the same sights (and sites!) over time will allow children to "see" change. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- What did you observe?
- What's happening today?
- What's changed since last time? Why might it have changed?
- What's the same?
- What do you predict might be different next time we go out?
- What are you wondering?

Pumpkin Paradise

WHAT'S HAPPENING?



FALL

WHAT'S THE
Big Idea?
Cycles

Enduring Understandings

- All living things have needs.
- Food comes from nature: from plants and animals.
- Pumpkins, like all plants, have a life cycle.

Objectives

- Children show interest and curiosity in the life cycle of the pumpkin.
- Children discover that pumpkins make good eating.
- Children experiment with baking and measuring.

Directions

Grow pumpkins in your school garden, if possible. If not, visit a pumpkin patch so that each child can harvest a pumpkin of his or her own.

1. Ask the children where a pumpkin comes from: It grows on a plant. How did that plant grow? Challenge the students to figure out the life cycle of a pumpkin. Hand out the pumpkin life cycle cards to the students. Ask them to arrange themselves in order from seed to pumpkin pie.
2. After the group feels they are in the correct order, have them tell a story of a pumpkin seed growing up. Move from student to student, each describing the picture they are holding as a part of the story. When finished, students can color in their own pumpkin cycle and write (if appropriate) their own pumpkin life cycle story.
3. Read *The Pumpkin Circle* by George Levenson. Discuss the life cycle of the a pumpkin, and the different things you can do with pumpkins.
4. Show the children the pumpkins, and cut the top open. Have the children help scoop out the inside and harvest the seeds to roast and eat (see recipe on next page). Cook the pumpkin,

Materials

- *The Pumpkin Circle* by George Levenson
- pumpkins
- ingredients and equipment for making pumpkin muffins (see Recipe Card on next page)
- "Pumpkin Life Cycle Cards," (Appendix p.235)

Note:

FRUITS are defined as the part of the plant that develops from the flower after a flower has been pollinated. The fruit contains the seeds to start a new plant.

VEGETABLES are defined as any edible part of a plant that does not contain a seed. Vegetables are the roots, stems, leaves, and flowers of plants.



Extensions

- **The Pumpkin Circle: A Story of a Garden** by George Levenson



- “Weight Guess:” Find 4 or 5 pumpkins in a variety of sizes. Weigh each pumpkin and write the weight on the bottom in permanent marker. Have students pick each pumpkin up and estimate/guess how much each ways. For perspective and comparison, have a 5-pound bag of sugar and a pint of cream (weighs a pound) Have a sheet for each pumpkin for students to record each of their guesses. Gather together and weigh the pumpkins or peek underneath for the real weight and compare to their guesses.
- “Fruit Vegetable Sort:” Using a bag of groceries you have purchased at the store, sort the produce in piles of fruit or vegetable (see box on previous page). As you investigate each fruit or vegetable, cut them up to see if seeds are inside. End this activity with a taste test of what you have sorted.

remove the skin, and mash it.

5. Make pumpkin muffins with the children. Let the children experiment with measuring ingredients and stirring. Before beginning any cooking project with children be sure to review good hygiene.
6. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- Where do pumpkins come from?
- What came first, the pumpkin or the seed?
- What parts of the pumpkin can you eat? (*seeds, pulp, flower*)
- What do people do with pumpkins?

Pumpkin Paradise Muffins

Prep time: 15 minutes | Cooking time: 18–22 minutes

INGREDIENTS

1 ½ c. whole wheat flour
¾ c. honey or sugar
1 tsp. baking powder
1 tsp. baking soda
pinch of salt
1 tsp. cinnamon
1 c. cooked pumpkin
2 large eggs lightly beaten
½ c. canola or vegetable oil
1 c. plain or vanilla yogurt
or applesauce

INSTRUCTIONS

1. Preheat oven to 400°F. Spray muffin tins with cooking spray.
2. Mix flour, sugar, baking powder, baking soda, cinnamon and salt in large bowl. In a separate bowl whisk together pumpkin, eggs, oil, and yogurt. Combine wet and dry ingredients until just blended
3. Spoon batter into muffin tins until ¾ full. Bake for 18–22 minutes or until toothpick comes out clean.
4. Transfer muffins to rack to cool.

Roasted Pumpkin Seeds

Prep time: 20 minutes | Cooking time: 20–25 minutes

INGREDIENTS

Pumpkin
2 Tbsp. olive oil
Salt to taste

INSTRUCTIONS

1. Preheat oven to 275°F.
2. Scoop the seeds out of a pumpkin. Remove as much of the pulp as possible.
3. Rinse the seeds in a colander, then dry the seeds with a paper towel.
4. Spread the seeds over a cookie sheet, sprinkle on the olive oil and add salt.
5. Cook for 20–25 minutes. Check often so they don't burn.

Putting the Garden to Bed

WHAT'S HAPPENING?



FALL

WHAT'S THE
Big Idea?

Cycles
Change over
Time

Enduring Understandings

- Change is part of life: all things change, and can adapt to change.
- Plants have a life cycle.
- Fall is the time when most plants in the garden have died and we need to get the garden ready for winter.

Objectives

- Children demonstrate an awareness of a plant's life cycle.
- Children cultivate a taste for a variety of vegetables.
- Children show interest and curiosity about what is growing in the garden.
- Children discover that not all plants grow above the ground.

Directions

If you are fortunate enough to have a school garden, fall is the best time to be in it. Most produce has been harvested and it is time to see what is left and if it is edible. If you don't have a school garden, find a parent, grandparent, or a community garden group that will allow your class to help put it to "bed."

1. Ask the children what they think may still be growing in the garden. Explain that you are going to "put the garden to bed" until next spring by harvesting any food that is left, and then cover up the garden with a "blanket" of hay or leaves for the winter.
2. Venture out to the garden and survey what is there. Plan your work, and locate and harvest any remaining food.
 - a. Root vegetables such as **carrots, turnips, radishes** can be harvested later into the season after the first frost. Wiggling and giggling is the best method for young ones to get them out in one piece.
 - b. Harvesting **potatoes** is like digging for gold! Make sure to plant potatoes in your garden. (They grow well in containers, too). Children will dig for quite some time in hopes of finding

Materials

- a garden, ideally with potatoes awaiting harvest
- small trowels, child-sized shovels
- baskets or bags for harvested goods
- hay or leaves (enough to cover garden bed)



harvesting potatoes is like digging for gold!

Extensions

- **Two Old Potatoes and Me** by John Coy
- **The Enormous Potato** by Aubrey Davis
- Play hide-and-seek in the old corn stalks once all the corn has been harvested.

another potato! Digging with your hands works best so as not to chop into the potatoes and it seems there is always one more tiny potato growing in the soil.

- c. **Kale** is one of the last vegetables to go and can be harvested right up to the first heavy frost.
3. Pull the last of the plants from the garden to put into the compost pile.
4. Have the children lay hay or leaves on top of the beds for a winter blanket.
5. Return to the classroom and process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- What did we find in the garden? How many different plants can you remember?
- How did these plants get here?
- What else might have been here during the summer?
- Why did we take out the old, dead plants?
- What will happen to the garden over the winter? What will happen in the spring? Next summer? Next fall?
- What was your favorite part of putting the garden to bed?

Roasted Roots

INGREDIENTS

Any assortment of root vegetables: potatoes, carrots, beets, turnips, whatever you have!

INSTRUCTIONS

1. Have children wash all the vegetables.
2. Preheat your oven to 350°F.
3. Chop the vegetables into about 1-inch chunks and place them in a bowl.
4. Have the children lightly coat the roots with olive oil and sprinkle with salt.
5. Place the veggies in a baking pan and cook for 20 minutes or until tender.

TIP!

Children love to help chop the vegetables. A good source for cutting tools for young children is: www.forsmallhands.com. Pre-cut your carrots and other cylindrical vegetables in half lengthwise so that they have a flat edge and won't roll. They'll be easier for children to chop!

Kale Chips

INGREDIENTS

Kale!

INSTRUCTIONS

1. Have children pick the kale, wash and dry it, and tear it into chip-size pieces.
2. Place kale pieces on cookie sheet, add some olive oil and massage the kale to distribute the oil evenly.
3. Give it a sprinkle of salt and bake at 350°F for 10–15 minutes or until the edges are brown.

Seed Hunt and Sort

WHAT'S HAPPENING?

FALL



WHAT'S THE Big Idea?

Cycles
Change over Time

Enduring Understandings

- All plants, wild and domestic, go through life cycles.
- Most plants reproduce through seeds.
- Many plants drop their seeds in late summer or fall so the seed will spend winter in the soil and sprout in the spring.
- Not all seeds look alike; each type of plant has a specific seed.
- Seeds have some similar qualities: seed coat, embryo, food storage.

Objectives

- Children understand that most plant life begins and ends with seeds.
- Children show interest and curiosity in discovering seeds.

Directions

It can be helpful for children to develop their “owl eyes” (see p.131) prior to beginning this experience.

1. Read books about seeds to children. Use the discussion questions to process the reading and gather information about seeds. Ask children what questions they have about seeds.
2. Take the children on a walk around the schoolyard, field, or forest to look for seeds (e.g., acorns, dandelions, or maple tree seeds). Distribute egg cartons or yogurt cups to children to hold the seeds they collect. Visit a school or neighborhood garden to collect seeds from vegetables or flowers that have gone by.
3. Set up a seed collection area in the classroom where children can sort and classify the seeds. Have them share their display and the others can guess how they were sorted. By color? Shape? Size?
4. As the seed discovery and exploration continues, keep returning to the discussion questions. Ask the children what other questions they have about seeds.

Discussion Questions

- Where can we find seeds?
- Do all seeds look the same? How are they alike? Different?
- What is the purpose of seeds?
- How do seeds travel?

Extensions

- “Tree Life Cycle Cards” (Appendix, p.245)
- Wear old, large, wool socks over your shoes. Examine the seeds that your socks pick up.
- Create a Seed Scavenger Hunt for children (or see Appendix, p.237).
- Plant some of the seeds. Watch what happens!

Materials

- books about seeds, such as *How A Seed Grows* by Helene Jordan and Loretta Krupinski, *The Dandelion Seed* by Joseph Anthony, *A Seed is Sleepy* by Dianna Hutts Aston, or *The Wind's Garden* by Bethany Roberts
- empty egg cartons for holding collected seeds
- magnifiers and magnifying boxes
- empty yogurt cups



Gathering the Leaf Creatures

WHAT'S THE Big Idea? Cycles

Materials

- *Leaf Man* by Lois Ehlert
- outdoor explore backpack or bag with journals, writing implements, water bottle
- old telephone books to press leaves

Extensions

- Use child-sized rakes and create large piles of leaves to jump into!
- Find the biggest leaf, the smallest leaf, the reddest leaf, the holiest leaf, etc.
- *Why Do Leaves Change Colors?* by Betsy Maestro (an informative concept book)
- Children create a class book with their leaf creatures.

Enduring Understandings

- Change is part of life: all things change and can adapt to change.
- Change is always happening.
- In the fall, leaves on the trees change color and fall off the trees.

Objectives

- Children show interest and curiosity about the changes in leaves that take place in the fall.
- Children experiment with leaves to create characters.
- Children play with fallen leaves.

Directions

1. Read *Leaf Man* by Lois Ehlert to your students. Discuss the book, and then explain that you will be going on a leaf hike to gather leaves to create interesting leaf creatures. (See p.41 for tips on creating guidelines for outdoor experiences with children.)
2. Venture outside, and hike through your schoolyard and neighborhood collecting various autumn leaves, choosing ones that have some possibilities to be turned into interesting creatures.
3. Back in the classroom, let the children create leaf creatures from their findings. Transcribe stories to go with their pictures. Compile the stories into a Leaf Creature book to share with others.
4. Talk with students about the season, explaining that each fall the leaves on many trees change color and fall off of their trees. Ask students if they know what happens to the leaves on the trees in the other seasons. Continue to process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- What different-colored leaves did we find? What different shapes?
- How would the leaves look different if it was summer?
- Why are the leaves different shapes?
- What creature did you create with your leaf? Share your creature's story.



Be a Sugar Maker

WHAT'S HAPPENING?

WINTER



WHAT'S THE Big Idea? Cycles

Enduring Understandings

- Humans can use the water cycle to their benefit.
- Sap, consisting mainly of water, can be changed into sweet syrup by heating the sap to evaporate most of the water.

Objectives

- Children role-play the maple sugaring process as they become sugar makers.
- Children experiment with taplines, funnels, and water.

Materials

Set up an area in the classroom as a sugar bush and sugar house. Hang paper trees on the walls of your room, attach “buckets” made of empty rolled oats boxes covered in foil. Fill buckets with corks or packing peanuts so children can “collect sap” and take it to be boiled in the evaporator pan. Set up the sugarhouse with the evaporator pan, a basket with wood scraps, fire gloves, and empty match box. Place “tools” in the evaporator pan such as a spatula to use as a sheeting tool, a slotted spoon to get any bugs out of the sap, and a wooden ruler to make sure there is always 2 inches of sap in the pan so it won’t burn.

Here’s what you’ll need to transform your classroom in to a sugarhouse.

- firewood
- empty match box
- simulated “fire” (for example, crumpled up red and orange tissue paper)
- heavy gloves: the pan and arch get very hot!
- buckets: to catch the finished syrup as it is poured off the pan
- ladles: used to test whether the sap is “sheeting.” As water evaporates from the sap, the sap thickens. To test the thickness, sugarmakers dip a special ladle into the sap and watch how the sap slides off. If it comes slowly off the edge of the ladle in one thin “sheet,” then the sap is close to being syrup. (See photo, p.150.)
- ruler: there needs to be 1 ½ to 2 inches of sap in the evaporating pan or it will burn.
- slotted spoon: used to remove foam that naturally occurs



tapping a tree



collecting sap



boiling sap into syrup



the evaporator pan with the fire arch underneath it

during the boiling process. It will also remove any bugs that have snuck into the sap!

- thermometer (*pretend, or broken is fine*), to test whether sap has become syrup. Sap turns into syrup when its temperature reaches 219°F.

- a tall plastic cup and stick to represent the hydrometer. The hydrometer is an instrument used to measure the density of syrup. If you add a little syrup to the hydrometer cup, and the stick in the hydrometer floats, the syrup is dense enough to pour off the pan. Sap becomes syrup when it is boiled down to 66% sugar.

- empty syrup containers

- hammers

- tree taps

- “Sugaring Tools Cards” (see Appendix, p.239)

- a cardboard box approx. 4 ft. x 3 ft. x 4 in., to make **evaporator pan** (*see photo at left*). Cover the box in aluminum foil or paint it silver. To make the evaporator pan more authentic, cut the flaps off the box before covering with foil, and use the two longer flaps as dividers in the pan.

- a cardboard box approx. 4 ft. x 3 ft. x 3 ft. to make the **fire arch**. Paint the box black and cut a door in the front. Place your evaporator pan on top of the fire arch (*see photo at left*).

- corks, packing peanuts, or some other material to represent sap. It won’t flow like liquid sap, but

children love collecting and “pouring” these sap substitutes.

- tree stump drilled with holes, extra taps, small buckets, kid-sized hammers

- *At Grandpa’s Sugar Bush* by Margaret Carney

Directions

1. Read *At Grandpa’s Sugar Bush* by Margaret Carney. Ask if any children have been to a sugar house. Do any of their families sugar?
2. Explain what is set up in the classroom—a sugar house! There is an evaporator pan with the fire arch under it, the wood, clothing, and tools to be a sugarmaker.
3. Before getting started, play the K.I.M. (“Keep in Mind”) game (read the following instructions or see Appendix, p.238). Lay all the sugaring tools out on a table or floor. Cover them with a cloth. Explain that there are tools under this cloth that sugar makers use to make maple syrup. Some will look familiar, many will not. The cloth will come off and each child is to look closely and take a mental picture of all the tools. The cloth goes back on and the fun begins! How many of the tools can the children identify? List and keep count of the items as they are mentioned. Once they’ve exhausted their memories, remove the cloth once again and go through the list to



K.I.M. game: sugarmaking tools

identify the tools and how they are used. Ask the children what they think are the steps for making maple syrup. Help them create a sugar making story that they can act out, then encourage the children to role-play making maple syrup.

4. While the children are role-playing, station yourself by an old tree stump that has tap holes drilled into it. Have children practice tapping a tree by using a small hammer to insert old taps (or “spiles”) into the holes on the stump and hanging small buckets on the taps.
5. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- How do you make maple syrup?
- What are the steps, in order?
- What happens to the sap when it’s heated up in the evaporator?
- Do you like maple syrup? What is your favorite way to eat maple syrup?
- Can you think of any other foods that come from trees?

Extensions

- Set up your water play table with tubing line, funnels, plastic cups (see above photo!)
- Use the “Sugaring Tools Cards” (Appendix, p.241) as sequence cards, to match to actual tools, or as prompts for writing stories
- Maple syrup taste testing: Have samples of real maple syrup and several samples of imitation maple syrup. If you check the labels of many commercial brands, you’ll find that they actually have no maple syrup in them but rather corn syrup, high fructose corn syrup, caramel coloring, and “natural” flavors. Using coffee stirrer sticks or small spoons, have each child sample a small taste of each. Graph their responses: Which sample was their favorite? Which samples did they think were genuine maple syrup?
- Take a field trip to see a real sugar house in action.



As an extension, set up your water play table with tubing, funnels, and plastic cups.



Sweet Sugaring

WHAT'S THE
Big Idea?
Cycles
Change over
Time

Materials

- *Sugarbush Spring* by Marsha Wilson Chall
- access to sugar maple tree(s)
- early spring weather, when days are above freezing temperatures, but nights dip into freezing
- electric drill
- taps (also called spouts or spiles)
- bucket or plastic container
- soup pot
- candy thermometer
- wool or cotton filter

Enduring Understandings

- We can impact cycles: Humans can use the water cycle to their benefit.
- Sap, consisting mainly of water, can be changed into sweet syrup by heating the sap to evaporate most of the water.

Objectives

- Children demonstrate an understanding of the sugaring process.
- Children show interest and curiosity about the water cycle.
- Children discover what happens to sap when it is boiled.

Directions

1. Ask the children, Have you ever tasted maple syrup? Do you know where we get maple syrup? Discuss the changes in the weather that signal its sugaring time, as winter turns into spring. Cold nights and warm days are a signal for the sap in trees to start moving.
2. Read *Sugarbush Spring* by Marsha Wilson Chall and talk about what had to happen to make maple syrup.
3. If possible, tap a sugar maple tree in your schoolyard. Trees that are 31–53 inches in circumference can safely take one tap, 54–75 inches 2 taps, and over

Tip!

Check www.leaderevaporator.com to purchase taps and other sugaring equipment.



Sap Facts

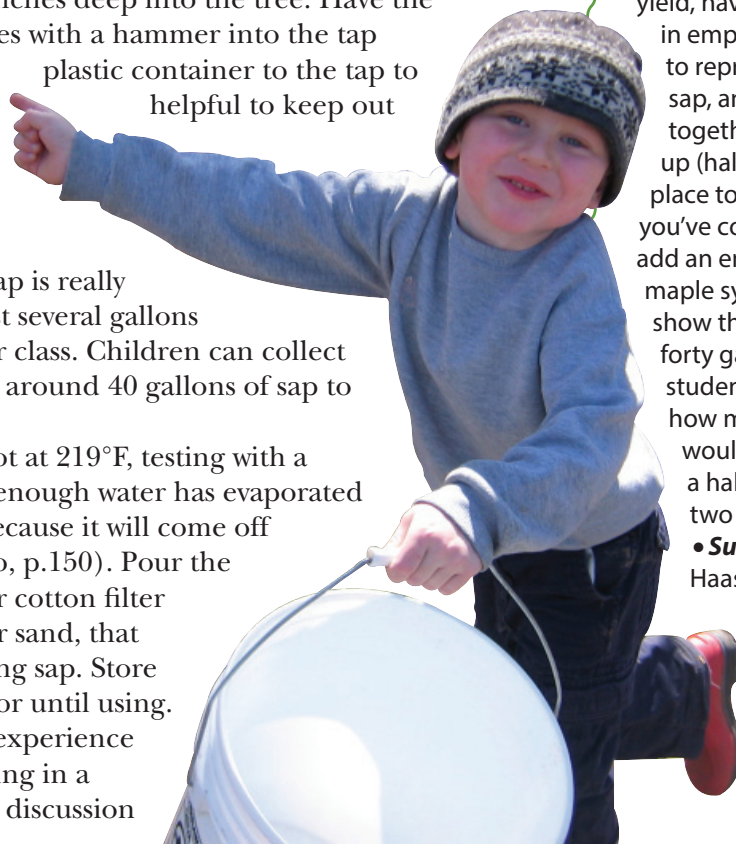
- All trees have sap but the sugar maple has a higher sugar content than other trees. Red maple and birch trees are also tapped by some sugarmakers.
- How can you tell if a tree is a sugar maple? Sugar maples have opposite branching. This means they have branches and buds directly opposite each other on a limb (unless a branch has broken off). There are four tree species that share this characteristic of opposite branching: maple, ash, dogwood and horse chestnut. Foresters call them the "MAD HORSE" trees. ("MAD" contains the first letters of the names of maple, ash and dogwood.) Once you have identified a tree as MAD, look at the bark to determine if it is a maple. Maple trees have long, irregular plates of grey-to-brown bark that lift along one edge. Also, the sugar maple's winter buds are sharply pointed, conical and brown in color.
- Sap is 98% water and 2% sugar and minerals and nutrients. It takes an average of 40 gallons of sap to make 1 gallon of maple syrup!
- Once leaves start to bud, sugaring is over as the taste of syrup is "off".



Line up 40 empty gallon jugs to visualize how much sap it takes to make one gallon of syrup!

75 inches, 3 taps. An electric drill with a $\frac{7}{16}$ or $\frac{5}{16}$ drill bit can be used to drill a hole 2–2 $\frac{1}{2}$ inches deep into the tree. Have the children gently tap the spiles with a hammer into the tap holes. Secure a bucket or plastic container to the tap to collect the sap. Lids are helpful to keep out the snow and rain. (You don't need more water!)

4. Collect sap. You are at the mercy of nature so you need to be flexible. If the sap is really flowing, try to collect at least several gallons and start sugaring with your class. Children can collect the sap. Remember it takes around 40 gallons of sap to make one gallon of syrup!
5. Boil the sap in your soup pot at 219°F, testing with a candy thermometer. Once enough water has evaporated off, you'll know it's syrup because it will come off a ladle in a sheet (see photo, p.150). Pour the hot syrup through a wool or cotton filter to remove the *niter*, or sugar sand, that naturally occurs when boiling sap. Store your syrup in the refrigerator until using.
6. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.



Extensions

- To get a sense of the volume of sap to syrup yield, have students bring in empty gallon milk jugs to represent gallons of sap, and string them together and hang them up (hallways are a great place to hang them). Once you've collected 40 jugs, add an empty gallon jug of maple syrup to the wall to show the yield from the forty gallons of sap! Have students try to figure out how many gallons of sap would be need to make a half gallon of syrup, two gallons, etc.
- **Sugaring** by Jessie Haas
- Have a pancake or waffle breakfast to use your homemade or bought maple syrup.

continued



"Sheeting" shown here, indicates that sap is now syrup!

- Use the "Sugaring Tools Cards" (Appendix, p.241) as sequence cards, or match to actual tools, or as prompts for writing stories
- Maple syrup taste testing: Have samples of real maple syrup and several samples of commercial maple syrups. If you check the labels most of the commercial syrups have no maple syrup in them but rather corn syrup and high fructose corn syrup with caramel coloring and "natural" flavors. Using coffee stirrer sticks or small spoons have each child sample a small taste of each. Graph results for favorite and/or which is "real" maple syrup.
- Take a field trip to see a real sugar house in action.

Discussion Questions

- Where does maple syrup come from?
- How do we get the sap out of the trees?
- How does the syrup turn into sap?
- Why do we only make maple syrup in the late winter

Maple Math

The number of gallons of sap needed to make a gallon of syrup varies with the sugar content of the sap. Using a special instrument called a **refractometer**, a sugar maker can determine the percent of sugar in a maple tree's sap. (The average for maple trees is 2%.) Then, using the **Jones Rule of 86**, the sugar maker simply divides 86 by the % sugar to calculate the amount of sap needed to produce a gallon of syrup.

What makes sap run?



Sap flows through a

portion of the outer tree trunk called sapwood. Sapwood consists of actively growing cells that conduct water and nutrients (ie. sap) from the roots to the branches of the tree. During the day, activity in the sapwood cells produces carbon dioxide (CO₂) gas, which is released into the spaces between the cells. Additional CO₂ dissolved in the cool sap is also released into the intra-cell spaces as the day warms up. This release of CO₂ causes pressure to build up in the cells. A third source of pressure is called *osmotic pressure*, which is caused by the presence of sugar and other substances dissolved in the sap. When the tree is wounded, like when a tap is hammered into it, the pressure pushes sap out of the tree. At night or when temperatures go below freezing, the CO₂ cools and contracts, and some becomes dissolved in the cooled sap again. Also, some of the sap freezes. All three of these factors create suction in the tree, which causes water from the soil to be drawn up into the roots and travel up through the sapwood. When temperatures rise above freezing the next day, sap flow begins again.

Source: Cornell University Extension: <http://maple.dnr.cornell.edu/FAQ.htm>

Water Goes Up and Down

WHAT'S HAPPENING?

WINTER



WHAT'S THE
Big Idea?

Cycles
Change over
Time

Enduring Understandings

- Water follows a cycle: liquid, solid and gas.
- Humans can impact a natural cycle.

Objectives

- Children demonstrate an understanding that water goes through phases of a cycle: liquid, gas and solid.
- Children show interest and curiosity in how the water cycle operates.
- Children discover how to make it rain.
- Children play with motions and dance to explore the water cycle.

Materials

- *The Water Cycle* by Helen Frost
- a visit to a working sugar house. If this is not possible you can use a pot of boiling water and a cold ceramic plate.

Directions

1. Read *The Water Cycle* by Helen Frost.
2. Observe the water cycle in action! If possible, visit a sugar house in operation to watch the steam rise off the evaporator pan, condense on the metal roof and feel it drop on your head as rain. If there is not a sugar house to visit, boil water in a medium-sized pan. As the steam rises, hold a cold ceramic plate above the steam. Have children



Extensions

- With older children, have them think of experiments where they could show the water cycle in action.
- Using watercolor paints, paint pictures of the water cycle.
- Play in the rain, jump in puddles, make snow angels.
- Observe a puddle during a sunny day, take a photo of it and document its progress as it evaporates into the air and/or percolates into the ground.
- **Water Dance** by Thomas Locker

The Water Cycle Dance

(Chant:) The water cycle goes round and round (*move your arms in a large circle over your head*)

The water cycle goes up and down (*move your arms and body up and down*)

EVAPORATION: *Say the word slowly as you start kneeling down and then slowly, waving your arms into the air, rise to standing. Repeat several times.*

CONDENSATION: *Again, saying the word slowly as you puff out your cheeks, raise your arms to make a huge circle above your head to represent a cloud.*

PRECIPITATION: *Say the word quickly, playfully as your hands and arms fall up and down like rain, louder and faster if the rain comes harder, light and daintily if its snowing.*

PERCOLATION: *Slowly repeat the word as you kneel on the ground, forming a puddle of water that will slowly seep into the ground to be evaporated once again.*

Repeat several times getting into the motions and “drama” of the water cycle!

carefully gather around to watch the steam condense into water that will drop back into the pan as “rain.”

3. After visiting the sugar house, or watching the boiling water rise off a pot, do “The Water Cycle Dance” (see box above).
4. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- Where else do you see evidence of the water cycle in action? (For example, a tea kettle boiling, melting snow, rain, a mud puddle, etc.)
- What does water look like when it’s a solid? When it’s a gas? When it’s a liquid?
- What makes the water change from a liquid to a gas? From a liquid to a solid?
- How do people turn water into a solid?

Chicken Little

WHAT'S HAPPENING?

SPRING



WHAT'S THE Big Idea? Cycles

Enduring Understandings

- Cycles have no beginning and no end; they are continuous.
- Chickens come from eggs; they are *oviparous* which means that they lay eggs that hatch outside their body.
- A rooster needs to mate with a hen in order for an egg to be fertilized. That egg must be incubated by the hen or artificially in an incubator for 21 days for the chick to develop.
- Hens will lay eggs even without a rooster, but the eggs won't produce chicks.

Objectives

- Children demonstrate an understanding of the sequence of the chicken's life cycle.
- Children show interest and curiosity in how an egg develops into a chick.
- Children discover that all living things need care, air, water and food.

Directions

Prepare your space to raise the chicks. Set up a calendar where students can mark each of the 21 days of the chicks growth. Set up the incubator. Let it run to test the temperature before putting in the eggs. Incubators come with directions for setting up and testing the machine.

1. Read *Where Do Chicks Come From* by Amy Sklansky to your students. Discuss the life cycle of a chicken. Talk about the responsibilities of raising chicks. Ask your students if they want to raise some chicks. Ask if they are willing to make a commitment to raising the eggs.
2. Have your students map out the life cycle of the chicken using the "Chicken Life Cycle Cards." Encourage students to write a story to go with the life cycle.
3. Show the students the eggs. Place the eggs in the incubator. If you do not have an automatic egg turner, the eggs need to be turned three times a day: when you get to school, at noon, and before you leave. With a pencil, place an X on one side of the egg so you can keep track of which eggs you've turned to which side. (These directions come with incubators and there are many sources online with more in-depth details.)

Be prepared!

Hatching Chicks?

Before deciding to try to raise chicks from eggs with your students, make sure you're aware of the commitment it will take on your part as the teacher. Eggs need to be turned three times a day, even on weekends, and need to be kept at a specific temperature. Chicks also grow very quickly and will need a home in three to four weeks after hatching. You should have homes in place before you buy the eggs. Finally, not all of the eggs may be viable. Chicks may not hatch from each egg, or chicks may hatch but not live. There are many powerful and valuable life lessons to be learned from raising chicks from eggs, and it is always worth the work. But think hard about it first!

Materials

- **Where Do Chicks Come From** by Amy E. Sklansky
- incubator
- automatic egg turner, optional (*This saves you from coming in on the weekend to turn the eggs.*)
- fertilized eggs
- red heat lamp
- pine shavings (*NOT cedar shavings, which cause respiratory problems for chickens*)
- chick waterer
- chick feeder
- chick starter feed
- calendar to keep count of the 21 days to hatching
- "Chicken Life Cycle Cards," Appendix, p.243

Visit a local farm or feed store, or check an online retailer like www.mypetchicken.com for hatching supplies, fertilized eggs and reliable information.

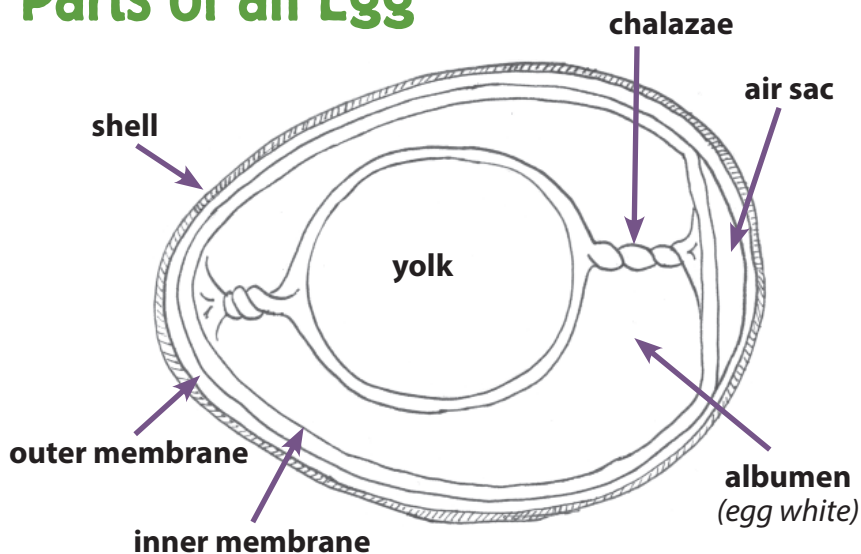


Extensions

- Crack open a store-bought egg for the children to see its parts (see graphic below).
- **Eggs and Chicks** by Fiona Patchett
- **Egg to Chick** by Millicent Selsam
- **Chicks and Chickens** by Gail Gibbons
- **Dora's Eggs** by Julie Sykes. How are the other farm animal babies like the chicks?

4. After seven days, use a strong light to “candle” the eggs to determine if they are fertilized and developing. Hold the egg over a toilet paper roll while shining the light from below. The eggs are translucent and allow the light to go through the shell, illuminating developing blood vessels and the eyes. Candle again after 10–14 days, and you’ll only see a dark mass if the chick is developing according to schedule. If the egg is not developing, compost it.
5. As the due date nears, set up a big box with pine shavings, a red heat lamp, an appropriate chick waterer, and a feeder. Get ready for your new arrivals!
6. Throughout the experience, process and reflect on what’s happening with the children by engaging in a conversation guided by the discussion questions.

Parts of an Egg



Discussion Questions

- What other birds and animals hatch from eggs? *Chickens Aren't The Only Ones* by Ruth Heller is a great introduction to the many creatures that hatch from eggs.
- What does the egg need to grow?
- What will the baby chicks need to survive?
- What were you able to do as an infant? What will the chicks be able to do when they are born?

See-Through Germination

WHAT'S HAPPENING?

SPRING



WHAT'S THE Big Idea? Cycles

Enduring Understandings

- Plants have a life cycle.
- Most plants begin their life cycle as a seed.
- Not all seeds look the same.
- Seeds need water, air, sun (warmth), space, and soil to grow.

Objectives

- Children show interest and curiosity about the growth of a seed.
- Children discover firsthand the beginning of a plant's life cycle.
- Children experiment with how a seed grows.

Directions

Consider doing "Fab 5" in *Who Are We*, (p.75) prior to this experience.

1. Ask children if they know the five things a plant needs to grow and survive: water, sun, air, soil, and space. Ask if they know where a plant comes from: starting as a seed, a plant begins to grow when the conditions are right. Tell them that the start of growth in a seed is called *germination*. Explain that they are going germinate seeds and see what happens!
2. Give each child a cup and some paper towels (another option is to use a large plastic ziplock bag instead of the cup). Wet the paper towels and stuff them into the cup.
3. Distribute the seeds to the children: two of each seed variety. Show the children how to stick the seed down the side of the cup, between the paper towel and the cup, so that the seeds are visible from the outside.
4. Cover each cup with plastic wrap and secure with a rubber band. Label each cup with the child's name

Materials

- pumpkin seeds
- lima bean seeds
- rubber bands
- clear cups, ideally one per child
- paper towels
- water
- plastic wrap
- large ziplock bag

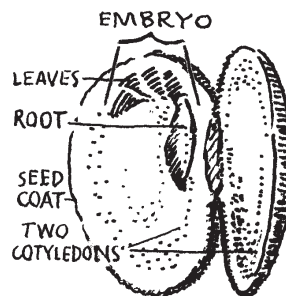


Diagram of a Seed

Seed Coat: The outer covering that protects the seed.

Cotyledons: Large fleshy structures that form the bulk of the seed. They are stored food that the plant uses to start growing.

Embryo: Located along the inner curve of the cotyledon. This is the tiny plant, made up of the first leaves and root.

Roots: The fine structures that will extend downward into the soil to anchor the plant and take in water and minerals to help the plant grow.

Leaves: Will absorb sunlight to make food for the plant.

Illustration: PROJECT SEASONS

Extensions

- ***A Seed Is Sleepy*** by Dianna Hutts Aston
- ***How A Seed Grows*** (*Let's-Read-and-Find-Out-Science 1*) by Helene J. Jordan
- Take the seed that germinated and transplant it into soil. Continue to document its growth.
- Have each student plant a bean seed in a cup of soil and observe what happens as the plant continues to grow once it has sprouted. Compare that growth to their seed germination experiment.
- Experiment with other seeds. Do they all grow the same?

and place them in a well lit or sunny spot, like a windowsill.

5. Make daily observations and have the children draw what they see each day for about a week. Once your seeds have sprouted, take off the rubber band and remove the seeds. Have students observe and draw this stage of the seed sprouting.
6. Ask children if they know what is inside the seed. Have each student peel off the shell/seed coat. What do you see? Can you identify all of these parts on your seeds? Explain that the germination process that they have been observing over the past week or so is the same thing that happens when a seed is planted in the ground. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- How could the seed germinate without soil?
- What else did the seed need to germinate?
- What will happen to the germinated seed next?
- What else can we do with seeds besides germinate them into plants? (eat them, feed them to animals, use them in art projects)

Soil Recipe

WHAT'S HAPPENING?

SPRING



WHAT'S THE
Big Idea?
Cycles
Change over
Time

Enduring Understandings

- The natural forces of air and water break down rocks, minerals, and organic materials to create soil.
- Soil is necessary to grow plants to eat and use in other ways.

Objectives

- Children demonstrate an understanding of the elements that make up soil.
- Children experiment with creating soil.
- Children play with different types of soil.

Directions

1. In the schoolyard, woods or garden, sit down and dig up a handful of soil. Alternatively, in the classroom pass around a baggie filled with soil. Pass it around to the children, have them smell, look at, and feel what is in this sample of soil. List and discuss their findings. Discuss why we should even care about soil. Why is soil important?
2. Pass around a cloth or paper bag filled with a variety of objects (see materials above.) Everyone should take one object from the bag. If you have more students than objects, have pairs of children take one object.
3. Have the children think about their objects and ask if they came from soil. As students think about each item, they should be able to connect the item in some way to soil. Even if it did not grow from soil, such as the wool glove, the wool that made the glove was shorn off a sheep that ate grass that grew in the soil! A connection!
4. After making these connections and acknowledging the importance of soil in our daily lives, read *Jump into Science: Dirt* by Steve Tomecek. Discuss what elements make up soil.
5. Challenge the students to help you create ten pounds of soil to add to Mother Earth's top layer. They should go off to look for the ingredients to "cook up a batch" of rich soil for either the garden, woods, or schoolyard. Recall the elements of soil from the book you just read if they are unsure what to look for.
6. When students return, lay the ingredients down on the ground (or in a bowl if you are in the classroom). Is there enough mineral material, air, water, organic matter? Pull out the "Soil Recipe Cards" to check if all the necessary ingredients are here. (Do not show the clock card yet.) If all the ingredients are here, why

Materials

- bag filled with everyday objects including but not limited to: apple, small bag of hay, pencil, wool glove, can of peas, cotton t-shirt, leather belt, empty potato chip bag, metal spoon, empty cereal box, small notebook, milk carton, maple syrup, candy bar wrapper
- **Jump into Science: Dirt** by Steve Tomecek
- "Soil Recipe Cards" (Appendix, p.254), or draw your own pictures of: a clock, a drop of water, worms and insects, the sun, bacteria, the wind

Soil Ingredients

45% minerals

25% water

25% air

5% is organic matter



Extensions

- Have children bring in samples of different types of soil from home to the classroom for students to examine. Compare the samples. What is common to all of them?
- Create a soil tunnel in your classroom to enable students to “go underground” to witness what lives below the soil.



As an extension of this activity, create a soil table with an “underground tunnel” where students can “go underground” to witness what lives below the soil.

doesn't look like soil? What needs to happen? Students may want to add more water, crumble the dead leaves or sticks or go find more worms to add to the batch. Is it soil yet?

7. Pull out the clock card for the most important ingredient of all: time! It can take 50 to 100 years to make an inch of topsoil. Discuss the small changes that would have to take place over those years to turn our pile of ingredients into soil.
8. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- How do the minerals change over time? What happens to them? What causes the change?
- Why does it take six weeks to make compost but 50 to 100 years for nature to make soil?
- Why doesn't all soil look the same?

Welcome Back!



WHAT'S THE Big Idea?

Cycles
Change over
Time

Enduring Understandings

- Every year some animals leave one place to find food in another place.
- Some animals have summer homes for nesting and migrate to different winter homes to find food.

Objectives

- Children show interest and curiosity why some animals migrate.
- Children role play the movement of geese throughout a yearly cycle.

Directions

1. A sure sign of spring in the northeast is the return of the Canada geese to their nesting habitats. As part of *What's Happening?*, share with students that some animals in your community live there only part of the year and migrate to warmer locations in the colder months. If you live in a warmer climate, you might discuss the animals that migrate to your area in the winter. (For more background information, check out "A Winter's Meal" in *Who Lives Here?* p.108.)
2. As spring begins to arrive, start a list of changes in your community: warmer days, children needing less clothing, the melting of snow (if it snows in your area), bulbs starting to poke out of the wet soil, or the honking of returning Canada geese. Another sign of spring happens during the first, cold, rainy spring night when salamanders leave their wooded habitat to migrate to a nearby pond.
3. Read *The Goose Story* by Cari Best, or *The Way Home* by Nan Rossiter. Both tell a story of an injured goose that cannot migrate with its flock. Discuss how humans intervened in the book to help the injured birds.
4. Ask your children if they have ever seen the geese flying in a V-formation. Did they hear the geese? Can they make the sound they heard? Most likely you will only hear honking sounds. Explain that the male geese make a deep "a-honk" sound but the females make a higher "a-hink" sound! You must listen carefully to hear the difference. When the geese are flying, the sounds are used to help keep the leader moving at the same speed.
5. Discuss why geese travel in a V-formation. Scientist have determined that this shape makes it easier for the birds to fly long distances and to communicate with each other.



Flying in a V-formation makes it easier for migrating birds to travel long distances and communicate with each other.



Safe on the ground, children mimic the V of flying geese.

6. On your next walk, bring along a rope. Have children hold on to the rope and form a V-shape. Choose a leader of to hold the V but remind them, geese take turns leading. (That sounds familiar!) As the flock flies, remind them of the sounds the males and females make as they fly. “A-hink, a-honk, a-hink, a-honk”-ing along on your walk!
7. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- Can you think of any other animals that migrate?
- Why do geese and other animals migrate?
- Do you ever leave your community? Why?

Extensions

- ***Big Night for Salamanders*** by Sarah Marwill Lamstein
- ***Salamander Rain: A Lake and Pond Journal*** by Kristen Joy Pratt-Serrafini
- Discuss the instinctive spring movement of salamanders. Visit a pond in early spring to see if you can find any evidence of the salamanders. The most obvious will be eggs floating in the pond. We recommend that you leave the egg masses in the pond to follow their natural life cycle.

Another Welcome Back

Salamanders are another animal that we welcome back in the spring (although they never really leave). In the spring, these amphibians emerge from their home in the woods and instinctively make their way to a vernal pool or pond to mate and lay their eggs. Then they return home. The first rainy spring night with temperatures in the forties is the signal to begin their trek to the water. In some areas, people organize to help the salamanders move safely across known crossing spots. They put out cones to slow down traffic and will even physically move the creatures safely across the road! This happens at night, so you may not be able to attend with your class, but you can let families know about this annual event.



Worm Delight!

WHAT'S HAPPENING?

SPRING



WHAT'S THE Big Idea?

Cycles
Change over
Time

Enduring Understandings

- Worms help to aerate the soil, which is helpful to plants.
- Worm castings help to fertilize the soil.
- Worms can change the landscape over time.
- Worms have a life cycle.

Objectives

- Children demonstrate an understanding of the life cycle of a worm.
- Children show interest and curiosity about how worms impact the soil.
- Children experiment with worms and their reaction to light and water.
- Children explore worms, looking for adult worms and worm eggs.

Directions

SET UP: Place worms on trays; cover them with a wet rag so they do not dry out. Set out several popsicle sticks to move the soil and worms, as well as magnifying lens and boxes.

1. Read *Wiggling Worms at Work* by Wendy Pfeffer to your class. Discuss the role of the worm in helping gardeners. Ask your students, “Who has seen worms? Where do you find them? What were they doing?”
2. Explain that students will have the opportunity to observe worms and look closely at them to identify body parts. They will have an observation sheet to help them identify worm body parts and worm eggs.
3. Divide your students into smaller groups and assign them a tray to explore. Encourage them to be gentle and move the soil and worms with care.
4. Have students use the “Worm Exploration Sheet” to help them record their observations. After students have had about fifteen minutes to observe, distribute spray bottles and flashlights for experimentation on how the worms react to these stimuli.
5. Process and reflect on the experience with the children in a conversation guided by the discussion questions.

Discussion Questions

- What did you notice?
- Describe the different stages of the worm’s life that you found.
- How did the worms respond to light? To water?
- Name three words you would use to describe a worm.
- What are you wondering now?

Materials

- If possible, purchase some red wiggler worms. (Check online.) Red wigglers are not the worms in your garden, they are special worms that eat home food scraps. You then harvest the vermicompost as fertilizer for gardens. If you cannot obtain red wigglers, collect earthworms from your soil.
- ***Wiggling Worms at Work*** by Wendy Pfeffer
- “Worm Exploration Sheet” (Appendix, p.242)
- magnifying glasses or bug boxes
- trays
- popsicle sticks
- spray water bottles
- flashlights

Extensions

- Look for earthworms during walks in the schoolyard or woods.
 - Create a worm composting box in your classroom. Search online for Do-It-Yourself instructions. Make sure to cover all food with soil to keep fruit flies at bay.
- ***Garden Wigglers: Earthworms in Your Backyard*** by Nancy Loewen
- ***Yucky Worms: Read and Wonder***, by Vivian French



Flower Power

WHAT'S THE Big Idea? Cycles

Materials

- *The Reason for a Flower* by Ruth Heller
- Day lily or other simple flowers such as tulip, magnolia, or azaleas, one for each child or pair of children
- diagram of the parts of a flower (Appendix, p.243)
- magnifying lenses for up-close investigating
- index cards

Enduring Understandings

- Flowers go through a life cycle starting with a seed.
- Flowers help plants to grow.

Objectives

- Children demonstrate an understanding of the purpose of a flower.
- Children show interest and curiosity about the parts of a simple flower.

Directions

1. Ask the children what a flower is. Why do plants have flowers? Have you ever looked really closely at a flower?
2. Read *The Reasons for a Flower* by Ruth Heller. After reading, discuss the purpose of the flower.
3. Explain that today they will become flower scientists! They'll look very closely at a flower and even get to take it apart to discover all of its different pieces and their purposes.
4. Give each student or pair of students a flower and a diagram of a flower's parts. Ask them to just look at the flower for right now and see what parts they can see.
5. First locate the **stem**. Ask children what its purpose is (to hold up the plant and give it strength). Next find the **leaves** and ask what their purpose is (to capture the sunlight to make food for the plant). Pull the leaves off of the stem and set them aside.
6. Instruct the children to find the **sepals**, and gently pull them off of the flower and lay them on an index card. How many are there on your flower? Different kinds of flowers have different numbers of sepals.
7. Ask the children, "Where are the **petals** of the flower?" Tell the children to pull off the petals carefully so they don't disturb what's in the middle of the flower. Have them lay the petals on another index card and ask, "How many petals did you find?"
8. Distribute magnifying lenses. Show children how to examine the inside of the flower with a magnifying lens. This is the



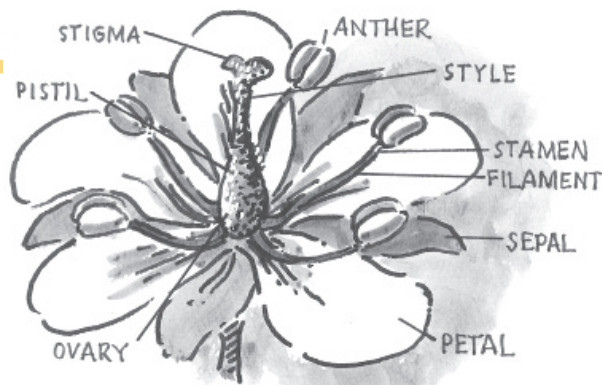


Illustration: PROJECT SEASONS

Flower parts & their purpose

Sepal: Outermost layer of the flower. It is often green leaves around the base of the flower, which cover the petals in the bud stage.

Petals: Various adapted, colored, shaped, and perfumed part of the flower, their purpose is to attract animals to the flower for the purpose of pollination.

Stamen: Male parts of the flower, each composed of a thin filament that holds up an enlarged structure, the anther.

Anther: Full of dusty pollen that is picked up by various pollinators and carried from flower to flower.

Pistol: Hidden among the stamen, there can be one or many pistols depending on the flower type. The pistol is often divided into three parts, the enlarged base—or ovary, the style, and stigma.

Ovary: Where the seeds develop.

Style: Long, thin neck-like section attached to the stigma.

Stigma: Divided, branched or lobed, sticky to catch pollen. Pollen on a stigma leads to seed in a fruit.

ovary, a reproductive part of the flower that makes the seeds after it is pollinated. This can be a short discussion, or lead to a larger conversation about bees and pollination.

9. Have the children find the **stamens** (the male part of the plant with the pollen grains on them) and pull them off. Lay them on another index card. Ask, “What happens to your fingers when you touch the stamen?” The pollen grains stick on your finger just like they would on a bee’s knees.
10. Ask, “What’s left?” The **pistol**, which is in the center of the stamens. The pistol is the female part of the flower. It is sticky so it can collect the pollen grains from the stamens.
11. Your flower should now be dissected and you can challenge the kids to find the different parts they set aside as you call out the name of the flower parts. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions (*sidebar*).

Extensions

- Have each child create their own flower by drawing it, cutting out paper and other scraps and glueing it together on a piece of paper, or making a 3-D model trying to include all of the special parts they just learned about by dissecting a flower. Can they think of a special name for their flower? “Plant” their flowers on a Flower Garden bulletin board in the class or in the hallway.
- Go on a flower-find adventure in your schoolyard or neighborhood. Have pairs of children bring a color wheel (Appendix, p.246) and try to find as many different color flowers as possible. Match them to the color wheel. Take a camera with you to document the many colors you find. Use the photos to create a flower book back in the classroom.
- **Planting a Rainbow** by Lois Ehlert
- **Flower Garden** by Eve Bunting

Discussion Questions

- Did every flower have the same number of parts?
- How does the flower help the plant?
- What insects, birds, or animals have you seen pollinating flowers?



Let's Make Pickles

WHAT'S THE Big Idea?

Cycles

Materials

- *Blueberries for Sal* by Robert McCloskey
- small jars with lids that have been washed/sanitized in the dishwasher
- ingredients for pickle making (see Recipe Card below)

Enduring Understandings

- Fruits and vegetables are harvested fresh during the growing season.
- Fresh food can be preserved to prevent spoilage so that it can be eaten later.

Objectives

- Children demonstrate the correct way to cut vegetables.
- Children show interest and curiosity where their food comes from.
- Children discover that cucumbers turn into pickles.

Refrigerator Pickles

INGREDIENTS

- 1 c. distilled white vinegar
- 1 tbsp. salt
- 1 c. white sugar
- 6 c. sliced cucumbers
- 1 c. sliced onions
- 1 c. sliced green bell peppers
- 1 c. celery seed (*optional*)
- ½ tsp. of dry mustard (*optional*)

INSTRUCTIONS

In a medium saucepan over medium heat, bring vinegar, salt, and sugar to a boil. Boil until the sugar has dissolved, about 10 minutes. Place the cucumbers, onions, and green bell peppers in a large bowl. Pour the vinegar mixture over the vegetables, transfer to sterile containers, and store in the refrigerator.

Directions

Prep the brine with or without your students depending on your kitchen availability. Cooked brine can be stored in a kid-sized pitcher so it is easy for them to pour into the jars.

1. Read *Blueberries for Sal* with your students. Discuss the story with the children; ask them

why Sal and her mother were picking blueberries. (To preserve them to eat over the winter, when fresh berries aren't available.)

2. Talk about gardening with students, and the time of year that vegetables and fruit are picked fresh. Ask children if this is the only time that they eat these things. Explain that we are able to enjoy fruits and vegetables all year long through preserving food. If you have experimented with composting (see "Incredible Compost," in *Who Are We?* p.59), talk about what happens to food scraps over time. Explain that preserving food prevents it from rotting and decomposing.
3. Ask the children if they'd like to preserve some food themselves. Show them the cucumbers and other ingredients, and ask if they know what these ingredients make.
4. Have children wash cucumbers. Using kid-safe cutting tools (such as ones you can purchase from www.forsmallhands.com) to chop the cucumbers, peppers, and onions.

Extensions

- Try other pickling recipes such as Dilly Beans (see recipe card on facing page).
- Taste test a variety of pickles such as dill, sweet, bread and butter, and gherkins. Graph children's preferences.

5. Fill the jars with cucumbers, leaving enough clearance on top to cover them with brine. Pour the brine over the cucumbers, and put the top on the jar. Store the pickles in the refrigerator, they will be ready to eat in 3–4 days and will keep for a month.
6. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- Where do pickles come from?
- How do you like to eat your pickles?
- Why do people make pickles?
- What other foods do people preserve?
- What foods are fresh in spring? Summer? Fall? Winter?



Dilly Beans

Adapted from a recipe in EDIBLE SEATTLE

INGREDIENTS

2–3 c. green beans, trimmed
 onion, thinly sliced
 fresh dill sprigs (2 per jar)
 black peppercorns (½ tsp. per jar)
 red pepper flakes (⅛ tsp. per jar)
 whole clove garlic, slightly
 crushed (1–2 per jar)

*For the brine, which makes enough
 for a couple of pint jars or one quart jar:*

¾ c. white vinegar
 ¾ c. water
 2 tsp. sugar
 1 tsp. kosher salt

INSTRUCTIONS

1. Blanch the beans: submerge them in boiling water for about 30 seconds, then transfer them to an ice-water bath until cooled.
2. Pack the green beans, onion, and dill vertically into clean canning jars. Add the peppercorns, red pepper flakes, and garlic.
3. In a saucepan, bring the vinegar, water, sugar and salt to a boil. Remove from heat and pour into the jars, leaving just a little headspace. Cover jars and cool to room temperature, then refrigerate. Beans will be ready to eat in 2–3 days and will keep for months in the refrigerator.



Terrific Trees

WHAT'S THE Big Idea? Cycles Change over Time

Materials

- *A Log's Life* by Wendy Pfeffer
- forest or wooded area, even a stand of a few trees will work
- empty egg cartons
- clipboards for each child made of cardboard, paper attached with binder clip
- pencils, markers, crayons (if children are not carrying their own supplies)
- magnifying boxes and glasses

Enduring Understandings

- All things change, and can adapt to change.
- Change is always happening.
- Cycles have no beginning and no end; they are continuous.
- Trees change over the seasons in the same pattern, year after year.



Objectives

- Children demonstrate that trees are plants and go through growth cycles just as they do.
- Children cultivate an appreciation for trees.
- Children show interest and curiosity about the changes they observe in the tree(s).
- Children play comfortably in the woods.

A Tree *by any other name*

Seedling: A tree less than 2 inches in diameter

Sapling: A small tree 2–4 inches in diameter at breast height

Pole: Trees 5–7 inches in diameter at breast height

Mature Tree: A tree greater than 7 inches in diameter at breast height.

Directions

It can be helpful for children to develop their “owl eyes” (see p.131) prior to beginning this experience.

1. Read *A Log's Life*. Give children time to look at the pages to see how much is going on in the log. Prepare them for a trip to the woods by creating guidelines for being in the

woods. (See p.41 for tips on creating guidelines for outdoor experiences with children.)

2. As you are about to enter the woods, stop and whisper that these trees have many stories to tell but we need to be ready to hear and “read” them. Tell children to use their “owl eyes” as they look carefully, listen, and reflect on what they’ve observed. Then we’ll have stories to share!
3. Once in the woods, allow children time to explore. Get down on the ground with them as they look for seeds, animal homes, and leaves.
4. Help find and identify a seedling, sapling, pole and a mature tree. As you are walking through the woods, call out “sapling” and help everyone find a sapling, one hand should be able to wrap around one. Find a mature tree to hug (a mature tree takes two or more arms for a hug).
5. Look for a downed tree such as the one in the story. If you can find one, look for many of the creatures that were in *A Log’s Life*. Use the magnifying boxes to exam the creatures.
6. If the tree is rotting and its wood is easily crumbled, bring some back in order to make paper. (See “Paper Making,” in *How Are We Connected*, p.206.)
7. Children should find a special spot to sit in alone during this time in the woods. Have the children find their spot and sit there with their journals. Tell the children to draw or write about a tree they can see from their spot.
8. Process and reflect on the experience with the children by sharing the “stories” children found in the wood, and engaging in a conversation guided by the discussion questions.

Discussion Questions

- Tell me about your tree.
- What did you notice?
- How many different types of trees did you see?
- What else did you notice with your owl eyes?
- What do you think this place will look like in the fall/winter/spring/summer? What will be different? What will be the same?

Tree Song!

Sung to the tune of
“Head, Shoulders, Knees, and Toes”

*Children stand like trees, hands in the air,
feet rooted in the ground as they sing:*

Roots, trunk, branches and twigs,
(Branch and twigs),

Roots, trunk, branches and twigs,
(Branch and twigs),

And buds that turn into leaves!

Roots, trunk, branches and twigs,
(Branch and twigs!)

Extensions

- **Be a Friend to Trees** by Patricia Lauber
- **A Tree Is A Plant** by Clyde Robert Bulla.
- **My Mother Talks to Trees** by Doris Gove
- Collect seeds in the woods. See “Seed Hunt and Sort,” p.143.
- In the woods or back in the classroom, put the “Tree Life Cycle Cards” (Appendix, p.245) into the correct sequence. Have children work in small groups to put the cards in order, then write a story about the tree’s life cycle.
- Another option: add a string to each Tree Life Cycle card. Place a card around a student’s neck so the card hangs on the student’s back, visible only to others. When the cards are passed out, those with cards must put themselves in order even though they don’t know what stage is on their back. Once the group feels they are in the correct order, the students without cards can tell the story of a tree’s life cycle and let the other students know if they were correct in their ordering of the story. Another option is to have the students with cards on their back not be able to talk. They must put the story in order without talking and use other means of communicating to complete the task.
- Return to this place often, asking children to return to their personal sit spots. Have the journal about what’s happening right now. Compare this visit to previous visits and talk about cycles and changes.

Water Babies Match Up

WHAT'S THE
Big Idea?
Cycles
Change over
Time

Materials

- *Tale of a Tadpole* by Barbara Ann Porte
- "Pond Animal Cards" (*adult & baby*) (Appendix, pp.249-250)

Extensions

- Think of other insects or amphibians that go through metamorphosis. Draw pictures of their juvenile and adult forms to create another matching game.
- Children bring in pictures of when they were younger; how have they changed?
- Display baby pictures and try to identify each other.
- **From Frog to Tadpole** by Wendy Pfeffer
- **Pond Circles** by Betsy Franco

Enduring Understandings

- Many pond babies do not look like their parents.
- Their juvenile body is very different from the adult body.
- Metamorphosis is the dramatic and profound change in appearance from an immature form to a mature form.
- Most insects and amphibians go through metamorphosis.

Objectives

- Children show interest and curiosity in how insects and amphibians of the pond change over time.
- Children learn that metamorphosis means big changes in appearance.

Directions

Consider completing "Pond Critters" in *Who Lives Here?* (p.113) prior to this experience.

1. Read *Tale of a Tadpole* by Barbara Ann Porte. Discuss the metamorphosis of the tadpole into a frog.
2. Explain that other animals and insects go through metamorphosis but many do not.
3. Introduce the "Baby and Adult Pond Animal Cards." Ask children to name the insect or animal on each card.
4. Mix up the cards, lay them face down, and explain the matching game.

One child at a time picks up two cards in an attempt to match the baby with the adult. If they match, the child gets another turn. If not, the next child takes a turn.

5. Process and reflect on the experience with the children by engaging in a conversation guided by the discussion questions.

Discussion Questions

- What did you look like when you were born? Did you have the same body parts you do now? How have you changed?
- Do all animals (insects, amphibians) look the same as babies and adults? What about a butterfly? A frog?
- Why do animals and insects go through metamorphosis?

Metamorphosis

For some creatures, the change from birth to adulthood is dramatic. This change in form is called

metamorphosis. Many insects, including butterflies and mosquitoes, experience **complete metamorphosis**. First, they hatch from eggs into *larvae*, whose primary purpose is to eat and grow. When the larvae reach a certain size, they form into *pupae*. Inside the pupae, complex changes rearrange the creatures' whole body structure, and they emerge looking nothing like their former selves. Other creatures, like frogs and dragonflies, experience **incomplete metamorphosis**. They do not go through the pupae stage, but slowly change from a tadpole or nymph into their adult form.

