3 ACTIVITIES

GENERAL FARM Activities

SOILS, COMPOST & LAND Activities

GARDEN & GREENHOUSE Activities

continued

DAIRY Activities

POULTRY Activities

MAPLE SUGARING & TREE Activities

BEE & INSECT Activities

A NOTE ON SOURCES:

The activities that follow were submitted by farmers; many of them were hand written. Any ideas, images, and text in this book that are similar to those in any copyrighted materials were used unintentionally and without awareness. To the best of our abilities, we have credited all the sources for activities. These sources include: Project Seasons, UK Soil Association, Digging Deeper, the NOFA Farm-to-School Directory, and the Farm Field Trip Manual from Massachusetts Ag in the Classroom. See the bibliography for a complete listing of sources.

Food Chain Game

Summary

Using pictures of ten different "players" in a food chain, students see that all living things are part of a complex food web. When one organism is destroyed, the rest of the web is affected.

Procedure

1. Give one picture to each child.
2. Ask them to put themselves in order of the food chain, i.e., "who eats who."
3. Once in order, have the students form a circle. This is the cycle of life and energy flow.
4. Talk about the importance of each member in the cycle. What would happen if we removed one of the organisms from the circle (maybe a farm is using pesticides to kill off their aphids). If the bees die due to disease, how will flowers produce fruits? What will people eat?

Farms are often home to a wide variety of wildlife because they encourage diversity and mutual reliance. These practices help the rest of the food chain by attracting the next level of predator, and so on.

For Grades K-5

Materials

Pictures cut out of magazines, or drawn of:

- ☑ water
- ☑ sun
- ☑ soil
- ☑ seed
- ☑ plant
- ☑ flower
- ☑ honeybee
- ☑ farmer
- ☑ farmstand
- ☑ people

You can also use puppets and/or real samples.

Extension:
Have students identify the producers, primary consumers, secondary consumers, and decomposers in their circle of life.

Sound Map/ Fistful of Sounds

For Grades K-8

Materials

(all optional)

- ☑ paper
- ☑ pencil
- ☑ clipboard or hard surface

Extensions:

- **Have students tape record sounds of the farm.**
- **Farmers can use taped sounds as background for narrative about the farm.**

Summary

Use this activity to introduce the group to your farm using senses other than sight—you'll be amazed at what they'll notice!

Procedure

Before everyone starts walking around and exploring the farm with their senses of sight and touch, explain that they will begin by listening to the sounds of the farm. Have each child find a private spot so that he or she is not touching anyone else. Ask them to close their eyes and hold up one fist. For each sound they hear, have them hold out one finger. After a few minutes, gather the group back together and share the sounds. To heighten the sounds, you can ask the students to cup their hands behind their ears (like satellite dishes or deer ears).

For an older group, you may want to expand this activity. Give each child a piece of paper and pencil before they find their private spot. Ask them to draw a dot in the middle of the paper to represent themselves. Have them sit and draw or write down all the sounds they hear in relationship to themselves (e.g., bird chirping behind me, airplane overhead, chicken clucking to my right, etc.). Come together after 5-10 minutes and share maps!

Now you can explore the farm looking for the sources of all of those sounds!

Encourage students to try this same activity back at school or at home.

Five Basic Needs on the Farm Scavenger Hunt

Summary

Using a scavenger hunt as a discovery tool, introduce students to the basic needs that all living things share and the concept of the farm as a whole system.

For Grades 2-8

Materials

- ☑ scavenger hunt sheets (enough for each person or small group)
- ☑ pencils or pens
- ☑ clipboards (optional)
- ☑ gathering baskets (optional)

Procedure

1. Following introductions, discuss the five basic elements all organisms need for survival — food, water, shelter, air, and space to grow. Explain that in many ways, a farm is a kind of living organism. It needs all the same things other living things need. Humans, animals, plants, and machines help the farm organism to thrive.
2. Ask the students, individually, in pairs or small groups, to find the various things listed on the scavenger hunt sheet and draw a sketch of each thing they find in the square.
3. As part of the hunt, have students lay the hunt sheet on the ground. How many plants are growing under it? How many insects travel over or under it in three minutes? See if you can get three or more people to stand on the paper at the same time.
4. How might students help to keep the farm viable? How about professionals (veterinarian, scientist, seed distributor)?

Five Basic Needs on the Farm

PLANTS	ANIMALS	PEOPLE
Find a source of water for plants in the garden	**Find a source of water for animals**	**Find a source of water for people**
Find a source of food (or nutrients) for plants	**Find a source of food for animals**	**Find a source of food for people**
Find a place plants find shelter	**Find a place animals find shelter**	**Find a place people find shelter**
Find a source of air (carbon dioxide) for plants	**Find a source of air (oxygen) for animals**	**Find a source of air (oxygen) for people**
Lay this paper on the ground. Count how many plants are growing under this space.	**Lay this paper on the ground. Count how many insects travel over or under this space in 3 minutes**	**See if you can get 3 or more people to stand on this paper at the same time**

Animal Feed Scavenger Hunt

Summary

Introduce students to the various farm animals and the different foods they eat.

For Grades K-8

Materials

- ☑ access to a barn, animal pens, and fields
- ☑ pencils
- ☑ photocopies of scavenger hunt chart
- ☑ paper

Procedure

1. Introduce yourself and tell students about your farm.
2. Ask some introductory questions.
   a. What animals are on the farm?
   b. Where would you find them?
3. Explain the scavenger hunt. The class will be broken into several groups. Each group will discover the kind of food each farm animal eats. Students will record their findings on the scavenger hunt sheet. Depending on students' age, an adult with the group may record the findings for the group.
4. Discuss ways students can tell what animals eat.
5. Have students look inside and outside the barns and animal pens to find the food each eats.
6. If possible, collect samples of foods (in ziplock bags) for students to sort and explore back at school.

Extensions:

• Categorize animals by what they eat — grass, grain, etc.

• Do farm animals eat just one kind of food? Do different farm animals eat different kinds of foods? What farm animal foods might people eat too? What foods wouldn't people eat? If there is interest, explain the differences between different animals' digestive systems.

Animal Feed Scavenger Hunt

ANIMAL	FEED	HOW DO YOU KNOW?

Date: _____ **Group Members:** _____

Dress up a _____

For Grades Pre-K - 6

Summary

Students will be introduced to the distinguishing characteristics of a certain animal or plant.

Materials

COW:

- ☑ glue 4 baby bottle nipples to a Cool Whip container for udder
- ☑ fly swatter for the tail
- ☑ headband with cardboard ears and horns attached
- ☑ 4 socks with paper hoof prints glued to the bottom for legs/ hooves
- ☑ sandpaper cut to size of cow's tongue
- ☑ four deflated balloons tied together for stomachs

SHEEP:

- ☑ sheep skin if available or handful of fleece for covering
- ☑ 4 socks with paper hoof prints glued to the bottom for legs/ hooves
- ☑ headband with cardboard ears attached
- ☑ plastic margarine tub for udder with 2 baby bottle nipples glued on (or inserted through holes and glued) for teats
- ☑ four deflated balloons tied together for stomachs

CHICKEN:

- ☑ feathers to represent covering
- ☑ paper cone with string for beak
- ☑ hair comb glued on headband for comb
- ☑ deflated balloons on a string for wattles
- ☑ cardboard wings with string/ rubber band/tape for handle
- ☑ 2 cultivators (claw-like hand tool) for feet (handle for 4th toe)

BEE/INSECT:

- ☑ large piece of cardboard shaped and decorated as a smaller black thorax on top and a larger yellow and black striped abdomen below. Attach ribbon or yarn to hang the body around a student's neck. Cut 3 holes on each side of the thorax to attach the legs—use old stockings or socks stuffed with batting or newspaper.
- ☑ cardboard wings with string/ rubber band/tape for handles.
- ☑ headband with pipe cleaners attached for antennae

continued

- ☑ old sunglasses divided into facets with marker or paint pen for compound eyes
- ☑ 3 sticky paper dots for simple eyes
- ☑ specialized mouth parts:
  - new kitchen sponge: housefly
  - drinking straw: butterfly/moth
  - turkey baster: mosquito
  - clothes pin: chewing beetles
- ☑ spray bottle labeled "Eau de Insect #5" to represent pheromones

SEED/SPROUT:

- ☑ large raincoat/poncho for seed coat
- ☑ backpack as cotyledon containing:
  - ☑ gorp/energy bar for food
  - ☑ water bottle with attached straw (roots)
  - ☑ hat for first green leaves

Procedure

Extension:
Copy this activity and give it to the teacher to do as a follow-up activity in her classroom.

1. Ask the students to imagine what the plant/animal looks like. What makes it unique?
2. Pick a volunteer from the class and have them stand by you, so everyone can see him or her. (Whisper in your volunteer's ear to ask permission to dress them up.) Explain to the class that they are going to help you turn their classmate into a plant/animal.
3. Ask the students for suggestions on how to make your volunteer look more like a plant/animal. As they come up with ideas, dress up the student volunteer with the props that you have in your large bag.
4. After you have dressed up the volunteer with all the props you have, ask the students what they could add to make the student look even more like the plant/animal (covering, placement of features, lack of features, posture, habitat, etc.) Discuss how we are different from plants/animals and how we are similar.

Product Relay

For Grades 2-6

Summary

Give your group an opportunity to release some energy and learn what products come from your chosen producer.

Materials

☑ 3 large bins: one labeled "from a COW " (or sheep, bee, plant), one labeled "NOT from a COW" (or other). For nonreaders, it is helpful to have a picture of the producer on the "from a" bin. The third large bin will hold assorted products to be sorted.

Product ideas:

COW:

☑ milk products (empty milk, butter, ice cream, yogurt, cheese containers)

☑ leather products (shoes, belts, purses)

☑ meat products (plastic meat replicas, beef dog food, raw hides, ox tail, soup cans)

☑ manure (dried in a bag or empty "moo-doo" compost bag)

CHICKEN:

☑ feather products (feather duster, single feathers, feather pillow)

☑ meat products (plastic meat replicas, chicken soup, chicken bouillon, chicken flavored pet food/treats)

☑ egg products (empty egg cartons, plastic/wooden eggs)

☑ manure (dried in a bag or empty compost bag)

☑ fly fishing tie

SHEEP:

☑ wool products (hats, mittens, felted items)

☑ lanolin (lotion bottle)

☑ milk products (cheese packages, milk containers, soap containers)

☑ meat (plastic replicas, empty sheep jerky packages, lamb/sheep flavored pet foods/treats)

☑ leather products

☑ manure

TREE:

☑ wood products (paper, cardboard, pencil, twig, etc.)

☑ fruits & nuts (be sensitive to possible nut allergies)

☑ sap products (syrup, rubber)

☑ crushed leaves, shredded bark mulch

continued

BEE:

☑ wax, honey, queen jelly, and other products that have honey as an ingredient like Honey Nut Cherrios, honey graham crackers

PLANT:

☑ fruits
☑ vegetables
☑ fibers (cotton/hemp clothing)
☑ baskets

* DON'T FORGET TO INCLUDE PRODUCTS THAT ARE NOT FROM THAT PRODUCER! These could be plastic things; wood things; synthetic fabric, etc.

Procedure

1. Set up the two labeled bins on a flat open space about 5 feet apart from each other. (Check to make sure area is free of holes and debris that could cause injury.)
2. The third bin (containing the products to be sorted) is located about 20 feet from the other bins—facing both.
3. Have your group split into two smaller groups and line up on either side of the product bin, facing the two labeled bins.
4. On your signal, the first person in each line will grab an item out of the product bin and run to the labeled bins, where they will place their item in the appropriate bin (have them guess if they don't know). Then they will run back and tag the next person in their line so that that person can take their turn.
5. Depending on the number of people playing, you may want to have each person take two turns and sit down after their second turn.
6. After the products have been sorted and everyone has had their turn(s), gather around the labeled bins and review and discuss the contents of each—were there any tricky items?

Extension:

Try having multiple baskets or bins that represent the full range of products that come from your farm (from a chicken, from a cow, from the garden, etc.). Have the students sort them all out based on the animal or plant they come from. Remember to include a bin for the products that don't come from your farm.

Farm Detective Bingo

Summary

Students explore the farm using a "bingo" card as a discovery guide.

For Grades K-4

Procedure

1. Photocopy and laminate the "Farm Detective Bingo" card on the following page, or create your own to guide students around your farm.
2. Divide the students into several smaller groups. Depending on the age, it may be appropriate to have an adult chaperone with each group. Give each group a card and grease pencil to carry with them around the farm as they hunt for the pieces to make a straight line for "Bingo."
3. Establish boundaries for the hunt, and the time frame for returning.
4. Send the students out to collect as many items as they need to complete a straight line.

Materials

- ☑ bingo cards
- ☑ grease pencils
- ☑ bags to gather items

Extension:
Have groups try to fill in the entire board.

Farm Detective Bingo

As you explore the farm, look for the items below. Mark the box with an X once you've found the item. Call out "BINGO" when you've found and marked 5 items in a row — horizontally, vertically, or diagonally.

Find an insect	**Find something that has been nibbled**	**Find food for a plant**	**Find food for an animal**	**Find something red**
Find a sprouting seed	**Find something made by the sun**	**Find food for a worm**	**Find part of an evergreen tree**	**Find something yellow**
Find a worm	**Find something that needs water**	**Find something green**	**Find another insect**	**Find something prickly**
Find a whole leaf	**Find something that smells sweet**	**Find a flower**	**Find something brown**	**Find something white**
Find a rock	**Find something dry**	**Find something mushy**	**Find a twig**	**Find a seed**

Help with the Chores

Summary

Introduce students to the many jobs on the farm that bring food from field to table.

For All Ages

Materials

Dependent on farm job

Procedure

Asking students to help with some farm chores and jobs can be a powerful learning experience and may even help you get some jobs done. Most schools are encouraging teachers to provide *service-learning** opportunities. Discuss with your teacher before the field trip the type of task you were considering having the students do. Some samples of tasks include: Mulching, weeding, thinning, mixing potting soil, stacking firewood for the sugarhouse, broadcasting cover crop, filling seed trays, or picking rocks.

*** Service learning is a method of teaching that engages students in addressing issues in their community as part of their academic education. If this is the intent of the field trip, work with the teacher to tie the farm chores to the curriculum.**

Considerations for Success

- **Be clear on steps to accomplish the task** with the end result obtainable in given time frame.
- **Be conscious of the number of students that fit comfortably and safely in the work space**, such as around an evaporator, down a row of potatoes, in the milkhouse or greenhouse.
- **Have the hand tools necessary for the task(s)** collected ahead of time and close at hand.
- **Be specific about the hazards and forbidden actions** such as jumping over garden beds, touching switches, or playing with scales.
- **Discuss, after the task is completed, how efficiency is important in farming.** How could this task be accomplished using different tools? Are there systems in place, or that could be in place to improve the task?

Compost Critter Charades

For Grades K-5

Materials

- ☑ clear containers (tennis ball containers work great)
- ☑ live compost critters:
  - worms
  - pillbugs (or millipedes or centipedes)
  - flies
  - whatever you can find!
- ☑ or take group to the compost pile with a shovel to find the critters together.

Summary

Introduce students to the important critters that help to make compost.

Procedure

1. Discuss with students what kinds of things live in the soil or compost. What kinds of critters help turn the soil into compost? Worms, bugs, flies, etc., are great answers.
2. After discussion, show the students some of these critters that you brought along or use the shovel to dig some out of the compost to show them.
3. After everyone has had a chance to look at the critters briefly, explain that the kids are going to play a compost charades game.
4. Divide the students into three groups. Once they are divided, tell them you will show each group one of the critters they have just seen. Instruct each group not to say the name of the critter.
5. Take a couple of minutes for each group to practice moving like their critter in small groups.
6. Once everyone is ready, each group will take a turn acting like their critter. The job of the other group is to guess which critter is being demonstrated.
7. Keep playing until all groups have gone. If time and interest allow, let all groups act out each critter.
8. Show all live critters again at the end.

Compost Concoctions

Summary

Introduce students to the process of composting.

For Grades K-5

Materials

- ☑ a collecting container for each student (paper cup, yogurt cup, small bucket)
- ☑ stirring stick
- ☑ pile of leaves, compost, soil, grass, hay, water or access to these things in the natural environment

Procedure

1. Discuss with the students what kinds of things turn into soil. What kinds of things make up soil in the woods? In the garden? What kinds of things don't turn into soil?
2. Give each student their own container and stirring stick.
3. Tell the students that they are going to make a compost concoction! Their job is to collect in their containers different ingredients that will make soil.
4. Demonstrate how they can take a little of this and a little of that and mix them all up in their cups. Tell them that they are making their own mini-compost.
5. As they mix their own compost, ask them to think of a name to go along with it to describe it.
6. Allow the students to mix and mush their compost for 5-10 minutes, assisting them with ideas as they go.
7. Bring kids back together to see if their compost have turned to soil yet. Suggest they may need a missing ingredient, water. Let students drip water into their mixes.
8. After a minute or two of dripping water ask again if they have soil. Explain that soil takes time and describe the process of breaking down vegetative matter to turn into soil. Ask each student to tell about their compost and how it came by its name. Why is soil so important to every living thing?

Save cups of mixed up compost to use later in the garden for planting.

Extensions:

• Give the students some partially decomposed unfinished compost to investigate. Is it ready? What needs to happen to decompose further?

• Create a decomposition timeline to demonstrate how one thing in the compost changes over time. Show students a whole fresh leaf, a slightly dried out leaf with a few holes, a skeleton of a leaf and a fully decomposed leaf. Have students put them in decomposition order and then describe what has happened to the leaf over time.

Soil and Worm Search

For Grades K-8

Summary

Introduce students to the biology and natural history of earthworms by digging into soil, examining worms, soil, and other creatures they find.

Materials

- ☑ metal spoons
- ☑ 3-ft. lengths of string
- ☑ 2-3 trowels
- ☑ pieces of 2x3-ft. white cloth or lage pieces of white paper
- ☑ hand lenses or magnifiers

Procedure

1. Following introductions, talk with the students about soil as an ecosystem with living and dead components, and how it is home to earthworms and many other critters. Tell students that they will be investigating earthworms. An earthworm has five hearts, which are actually pairs of enlarged blood vessels that pump blood throughout the worm. Worms eat their weight in soil each day. Soil enters the mouth, travels into a bag-like crop, and then to the gizzard, where strong muscles and bits of soil act like teeth to grind up food hidden in the soil. The remaining soil is expelled from the worm as waste, called worm *castings*.
2. Discuss earthworms' role in soil quality (and, therefore, animal and plant health). Worm castings are five times richer in nitrogen, seven times richer in potassium and eleven times richer in phosphorus than the soil ingested. These nutrients are important for plant growth.
3. With her or his string, have each student mark a patch of ground that she or he will dig in.
4. Have students dig small holes with their spoons. Encourage them to look carefully for worms, insects and evidence of plant roots or decomposing leaves.
5. Lay the white clothes on the ground. Place specimens on the cloths to get a better look at the soil and worms. Have the students observe the worms carefully and describe what they notice. What parts of the worms can they see? What parts can they see through the magnifier? Put a worm on a clear plastic plate and shine a flashlight under it to show some of its internal and external parts.
6. After everyone has finished looking at their worms and sharing their observations, place the worms gently in the holes and cover them lightly with soil and leaves.

Learning about Soil

Summary

This series of experiments involves students in soil investigation and comparison.

For Grades 6-12

Materials

Each pair/group of students will need:

- ☑ copy of the "Soil Properties Record Sheet" on p. 68.
- ☑ clear jar with lid
- ☑ trowel
- ☑ paper cup
- ☑ one mason jar (quart size)
- ☑ paper & pencil
- ☑ pie plate

Procedure

Experiment #1:

1. Have groups or pairs of students collect soil samples. Each group should be assigned a different place on the farm so that each sample will be unique.
2. Each pair of students will study their soil sample and record their findings on the "Soil Properties Record Sheet."
3. Discuss with the entire group how the soil samples are different.
4. Have each group fill their lidded jar 2/3 full of water. Add 1/3 soil, add a lid, and shake the contents vigorously.
5. Leave the samples alone for at least 15 minutes while performing another experiment or exploring the farm. Let the contents settle out and observe the differences. Which soil is heaviest? Which soil has the most sand? Sand will settle at the very bottom because it is the heaviest; clay will be on top since it is the lightest and has the smallest particle size.
6. Discuss how different plants need different kinds of soil, how Vermont has more than 25 different soil types, and how soil types are derived.

Experiment #2:

1. Have students poke three holes in the bottom of their paper cups and fill the cups ½ full with soil.
2. Hold the soil cup over the mason jar and then pour a measured amount of water through the soil. Time how long it takes for ½ of the water to pass through the soil.
3. Compare results. How does soil "hold" the water? Which part of this experiment illustrates a part of the water cycle? How does this experiment relate to water pollution? How do farmers and gardeners use this information to farm better?

Extension:
Set up 3 containers: One with sand, one with clay, one with silt. Do Experiments 1 and 2 with these pure samples. Explain to students that their soil samples from the farm have a mixture of these soil particle sizes. Let students compare their own soil samples to the sand, clay, and silt. Ask students which soil particle sample their soil is most like.

Soil Properties Record Sheet

Soil is made of 4 main components:
solid rock and minerals (45%), organic matter (5%), air (25%), and water (25%).

What organic (living or once-living) components can you see in your soil sample? (worms, leaves, seeds, etc.)

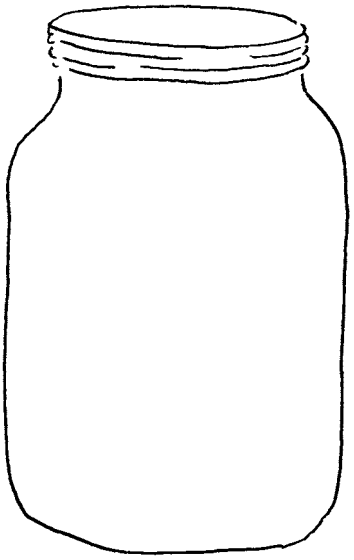
How big are the inorganic (rocks & minerals) components?

How does your sample feel if you rub it between your fingers? (Textures: rough, sandy, soft, silky).

How does your sample hold together if you try to form it into a ball? (Consistency: loose, friable/crumbly, firm, sticky)

Smear a bit of your sample below. What color is it?

EXPERIMENT #1:
Draw the layers of your sample in the jar after its particles have settled out of the water (wait about 24 hours).



EXPERIMENT #2:
How long did your sample "hold" ½ the water?

A Fruit by Any Other Name

Summary

Introduce students to the variety of plants that produce edible fruit through discussion, observation, and comparison.

For Grades K-6

Procedure

1. Discuss the different fruits we eat.
2. Explain the difference between fruits and vegetables. A *fruit* is any edible part of a plant that has seeds inside it. A *vegetable* is a plant part that is consumed and does not have seeds inside it.
3. Have students classify fruits according to what they grow on: bushes, vines, trees.
4. Have children differentiate between small fruit (grown on bushes or vines) and other fruits.
5. Ask children to classify fruits according to which grow in Vermont and which do not.
6. Discover which foods are grown on the farm during the farm tour. As each food is discovered, write its name on an index card for students to bring back home or to the classroom for further investigation.
7. After exploring the farm, have the students map the buildings and land. Focus on where the food for animals and the food for people are grown. Make a large map on a white bed sheet to hang up for future guests or for the students to take back to the classroom.

Materials

- ☑ fresh fruit
- ☑ access to gardens or orchards
- ☑ photographs of fruit and fruit plants

Extensions:

• Ask students to draw the fruit and plants that they are from when they get back in the classroom. Ask them to research more about these fruits and turn their artwork and research into a "Vermont Fruit Field Guide."

• Collect a variety of fruits (fresh and preserved) for the group to investigate. Have students describe how these fruits are similar and different. Let students sample and compare the different kinds of fruits: fresh, dried, jammed, and leathered.

Brown Bag Botany

For All Ages

Materials

- ☑ large brown paper bag
- ☑ labels identifying each of the plant parts listed
- ☑ an assortment of foods, including a variety of plant part products such as:
- ROOTS: carrots, beets, tapioca
- STEMS: celery, potatoes, sugar, asparagus, rhubarb
- LEAVES: tea, lettuce, spinach, onion
- FLOWERS: chamomile, nasturtiums
- BUDS: broccoli, brussel sprouts, cauliflower, artichoke
- FRUIT: cucumber, pepper, pizza sauce, tomatoes, zucchini
- SEEDS: alfalfa sprouts, bread, spaghetti, cereal, oatmeal, rice, chocolate, peas or beans out of the shell

Summary

Students are introduced to edible parts of plants and identify the nutritional qualities of different plant parts.

Procedure

1. Set up areas with a label or sign for each plant part.
2. Fill the paper bag with an assortment of edible foods from each of the plant-part categories (see materials list). Be sure to include animal and people food from your farm!
3. In teams of two, have students pull a food out of the bag and try to match it with the corresponding plant part. Lettuce, for example, would be placed in the station marked "leaves."
4. When everyone has had a turn, review and critique.

Plant Part Chart

Plant	Description	Examples
Root	**Usually forms below ground, acts as an anchor for the plant, absorbs water and minerals, and provides physical support and food storage.**	**Diakon, burdock, tapioca, carrots, parsnips, beets**
Stem	**Provides support for the buds and leaves, and gives the plant its form. Serves as a conduit for water, minerals, gases, and sugars.**	**Potatoes, celery, rhubarb, asparagus**
Bud	**An undeveloped shoot from which leaves or flowers grow. A flower bud includes a short stem with embryonic flower parts.**	**Broccoli, artichokes, brussel sprouts, cauliflower**
Leaf	**The part of the plant involved in photosynthesis and transpiration. Leaves are made up of: stoma, guard cells, epidermis, cuticles, veins, chlorophyll, and chloroplasts.**	**Parsley, onions, celery, lettuce, mint, chives, garlic, tea**
Flower	**The structure that contains the organs for sexual reproduction. Also the site where the pollination occurs.**	**Nasturtiums, chamomile**
Seed	**After pollination has occurred, fertilized ovules grow and swell to form seeds. A seed contains an embryo (which has all the necessary genetic information to create a new plant), an endosperm (the food required to sustain early growth), and a seed coat (which protects the seed from disease).**	**Shell peas, wheat products, oats, coconut, peanut butter, corn starch, coffee, dried beans, chocolate**
Fruit	**The enlarged ovary surrounding the newly developed seed is the true fruit of the plant. The fruit holds and protects the seed.**	**Pumpkins, tomatoes, vanilla, snap peas, green beans, avocadoes, peaches, grapes, zucchini, peppers**

Simply Salads

For All Ages

Materials

- ☑ farm maps
- ☑ pictures of salad ingredients
- ☑ collecting bowls
- ☑ scissors for cutting greens and herbs
- ☑ cooler of water
- ☑ salad spinner
- ☑ plates
- ☑ forks
- ☑ napkins
- ☑ jars for salad dressing
- ☑ oil
- ☑ vinegar
- ☑ salt & pepper

OPTIONAL: 6-inch pots, lettuce, radish, chive seeds; soil, water, Popsicle sticks, and pencils to label.

OPTIONAL: Have ingredients to make a salad dressing.

Extension:
Sort collected items by plant part.

Summary

Participants explore the vegetable farm through a scavenger hunt: identifying, collecting, and eating wild and cultivated greens, herbs, and flowers.

Procedure

1. In advance, make farm maps and a picture guide to the salad ingredients to be collected. The map can be a simple line drawing that shows major buildings and fields. Salad ingredient pictures can be cut out from a seed catalog. Label and number each picture. Put the corresponding number on the map where the item can be found.
2. After introductions, break into three groups for collecting. Distribute maps and explain that each group will go to one area at a time, return with what they gather, and then go to the next area. Be specific on quantity to gather!
3. Show each group the pictures of what they need to collect and locate the first plant on the map. Have students go to that location and search for the plant.
4. Teach students careful ways to harvest (e.g., stand in the path, cut low for lettuce, high for perennial herbs) and collect a little from each area.
5. Depending on how far students have to walk, it takes about 15 minutes to collect four to five plants. Do fewer plants for preschoolers, and more for middle and high school students.
6. At the spot groups meet and switch, have three collecting bowls for each plant group — wild and cultivated greens, flowers and herbs.
7. After all groups have collected all three plant groups, wash greens and cut the herbs.
8. Make a dressing by putting two parts oil to one part cider vinegar, 1-2 pinches of salt and about ¼ of the chopped herbs. Almost any combination of herbs will work if they are cut up finely enough to release flavor.
9. *(Optional)* After eating, students can fill a pot with soil and plant a salad-type seed to take home and grow.

Recipe Scavenger Hunt

Summary

Students discover the connections between the foods they eat and the foods produced on Vermont farms.

For All Ages

Materials

- ☑ bags or gathering baskets are helpful
- ☑ copies of a simple recipe made from farm products

Procedure

1. Make copies of a simple recipe containing farm products. Common recipes include vegetable stew, squash soup, vegetable rice pilaf, carrot parsnip beet salad, etc. (Include your farm's name on the recipe.)
2. After a tour of the farm, divide into groups and give each group a copy of the recipe (or give each child a copy of the recipe).
3. Talk about the ingredients that are not produced on the farm, and where they will come from.
4. Take the group(s) out around the farm to collect the ingredients.
5. If there is enough time and the necessary facilities, the students can use the ingredients to make the recipe. If not, make the recipe in advance so the children can taste it, or give the ingredients and recipe card to the teacher for the students to make it at school.

Extensions:

• Make sweet dips or dairy dips for harvested fruits and vegetables.

• Dry harvested items for tasting later or mixing into cereals, yogurt (for fruit), or soup with pasta (for vegetables).

Carrot, Parsnip & Beet Salad

Yield: 25 servings

INGREDIENTS

2 ½ lbs. parsnips
1 ½ lbs. carrots
1 lb. beets or ½ lb. green cabbage and ½ lb. red cabbage
2 Tbsp. grated fresh ginger or 1 Tbsp. dried ginger
¼ cup honey or ½ cup of brown sugar (sweeten to taste depending on vegetables)
¼ cup lemon juice
¼ cup orange juice
½ cup olive or vegetable oil

DIRECTIONS

1. Clean and grate all vegetables.
2. Make a dressing by mixing ginger, honey, lemon juice, and orange juice.
3. Add vegetables to dressing. Mix well.
4. Let stand for one hour to marinate before serving.

Variations:

Add dried fruits such as cranberries.

Squash Soup

Yield: 50 servings • Serving size: 2 oz.

INGREDIENTS

12 lbs. raw winter squash
1 lb. or 3 medium onions, chopped
5 cloves of garlic, minced or
4 Tbsp. garlic powder
3 stalks of celery or celeriac,
chopped (about 1 cup)
4 oz. butter or margarine
¼ cups olive oil
5 bay leaves
6 cups orange juice
6 cups apple juice or cider
2 tsp. vegetable bouillon cubes
1 Tbsp. pepper
Salt to taste

DIRECTIONS

1. Roast WHOLE squash on sheet trays in a 325°F oven until fork tender (about 45 min.). May be cooked the day prior and refrigerated until ready to use. Soup has much better flavor, sweeter, when squash is roasted prior to boiling.
2. Scoup out flesh into bowl.
3. Sauté onions and garlic in the butter and oil in a large kettle.
4. Add squash and celery or celeriac, coat in oil, cook 1 minute.
5. Add water to cover vegetables, add 5 bay leaves, and boil until tender.
6. Take out bay leaves and puree the vegetables, squash, and liquid in food processor.
7. Return puree to pot, add orange juice, apple juice, vegetable base, pepper & salt.
8. Reheat on low. Do not boil. Hold at 160°F for service.

Confetti Rice Salad

Yield: 8 servings

PREPARATION: Cook 1 cup white and 1 cup brown rice, each in 2 cups of water. Cool.

INGREDIENTS

4 cups cooked rice
1 cup red or green pepper, chopped small
1 cup red cabbage, chopped small
2 carrots, grated
2 scallions finely chopped
¾ cups chopped parsley
(or mix chopped parsley with chopped cilantro)

DRESSING

6 Tbsp. sesame oil (or use vegetable oil)
4 Tbsp. cider or white vinegar
1 Tbsp. tamari or soy sauce
2 tsp. toasted sesame oil
(or 4 Tbsp. toasted and crushed sesame seeds)

DIRECTIONS

1. Toss rice and vegetables until mixed.
2. Pour all dressing ingredients into a jar or blender and mix vigorously.
3. Drizzle dressing on rice and vegetables and toss gently.

Smelly Plant Scents Match

Summary

Encourage students to explore the scent of plants, herbs, and flowers on the farm and begin to identify them by scent; demonstrate how animals use their sense of smell to identify other animals and food.

For All Ages

Materials

- ☑ film canisters (available free in film stores) or small yogurt containers with lids
- ☑ cotton balls or tissues
- ☑ access to garden, vegetable fields, and other areas with fragrant plants

Procedure

1. After introductions, encourage students in partners to explore a particular area of the farm with fragrant plants.
2. After they have explored for a short while, give each student pair two film canisters and two cotton balls. In each canister, they place a piece of plant with a unique of obvious smell. The same plant should go in both canisters. Take a moment to demonstrate to students proper harvesting techniques — "pick only 1 leaf, not the whole plant."
3. Students then place cotton balls or tissues on top of the plant to conceal its identity. Encourage students to find plants different from their friends.
4. Gather the students and their canisters in an area where they can move around easily.
5. Set aside half of the canister pairs for a second round. Give one canister to each student pair.
6. Make a large circle. Direct students to mingle, sharing their scent and trying to match up with like scents. Discourage students from talking or peeking; encourage them to concentrate on their noses. Everyone should find a partner; there may be groups with the same scent.
7. Play again with the remaining canisters.
8. At the end of the second round, have the pairs try to match the smell of their canister with the actual plant where they found the scents originally. If students are having a hard time with this, they can peek at the plant to compare appearance.
9. Ask students to answer some or all of the following questions: How hard was it to find your matching smells? Are there places on your plant that have more smell than others? Where? Why do you think plants have smells? How do humans use their sense of smell? How about other animals? How about farm animals?

Blindfold Walk in the Garden

For Grades 3-12

Summary

Encourage students to discover the scents and textures of various garden plants.

Materials

- ☑ blindfolds—one for every two people
- ☑ access to a garden

Procedure

1. Split the group into pairs.
2. In each pair, one person is blindfolded, the other is the guide. Chaperones can be used for each pair of children to guard against injury. Hats may also be pulled down over eyes in lieu of using blindfolds.
3. The guide carefully leads the blindfolded partner to an area in the garden by holding one hand of the blind person and placing the other hand on his or her shoulder. Make sure the blindfolded person feels safe.
4. Try not to step on plants or obstacles.
5. When the pair reaches a the chosen spot, the guide shows the blindfolded partner where the plants are with his or her hands. The blindfolded partner squeezes the plant and smells its aroma. Encourage the students to feel for other things in the area – soil texture, row size, etc., without moving their feet too far from the chosen spot.
6. When the blindfolded person is ready, the guide leads the blindfolded partner back to the starting point. When the blindfolded person is back at the starting point, the student may remove the blindfold. Now, can that person find the same plant?
7. Switch roles, and do it all again.
8. Share observations. Which plants smell similar? Do they look similar? What makes it easy to find your plant? Describe the texture.

Count the Seeds

Summary

A hands-on introduction to the number and variety of arrangements of seeds in fruit and vegetables.

For Grades 4-12

Procedure

1. With students, or in advance, collect an assortment of seed-bearing fruit and vegetables. Items not available on the farm can be purchased.
2. With students, make estimates of the size and number of seeds in each fruit.
3. Have samples of the seeds available before you cut open the fruit for students to try and match the seed with the fruit.
4. Cut open the fruit or vegetable, and examine the arrangement of the seeds. Count, or estimate the number of seeds per item.
5. Compare the size of the produce to the number of seeds within or on each.
6. Find out how many fruits are on the plant and figure out (or estimate) how many seeds each plant will produce.
7. Ask students to consider how many second-generation plants will be produced. Why won't apple trees and tomato plants overtake us all? What are some of the growing conditions and factors that affect the success rate of second generation plants?

Materials

- ☑ access to a wide variety of garden vegetables and fruit
- ☑ bags or baskets
- ☑ knives and cutting boards or plates

See "Learning About Seeds," p. 84.

Extension:
Ask students to discuss what the farm would look like without seeds. Have them form a circle, facing outward, and describe what they see. What would not be part of the scene if there were no seeds?

Three Sisters Improvisation

For Grades K-4

Summary

Introduce students to companion planting by acting out the planting and growing of the "Three Sisters" — corn, beans and squash.

Materials

☑ optional: bean, corn, and squash seeds

Extension:
If time allows, play Three Sisters Tag afterward.

Procedure

1. Explain to the students about the plants they will be "growing" — corn, beans and squash. Discuss how plants begin to grow from seeds.
2. Each student pretends to be a seed by crouching down in a ball. Explain the growing cycle and ask the students to act it out.
3. Pretend to cover them with soil and warm them with sunshine. Describe the seed sprouting and growing into a plant. Ask the students to act this out as you describe it.
4. Ask a volunteer to come to the front of the group to be a tall corn plant. Then plant a "bean seed" (student) next to the corn plant. Describe how the corn provides a trellis for the bean plant to grow tall on. Next, plant a "pumpkin seed" (another student) next to the corn and bean. Describe how the pumpkin seed grows into a plant that is long and sprawling along the ground.
5. Choose a fourth student to role play a raccoon. What does the raccoon want? Ask the students, why can't the raccoon get it? Have the child who is role playing the squash act "bristly" toward the raccoon, not letting the raccoon get through the plants to the corn. The squash's bristles protect the fruits of the three sisters.
6. Summarize how the "Three Sisters" plants help each other out. The corn provides a trellis for the beans. The pumpkin protects the corn and beans, trapping moisture and shading out weeds. The bristles repel the raccoon. The bean roots provide soil nutrients for the corn and pumpkins.
7. How are plants on the farm grown in relation to one another?
8. What animals might damage the plants grown on the farm?

Three Sisters Tag Game

Summary

For Grades K-6

A version of freeze tag to help students remember the "Three Sisters" and run off some energy during a farm visit.

Materials

None needed

Procedure

1. Briefly discuss the "Three Sisters," a companion planting of corn, beans, and pumpkins. Explain how interplanting the three crops helps each. The tall corn plant provides a trellis for the beans, the pumpkin vines and foliage help trap moisture and shade out weeds, and the beans roots help provide important nutrients for the other two plants.
2. Briefly explain the rules of the game. One person is "it" and is the chaser. In this case, "it" is Jack Frost. The rest of the students are plants — corn, beans, and squash. Each student decides for himself or herself which plant to be. If a plant is tagged by "it," she or he must stand still and raise her or his arm as a signal that she or he is frozen. To be set free, two free plants must come to the frozen plant and hold hands around the frozen plant while all three chant loudly, "Corn, beans, squash!"
3. The game continues until all are tired out.
4. Be sure to set boundaries for the game ahead of time and make sure everyone knows the chant and how to hold hands around a frozen person.

Plant Needs Inventory

For Grades 6-12

Summary

Students learn about what different plants need to grow and why some plants grow well together in certain conditions.

Materials

- ☑ plants started in a greenhouse representing various plant groups that grow well together
- ☑ books/magazines/catalogs/manuals that students can use to identify and research the plants
- ☑ seeds for planting
- ☑ various fertilizer and insecticide packages in clear bags (so students can't touch them directly)

Procedure

1. Discuss with students what plants need to grow. Include in the discussion how different plants need varying amounts of light, heat, nutrients, and water in order to grow.
2. Split the group into two. Give half the group a number of different plants that are started in a greenhouse. Have them research their plants to find out their growing requirements. Have other students guess the identity of each plant and their growing requirements.
3. Ask, which plant groups might be grouped together? Why?
   Some plant sets might include:
   - tomatoes, peppers, eggplants *(need a lot of light)*
   - lettuce, spinach, cabbage *(grow early in the season)*
   - melons, hot peppers, okra *(like hot temperatures, grow late in season)*
   - ferns, moss, impatients, hostas *(like light shade)*
4. Have students then plant in the greenhouse while discussing what the specific plants need for optimum growth such as: sifted soil for the smaller seeds, low light for shade plants, extra fertilizer for perennial starts.
5. Set out various fertilizers, soil amendments, and insecticides with their labels, in clear plastic bags. In small groups led by a chaperone, have students read the labels and decide which plants benefit from which product and why.

Stages of Growth Scavenger Hunt

For Grades 5-12

Summary

Students will discover the various stages of plant growth and learn the distinguishing characteristics of these stages.

Materials

- ☑ plants in varying stages of growth
- ☑ small group questionnaires

Procedure

1. Break the class into small groups.
2. Give each group a sheet that lists the five stages of plant growth (seed, seedling, immature plant with true leaves, mature/reproducing plant, and dead plant).
3. In the greenhouse or in the field, display plants in various stages of growth.
4. For each plant species, have the small groups try to answer the following questions on their questionnaire:
   - Which stage lasts the longest?
   - Which stage is like a toddler, a teenager, an adult, a grandparent?
   - Can you still see the seed attached to the plant?
   - When does the plant flower?
   - How can you tell when the plant is ready to have its edible parts harvested?
   - How do these chosen plants reproduce? (Have a sample of reproduction styles available to discuss — seed, tuber, runner, bulb, etc.)
5. With the whole group back together, ask students to share their findings. Review the questions and the answers with the whole group. Use plant markers to distinguish the stages.

Working in the Greenhouse
Greenhouse stations

For Grades 4-12

Materials

- ☑ seeds and pots for planting
- ☑ a variety of plant foods
- ☑ components for potting soil
- ☑ soil-making screens (could use window screens, tennis racket, food sieves)

Extension:
Examine greenhouse tools with students. Search for tools that aid in growing the greenhouse plants. For example: fans, screens, watering wands, heater, flats, trowels, etc.

Summary

Students learn the ins and outs of working in a greenhouse by planting, working with plant foods, and making soil.

Procedure

Set up three stations at various places in the greenhouse:

STATION 1: Making Soil

Have students sift potting soil components and mix the components into a growing medium. Experiment with different size screens and determine how each component is important to the mixture. What are the origins of the components? Fill seed trays with the soil.

STATION 2: Learning About Plant Food

Have students smell different plant foods such as fish emulsion, compost tea, egg shells, seaweed extract, or "Miracle Grow." Using the information on the labels mix some of the fertilizers. What is the proper use of each plant food? What are these foods made from? Which fertilizer is the strongest? Which is best for leaf growth? Root growth? Would you use one over the other? When and why?

STATION 3: Planting

Start a variety of seeds in appropriately sized pots or plugs. Remember to label each planting and write varieties in the calendar. Count days to harvest, where appropriate. Discuss with students why each seed needs the size container it is being planted in. Tie in the previous stations with discussions about why the seeds are being planted in that particular soil or in that particular plug or pot size.

Greenhouse Pests

Summary

Students learn about pest management in a greenhouse.

For Grades 5-12

Materials

- ☑ plants that have been damaged by pests
- ☑ pictures of pests
- ☑ cards with definitions of different ways of dealing with pests, names of pesticides, explanation of integrated pest management, etc.

Procedure

1. In small groups, have students look for and record evidence of large and small pests in the greenhouse. Suggest that they look at the tops and underside of leaves, at stems, and at the base of the plant at soil surface for pest damage. Who might eat seeds? Who would eat mature leaves? Who would suck the sap out of young seedlings? You can hide pictures of pests in appropriate places for students to find if no real pest evidence is apparent.
2. Bring group back together. Have samples of the different types of pest damage ready to show and discuss. Have students share what they found and then show the samples you have.
3. Have pictures or samples of the pests that caused the damage. Discuss how these pests created the damage. Did they use teeth, claws, chewing mandibles, pinchers, etc.? Identify some of the body parts on the pests that caused the damage.
4. Discuss strategies that a grower may use to deter pests from damaging their plants. Look in seed catalogs to find some more strategies that deter greenhouse pests. Discuss varying approaches of dealing with pests, including integrated pest management.

Extension:
Visit other crops around the farm and determine what the pests are (both large and small) for each crop.

Learning about Seeds

For Grades 2-6

Materials

- ☑ seeds
- ☑ seed catalogs
- ☑ potting mixture

Summary

Students learn about seeds by examining their size and guessing what kind of plants they will become.

Procedure

1. Allow students to handle a variety of seeds. Have them guess what kind of plant each seed will become. Examine and discuss the purpose and morphology of the seed. Why are some seeds shaped the way they are? Discuss different types of seeds you might find in a greenhouse and in a crop field (hitchhikers, flyers, helicopters, floaters); how they are different from one another and why.

2. Match the seeds to pictures of the adult plant (cut from catalogs), or to actual plants.

3. Look for seed requirements in seed catalogs. Discover the requirements for seed-to-plant maturity. Find the pictured vegetables, herbs, flowers in the greenhouse.

4. Measure seed widths with the students. Plant a variety of seeds in various growing mediums in the greenhouse or directly outdoors.

Extensions:

• VIABILITY TESTING
Put seeds on moist paper towels and slip into plastic bag. Check moisture after ½ hour. Keep in greenhouse for further observation or send the test home with the kids. Record % of germination.

• COMPARING PLANTS
Dissect a number of different plants. Compare root systems, stems, leaves, flowers. Use this information to make a key or field guide.

What Does It Take to Make Milk?

For All Ages

Summary

Introduce the students to the cow. Learn about the milking process, different breeds, feed, and manure.

Materials

- ☑ large diagram of a cow
- ☑ an outline of a cow (multiple copies for handouts)
- ☑ access to a dairy barn

Procedure

1. Introduce the students to the different parts of a cow by using post-it notes to label the different parts of a cow on a large diagram.
2. Go through the milk house and explain where the milk goes and how it is filtered. Introduce students to the milking equipment.
   a. Explain the cooling system and the washing system.
   b. Ask students if they know what pasteurization and homogenization mean. Explain these two processes to the students.
   c. Explain the tests that are performed on milk before it is used for consumption. The tests help make dairy food safe.
3. Visit the grain/TMR/feed area. Explain the feed and give a simple explanation about how the food is turned into milk.
4. Have the students milk a cow (or demonstrate for them). Show the sanitary steps used to prepare the teats for milking.
5. Go through the manure system used on the farm. Ask students if they know about the free fertilizer that farmers have. Have them guess how much manure (free fertilizer) a cow makes in one year.
6. Introduce students to the different breeds of cows and their characteristics: Holstein, Jersey, Milking Shorthorn, etc.
7. Have each student find a favorite cow. Name it if it doesn't have one.
8. Give students the outline of a cow handout and have them color in the cow to look like their favorite cow.
9. Have students present to the group which cow was their favorite, the name they gave it, and what made it special or unique.

If I Were A Cow, What Would I Eat?

For Grades K-12

Materials

- ☑ access to rotationally grazed pastures
- ☑ plastic bags
- ☑ pencils, markers
- ☑ notebooks
- ☑ poster board
- ☑ glue
- ☑ white sheet
- ☑ field guides for older youth

Summary

Students discover the variety of plants that grow in pasture and begin to identify which plants farm animals eat.

Procedure

1. Ask students the following questions to see what they already know. Do they know what cows eat? Is there a difference between lawn grass and the grass cows eat? They're about to explore your pastures to find out.
3. Split the group into pairs. Each pair will need a bag to collect vegetation. For older groups, add a notebook (or paper) and pencil to record their observations.
4. Ask each pair to explore the pasture, observing and collecting the different grasses growing in different areas. Encourage students to look under trees, along the fenceline where cows can't eat, in the pasture, and near manure. Older students should record where they found the plant, and may draw pictures. While they are collecting, students should consider whether they think the plant is something cows like to eat or not. How might they tell?
5. Spread white sheet out and have students lay their samples on the sheet, then sort them into groups of similar plant varieties. Have older students use field guides to identify the different plants. Discuss with the group which plants cows like to eat and which they do not.
6. Students may glue their samples to a piece of poster board. Label each plant (if they know what it is) and where they found it. Leave a space under each plant so students can write if this is a plant that cows think is "Yummy" or "Yucky." This board can be taken back to school and displayed as a pasture field guide.

Dairy Food Tasting

Summary

Introduce students to a variety of dairy products (cow, sheep, and goat).

For All Ages

Materials

- ☑ cheese samples cut up
- ☑ a white board and marker
- ☑ yogurt samples
- ☑ Dixie cups for sampling
- ☑ milk samples

Procedure

1. Cheese tasting

a. Cut up different cheeses in advance. Number each sample group.
b. Let students taste each type of cheese.
c. List on a whiteboard/chalkboard or piece of paper the name of the cheeses they are tasting. Can they match each taste with the correct name? What type of animal did each cheese come from (cow, sheep, goat)? Discuss some common uses of the cheeses they are trying (mozzarella is often used on pizza, cheddar is often used in macaroni and cheese, etc.).

2. Yogurt tasting

a. Have several different flavors and name brands of yogurt available for sampling. Hand out each sample one at a time in a Dixie cup.
b. Write a letter — A, B, C, for example — on the bottom.
c. Have a key to which milk goes to which letter.
d. Have students guess the flavor of yogurt and if it is nonfat, low fat, or whole milk. Many children have not tried the different yogurt flavors available so this is a good way to turn them on to something.
e. Read labels to discover ingredients of each product.

3. Milk tasting

a. Have skim milk, 1%, 2%, whole milk, and half-&-half in Dixie cups.
b. Write a letter — A, B, C, for example — on the bottom.
c. Create a key to match milk with corresponding letter.
d. Have the students put in order their favorite milk.
e. Have students tell the group which milk they usually drink at home and then give them the key to see if they picked that kind of milk.
f. For older students, discuss and explain the descriptions on each container (homogenized, organic, Seal of Quality, USDA certified).

Ice Cream in a Bag

For All Ages

Materials

- ☑ 1 Tbs. sugar
- ☑ ½ cup of whole milk or half and half
- ☑ 2 cups crushed ice
- ☑ ¼ tsp. vanilla extract
- ☑ 2 Tbs. coarse salt (found in the baking isle)
- ☑ freezer ziplock bags: gallon and quart size
- ☑ duct tape
- ☑ spoons

***If you find that bags break, you can use plastic containers with lids (like a small yogurt container inside a large yogurt container). If you decide to use containers, seal the lids with duct tape after ingredients are added.**

Summary

Introduce students to a yummy dairy product through an easy activity.

Procedure

1. Put sugar, milk (or half & half), and vanilla into the quart-size bag and seal it. Secure the seal with duct tape.
2. Fill the gallon-size bag with the crushed ice. Add the salt.
3. Place the small bag inside the large bag. Nest it within the ice and seal the large bag. Shake it until the liquid inside the small bag looks like soft serve ice cream (about 10-15 minutes or less).* Don't let students squish the bags.
4. Wipe the salt off the small bag before you open it. If you forget this step the ice cream is very salty and melts too quickly.
5. Use the spoon to eat it right out of the bag.
6. Ask the students if they have eaten Vermont-made ice cream. Who consumes Vermont-grown dairy products? What would Vermont look like if our dairy farms that produce milk (to make ice cream!) disappeared?

Note: *You can double the ice cream mix quantity, but it will take longer to freeze.*

There's No Such Thing as a Free Lunch

For Grades 5-10

Summary

Through a tour of the farm, students will examine energy flows on a farm and energy needed to produce food. Buttermaking may be used as a hands-on demonstration.

Materials

- ☑ cream
- ☑ bowls
- ☑ electric mixer(s)

Procedure

Note: *This activity assumes that students have a working understanding of energy concepts. You may want to check with the teacher beforehand to make sure students have studied what energy is and how we make energy.*

1. While touring the farm, look for energy consumption. Have students identify where the energy is coming from — directly from the sun, from "purchased" sources such as fossil fuels and electricity, or some combination.
2. Before beginning buttermaking, have students discuss and draw pictures or charts of where butter comes from. Start with butter and go back to identify the ingredients and energy needed to make butter:
    - *Butter* comes from *cream* that is mixed using *electricity*.
    - *Cream* comes from *milk* which comes from a *cow*.
    - The *cow* is milked using *electricity*.
    - The *cow* needs *water, grain,* and *grass* to make milk.
    - The *water* is pumped using *electricity.*
    - *Grain* is grown using *sunlight, soil,* and *water* (rain and irrigation). *Planting, cultivating, harvesting,* and *processing* all use *fossil fuels*.
    - The *grass* is grown using *sunlight, soil,* and *rain.*

3. Make butter with the students. Either put heavy pasteurized cream in a bowl and mix it with an electric mixer, or put the cream in a glass jar with lid and shake it until it turns to butter. If you can, try both options and discuss which type of energy each option took. Serve butter on crackers.

Extension:
Ask students to identify ways to reduce purchased energy on the farm. What are the trade-offs? What other energy needs are there to get food from farm to table (delivery, storage, refrigeration).

Flocks of a Feather

For Grades K-4

Materials

- ☑ paper
- ☑ pencils
- ☑ candle
- ☑ access to eggs and chickens

Summary

Introduction to the feathered friends on a farm through comparing, drawing, writing, investigating, observing, hypothesizing, and experimenting.

Procedure

1. Ask some introductory questions:
   - What is a chicken and why do we have them on farms?
   - What kinds of chickens are on the farm? (meat vs. laying)
2. Discuss the various characteristics of chickens compared to those of humans. How do they eat? How do they keep warm? How do they hear? How do they get around? How is what they use to see, eat, hear, walk, different from what we use?
3. Gather feathers from the chicken coop.
4. Gather eggs and count them and compare to the number of chickens. Discuss how egg production varies according to the age and health of the bird, the season, and other factors such as weather and stress.
5. Draw a picture of the chickens, their home, incubated eggs, etc.
6. Candle eggs to see the growth of the chickens. Grade the eggs according to size and quality.

If you have ducks:

1. Visit them and have the students discuss the differences between chickens and ducks.
2. Check out a duck before and after it has gone swimming and have students make some observations.

Extensions:

• For students in 2nd grade and older, ask them to write a story about your chickens/ ducks. What is life like? What does it think about? How does it fill its day?

• Discuss the difference between wild birds and your domesticated birds living on the farm. Introduce and visit any other birds that use your farm for their home. Look for nests and habitats of these birds.

• Visit various hatchery web sites to discover additional breeds of farm birds.

How Does Your Food Behave?

Summary

Encourage students to value the food they eat and the sources of that food by exploring the behaviors, lifestyles, and actions of poultry they eat. (Other animals may also be observed using procedures below. Poultry works well because they move more often.)

For Grades 4-12

Materials

- ☑ access to chickens (and/or other poultry species)
- ☑ copies of a behavior chart
- ☑ pencils and notebooks for recording observations

Procedure

1. Provide a little background about the farm and the animals students will observe. Describe the behaviors that students may see: territorial, dominance, hierarchy, and courting.
2. Ask each student to choose a bird to watch. Have each student record his or her bird's height and approximate weight, color, and distinguishing markings.
3. Have each student observe and record his or her bird's behaviors for five minutes. Every 10 seconds time will be called, and students will use tick marks to record what their birds are doing: walking, eating, sleeping, pecking, standing, scratching, grooming, or laying down.
4. Have students total the marks for each behavior, and identify which behavior their birds displayed most frequently. (Optional: have students calculate the percentage of time the animal spent in each behavior.)
5. Ask students to respond (in discussion or writing) to the following questions:
   a. Identify three stimuli that produced behaviors you observed. Label the stimuli "internal" or "environmental."
   b. Pick three behaviors and describe the message the bird communicated through each.
   c. Describe a behavior you think is innate. Describe another that is learned.
   d. Where is your bird's approximate place in the pecking order? What did you observe that supports that conclusion?

Extensions:

• Offer students time to draw or photograph the chickens and the chicken area, particularly if they will be asked to complete a report or poster at a later date.

• Repeat at a second station with a different species or chicks. Have students compare behaviors.

Behavior Chart (Ethnogram)

Use this chart to record your bird's behavior. (It may be taped or stapled into your notebook.) Ethnography is the study of behavior that uses observations and descriptions of the behaviors shown by the animals under study as a learning tool. Every 10 seconds, time will be called and you will mark down (using a tick mark) what your bird is doing in the appropriate row.

BEHAVIOR		TOTAL
Walking: taking one or more steps forward while in an upright position		
Eating: head down at ground, picking food up with beak		
Sleeping: eyes completely closed		
Pecking: poking another bird or object with beak		
Standing: staying in an upright position with both feet on the ground		
Scratching: scraping the ground with one foot at a time		
Grooming: using beak to smooth out feathers on its body		
Laying Down: full body in contact with ground, legs tucked underneath		

Date: _____ Name (s): _____

Farm Animal Travels

Summary

Students explore animal behavior and identify patterns by keeping track of one animal during a 10-minute observation. (Poultry work well for this activity.)

For Grades 3-6

Materials

- ☑ safe access to farm animals
- ☑ pencils and paper
- ☑ watch or timer

Procedure

1. Sketch a map of the animal's immediate environment, which should include food, water, and shelter for that chosen animal. Depending on the group, you can provide the map to the students, or they can draw it themselves. Be sure to include important locations for the farm animal, including the shelters, feeders, water, terrain (tall grass, short grass, dirt, shrubs, etc.), shady spots, and sunny spots.
2. Have each student select his or her favorite animal, or one that is easy to identify.
3. Have each student watch his or her chosen animal for 10 minutes. Students should stand at distance so as not to disturb usual routines. Every time the animal visits one of the locations on the map, students will make a check mark to show it was there. If they can, they may draw lines to show what paths it travels to get from one place to another.
4. Have the students analyze their map.
   a. What routes are used most?
   b. Where did your animal spend most of its time?
   c. How often does it eat in one minute?
   d. How often does it drink?
   e. Compare your animal with other students' animals.

Extension:
Research how much area each farm animal needs in order to maintain health. Generally speaking, a turkey needs 7 square feet (indoor captivity), a cow needs 1 acre, and a sheep needs 1/3 acre.

Feathers, Feathers, Feathers

For All Ages

Materials

- ☑ a variety of feathers
- ☑ hand lenses

Note:
This information is found in *Hands-On Nature: Information and Activities for Exploring the Environment with Children*, **edited by Jenepher Lingelbach and Lisa Purcell. Vermont Institute of Natural Science, Woodstock, Vermont. Copyright 2000. The book contains a good illustration of types of feathers on page 38. Used with permission.**

Summary

Students learn about the kinds and parts of feathers through hands-on examination.

Background

All birds — from chickadees to eagles — have three basic kinds of feathers:

- **Flight feathers**, found on the wings and tail. They have strong shafts running the entire length of the feather, with flat webs on two opposite sides. This makes a lightweight but solid surface for flight.
- **Down feathers**, found close to the skin and body of the bird. They have very short shafts with many non-interlocking barbules to create dead air spaces for insulation.
- **Contour feathers**, found over down feathers. They help streamline the bird and, along with the flight feathers, carry the colors and patterns that are distinctive of the species.

Close examination of a feather reveals three parts: the *shaft*, which is the central hollow tube that gives the feather its rigidity; *barbs*, the parallel strands that attach on either side of the shaft to create the feather's flat surface, or *vane*; and *barbules*, which run along barbs and connect them together with tiny hooks on one side and bumps on the other.

Procedure

1. Take the students on a feather search around the chicken yard and house. Try to find an example of each of the three kinds of feathers — flight, down, and contour — for each group of students. Ask students to sort the found feathers into like groups.

2. After finding the feathers, closely examine them to find the different parts. Encourage students to observe the different parts of the feathers, and to compare and contrast them. Ask them to use hand lenses if needed. Can they guess which job each feather might have?

3. Have students gently pull apart the web of the feather. Students can use hand lenses to see the tiny barbules that project from the barb. Ask them to try to zip the feather back together by pinching and drawing their fingers along the separated from the shaft to the outer edge.

Chicken Choices

For Grades 1-4

Materials

- ☑ access to chickens
- ☑ access to a variety of foods (weed seeds, insect pests) for the chickens
- ☑ a collecting basket (or bags)
- ☑ chicken choices chart (below)
- ☑ paper and pencils

Summary

Students discover how chickens use their feet and beaks to forage and obtain a variety of different foods.

Procedure

1. Collect a variety of seeds from wild plants growing along a hedgerow, or left over from weeding. (It can be done before students arrive or with them, or some of both, depending on the group and time frame.)
2. Try to catch some insect pests — e.g., potato beetles, squash bugs, bean beetles. (Again, it can be done before students arrive or with them.)
3. Go to the chickens. Briefly explain that chickens eat a variety of foods: in addition to grains and vegetable scraps offered them by farmers, they also forage on their own for insects and worms in the grass and in the top layer of the soil. Before offering your items to the chickens, ask students whether they think the chickens will eat it.
4. Offer the various seeds to the chickens by spreading them out on the ground. Watch the chickens while they scratch and peck at the food. Encourage students to observe how chickens forage. Which seeds do they seem to prefer? Which ones do they avoid?
5. Spread the insects out on the ground. Which ones do the chickens seem to prefer? Which ones do they avoid? Have the students record their observations.
6. On a whiteboard, chalkboard, or big piece of paper, make the chart below with a list of all the food items you offered the chickens. Ask students: Will the chickens eat it? Did the chickens eat it? Ask why they think the chickens liked some of the foods better than others.

Chicken Choices Experiment *(sample chart)*

FOOD OFFERED	WILL THEY EAT IT?	DID THEY EAT IT?
Sumac berries		
Potato Beetles		
etc.		
etc.		

Grinding Grain

Summary

Students learn about chicken grain by hand-grinding it and feeding it to the birds. (This activity may also be done with other animals that eat grain.)

For All Ages

Materials

- ☑ whole kernel, dry corn
- ☑ other dried grains if available
- ☑ rounded grinding stones (to fit in a child's hand)
- ☑ wooden bowls or flat rocks
- ☑ circular pieces of canvas cloth or leather
- ☑ yogurt cups or containers for carrying ground corn

Background

Farmers generally feed chickens grain that comes from the mill. It is made up of corn and soybeans and other grains. These grains have a lot of protein to help the chickens grow and enough energy to help them lay eggs. It is easier for chickens to eat grains that are already partly ground up. Chickens don't have any teeth, but they eat small stones and collect them in their crop. When they eat the grain it goes into the crop and is ground up into smaller bits by all the stones. Then the food moves on to the stomach and is digested more thoroughly.

Procedure

1. Have the students place a handful of dried corn (or other grains) in a wooden bowl or on a flat rock. Cover the corn with a piece of canvas to keep the corn from flying around as the student pounds.
2. Use the rounded rock to pound the corn, checking occasionally to see how small the pieces are getting. Explain that this is just like what is happening in the chicken's crop.
3. When the corn is ground to the desired coarseness, students collect it in a cup and bring it to the chickens to eat.
4. Have students observe which size kernels (and which grains) the chickens like best.

Signs of Sugaring

For Grades 6-12

Materials

- ☑ access to a sugarbush with varying altitude and aspect

optional for extensions for older students:

- ☑ poles to measure snow depth
- ☑ measuring tape
- ☑ thermometers
- ☑ notebooks (or paper) & pencils
- ☑ surveyor's tape
- ☑ waterproof marker
- ☑ compasses

Extensions:

• In advance, mark site numbers at several spots in the sugarbush with different altitude and aspect. Have students measure snow depth and aspect (north to east, south to west). Use the data collected to make charts and graphs.

• Repeat the exercise on two or three dates. Prior to going out, have students predict how recent weather is likely to have affected conditions in the sugarbush, and then test their hypothesis.

Summary

Discover, in small groups, signs of changing weather — one important component of maple sugaring.

Procedure

Prior to Visit:

Two weeks prior to visit, have the teacher and students collect daily weather information and put it into a calendar format. You will compare this to your sap flow each day (high or low).

1. Ask the students if they understand the effects of temperature on sap flow. If needed, explain the basics of sugaring. Brainstorm with the group some factors that affect temperature (and therefore sap flow) in different parts of your sugarbush (altitude, aspect, sun angle, wind, cold pockets, etc.).
2. Explain that in small groups, they will be walking through the sugarbush looking for indicators of temperature differences. Brainstorm with the group some of the indicators they should look for to tell temperature differences without using a thermometer. (snow consistency, sap flow, wind, bird songs, water flowing, etc.)
3. Split into small groups. Have them walk through the sugarbush, observing and recording these indicators.
4. As a large group, discuss what they found and where they found it.
5. Have students look at their weather data and your sap flow for those days and discuss the effects weather has on sap flow.

Maple Stations

Summary

Introduce students to maple sugaring process, vocabulary, products, and history through small group discovery at educational stations. Each station should take approximately 15 minutes. Many other activities can be used as stations as well.

For Grades K-8

Materials

For each station:

- ☑ maple scavenger hunt cards
- ☑ tasting samples
- ☑ trash bag
- ☑ paper cups
- ☑ napkins
- ☑ tape
- ☑ stapler
- ☑ string
- ☑ crayons or markers
- ☑ a sugaring legend
- ☑ vocabulary/picture matching page

Procedure

1. Divide students into small groups with one adult chaperone per group.
2. Describe each station and the rotation process thoroughly.
3. Choose an indicator sound (bell or whistle) to let everyone know when it is time to rotate. Space out the home bases for each station so that students have room to work with their group.
4. Provide printed instructions and materials needed at each station.

STATION 1: Scavenger Hunt

At the home base is a scavenger hunt card listing different things for students to find: sugarhouse, sap lines, sap bucket, storage tank, sugarbush, a spile, wood pile, etc. Let students roam around to familiarize themselves with sugaring vocabulary and equipment. Ten to twelve items can be covered in 15 minutes.

STATION 2: Taste Testing

Encourage students to taste a variety of sweeteners provided at this station. Items to taste can include honey, corn syrup, molasses, and imitation maple syrup, among others. Be sure to have a supply of paper cups, napkins, and trash bags at this station. Discuss where different products come from, and common uses. Taste pure maple syrup, and follow the same discussion. Have students taste fresh sap and

compare it to maple syrup. You could also try sap at different stages of the boiling process as well as different grades. With student help, make a list of maple syrup uses (especially for different grades of syrup).

STATION 3: Visit the Sugarhouse

Give students a tour of the large equipment within the sugarhouse and explain the process of boiling. Introduce the students to all the large equipment in the sugarhouse: filter press, evaporator, sap pump, syrup drum, syrup grade tickers, syrup canner, etc. If boiling, demonstrate as best you can the different tasks: testing with the thermometer, testing with the hydrometer, sheeting/aproning, etc.

STATION 4: Tools of the Trade

Collect a variety of smaller maple-related tools and label them with numbers. On index cards, write the name of the tool and describe its purpose. Have students match the cards to the tools. Examples: grading kit, splies, tubing, bucket, drill, filter, maple syrup container, scoop, gloves, etc. To make it a little harder, exclude the name of the tool and only provide the description. Students can take photos or draw the different tools for later use back in school.

Every Tree is Different

Summary

Students discover how to identify different trees.

Procedure

1. Brainstorm with the students the many ways to tell different tree species apart (bark texture and color, bud, leaf, branching pattern, seed, shape, and silhouette).
2. Ask a volunteer to describe a specific maple tree to all the other students, who have their eyes closed. Can the listeners find the particular tree?
3. Collect twigs from maple, ash, and birch trees. Have students identify the differences in the twigs.
4. Ask students to observe the shape of a prime maple tree. How is it different from one found deep in an early growth forest?
5. Do the same activity in an apple orchard or within a Christmas tree plantation.

For Grades 6-12

Materials

- ☑ access to a mixed forest, orchard, or tree plantation

Extension:

Pair up students and give each pair a blindfold. Explain to them that one partner is going to lead the other partner blindfolded to a tree. Stress that this will require trust and care of your partner. The leading partner needs to very carefully guide the blindfolded partner safely to their tree. The blindfolded partner will "meet" the tree and then be led back to the beginning spot.

They should use their sense of touch and smell to get to know the tree. What does the bark feel like? Reach above, what do the branches feel like? Reach below, what does the base of the tree feel like? What does it smell like? After they have returned to their starting spot, take the blindfold off and try to find the tree. After they have found the tree, let them switch roles.

Food from Trees

For Grades 1-5

Materials

- ☑ access to a sugarbush
- ☑ a variety of maple-made items such as bowls, a chair, a crate, a floor board, wooden toys, maple candy, maple syrup
- ☑ a variety of food products from trees such as: fruit leather, sauces, jams, dried fruit
- ☑ large easel-sized paper & markers

Extension:

For older audiences or to make the activity more difficult, add some more processed wood products like: artificial snow, coffee filters, varnish, diapers.

Summary

Introduce students to human and animal uses of maple or fruit trees.

Procedure

1. In advance, hide items that are made from food producing trees around a select group of trees.
2. Have the children find these items and bring them to the group's gathering space.
3. Discuss your findings.
4. Ask children to consider who else uses food producing trees. Go back around the trees and look for evidence of animal life. How many different animals utilize just a small number of trees?
5. Brainstorm all the foods that people eat that come from trees (syrup, nuts, fruits). Which ones are grown in Vermont?
6. Which wild animals depend on food from trees?
7. Draw a large fruit or maple tree at the center of a large piece of paper. Have students call out the names of the animals they listed that depend on food from trees. Write the name of each animal around the sketched tree, then draw a line from the tree to each animals name. (remember to include domestic and wild, and people).

Tree Life Cycle Sort

For Grades 3-6

Summary

Students will learn about the developmental stages in the life of an organism by focusing on a tree life cycle.

Materials

- ☑ a selection of photographs of one person from infancy through adulthood
- ☑ Tree Life Cycle cards hung on long strings. Cards show: seed, seedling, sapling, pole, mature tree, dying tree, rotting log

Procedure

1. Tell students that you have a collection of photographs of a person over the years and you'd like the students' help putting the photos in chronological order. Ask them to brainstorm important events in a person's life that might be recorded in the photographs.
2. Allow students to study the photographs. Have them guess the proper sequence and record their guesses. When everyone has finished, ask the class what they think the right order is. Have them match the photos to the stages and events they brainstormed.
3. Explain that all living things go through different stages of development in their lives just as we do. The sequence of these stages from beginning to end is called a *life cycle*. Can they think of any obvious examples in nature? (Egg, tadpole, frog; egg, chick, chicken; calf, heifer, cow.)
4. Divide the class into two or three groups, depending on size. Have the students in each group stand in a circle. Hang one life-cycle card around each student's neck with the picture on his or her back. Explain that they may look at everyone's card but their own.
5. As a group, the students must determine the order of the life cycle of a tree. Explain to the students that they may not tell each other what cards they have on their backs. As they decide the order they can sit in that order on the ground. As they sit they can guess what card they have on their backs by looking at who comes in front and behind them in order.
6. Allow students to see cards on their backs and discuss the tree life cycle. Finish by comparing the stages in a tree's life with stages in human life. Discuss the life cycle of other plants on the farm.

Those Tappable Trees

For Grades 6-12

Materials

- ☑ tape measures
- ☑ taps
- ☑ drills

Summary

Introduce students to basic practices for tapping maple trees and include an opportunity to do it themselves.

Procedure

1. Show students how to measure diameter at breast height (DBH) of various sugar trees (DBH = 4½ feet). Have them measure a sampling of different trees for practice.
2. Have students tap trees suitable for one tap (DBH = 12-17 inches), two taps (DBH = 17-24 inches), three taps (DBH = 25+ inches). Explain circumstances under which trees are not suitable for tapping (old, diseased, in cemetery, home to specific animals).
3. Calculate tappable trees in a given plot. What will the expected yield be for a variety of plots? This will of course be dependent on your sugarbush's make up and your maple's yield per tap. Explain to the students your sugarbush statistics and how this may be different from other sugarmakers' yields.

Tapping Sugar Maples

For Grades 4-12

Summary

Exploration of the basics of maple sugaring.

Materials

- ☑ rulers
- ☑ tape measures
- ☑ taps
- ☑ drills

Procedure

1. Using rulers, measure tap hole depths, diameters and distance away from each other.
2. Discuss reasons for each specific measurement.
3. Measure distance to next oldest visible tap hole.
4. Discuss how trees heal their tap holes and other wounds. Look for other tree wounds and wounds that are healing.

The Boiling Process

For Grades 4-12

Materials

☑ standard sugarhouse equipment and tools

Summary

Engage students in the process of making maple syrup.

Procedure

1. Have students participate in each chore.
   a. Stack firewood next to the firebox.
   b. Check the sap storage tank for quantity and open intake valve to evaporator.
   c. Determine the level of sap in back pan.
   d. Monitor temperature of sap and cream when necessary.
   e. Strain debris from sap.
   f. Regulate flow from back to front pans.
   g. Monitor temperature, sugar content, and depth of syrup in front pan (using scoop and hydrometer).
   h. Open valve for draw off.
   i. Filter syrup for impurities. Check sugar content.
   j. Can.

Extension:

Make index cards and have students put the sugaring process steps in order.

Insect Safari

Summary

Introduce students to the biology of insects by collecting and examining insects in the field.

For All Ages

Materials

- ☑ small glass jars with lids
- ☑ hand lenses
- ☑ pieces of 2x3-ft. white cloth
- ☑ access to a garden or place with tall grass or weeds
- ☑ field guides of insects

Procedure

1. Following introductions, find out what students know about insects and give a little background. Insects are arthropods, related to spiders, crabs, lobsters, millipedes, and centipedes. They have segmented bodies with jointed legs and exterior skeletons. Insects have three body parts: the head, thorax, and abdomen, with two antennae on the head and six legs on the thorax. Most adult insects have wings and these are also attached to the thorax. Spiders are not insects because they have two main body parts, eight legs and no wings or antennae.
2. In small groups, go to the garden or a place where students will look for insect life.
3. Ask students to be quiet and listen for insect noises. How many can you hear? Can you find an insect that is making the noise you heard?
4. Turn over flat stones or logs to observe the creatures living there.
5. Look for insects flying, on plants, on the ground.
6. Spread the white cloths in an area with tall plants. Walk through the plants toward the cloth and observe the insects that hop and crawl onto the cloth.
7. Carefully watch one insect in its natural environment for at least two minutes. What is it doing? How does it move?
8. Gently collect an insect observed while doing this search and inspect it more carefully using the hand lens.
9. Share any interesting observations.
10. How are insects helpful to farmers? How are they not helpful?

Bees A-Buzzin'

For Grades 4-12

Materials

- ☑ access to an observation hive
- ☑ bee-tending tools
- ☑ honey processing tools
- ☑ glass jars and lids

For more information on bees, visit: www.vtbeekeepers.org

Summary

Introduce students to bees through an observation hive. Students learn about bee behavior and social patterns. Students also learn about bee-tending tools and processing honey.

Procedure

1. Introduce students to a bee hive. Ask them to watch the bees and try to figure out what they are doing.
   a. *Find a queen.* What is the queen doing? What makes the queen different? What does she do for the hive?
   b. *Find a worker bee.* Find one coming out of the hive and one coming in. Where is she going? What is she looking for? How is the bee entering the hive different from the one leaving it? What do bees do with the food they have gathered?
   c. *Find a guard bee.* Are they different in size? Where do they guard?
   d. *Find a bee dancing in the hive.* What is the dance? Does the queen dance? Why not?
   e. *Find a drone bee.* How is a drone different? What is the drone's job?
2. Introduce the students to the clothing worn while working with bees. Have students try on and model the gloves, helmet, and white overalls. Discuss why it is a good idea to wear white, and the way to act around the beehive. Slow steady movements are best.
3. Introduce all the tools used for beekeeping including the hive tool, the boxes, supers, frames, spinner, and decapper.
4. Introduce the students to a super with honey in it still on the comb. Pick up a frame and have them help decap the comb for spinning. Have each student take a turn spinning the centrifuge. Take turns filtering the honey after it is off the comb. Let anyone who wants to, taste the comb that is left.
5. Bottle the honey into clear bottles so they can observe the final result of the bees' work (and their work). Have a honey-tasting party with honey on crackers.
6. Write a story about being a bee. Draw a picture of this story.
7. Why are honeybees important to farmers? To students?