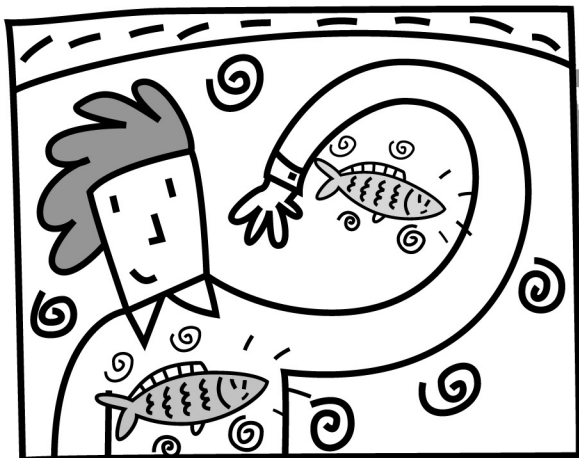
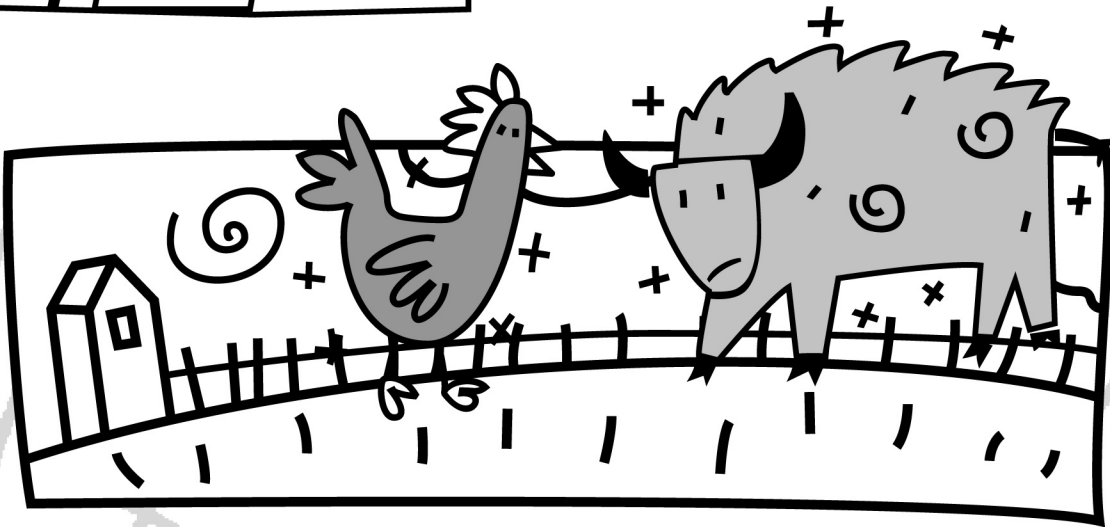
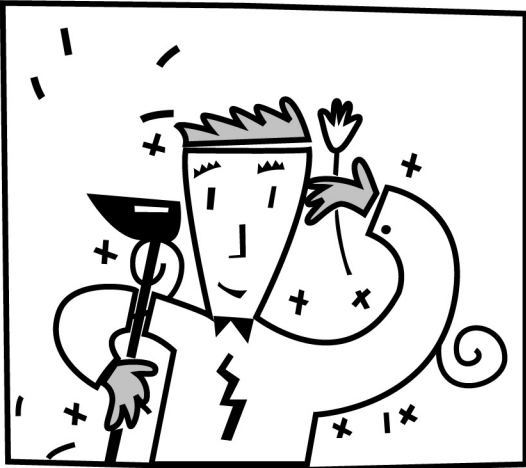
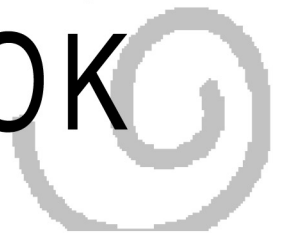


PALS

Partners in Active Learning Support



ACTIVITIES HANDBOOK



Measuring Sugar

How much sugar is in a piece of gum? You'd be surprised. This activity will make your PAL more aware of the "hidden" sugar in foods we eat every day. It's a good activity if you're trying to emphasize nutrition. It's also a way to make science more fun.

Objectives:

Upon completion of this activity, the student will be able to:

1. Properly measure weight using micro-scales.
2. Formulate a hypothesis, based on a given set of information.
3. Record pertinent data gathered during the experiment.
4. Draw conclusions based on data gathered from an experiment.

Procedure:

1. Place a small square of waxed paper on the scale.
2. Unwrap a piece of gum.
3. Weigh it.
4. Record the weight on a piece of paper.

Nowhere's the part your PAL will love.

5. Take the same piece of gum you weighed and have your PAL chew on it for a few minutes.
6. Have your PAL take the gum and place it on the wax paper to be weighed. Record the weight, the difference in weight is the volume of sugar in the piece of gum.
7. Experiment with other flavors. Which has the most sugar? The least? When you're finished, make sure you leave the lab as you found it.

Materials You'll Need:

- Lots of chewing gum (all flavors) with sugar
- Micro scales (located in your school's chemistry lab)
- Small squares of waxed paper

Time Needed: 15-20 minutes



Using A Microscope

This is a fun activity, and one that will help your PAL learn more about the world around us.

Objectives:

Upon completion of this activity, the student will be able to:

1. Properly set up and adjust a compound microscope.
2. Explain what a microscope does, (the function).
3. Identify the major parts of a compound microscope.
4. Transfer/interpret items viewed under a microscope into a larger-scale, proportional drawing.

Procedure:

1. Make sure your PAL understands that microscopes are not toys. Although this is a fun activity, you are both responsible for leaving the equipment in the condition you found it.
2. Identify parts of the microscope with your PAL.
3. Show your PAL how to adjust the microscope.
4. Examine the items you have identified. Have your PAL draw a picture and label parts of what you see for one or two of the objects.

Materials You'll Need:

- A compound microscope (check your school's science lab)
- Various items to be examined: a human hair, colored thread, wood fiber, salt crystals, a plant leaf; use your imagination

Time Needed: 30-45 minutes



Rock-'n'-Roll Ice Cream

This is a great way to celebrate a special accomplishment by your PAL. One chapter rewarded all PALS who had improved their grades with a special ice cream celebration.

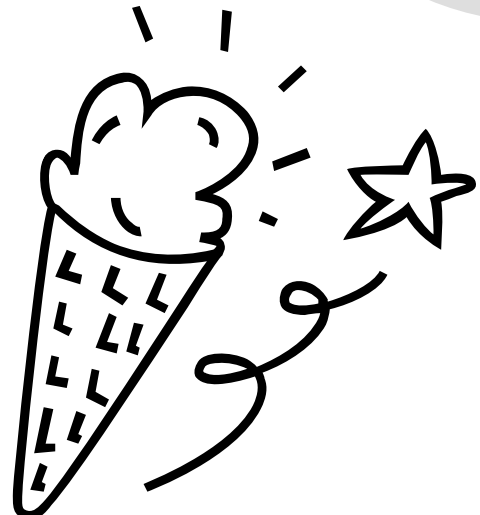
Procedure:

In the smaller coffee can, combine half-and-half, sugar, and vanilla; stir well. Put the lid on tightly. Place a thin layer of crushed ice on the bottom of the larger coffee can; sprinkle with 1 tablespoon rock salt. Place the small can inside the large can. Pack the area between the cans with crushed ice and rock salt using about 2 tablespoons rock salt for every cup of crushed ice. Put lid tightly on the large can. Roll can back and forth for about 10 to 15 minutes (protect counter top or floor with a towel, or roll on a cement floor). Lift out smaller can and carefully remove lid. Scrape down sides and stir all the ice cream together. (If the ice cream is too soft, repack large can with fresh ice and rock salt; replace lid. Roll back and forth a few minutes more or till firm.) Makes about five 1/2-cup servings.

Materials You'll Need:

- One large (2lb., 7oz.) coffee can with lid
- One 1-lb. coffee can with lid
- One pint half-and-half or light cream
- 1/2 cup sugar
- One teaspoon vanilla
- Crushed ice (six to seven cups)
- Rock salt (about 3/4 cup)

Time Needed: 15-20 minutes



Grid Game

Helping children learn to put things into categories is an important math skill. This is a fun game that will also improve your PAL's memory.

Objectives:

Upon completion of this activity, the student will be able to:

1. Match words related to agriculture to specified characteristics.
2. Follow instructions/procedures (e.g. rules of a game).

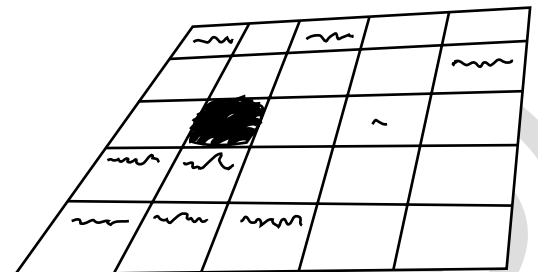
Procedure:

1. On the paper, draw a grid with five columns and five rows. Each square should be at least 6 inches across.
2. On the top, list five characteristics of animals—for example, has wings, lays eggs, gives milk, walks on four legs. Along the side, list five adjectives "yellow," "red," "fluffy," etc.
3. Have your PAL stand a few feet back from the paper and toss a bean bag onto the grid. If the bag falls on the square marked "has wings" and "yellow," the student has to name a yellow farm animal that has wings. You can also create a grid for farm machines or for foods.

Materials You'll Need:

- Large piece of paper (at least 3' x 3')
- Marker
- Bean Bag
- Yard stick or other straight edge

Time Needed: 20–30 minutes



Painting With Seeds

Objectives:

Upon completion of this activity, students will be able to:

1. Identify five different kinds of seeds.
2. Identify parts of a monocot and dicot seed.
3. Explain how the baby plants are "fed" from materials inside the seed.
4. Create a seed-art project.

Procedure:

1. Collect seeds of different sizes and colors. Don't forget seeds that come in fruits.
2. Talk about seeds and how they contain all the nutrition a plant needs until it can grow its own leaves.
3. With the sharp knife, cut a seed in half. (You, not your PAL, should handle the knife.) Examine the inside of the seed with the magnifying glass.
4. Help your PAL arrange the seeds to create a picture. Use white glue to attach them. Display the finished picture.

Materials You'll Need:

- Different kinds of seeds
- Magnifying glass
- Sharp knife
- Paper
- Glue

Time Needed: 20-30 minutes



Writing With Seeds

This activity is a fun way for your PAL to learn about how seeds germinate.

Objectives:

Upon completion of this activity, the student will be able to:

1. Define "germination" and list the steps in the germination process.
2. Name three environmental conditions required for a seed to germinate.

Procedure:

1. Dampen a paper towel.
2. Have your PAL arrange the seeds on the paper towel in the shape of letters. Your PAL's initials might be fun.
3. Keep the seeds damp and warm.
4. In a few days, the seeds will sprout in the shape of the letters you've planted.

Materials You'll Need:

- Packet of quick-sprouting seeds (cress seeds work well)
- Paper towel

Time Needed: 10-15 minutes
(But allow several days for the seeds to germinate.)



Take a Seed Walk

Objectives:

Upon completion of this activity, the student will be able to:

1. Identify five different kinds of seeds.
2. Locate/collect seeds from various sources.
3. Sort items according to varying specifications.

Procedure:

1. Take a seed walk with your PAL. Look in gardens, under trees, and in fields to find as many different types of seeds as you can.
2. Add to the seeds you find outside, the edible seeds found in your kitchen. Don't forget the seeds inside fruits.
3. Help your PAL find different ways to sort the seed collection into groups. Some ideas might be:

Size (largest to smallest)

Weight (heaviest to lightest)

Edible or not

Materials You'll Need:

- Several small bags for collecting seeds

Time Needed: 30-45 minutes



Edible Seeds

Many of the foods you find in your kitchen are really seeds. Some of them will germinate and start a new plant, but others have been treated so they won't.

Objectives:

Upon completion of this activity, the student will be able to:

1. Identify three different kinds of edible seeds.
2. Define the words "edible" and "germinate."
3. Explain why some seeds found at home will germinate, while others will not.

Procedure:

1. With your PAL, look for edible seeds found in the kitchen. They might include different kinds of dried beans, chickpeas, rice, lentils, and mung beans.
2. Wet a paper towel on a plate and dampen it.
3. Spread the seeds on top.
4. In about three days, you and your PAL should be able to see which seeds are going to germinate. In less than a week, you'll be able to "harvest" your crop.

Materials You'll Need:

- Saucer
- Paper towel
- As many edible seeds as you can find in your kitchen. Look for dried beans, chickpeas, mung beans, rice or lentils.

Time Needed: 15-20 minutes (allow several days for the seeds to germinate)



Plant a Garden

Your PAL may think that food comes from the grocery store. Planting a garden will help him/her learn more about agriculture. It's also a lot of fun.

Objectives:

Upon completion of this activity, the student will be able to:

1. Prepare soil for a garden.
2. Name five common garden crops.
3. List three environmental conditions required for successful garden operation.
4. Plant a garden.
5. Explain factors influencing a site's suitability as a garden location.
6. Name three common garden weeds, and explain what makes a plant a "weed."

Procedure:

First, find a place for the garden. It should be a place that both you and your PAL can get to easily. If you're doing this as a chapter project, the elementary school principal may suggest a plot of land at the school. Check to see how much sunlight your chosen spot gets.

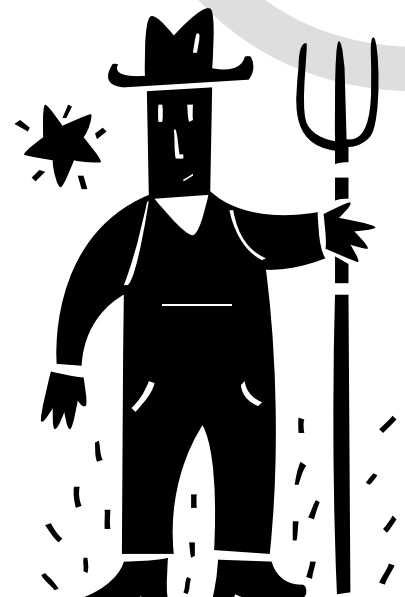
Involve your PAL in planning the garden. What should you plant? Together, prepare the ground and plant the seeds. Work with your PAL to weed and water the garden. When it's time to harvest, you might plan a meal using some of the food you grew together.

If a suitable location is not available, do container gardening with garden tools & soil.

Materials You'll Need

- A place for a garden
- Seed
- Basic Gardening tools

Time Needed: Several months



Plant an Herb Garden

Many herbs grow indoors and out. Your PAL is much more likely to try a new taste if it's something you've grown together.

Objectives:

Upon completion of this activity, the student will be able to:

1. Define "herb."
2. Name five common herbs.
3. List three foods containing herbs.
4. Explain the process and purpose of drying herbs.

Procedure:

1. Choose some herbs to plant. Try to include both some familiar herbs and some unfamiliar ones.
2. Either plant the herbs in pots and grow them indoors or set aside some space in your outdoor garden or greenhouse.
3. When the herbs are ready to harvest, look for interesting recipes that use fresh herbs. Oregano can go in spaghetti sauce or on pizza. Basil is great in salads. See if you can find other interesting ways to use herbs (rosemary).
4. You can also dry herbs. Hang a bunch upside down in a cool, dry location.
5. Many herbs may be grown for the decorative value as well.

Materials You'll Need:

- Herb seeds or seedlings
- Planter/Garden
- Soil

Time Needed: 20-30 minutes,
(growing time)



Grow a Pineapple Plant

Your PAL may think pineapples grow only in tropical areas. But you can grow a plant almost anywhere.

Objectives:

Upon completion of this activity, the student will be able to:

1. Identify why some plants cannot live in all environments.
2. Learn how a plant can grow from taking a part or piece of it and planting it (asexual reproduction).
3. Identify what type of potting soil to use for indoor plants.
4. Identify how to water and fertilize a plant.

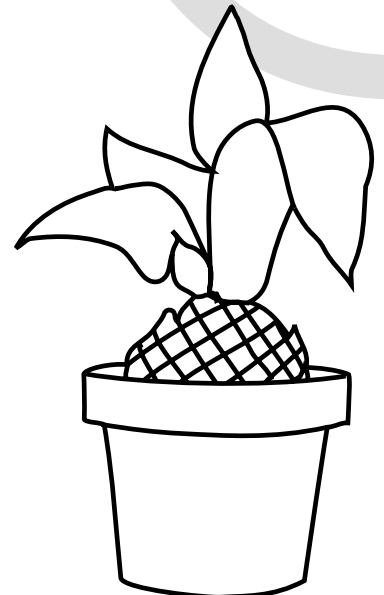
Procedure:

1. Cut about two inches off the top of a pineapple.
2. Plant the top in a pot that contains moist, sandy potting soil.
3. This plant takes a long time to grow, You can expect it to grow about a foot a year.

Materials You'll Need

- The top of a pineapple (eat the fruit with your PAL)
- A pot about six inches in diameter
- Potting soil (you need soil that is sandy)
- A knife

Time Needed: 15-20 minutes
(the plant will grow as long as your PAL takes care of it)



Grow a Carrot Plant

Objectives:

Upon completion of this activity, the student will be able to:

1. Name two nutritional benefits of carrots.
2. Discuss how one single part is able to reproduce an entire new plant.

Procedure:

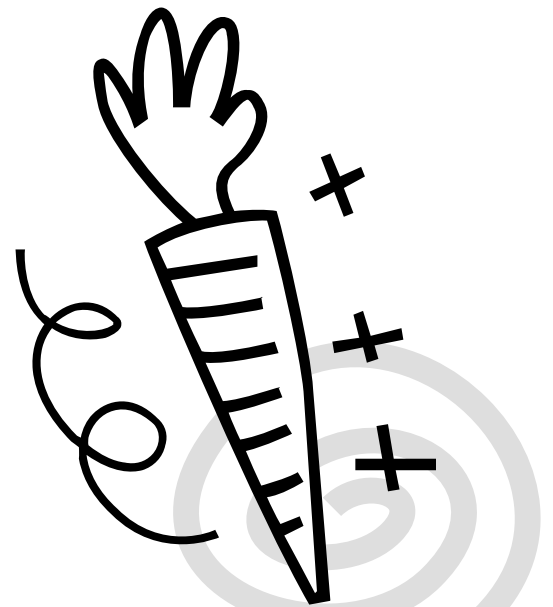
1. Cut the top off a carrot.
2. Put the carrot top on the saucer and add water. Cover it with a glass so it stays moist.
3. When leaves begin to grow, your PAL can remove the glass.
4. Talk with your PAL about the nutritional value of carrots:

- They are high in fiber and low in calories and fat.
- They are high in vitamin A, which is needed for good vision, healthy skin, strong bones and wound healing.
- Nutrition experts say that everyone should "Strive for five" eating five servings of fruits and vegetables each day. Ask your PAL which fruits and vegetables he/she enjoys eating.

Materials You'll Need:

- A large carrot
- Saucer
- Glass or jar
- Knife

Time Needed: 5-10 minutes (plus time for carrot to grow)



Grow an Avocado Plant

Objectives:

Upon completion of this activity, the student will be able to:

1. Explain how a seed is able to produce a new plant.
2. Discuss proper care of a plant.
3. Explain why the pointed end of an avocado seed must be placed upright for it to grow.

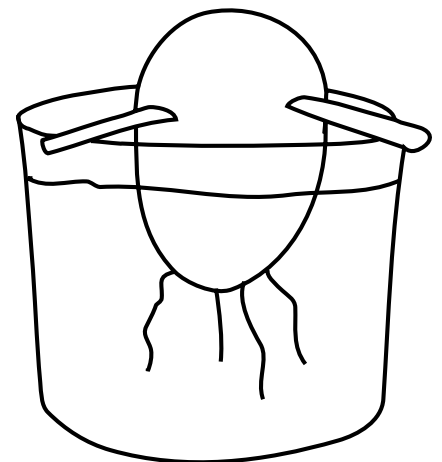
Procedure:

1. Cut the avocado in half and remove the seed. Clean it gently.
2. Push three toothpicks into the seed.
3. Place the seed, pointed end up, in the glass of water. The toothpicks should hold the top half of the avocado seed in the air while the bottom half is in the water.
4. Add water as it evaporates.
5. Your PAL can watch the roots grow. Soon a plant will sprout from the seed. You can transplant it and it will grow for several years.

Materials You'll Need:

- One Avocado
- Three Toothpicks
- Glass of water

Time Needed: 20-30 minutes (extended care)



Sweet Potato Vine

Your PAL may think of sweet potatoes as something to eat. This activity will teach students that sweet potatoes come from plants.

Objectives:

Upon completion of this activity, the student will be able to:

1. Discuss how plants are able to reproduce all necessary parts from a single part.
2. Pot a plant.
3. Name four major plant parts.
4. Name the plant part which makes up what we know as a "potato."

Procedure:

1. Push the toothpicks into the sweet potato. Set the potato in the glass of water so the flat part of the potato rests in the water.
2. Put the glass on a window sill.
3. Watch as roots and then leaves grow.
4. You can keep the vine in water for several months. Or, you and your PAL can transplant it to a pot of soil. Some sweet potato vines grow quite large.

Materials You'll Need:

- Sweet potato
- Three or four toothpicks
- Glass of water
- Pot for transplanting the vine (optional)

Time Needed: 20-30 minutes
(plus growing time)



Preventing Soil Erosion

Farmers use many different techniques to reduce soil erosion. This demonstration will help your PAL see why producers use certain land management practices.

Objectives:

Upon completion of this activity, the student will be able to:

1. Define the terms "erosion," "conservation" and "runoff."
2. List two causes of erosion.
3. Discuss the effects of erosion, if left uncontrolled.
4. Name and describe methods of erosion prevention.
5. Discuss practical applications of concepts learned through a demonstration.

Procedure:

1. Cut a "V" in one end of each tray. Line the trays with plastic. Leave about 2" of extra plastic at the notch.
2. Fill each tray with a different type of soil. These might include: moist, bare soil packed firmly; sod (representing a cover crop); moist, bare soil packed firmly with furrows running across the width of the tray (to represent contouring); moist bare soil packed firmly with furrows running the length of the tray (to represent plowing up and down a hill); moist soil packed firmly with steps formed across the width of the tray (to represent terracing); strips of moist soil alternated with strips of sod (strip cropping).
3. Raise one end of the trays. Make sure all are tilted at an equal incline. Put the beakers beneath the "V" at the lower end of the tray.

(Continued on next page)

Materials You'll Need:

- Six Plastic trays (or show boxes 5" deep)
- Plastic sheeting to line trays
- Beakers and sprinkling cans (one for each tray)
- Trowel
- Stop watch
- Soil
- Sod
- Water

Time Needed: 30-45 minutes



Preventing Soil Erosion (continued)

4. Measure an equal amount of water into each sprinkling can. Then hold the can about one foot above the tray. Have your PAL pour water for about five seconds.

	Tray 1	Tray 2	Tray 3	Tray 4	Tray 5	Tray 6
Amount of time water flows from the spout						
Amount of runoff						
Volume of sediment						

5. Fill out the chart below for each tray. Let the runoff settle and measure the volume of sediment in each beaker.
6. Talk with your PAL about the importance of soil conservation.

Growing Bulbs

Fresh flowers are a wonderful holiday gift.

Objectives:

Upon completion of this activity, the student will be able to:

1. Explain the function of a bulb.
2. Discuss the steps involved in growing bulbs indoors.

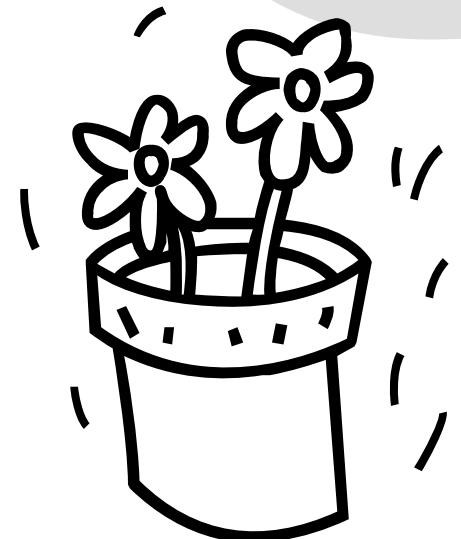
Procedure:

1. Spread the gravel on the bottom of your container.
2. Gently push the bottom of the bulbs into the gravel until they stand by themselves.
3. Add water until the bottom inch of the bulb is covered.
4. Place the container next to a sunny window. Add water periodically to keep the bottom of the bulb wet.
5. Enjoy your flowers.
6. While you're waiting for the bulbs to flower, try cutting open a bulb and looking inside. Show your PAL that the bulb contains stored food that helps the plant to grow.
7. You may also gather bulbs from your yard. Place them in the freezer for six weeks and then plant them. (You may need to plant them in the greenhouse if the weather is cold.)

Materials You'll Need:

- Several bulbs—hyacinth or narcissus bulbs grow well
- Colored gravel
- A pretty container (if you're growing a single bulb to give as a present, a 16-ounce glass works well)

Time Needed: 20–30 minutes
(plus growing time)



Stem Cuttings

Objectives:

Upon completion of this activity, the student will be able to:

1. Define the terms "node" and "cutting."
2. List the steps in properly taking and caring for stem cuttings.
3. Explain why cuttings are placed in a plastic bag, and why this bag should be transparent.
4. Explain how a whole new plant can develop from a single cutting.

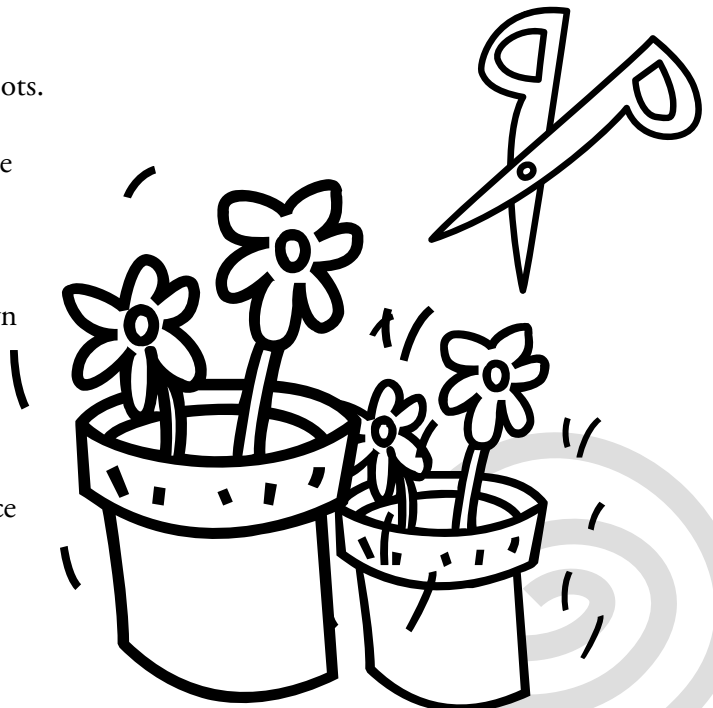
Procedure:

1. Fill several small containers with gravel and potting soil.
2. Show your PAL how to cut the plant just below a leaf node. The cuttings should be about 3-4" long.
4. Stand the cuttings in water until they grow roots.
5. Use the stick to make one or more holes in the soil.
6. Place one cutting carefully in each hole. Put a little more soil around the cutting. Press down around base of cutting.
7. Water thoroughly.
8. Cover with a plastic bag. Hold the bag in place with a rubber band.

Materials You'll Need:

- Lots of small containers
- Potting soil and gravel
- A thin stick (a pencil works well)
- Several large plants from which to take cuttings—impatiens, jade plants and ivy all work well
- Plastic bags - must be transparent
- Rubber bands
- Sharp scissors

Time Needed: 20-30 minutes
(plus growing time)



Do Seeds Need Water to Germinate?

Objectives:

Upon completion of this activity, the student will be able to:

1. Define "germination."
2. Discuss the water requirements of seeds in order to germinate properly.
3. Formulate a hypothesis.
4. Draw conclusions based on data gathered during an experiment.

Procedure:

1. Label each container one-four.
2. In container one, put some wet seeds on wet cotton balls.
3. In container two, put wet seeds on dry cotton balls.
4. In container three, put some dry seeds on wet cotton balls. Add more water so the seeds are under water.
5. In container four, put some dry seeds on dry cotton balls.
6. Cover all the containers.
7. In a few days, remove the covers. Tell your PAL that seeds need the right amount of water or they won't germinate. Only the wet seeds on the wet cotton had the proper amount of water. All the others had too much or too little.

Materials You'll Need:

- Four Small containers with lids
- Cotton balls
- Quick-sprouting seeds (try cress seeds)
- Marker

Time Needed: 20-30 minutes
(few days for germination to occur)



How Plants Drink

All living things depend on water for survival. Different organisms take in water in different ways. This activity illustrates how plants take in and give off water.

Objectives:

Upon completion of this activity, the student will be able to:

1. Form a hypothesis, given a set of information about an experiment.
2. Draw conclusions based on data gathered in an experiment.
3. Define "transpiration" and "translocation."

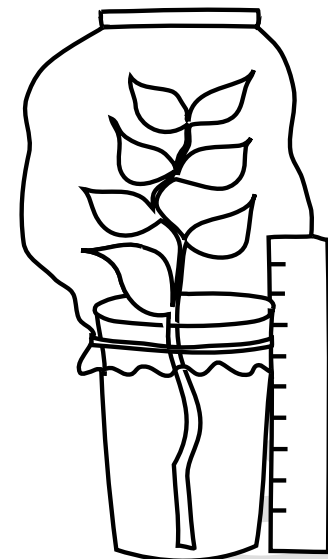
Procedure:

1. Read through the entire activity with your PAL. Ask him/her to come up with a hypothesis of what will happen to the water level in the bottle, and write it down.
2. Fill the bottle with water.
3. Mark the water level on the outside of the bottle, using the marker.
4. Place the plant into the bottle, making sure the roots are in the water.
5. Cover the plant with the plastic bag, and secure it with the rubber band.
6. Place the experiment in a sunny location.
7. In 5 days, check the water level. Can you see droplets of water inside the bag?
8. With your PAL, compare the original hypothesis to the results. Discuss reasons for the results and have your PAL write down his/her conclusions, based on the data you have gathered.

Materials You'll Need:

- A large plastic bottle
- A green plant
- A plastic bag
- A rubber band
- A ruler and marker

Time Needed: 15–20 minutes



Water Movement in Plants

How does water travel from a plant's roots to its leaves? This experiment will help your PAL learn more about translocation.

Objectives:

Upon completion of this activity, the student will be able to:

1. Define the terms "capillary," "translocation" and "vascular bundle."
2. Formulate a hypothesis.
3. Draw conclusions based on data gathered in an experiment.

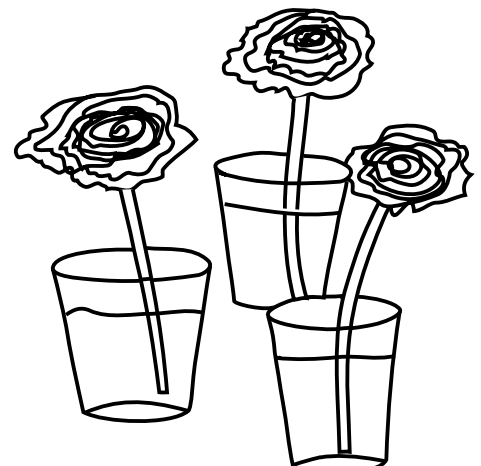
Procedure:

1. Fill each jar with the same amount of water. Mix a few drops of food coloring into all but one of the jars.
2. While holding the stem under water, cut a small piece off the stem of each flower. Immediately put the stem in a jar filled with water.
3. Have your PAL watch to see how many days it takes for the flowers in the colored water to change color. By cutting across the stem, you'll be able to see the tubes that the water uses to travel up the stem.

Materials You'll Need:

- Three or four white carnations with long stems (you can also use stalks of celery for this experiment)
- One glass beaker or glass jar for each flower
- Food coloring in several colors

Time Needed: 15-20 minutes
(and allow several days for the flowers to change colors)



A Two-Colored Flower

Once your PAL understands water movement in plants, you might like to try this unusual activity.

Objectives:

Upon completion of this activity, the student will be able to:

1. Define "translocation", "capillary" and "vascular bundles."
2. Explain how a flower is able to take in two different colors at once.
3. Formulate a hypothesis.

Procedure:

1. Fill both containers/vases with water. Add a few drops of red food coloring to one and a few drops of blue to the other.
2. Use the knife to split the stem of the carnation from the bottom to the top. (Big PALS should do this part.)
3. Put one half of the stem in the blue water. Put the other half in the red water.
4. After several days, some of the petals will turn blue. Others will turn red. Can your PAL explain why? (Look back to activity on page 21.)

Materials You'll Need:

- One white carnation
- Two containers
- Red and blue food coloring
- Sharp knife

Time Needed: 15-20 minutes



Ag-grams

Here's a fun way to help your PAL learn to spell words that relate to agriculture.

Objectives:

Upon completion of this activity, the student will be able to:

1. Define "agriculture."
2. List and define 10 agriculture-related terms.
3. Create a hidden-word puzzle.

Procedure:

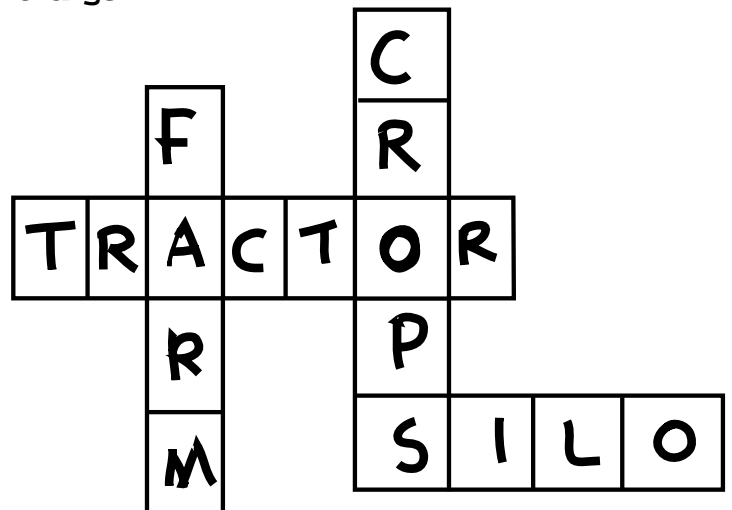
1. With your PAL, make a list of agriculture words. Your PAL may be surprised at how many ag words he/she knows.
2. Now have your PAL create a "find-a-word" puzzle using as many of the ag words as possible. Words can run forward, vertically or diagonally – no turning corners. Then, fill in the blanks with random letters.

• If several PALs try this, they can exchange puzzles for fun.

Materials You'll Need:

- Pencil
- Grid paper

Time Needed: 20-30 minutes



"A" is for Agriculture

This activity works well as either an indoor or an outdoor walk.

Objectives:

Upon completion of this activity, the student will be able to:

1. Define "agriculture."
2. List one agriculture-related word beginning with each letter of the alphabet.
3. Design and create a display.

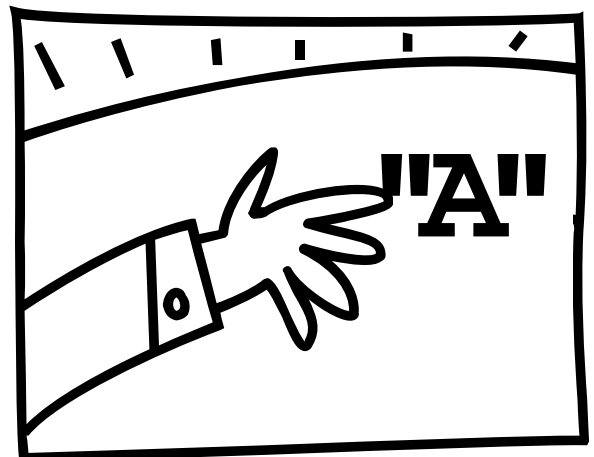
Procedure:

1. Tell your PAL, "Today, we're going to take an alphabet walk. We're going to look for things that start with each letter of the alphabet. But everything we choose has to be related to agriculture."
2. Some things will be easy for your PAL to relate to agriculture. Most kids know that apples grow on trees, for example. But suppose they say, "B is for blue jeans." You'd need to point out that blue jeans are made of cotton and that farmers grow the cotton.
3. Collect as many items in your agriculture alphabet as you can. Then help your PAL make a display of what you found.

Materials You'll Need:

- Paper
- Pencil
- Bag for collecting

Time Needed: 20-30 minutes



Test Your Soil

There's a lot of science involved in deciding which fertilizers to use. This experiment will help your PAL learn about different types of soil. This is a good activity to try before you plant a garden.

Objectives:

Upon completion of this activity, the student will be able to:

1. List the steps in properly obtaining a soil sample.
2. Name three practical applications of soil tests.
3. Follow written instructions.
4. List the four most commonly tested soil fertility characteristics.
5. Make a fertilizer recommendation based on soil test results.

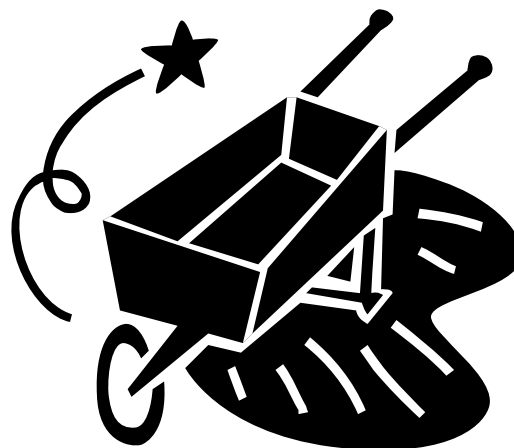
Procedure:

1. Gather some soil samples. Be sure to follow the directions in the kit. Explain to your PAL that you cannot handle the soil or the test results will not be accurate.
2. Follow the kit's instructions for the nitrogen test. Record your findings on the chart below.
3. Follow the kit's instructions for the phosphorus test. Record your findings.
4. Perform the potash test. Record your findings.
5. Perform the pH test. Record your findings.
6. Based on the percentages of nitrogen, phosphorous, and potash you found, what fertilizer would you choose to improve the soil?

Materials You'll Need:

- Sudbury soil test kit (or the kit your FFA Advisor recommends)
- Soil samples

Time Needed: 20–30 minutes



TEST	RESULTS
Nitrogen	
Phosphorus	
Potash	
pH	

What Type of Soil is Best?

Objectives:

Upon completion of this activity, the student will be able to:

1. Name the three basic soil types.
2. Formulate a hypothesis.
3. Design a record-keeping system for gathering experimental data.
4. Explain the purpose of placing gravel in the bottom of a planting container.
5. Draw conclusions based on the results of an experiment.

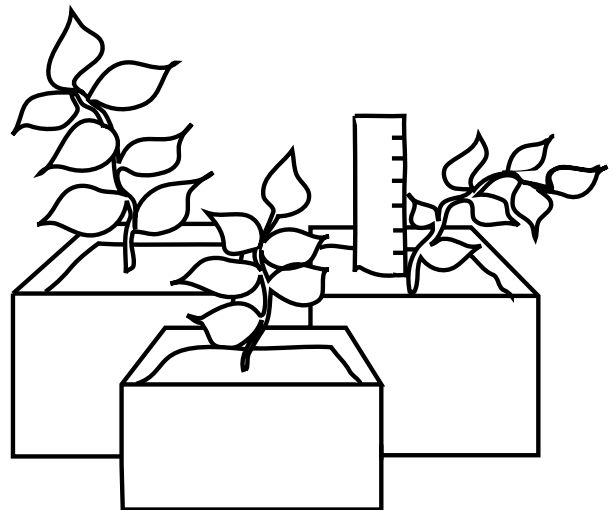
Procedure:

1. Cut off the tops of the milk cartons. Leave about six inches.
2. Fill the cartons with about an inch of gravel.
3. Fill one carton with four inches of sand. Fill another with four inches of clay soil. Fill the third with four inches of potting soil.
4. Plant two seeds in each container.
5. Water the plants and put them in a sunny place.
6. Have your PAL make a chart. Which plant sprouts first? Which plant grows the tallest?
7. Have your PAL draw conclusions as to why the results turned out this way.

Materials You'll Need:

- Three clean half-gallon milk cartons
- Scissors
- Gravel
- Sand
- Clay soil
- Potting soil
- Package of seeds

Time Needed: 20–30 minutes
(extended time needed for plants to germinate)



Separate Soil

Objectives:

Upon completion of this activity, the student will be able to:

1. Name the three major soil particle types.
2. Explain why soil separates into layers when suspended in water.

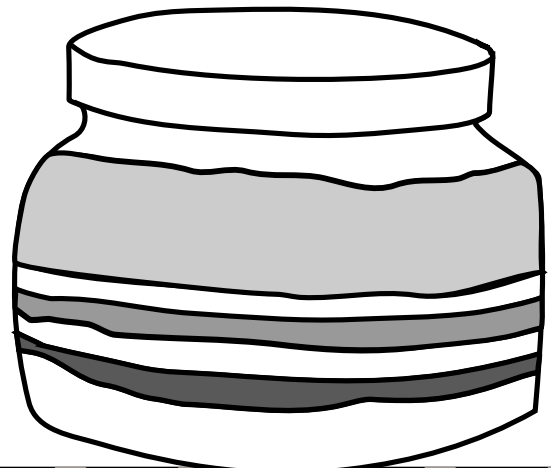
Procedure:

1. Add the soil to a jar of water.
2. Shake it up.
3. Now let the jar stand for a day or two.
4. How many layers are there? You may find a layer of gravel, one of sand, one of silt, one of clay and one of humus.
5. Have your PAL draw a picture of what he sees. (This is called the "soil horizon.")

Materials You'll Need:

- A large, wide-mouthed jar with a tight-fitting lid
- Some soil (or try several different types of soil)
- Water

Time Needed: 20-30 minutes
(one day for soil to settle)



How Do Plants Make Food?

Green plants need water, minerals and chlorophyll to make food. The word chlorophyll means "light-green leaf." The process is called photosynthesis.

Objectives:

Upon completion of this activity, the student will be able to:

1. Define the terms "chlorophyll" and "photosynthesis."
2. Draw conclusions based on data gathered in an experiment.
3. Relate the conditions of an experiment to real-life situations.
4. List the requirements for photosynthesis to occur or explain the role of light in photosynthesis.

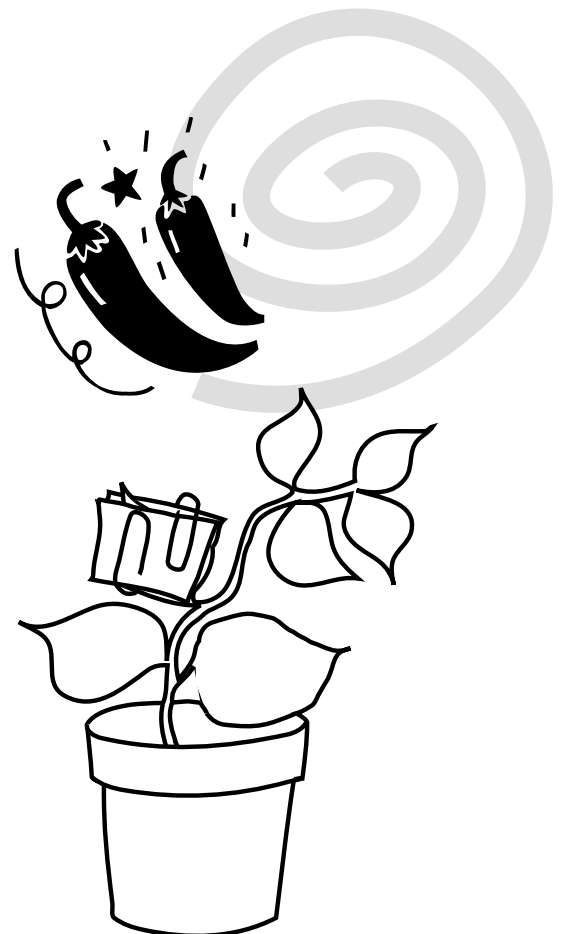
Procedure:

1. Near the top of the plant, place two paper squares on the top and bottom of the same leaf. Use the paper clips to fasten the squares in place.
2. Place the plant in a sunny window.
3. After a few days, remove the paper clip. The area you have covered with the paper is lighter. Because that area of the leaf did not receive light, the plant could not produce chlorophyll there.
4. This experiment shows that without sunlight and chlorophyll, plants cannot make food.

Materials You'll Need:

- A potted plant (bean plants work well for this experiment)
- Two 1 inch paper squares
- A paper clip

Time Needed: 15-20 minutes
(extended time required for experiment completion)



What Happens When Plants

Don't Get SunLight?

This is another way to help your PAL learn about photosynthesis.

Objectives:

Upon completion of this activity, the student will be able to:

1. Define and explain the term "photosynthesis."
2. Formulate a hypothesis.
3. Draw conclusions based on the results of an experiment.
4. Explain the role of light in photosynthesis.
5. Apply experimental results to a real-life situation.

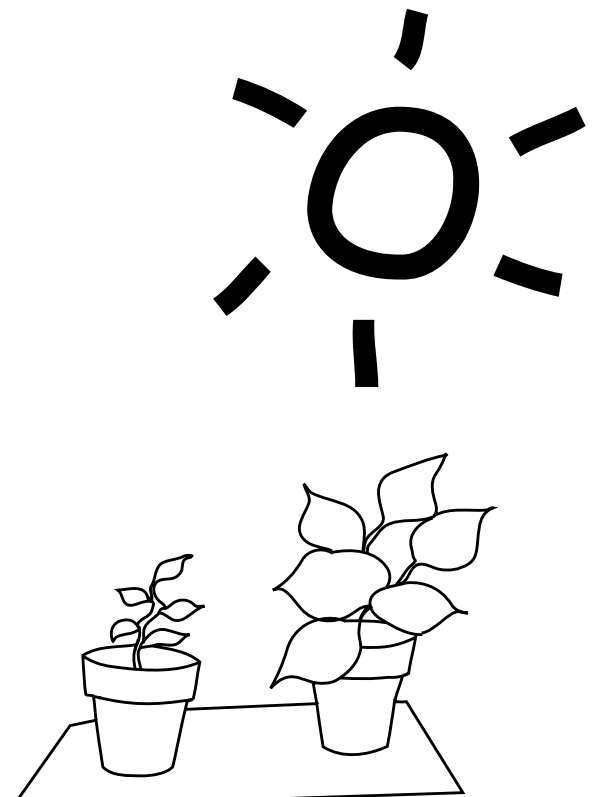
Procedure:

1. Place one of the plants in normal sunlight. Put the other plant in a cupboard or a closet where no sunlight can get to it.
2. Water each plant as you normally would.
3. After two or three weeks, set the plants side by side. The plant in the closet should have lost most of its green color. Without sunlight, the plant could not produce food through photosynthesis.

Materials You'll Need:

- Two small plants about the same size (bean plants work well for this experiment)

Time Needed: 15-20 minutes
(care for the plant required on an extended basis)



Make a Potato Maze

Your PAL will think this is amazing!

Objectives:

Upon completion of this activity, the student will be able to:

1. Define "phototropism."
2. Formulate and evaluate a hypothesis.

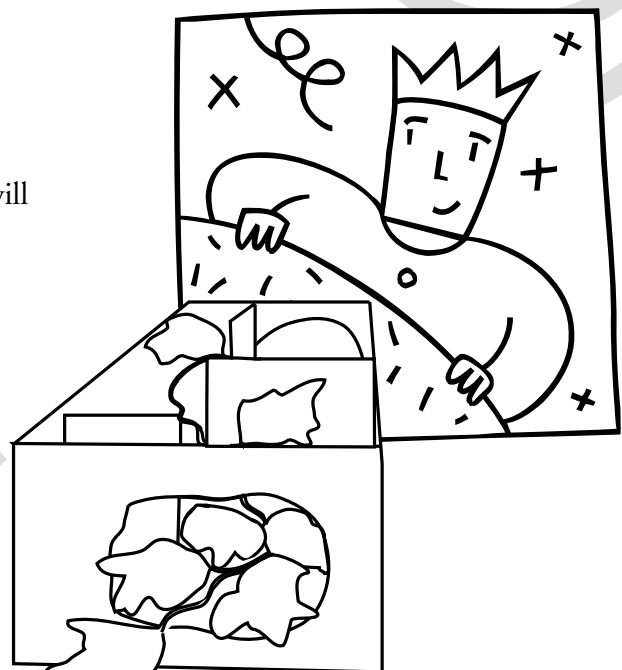
Procedure:

1. With the scissors, cut a hole about 1-1/2" in diameter in one end of the shoe box. (You may need to do this.)
2. Help your PAL use several pieces of cardboard to create a maze inside the shoebox.
3. Place the sprouting potato at the end of the shoebox farthest from the hole. Put the lid on the box. Keep it in a sunny location so light gets into the box through the hole.
4. After a few days, take the lid off the box. The potato plant should be finding its way through the maze toward the light. Eventually, the plant will grow through the hole in the box.
5. Let your PAL know that plants need light to survive.

Materials You'll Need:

- A shoe box with a lid
- Several pieces of cardboard small enough to fit into the shoebox
- A sprouting potato
- Scissors

Time Needed: 20-30 minutes
(extended time required for completion of this project)



The Parts of a Flower

Objectives:

Upon completion of this activity, the student will be able to:

1. Identify the parts of a flower and explain the function of each.
2. Explain the function of a flower.
3. Define "pollinate."
4. Create a display.

Materials You'll Need:

- One or more types of flowers
- Colored pencils and paper
- Microscope

Time Needed: 30 minutes

Procedure:

1. Collect several different types of flowers.
2. Explain the following plant parts to your PAL:

Stamen - the male reproductive parts of a plant flower.

Pistil - the female reproductive parts of a plant flower.

Petals - Produce a scent that attracts insects or other animals that will pollinate the flower.

Sepal - Protects the developing flower.

3. Show each of these parts to your PAL on one flower. Then see if he/she can find them on other types of flowers.
4. Using colored pencils, your PAL might want to draw several flowers. It is also interesting to take various parts of the flower and examine them under a microscope. Or, mount your flowers with tape or glue and label each part.



Leaf Book Marks

Objectives:

Upon completion of this activity, the student will be able to:

1. Demonstrate safe use of an iron.
2. Create a bookmark using waxed paper and dried plants.

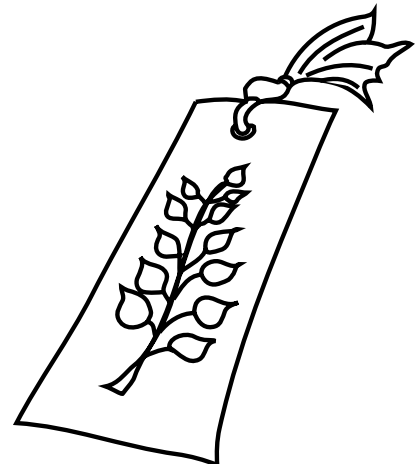
Procedure:

1. Place a piece of waxed paper approximately 9" x 12", onto the ironing surface.
2. Arrange four sets of flowers and/or leaves on the paper.
3. Place a second piece of waxed paper on top of the plants.
4. Using a warm (not hot) iron, press the top of the paper; turn the entire paper over and press the other side.
5. Use the scissors to create four bookmarks.
6. Use the punch to make a small hole near the top of each bookmark.
7. Loop a 6" length of yarn through each hole to make a tassel.

Materials You'll Need:

- Autumn leaves or pressed flowers
- Waxed paper
- Warm iron
- Ironing surface (towel, ironing board, etc.)
- Scissors
- Yarn
- Single-hole punch

Time Needed: 15-20 minutes



Leaf Rubbing

This activity can help your PAL learn more about leaves.

Objectives:

Upon completion of this activity, the student will be able to:

1. Identify four common leaf forms.
2. Identify five common kinds of leaves.

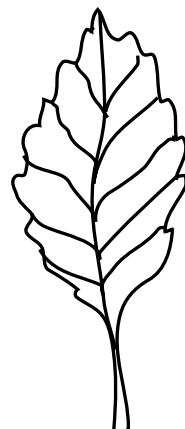
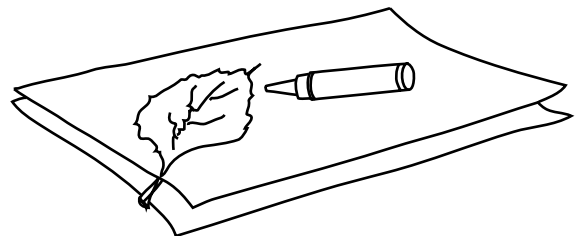
Procedure:

1. Collect some leaves with your PAL.
2. Lay one leaf upside down on a piece of paper. Put another piece of paper over it.
3. Have your PAL use the side of a crayon to rub gently over the leaves. The shape of the leaf should come through on the top sheet of paper.

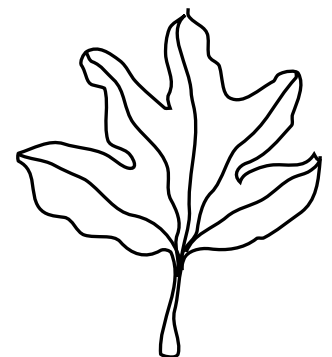
Materials You'll Need:

- Several leaves with large veins and ribs
- Paper
- Crayons

Time Needed: 10-15 minutes



Pinnate



Palmate

Leaf Painting

Objectives:

Upon completion of this activity, the student will be able to:

1. Identify four common leaf forms.
2. Identify five common kinds of leaves.

Procedure:

1. Collect some leaves. Look for leaves with interesting shapes. Those with large veins or ribs work best.
2. Mix some tempera paint in a container. (Mix in some detergent so the paint won't stain clothing.)
3. Have your PAL paint the underside of the leaf carefully with the paint. Press it onto the paper. Then, even more carefully, remove it. The shape of the leaf will be printed on the paper.
4. This activity works well with fruit, too.
5. Stand under a tree and look up. You will see very little sunlight. Leaves, which use sunlight to make the tree's food, trap nearly all the sun's light.
6. Learn more about different leaf shapes. What affects the size and shape of a plant's leaves?

Materials You'll Need:

- Several leaves
- Tempera paint
- Detergent
- Paper

Time Needed: 25–30 minutes



Leaf-Painted Napkins or T-Shirts

The napkins make a nice holiday gift for your PAL to give. The T-shirt is fun to wear.

Objectives:

Upon completion of this activity, the student will be able to:

1. Identify four common leaf forms.
2. Identify the leaves of five common trees and/or plants in your area.

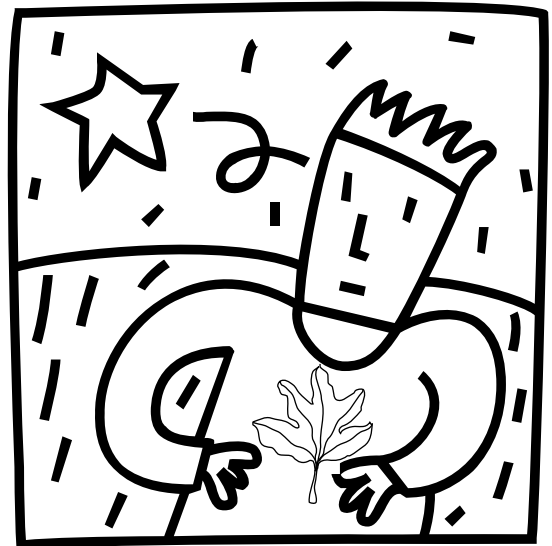
Procedure:

1. Spread newspapers on a desk or table.
2. Using the brush, spread fabric paint on the back of the leaf.
3. Carefully place the painted side on the napkin. Then help your PAL rub the leaf gently. Carefully lift the leaf from the napkin. Dry flat.
4. This same method could be used to decorate T-shirts. It's probably a good idea to wash the T-shirt before you apply the paint. With indelible marker, label each of the leaves on the shirt.

Materials You'll Need:

- Medium-colored napkins
- Gold and silver fabric paint
- Small paint brush
- Old newspapers
- Leaves

Time needed: 30-45 minutes



A Fishy Shirt

Objectives:

Upon completion of this activity, the student will be able to:

1. Identify different types of fish.
2. Provide an activity where the student can use his/her imagination in designing a custom T-shirt.

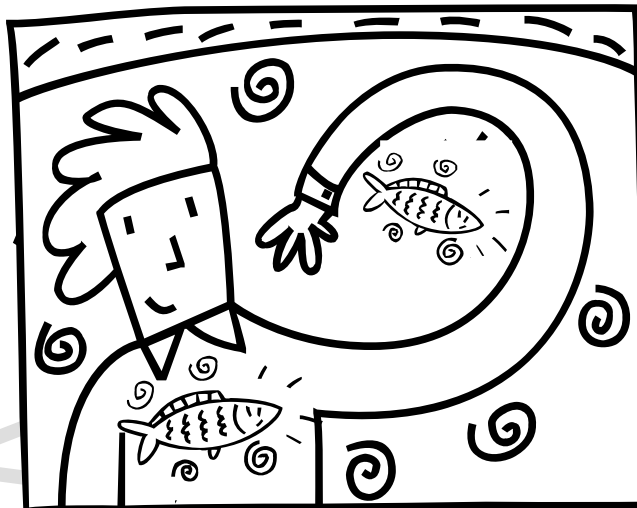
Procedure:

1. Visit a fish market with your PAL. Look for interesting fish—for example, starfish.
2. Spread the newspapers out. Use the paint brush to spread fabric paint on the fish.
3. Carefully place the fish on the T-shirt. Rub gently. Lift the fish carefully from the shirt. Dry flat.
4. If fish are not available, cut shapes from sponges to resemble fish—starfish, anemones, perch, octopus, etc. Dip or brush sponges with paint, place on T-shirt press firmly and remove carefully.

Materials You'll Need:

- A white T-shirt (ask your PAL to bring one in from home)
- Fabric paint
- Paint brush
- Old newspapers
- Fish

Time Needed: 15-20 minutes
(additional time for obtaining the fish)



A Freshwater Aquarium

Objectives:

Upon completion of this activity, the student will be able to:

1. Name three types of plants and animals found in ponds.
2. Explain why a filter is needed in an aquarium.
3. Discuss the conditions required for pond life to survive.

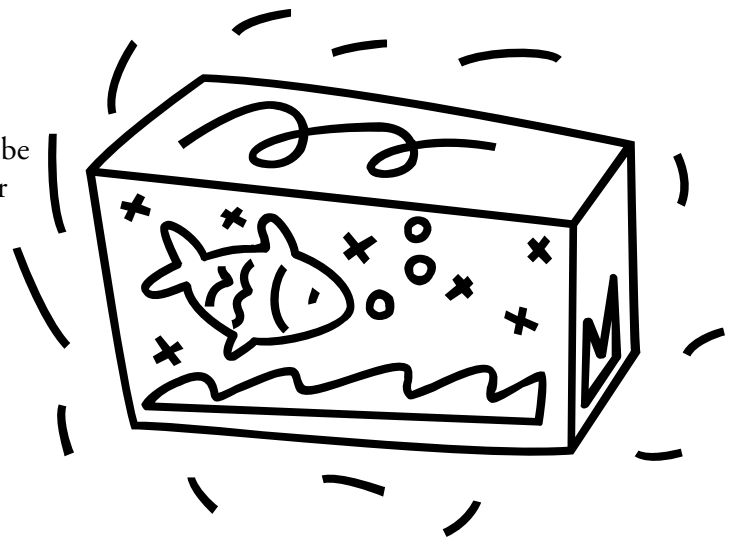
Procedure:

1. Visit a nearby pond. Take along several smaller containers. Collect several specimens.
2. Make sure your aquarium is clean. (Don't use soap to wash it out, try salt instead).
3. Install the undergravel filter. Then spread the sand or gravel over the bottom. It should be higher in the back than in the front.
4. If you are using tap water, wait 24 hours before adding plants or animals. If you are using pond water, add the animals and plants immediately.
5. If you have air-breathing creatures (like turtles), be sure to give them a clean stone with a flat top for them to rest on above the water level.
6. You may want to cover the aquarium with glass or with a piece of netting.

Materials You'll Need:

- Small containers
- An aquarium tank
- Sand or gravel
- Undergravel filter
- Pond creatures—tadpoles, snails, small fish
- Pond plants

Time Needed: 20–30 minutes



Make Your Own Scale

Objectives:

Upon completion of this activity, the student will be able to:

1. Compare/contrast the weight of various items.
2. Explain the word "balance."
3. Discuss the effect of water on an item's weight.

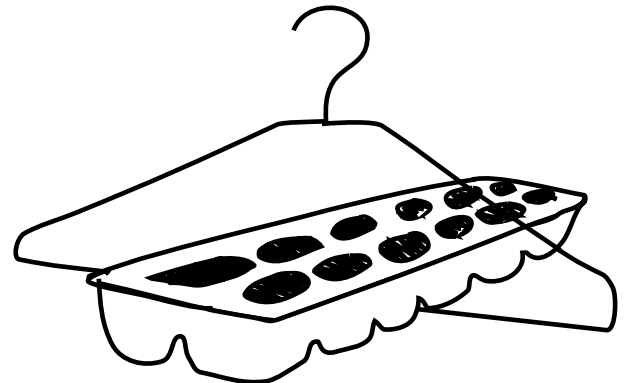
Procedure:

1. Carefully cut the top off the egg carton. (If your PAL is very small, you do this.)
2. Balance the egg carton on the hanger. This is your scale.
3. How many dried beans does it take to balance a handful of birdseed? How many beans that have been soaked in water will balance the same amount of birdseed? Use various sizes of seeds, fruit, leaves etc. for the project.

Materials You'll Need:

- Egg carton
- Coat hanger
- Scissors or Exacto knife
- Items to weigh—birdseed, beans, rocks, etc.

Time Needed: 15-20 minutes



Make Your Own Greenhouse

Your PAL can start plants from seeds. Later, you can transplant them to your outdoor garden.

Objectives:

Upon completion of this activity, the student will be able to:

1. List the steps in completing a tabletop greenhouse.
2. Name five types of seeds.
3. Explain why a greenhouse is covered.

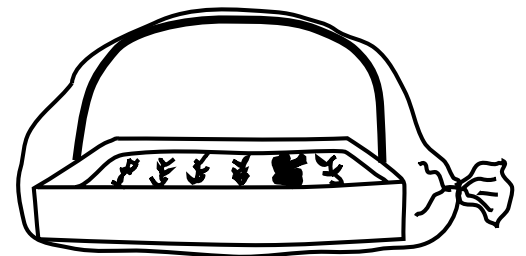
Procedure:

1. Cut the hanger part off the coat hanger. Use the pliers to shape the rest into a large, squared-off "U" shape.
2. Press the ends of the wire into opposite sides of the cardboard box.
3. Use two hangers, placing ends of each into opposite corners of the box, crossing them (x) at the top—sides collapse if only one is used.
4. Use one plastic bag to line the inside of the box. Fill the box with moist soil and gravel.
5. Plant your seeds.
6. Gently slide the box into the second plastic bag. Use the rubber band to close it tightly.
7. Use plastic tray or disposable aluminum broiler tray to line cardboard box.

Materials You'll Need:

- Shallow cardboard box
- Three wire clothes hangers
- Two large clear plastic bags
- Rubber band
- Wire cutter
- Pliers

Time Needed: 20–30 minutes



Dried Fruit Wreaths

Objectives:

Upon completion of this activity, the student will be able to:

1. Define "dehydrate."
2. Name three safety precautions to consider when using a knife.
3. Discuss the steps in creating a dried fruit wreath.

Procedure:

1. Help your PAL slice the apples or oranges into slices 1/4" thick. This is a good time to teach your PAL about using a knife safely. (But if your PAL is too small to cut safely, you may need to do this part.)
2. Dip the apple slices in lemon juice for five minutes. Then dry them with a paper towel.
3. Spread the fruit slices on cookie sheets. Dry in the oven at 200 degrees for five or six hours. (If someone has a food dehydrator, you can use it instead, although drying time will be about the same).
4. When the slices have dried, shape a wire coat hanger into a circle. Untwist the wire at the base of the hanger. Help your PAL thread fruit slices onto the wire.
5. When the wreath is completed, retwist the wire around the hanger. Tie a raffia bow on the top. This makes a nice gift for your PAL to give at holiday time.

Materials You'll Need:

- Oranges or apples (if you use apples, you'll need a bowl of lemon juice)
- Sharp knife
- Cookie sheet
- Oven
- Wire coat hanger
- Colored raffia

Time Needed: 45 minutes - one hour
(drying the fruit will take much longer - this may be a project you want to schedule for two days)



Ivy Wreaths

Objectives:

1. To identify the materials/equipment needed for making a wreath.
2. To make an ivy wreath.

Procedure:

1. Help your PAL form the wire into a semi-circle. Insert the two ends in the soil.
2. Carefully wrap the ivy strands around the wire.
3. This makes a nice gift for your PAL to give at the holiday season.

Materials You'll Need:

- A large ivy plant in a pretty pot (perhaps one you and your PAL grew from a cutting)
- Sturdy wire
- Pliers

Time Needed: 20-30 minutes



Make a Bottle Garden

Objectives:

Upon completion of this activity, the student will be able to:

1. Describe the steps involved in creating a "bottle garden."
2. Explain the purpose of adding gravel and charcoal to the bottom layer of a bottle garden.
3. List the steps in the water cycle.
4. Define the terms "condensation" and "transpiration."

Procedure:

1. Make sure the container is clean.
2. Put the funnel in the neck of the bottle. Pour in a layer of gravel, add some crushed charcoal and finally some potting soil.
3. Moisten the soil. Use the spool to tap it down firmly.
4. Use the long fork or your fingers to poke some holes in the soil.
5. Carefully lower the plants into the holes. Cover the roots with soil.
6. Put the top on the bottle to seal moisture inside. You may need to remove lid periodically if you see too much water inside.
7. Put your garden in a bright place out of direct sunlight.
8. After a month or so, take off the top of the bottle. Add a little water if necessary. If the water balance is right, you will not need to water for several months.

Materials You'll Need:

- A large glass or plastic container with a top
- Gravel and charcoal
- Potting soil
- A funnel
- Some long-handled tools—a long fork (a fondue fork works well), a long, thin stick, an empty spool on the end of a stick
- Small, slow-growing plants

Time Needed: 20–30 minutes



Measure the Rain

Producers need to know how much rain has fallen. Your PAL can make a rain gauge with just a few simple things.

Objectives:

Upon completion of this activity, the student will be able to:

1. Discuss the importance of rainfall data to producers.
2. List the amount of water required by three common local crops.
3. Create a rain gauge.
4. Explain the relationship between climate and crop requirements.

Procedure:

1. Look for a jar with a wide top so you can collect enough rain to measure.
2. On the outside of the jar, use the ruler to create a "measuring stick." Mark off by quarter inches.
3. Help your PAL keep a weather chart to record the total rainfall.
4. Learn the amount of water (or rain) needed for certain crops from germination to harvest.

Materials You'll Need:

- Glass or plastic jar with straight sides and a flat bottom
- Ruler
- A laundry marker

Time Needed: 15-20 minutes to prepare (additional time requirement for recording of daily rain accumulation)



Make A Weather Vane

A weather vane is used to measure the direction of the wind. This instrument is used by weather forecasters to help predict changes in the weather.

Objectives:

1. To put together a weather vane.
2. To learn how weather patterns affect plant growth.

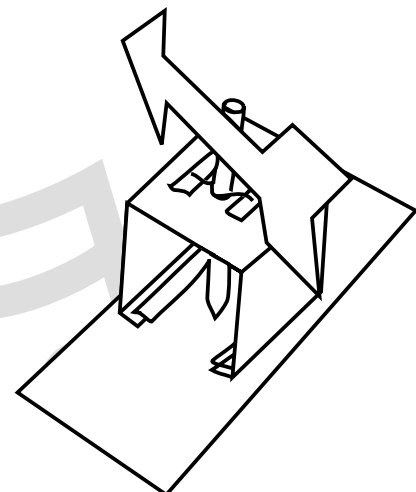
Procedure:

1. Use the scissors to cut out three pieces of cardboard, each 4" x 12". (As with all activities involving scissors, make sure you emphasize safety. You may have to do the cutting if your PAL is very young.)
2. With the tip of the scissors, score across the piece of cardboard. Make a hole in the middle of this cardboard piece and push a pencil through it until the hole is slightly larger than the diameter of the pencil. This is the stand for your weather vane.
3. Using tape, attach the stand to a second piece of cardboard.
4. Straighten out two paper clips. Wrap one loosely around the top of the pencil and the other one loosely around the sharpened end. Remove the paper clips from the pencil.
5. Draw an arrow on the third piece of cardboard. Cut out the arrow shape.
6. Use the clay to attach the pencil to the center of the arrow. (Make sure there's an equal amount of clay on both sides of the pencil or the arrow won't balance properly.)
7. Use tape to attach one paper clip over the hole in the stand. Attach the other to the base underneath. Now stand the pencil in the hole.
8. Mark the points of the compass on the base. Then take it outside and use a compass to line it up.
9. You may need to use two large rocks to hold it in place.
10. Help your PAL understand how a weather vane can help farmers or crop dusters.

Materials You'll Need:

- Scissors
- Three Pieces of cardboard
- Pencil
- Two paper clips
- Modeling clay
- Two heavy rocks
- Tape
- Compass

Time Needed: 30-40 minutes



Make It Rain

Objectives:

Upon completion of this activity, the student will be able to:

1. Explain atmospheric conditions required to produce rainfall.
2. Recall the average annual rainfall amount for his/her state/region.
3. Explain why rainfall amounts vary from one region to another.
4. Name the amount of water required to produce three locally grown agricultural crops.

Procedure:

1. Place the funnel in the freezer. Fill the small plastic bag with four or five ice cubes.
2. Fill the saucepan with water. Heat it on the stove until the water is nearly boiling. (Teach your PAL about safety—make sure the handle of the saucepan is turned toward the back of the stove.)
3. Place the paper clips around the rim of the jar. They will keep the funnel from forming a seal.
4. Carefully pour the hot water into the jar. (You do this.)
5. Set the funnel in the jar and immediately put the plastic bag with ice cubes inside the funnel.
6. In a few minutes, it should "rain" inside your jar.
7. Tell your PAL that rain forms when warm, moist air rises and begins to cool. If there's enough moisture, the droplets soon form raindrops.

Materials You'll Need:

- Wide-mouth glass jar
- Four paper clips
- Small plastic bag
- Metal funnel
- Water and some ice cubes
- A saucepan
- A stove and a refrigerator with a freezer

Time Needed: 20-30 minutes

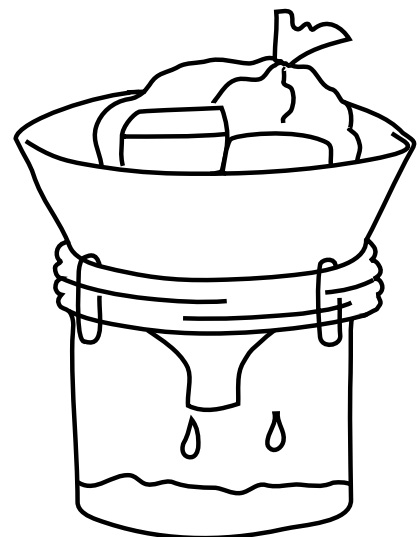


Chart The Weather

Objectives:

Upon completion of this activity, the student will be able to:

1. List the types of data included in the newspaper weather report.
2. Define "weather," "precipitation," "climate."
3. Explain the relationship between the ability of a plant to survive and the weather/season.

Materials You'll Need:

- Your local newspaper
- A weather chart (use the one below or make your own)

Time Needed: 30-45 minutes (5 minutes per day when recording data)

Day	High Temperature	Low Temperature	Chance of Rain	Amount of Precipitation
1				
2				
3				
4				

Procedure:

1. Each day for three weeks, look in the newspaper for the weather report.
2. Record the high and low temperature, whether rain was predicted, and the amount of precipitation, if any.
3. Your PAL might be interested in doing some comparisons. Choose three states in different parts of the country. Chart the weather in each. Determine in which season these three plants would grow in each state:

Corn

Sorghum

Pansies



Bird Feeders

Objectives:

Upon completion of this activity, the student will be able to:

1. Identify 10 species of birds common to your area.
2. Make linear measurements.
3. Name three ingredients commonly found in wild bird food.
4. List the steps involved in constructing one type of bird feeder.

Here are three different bird feeders. Choose one to make with your PAL.

Milk Carton Birdfeeder

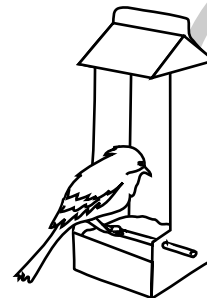
Procedure:

1. Make sure the milk carton is completely clean before you begin.
2. Using the picture as an example, cut a section out of the front of the milk carton.
3. Insert a thin wooden dowel. This is the perch for the birds.

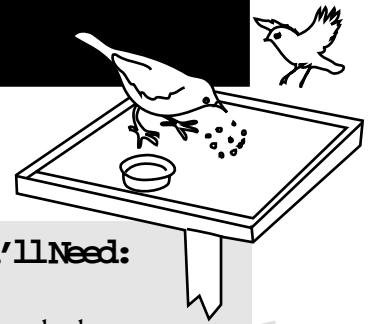
Materials You'll Need:

- Milk carton
- Thin wooden dowel
- String
- Scissors

Time Needed: 15-20 minutes



Wooden Birdfeeder



This is a good project to help your PAL learn how to use tools safely.

Procedure:

1. Measure each side of the feeder's plywood base (Leave a small gap in one corner to facilitate cleaning).
2. Cut the wooden strips to length. If your PAL is old enough, show him how to safely use the saw.
3. Attach the strips to the sides of the feeder using the hammer and nails.
4. Apply a coat of non-toxic preservative to the feeder to prevent it from rotting.

Materials You'll Need:

- Outdoor plywood, about 20" x 12"
- Thin wooden strips
- Hammer
- Nails
- Saw
- Tape measure
- Non-toxic wood preservative
- Paint brush

Time Needed: 30–40 minutes

Plastic Bottle Birdfeeder

Procedure:

1. Using the scissors, make two holes in the bottom of the bottle on opposite sides. Thread a string through the holes so you can hang the bottle from a tree.
2. Use a felt-tip pen to draw a line around the bottle about half-way. Draw a second line around the bottle at the base of the neck.
3. Make slits around the bottle from the line up to the neck. (You may need to help your PAL do this.)
4. Push two thin sticks through the bottle so the birds can get a grip.
5. Use a funnel to fill the bottle with peanuts. Hang the bottle upside down from a tree.

Materials You'll Need:

- Two-liter plastic soda bottle with a cap
- Felt-tip pen
- Scissors
- String
- Two thin sticks

Time Needed: 20–30 minutes



Understanding Gears

This is a great activity to help your PAL to learn how to handle tools safely. It also shows how gears work in engines.

Objectives:

Upon completion of this activity, the student will be able to:

1. Define the word "gear."
2. Explain how gears work.

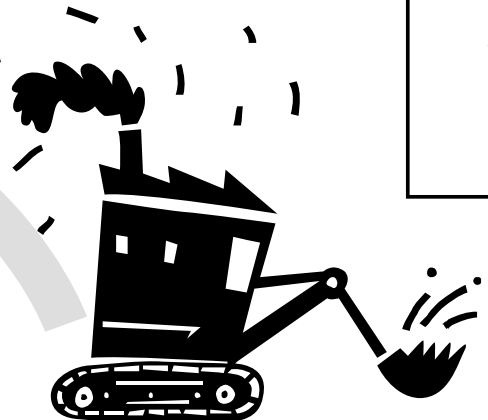
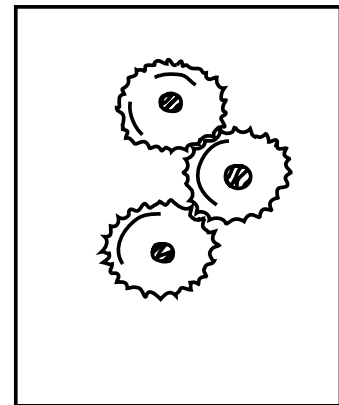
Procedure:

1. Make sure the bottle caps are round. (This won't work if they have a bent edge.)
2. Help your PAL nail the first bottle cap to the board. Don't drive it in too far—you want the bottle cap to turn freely.
3. Using the illustration as a guide, fasten the other two caps to the board.
4. Have your PAL turn the first bottle cap. See what happens to the others—they will turn in opposite directions.
5. Tell your PAL that gears in engines help transfer power from the engine to the drive wheel.
6. Gears can also be made of wood.

Materials You'll Need:

- Three bottle caps (the kind with crinkly edges)
- Three small nails
- Hammer
- A small wooden board

Time Needed: 20–25 minutes



Invent Your Own Cereal

This activity may make breakfast a lot more fun for your PAL.

Objectives:

Upon completion of this activity, the student will be able to:

1. Discuss the process of new product research and development.
2. Name three ways that new products are promoted.

Procedure:

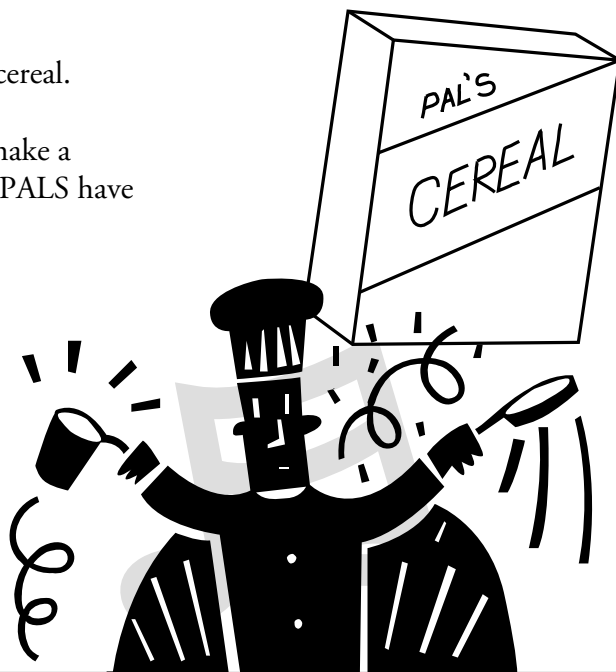
1. Challenge your PAL to invent a new cereal. What should it be named?
2. Show your PAL the ingredient label on the cereal box. Ask your PAL to list the ingredients his/her cereal will contain.
3. Now challenge your PAL to design a box for this new cereal.
4. Think of ways to promote and sell your cereal.

(If you do this as a team building exercise, make a display of all the different cereal boxes your PALS have created.)

Materials You'll Need:

- Empty cereal box
- Construction paper
- Brightly colored markers
- Scissors
- School glue

Time Needed: 20–30 minutes



Pumpkin Carving

Even PALS who carve a pumpkin at home will love carving another one with you.

• Optional Fun Activities for you and your PAL...

Procedure:

1. Help your PAL draw a face on the front of the pumpkin.
2. Using the sharp knife, carefully cut a hole in the pumpkin. (Try cutting the hole in the bottom. This makes it easier to insert a light).
3. Have your PAL scoop out the insides.
4. Carefully cut out eyes, nose, mouth and any other features.

Roast the pumpkin seeds for a delicious snack.

Next year, you and your PAL can grow the pumpkin if there is a garden available.

If you do this activity as a team building exercise, have a contest—the scariest pumpkin, the funniest pumpkin, the most unusual face, and so on.

Materials You'll Need:

- Pumpkin
- Sharp knife
- Large spoon
- Pencil

Time Needed: 20–30 minutes



Prepare a Meal

Objectives:

Upon completion of this activity, the student will be able to:

1. Plan a balanced meal menu.
2. Discuss what it means for a meal to be balanced.
3. Prepare a grocery list.
4. Compare grocery items and make economical choices.
5. List the steps in preparing a meal.
6. Explain the importance of a healthy diet.
7. Interpret and discuss the Food Guide Pyramid.

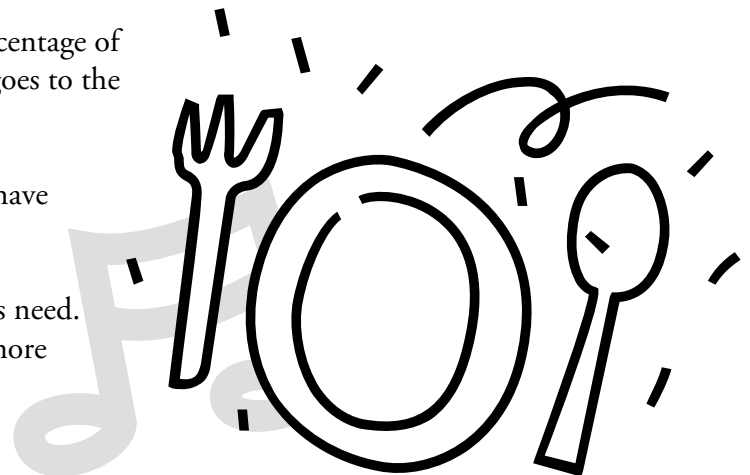
Procedure:

1. Plan a dinner menu. Discuss the food guide pyramid - (make it a balanced meal) with your PAL. Make a list of all the ingredients you need to prepare the meal.
2. Visit the grocery store with your PAL. Buy the food you'll need to make a complete meal.
 - **Prepare and enjoy the meal together.**
3. Now use the menus you have collected from local restaurants. Compare the cost of preparing a meal yourself with the cost of going to a restaurant.
4. For older PALs, you might also research what percentage of the cost of the food you buy in the grocery store goes to the farmer who grew the food.
5. Help your PAL make a poster to share what you have learned.
6. Compare the food you need with the food animals need. Visit a feed and seed store or a pet shop to learn more about animals' diets.

Materials You'll Need:

- Menus from some local restaurants
- A place to prepare a meal
- Food Guide Pyramid
- Ingredients to prepare a meal planned by your PAL

Time needed: Dependent upon completion of project, 2-3 hours



Make Your Own Cheese

Now when your PAL reads about "curds and whey," they'll know what they are!

Objective:

Upon completion of this activity, the student will be able to:

1. Name five different kinds of cheese.
2. Name the ingredient used to make milk curdle and harden into cheese.
3. List the steps in the basic cheese-making process.

Procedure:

1. Pour the milk into the saucepan. Heat it on the stove or hotplate. Use the thermometer to heat it to a temperature of 88-90 degrees Fahrenheit.
2. Immediately add 12 drops of the rennin solution to the milk. Stir until it is completely mixed in.
3. Fill three plastic cups about 2/3 full with the heated milk.
4. Let stand until the liquid portion (whey) separates from the solids (curds). (You can recite "Little Miss Muffet" while you wait.)
5. Fold the cheesecloth in half. Hold it over the cup. Pour the liquid into another plastic cup.
6. Salt and lightly press the curds, draining any remaining liquid, and allow them to harden.
7. Cut and eat the cheese.

You might also want to have a cheese tasting session with your PAL, and invite other FFA members and their PALS. Include as many different kinds of cheese as you can find, and compare their taste and texture.

Materials You'll Need:

- Cheesecloth about 12" square
- Stove or hotplate
- Saucepan
- Cooking thermometer
- One quart of milk
- Six plastic cups, 16 oz. size
- Salt
- Rennin or rennilase

Time Needed: 20-30 minutes
(additional time for separation process)



Make Your Own Butter

Objectives:

Upon completion of this activity, the student will be able to:

1. Explain the Food Guide Pyramid.
2. Describe the steps involved in making butter.
3. Compare the ingredients of homemade versus store bought foods.
4. Describe differences in taste, texture and cost of homemade and store bought foods.

Procedure:

1. Refrigerate the cream, the bowl and the mixer or blender until they're cold.
2. Begin to whip or blend the cream. It will first turn into whipped cream. If you keep going, it will turn into butter. Keep sides scraped down with spatula.
3. Spread on bread and enjoy.
4. Show your PAL the Food Guide Pyramid. Point out that butter is at the top of the pyramid. That means it should be eaten in small amounts.

Materials You'll Need:

- 1/2 pint whipping cream
- Electric mixer or blender
- Bowl
- A drawing of the Food Guide Pyramid.
- Bread
- Spatula

Time Needed: 15-20 minutes



Make Your Own Peanut Butter

Objectives:

Upon completion of this activity, the student will be able to:

1. Explain the process of preparing homemade peanut butter.
2. Explain why manufacturers add ingredients other than peanuts and oil to their peanut butter products.
3. Explain why homemade peanut butter requires refrigeration, while store bought does not.
4. Describe differences in the taste, texture and other characteristics of homemade versus store bought peanut butters.

Procedure:

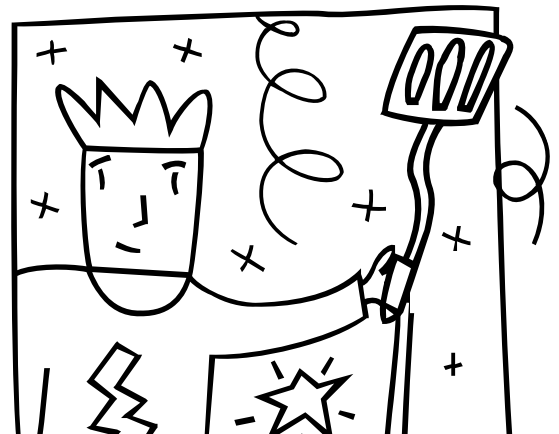
1. Place the peanuts and oil in the blender. Start on low speed. (Hold the lid down.)
2. Switch to high, stopping occasionally to scrape down the sides with the spatula.
3. Add salt to taste.
4. Spread on bread or crackers.
5. This fresh peanut butter needs to be kept in the refrigerator.

You and your PAL might also enjoy baking the bread.

Materials You'll Need:

- One cup hulled, roasted peanuts
- 1-1/2 tbsp. peanut oil
- Pinch of salt
- Blender
- Rubber spatula
- Bread or crackers

Time Needed: 20-30 minutes



Make a Pizza

Objectives:

Upon completion of this activity, the student will be able to:

1. Explain the Food Guide Pyramid.
2. Determine and explain the amount of recommended daily food group allowances included on one slice of the pizza made.
3. Interpret and follow simple cooking directions.

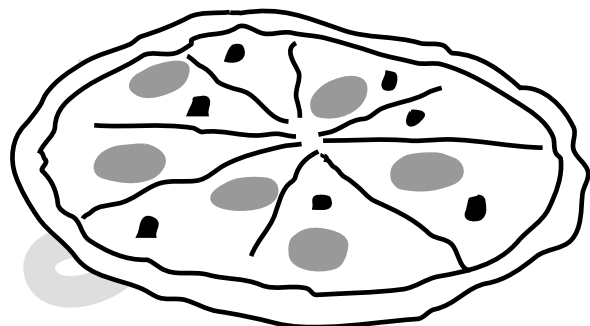
Procedure:

1. Unroll the pizza dough onto pizza pan. Spread the pizza sauce and cheese. Top with your favorite toppings.
2. Bake according to directions on the pizza dough package.
3. While the pizza is baking, talk to your PAL about eating foods from many different food groups. Have your PAL determine what groups are represented on your pizza.
4. Encourage your PAL to keep a food diary for a day or two.
5. How many of your pizza ingredients come from plants? From animals?

Materials You'll Need:

- One package of refrigerated pizza dough
- One eight-ounce jar of pizza sauce
- One four-ounce package of mozzarella cheese (shredded)
- PAL'S favorite pizza toppings
- Pizza pan or cookie sheet
- Hot pads
- Oven
- A drawing of the Food Guide Pyramid

Time Needed: 30-45 minutes



Be a Wildlife Watcher

Objectives:

Upon completion of this activity, the student will be able to:

1. Identify 10 kinds of birds commonly found in the area.
2. Name five types of wildlife found locally.
3. Discuss personal experiences as a "wildlife watcher."

Procedure:

1. With your PAL, learn about wildlife in your area. What birds are native? What other animals live nearby?
2. Take a wildlife walk. Identify and record the animals you see.
3. Encourage your PAL to keep a journal of animals he sees throughout the year.

Materials You'll Need:

- Some books about wildlife (perhaps you and your PAL can visit the library together)
- A notebook to record your findings

Time Needed: 30-45 minutes



Ant Farm

Objectives:

Upon completion of this activity, the student will be able to:

1. Discuss the life cycle and social behavior of ants.

Procedure:

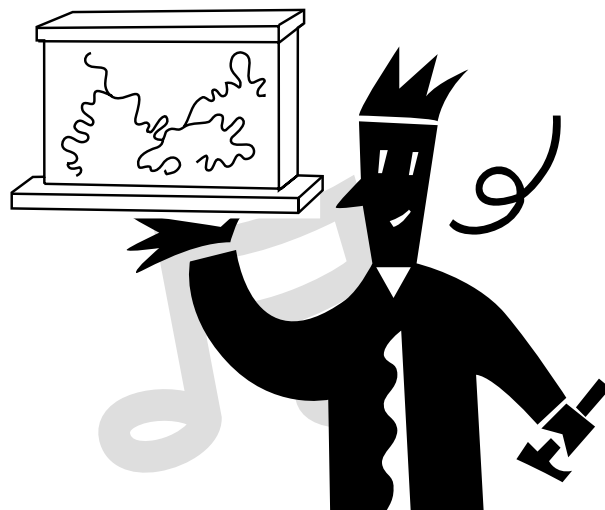
1. Fill the ant farm with soft soil.
2. Put on protective gloves and add the ants. You may look for a nest outside. Dig down until you find the queen (who is much bigger than the workers). Put as many workers as you can find in the ant farm with the queen.
3. Add some food. Your PAL may want to observe the ants at work and write a story about what they see.

CAUTION: Teach you PAL to distinguish different types of ants so only the harmless ants are used for your PAL's farm.

Materials You'll Need:

- Glass-sided ant farm (many pet stores sell these)
- Soil
- Food—ripe fruit, seeds, other small food scraps
- Ants
- Gloves

Time Needed: 20–30 minutes



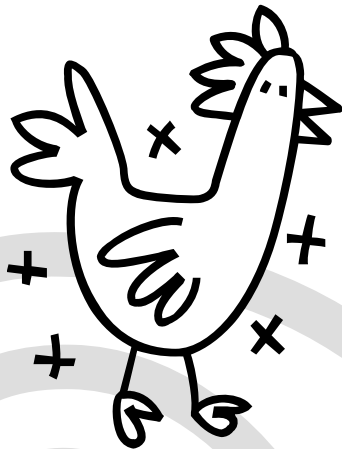
Animal Activities

• Optional Activities for you and your PAL...

Many FFA animal activities are things your PAL would enjoy. If you are clipping or showing an animal, for example, let your PAL learn what you're doing. If you are raising an animal for sale, your PAL will enjoy feeding and watering it.

Examples might include:

- Proper care and feeding of hamsters
- Proper care and feeding of lambs
- Proper care and feeding of piglets
- Proper care and feeding of calves
- Proper care and feeding of sheep
- Proper care and feeding of chickens



Plaster Casts of Animal Tracks

Your PAL can preserve footprints you see outside.

Objectives:

Upon completion of this activity, the student will be able to:

1. Identify the tracks of three different animals.
2. List the steps in creating a plaster footprint cast.

Procedure:

1. Cut a strip about two or three inches wide out of cardboard. Form into a ring that is a little bigger than the footprint you've found.
2. Tape the ends together. Then push the ring around the print leaving about 1" exposed.
3. Following the directions on the package: mix the plaster of Paris. When it is smooth, pour it onto the print and make it even with the top of the cardboard.
4. Before long, the plaster of Paris will feel hard. Then your PAL can take it home. Leave the cardboard on for a day.
5. Your PAL can paint the animal print and use it to make animal tracks on paper.

Materials You'll Need:

- Plaster of Paris
- Container to mix plaster in (an old coffee can works well)
- Mixing stick
- Thin cardboard
- Tape

Time Needed: 30-45 minutes



What Decomposes? What Doesn't?

Decomposition is the process by which leaves and other organic matter breaks down. This process brings the nutrients back into the soil to make it fertile. Some things do not decompose, however—as this experiment will show.

Objectives:

Upon completion of this activity, the student will be able to:

1. Define "organic matter," "organic," "inorganic," and "decompose."
2. Explain the importance of proper disposal of non-decomposing items.
3. Explain the process of decomposition, including conditions necessary for it to occur.

Procedure:

1. Explain to your PAL that the word *organic* means something that originally came from a plant or an animal. Help your PAL make a list of items that are organic. Collect 10 organic and 10 nonorganic items.
2. Cut the tops off of the milk jugs using scissors.
3. Carefully punch holes in the bottom and the sides.
4. Place the 10 organic items in one container. Record what you have placed in this container. Place the 10 inorganic items in a second container and record them, as well.
5. Dig two holes, each about a foot square. Place one container in each hole. Cover with soil. Wait three months.
6. Three months later, remove both jugs from their locations. Carefully empty out their contents and examine what you find. What is left from the container of organic items? The inorganic items?
7. Have your PAL draw conclusions based on the findings of this experiment.

Materials You'll Need:

- 10 different organic items—leaves, grass, etc.
- 10 different inorganic items, such as plastic, metal, glass, etc.
- Two one-gallon milk jugs
- Scissors
- Shovel
- Ice pick or nail

Time Needed: 30–45 minutes
(additional time for digging up and evaluating materials.)



Plant a "Throw Away" Garden

What happens when we throw things away? Many people think they disappear. This experiment will make your PAL more aware of the environment.

Objectives:

Upon completion of this activity, the student will be able to:

1. Discuss the concept and purpose of "controls" in scientific experiments.
2. Explain the conditions necessary for an item to decompose.

Procedure:

1. Place one of each item on a shelf or in a drawer. These will be your control items.
2. Bury the remaining items in a large container of soil, and leave it outside.
3. After a month, carefully dig up the buried items. Compare them to the control items. Which are starting to decompose?

Materials You'll Need:

- Two paper lunch bags
- Two plastic sandwich bags
- Two plastic pens
- Two wooden pencils
- Two paper napkins
- Two styrofoam plates
- Two paper plates
- Garbage can filled with soil

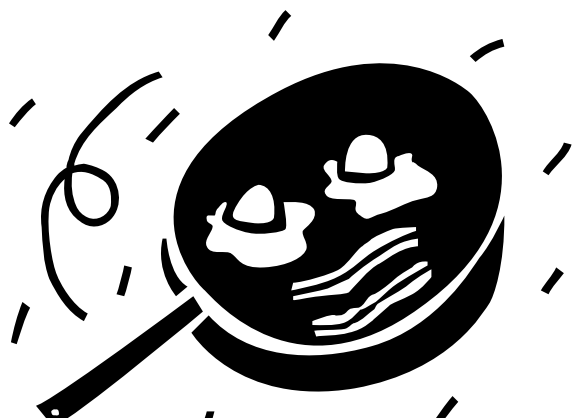
Time Required: 20-30 minutes



From Field To Table

- **Great Activity Plan for You & Your PAL**

Your PAL may think that milk comes from a grocery store and that clothes come from a department store. Choose a favorite food or a favorite item of clothing. Research how that product travels from field to table. Your PAL may want to make a poster to share what he/she has learned.



Make Your Own Ladybug

Objectives:

1. Identify why a ladybug is so important in nature.
2. Identify what harmful insects do, such as aphids, if ladybugs are unable to control them.

Procedures:

1. Blow up a round balloon.
2. Tear the newspaper into strips about an inch wide and about a foot long.
3. Dip the strips into the glue (or water & flour mix), one at a time. Then wrap the strips around the balloon until it is covered. You'll need several layers to make it strong.
4. After allowing balloon to dry overnight, cut the balloon in half.
5. Draw or paint the ladybug's head, thorax, and wings onto half of the molded paper.
6. Use the pipe cleaners to make legs.
7. Tell your PAL that ladybugs are good bugs. They eat other insects that can destroy crops.

Materials You'll Need:

- Strips of newspaper
- Paste
- A round balloon
- Paint or markers
- Pipe cleaners

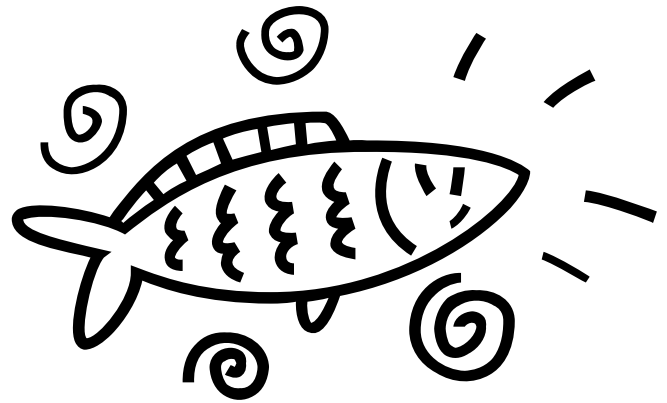
Time Needed: 20-30 minutes
(One day drying time)



Learning About Fish

- **Great Activity Plan for You & Your PAL**

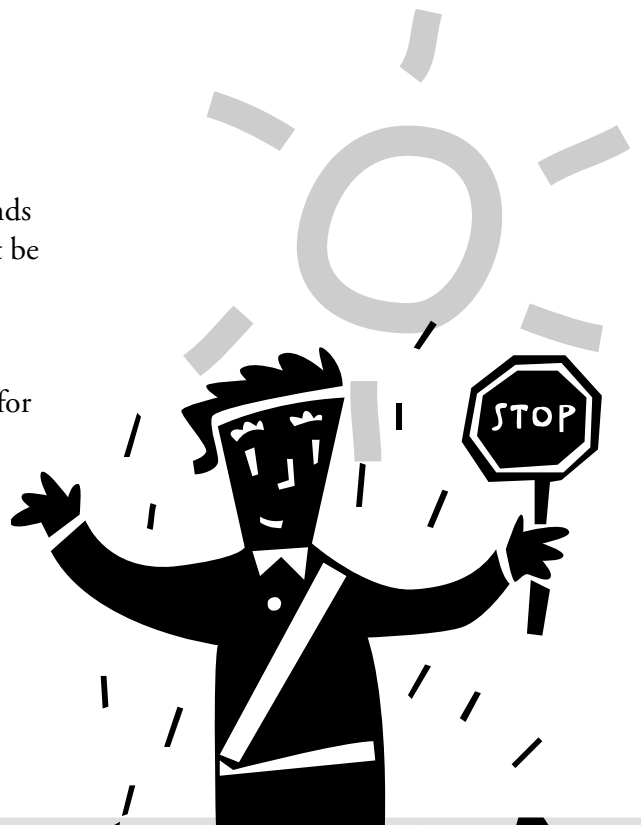
1. Visit a fish farm or a pet shop with your PAL.
(You'll need a permission slip—see Activity on page 68.)
2. Learn about the parts of a fish. Make sure your PAL knows the proper names to use.



Safety Activities

It's important to teach your PAL about safety. You may wish to schedule several demonstrations during the year to teach basic safety messages. Here are some to include:

- Safe animal handling. Make sure your PAL knows that it's dangerous to touch any animal on any part of its body if the animal doesn't know you are nearby.
- Safety around equipment with a power takeoff (PTO). Many different types of farm equipment, for example; balers, certain types of combines, and manure spreaders, are equipped with a power takeoff. As a lesson in why the guard should always be left on, you might throw a dummy into the power takeoff shaft.
- Safety around other large equipment. Children need to realize that the operator of a large machine may not be able to see them. One way to demonstrate this would be to ask one child to sit in the driver's seat of a large (stationary) piece of farm equipment. Other children should stand around the sides. How far away do they have to stand before the "driver" can see them?
- Safety around equipment with moving parts. Make sure children understand that they should never put their hands close to any moving equipment. Again, a dummy might be a good way to demonstrate.
- Always wear your safety belt. Make sure children understand that wearing safety belts is just as important for farm equipment as it is for cars.
- Contact your agricultural education instructor/FFA advisor for the times when you can have safety demonstrations.



Create a Petting Zoo

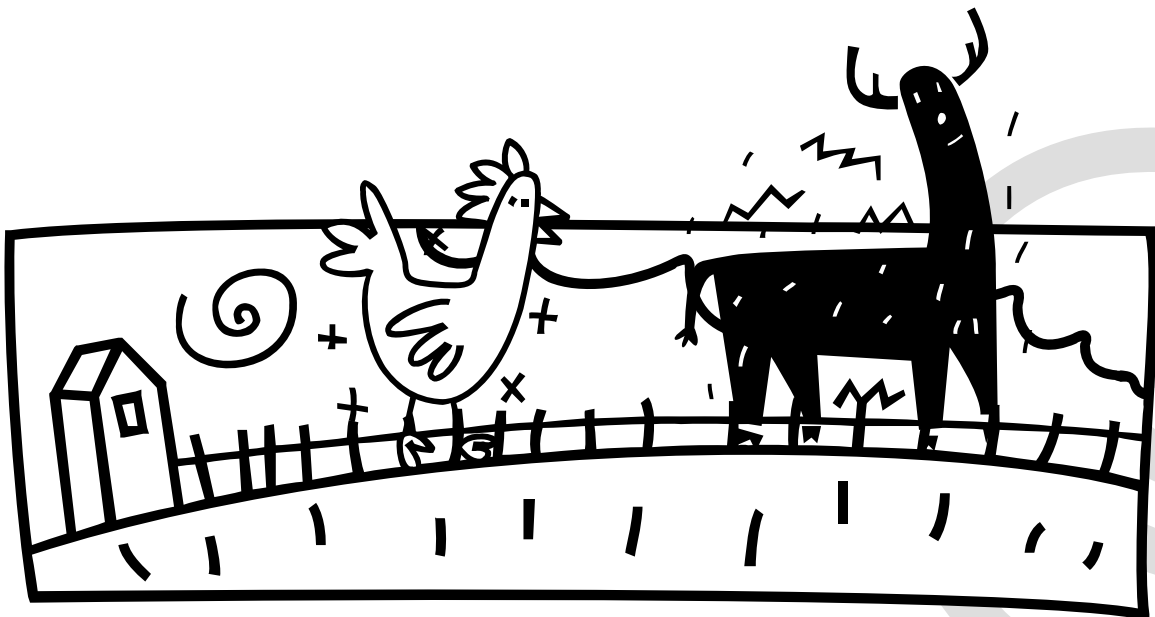
This is a great activity for FFA Week.

1. Many PALS may never have seen or petted a farm animal. Survey your FFA chapter to see how many different types of animals you can assemble.
2. Find a place for your petting zoo. You may want to set up in the yard of the elementary school that your PALS attend. One FFA chapter set up the petting zoo at the high school . . . and took their PALS on a hay ride from their school.
3. Have lots of FFA members on hand to answer questions and to help the children pet the animals safely and carefully.

Materials You'll Need:

- Lots of farm animals—rabbits, piglets, lambs, calves and other small or young animals you can find
- Material for building pens
- Plenty of FFA members to act as tour guides

Time Needed: 30–45 minutes



Interesting Places To Visit

Visiting different agriculture-related locations in your community is a great way to create team spirit . . . and to help your PALS understand more about agriculture today.

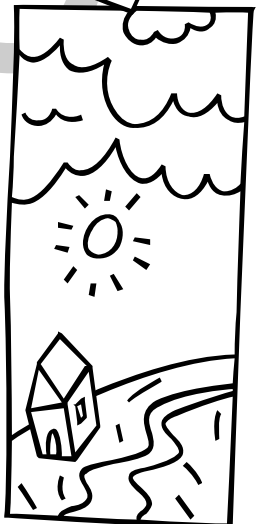
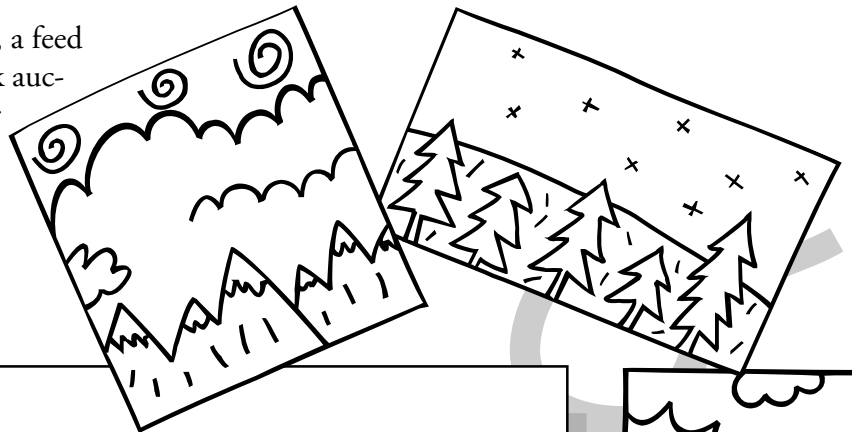
Procedure:

1. Taking a group of young children on a visit requires advance planning. Start making plans several weeks before your visit.
2. Make sure you have a signed permission slip for each child.
3. Make a name tag for each child. Include a contact phone number in case one PAL should become separated from the group.
4. Fun places to visit include a farm store, a feed store, a co-op, a greenhouse, a livestock auction, a bakery, a dairy, a horse ranch or any local farm.

Materials You'll Need:

- A permission slip for each child (see the sample below)
- Enough FFA members to provide good supervision

Time needed: Dependent upon time, date, place, etc.



PERMISSION SLIP

I give my permission for _____ to take part in the FFA/PALS Field Trip to _____ on _____.

I understand that the children will depart at _____ and will return _____.

Transportation will be provided by _____.

Signed _____

Guest Speakers

Guest speakers can bring the entire world to your PAL. Here are some speakers and subjects that might interest your group. Use this list to start thinking.

1. Sheep producer—to demonstrate shearing sheep.
2. Veterinarian—to talk about keeping animals healthy.
3. County Extension Agent—Controlling pests safely (this would be a good time to teach your PAL not to touch or use chemicals).
4. Fruit grower—to talk about raising fruit (and to bring some samples!)
5. Someone who raises bees—to talk about how bees make honey and about how to be safe around bees (serve honey for a snack).
6. Other people in agriculture-related careers.

• **Contact your agriculture education instructor/FFA advisor for times you can have special guest speakers.**



A School Beautification Project

Procedure:

1. Plan a beautification project at your PALS' school. Use your skills in landscaping to plan a design for an area around the school.
2. Use plants, seeds or bulbs to carry out the design.
3. If possible, make a small sign that says, "Garden planted and maintained by _____ FFA Chapter."
4. Be sure to get approval from school principal before you begin.

Materials You'll Need:

- A landscape design
- Plants, seeds, or bulbs (grow your own if you can)

Time Needed: 30-45 minutes
(additional time for PALS
as needed for project)



Safety Fair

Procedure:

1. To demonstrate the importance of farm safety, host a safety fair. Choose a location where you're sure to attract lots of interest (a school parking lot or a shopping mall are good suggestions). Advertise it with flyers, posters, local newspapers, etc.
2. Think of ways to demonstrate farm safety. (See Activity page 66 of this handbook for some suggestions.)
3. Have lots of FFA members on hand to serve as demonstrators and to make sure the day remains a safe one.

Materials You'll Need:

- Farm machinery
- Several guest demonstrators (ask members of your FFA chapter and local farmers)

Time Needed: 30-45
minutes for little PALS



A Vegetable Tasting Party

This is a good way to promote nutritious snacking.

Objectives:

1. Identify different types of vegetables and fruits that are great tasting and nutritious.
2. Identify the nutrient value of the snacks that you have chosen.

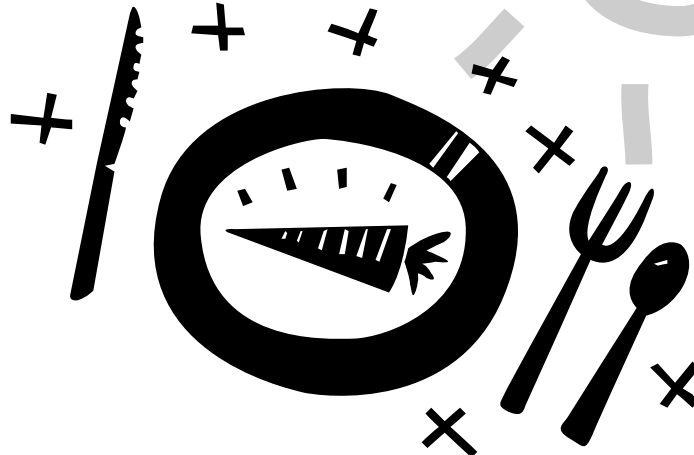
Procedure:

1. Visit local supermarkets, farmers' markets or gardens to assemble as many different types of vegetables as you can.
2. Prepare some low-fat dips—look for dips that use yogurt instead of sour cream.
3. Encourage your PALS to try new tastes. Talk with them about the importance of eating at least five servings of fruits and vegetables each day.
4. This activity is also fun to try with fruits.

Materials You'll Need:

- As many different vegetables as you can locate
- Interesting, healthy vegetable dips

Time Needed: 20-30 minutes



The Match Game

Objectives:

1. Identify different types of agricultural crops produced.
2. Identify what products are made from agricultural crops.

Procedure:

1. On half of the cards, write the names of agricultural products.
2. On the remaining cards, write the names of items that are made from the agricultural products written on the cards from step one.

Examples:

<i>Wool</i>	<i>Sweater</i>
<i>Cotton</i>	<i>Blue jeans</i>
<i>Soy bean</i>	<i>Newspaper ink</i>
<i>Wheat</i>	<i>Bread</i>

3. Instruct a person to draw a card as he or she walks into the room.
4. They have to talk with other people until they find the person who is their "match."

Materials You'll Need:

- One 3" x 5" card for each person
- Pen or pencil

Time Needed: 20-30 minutes



Lap Sit

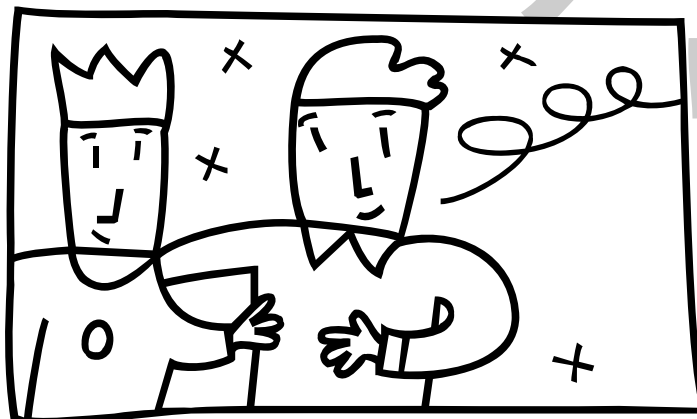
Procedure:

1. Have your group form a tight circle. Stand shoulder to shoulder.
2. Ask people to turn to the right. They should now be facing the back of the person in front of them.
3. Ask everyone to take another small step toward the center of the circle.
4. Say, "Place your hands on the shoulders of the person in front of you."
5. Have everyone slowly begin to sit back until they are resting on the knees of the person behind them.
6. Believe it or not, this will work! Everyone—from the smallest PAL to the tallest mentor—can support one another without strain. If part of the line falls over—try again.
7. Talk about teamwork! What lessons can you learn from this activity?

Materials You'll Need:

None

Time Required: 10-15 minutes



Potato People

• **Optional Activity for You & Your PAL**

For PALS who loved decorating pumpkins, this is an activity to try any time of the year.

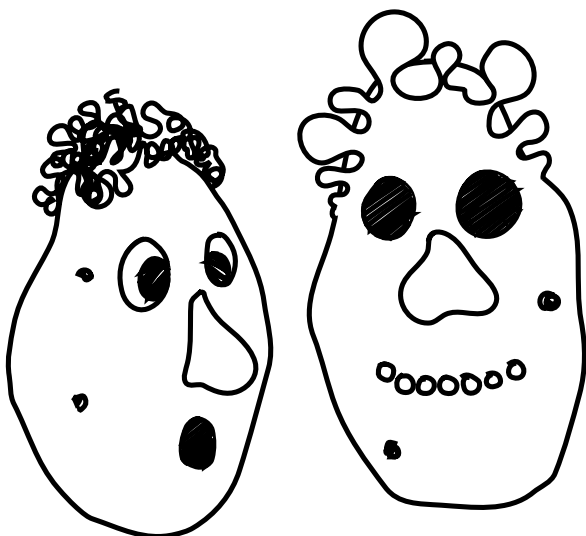
Procedure:

1. Scrub one or two large potatoes.
2. Encourage your PAL to turn the potato into a person. Clay or Play Dough can make a nose and mouth. Buttons make good eyes. (Felt works, too.) The scrubber or some yarn can make hair. Have a contest with other PALS to see who can come up with the funniest Potato People.
3. Talk about why potatoes are good to eat.

Materials You'll Need:

- Large baking potatoes
- Buttons (look for the "eye" buttons you see on some toys)
- Dishwashing scrubber or yarn
- Clay or play dough
- Ribbons
- Colored felt
- Toothpicks
- Scissors

Time Needed: 15-20 minutes



Extension Cord Confusion

Objectives:

Upon completion of this activity, the student will be able to:

1. Discuss the importance of cooperation among group members.

Procedure:

1. Before meeting with the PALS, tie several knots in the extension cord.
2. If your group is very large, you may want to do this as a team activity. Tell the group, "I want each of you to put one hand on this extension cord."
3. When everyone has done this, say, "Now without removing your hands from the cord, untie the knots."
4. After the cord is unknotted, discuss:

Was this hard or easy? Why?
(Probably hard because people weren't working together.)

Could you have unknotted the cord with out everyone's cooperation? (No.)

What happens when we don't all work together? (Things stay all knotted up.)

Materials You'll Need:

- One long extension cord (50' or 100'). Or, have several extension cords and give one to each group.

Time Needed: 15-20 minutes



The Mirror

Objectives:

Upon completion of this activity, the student will be able to:

1. Discuss the importance of communication in relationships and group work.
2. Discuss self-esteem and goal setting.

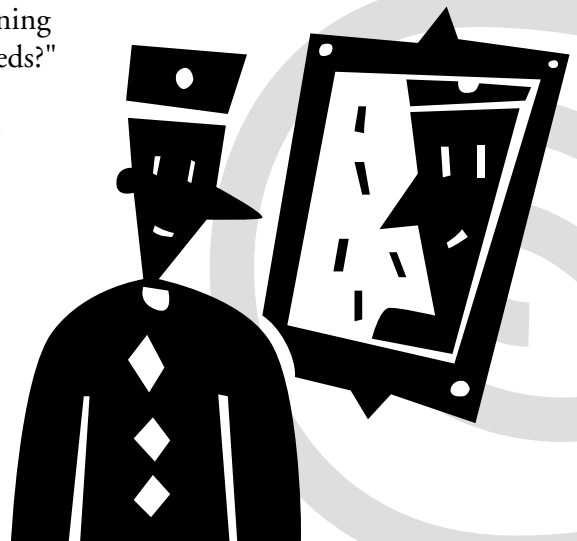
Procedure:

1. Divide the group into pairs. One person acts as the "mirror" for the other. Whatever the first person does, the second must mirror. Then switch roles.
2. Discuss. Ask, "what was hard about being a mirror?" (You had to watch very carefully. The other person might do something and you wouldn't know what they were doing.)
3. "What was hard about being the actor?" (You had to do all the thinking. You felt responsible.)
4. "Have you ever felt like you were the mirror—that you were just a "reflection" of someone else? When did that happen?" (In a relationship with a boy or girl; with a friend who is more popular.)
5. "How could you stop being a "mirror" and start defining your friendship/relationship in terms of your own needs?" (Be clear about your own goals. Talk honestly about why you may need to act on your goals, not the other person's.)

Materials You'll Need:

- Mirror for students

Time Needed: 20–30 minutes



Secret Code

A Great Activity For You And Your PAL!

Procedure:

1. Brainstorm with your PAL. Ask, "If you were to describe yourself in five words or less, which words would you use?"
2. Dip the pen into the vinegar. Use it to write these five words on your paper.
3. Wait for the paper to dry. The messages will disappear!
4. Now mix up the papers and let each PAL choose one.
5. Light the candle and carefully move the paper back and forth about an inch above the flame. (Watch carefully to see that the paper doesn't catch on fire.)
6. When the message appears, your PAL has to guess the name of the person who wrote this secret message.

Materials You'll Need:

- Vinegar
- A clean ink pen (an art supply store will have these)
- White paper
- Candle in a candleholder
- Fire extinguisher

Time Needed: 15-20 minutes



Potato Prints

A Great Activity For You And Your PAL!

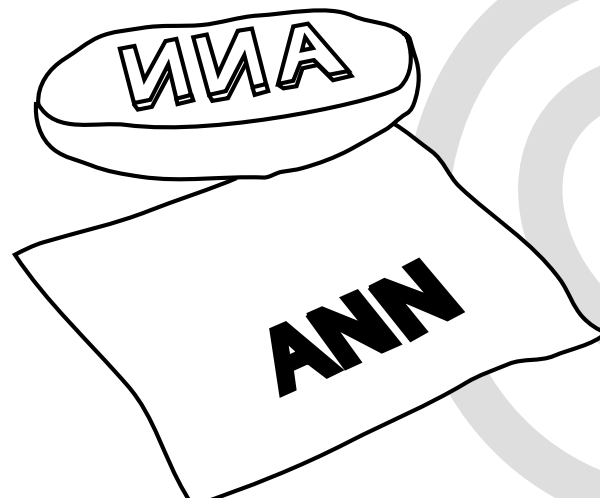
PALS who love stamps and stickers love this activity.

1. Have PAL put on an apron or old T-shirt.
2. Slice a potato lengthwise. Have your PAL draw a simple shape on the potato. Or, draw one of the letters in his/her name. (Remind your PAL to draw the letter backwards.)
3. Using the sharp knife, cut away the potato so that the design stands out. (Have big PALS handle this part.)
4. Mix some tempera paint in a container. (Your PAL'S Mom will be happy if you mix in some detergent so the paint won't stain clothing.)
5. Dip the potato in the paint and then press it onto the paper. Instant printing!

Materials You'll Need:

- Large potatoes
- Felt-tip pen
- A sharp knife
- Tempera paint
- Detergent
- Paper
- Apron or old T-shirt

Time Needed: 20-30 minutes



Make a Pond

Objectives:

Upon completion of this activity, the student will be able to:

1. List the steps in creating a landscape water feature.
2. Name three types of pond plants and animals.

Procedure:

1. Dig a hole in the ground about 20" deep and about a yard across. It should be narrower at the bottom than at the top.
2. Line the hole with at least 2" of sand. Cover the sand with plastic.
3. Fill the pond with water.
4. Pile rocks around the plastic sheet at the edge of the pond to hold it in place.
5. Add plants and stock with fish and other pond creatures.

- Consider using an aeration unit for clean filtered water.

Materials You'll Need:

- Shovels
- Sand
- Heavy plastic sheeting
- Rocks
- Plants and fish or other pond creatures

Time Needed: 30-45 minutes





Partners in Active Learning Support

National FFA Organization
5632 Mt. Vernon Memorial Hwy. Alexandria, VA 22309
Tel: (703) 360-3600
Fax: (703) 360-5524

