

**ELEMENTARY SCIENCE PROGRAM**  
**MATH, SCIENCE & TECHNOLOGY EDUCATION**

**A Collection of Learning Experiences**  
**PLANTS AND ANIMALS**



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# **PLANTS AND ANIMALS**

## **GRADE 2**

### **Unit Overview**

Students will complete an in-depth study of plants by examining their stems, roots, and leaves. A study of animals will also be completed. Animals will be grouped according to their major characteristics. Special emphasis will be placed on observing, classifying, collecting data, and predicting.

### **Scheduling**

This unit may take from five to nine weeks to complete depending upon the goals of the teacher and interests of the students. Use of the section included in this manual called More Ideas may extend the time span of this kit.

Materials to be  
obtained locally:

Please make **one** student activity book for **each** student.

chart paper	evergreen tree branch
felt tip markers/pens	scratch paper
notebooks	scissors
folders	metric ruler
various fruits and vegetables	water
knife	index cards
leaves	construction paper
celery stalk	stapler
glue	yarn
crayons	a compound leaf or picture of a compound leaf
pencils	research materials (books, internet, video)
samples of veggies classified as stems	potato and sweet potato
8" ½ x 11" paper	picture of spider (if necessary)
samples of twigs with buds	plastic aquatic plants
paper towels	cones from an evergreen
carrot	
flower (ex. lily, tulip)	
white flowers(carnation, daisy)	

### **Caution**

Remind students to wash their hands after handling any of the materials in the kit. Small objects should be handled with care.

### **About the Format**

Each learning experience is numbered and titled. Under each title is the objective for the learning experience.

Each learning experience page has two columns. The column on the left side of the page lists materials, preparations, basic skill processes, evaluation strategy, and

vocabulary. The evaluation strategy is for the teacher to use when judging the student's understanding of the learning experience.

The right column begins with a "Focus Question" which is typed in italicized print. The purpose of the "Focus Question" is to guide the teacher's instruction toward the main idea of the learning experience. The "Focus Question" is not to be answered by the students. The learning experience includes direction for students, illustrations, and discussion questions. These discussion questions can be used as a basis for class interaction. A **Student Assessment** has been included in the **Teacher's Manual** and the **Student Activity Manual**. If you do not want the students to have the assessment beforehand, remove it from the **Student Activity Manual** before printing a class set of the student manuals.

## **Background Information**

### **Plants**

When we eat fruits and vegetables, we are eating plants or the parts of plants.

**Botanists** are scientists who study plants. Plants are found in various habitats around the world. Plants need air, soil, water, space, and light to grow. Water and nutrients are taken in from the soil through the roots of the plant. Soil also supports the plant and anchors the roots. Plants need sunlight to grow. They use light energy to change carbon dioxide and water into sugars. This process of food production is called **photosynthesis**. Plants use water to carry moisture and nutrients to the leaves and food from the leaves to the other parts of the plant. The part of a plant that contains its seeds is the plant's **ovary** or the fruit of the plant. A plant's ovary or fruit is the place where seeds develop and are nourished by the plant. The fruit or ovary supplies food to the seeds until the seeds germinate and grow into new plants and are able to make their own food. Tomatoes, eggplants, cucumbers, and squash are each classified as the fruits of their plant. A seed of a plant contains the embryo, seed coat, and cotyledon. The small plant inside the seed is the **embryo** and the **seed coat** protects the embryo. The **cotyledon** stores food and it surrounds the embryo. Water makes the seed swell and softens the seed coat and then it begins to sprout or **germinate**. Warm temperatures are also necessary for seeds to germinate. As the embryo continues to grow, the roots grow downward and the stem grows upward. Once the stem breaks through the surface of the soil into the Sun, the true leaves form and the plant begins to make food. Water, air, and proper temperature is necessary for seed growth.

Most plants produce a large number of seeds because so few seeds of a plant survive. In order for a seed to survive, they must be carried away from their parent plant. Some fruit and seeds drop from a parent plant and take root. The parent plant and the seed compete for space and light. **Seed dispersal** helps prevent too many seedlings from growing in a small area near the parent plant. Many seeds have wings or hairs that allow them to be carried away from the parent plant by the wind. Plants that grow along the bank of a stream or along the ocean shores often have seeds that will float in water. The seeds have tough husks and air spaces inside to help them float. A coconut is a floating seed. Other seeds have sharp hooks which stick to furry coats of animals and drop off the animal some distance away from where they originated. Animals can also

help disperse seeds by eating the fruit of a plant and then passing the seed through their body and dropping the seed in a new location.

### **Dicot and Monocot**

**Dicots** are seeds that have two parts, like a bean seed. The outside covering of the seed is the **seed coat**. If you look closely at the seed coat, you can see a division going down the middle of the seed. If you opened the seed at that division, you will see the tiny plant, the embryo, and two large parts of the seed that are called cotyledons. Because the bean seed has these two parts, it is a **dicotyledon** or **dicot** for short.

**Monocots** are seeds that have only one cotyledon, such as a corn seed. The corn seed will not split like the bean seeds. It stays in one piece. One cotyledon surrounds the embryo.

### **Seed Germination**

**Germination** begins when the seed begins to grow. A dry seed will stay dormant until it is soaked in water. Then it begins to germinate. The cotyledons store food for the embryo or baby plant inside the seed. When the seed starts to germinate, the first part that comes out is the main root. The skin starts to split and the tiny shoot straightens, carrying the cotyledons with it. The main root gets bigger, side roots, and leaves appear. Seeds have particular requirements if they are to germinate successfully. Two that are particularly important are warmth and moisture.

If a seed does not germinate, it can be dug up out of the soil to see what happened to it. If it is rotten, it was probably over watered. If it is unchanged, it may have been under watered. Be sure that the seeds are not being overheated, planted too deeply, or that the soil has not been pounded too hard on top of them. Most bean seeds will begin to germinate within ten to fourteen days.

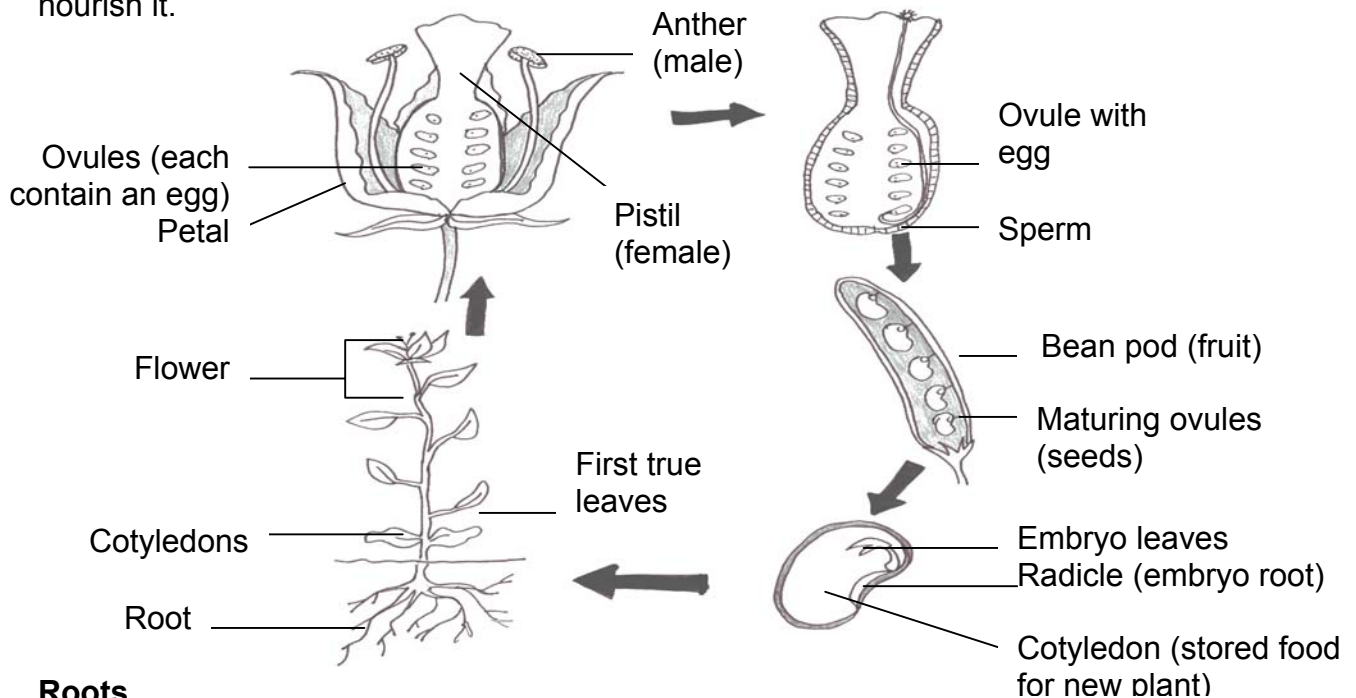
### **Bean Plant**

If we were to look at the life cycle of the bean plant we could start with the flower, the reproductive structure of the plant. The bean flower has both male (sperm produced parts) and female (egg produced parts) in the same flower. (The corn plant may have separate male and female flowers on the same plant.) The male **anther** of the bean plant produces grains of **pollen**, each which contain a sperm cell. The ovary located at the bottom of the female **pistil** contains **eggs** inside an **ovule**. The pollen from the male anther must reach the top of the female pistil, **the stigma**. The stigmas are like doorways to the ovary. Insects, winds, or water, depending upon the plant and its structure, may carry the pollen. Next, the sperm cells in the pollen grain must get to the egg cell in the ovule. The pollen grain grows a microscopic tube that bores through the pistil and carries the sperm to the egg. Most flowers contain many ovules so the number of pollen tubes growing through the pistil could be many.

When the egg has been **fertilized**, many changes occur in the flower. The petals dry up because they are no longer needed to attract insects to the flower. The ovary grows and develops into a **fruit**. The fertilized egg develops into the small **embryo** plant (what you see when you open a bean seed). The rest of the ovule develops into the

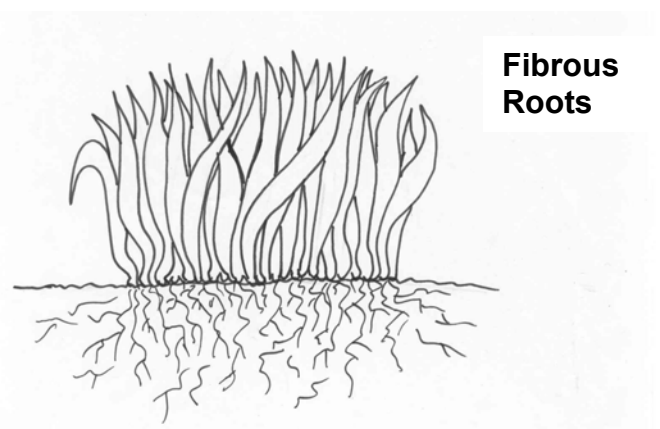
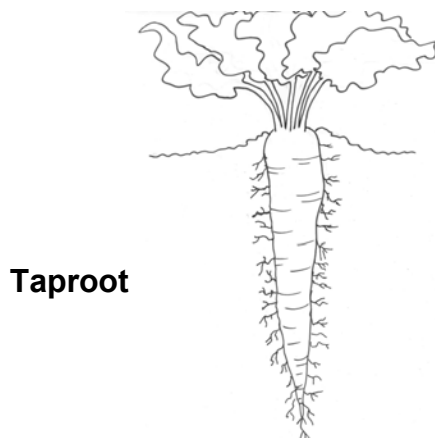
**cotyledons.** The cotyledons serve as food for the embryo plant. The ovule is now a **seed** inside the fruit of the plant, which was once the ovary.

In other words, when you look at a string bean pod, you are looking at the fruit of the plant, which was once the ovary of the flower. Inside are the beans, once the ovules, which are the plant's seeds with the embryo plant inside it and two cotyledons to nourish it.



## Roots

A plant's root system is very essential to plants. The function of roots is to anchor plants, to absorb water and nutrients from the surrounding soil, and to store food. Plant root systems may vary in several ways. **Taproots** are large central roots that grow deep into the soil. Smaller roots extend from this central root. A carrot root is an example of a taproot. **Fibrous roots** obtain more surface water. They are shallow roots that are spread over a wide area. Fibrous roots branch outward and have a threadlike appearance. Grass roots are fibrous roots. When a seed begins to grow, the roots always grow first. Gravity causes the roots to grow downward towards the earth and the stem grows upwards towards the sun. When you eat foods that are considered roots, they sometimes taste sweet because roots store food in the form of sugar and/or starch for the plant to use to grow new leaves and flowers. When we eat the roots, we are eating the food that the plant has stored for itself. Roots, like carrots, are pulled from the ground before more leaves and flowers are produced by the plant.



## **Stems**

Stems of plants serve many functions. One function is to support the plant parts that are above the ground. The stem holds up the plant toward the sun so the plant can receive the light energy it needs to make food. Some plants have stems that are soft and green. Others have stems that are thick and hard, like the trunk of a tree. The most important function of a stem is to serve as a transport system in plants. Small tubes from the roots go up through the stems. Water and minerals are carried from the roots to the leaves of a plant. Food made in the leaf moves through the tubes in the stem to other parts of the plants. Some stems are specialized organs used to store food.

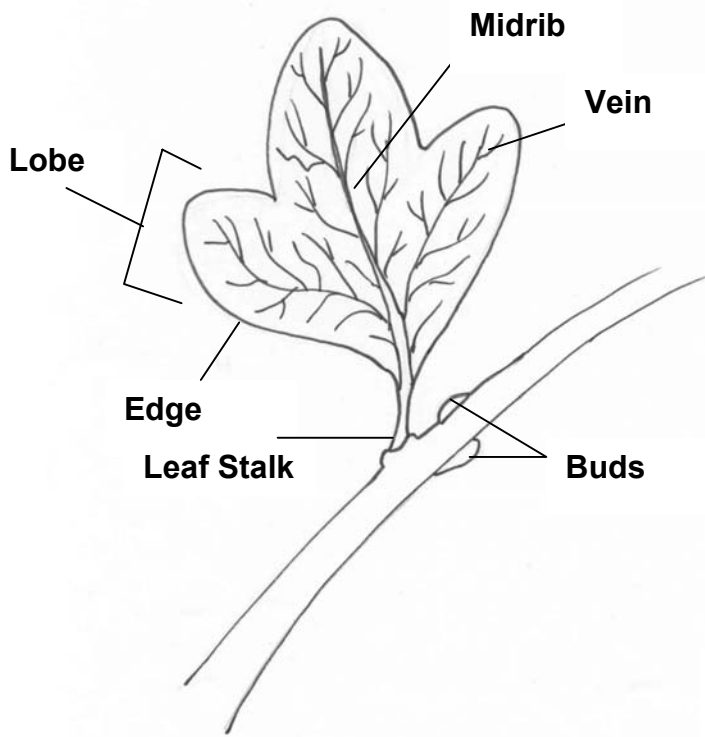
## **Buds**

When deciduous trees lose their leaves in the fall, they leave a bud behind. The winter buds are usually larger than the spring and summer buds. Winter buds have an extra layer of scales to protect them from the cold of winter. Winter buds contain leaves and flowers and the beginnings of new twigs. These twigs eventually become new branches. There are two kinds of buds on a twig. The **terminal** buds grow at the end of the twig and the **lateral** buds are found on the sides of the twig. The terminal buds grow the most often. Lateral buds act like terminal buds when terminal buds are damaged or pruned. Every year in the fall, the plant produces new terminal and lateral buds. (see picture of twig, p. 10)

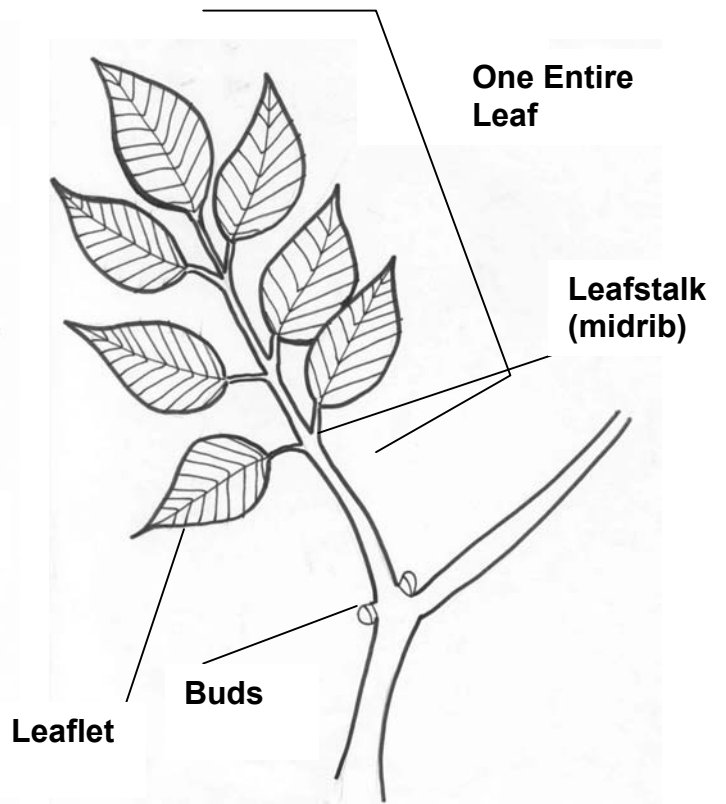
## **Leaves**

Some leaves are classified as simple, compound, or double compound. A **simple leaf** is composed of one leaf blade. The broad flat part of the leaf is connected to the **stem** or **petiole**. The stem supports the blade and turns it toward the Sun. The bud grows at the base of the leaf. The **midrib** is the central stalk of the leaf. A **compound leaf** is composed of many leaflets on a stem. These leaflets are arranged in two rows facing each other along the midrib. The leaflets connect to a nonwoody leafstalk that connects to the woody twig. Buds appear at the based of the leafstalk. Leaves are the part of the plant where food is made by photosynthesis. During **photosynthesis**, the leaves use light energy to change carbon dioxide and water into sugars or food for the plant. The veins of a leaf have two kinds of tissue flowing though them: **xylem** and **phloem** tissue. Xylem tissue carries water up to the leaves from the roots. This water is called the **sap**. Phloem tissue carries food (sugar that is converted to starch) away from the roots. It also carries food up to the flowers and fruits.

Leaves have their own distinct and unique leaf patterns. Plants can be identified by their leaf. Vein patterns of a leaf can be divided into three large groups: broad leaves, needle leaves, and narrow leaves. Edges of broad leaf plants can be smooth, serrated, lobed, wavy, fine-toothed, or a combination of several edge types. Leaves from deciduous trees can be grouped according to their growth patterns.



**Simple Leaf**



**Compound Leaf**



**Double Compound Leaf**



**Opposite & Simple**



**Opposite & Compound**



**Alternate & Simple**



**Alternate & Compound**

### **Photosynthesis**

Photosynthesis is the process by which sunlight is turned into energy for the plant by the leaf. The leaves are food factories for the plant. **Chloroplast** cells contain chlorophyll. These cells are usually located on the top surface of leaves and are exposed to sunlight. Chloroplasts are the green cells in the green leaves. The **chlorophyll** stores and holds the energy from the sunlight. **Stomata** cells are located on the underside of a leaf, the side not facing the sun. Stomata cells regulate **evaporation (transpiration)**. Air and water vapor come in and out of the leaf cells through the stomata cells. The chlorophyll in the chloroplast cells allows water and carbon dioxide from the stomata cells to combine and form a molecule of sugar. Energy is stored in the sugar molecule for the plant. The hydrogen atoms combine with carbon dioxide, which forms a sugar, thereby leaving oxygen atoms over as a by-product. Because oxygen is a by-product of the photosynthesis process, it is released into the atmosphere.

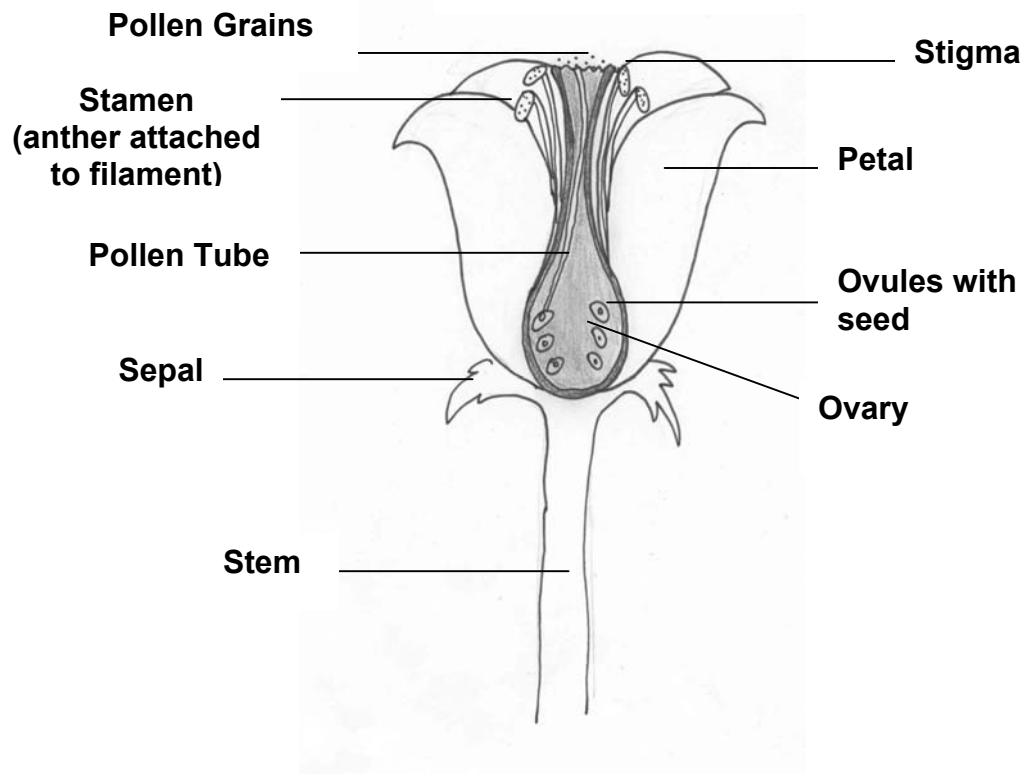
As mentioned above, **chlorophyll** is the chemical in leaves that makes them green. When photosynthesis stops in the fall, the leaves stop producing chlorophyll. That is when we begin to see the colors in the leaves. The colors were there all the time we just could not see them behind the chlorophyll. The yellow color is from **xanthophyll**, orange is **carotene**, **anthocyanin** makes leaves red and purple, and **tannin** makes the

leaf brown. Eventually, the base of the stem where the leaf is attached to the tree grows weak. When the wind blows, the leaf breaks off the stem and falls to the ground.

### **Flowers**

A flower is the reproduction structure of a seed-bearing plant. Flowers have specialized male and female parts. The **stamen** is the male part of the flower and **pistil** is the female part of the flower. The stamen produces pollen. It consists of a **filament** and an **anther**. The pollen grows on the anther. The pistil produces the seed for a plant. It includes a stigma, style, and ovary. The **stigma** is a hollow, sticky opening at the top of the pollen tube (style tube) that connects to the ovary at the base of the tube. The pistil is usually in the center of the flower inside the petals and sepals. When the ovules inside the ovary are fertilized by a pollen grain, it can develop into a seed. The ovary develops into a fruit to protect the seed. **Pollination** occurs when pollen from a flower's stamen comes in contact with the pistil of the flower. **Cross pollination** occurs when the pollen from one flower comes in contact with another flower of the same species. Bees, birds, insects, and the wind are responsible for pollination and cross pollination. The colorful petal of the flower and the flower's smell attract these animals. They are able to land on the **sepals** of the flower.

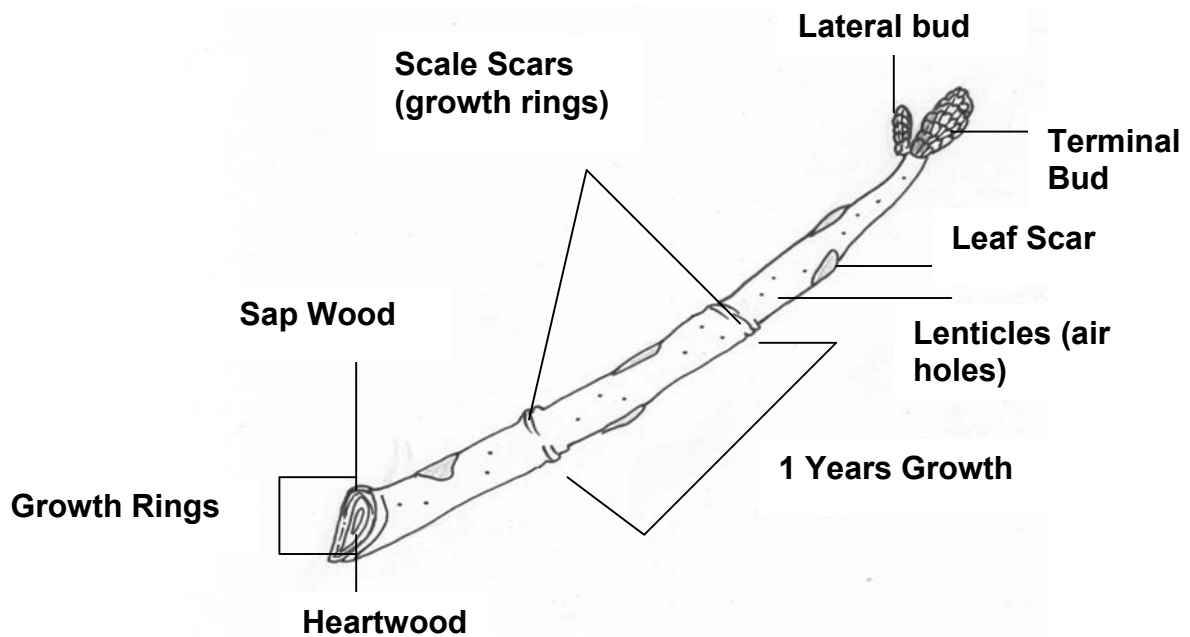
#### **Parts of a Flower**



Roots	Stems	Bark	Leaves	Flowers	Fruits (Ovaries)	Fruits without edible seeds	Seeds
Beets	Asparagus	Cinnamon	Basil	Artichoke	Allspice	Apple	Caraway
Carrots	Celery		Bay leaf	Broccoli	Banana	Cherry	Corn
Garlic	Rhubarb		Cabbage	Cauliflower	Corn	Orange	Dill
Ginger	Broccoli (stems)		Kale	Cloves	Eggplant	Peach	Mustard
Radishes	Potatoes (tuber)		Oregano		Green beans	Plum	Nutmeg
Turnip			Parsley		Hot pepper		Nuts
			Rosemary		Peas		Peas
			Sage		Cucumber		Poppy
			Lettuce				

### Twigs

Twigs should be examined very carefully. They are a good way to begin a study on trees. Twigs are miniature trees. They lack roots but have all the other parts of a tree. Twigs can grow roots if they are left in water. Leaves leave a scar when they fall off the twig. Also, for each year of growth, a new scale scar grows on the bark. It is possible to tell the age of a twig by counting the scale scars on its bark. It is also possible, if the twig has been cut, to count the rings on the inside. Each ring indicates a year of growth.



## **Trees**

Trees are very beneficial to us. We get a variety of products from trees that include building materials, paper, oils, gums, syrups, fruit, and nuts. Trees also offer many environmental and economic benefits. For example, a tree produces oxygen while using up carbon dioxide. A tree's foliage filters out particles in the air and traps ash, dust, and pollen. A tree's falling leaves and needles decompose. This decomposing material provides rich nutrients for the soil. A tree's roots help to anchor the soil and prevents topsoil from being blown away by wind or washed away by rain. It also prevents harmful land pollutants contained in the soil from getting into our waterways. It ensures that ground water supplies are continually being replenished. A tree's roots and canopy reduce flooding by allowing rain to percolate to the ground, which reduces rainfall run-off. Trees can act as sound absorbers to noise pollution. If trees are placed properly in a yard, they can act as windbreakers and insulators that can reduce heating costs in a home.

## **Parts of a Tree**

The **head** or **crown** of a tree makes up its branches, which in turn are made up of smaller branches and twigs. The **spray** consists of the outer twigs that bear the leaves and fruit. The **trunk** is the body or stem of the tree divided at the top into branches and the bottom into roots, rootlets, and root hairs. The trunk holds branches up so that the leaves will be exposed to sunlight and acts as a channel through which sap surges from root to leaf and back again to the various growing parts. Roots extend in every direction in the ground to absorb water and minerals from the soil and to hold the tree in place against winds.

A tree's growth occurs at the tips of the twigs and the tips of the rootlets. This causes the tree to grow higher and deeper and further at the sides. Growth only occurs when the tree has food, water, and minerals. The root hairs take up the water and minerals up to the larger roots, through the sapwood of the trunk, and out to the branches and leaves where the water and oxygen are released. The tree breathes through the many pores in the leaves (the **stomata**) and through the **lenticles** in the bark. The minerals that are important to the tree are retained and mixed with other chemical elements of the air making food for the tree. The leaf acts as a food factory, which is activated by sunlight and uses carbon dioxide from the air and elements from the sap resulting in starch. The leaves are arranged on the tree to gain as much sunlight as possible given its environment. Plant food, starch, is stored in the limbs, branches, and trunk and is used for the growth of next year's leaves. The starch is changed to sugar before it can be used in tree growth. The leaves act as a stomach to digest the starch. The leaf cells convert the starch to sugar using other elements found in the tree (nitrogen, sulfur, and phosphorus). Most growth occurs by midsummer. In autumn, the starch is stored away and the colored leaves reflect that the leaves have stopped producing food.

## **Deciduous Trees**

Deciduous trees are those trees that shed their leaves annually. These are mostly broad-leaved trees in the north. The brown leaves of the oaks may stay on the tree until growth begins again in the spring. As winter nears, less sunlight and water, essential to photosynthesis, will be available to the trees. This means less food for the deciduous

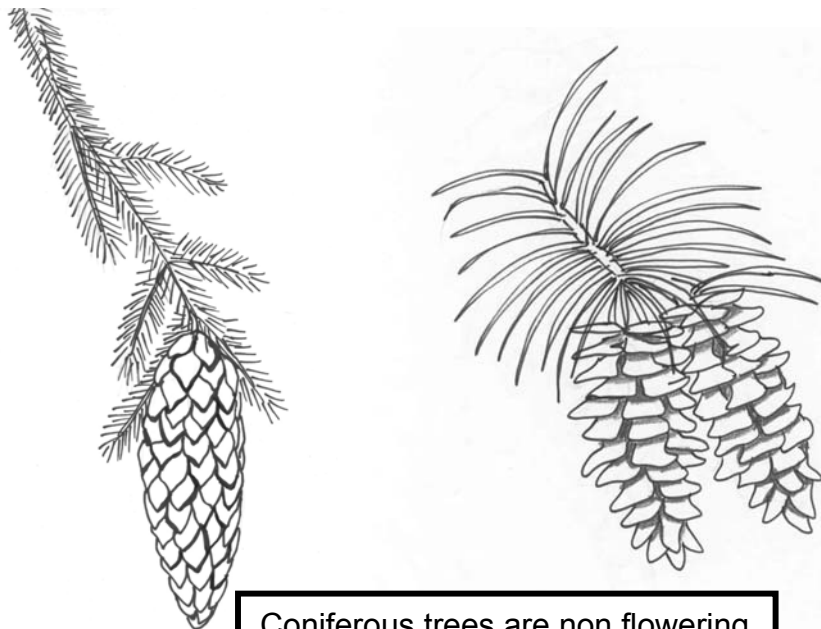
tree. During the winter, deciduous trees shift the metabolism from relying on photosynthesis for energy to a metabolism used to store glucose and amino acids for energy. The increased levels of glucose and amino acids also act as an antifreeze to protect the tree from cold temperatures.

Broad  
leaves of  
the  
deciduous  
tree.



### Evergreens

An evergreen is a tree or shrub that remains green all winter. Most evergreens are **conifers**. Conifers do not have tree flowers. Instead, they produce cones. Most evergreen leaves are tough, narrow-shaped, and have a waxy coat. While they are frequently called needles, they are actually leaves. The shape of the leaves allows them to withstand wind and snow. Snow slides off the narrow leaves and the waxy surface helps prevent freezing and drying out of the leaves. Because of their special adaptations they can grow in arctic regions as well as desert regions.



Coniferous trees are non flowering  
evergreen trees that produce  
cones that have seeds.

Each leaf on an evergreen has only one or two veins which run the length of the leaf. These veins transport the root sap and sugar sap that keeps the tree alive. Evergreen leaves make less food than the broad leaves. However, evergreen leaves do not fall all at once, so they make food for a longer periods of time.

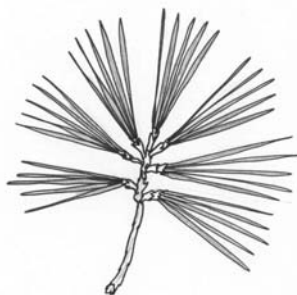
Most evergreen leaves can be grouped into three main categories: **cluster** needs, also known as bundled, **single** needles, and **scaly** leaves. Cluster needles are needles bundled by 2's, 3's, 5's, 10's or more. The best known species of this group is the pine. Single needles are found on spruce and fir trees. Firs have single needles that grow opposite each other on the twig. Spruce needles are single needs that grow all around the twig. Scaly leaves resemble needles but are actually tiny overlapping, scale-like petals. The twigs are hidden underneath the overlapping scales. The best known trees with scaly leaves are cedars, junipers, and cypress.



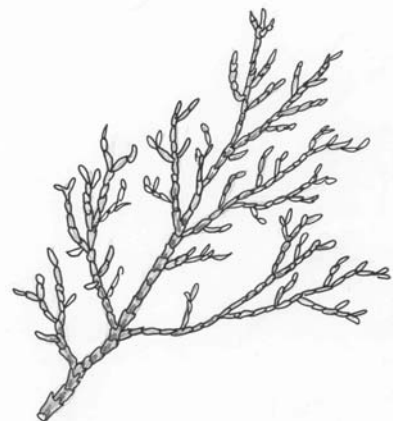
Needle Leaves



Single Needles



Cluster Needles



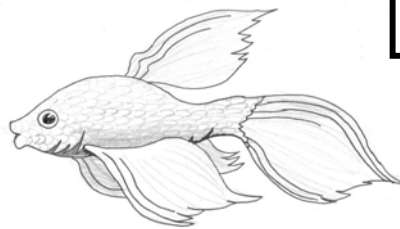
Scaly Needles

## Fish

Fish are a class of **vertebrates** that live almost anywhere there is a permanent source of freshwater or saltwater. Fish differ in size, color, and shape. Fish can smell, taste, and sense in water. Different species of fish live in different water-temperature areas of the ocean and at different water depths. For example, tuna live near the surface of the ocean while puffers and flounders are bottom dwelling fish. All fish have three similar characteristics: they breathe through gills, they have a backbone, and they are **cold-blooded** (which means that their body temperature changes with the surrounding temperature). Fish take in water through its mouth and releases it through the **gill** slits. Tiny blood vessels in the gills absorb oxygen from the water. Almost all fish have **fins**, which they use to move in the water. Its fins are found on the top, bottom, and sides of the fish and allow it to swim. Most fish have a protective outer covering of **scales**. Fish live on plants (algae, plankton) and animals (shellfish, worms, and other fish). Some fish are scavengers. The spawning season is the period of time from when the eggs of a fish are fertilized to when they hatch. Most fish have a specific spawning ground to which they return each year. This may be nearby, or a fish may have to migrate thousands of miles to reach it. A salmon hatches in freshwater and may travel thousands of miles out to sea. The salmon returns to freshwater to where he was born, to reproduce and die. Fish protect themselves by either swimming quickly to escape enemies or by camouflaging themselves by keeping their body color the same as their surroundings. Some fish have poisonous spines to keep the other fish away. Fish swim in **schools** or swim alone.

## Male bettas

Bettas, also know as Siamese Fighting Fish, originate from Thailand where they live and breed in the shallow water of the rice fields. They are easy to care for and are often seen in aquariums because of their bright colors and large fins. They are able to live in water temperature between low 70°F – mid 80°F. Keeping their water temperature constant is important. Keeping the aquarium out of a sunny window will help with keeping temperatures constant and will prevent the rampant growth of the algae on the sides of the tank. Bettas are unique in that they breathe air from the water's surface. Bettas have a **labrynth** in their bodies which allow it to carry oxygen to the rest of its body. If more than one male betta is placed in a tank, they will fight for domination. They show their **flukes** when they are aggravated. The female betta can live together peacefully. Male and female bettas should only be kept together while they spawn. The males build bubble nests on the surface of the water to indicate that he is ready to spawn.



**Male Betta**

## Reptile

Reptile is a word that means “animal that crawls,” and they differ in size and shape. Lizards, turtles, snakes, alligators, and crocodiles are all reptiles. Reptiles are **cold-blooded vertebrates**. They can lie in the sun to make their body temperature rise. They also hibernate during cold or very warm weather. They breathe by means of lungs and commonly have an outer covering of dry, thin scales or a hard, thick shell or hide. Some reptiles, such as alligators, lizards, and turtles, have legs. Others, such as snakes, do not have legs but slither about using the muscles in their bodies. Most reptiles hatch from eggs that are laid on or in the ground. After hatching, most newborn reptiles receive very little parental care. Turtles are reptiles with hard, bony shells. When danger approaches, a turtle draws in its head, legs, and tail into its shell. Turtles are able to live on land or in water and they feed on plants or on other animals. Crocodiles and alligators live in shallow water in tropical or semitropical areas. They have long, powerful tails and webbed feet for swimming and walking on soft ground. These reptiles feed on small animals and swallow their food whole. Lizards are found in water, on land, in trees, and underground. They have four legs and a tail. Many are brightly colored and are able to change their color for camouflage. There are many types of snakes. One group called **constrictors** (boa, python, and anaconda) kill their prey by squeezing it. Some snakes (coral snake, rattlesnake) are poisonous. These snakes are called **vipers**. However, most snakes are harmless and feed on insects, mice, frogs, birds, and other snakes. A snake’s jaw expands to allow it to swallow prey larger than itself. Snakes shed their skins several times a year.

## Amphibians

Amphibians are **vertebrate** animals who spend part of their life on land and part of their life in the water. Amphibians include species of **frogs, toads, and salamanders**. Amphibians are **cold-blooded** animals. Most reproduce once a year. The young are often very different in appearance from the adults. Most female frogs lay their eggs in the water, where the eggs float on the surface in a jelly-like mass. When the eggs hatch, young amphibians called tadpoles emerge. As the tadpole develops, gills appear and the tadpole feeds upon small water plants. Later, the gills disappear and lungs develop so that the animal can soon live on land. Hind legs then appear, the tail becomes shorter, and front legs develop. The amphibians that live in water have webbed feet for swimming and smooth, moist skin. Most amphibians that live on land have a rough, dry skin. During cold months, many amphibians **hibernate** by digging into the soil or muddy bottom of lakes or streams. They may also **estivate** when it gets too hot.

Frogs and toads differ in appearance. Frogs are usually slender, while toads are broader and have shorter legs. Frogs have a smooth, moist skin and live mainly in water. Toads have a dry skin covered with bumps and live mainly on land. The hind legs of both are long and muscular for leaping or swimming. Both feed on insects, spiders, and worms. The tongues of frogs and toads are fastened in the front of their mouths so they are able to stick out their tongue and their capture prey. Salamanders and newts possess tails, which other amphibians do not. A newt is a type of salamander, but it is smaller in size. Its tail is also flatter than that of the salamander. Salamanders and newts can replace their body parts by regrowing them if they are lost. These animals eat slugs, insects, and grubs.



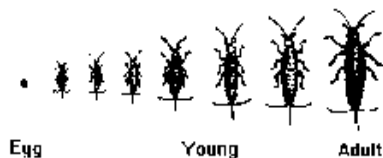
## Birds

Birds live in all parts of the world and can be found on land and water. Birds are **warm-blooded vertebrates** with two legs to walk or swim and a bill or a beak. A bird's feet are clawed or webbed depending on where it lives. They breathe air through lungs. Birds hatch from an egg. Birds have an outer covering of feathers and down. The color of the feathers can camouflage a bird in its surroundings. All birds have wings, even though some birds cannot fly. They have long, hollow, lightweight bones. These bones make the bird light in weight for flight. They act as an air conditioning system when the lungs pump cool air into the hollow bones and other body cavities. Most birds build a nest with twigs and branches and incubate their fertilized eggs. The eggs vary in size, color, and number. Most baby birds are helpless at birth and need parental care for several weeks. Birds eat fruits, seeds, nectar, insects, fish, and small animals, including other birds. The type of food a bird eats can best be determined by examining the shape of its bill or beak. For example, a spear-like bill usually indicates a bird that eats fish. A bird with a long slender bill indicates that it extracts nectar from flowers. A bird with a large, chunky bill uses it to crack seeds. Birds communicate through distinctive songs, calls, or body movements. They may warn of approaching enemies, or may call when another bird enters their territory or during mating. Many birds **migrate** from summer to winter feeding grounds and return in the spring. Migrating birds usually follow flight routes that they seem to know instinctively.

## Insects

Insects make up the largest group of the animal kingdom. An insect is an animal that is divided up into three parts: **head, thorax, and abdomen**. It is a six-legged animal with three pairs of legs on each side of its body. The skeleton (exoskeleton) of an insect is on the outside of its body, just the opposite of other animals. Insects begin their life as eggs. After the egg hatches, the insect may look like a miniature adult. This is called a **direct metamorphosis**. The silverfish is a good example of an insect that goes through this type of growth and development. Other insects such as dragonflies and cicadas, go through a three-stage life cycle called an **incomplete metamorphosis**. The stages include egg, nymph, and adult. Some nymphs (grasshoppers) look like wingless adults while other nymphs (dragonflies) look much different than their parents. Most species of insects go through a four-stage metamorphosis: egg, larva, pupa, and adult. The insect looks different and lives in a different way at each stage. After the pupa stage the insect emerges as a fully-grown adult. This four-stage change is called a **complete metamorphosis** and can be seen in butterflies, moths, ants, and bees.

### No Metamorphosis



### Incomplete Metamorphosis



### Complete Metamorphosis



The **head** of an insect includes its mouth parts, eyes and antennae. There are two main kinds of mouth types. One type of mouth is used for chewing, such as in grasshoppers and crickets. The other mouth type is used for sucking nectar, which are found in bees, butterflies, mosquitoes, and moths. Most adult insects have two large eyes to detect movement and colors. The antennae are used to smell, feel and hear. The middle section of an insect's body is called the **thorax**. Legs and wings are usually attached the thorax. Most adult insects have two or four wings. The **abdomen** is the largest part of the insect's body. Organs for digestion, reproduction, and elimination may be found in this body part. Insects live in water and on land. Insects survive in the desert and in cold weather by estivating/hibernating from the elements.

### **Mammals**

Mammals are a class of animals, that have two major distinguishing characteristics: hair and mammary glands. All mammals have hair or fur. Some mammals, like sheep and bears, have a lot of hair, whales and hippos have little hair. Soft hair, like that of a rabbit, is called **fur**. The color of the hair may blend with the environment to camouflage the animal. For example, the snowshoe rabbit is usually white in winter and brown in the summer. As winter approaches, some mammals (polar bear, caribou) grow thicker hair for protection against cold weather. The porcupine has thick, sharp hair called quills for defense against enemies. Mammals also protect themselves with their sharp teeth and/or claws and can run if pursued by a predator. Mammals have 4 limbs: 4 legs or 2 legs and 2 arms. They also have 2 ears that are visible.

The female mammal gives live birth to its young. The spiny anteater and the duck-billed platypus are the two mammals that lay eggs. The first food a mammal receives is milk from its mother. Newborn and baby mammals are often helpless so mammals care for their young for longer periods of time than other animals do. Some mammals, like porpoises and seals, live in water. The bat is a flying mammal that is often found in caves. Mammals are air breathing, **warm-blooded vertebrates** that need to eat a lot in order to maintain their high body temperature. Some mammals eat strictly meat or plants, while others will eat a combination of both. Other mammals eat insects, worms, and the bark of trees. The sharp eyes, keen ears, sense of smell, and the ability to move quickly help the mammal secure its food. A highly developed brain is another characteristic of mammals. Humans are mammals, and they have the most complex brain and nervous system of all mammals.

# Learning Experience 1: Getting Started

**Objective:** Students will discuss their background knowledge of plants and contribute information to a class KWLH chart.

## **Materials:**

### **For the class:**

Video - Eyewitness Video "Plant" (35 min.)

Chart paper\*

Felt tip markers\*

Notebooks\*

Folders\*

\*provided by teacher

## **Preparation:**

Each student should obtain a notebook and a folder with pockets to hold the activity sheets for this unit.

## **Basic Skills Development:**

Discussing

Brainstorming

## **Evaluation Strategy:**

Students will use their background knowledge to contribute ideas to a KWLH chart.

## **Vocabulary:**

strategy

observe

plant

## *What do we know about plants?*

Using the KWLH Strategy, students will explore their knowledge about plants and then expand on it throughout the unit. Brainstorm with the students what they already **know** about plants. Record their ideas on a class-size KWLH chart. Ask students what they would like to know more about concerning plants and record their ideas under the **"want to know"** column. Now that the students have decided what they want to know, they need to think about **"how they are going to find out"** the answers to the questions they have. After the hands-on activities, maintaining journals, and discussions, students can then record information in the **"what we learned and still want to learn"** column. This process can also be done in cooperative groups where students gather information in small groups then share their ideas with the class.

KWLH Strategy			
What we know	What we want to know	How are we going to find out	What we learned and still want to learn

As an introduction to the plant section of the unit, the video "Plant" by Eyewitness Video is provided for student viewing.

## Learning Experience 2: Flowers

**Objective:** Students will identify the parts of a flower and their function and dissect a sample flower to locate the parts.

### **Materials:**

#### **For each pair of students:**

2 Plant And Animals Student Activity Books

2 triple lens magnifiers

2 toothpicks

Paper towels\*

Flower for observation\*

#### **For the class:**

Flower (lily, tulip)\*

\*provided by teacher

### **Preparation:**

Read background information on pages 4 and 5, 9. Ask each student to bring in a flower to study or provide each pair of students with a flower to study. A simple flower such as a tulip, poppy, buttercup, pansy are the easiest to begin with.

### **Basic Skills Development:**

Observing

Discussing

Describing

Measuring

### **Evaluation Strategy:**

Students will identify the parts of a flower and their function of a flower and then dissect a simple flower to locate those parts.

### **Vocabulary:**

ovary                      sepals

ovule                      pollen

stigma                      petal

stamen

flower

pistil

pollination

### *How do flowers help a plant?*

Student pairs are to complete the activity sheet for Learning Experience #2 in their Plant And Animals Student Activity Book by closely observing their flower. Then on page 2 of the activity sheet, label the parts of a flower and discuss the importance of each plant.

Once students are familiar with the parts of a flower, they can begin to find these various parts on the flower they have been observing.

Students will find the inside parts of the flower more easily if they first remove the petals of their flower. They can place their petals on a paper towel.

### **Discussion Questions:**

Is the stem wider as it reaches the flower's base?

What are the green leaves at the bottom of the flower called? (sepals)

What are they used for? (landing pads for insects)

Why are colorful petals important on a flower? (attracts insects)

Assist students in locating the **pistil** (female part of the flower) on their flower. It has a sticky end to it. This sticky end is called the **stigma**.

Students can then look for the **stamen** (male part of the flower – has the pollen grains on its end).

### **Discussion Questions:**

Do you see a stalk like part in the center of the flower? (pistil)

What does it feel like?

## Learning Experience 2 continued

### Page 2

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Where is the stigma located?

Why do you think it is located there?

Do you see several stalks surrounding the pistil? (stamen)

What do the stamen produce? (pollen)

Where does the pollen from the stamen need to go for pollination?

How can pollen be carried to the pistil?

Ask student pairs to remove the stamen and examine the pollen grains with their triple lens magnifiers. Students may use the toothpicks to help examine the pollen grains. They can then rub a stamen on the pistil of the flower and observe what occurs. (The grains will stick to the pistil's stigma). When the pollen from the stamen touches the stigma, pollination occurs. Some flowers only have pistils and some only have stamens. Insects and the wind help pollinate flowers. Show students a flower's ovary. Lily flowers have ovaries and ovules that students can easily see. Split open the ovary and count the eggs inside the ovary. Explain that after pollination takes place, fertilization follows. The pollen grains grow tubes down the pistil, into the ovary and into the ovule. When this occurs, a seed begins to develop and grow.

The pistil grows larger and the ovary grows and develops into a fruit. The mature fruit holds seeds for a new plant. Students can try to locate the ovary and ovules in their flowers but it may be more difficult depending on the type of the flower they are observing.

#### **Discussion Questions:**

What do you see inside the ovary?

What is the function of the ovary?

## Learning Experience 3: Seeds & How They Germinate

**Objective:** Students will journal the germination of bean seeds and plant the seeds that have germinated for further learning experiences.

### **Materials:**

#### **For each student:**

Plant And Animals Student Activity

Book

2 triple lens magnifiers

Bean seed

Various fruit\*

#### **For the class:**

5 plastic jars

Potting soil

Sand

2 cardboard trays

2 gallon size plastic bags

Paper towels\*

Water\*

Stapler\*

\*provided by teacher

### **Preparation:**

Read background information on pages 4 and 5. Place five bean seeds in water 24 hours prior to this learning experience. Soaking seeds will rot if kept in water too long. The planting jars should be checked daily even though it may not be necessary to water them daily. The bean plants in this Learning Experience will be needed in Learning Experience #9.

### **Basic Skills Development:**

Predicting

Discussing

Observing

Describing

Inferring

### **Evaluation Strategy:**

Students will journal the germination of the bean seeds and plant seeds for further observations.

### **Vocabulary:**

seedling

seed

embryo

seed coat

germinate

cotyledon

*What happens to seeds when they germinate?*

### **Session 1:**

Discuss with students the experiences they have had planting seeds.

Distribute a dry bean seed to each student and ask students to observe their seed with a magnifier. Discuss their observations.

Ask students if they notice the bean seed seems to have two sections to it. Students can draw a picture of their bean seed on the activity sheet for Learning Experience #3 in the Plant And Animals Student Activity Book. Observe the bean seeds that have been soaking by placing them in areas of the room where student pairs can observe them. Student pairs can then draw a picture of the soaking bean seeds. Ask a student to open the bean seeds that have been soaking. Discuss seed parts. Students should notice the embryo, seed coat, and cotyledon (stored food for the growing embryo). Because the bean seed has two cotyledons it is considered a dicotyledon or dicot rather than a monocot which is a seed that has one cotyledon. They can draw the parts they observe on their activity sheet. The inside of the bean seed is also illustrated on page 2 of the activity sheet. Students can label the three main parts of the seed.

### **Discussion Questions:**

What parts of the seed do you observe?

## Learning Experience 3 continued

### Page 2

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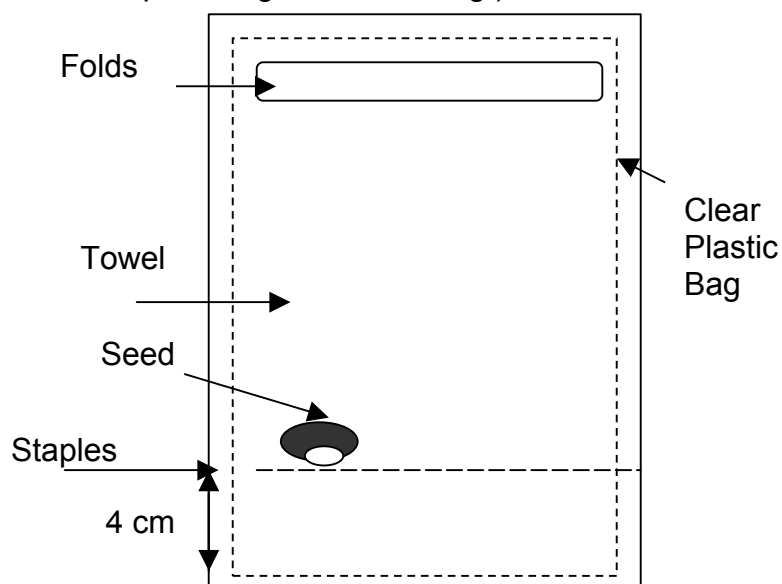
Why do you think there is so much stored food for the tiny plant?

How does the seed coat help the plant?

What do you think happens to the embryo when the seed begins to grow?

#### **Session 2:**

Before planting the bean seeds in the jars, students are to observe them germinating. Place the seeds on the wet paper towels in the plastic bags and set the bags on the cardboard trays. Place one bag in the sunlight and one bag in a dark area of the room. Observe seeds daily and add water to the paper towels as needed. (If mold develops, dispose of germination bag.)



Students are to observe any differences between the germinating seeds in the lighted area and the darker area if the temperature is the same for each. It is suggested that the germination bag should not be kept near a cold or drafty window. Students will see that the seeds do not need sunlight to germinate the seeds. The food stored in the seed provides the energy the plant needs to sprout into a seedling. This is not the case for a growing plant with leaves as students will see in Learning Experience #9. Once the seeds germinate, ask students to draw their observations before planting the seeds in the soil in the jars. Have students create five bean plants in jars. Pour a centimeter of sand in the bottom of each jar for drainage. Students are then to fill their jar with soil. They are to poke a hole in the soil (twice as deep as the diameter of the seed). They are to place their seed in the hole, cover it with soil, then pat the soil down. Repeat these steps with all the seeds. Water the soil until it is damp. Set the jars in a location where they can get a lot of light but not near a cold or drafty window. These bean plants will be needed again for Learning Experience #9.

# Learning Experience 3 continued

## Page 3

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### **Discussion Questions:**

Describe how the bean plant appears to be germinating?

How many days will it take for the seeds to begin to germinate?

How long does it take for the first leaves to grow?

### **Session 3:**

Now that students have examined the bean seeds closely, students are to look at the seeds in other fruits. Make the connections for students that these fruits used to be the ovary of the flower and we are going to look at the seeds which used to be the plant's ovules. These seeds have the embryo plant inside of them and food (cotyledon) in which to nourish it. Assign each student to bring in the fruit of a variety of plants (orange, pepper, melon, apple, peach, tomato). Cut open each fruit. Ask students to draw where the seeds are found and count the number of seeds in each fruit. Record the data on page 3 of the activity sheet for Learning experience #3. Students can then create a graph of the number of seeds in the fruit of each plant on page 4 of their activity sheet for Learning Experience #3.



## Learning Experience 4: Seeds & How They Travel

**Objective:** Students will collect a sampling of seeds from the environment and determine how they are dispersed.

### **Materials:**

#### **For each pair of students:**

2 Plant And Animals Student Activity

#### **Books**

Triple lens magnifier

Various fruits and vegetables\*

#### **For the class:**

Pictures of seeds (seed cards)

Tape measure

Sock\*

\*provided by teacher/student

### **Preparation:**

Read background information on page 3 and 4. Students will need to be instructed to look for seeds around their homes.

### **Basic Skills Development:**

Predicting

Discussing

Observing

Describing

Inferring

### **Evaluation Strategy:**

Students will describe the various ways seeds travel and compare how various seeds travel based on the structure of the seeds.

### **Vocabulary:**

structure

fruit

seed

travel

seedling

germinate

### *How do seeds travel in their environment?*

Ask students to look out at the classroom window and point out the various plants they see. Ask students if they think someone planted each one of those plants. They respond no, ask students how they all got there. Explain to students that the reason we have plants all over our environment is because the seeds “traveled” away from their parent plant.

### **Discussion Questions:**

Have you ever seen a seed of a plant or tree?

What did it look like?

Explain to students that the structure of different seeds tell you how they travel. Brainstorm with students the various ways seeds may travel. (air, water, people, animals) Show students the pictures on the seed cards of different seeds. Discuss with their partner how they think the seed travels and give reasons why they think it travels by that method. Students can record their responses on how they might travel based on their structure on their activity sheet for Learning Experience #4 in the Plant And Animals Student Activity Book. As students discover how these seeds travel, begin to categorize the cards as traveling by water, air, and people/animals.

# Learning Experience 4 continued

## Page 2

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### **Seed Cards**

#### **Water**

Box fruits/Coconut – Plants that live near water have seeds that float. The seeds drop into the water and float away from the parent plant. Some have air spaces inside of them that help them float and be carried away.

#### **Air**

Maple/Dandelion/Milkweed/Cattail – Many light seeds have wings or silky hairs that help them be carried by the wind. The hairs catch the wind like a parachute. The seeds ride the wind away from the parent plant.

#### **People/Animals**

Foxtail/Tick Trefoil/Acorn/Cranberry/Krameria/Cocklebur – Some seeds have hooks or hairs that catch onto people's clothes or fur of animals. These seeds attach on to the clothes or fur and "ride" away from the parent plant. Other seeds, like the cranberry, are dispersed when birds eat the cranberry and the soft part of the fruit is digested and the hard seeds are passed through their body and dropped in new locations as they fly. Squirrels gather the acorns of the oak tree and bury them in the soil as stored food for winter.

Take an outdoor walk and look for seeds around the schoolyard or ask students to look for seeds around their yard at home. Ask students to collect the seeds and bring them back to class for further observation. Use magnifiers to observe these seeds carefully and discuss how each seed may travel. Classify the seeds into groups based on their appearance and how they travel.

### **Discussion Questions:**

How do you think these seeds would travel? Explain.

How would the seeds attach to people/animals?

What makes the seeds float?

How are the seeds carried by the wind?

### **Extension:**

Take seeds that students find that are carried by the wind, and drop them at the same time from the same distance and record how long the seed stays in the air. Take the seeds outside when a breeze is blowing with a tape measure to measure how far the seed travels.

Ask each student to bring in an old sock and dampen it. They are to place the sock over his/her shoe and go on a nature walk. As students are walking, they may be gathering seeds that are on the ground. Come back to the classroom and lay the socks in a sunny window. Keep the sock damp and observe to see if any seeds germinate.

## Learning Experience 5: Root & Stem Study

**Objective:** Students will identify the roots and stems of plants and explain their function for survival.

### **Materials:**

#### **For each pair of students:**

2 Plant And Animals Student Activity

#### **Books**

9 oz clear plastic tumbler

2 triple lens magnifiers

Celery stalk\*

Water\*

Metric ruler\*

#### **For the class:**

Book - My First Green Book (p. 16-17)

Hand trowel

Toothpicks

Food coloring (red, blue)

5 - 9 oz clear plastic tumblers

Potato and sweet potato\*

3 white flowers (carnation or daisy)\*

Chart paper\*

Carrot\*

Felt tip markers\*

Knife\*

Water\*

Sample of vegetables classified as stems (see page 10)\*

\*provided by teacher/student

### **Preparation:**

Read background information on pages 5 and 6. Collect stems (celery, broccoli, asparagus, rhubarb) and root systems (grass, dandelion, radish, carrot, onion, turnip) before beginning this learning experience.

### **Basic Skills Development:**

Predicting

Observing

Brainstorming

Classifying

Describing

Measuring

Collecting

### **Evaluation Strategy:**

Students will identify the different type roots and stems of plants and explain their function.

### **Vocabulary:**

stem

function

fibrous root

root

taproot

tuber

*How do stems and roots help a plant?*

### **Session 1:**

Wash the soil from the roots of several plants/weeds and display them for students to observe. Read the pages 16-17 of the book "My First Green Book" to students.

### **Session 2:**

Introduce the terms taproot and fibrous roots. A carrot is an example of a taproot (large central roots that grow deep into the soil, smaller roots extend from the taproot). Grass or dandelion roots are fibrous roots (roots that grow close to the surface and spread over a wide area – look like threads). Ask students to classify the various roots displayed as a taproot or fibrous root. Ask students to give other examples.

Take students out on a nature walk and dig up the roots of various weeds and observe their structure. Most, if not all, will be fibrous root systems. Students can observe their roots with triple lens magnifiers and complete #1-4 on the activity sheet for Learning Experience #5 in the Plant And Animals Student Activity Book.

Explain to students that you are going to try and grow a plant from a sweet potato, which is a root. Place a toothpick in the sweet potato in four places. The toothpicks should set on the lid of the tumbler and allow the sweet potato to sit in the water without touching the bottom of the tumbler. Measure the growth of the plant and its roots once it begins to grow by creating

## Learning Experience 5 continued

### Page 2

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a class graph. Once the sweet potato grows roots it can be planted in soil with only half of the sweet potato covered with soil.

#### **Discussion Question:**

Why does a plant need roots?

Do all roots look alike?

What is the difference between plants with fibrous roots and those with taproots?

Why do you think a tree needs a deep taproot while grass or weeds do not?

#### **Session 3:**

Take students on a nature walk to look carefully at the stems of various plants. Compare how they are alike and different. (Flowers have soft thin stems vs. tree trunks that are large thick stems) Return to the classroom and ask students what they think stems do for the plant. Record their ideas on chart paper. Discuss the stems we eat and share the actual vegetables with students. Compare and contrast these stems.

#### **Discussion Questions:**

How are the stems of plants different/alike?

How do the leaves of the plant attach to the stem?

How do you think the roots attach to the stem?

Student pairs are to set up an activity in which they place a celery stalk with the leaves still attached at the top in a 9 oz clear plastic tumbler filled halfway with water. Be sure to cut the end of each student's stem. Color the water with food coloring. Predict with students what they think will happen to the celery stalk and the leaves. Each student is to observe what happens after leaving the celery stalk in the water overnight. Ask students to explain why they feel these predictions will occur. The stem takes in water and sends it up to the leaves of the plant. Students are to complete the activity sheet for Learning Experience #5 in their Plant And Animals Student Activity Book.

A similar activity can be complete as a whole class activity. Fill three clear plastic tumblers halfway with water. Add blue food coloring to the first tumbler and red to the second. Place one white flower (ex. carnation or daisy) in each tumbler. Ask students to predict what will happen to each flower. Leave the flowers in the water overnight.

#### **Discussion Questions:**

Why are stems important to plants?

What would happen to a plant if the stem was damaged?

Where does the water carried by the stem come from?

## Learning Experience 5 continued

### Page 3

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Explain to students that you are going to try and grow a plant from a potato, which is a tuber or underground stem. The potato plant has stems, roots, leaves, and flowers. However, there are swellings on the underground parts of the stems. These swellings are called “tubers” and are what we call potatoes. The “eyes” on a potato are tiny buds with a small scale-like leaf beside each eye. Place a toothpick in the potato in four places. The toothpicks should also set on the lid of the tumbler and the potato should sit in the water without touching the bottom of the tumbler. Measure the growth of the plant and its roots once it begins to grow by creating a class graph. Once the potato grows roots it can be planted in soil with only half of the potato covered with soil.

# Learning Experience 6: Leaf Study

**Objective:** Students will compare and contrast the edges and veins of various leaves and identify the tree that different leaves came from.

---

## **Materials:**

### **For each pair of students:**

2 Plant And Animals Student Activity

Books

2 triple lens magnifiers

4 leaves\*

### **For each group: (5 groups total):**

Book - Tree Finder by Mary Theiloard Watts

Index cards\*

### **For the class:**

A compound leaf or picture of a compound leaf\*

\*provided by teacher/student

## **Preparation:**

Read background information on pages 6-10. Ask students to bring in a variety of broad leaves from home or from the playground.

## **Basic Skills Development:**

Observing

Describing

Predicting

Measuring

## **Evaluation Strategy:**

Students will observe the sizes, edges, and veins of various leaves and will classify leaves according to these observations.

## **Vocabulary:**

vein          galls

leaf

structure

edge

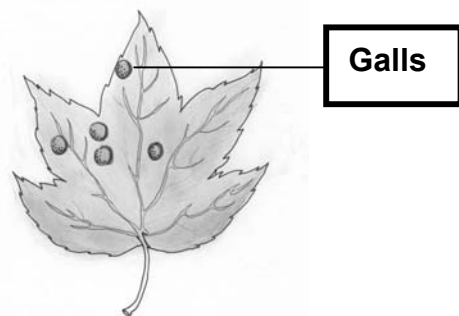
midrib

*How are leaves alike and different?*

## **Session 1:**

Gather the leaves that students have brought to class and place them in one large leaf pile. Ask each pair of students to choose four leaves from the pile in the classroom.

Ask students to observe their leaves closely with a triple lens magnifier and draw a picture of each leaf on their activity sheet for Learning Experience #6 in the Plant And Animals Student Activity Book. Be sure students look at the veins in the leaf, the color of the leaf, and the differences between the size and edges of the leaves. Students may even notice eggs on some of the leaves that an insect has laid. These are called **galls**.



Distinguish between the **simple** and **compound** leaves. If no compound leaves were brought in, have an example ready to show students or show them a picture of a compound leaf. Ask students to compare the two types.

## Learning Experience 6 continued

### Page 2

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Students are to measure the length of their leaves (from stem to tip) and the width of the largest section of their leaves and record their measurements on the activity sheet for Learning Experience 6.

As a class, students can order the leaves by length and/or width to create a “graph” on a table.

#### **Discussion Questions:**

What can you tell about these leaves from observing them?

What is the same about the leaves?

What is different about the leaves? Why are they different? (Come from different plants)

Why do you think plants have leaves?

How would you describe the shape of the leaves?

What did the leaf look like under the magnifying lens?

Does anyone’s leaf show that an insect was eating it? How do you know?

#### **Session 2:**

When the leaves are laid out, ask students to look at the edges of the leaves. Ask students to describe what they see. Students are to use the pictures on page 2 of their activity sheet to help classify the leaves based on their edges. Discuss with students the name of each type of leaf edge and why it might be called that. Discuss the types of leaf edges found by each student, and ask students to share their leaves with the class. If any of the different types of leaf edges are not found, have students go on a scavenger hunt at home or at school for the missing type of leaf edge. Find a place in the classroom (on the table, chart paper, chalkboard) where the leaves can be classified by their edges.

#### **Session 3:**

Ask students to choose a leaf that is their favorite and create a leaf rubbing on page 3 of their activity sheet. Students are to look closely at the vein structure of their leaf.

#### **Discussion Questions:**

Describe what the veins look like on your leaf?

What do you think the veins in the leaves are for?

Do humans have veins? What do you think our veins do?

Can you locate a vein in your arm? Are your veins straight? Wavy?

Ask students to locate the center vein of their leaf and their leaf rubbing. Ask students to label this vein on their leaf rubbing on line #1 as the **midrib** and draw a line to it on their rubbing. It is the main vein of the leaf. Smaller veins are connected to the midrib. Ask students on line #2 to write the word **vein** and to draw a line to one of the veins in

## Learning Experience 6 continued

### Page 3

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their leaf rubbing. Students can then share the vein structure of their leaf and compare how the veins structures differ from leaf to leaf. Ask students to write the word **stem** on line #3 on their activity sheet and to draw a line from it to the stem of the leaf shown in their leaf rubbing. Ask students to compare their leaf rubbings and share how their vein structures are different between leaves.

#### **Discussion Questions:**

What does the midrib look like?

Describe how the veins branch off the midrib?

How do the other veins on the leaf compare to the midrib?

How do the veins of one leaf compare to that of another?



#### **Session 4:**

Now that students are more aware of leaves and how they are different, they can get into groups and name the various leaves with the help of the book Tree Finder by May Theilgard Watts. Place all the leaves back into one large pile or gather some new leaves. Students are to get into five groups and each group is to choose five leaves from the pile and then use the Tree Finder book to find out what kind of tree that leaf came from. Modeling how to use the identification book may be necessary. For example, the green maps next to each leaf shows where the trees grow in the wild. Students should be sure they have chosen the name of a tree that shows it grows in New York State. The book has a dichotomous key that begins on page 5 of the book. Using this key at this grade level is not necessary, however, students should be paying close attention to the shape of the leaf, edges of the leaf, and the structure of the leaf and comparing the pictures in the book to the leaves in front of them. Groups can use index cards to label each leaf by name. Student groups can then switch positions and check the identification of that groups leaves by using the Tree Finder book. If the second group disagrees with any of the identifications made by the first group, they need to explain why they disagree with the identification. The original group may need to go back to the Tree Finder book and be more accurate in their identifications.

The class can then reclassify the leaves based on the trees they originated from. Again, this classification can be done in class on a table, on chart paper, or a chalkboard.



## Learning Experience 7: Twigs & Buds

**Objective:** Students will locate major parts of a twig, dissect a bud on a twig, and document the leaves emerging from a twig that is forced to bloom.

---

### **Materials:**

#### **For each pair of students:**

2 Plant And Animals Student Activity Books

2 triple lens magnifiers

Tweezers

Twigs with buds\*

Paper towels\*

#### **For the class:**

3 32oz deli containers

\*provided by teacher/student

### **Preparation:**

Read background information on pages 6 and 8. Write a letter home to parents asking them to help their child prune a twig with buds off a tree at home or gather a variety of twigs with buds to bring in the classroom.

### **Basic Skills Development:**

Observing

Comparing

Discussing

### **Evaluation Strategy:**

Students will locate and name the different parts of a twig and dissect a bud on that twig.

### **Vocabulary:**

twig

bud

scales

terminal bud

lateral bud

leaf scars

lenticles

growth ring

*What important role do twigs and buds play in plant development?*

Ask students to bring a twig from a tree near their home or provide a variety of twigs for the class. Ask students to look at the picture on the activity sheet for Learning Experience #7 in the Plant And Animals Student Activity Book and locate the different parts of a twig on the twigs they brought in.

### **Discussion Questions:**

Is there another twig that is similar to yours? How is it similar?

Are the buds of different shapes?

Explain.

How many buds are on your twig?

Who has the most buds on their twig?

What is on the bud to protect it? (scales)

Ask student pairs to look at pages 2 and 3 of their student activity sheet.

Students can identify the characteristics of their buds through the pictures provided. Ask students to look closely at the leaf scars with their triple lens magnifiers. These are left when the old leaves drop off the twig. The dots on the scar show the pipelines where water and food are carried through the leaf.

Student pairs can then examine the internal structure of the bud. Students are to remove one of the buds from their twig and dissect the bud on a paper towel using the tweezers provided. Students should be able to pick off the scales and find the tiny leaves ready to bloom. Students can compare their dissected buds, as well.

# Learning Experience 7 continued

## Page 2

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### **Discussion Questions:**

What did you peel away to get to the leaves? (scales)  
Why do you think these scales grow on the bud?  
In what conditions are the leaves inside the bud?  
Do the leaves in different buds differ?

The class could see some of the buds bloom before they are ready by putting some of the twigs in a container of water in a sunny window (be careful that it is not a drafty window). Three 32 oz containers are provided for this learning experience. Each week cut one centimeter off the bottom of the twig. The clean cut will allow the water to enter the twig. Students can observe the buds every few days to see the leaves or flowers emerge from the buds. Students can document the bud's progress on their activity sheet. Discuss student observations.

### **Discussion Questions:**

#### When buds first open:

Which buds open first? Next? Last?  
Do the larger buds open before the smaller ones?  
Do all the buds open at the same time?  
Did the terminal or lateral buds open?  
Does position on the twig matter as to how soon it opens.

#### When leaves unfold:

What happened to the covering (scales) that protected the bud?  
How many leaves came out of the bud?  
What kind of bud produces the most leaves?  
Describe how the leaves were folded?  
What do the new leaves feel like?  
How do the leaves change as they get older.  
Did any of the buds contain flowers?  
Did any of the twigs contain leaves and flowers?

## Learning Experience 8: Evergreens

**Objective:** Students will compare and contrast the various needles (leaves) from evergreen trees and identify the tree that was the source of those needles (leaves).

---

### **Materials:**

#### **For each student:**

Plant And Animals Student Activity Book

Triple lens magnifier

Evergreen twig w/needles\*

Cones\*

#### **For each group of five students:**

Book – Tree Finder by May Theilgard Watts

Index cards\*

#### **For the class:**

Chart paper\*

Felt tip markers\*

32 oz deli container

\*provided by teacher/students

### **Preparation:**

Read background information on pages 12 and 13. Ask students to gather evergreen needles and cones for student observation. Place an evergreen twig in one of the 32 oz deli containers after completing this learning experience.

### **Basic Skills Development:**

Observing

Discussing

Classifying

Collecting

### **Evaluation Strategy:**

Students will observe the size and structure of evergreen needles and identify the name of the tree that the needles came from using a tree identification book.

### **Vocabulary:**

conifer

cones

seeds

needle

evergreen

*What type of trees have leaves that look like needles?*

Review with students the different types of broad leaves examined in Learning Experience #6, and the trees that they came from. Ask students to think of a tree that has a different type of leaf on it. Students may or may not mention an evergreen tree. If not, show students a picture of an evergreen tree or show students one in the schoolyard. Students may not realize that the needles on the tree are the leaves of an evergreen tree.

Have students bring in a twig from an evergreen tree. Ask students to bring in a cone from their evergreen tree if their evergreen tree has cones. Students should notice how the needles are attached to the twig and the size of the needles. Students can also closely observe any cones that were brought in with a magnifier. Students are to draw a picture of the needles and cones (if available) of their evergreen tree on the activity sheet for Learning Experience #8 in the Plant And Animals Student Activity Book.

Students should compare the needles from their evergreen tree to those of another student's needles. Notice how they are alike or different. Have students group themselves based on the similar characteristic of the evergreen needles they brought in. Emphasize the words cluster, single,

## Learning Experience 8 continued

### Page 2

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and scaly in describing the type of evergreen needle. (see background information on page 13). Students can also compare how the cones of the evergreen are alike and different based on their characteristics. The cone is where the seeds of the evergreen trees are found. Evergreen trees that have cones are called **conifers**.

#### **Discussion Questions:**

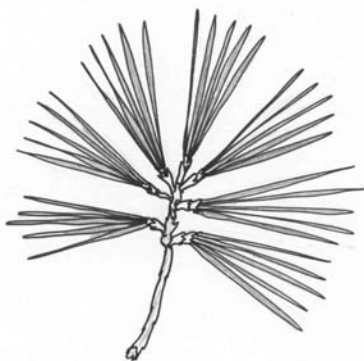
What do your needles look like?  
How do they compare to the other needles in the class?  
How would you describe the differences?  
How are they attached to the branch?  
Are they all the same color? How are they grouped?  
Can you find leaves (needles) that are round at the tip? Sharp at the tip?  
Can the cones be grouped by their characteristics?  
Do similar needles come from trees with similar cones?

#### **Session 2:**

Students can, again, get into five groups. The groups are to use the Tree Finder book to identify the name of the tree that their evergreen needles came from. Students will use pages 6-13 in the book to make their identification. Students are to then classify their evergreen needles by name using index cards. Once they classify their needles by name, make a list on chart paper/chalkboard of all the evergreen trees named in class that are conifers.

#### **Discussion Questions:**

Was it easier or more difficult to name the needle leaves rather than the broad leaves (from Learning Experience #6)? Explain?  
What else besides the leaves would help you identify a tree that a leaf came from?



**Cluster Needles**



**Single Needles**



**Scaly Needles**

## Learning Experience 9: Plants Need Light

**Objective:** Students will observe and illustrate green plants grow toward a light source and identify sunlight as a basic need for a plant because plants use sunlight to make food.

---

### **Materials:**

#### **For each student:**

2 Plant And Animals Student Activity Books

#### **For the class:**

3 bean plants from Learning Experience #3

4 pieces of black construction paper

Tape

Scissors\*

\*provided by teacher

### **Preparation:**

Read background information on page 3. Bean seeds planted in Learning Experience #3 will be used in this learning experience.

### **Basic Skills Development:**

Gathering data

Observing

Describing

Measuring

Discussing

### **Evaluation Strategy:**

Students will predict how bean plants will grow under different light conditions and will conclude that plants need sunlight to make the food they need for survival.

### **Vocabulary:**

adapt

sunlight

seedling

*Why do plants need light?*

### **Session 1:**

In Learning Experience #3, students planted five bean plants. Students will only need three to perform this learning experience. The other two bean plants were extra just in case there was a problem with their growth. The plants need to have sprouted through the soil and grown to 8 - 10 cm in height to use in this learning experience. Create a cylinder with the black construction paper and then tape a circle made with the black construction paper that will fit the top of the jar to completely cover one of the plants. Create another cylinder with a second piece of black construction paper and place that over the second plant (there should be a hole in the top). Create a third cylinder with the construction paper, cut another circle out of black construction paper that will fit the top of the construction paper, then cut a hole on the side of the cylinder and place it over the third plant. Ask students to predict what will happen to the growth of each plant and draw a picture of their predictions on the activity sheet for Learning Experience #9 in the Plant And Animals Student Activity Book. As the plants grow they will seek light. The plant's growth pattern will be determined by the direction of the light source. The covered plant will do poorly. With no sunlight, the covered plant is not able to manufacture food.

# Learning Experience 9 continued

## Page 2

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### Discussion Questions:

What do you think will happen to each plant with the bags over them? Explain.  
What do plants need that the bags will not allow them to get? (sunlight)  
Why do you think plants need sunlight?

Once the plants show evidence of being effected by the lack of light, ask students to draw pictures on their activity sheets for Learning Experience #9 in the Plant And Animals Student Activity Book the results. Compare results to predictions made.

### Discussion Questions:

How did the plants grow in the different bags?  
Why do you think they grew in that way? Were your predictions correct?  
What do you think would happen to the first plant if we let it grow now without the bag over it?

Leave the plant that was completely in the dark in the light for a few days and observe any changes.

Light blocked from  
plant.

Light reaches the  
plant from the top.

Light reaches the  
plant from the side.



# Learning Experience 10: Trees

**Objective:** Students will collect data on a tree of their choice and explain how different types of trees adapt to the winter season.

## **Materials:**

**For each pair of students:**

2 Plant And Animals Student Activity

Books

Mirror

Metric ruler\*

**For the class:**

Book - My First Green Book (p. 38-39)

Potting soil

5 tape measures

2 32 oz. deli containers

2 gallon size plastic bags

2 rubberbands

9 oz plastic tumbler

2 straws

Broad leaf potted plant (if necessary)

3 bean plants from Learning Experience

#3

Evergreen tree twig\*

Construction paper\*

Water\*

Crayons\*

Glue\*

Yarn or tape\*

\*provided by teacher

## **Preparation:**

Read background information on pages 10-12.

## **Basic Skills Development:**

Gathering Data

Observing

Describing

Measuring

Discussing

## **Evaluation Strategy:**

Students will report on the data they collected on their tree and describe how different trees adapt to the winter season.

## **Vocabulary:**

trunk	chlorophyll
evergreen	oxygen
deciduous	carbon dioxide
bark	adapt
leaf	veins

*How do trees adapt to the seasons?*

## **Session 1:**

Review with students how plants need sunlight to grow from Learning Experience #10. Ask students to list the signs of winter (trees lose their leaves, seeds disperse, plants die away).

Focus again on the bean plants and the color of their leaves. (any type of green plant could be used). Introduce the word **chlorophyll** to students. Chlorophyll is the chemical found in plant leaves that make them green. Plants need sunlight in order to make chlorophyll. Students may notice that the bean plant that was covered with the bag has leaves that may have yellowed. Relate this to what happens to the trees in autumn.

## **Discussion Questions:**

Do plants need sunlight?

What happened to the bean plant that did not get sunlight? (withered, yellowed)

How is it similar to what happens when leaves change color in the fall? (plants receive less sunlight in the fall – chlorophyll that makes leaves green breaks down and reveals other colors that are there all year long.)

# Learning Experience 10 continued

## Page 2

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Set up an activity where a twig from an evergreen is placed in a 32 oz. deli container filled halfway with soil then add water. Place a clear plastic bag over the twig and fasten the bag to the container with a rubberband. Place a similar bag over the bean plant with broad leaves. Over the next couple of days, observe what happens and discuss results with students. (If the bean plant is not large enough to release a sufficient amount of water vapor, another potted broad leaf plant may need to be used.)

### **Discussion Questions:**

What do the leaves appear to be giving off? (water vapor when it exchanges oxygen for carbon dioxide)

Where is the water coming from? (the stem of the twig is gathering water from the container delivering it to the leaves)

Where does a tree outside get its water from? (roots in the ground)

Ask one student to volunteer to pretend they are the roots of the plant/stem of twig.

Give that student a 9 oz. tumbler filled with water with a straw in it. Ask the student to take a drink from the tumbler.

What happens to the ground in winter? (freezes) Ask the same student to take a drink from a straw in a tumbler of water that has been placed in the freezer overnight.

Discuss the differences.

What happens to the water? (freezes)

Could you gather water from the frozen or unfrozen water? Describe your experience.

Do plants need water to survive? (yes)

If we see the leaves of the tree give off water, why do you think a tree loses its leaves in the fall? (leaves fall off the tree so the tree does not lose water so it can survive – adapting to its environment)

Are there trees that do not lose leaves? (evergreens)

Why do you think they do not lose leaves? (the evergreens release less water from their needles – the needles do not need to fall off)

If the tree (plant) loses its leaves in the winter and the leaves gather sunlight to make food, how does the tree survive in the winter? (plants store their food)

How is this similar to animals? (animals store fat for energy in the winter)

Introduce the word **deciduous** to students. Deciduous trees are those trees that have leaves that change color and fall off the trees in the fall. Compare deciduous to evergreen trees that keep their leaves (needles) year round. The deciduous tree releases more water than the evergreen bag. Discuss with students why this could be very harmful for the tree in the winter (water is not as plentiful). Ask students to then explain why deciduous trees lose their leaves and evergreens do not. Introduce the word **adapt** to students. Deciduous trees adapt to the winter environments by losing their leaves for survival.



# Learning Experience 10 continued

## Page 3

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### **Discussion Questions:**

Do you think it is hard for a deciduous to survive during the winter? Why? Why not?  
What happens to the ground in the winter? (freezes)  
Can the roots get water easily? (no)  
What did we observe is released by the leaves of the plant?  
How do other plants adapt in the winter?  
How do animals adapt in the winter? (be sure to include humans in the category of animals)

Students could work in pairs and complete pages 1-3 of their activity sheet for Learning Experience #10 in the Plant And Animals Student Activity Book. On these pages are “pages to a book” on how a plant makes food but loses its leaves in the fall to adapt to the upcoming winter. Students can draw a picture for each page of their “book.” The dialogue at the bottom of each page is to be used as a basis for their picture. This could also be a whole class activity if students are having difficulty with the illustrations. Each “page” of the “book” on the activity sheet can be cut out and pasted on construction paper as a backing. These pages could then be bound in a book with yarn or tape. The books could be shared among student groups.

### **Session 2:**

Ask each pair of students to choose a tree to observe. Students can choose a deciduous tree or an evergreen tree. Encourage pairs to look at the trees close up getting under the last bough by placing a small mirror flat with one end of the mirror near their nose. They can see the spray of the tree growing from the trunk. Also, students are to observe the tree from a distance. They are to look at the top of the tree (head or crown), the middle (the spray), and the bottom (trunk). Students are to gather data about their tree and record the data on the activity sheet for Learning Experience #10 in the Plant And Animals Student Activity Book.

Students can then focus in on the leaves of the tree (shape, edges, color, veins, length, width), the animals that live in/near the tree, the tree bark, and tree trunk size. All data can be recorded on the activity sheet for this learning experience.

### **Discussion Questions:**

Describe the shape of your tree?  
Where is the stem of the plant? Did you see any roots showing above ground?  
What are the roots used for?  
Describe the leaf from your tree?  
Is there a part of your tree that has large leaves and another part that has smaller leaves? Where are the smaller ones located? (In shady area away from sunlight)  
What does the seed of the tree look like? How do you think it travels?  
Do you notice any color change in your leaf?  
If so, where does the color change?

## Learning Experience 10 continued

### Page 4

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What animals live in or around your tree?

What do you think the animals use the tree for? (food, shelter, home)

Describe the bark of your tree. What do you think the bark's function is?

Students can report the data they have gathered on their tree. Students can observe the tree over time and compare their data. Student data from different trees can also be compared.

Review with students how trees change throughout the year. Ask students to draw what their tree would look like in each season of the year on page 6 of their activity sheet for Learning Experience #10 in the Plant And Animals Student Activity Book. The evergreens keep their leaves throughout all the seasons and the deciduous trees do not.

#### **Discussion Questions:**

How does your tree change throughout the year?

Why do you think these changes occur?

# Learning Experience 11: Classifying Animals

**Objective:** Students will name various animals and classify the animals into groups based on their characteristics.

## **Materials:**

### **For each student:**

3 index cards\*

Pencil\*

### **For the class:**

Chart paper\*

Construction paper\*

\*provided by teacher

## **Preparation:**

Read background information on pages 14 - 17. Establish a place in the room where the cards students create can be posted throughout Learning Experience 11-16.

## **Basic Skills Development:**

Describing

Classifying

Discussing

Making Decisions

## **Evaluation Strategy:**

Students will classify animals into groups and justify their classification based on the animals' characteristics.

## **Vocabulary:**

classify

animal

characteristics

## *How do we group animals?*

Pass out three index cards to each student and have them write the name of an animal on their card (dog, cat, lizard, fish, cow, etc.) Tape the cards to the chalkboard. Read the names of the animals together and discuss some of their features. Group the animals according to common characteristics. Attach the groups of cards to chart paper/construction paper. Ask students what they would call each group of animals. This learning experience may get students to recall animal groups such as insects and or mammals, etc. If not, leave group titles off so they can be added later to the groups. Also, the index cards may not be grouped into the six groups we will be working within the following learning experiences (fish, mammals, reptiles, amphibians, insects, birds). The index cards can be moved into the correct groups as students learn about the animals (ex. frogs and amphibians may be in with the snakes, which is a reptile because of their appearance). Students can then regroup the cards as they learn about the animals.

## Learning Experience 12: Fish

**Objective:** Students will work with a partner to discuss various characteristics of fish and observe those characteristics of the fish in a class aquarium.

### **Materials:**

#### **For each student:**

Plant And Animals Student Activity Book  
Index card\*

#### **For the class:**

Video #1 - "All About Fish" (10 min.)

Aquarium

Betta fish

Fish food

Gravel

Fish net

2 triple lens magnifiers

Chart paper\*

Plastic aquatic plants\*

Felt tip markers/pens\*

Water\*

\*provided by teacher

### **Preparation:**

Read background information on pages 14. Notify your school office of live materials to be delivered. Prepare aquarium as soon as your betta arrives. Prepare the class chart before beginning this learning experience. Create a feeding schedule for your betta fish.

### **Basic Skills Development:**

Observing      Discussing

Discussing

### **Evaluation Strategy:**

Students will discuss the characteristics of fish and identify those characteristics.

### **Vocabulary:**

fish	characteristics
gills	fins
scales	cold-blooded
aquarium	

### *What are the characteristics of fish?*

The aquarium for your betta fish will need to be prepared prior to its arrival. Put water into the aquarium and set it out in the classroom for 24 hours to get the water temperature to room temperature and to allow the chlorine to evaporate from the water. Gravel (provided in kit) can be added to the aquarium, along with plastic or aquatic plants. These are only suggestions. Students may have other ideas as to how they would like to decorate the aquarium. When the fish arrives, allow it to stay in its bag for 24 hours until the water has reached room temperature, as well. Then the fish can be placed in the aquarium. The one-half of the water in the aquarium needs to be changed every 10 days or when it gets cloudy. Remember to let the water, again, sit out to reach room temperature and rid itself of chlorine. The betta fish should be fed bloodworms every other day (M, W, F).

Create a classroom chart that lists the various characteristics of animals and the categories of animals. See page 44 for a completed chart.

Students are to watch the video titled - "All About Fish (Video #1).

Ask students to pair with a partner and write down on their activity sheet for Learning Experience #12 in the Plant And Animals Student Activity Book what they learned about fish from the video. As students are discussing with their

# Learning Experience 12 continued

## Page 2

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partner, ask each group to go to the aquarium and observe the betta fish to help with their discussion. Each group should get a close-up look at the fish during this discussion. Students can use the magnifiers to help them see the parts of the fish discussed in the video (scales, gills, eyes, mouth, etc). There is also a place on their activity sheets for a drawing of the betta fish. Discuss their observations as a whole class. Students can then label their drawings that show the gills, fins, scales, mouth, and eyes.

### **Discussion Questions:**

What did we learn about fish?

What are some of the parts of a fish and what are they used for?

Are there animals who like to eat fish?

Name one. (bears, birds, other fish)

How can fish protect themselves? (some fish have body parts that can harm predators, camouflage to hide, swim fast)

Where do fish live?

Can you breathe underwater?

Do fish breathe underwater? How? (gills use the oxygen from the water the betta fish takes in air from the surface of the water).

What does it mean to be cold-blooded/warm blooded?

As a review, complete the section of the data chart for the fish category. Answer each statement/question for the fish. Discuss with students what it means for an animal to be cold- blooded and warm-blooded. Also, ask students to share their drawings with the class and point out the characteristics they observed of the fish.

# Learning Experience 12 continued

## Page 3

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Characteristics	Fish	Reptiles	Amphibians	Birds	Insects	Mammals
Have a backbone	Yes- except for sharks	Yes	Yes	Yes	Skeleton on outside of body	Yes
Live in water	Yes	Yes	Yes (as young)	No	Yes	No
Live on land	No	Yes	Yes	Yes (nest)	Yes	Yes
How do they move?	Fins (top, bottom & side)	Short legs or no legs (snakes)	First, they use a tail to swim, then they grow legs	Wings – fly Legs, move on land two legs, two feet	Wings – fly (4 or 2) Legs – (6) walk, jump	4 legs, 2 legs, 2 arms, walk, jump
How do they breathe?	With gills (get oxygen from the oxygen in the water)	Lungs	First use tail to swim then grow legs.	Lungs	Spiracles or breathing tubes	Lungs
How are they born?	Eggs	Eggs	Eggs (jelly covered)	Eggs	Eggs	Live birth
Parents care for them until adult?	No	No	No	No – until they can fly away on their own	No	Yes – feed young milk
Feathers	No	No	No	Yes	No	No
Fur/hair?	No	No	No	No	No	Yes
Cold-blooded or Warm-blooded	Cold-blooded	Cold-blooded	Cold-blooded	Warm-blooded	N/A	Warm-blooded
Scales/shell	Yes (scales)	Yes – some do and others have dry skin or a shell	No – smooth or Bumpy, wet skin	No	No	No

Ask students to look at their grouping of animals from the previous learning experience.

### **Discussion Questions:**

Is there a fish category?

Are there any animals that may have been put in another category that could be switched to a fish category? If no fish have been listed, pass out an index card to each student again and ask them to name a type of fish that they know of and create a fish category with those index cards. Discuss if the fish the students list match the characteristics listed on the chart.

## Learning Experience 13: Reptiles & Amphibians

**Objective:** Students will gather data on reptiles and amphibians and compare and contrast their characteristics.

### **Materials:**

#### **For each pair of students:**

Plant And Animals Student Activity Book  
Index cards\*

#### **For the class:**

Video #2 - "All About Reptiles"  
Video #3 - "All About Amphibians"

### **Preparation:**

Read background information on pages 15.

### **Basic Skills Development:**

Describing  
Classifying  
Observing  
Comparing

### **Evaluation Strategy:**

Students will compare and contrast the characteristics of reptiles and amphibians.

### **Vocabulary:**

reptile  
amphibian  
characteristic  
compare  
contrast  
cold-blooded

*How are reptiles and amphibians alike and different?*

### **Session 1:**

Ask students to watch the Video #2 titled - "All About Reptiles". Ask students to get with a partner and write down what they know about reptiles from the video on the reptile side of the "H" chart on the activity sheet for Learning Experience #13 in the Plant And Animals Student Activity Book. Be sure students write in pencil because they may have to erase some of their entries and put them in the both column.

### **Discussion Questions:**

What are some characteristics of reptiles?  
Has anyone had a reptile for a pet?  
Did you write down anything on your chart from your own experiences with reptiles? Explain.

Ask students to view the Video #3 - "All About Amphibians". Ask students to once again, get together with their partner and write down what they learned about amphibians from the video. Instruct students to look at the reptile side of their chart. If there is anything on that side of the chart that reptiles have in common with amphibians, they should move the characteristic from the reptile side into the part of the "H" chart labeled "both". Discuss results as a class.

### **Discussion Questions:**

What are some characteristics of amphibians?

## Learning Experience 13 continued

### Page 2

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Do reptiles and amphibians have any common characteristics?

Has anyone had an amphibian for a pet? (frog, toad, salamander)

Did you include anything on your chart from your experiences with amphibians?

Explain?

Now that comparisons have been made between reptiles and amphibians, review by completing the class chart on the characteristics of these two categories of animals (pg. 44). Ask students to look back at all the animals they listed on the cards. Look to see if there is a reptile and/or amphibian category. If not, look for animals listed that can be placed in that category and/or create new animal cards naming reptiles and amphibians that will to create those categories.



## Learning Experience 14: Birds

**Objective:** Students will identify important characteristics of birds and research a bird of choice to share with the class.

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### **Materials:**

#### **For each pair of students:**

2 Plant And Animal Student Activity Books

Research materials (books, videos, internet)\*

Index cards\*

2 pieces of 21.5 cm x 27.9 cm (8 1/2" x 11") paper\*

Glue\*

Metric ruler\*

#### **For the class:**

Video #4 - "All About Birds"

Picture cards of bird beaks and bird feet

\*provided by teacher

### **Preparation:**

Read background information on page 16. Gathering reference books for students or bookmarking internet sites will be necessary for research.

### **Basic Skills Development:**

Observing                      Communicating

Gathering Data              Describing

Discussing

### **Evaluation Strategy:**

Students will complete a chart of characteristics for birds, research a type of bird, and share the information with the class.

### **Vocabulary:**

bird

feathers

warm-blooded

beak

bill

adapt

habitat

### *What are the characteristics of birds?*

Since most students are familiar with birds, ask students to look at the chart first and see if they can complete the category on birds. If students are unsure of a category, write in information on the chart in pencil. Watch the Video #4 - "All About Birds" (10 min.) Once students watch the video, confirm the information on the chart or add the information that was once unclear.

### **Discussion Questions:**

What makes birds different than the other animal categories?

Has anyone had a bird for a pet?

What did you learn about birds after having one for a pet?

Use the bird picture cards to discuss the beaks and feet of various birds and how they help the bird adapt to its habitat. Birds have different shaped beaks depending on their food source. The shape of a bird's feet indicates if the bird is a runner, grasps fish, or swims. Students could infer about the bird's lifestyle from the picture or the teacher could tell the students about the eating habitats of various birds and where they live and students could guess which picture card would match that bird's lifestyle.

Look to see if any birds were listed on the animal cards and if a category was created for birds. If not, create a bird category. Ask students to add to the list as many birds as they can think of. Try to get a list that will equal the number of

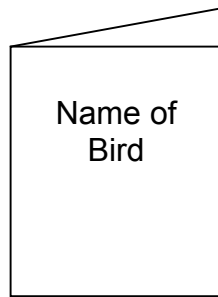
## Learning Experience 14 continued

### Page 2

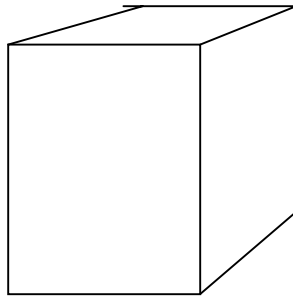
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students in the class. (Sample list of birds: flamingo, duck, pelican, rooster, parrot, swan, owl, peacock, eagle, hawk). Ask each student to choose one of the birds and research that bird using books, internet, other videos, etc. Suggested topics for research could be: where the bird lives, does it hibernate or migrate, what the bird eats, a description and picture of the bird, a picture of the bird's beak or feet, or other interesting facts about the bird. The activity sheet for Learning Experience #14 in the Plant And Animals Student Activity Book shows students how to create a book to present their research.

The students can share their research with the class in book form, but the project may also be unfolded and displayed.



(Book)



(Display)

As students present their research, emphasize the habitat of the bird and what the bird eats, and how it lives.

## Learning Experience 15: Insects

**Objective:** Students will collect creatures from the schoolyard and will determine if their creature is an insect based on its body parts.

---

### **Materials:**

#### **For each student:**

Plant And Animal Student Activity Book

Petri dish

Triple lens magnifier

Index cards\*

#### **For the class:**

Video #5- "All About Insects" (10 min.)

Picture of spider (if necessary)\*

### **Preparation:**

Read background information on pages 16 and 17. Be sure students are collecting insects that are not harmful. Look out for dangers in the schoolyard such as poison ivy or oak, poisonous spiders, a beehive, or ticks. Flag areas of concern so students do not investigate there. Students should wear closed shoes, long pants, long sleeved shirts as extra precaution against these dangers.

### **Basic Skills Development:**

Describing

Observing

Interpreting Data

Discussing

Making Decisions

### **Evaluation Strategy:**

Students will describe the necessary characteristics of insects and classify the creatures collected from the schoolyard as insects or non-insects based on their characteristics.

### **Vocabulary:**

insect

thorax

abdomen

spiracles

*What characteristics are unique to insects?*

Explain to students that they are going to go outside and search for an insect of their choice. They are to place the insect in a petri dish for close observation. On their activity sheet for Learning Experience #15 in the Plant And Animal Student Activity Book, students are to draw their insect and label as many parts of their insect as they can.

Show the video "All About Insects" (10 min.) Complete the section of the class chart on insects (pg. 43) and compare insects with the other animal classifications. Ask students to also list what parts are necessary for an animal to be called an insect (three part body: head, thorax, abdomen, and six legs). Students are to look at their insects closely and look for those characteristics specific to insects. If, by chance, a student has chosen a spider, for example, ask students to take turns looking closely at it and compare it to the body parts of an insect. Showing a picture of a spider may be just as effective in showing students that not all of the creatures we see are insects. They must have the necessary parts to be classified as such. See if there is a category of insects from Learning Experience #11. If not, distribute index cards to students and ask them to name some insects.

Students can do additional research on the insect they found to find out more about its life cycle, where

## Learning Experience 15 continued

### Page 2

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it lives, the function of its parts, and how it helps/hurts the environment.

#### **Discussion Questions:**

Is the creature you found an insect? Why or why not?

Can you name various animals that you know are insects?

What are the needs of various insects you know of?

What do insects do in the winter?

How can insects help or hurt the environment?

## Learning Experience 16: Mammals

**Objective:** Students will identify the characteristics of mammals and will model and simulate animal prints and tracks that demonstrate the habits of a particular mammal.

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### **Materials:**

#### **For each pair of students:**

2 Plant And Animals Student Activity Books

Construction paper\*

Scissors\*

#### **For each group (five groups total):**

Track Finder Book

Tape measure

Butcher paper

Metric ruler\*

Glue\*

#### **For the class:**

Video #6 “All About Mammals” (10 min.)

\*provided by teacher/students

### **Preparation:**

Read background information on page 17. It is recommended that time be taken to become familiar with the book Track Finder, before using it in this learning experience. Students will need to be familiar with using a centimeter measuring tape and centimeter ruler for this learning experience.

### **Basic Skills Development:**

Describing

Generalizing

Discussing

Inferring

### **Evaluation Strategy:**

Students will identify the characteristics of mammals and will create models of the print and tracks of mammals and explain their significance in identifying the habits of that mammal.

### **Vocabulary:**

mammal	track	print
habitat	adapt	hind
camouflage	stride	leap
defense	straddle	

*What are the characteristics of mammals?*

### **Session 1:**

Since this is the last category of animals, take a look at the animals listed on the cards students wrote from Learning Experience #11. As a class, list the characteristics that all those animals have in common.

Watch Video #6 - “All About Mammals” (10 min.) Look to see if characteristics listed by the class are those of mammals. Add to the list if necessary:

1. hair/fur
2. four limbs (4 legs – 2 arms/legs)
3. teeth
4. breath with lungs
5. two ears (visible)
6. backbones

### **Discussion Questions:**

What mammals have thick hair/fur? (tigers, dog, rabbit)

What mammals have very little hair? (hippo, whale)

How can hair/fur protect the animal? (warmth, camouflage, defense – thick, sharp hairs of porcupine)

Group the index cards into a mammals category and complete the last column on the class chart. Some of the answers will come from the characteristics list already generated. Make a note of how mammals feed their young milk and care for their young until adulthood as a difference between this animal classification and the others.

# Learning Experience 16 continued

## Page 2

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### **Discussion Questions:**

How are mammals different than other animals?

How do you match up to the list of characteristics of mammals?

Are humans animals? (yes)

What type of animals are humans? (mammals)

How do you know that?

### **Session 2:**

Divide the class into five groups and give each group a Track Finder book. This book illustrates the tracks of mammals in eastern North America. Students should first examine the pictures of the animals in the books and give reason why those animals are considered mammals based on the video and class chart.

Ask students to begin on page 7 of the book. Students are to carefully observe the various types of prints: hoofed animals, long-heeled animals, long-toed animals, canines, digging animals, felines, and weasel. Discuss with students the characteristics of each print and how it tells about the habits of the animal. For example, long-heeled foot, like that of the hare, helps the animal jump or hop. The beaver and otter have webbed qualities to their foot to help it in the water. The black bear have claws on their feet for digging. The squirrel has long toes for climbing. See if any of the mammals written by students on the index cards are in the Track Finder book and discuss how their feet help the animal adapt to its environment.

### **Discussion Questions:**

What are some characteristics you notice about the different prints?

How do these prints help you figure out how the animal moves or its habits?

Does it walk on two legs or four?

What does each animal print tell you about that animal?

How do some of the animal's prints change in snow? (prints are circular without clear toe marks, thick hair grown on bottom of paws.)

The mammal prints on their activity sheet are from those animals on pages 14-21 in the Track Finder book and are drawn to scale. Students are to measure the length and width of each print. As a class, discuss the print sizes and identify the animal for each print. (**Answers to activity sheet:** 1. Red fox (6.5 cm long , 5 cm wide) 2. White tail deer ( 9 cm long, 6.5 cm wide) 3. Moose (18 cm long, 13 cm wide) 4. Coyote (7 cm long, 6 cm wide)

Each group should then be assigned a mammal from pages 14-21 in the Track Finder book and groups will measure and lay out the track for their mammal. Give each group another copy of their print so it can be cut out and traced four times on construction

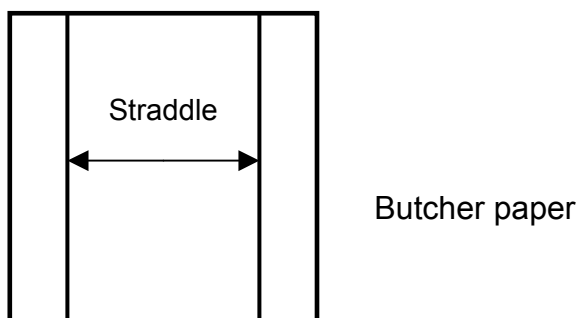
## Learning Experience 16 continued

### Page 3

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paper. If there are two parts to the print, encourage students to not cut them apart. Student are then to label each print as front or back and as left or right. Using the tracks pictured in their Track Finder book, students are to lay out the actual track of the animal they have chosen. Students are to measure how far the prints will be away from each other from side to side (straddle) and how far apart prints are when the animal is walking (stride). Student groups can practice by measuring their own straddle and stride (pace). They can do this by asking each person to stand with their feet together, then take a step forward. The person who has taken the step is to stand still while the others in the group measure the width between the feet (straddle) and how long the distance is from the toe of the foot in front from the toe of the foot in back (stride). All measurements are to be done in centimeters. Their straddle and stride can be recorded on the activity sheet for Learning Experience #16 in the Plants And Animals Student Activity Book.

When students are ready to measure the track of their animal, it is suggested that groups focus on the straddle of the mammal first. They are to measure the distance of the mammal's straddle on their butcher paper and then draw two straight lines down the paper. The prints will eventually be glued somewhere on those two lines.



All the animals that student groups are working with are “perfect walkers” (page 14-21). Since they are perfect walkers, the distance between each print (stride) will be the same. Identify the mammal's stride in centimeters from the Track Finder book. Then students can place the first left hind print on the bottom of the left line. They can then measure from the top of that print to the top of the right hind print on the right. Once they find the distance that equals the animal's stride, they can then glue the prints down on the paper (on the lines).

Measuring the same length from the top of the right hind print to the top of the front, left print and glue the front, left print on the paper. Finally, measure from the top of the front, left print to the top of the front, right print. All prints are equal in distance because these animals are “perfect walkers”.

## **Learning Experience 16 continued**

### **Page 4**

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Be sure students label their track with the name of the animal. Post each animal's stride and compare them to one another and to the student's straddle and stride in the classroom. Additional activities could be completed with students mapping out the tracks of the bounders (page 24-31), the leapers and hoppers (page 33-45), the walkers (page 47-59). Those are more challenging.



## Learning Experience 17: Tracing Your Own Tracks

**Objective:** Students will create a model of their hand print, including fingerprints and classify their fingerprints according to the classifications of arch, loop and whorl.

### **Materials:**

#### **For each student:**

Plant And Animals Student Activity Book

Triple lens magnifier

Pencil\*

Paper towel\*

21.5 cm x 27.9 cm (8 ½" x 11) white paper\*

Metric rulers\*

#### **For each group of three students:**

Scratch paper\*

#### **For the class:**

Roll scotch tape

Chart paper\*

Felt tip markers\*

\*provided by teacher/student

### **Preparation:**

Modeling for students how to take their fingerprint may be necessary.

### **Basic Skills Development:**

Classifying

Observing

Discussing

Gathering & Organizing Data

Interpreting Data

Describing

### **Evaluation Strategy:**

Students will create a model of their hand print and classify their fingerprints according to three main categories (arch, loop, whorl).

### **Vocabulary:**

fingerprint                      pattern

arch                                whorl

loop

formula

classification

*How do human (mammal) tracks compare?*

Begin this learning experience by asking students to think about when a mammal called a human makes tracks? (shoes make tracks in snow, dirt, mud, feet make tracks in sand, fingerprints)

### **Discussion Questions:**

What do you notice about the inside top of your fingers?

How does your observation compare with that of your partner?

What are fingerprints?

Do you think people's fingerprints are all the same or different?

Do you think all the prints on your hand are similar or different?

Have you had your fingerprints taken?

When and why?

Why do people have their fingerprints taken?

Why do you think prints are taken from fingers instead of another part of the body?

Can you think of another part of the body in which getting a print of it might be helpful? Explain?

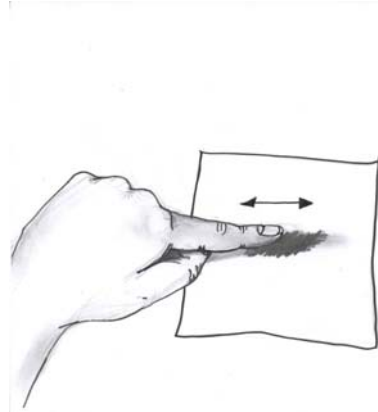
Ask students on their activity sheet for Learning Experience #17 in the Plant And Animal Student Activity Book to trace their right hand, and on page 2 of the activity sheet, ask students to trace their left hand. Demonstrate for students how to take their fingerprints. Page 3 of the student activity sheet also provides direction. Using a number 2 pencil, rub a small patch of graphite onto a piece of scratch paper. Rub your finger back

## Learning Experience 17 continued

### Page 2

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and forth across the graphite. Be sure the area between the tip and the bend in the first knuckle on the finger is blackened, not the tip. Use a piece of magic tape to “lift” the fingerprint from the finger.



Place the magic tape on the correct finger of the hand they traced in the activity sheet. A print is to be taken for each finger on both hands. A damp paper towel will help with clean up and will help keep the magic tape from being smudged.

If the fingerprints are too dark, they will be difficult to read. Using the same graphite patch for all fingers will help keep this from happening. Students may want to make a few practice prints on scratch paper before they actually place them on their activity sheet. Once students make a clear print of each of their fingers on both hands, they can stick them on the corresponding finger of the hand drawing on their activity sheet.

Ask students to closely examine their fingerprints with a triple lens magnifier and make note of observations. Students can get into pairs or groups of three, switch papers, and

# Learning Experience 17 continued

## Page 3

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examine the prints of group members. Students can then share words that describe the patterns of the lines in the fingerprints. Record descriptions on chart paper. Student responses may include rainbow shaped, shaped like a “bulls eye”, looks like a maze, swirling, circular, etc.

### **Discussion Questions:**

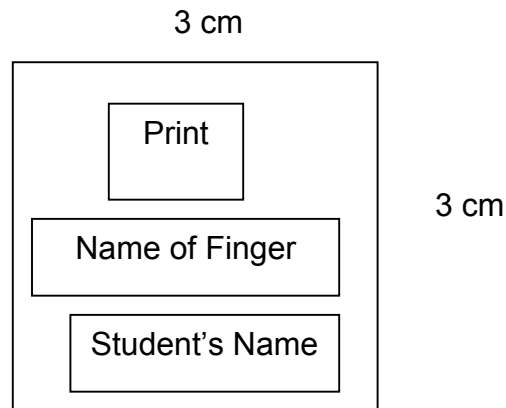
What patterns do you observe in your prints? Prints of group members?

How would you describe the prints?

Are any of the prints the same? Are they all unique? (every person has a unique set of fingerprints, unlike anyone who has ever lived)

### **Session 2:**

Ask students to measure and cut out five 3 cm x 3 cm squares of paper. Students are to, again, make a print of each finger on their right hand and place the tape on one of the five squares. Students should label each print with the name of the finger it represents. (thumb, index, middle, ring, little) and their name.

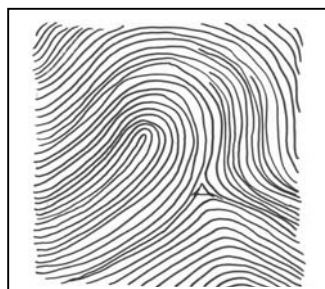


Students should check to see that the prints are clear prints. Students are to get into groups of three and place all their prints on the desk. They are to group the prints by similar characteristics. Have students share why they grouped them the way they did (“This group looks like circles”, “This group looks like waves”). Ask students to look at the pictures of the three main fingerprint type on page 4 of their activity sheets for Learning Experience #17 in the Plant And Animals Student Activity Book and define each.

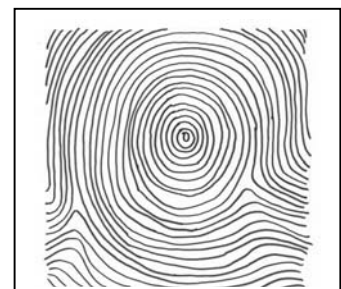
**Arch**



**Loop**



**Whorl**



# Learning Experience 17 continued

## Page 4

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Arches – have lines that start on one side, rise, and exit on the other side of the print.

Loops – have lines that enter, rise, and exit on the same from which it started.

Whorls – have circles that do not exit on either side of the print.

Ask students to now compare the three categories and the categories they generated to come up with a match. Some prints may fit into more than one group. They can then decide in what group most of the lines fall into and place it in that group. As a class, graph the number of each type of print for each finger. A graph can be made with colored markers or students could place their 3 x 3 squares on top of each other in each category to create a vertical bar graph. See sample graph below.

### **Discussion Questions:**

What categories did you place the prints in?

How did your categories match with the three main categories (arch, loop, whorl)?

Are there any prints that could fit in more than one group?

What do you notice about the results on the class graph?

What are the most common? Least common?

Have students now go back to their activity sheet and identify the name of the prints on their left hand and label those prints on the activity sheet. Students can then come up with their fingerprint formula from thumb to little finger. For example, if from thumb to little finger the prints are a loop, arch, arch, loop, and a whorl, the fingerprint formula would be L-A-A-L-W. Students can trade their activity sheets to look at each other's classifications and discuss disagreements on classification. Students can then share their fingerprint formulas with the class.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Plants & Animals Student Assessment

Directions: Read the question carefully and answer based on your knowledge about plants and animals. Circle the correct answer.

1.) Which part attracts birds and insects who, in turn, help the plant to reproduce.

- A.) Stem
- B.) Roots
- C.) Leaf
- D.) Flower

2.) Which part carries water and minerals to the leaves?

- A.) Stem
- B.) Roots
- C.) Leaf
- D.) Flower

3.) Which part collects water and minerals from the soil?

- A.) Stem
- B.) Roots
- C.) Leaf
- D.) Flower

4.) Which part uses sunshine to make food for the plant?

- A.) Stem
- B.) Roots
- C.) Leaf
- D.) Flower

5.) Which part holds the plant in the ground?

- A.) Stem
- B.) Roots
- C.) Leaf
- D.) Flower

6.) Which word do we use when a seed sprouts and begins to grow?

- A.) Photosynthesis
- B.) Plant
- C.) Germination
- D.) Flower

7.) You need to feed your pet dog, but you do not need to feed your plant? Why?

- A.) Plants are not living things.
- B.) Plants get food from the air.
- C.) Plants only need water.
- D.) Plants make their own food.

8.) Which part stores food for a seed?

- A.) Cotyledon
- B.) Seed coat
- C.) Embryo
- D.) Soil

9.) A \_\_\_\_\_ holds seeds for a new plant.

- A.) Leaf
- B.) Fruit
- C.) Root
- D.) Petal

10.) Water, wind, and people/animals are all examples of \_\_\_\_\_.

- A.) How seeds sprout
- B.) How plants grow
- C.) How seeds travel
- D.) Living things

11.) Which of the following are useful for identifying a type of tree?

- A.) Bark
- B.) Leaf
- C.) Tree Finder book
- D.) All of the above

12.) Which word describes a tree that stays green all winter?

- A.) Maple
- B.) Trunk
- C.) Bush
- D.) Evergreen

13.) You are likely to find a bud on a \_\_\_\_\_.

- A.) Twig
- B.) Leaf
- C.) Animal
- D.) Root

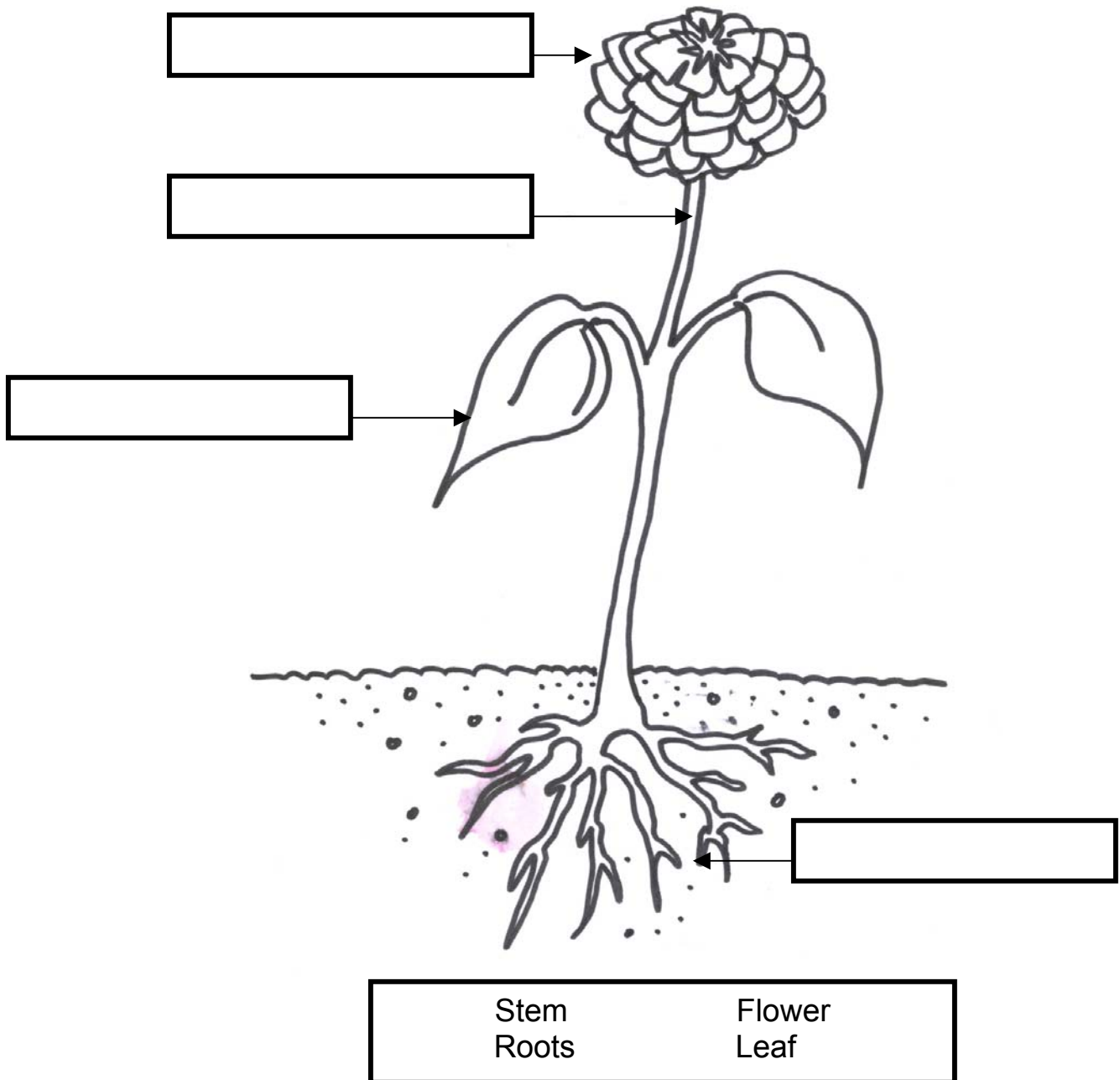
14.) You can group animals best by thinking about their \_\_\_\_\_.

- A.) Mammals
- B.) Reptile
- C.) Fish
- D.) Insect

15.) An animal with a head, thorax, and abdomen is an \_\_\_\_\_.

- A.) Mammal
- B.) Reptiles
- C.) Fish
- D.) Insect

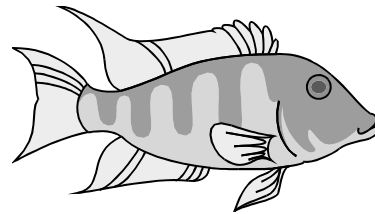
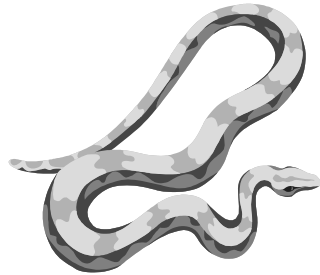
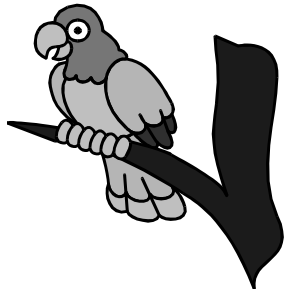
Use the words in the box to label the picture.





16.) Cut out pictures on the next page and paste them in the correct boxes.  
Write two characteristics for each animal group.

<p style="text-align: center;">Fish</p>     <p>1. _____ 2. _____</p>	<p style="text-align: center;">Mammals</p>     <p>1. _____ 2. _____</p>
<p style="text-align: center;">Insects</p>     <p>1. _____ 2. _____</p>	<p style="text-align: center;">Reptiles</p>     <p>1. _____ 2. _____</p>
<p style="text-align: center;">Birds</p>     <p>1. _____ 2. _____</p>	<p style="text-align: center;">Amphibians</p>     <p>1. _____ 2. _____</p>



## **Plants and Animals Student Assessment Key**

1. D
2. A
3. B
4. C
5. B
6. C
7. D
8. A
9. B
10. C
11. D
12. D
13. A
14. C
15. D
16. flower
17. stem
18. leaf
19. roots
20. answers will vary

## **MORE IDEAS**

### **Language Arts**

- ◆ Create a book of the bean plant's growth.
- ◆ Write a poem about the leaves or flowers.
- ◆ Write a story about a root's search for water.
- ◆ Create a twig book on its development through the year.
- ◆ Go on a scavenger hunt for specific types of flowers, leaves, etc.
- ◆ Sequence the day in the life of a dandelion flower.
- ◆ Read the story "Jack and the Beanstalk" to students and ask students to write a story about the bean plant in this format.

#### **Book suggestions:**

Beans (Plants Growing & Changing) by Gail Saunders-Smith

Dandelion Adventures by L. Patricia Kite

The Dandelion Seed by Chris Arbo

Eyewitness Explorers: Flowers by David Burnie

From Acorn to Oak Tree (How Things Grow) by Jan Kottke

From Seed to Dandelion (How Things Grow) by Jan Kottke

Honey Bees & Flowers by Lola M. Schaefer

How a Seed Grows by Helene Jordan

Autumn Leaves by Ken Robbins

About Mammals: A Guide for Children by Cathryn P. Sill

Amazing Mammals by Alexandra Parsons

The Care and Feeding Fish by Sarajo Frieden

Fish (First Discovery Book) by Sabine Krawczyk

About Reptiles: A Guide for Children by Cathryn P. Sill

All About Frogs by Larry Block

All About Turtles by Jim Arnosky

About Birds: A Guide for Children by John Sill

The Adventures of Pelican Pete: A Bird is Born by Frances Keiser

Amazing Birds by Alexandra Parsons

### **Art**

- ◆ Make a collage of things that come from plants.
- ◆ Make a leaf collection by mounting them on cardboard.
- ◆ Cover various leaf patterns with tempera paint and "stamp" the leaf pattern to decorate paper or fabric.
- ◆ Make potato prints with tempera paint.
- ◆ Use fingerprints as bodies of various insect pictures.

### **Social Studies**

- ◆ Discuss the world of agriculture with students.
- ◆ Discuss the types of plants that have been important to our history.
- ◆ Research the crops found in New York State.

### **Math**

- ◆ Create a growth graph of the students in the room.
- ◆ Find the measurements of the various animals in the categories and measure out their actual length for students to see.
- ◆ Count the number of leaves brought in by students by two's, five's, ten's.

### **Science**

- ◆ Make a plaster cast of an animal print. Clean the area around the print and print itself with a paint brush. Surround the print with a piece of firm plastic and enclose the print in the middle of the area. Mix Plaster of Paris with water to a thick cream consistency and pour it into the track. Allow the plaster thirty minutes to harden. Remove the plastic from around the print. Remove the cast and allow it to dry for 24 hours. Clean again with a brush.
- ◆ Invite a police investigator to come in and discuss fingerprinting classification.
- ◆ Ask students to compare their prints to those of their siblings and parents to see if fingerprints are inherited.
- ◆ Research information on bees and how they help/hurt our environment.
- ◆ Open dicot seeds or monocot seeds and compare them to the bean seed used in the kit.
- ◆ Try growing seeds from fruits and vegetables.
- ◆ Try growing a plant from the cutting of another plant.
- ◆ Look closely at the parts of a dandelion. The dandelion flower's head is actually made up of individual flowers.
- ◆ Plant a sampling or small evergreen as a class project.

### **Health**

- ◆ Discuss how to protect skin from different types of harm and create a model of the different layers of skin.
- ◆ Research the nutritional benefits of some of the plants we eat.

## **INQUIRY AND PROCESS SKILLS**

Classifying	Arranging or distributing objects, events, or information in classes according to some method or system.
Communication	Giving oral and written explanations or graphic representations of observations.
Creating Models	Displaying information by means of graphic illustrations or other multi-sensory representations.
Formulating Hypothesis	Constructing a proposition or assumption of what is thought likely to be true based on reasoning, which serves as a tentative testable theory.
Gathering & Organizing	Collecting information about objects and events which show a specific situation.
Generalizing	Drawing general conclusions from information.
Identifying Variables	Recognizing the characteristics of objects or events which are constant or change under different conditions.
Inferring	Making a statement or conclusion based on reasoning or prior experience to explain an observation.
Interpreting Data	Analyzing information that has been collected and organized by describing apparent patterns or relationships in the information.
Making Decisions	Choosing an alternative from among several and basing the judgment on defensible reasons.
Manipulating Materials	Handling or treating materials, equipment or procedures skillfully and effectively.
Measuring	Making quantitative observations by comparing to a standard.
Observing	Becoming aware of an object or even by using any of the senses to identify properties.
Predicting	Making a forecast or estimate of what future events or conditions may occur.

## **GLOSSARY**

Abdomen:	the lower portion of an insects body, below the thorax.
Adapt:	to adjust to new conditions.
Amphibian:	an animal that lives on land and in the water.
Animal:	a living being that moves on its own.
Aquarium:	a tank in which living aquatic animals or plants are kept.
Arch:	a name given to a fingerprint pattern that has lines that start on one side, rise, and exit on the other side of the print.
Bark:	the outer covering of a woody stem, branch, and root of a plant.
Beak:	the mouth part of a bird used for cracking seeds, catching insects.
Bill:	the mouth part of a bird, slender in nature, used for catching fish or extracting nectar.
Bird:	a warm blooded vertebrate that is covered with feathers and limbs that are wings.
Bud:	a growth on a plant that develops into a flower, leaf, or branch.
Camouflage:	the disguising of things so as to not be seen by a predator.
Carbon dioxide:	a gas present in the atmosphere and exhaled by the body.
Characteristic:	a feature.
Chlorophyll:	the green coloring of leaves and plants needed for photosynthesis.
Classify:	to arrange or organize into groups.
Cold-blooded:	animals such as fish and reptiles whose body temperature changes due to their surroundings.
Compare:	to examine for similarities or differences.
Cone:	the fruit of the conifer (pine, fir, etc.)
Conifer:	a cone-bearing evergreen tree or shrub (pine).

Contrast:	to compare to show differences.
Cotyledon:	the part of a seed containing stored food, used by the embryo for its initial growth (food).
Deciduous:	trees that shed their leaves every year.
Defense:	to protect/resist against attack.
Edge:	the side of a leaf blade.
Embryo:	the small plant contained in a seed.
Evergreen:	trees that have green leaves through the entire year.
Feathers:	one of the structures that form a bird's covering.
Fibrous root:	a system of roots that consists of many branching roots that grow from the bottom of the stem.
Fingerprint:	an impression made of the inner surface of the fingertip.
Fins:	an organ on the body of fish used for swimming, steering, and balance.
Fish:	an aquatic, cold-blooded vertebrate having gills, fins, and scales.
Flower:	the part of a seed plant that includes the reproductive organs.
Formula:	parts of a compound shown in symbols
Fruit:	developed ovary of a seed plant.
Function:	purpose for which something is designed or exists.
Galls:	abnormal growth on a plant caused by insects, fungi, or bacteria.
Germinate:	to begin to grow, the sprouting of a seed.
Gills:	breathing organ of a fish.
Growth ring:	rings on the inside of a tree trunk or twig that shows its years of growth. One ring – one year.
Habitat:	the natural environment of a plant or animal, where its basic needs are met.



Hind:	in the rear or back.
Insect:	a segmented vertebrate with a body divided into three parts (head, thorax, abdomen, and three pairs of legs and two wings).
Lateral bud:	buds found on the sides of twigs that open when the terminal bud is pruned or damaged.
Leaf:	green part of the plant that makes food for the plant with sunlight, water, and carbon dioxide.
Leaf scars:	scars left on the twigs of tree when they fall off each year.
Leap:	to spring from one point to another.
Lenticles:	air holes found on the side of a twig.
Loop:	a name given to a fingerprint pattern that has lines that enter, rise, and exit on the same side from which it started.
Mammal:	a group of vertebrate animals that feed their young with milk from the female mammary glands. Human beings are classified as mammals.
Midrib:	the central or middle vein of a leaf.
Needle:	a needle shaped leaf found on a conifer.
Observe:	to see or notice.
Ovary:	contains the seeds of the plant, develops into a fruit to protect a seed.
Ovule:	contains the female germ cell that develops into a seed after germination.
Oxygen:	a gas found in the atmosphere, release oxygen as a by-product.
Pattern:	behavior of a person or thing.
Petal:	one segment of the corolla of a flower.
Pistil:	female organ of the flower that produces the seed for the plant.
Plant:	a living organism that grows in the ground that makes its own food through photosynthesis.

Pollen:	powdery grains that are the male reproductive cells of a flowering plant.
Pollination:	occurs when the pollen from the flower's stamen comes in contact with the pistil of the flower.
Print:	a mark made by the pressure of one object on another.
Root:	underground part of a plant used to support the plant and gather food and water from the soil.
Reptile:	a cold-blooded scaly vertebrate, such as a turtle, lizard, or snake.
Scales:	a thin, flat, plates covering certain animals, as fish, snakes, and lizards.
Seed:	the fertilized and ripened small body produced by a flowering plant containing the embryo capable of producing a new plant.
Seed coat:	the skin or coating of a seed.
Seedling:	a seed that has germinated and become a young plant.
Sepals:	one of the leaf-like parts of the outermost group of floral parts, mostly green in color.
Spiracles:	a hole for breathing on the abdomen of an insect.
Stamen:	male organ on the flower that produces pollen.
Stem:	the part of the plant that provides support for the leaves and flowers, stores food, and acts as a pathway for liquids to move up and down the plant.
Stigma:	hollow, sticky opening that connects to the ovary, usually found in the center of the flower.
Straddle:	to stand or sit with leg(s) on each side.
Stride:	the distance covered by a step.
Strategy:	a plan for reaching a goal.
Structure:	the manner in which the parts of anything are organized.
Sunlight:	the direct light of the sun.

Tap root:	large central root of a plant that grows deep into the soil.
Terminal bud:	buds that grow at the end of a twig.
Thorax:	the portion of an insect's body between the head and abdomen.
Track:	a mark or series of marks left by a person, animal, or object in passing.
Travel:	to move about.
Trunk:	the main stem of the tree.
Tuber:	rounded outgrowth of an underground stem, such as a potato.
Twig:	branch of a tree.
Vein:	a strand of tissue forming the framework of a leaf.
Warm-blooded:	having a blood temperature that remains constant regardless of the temperature of the surroundings.
Whorl:	a name given to a fingerprint pattern that has circles that do not exit on either side of the print.

## **TEACHER REFERENCES**

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Plant Growth & Development. Natural Science Resource Center. National Academy of Sciences. 1991.

Animals. Primary Science Discovery Series, Weber Costello. 1980.

### **Media Library**

Call the media library to order media materials and to check on new materials that are available. The number to be reached is (716) 376-8212.

### **Web Sites**

<http://encarta.msn.com/index/conciseindex/55/055E5000.htm>

<http://www.geocities.com/Yosemite/Rapids/7076>

<http://www.vusd.solanocoe.K12.ca.us/Cooper/Intranet/science/animals.htm>

<http://www.quia.com/jg/2205.html>

<http://au.yahoo.com/Science/Biology/Botany/Plants/>

<http://tqjunior.thinkquest.org/3715>

<http://www.proteacher.com/110013.shtml>

<http://www.powerup.com.au/~rdale/seeds.htm>

<http://www.abs.sdstate.edu/hort/carter/seed.htm>

<http://www.school.discovery.com/lessonplans/programs/scatteringseeds/index.html>

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