

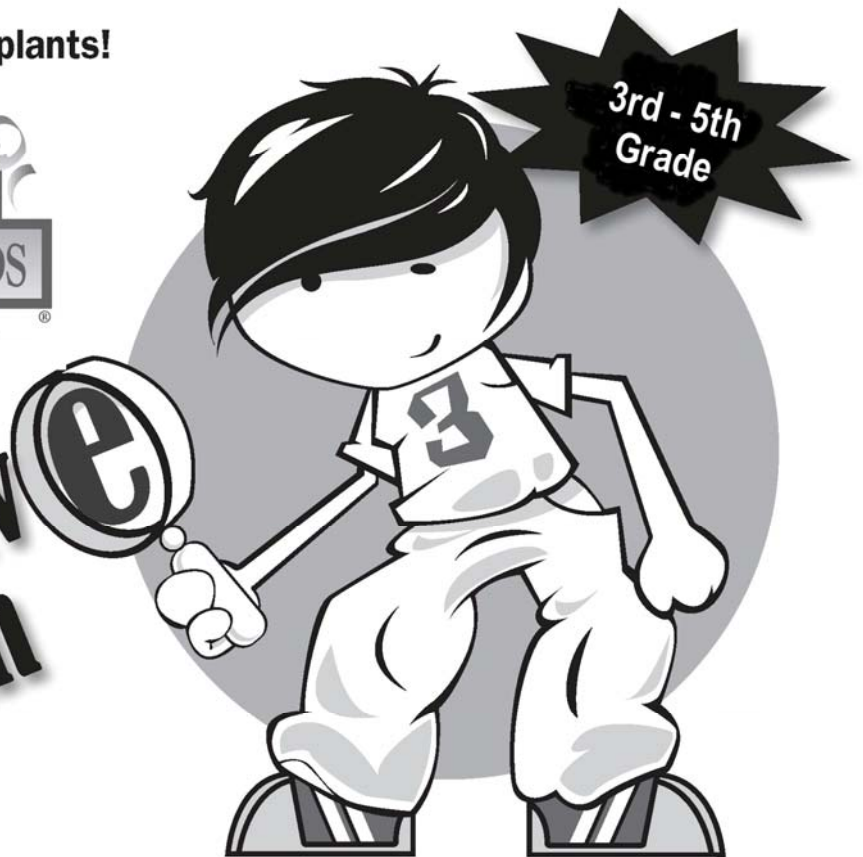
Activity Sheets

Adventure into the world of plants!



3rd - 5th
Grade

**The
Investigative
Program**



Name: _____ Date: _____

Pollination Activities

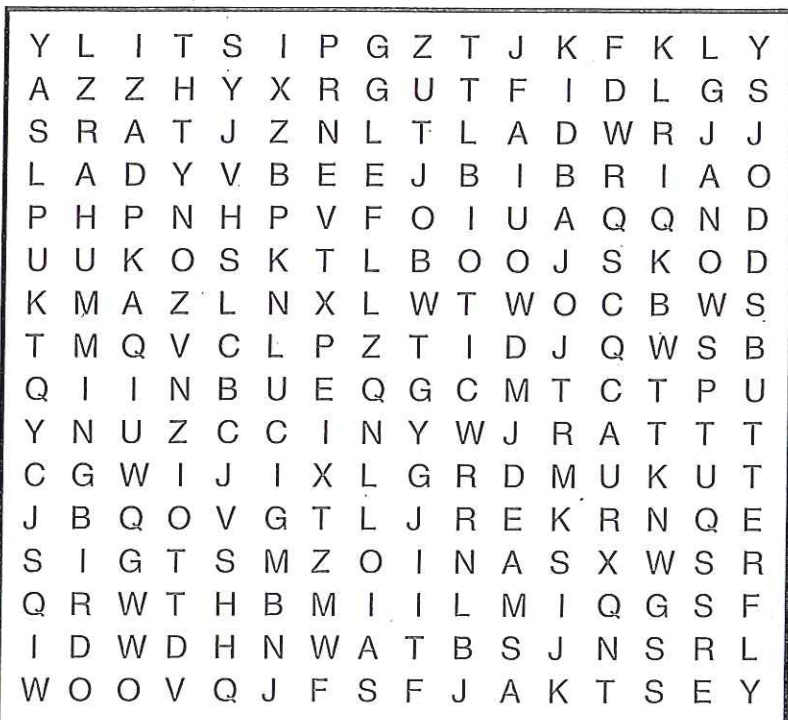
Directions: Make a list of plants that are self-pollinators and a list of plants that are cross-pollinators. Use the Internet or other sources to identify the types of plants for each list.

Self-Pollinators (pollination in one plant)

Cross-Pollinators (pollination requires another plant)

Directions: Find and circle the words associated with pollination in the word search puzzle below. Words may be printed forward, backward, vertically, horizontally, or diagonally.

abiotic
bat
bee
biotic
butterfly
hummingbird
pistil
pollen grains
stamen
wind



Answers to Activities:

Identify the Parts of a Flower (page 4)

1. anther
2. stigma
3. corolla (petals)
4. filament
5. stamen
6. pistil
7. style
8. calyx (sepals)
9. ovary

Plant Cell Matching (page 5)

1. D
2. H
3. C
4. K
5. I
6. Q
7. L
8. R
9. O
10. F
11. G
12. M
13. A
14. J
15. P
16. N
17. E
18. B

Pollination Activities (page 6)

Plant lists will vary.

Some examples are shown.

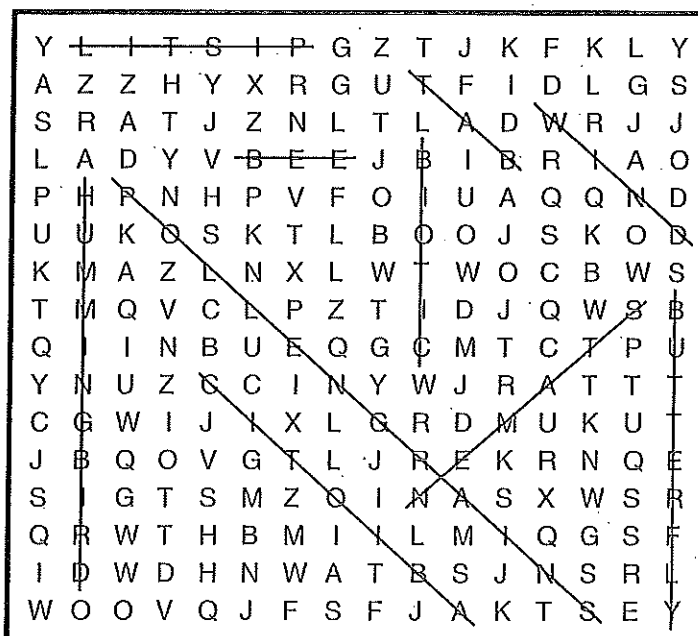
Self-Pollinators

peanuts
peaches
peas
lettuce
tomatoes
snap beans
eggplant
strawberries

Cross-Pollinators

apples
holly
asparagus
sweet cherries
pears
plums
cabbage
radishes

Word Search

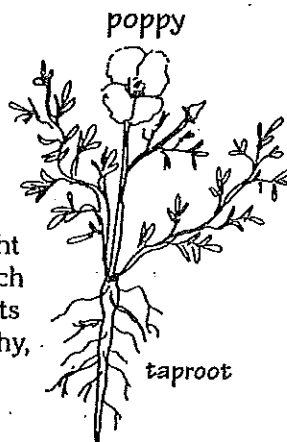
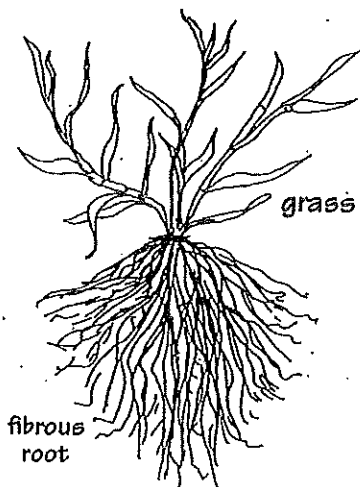


Plant Structure Facts

Roots

Roots serve several purposes. They anchor the plant to the ground. Numerous fine root hairs absorb water and minerals from the soil needed for plant growth. In some plants, roots store food for plant use.

There are two main types of root systems—fibrous and taproot. The fibrous root system is a mass of branching roots spreading in all directions from the base of the stem. More of a plant's mass is often below ground than above ground. Most monocots, such as grasses, have a fibrous root system; so do weeds.

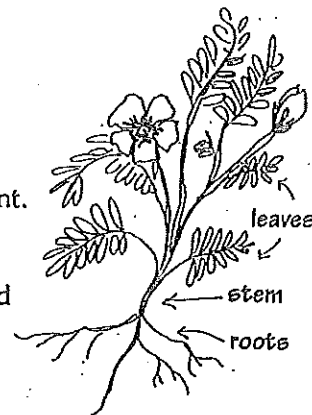


The taproot system has one large root growing straight downward, with smaller branch roots growing from it. Taproots that become swollen and fleshy, like carrots, store food for the plant. Most dicots have a taproot system.

People use roots as a source of food. Carrots, beets, sweet potatoes, radishes, turnips, rutabagas, parsnips, and cassava (tapioca) are all root foods. Spices such as sassafras, sarsaparilla, and licorice are obtained from roots. Other root products include drugs, insecticides, dyes, and poisons.

Stems and Twigs

The stem supports the leaves and flowers of a plant. It also transports the water and minerals to the rest of the plant. Water is absorbed by the roots and moves up through the narrow xylem tubes in the stem to the leaves and flowers.



Transpiration is the evaporation of water from the stomata—tiny openings on the surface of the leaves. The loss of water through the stomata helps pull up more water from the roots.

Almost all plants have stems. They can vary in size from the extremely short stem of a lettuce plant to the towering trunk of a redwood tree.

Stems that people eat include celery, asparagus, bamboo shoots, and rhubarb. White potatoes are swollen underground stems called tubers. Sugar is extracted from sugar cane stems. Maple sugar comes from the sap in maple tree trunks.

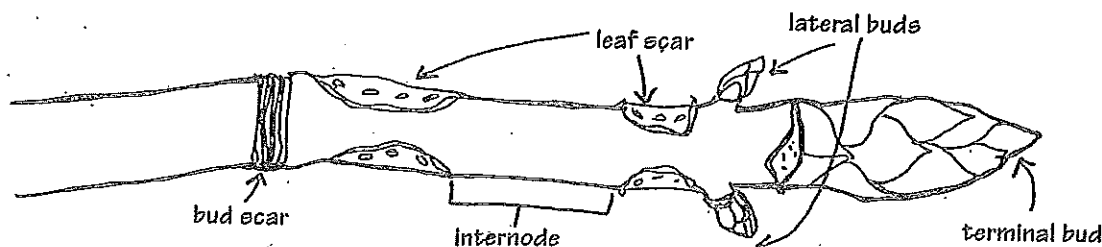
A tree adds new growth at the tip of each branch and twig. Trees can be identified during dormancy by the shape and the arrangement—opposite, alternate, or clustered—of the buds and accompanying leaf scars on the twigs and also by the bundle scars.

The terminal bud at the tip of a stem is protected by bud scales during winter dormancy. When the bud begins its spring growth, these scales are shed, leaving bud scale scars that circle the stem. The terminal bud adds height to a tree.

Lateral buds grow on the sides of the stem. They contain shoots that develop into lateral leaf-bearing twigs.

The places on the stem where leaves are attached and lateral buds develop are called nodes. The space between two nodes is an internode. The length of the internode depends on growing conditions.

The leaf scar, where the leaf was attached to the twig, has small, raised dots called bundle scars. The dots are the ends of the xylem tubes.



Label the Insect

Read the definitions, then label the diagram below.

Definitions

Abdomen - The abdomen is the segmented tail area of an insect that contains the heart, Malpighian tubules, reproductive organs, and most of the digestive system.

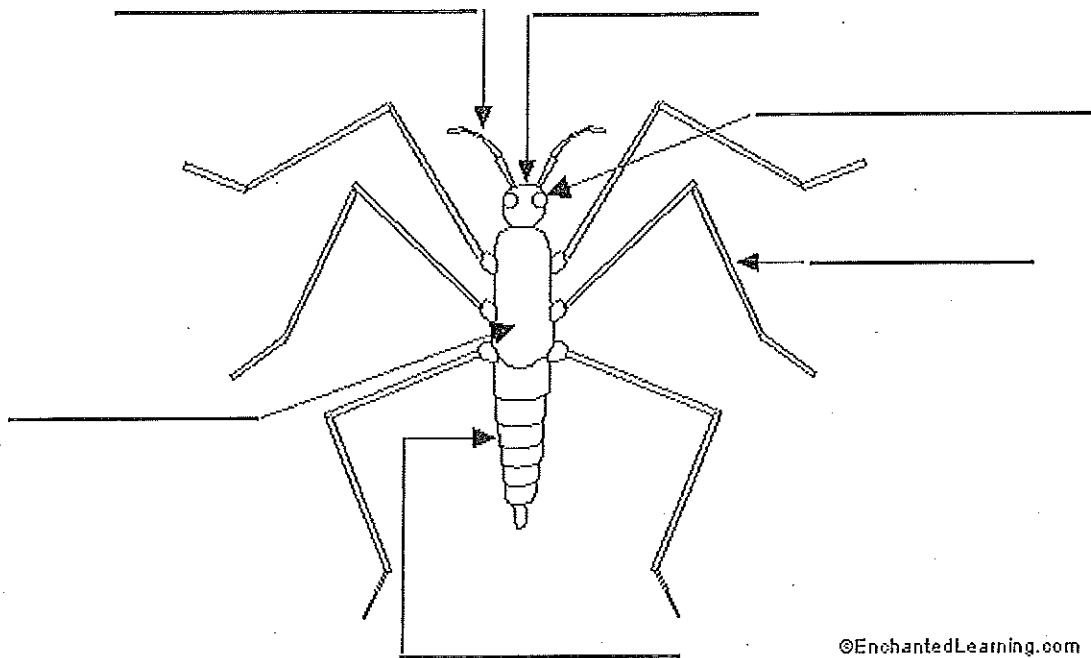
Antenna - An antenna is a sensory appendage that is attached to the head of adult insects. Antennae are used for the sense of smell and balance. Insects have two antennae.

Compound Eye - Insect compound eyes are made up of many hexagonal lenses.

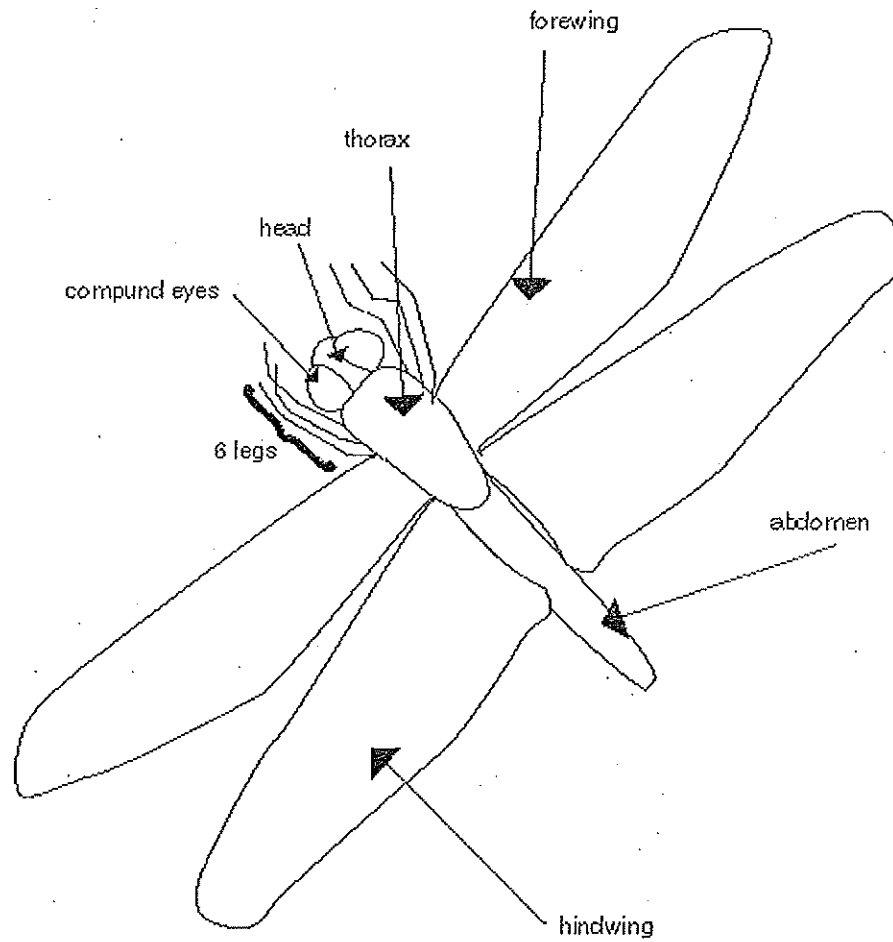
Head - The head is the part of the insect that contains the brain, two compound eyes, the proboscis, and the pharynx (the start of the digestive system). The two antennae are attached to the head.

Leg - All adult insects have six legs.

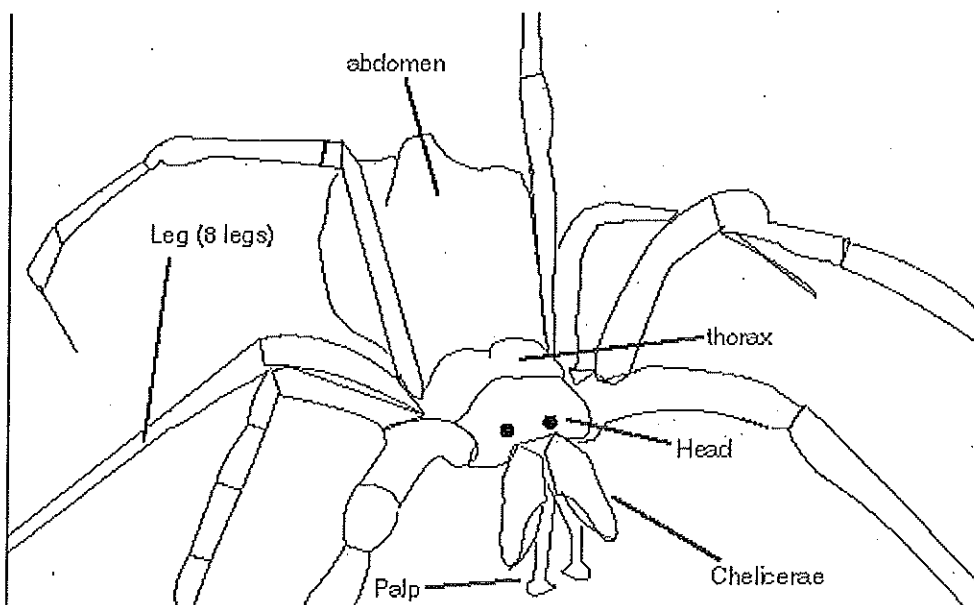
Thorax - The thorax is the body section between the head and the abdomen. The legs attach to the thorax.



BASIC INSECT ANATOMY DIAGRAM

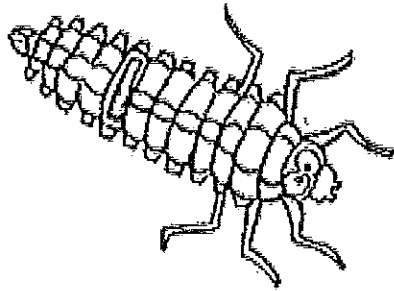


BASIC SPIDER ANATOMY DIAGRAM

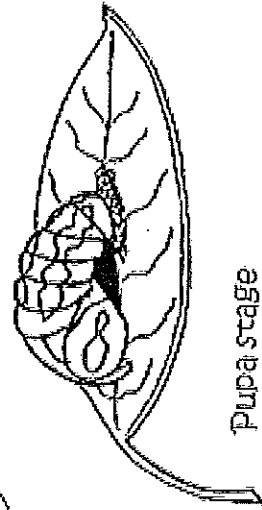


Color Me!

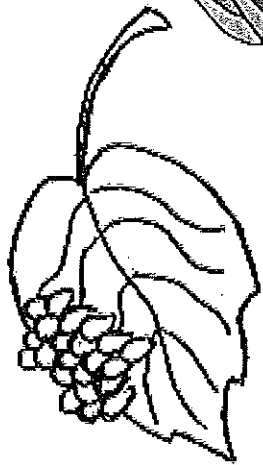
Watch me
Grow from
Larva to Beetle!



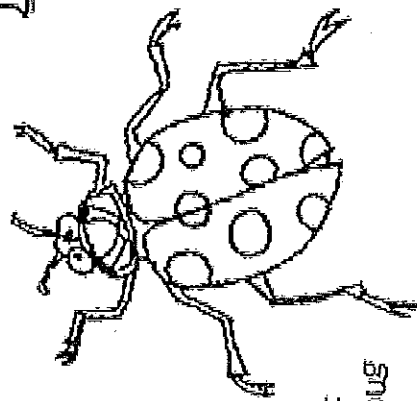
Larval stage
5-7 Days



Pupa stage
7 Days

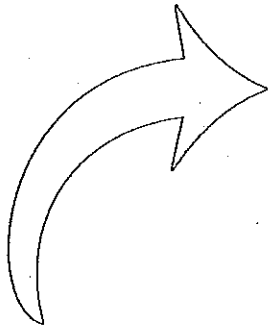


Egg stage
2-5 Days

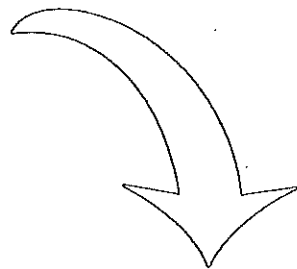


Adult
Ladybug

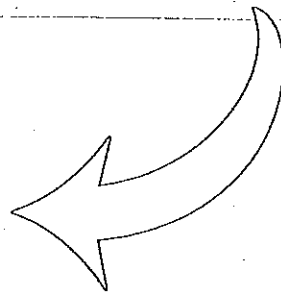
Ladybug Life Cycle



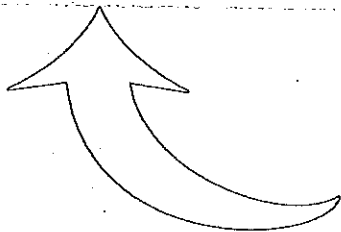
Stage 1:



Stage 2:



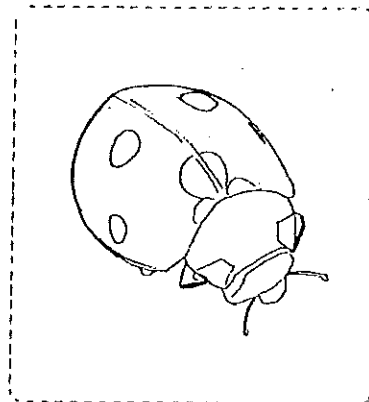
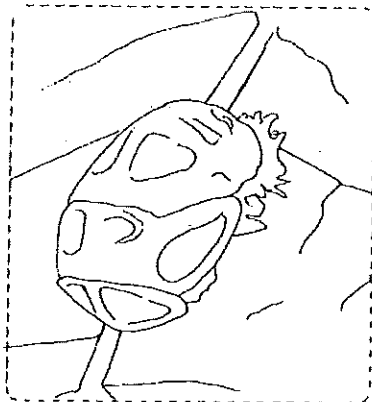
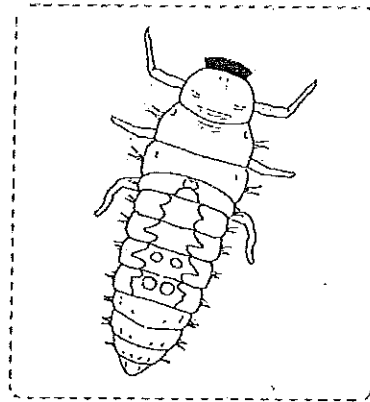
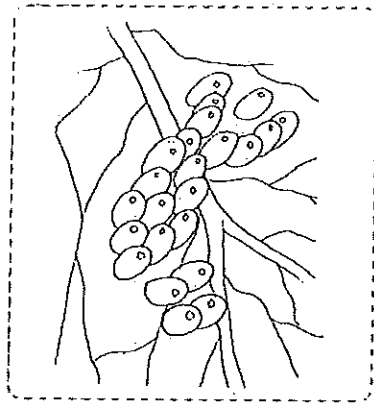
Stage 3:



Stage 4:

Instructions:

1. Color the ladybug life cycle pictures below.
2. Cut out the pictures on the dotted lines.
3. Glue them to the white rectangles on the Ladybug Life Cycle chart on page one to show the correct order of a ladybug's life cycle.
4. Write the name of each stage in the correct spots (these are the names of the stages: adult, larva, egg, pupa).



Guide to Small Common Schoolyard Animals

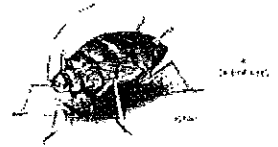
Ants

You can easily see the three main body parts of this common insect – head, thorax, and abdomen. During warm weather you might find ants with wings, as they mate and travel to start a new colony. Ant colonies usually have thousands of workers and guard ants, so if you find one ant there are certain to be many more. *Follow an ant trail back to the colony.*



Aphids

These tiny, round, soft-bodied insects suck plant juices for food. Aphids have wings at certain times of the year. Usually green, aphids can also be black or brown, and may be tended by ants that “milk” the aphids to get the sweet plant juices. *If you find aphids, look for worker ants visiting and tending the “farm.”*



Bees, Yellow Jackets, and Small (non-stinging) Wasps

Honeybees and bumblebees normally will not bother quiet observers unless their hive or nest is disturbed. Beware of aggressive yellow jackets; they will sting if you swat at them. If you find one of their gray paper nests, avoid it and immediately tell your teacher.



There are many species of small, harmless, narrow-waisted wasps that can be found in vegetation around buildings. Many are parasites of other insects, and help reduce the numbers of plant-eaters such as caterpillars. Some insert their eggs into a leaf or twig, creating a gall or growth on the plant that protects the growing larvae. *If you find several galls, ask your teacher’s help in opening one.*



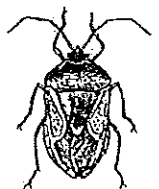
Beetles

Many interesting kinds of beetles can be found around schoolyards. They are all hard-bodied and many have spectacular colors and designs. They have two pairs of wings, but the top wings form an armor-like shell over the soft, inner flying wings. Some beetles are predators, some eat plants, and others are scavengers. *There are more than 30,000 different kinds of beetles in North America. How many different kinds of beetles can you find?*



Bugs-these are True Bugs!

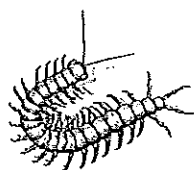
This large group of insects resemble flattened beetles and come in many beautiful colors and sizes. The wings fold flat across the back usually forming an “X” pattern. They have sucking/piercing mouth parts that look like a small straw under the head. *Use a magnifier to examine how the upper wings are half leathery and half membranous.*





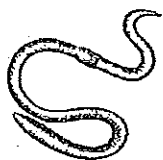
Butterflies and Moths

These have four large wings that are covered with tiny iridescent scales. Many of their larvae, or caterpillars, are well camouflaged as they munch on leaves. **Some have stinging spines and itchy hairs, so just look - don't touch.** Most moths are active at night and hide in vegetation during the day. The common Lawn Moth has slender wings that are usually folded against its body when at rest. The tiny caterpillars of these moths feed on stems or roots of grass. *If you find a caterpillar, look for its six legs near the head that will become its adult legs. How many other "larvae legs" does it have?*



Centipedes

Don't pick up these fast moving, worm-like animals-they can sting and bite! The many-legged centipedes hide under leaves and logs and prey on small soil animals. They are crustaceans, and have two large antennae and two large sensors at their back end.



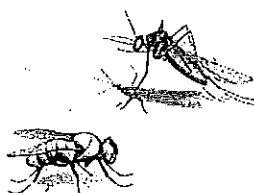
Earthworms

Earthworms are segmented and have a light-colored band around the body about one-third of the way down the body, near the head. They feed on decaying plants, and are a very important soil builder. *Look for earthworms after a rain, crawling across walkways. Once you have observed them, return them to the safety of some leaf litter or lawn.*



Earwigs

Earwigs hide during the day under leaves and debris, and then come out at night to feed on dead leaves, fruits and petals. The females protect their eggs and feed their nymphs until they are strong enough to find their own food. *Earwigs don't go into people's ears, but how do you think they might have gotten their name? Find out more about earwigs at your library.*



Flies, Gnats, Mosquitoes, and Craneflies

Flies have only one pair of transparent wings. Many fly larvae feed on decaying vegetation and mushrooms in the soil, recycling Nature's waste. *Use a magnifier to locate the tiny knobs (halteres) behind the wings that may indicate that fly ancestors had two pair of wings.*



Grasshoppers and Crickets

These long-legged jumpers come in many sizes and shapes, and all eat plants. The males are known for the musical sounds they make by rubbing together the roughened edges of their wings or legs.



Isopods-Pill Bugs and Sow Bugs

The name isopod ("same foot" in Latin) describes how these crustaceans have legs and feet that look the same. The pill bug does, as its name suggests, roll into a ball when disturbed. Sow bugs are flatter, faster, can't roll up, and have a pair of sensors that stick out their back end. *Count the pairs of legs.*

Lacewings

Green and brown lacewings are common throughout the woods and fields of North America. The larvae of these beautiful net-winged insects are predators. Green lacewings are raised commercially and released in vineyards and greenhouses to control mealybugs.



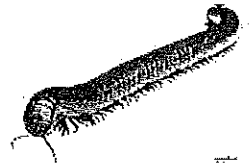
Leafhoppers

The acrobatic leafhoppers and treehoppers will move sideways, hop, and fly. Some are bright green, others look like thorns, and many are colored with bright patterns. The size of rice grains, these insects are very numerous during warm months, sucking plant juices for food. *Release some leafhoppers into a large box to observe how many times their body length they can jump.*



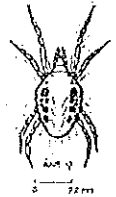
Millipedes

These worm-like, armored animals are harmless and very slow moving. Sometimes they coil into a spiral for protection. They are crustaceans, and are beneficial scavengers, helping recycle Nature's waste. *How do you think millipedes got their name?*



Mites

These very tiny spider-like animals have eight legs. They look like fast moving dots. Colors vary; red, orange, brown, and black are most common. Some mites are predators, eating the eggs of small animals like aphids and roundworms; others feed on plants and decaying vegetation.



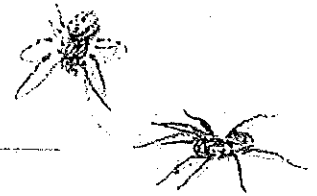
Snails and Slugs

Most of their relatives live in the ocean or in lakes and streams. Land snails and slugs secrete a slippery substance on which they travel, leaving a silvery track to mark their passage. They eat fresh and decaying plant material.



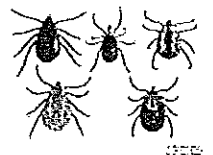
Spiders

These amazing predators are found almost everywhere-on ground, among grasses, hiding in tree branches, and in the crevices of buildings and fences. Some spiders pounce on their prey, while others build webs, but all make silken sacs to protect their eggs.



Ticks

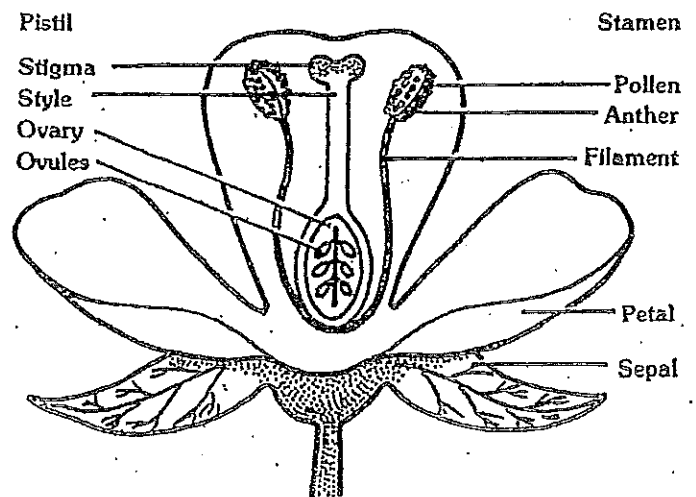
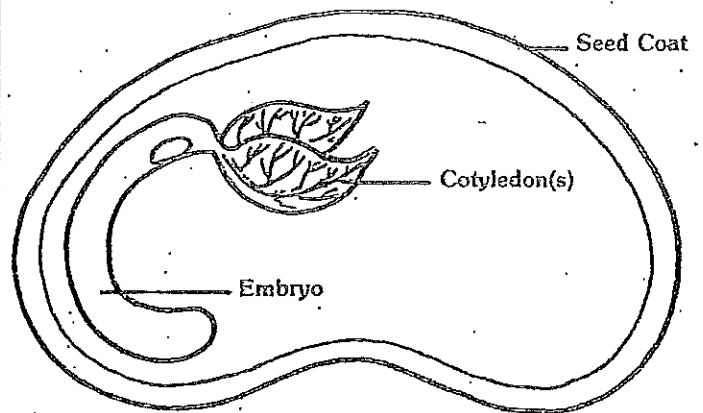
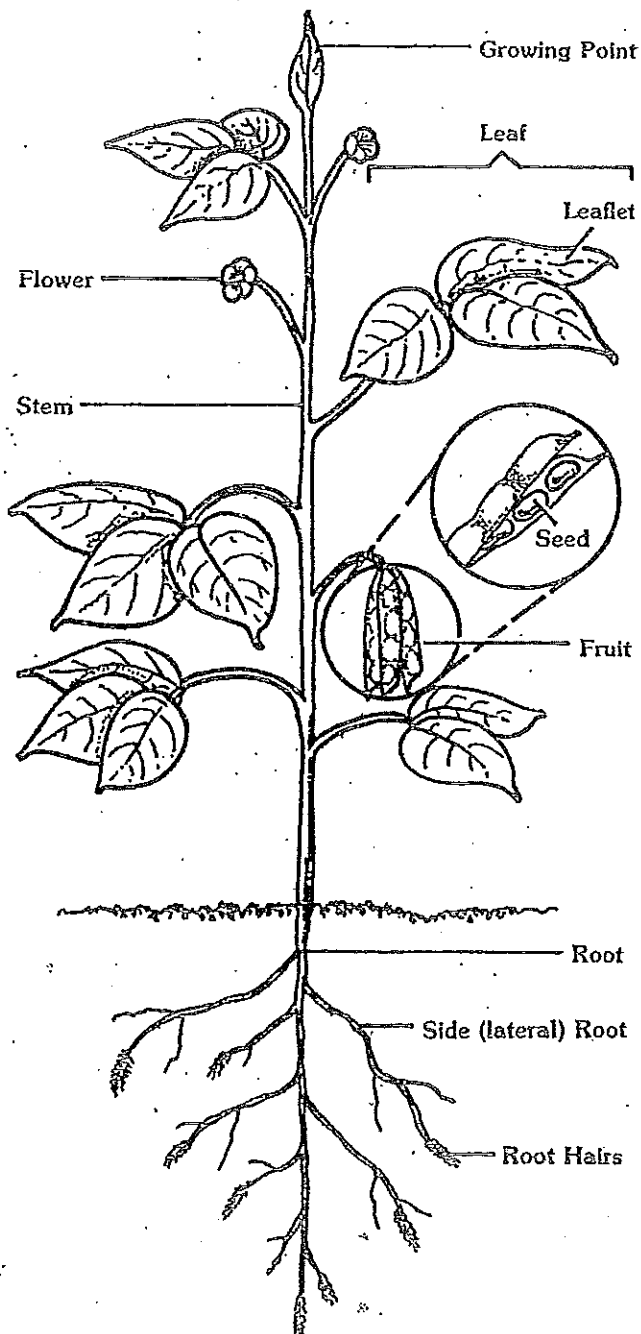
Ticks have eight legs and two body regions like their distant relatives, the spiders. They are ectoparasites and feed on the blood of reptiles, birds, and mammals. The nymphs of some ticks are smaller than the head of a pin, and the even smaller larvae have six legs. Adult ticks can be the size of a small raisin. Ticks can transmit dangerous diseases to humans. If you find a tick, don't touch it, and have your teacher save it for identification.



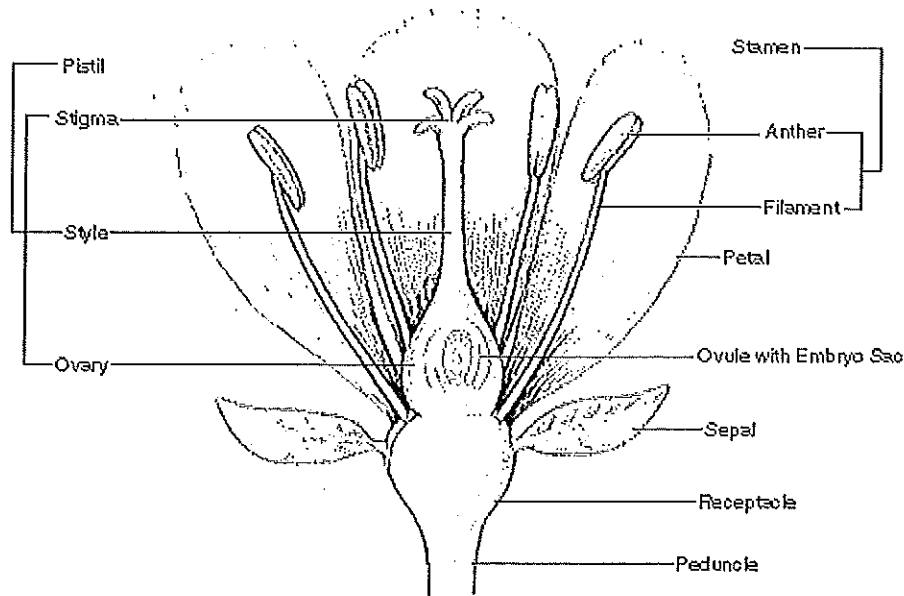
Name _____ Date _____



PLANT PARTS DIAGRAM



Flower Parts



Peduncle: The stalk of a flower.

Receptacle: The part of a flower stalk where the parts of the flower are attached.

Sepal: The outer parts of the flower (often green and leaf-like) that enclose a developing bud.

Petal: The parts of a flower that are often conspicuously colored.

Stamen: The pollen producing part of a flower, usually with a slender filament supporting the anther.

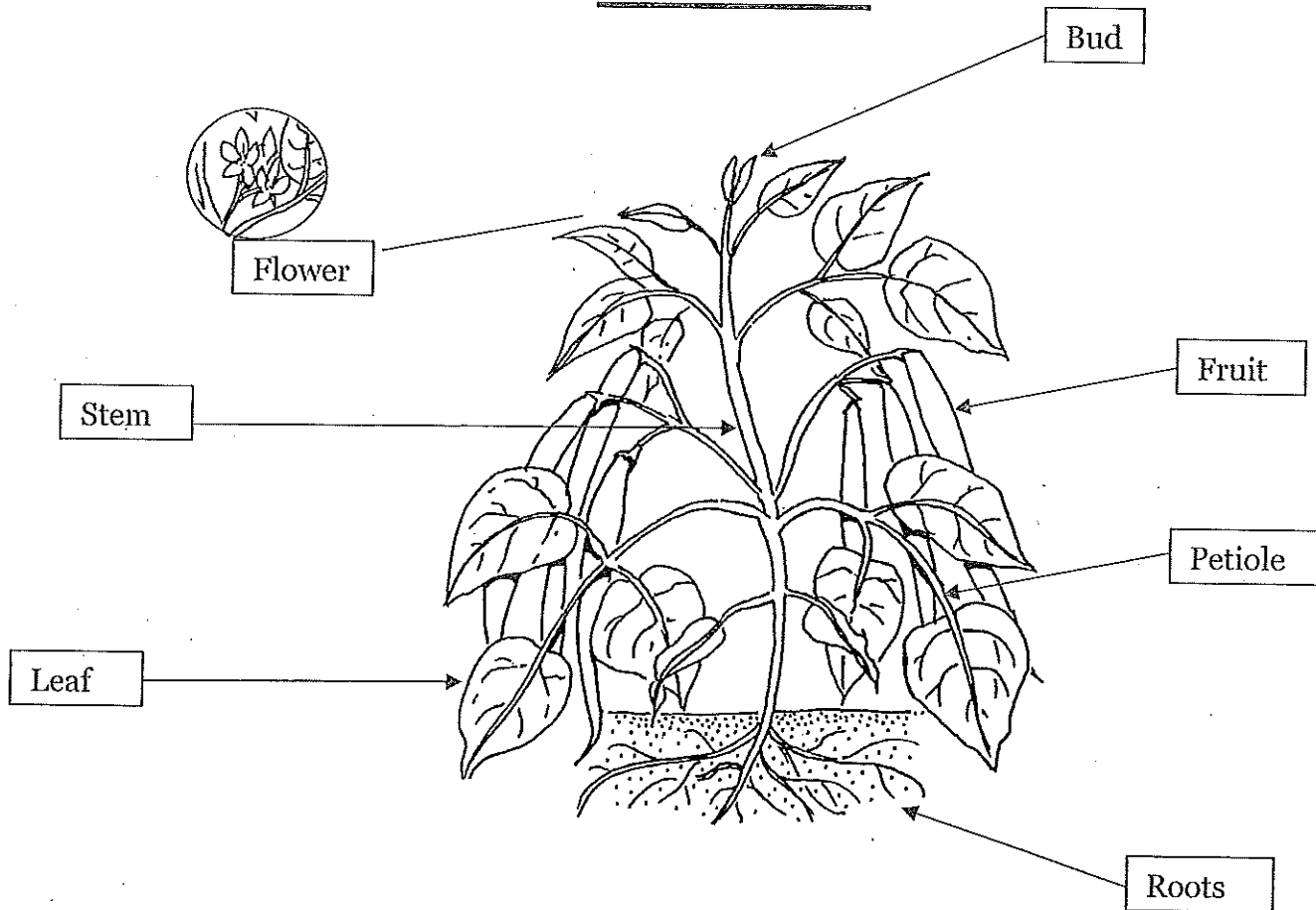
Anther: The part of the stamen where pollen is produced.

Pistil: The ovule producing part of a flower. The ovary often supports a long style, topped by a stigma. The mature ovary is a fruit, and the mature ovule is a seed.

Stigma: The part of the pistil where pollen germinates.

Ovary: The enlarged basal portion of the pistil where ovules are produced.

Plant Parts



Functions:

Flower - Flowers are often showy because they are designed to attract pollinators like birds and insects who will fertilize them. The flower's job is to make seeds.

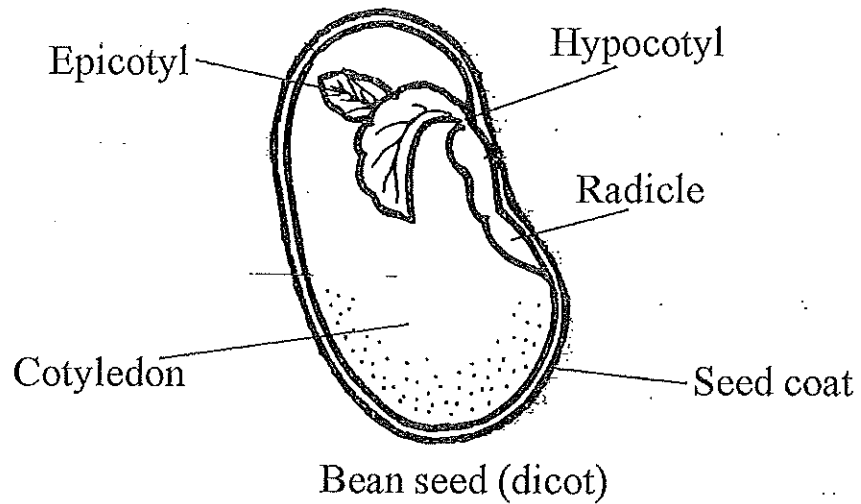
Fruit - Plants make a fleshy fruit to contain the seeds. In nature when the animal eats the fruit, it spreads the seeds inside. Each seed might grow into another plant in the right conditions.

Leaf - A plant's leaves collect sunlight for the process of photosynthesis. Photosynthesis is the process where green plants use sunlight, carbon dioxide and water to make food and oxygen. Little openings in the leaves, called stomata, collect carbon dioxide from the air and release oxygen. Tiny veins in the leaves spread water and nutrients throughout the leaf. The process of photosynthesis occurring in green plants around the world is what produces the oxygen we breathe.

Stem - A plant's stems help support the weight of the plant and all its leaves. Water and minerals are brought up from the roots. Nutrients made by photosynthesis in the leaves are sent down and all around the plant.

Root - A plant's roots anchor it into the ground. They also collect water and minerals from the soil and transport them up into the plant.

Seed Parts



The seed contains the embryo of the new plant, with a supply of food for the embryo until it has formed sufficient roots and leaves to obtain its own food. The food, endosperm, may be in the seed leaves or it may be outside the seed leaves and be absorbed when the seed germinates.

To start germination, the seed leaves absorb water and swell, and the radicle emerges, followed by the plumule.

