Forests: Lesson Plan Overview

Forests provide homes for wildlife, shelter, food, cover; and the plants of the forests cleanse the air and provide oxygen while taking in carbon dioxide. The plants also stabilize the soil and provide a barrier to noise and dust from farm fields. Forests protect our soil and waterways and help prevent erosion by acting as a buffer to waterways.

Forests provide a retreat for humans, a chance to revitalize the soul. Campers and canoers, hikers and hunters, birdwatchers and horseback riders all use and enjoy forests. And forests have inspired many painters, photographers, writers, and other artists. Forests provide lumber for our homes, furniture, musical instruments, toys -- and all kinds of other things it would be hard to imagine living without.

Forests cover about one-third of the United States. Of these forests, the U. S. Department of Agriculture Forest Service manages 156 National Forests spread out over 186 million acres. The rest are managed by other federal and state agencies (such as the National Park Service, U.S. Fish & Wildlife Service, and the Bureau of Land Management, and state forests) and by private owners.

Lesson Plan 4:

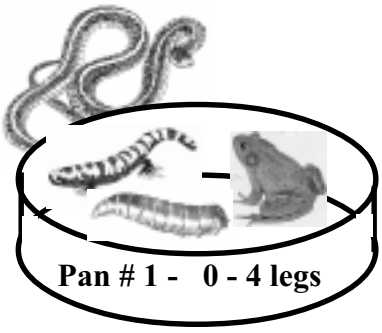
Forest Investigations

Activity 1: Forest Understory and Decomposers

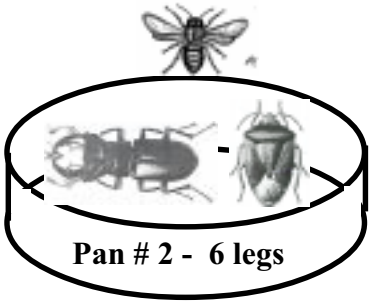
There is enough equipment for at least 10 teams. Depending on the size of your group, divide into teams of 2-5 students. Each team gets 1 trowel, 1 jar, and 1 white paper plate. Have teams find a place in the woods near a fallen log and leaf litter and away from poison ivy. Teams may spread out, away from other teams, but stay in sight of the bus.

Use the white paper plate to spread soil and litter on and the trowel to sift through soil. Place animals in jars. At the end of activity, classify animals by number of legs and place specimens in white bottomed pans for group observation and identification. See below.

Examine logs for plant and animal life. When turning over logs, remember to return them to their original position to protect this animal home.



Place animals with no legs (worms, snakes, slugs, etc) and 4 legs (frogs, toads, salamanders, lizards, etc) in Pan # 1. The most common snakes at Bombay Hook are the blackrat, ribbon and garter snakes in the forest and Northern water snake in the wetlands. Toads are dry, have warts, and hop. The frogs are smooth and moist and leap. Salamanders are smooth and moist and are amphibians like the frogs. They have a similar body shape to lizards, which are dry, scaly, have claws and teeth, and are reptiles.



Place animals with 6 legs (insects) in Pan # 2. Note: Insects that go through complete metamorphosis may fool you in certain stages like the larval and pupa stage. In the larval stage you can still see the 6 legs but in caterpillars you also see stumps or false legs, which don't count as true legs. In the pupa stage you see a sack which may wiggle, but you don't see the legs.

Place animals with 8 or more legs in Pan # 3. Spiders, ticks and mites have 8 legs. Isopods (sometimes called rolly pollies or sow bugs) have more than 8 legs and are land crustaceans. Centepedes have 2 legs per segment; millipedes have 4 legs per segment and can roll up.

See Attached Forest Identification Key

Activity 2: Observing a Critter

Name: _____

Date: _____

Draw Your Critter

How does your critter:

Move: _____

Protect itself: _____

Obtain food: _____

What might your critter eat: _____

What might eat it: _____

Where do you think your critter lives: _____

How can you tell: _____

Does the color(s) serve any purpose: _____

What purpose: _____

What value is your critter to the environment: _____

What kind of critter do you have?

Circle one: **insect** **insect larvae** **spider** **mite**

millipede **centipede** **sowbug** **earthworm**

nematode **other:** _____

Activity 3: Create A Five Stage Food Chain

Background Information

Food contains stored energy which animals use for metabolic maintenance, growth, and reproduction. When food is eaten, some portion of the stored energy is passed to the animal. This same energy is then transferred along a **food chain** as one animal eats another. *Example: Food Chain - A gray squirrel eats an acorn and a red fox eats the gray squirrel.* Many food chains make up a **food web**. The word "Food Web" refers to the many possible feeding relationships found among members of a community. Most animals use more than one species as food.

Every species has a unique ability to get food including grazing, foraging, and hunting. Food availability affects population size within a given community. Generally, in spring and summer abundant plant growth provides an ample food supply causing an increase in birthrates among herbviores. In turn, an increase in herbivores (prey species) provides additional food for carnivores (predator species). As more food becomes available for predators their populations also increase in number. Prey species are adapted for escaping, while predators are well suited for hunting and catching prey. The result is a kind of balance between the two.

Using the attached forest food web and information from activities 1 and 2 construct a five stage food chain that shows predator/prey relationships.

Draw Your Predator and Prey

A _____ eats

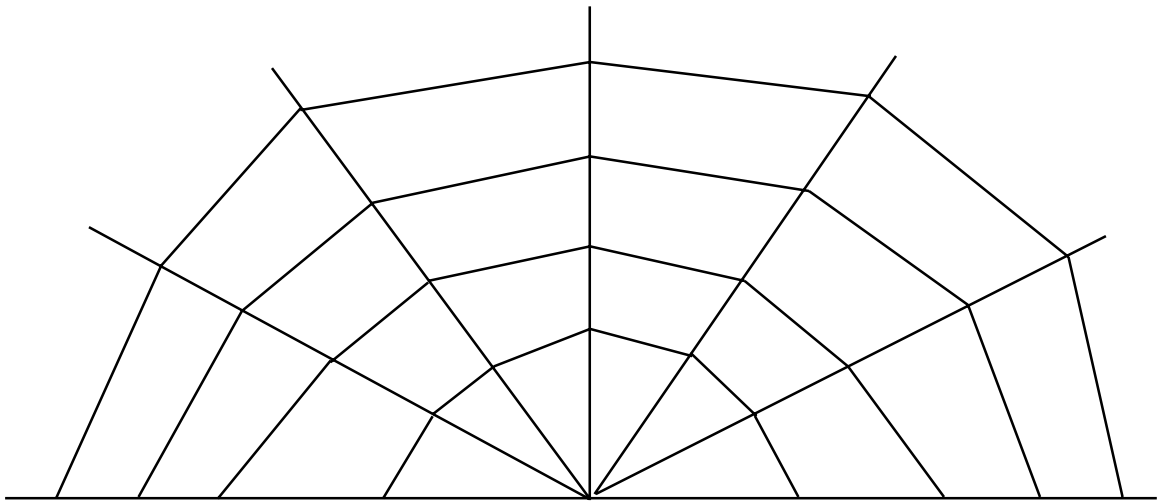
a _____ ,which eats

a _____ ,which eats

a _____,which eats

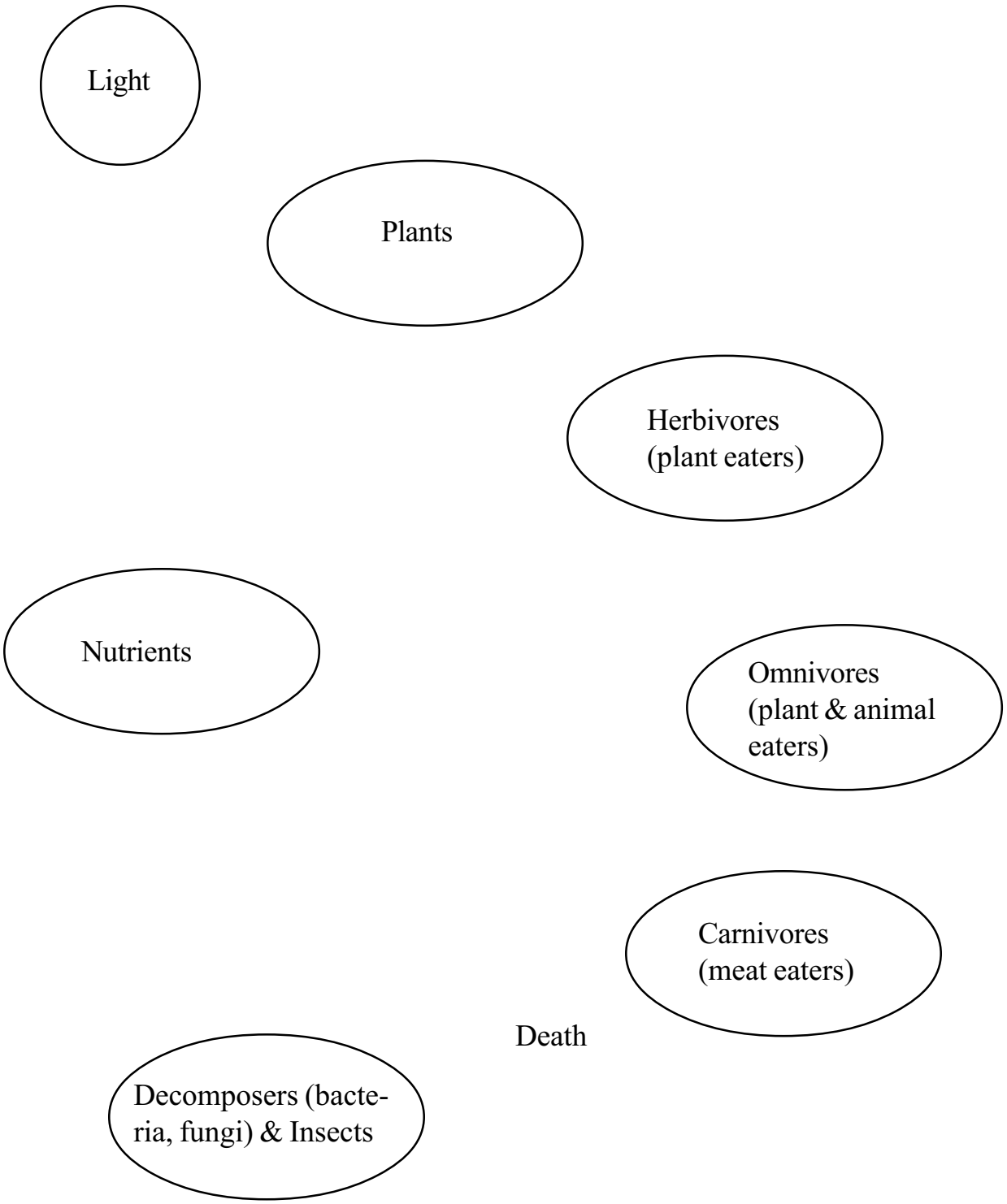
a _____.

Activity 4: Draw Animals and Plants and Label a Food Web for a Community



Activity 4: The Cycle of Life

List the animals, their evidences, and the animal food you have seen in the appropriate places in this diagram. What other words and ways can you think of to illustrate a similar cycle? *Put in arrows.*



What would happen if one of these groups were eliminated?

Key To Identification of Soil Animal Groups

1a. Segmented animals: animals with a series of constricted rings around the body 2
1b. Nonsegmented animals 8

2a. Segmented animals with jointed legs or other jointed appendages 4
2b. Worm-like segmented animals with no jointed appendages 3

3a. All segments similar, no well defined head ..... earthworms (Phylum Annelida)

3b. Head well defined, harder and usually darker than the rest of the body, mouthparts usually visable ..... insect larvae (Phylum Arthropoda)

4a. Animals with 3 pairs of legs (if worm-like -- insect larvae) ..... insects
4b. Animals with more than 3 pairs of legs 5

5a. With 4 pairs of legs ..... spiders, mites, ticks (Phylum Arthropoda, Class Arachnida)
5b. With many pairs of legs 6

6a. With one pair of legs on almost every segment 7
6b. With 2 pairs of legs on most segments ..... millipedes

7a. Oval-shaped animals; often fold body into ball when distrubed ..... sowbugs or pillbugs (Phylum Arthropoda, Class Crustacea, Order Isopoda)
7b. Elongated body, not folding into a ball ..... centipedes (Phylum Arthropoda, Class Chilopoda)

8a. Minute nonsegmented worms ..... nematodes (Phylum Nemotada)
8b. Soft bodies, slimy animals with or without a hard coiled or spiral shell ..... slugs (without shells) snails (with shells) (Phylum Mollusca)

Table to Identify Amphibians and Reptiles

Vertebrate cold-blooded animals (body temperature controlled by surroundings)

	AMPHIBIANS	REPTILES
Skin	either moist and smooth or dry and warty, no scales	dry, scales
Eggs	usually laid in water	laid on land (some snakes bear living young)
Young	different shape from adults, except some salamanders	same shape as adults
Breathe	with gills when young (usually) with lungs when adult (usually)	with lungs at all times
Claws	none	all except snakes
Examples	TOADS, FROGS, SALAMANDERS	SNAKES, TURTLES, CHAMELEONS, LIZARDS, CROCODILES, ALLIGATORS

In Delaware most of these animals are harmless; however, the jaws of a large snapping turtle are dangerous. Only one species of poisonous snake, the copperhead, is found in Delaware, and they are not found at Bombay Hook. The bites of other snakes are not dangerous unless the wound becomes infected.

Salamanders are often mistakenly called lizards, but actually they are more like frogs with tails. (Lizards have dry and scaly skin and the skin of a salamander is moist and smooth.) They eat mostly insects and other small invertebrates. Although adult frogs and salamanders usually have lungs they also breathe through their skin, so must be kept moist at all times. In hibernation they breathe entirely this way.

Frogs eat primarily land or water insects. They have moist smooth skin. Their slipperiness and their ability to jump enable them to escape their enemies. They are much better jumpers than toads. Frogs' eggs are laid singly or in clusters.

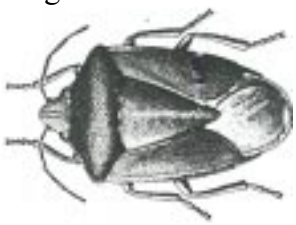
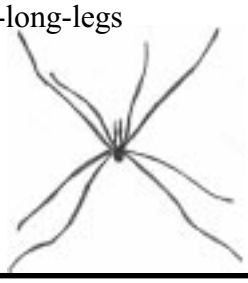
Toads eat mainly insects and earthworms. They have a dry warty skin, but people cannot get warts from handling them. Toads lay their eggs in a chain-like formation.

Snakes are very useful animals which should not be killed. The small ones live largely on soft-bodied animals, earthworms, slugs, and some insects. The larger ones eat mice and other small vertebrates, frogs, toads, etc. A snake swallows its prey whole, holding it with teeth which curve back, while the top and bottom jaws move alternately to work the prey down. The hinged jawbones and the elasticity of the skin and stomach allow it to eat animals bigger around than itself. A snake sleeps with its eyes open since it has no moveable eyelids. Its forked tongue is not a stinger but aids the snake in smelling, tasting, and feeling objects.

Turtles are among the best protected animals due to their shell which is like a hard suit of armor. The backbone of turtles is attached to the upper shell and the breastbone to the lower shell. A full-grown turtle has few enemies, but the eggs are often dug up and eaten by skunks or raccoons and the young are often eaten by larger turtles and other water animals. They all lay their leathery-shelled eggs on land, usually digging a hole for them.

Crocodiles and alligators are not found in Delaware. Two lizards, the five-lined skink and the Northern Fence Lizard are uncommon but can be found at Bombay Hook.

Forest Identification Key

Larva 	Worm 	Garter snake 
Five-lined skink 	Marbled salamander 	Redback salamander 
Fowlers toad 	Gree treefrog 	Bee 
Stag beetle 	Ground beetle 	Stink bug 
Cockroach 	Daddy-long-legs 	Spider 
Pillbug 	Centipede 	Millipede 

Bombay Hook National Wildlife Refuge