A FIELD GUIDE TO FAIRFAX COUNTY'S Plants and Wildlife

A FIELD GUIDE TO FAIRFAX COUNTY'S PLANTS AND WILDLIFE

Developed by Fairfax County Stormwater Planning Division
and Urban Forest Management
in coordination with Fairfax County Public Schools
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This field guide belongs to:

_____

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INTRODUCTION

General Introduction

Most people are naturally curious about the world they live in. Scientists are also curious about the world, and explore the natural world to make observations and new discoveries. Science is a huge and amazing field and there are many different types of scientists who study and work with different things. A **biologist** is a scientist who studies living organisms and their relationships to their environment. Some biologists focus on one kind of organism, while other biologists study entire communities of organisms.

How Living Things are Classified

An **organism** is an individual living thing. All organisms are made of cells, obtain and use energy (eat), grow and develop (have a life cycle), have offspring (reproduce), respond to their environment, and respire (breathe).

Biological classifications are based on how organisms are related. Organisms are classified into a series of ordered groupings based on things that they have in common (see sidebar).

A **species** is defined as a group of organisms that have the ability to interbreed and produce fertile offspring in nature. Species is the basic unit of classification. The name of a species is made by using two words: the genus name followed by the species name. The genus name is always capitalized while the species name is not. For example, *Homo sapiens* is the scientific name for humans.

Biological classification groups go in order from largest to smallest:

Kingdom
Phylum
Class
Order
Family
Genus
Species

Here's a handy way to remember the order of classification groups: take the first letter of each group (**KPCOFGS**) and make up a fun saying to help you remember. For example: "**K**ids **P**refer **C**hocolate **O**ver **F**unky **G**reen **S**paghetti." Try it!

A **dichotomous key** (from *dichotomy*, meaning divided into two parts) is a tool scientists use to identify organisms based on their unique traits. It asks a series of paired questions, each of which narrows down the set of species. For example, the question "Does it have a backbone?" may be used to divide animals into **vertebrates** and **invertebrates**.

Icon	Name and Description
	Invertebrate. Animal lacking a backbone
	Vertebrate. Animal with a backbone

A dichotomous key used to identify plants might ask, "Does it have woody tissues to transport water, minerals and nutrients?" to divide plants into **vascular** and **non-vascular** species.

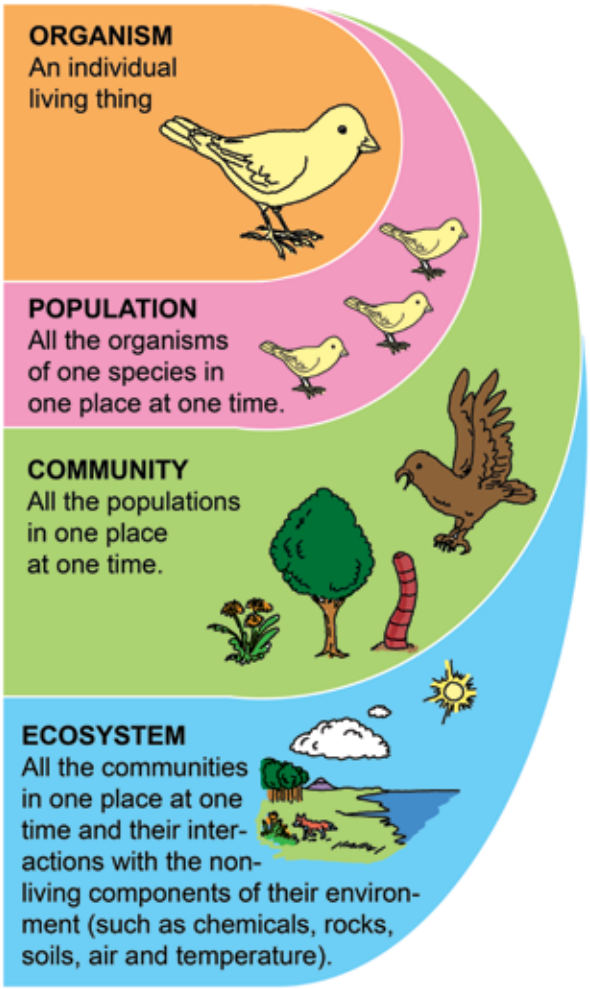
Icon	Name and Description
	Non-vascular. Plants that lack woody tissues. Includes hornworts, liverworts, most mosses and some algae
	Vascular. Plants with woody tissues, such as club mosses, ferns, trees and flowering plants (including grasses)

About the Icons

This field guide uses a system of icons to categorize organisms into groups. The icons provide a quick visual reference to indicate whether an organism is a non-vascular or vascular plant; an invertebrate or a vertebrate animal; a native or non-native species; and identify the organism's habitat types and role in the food web. The key to the icons shown in the Introduction is located on the inside back cover.

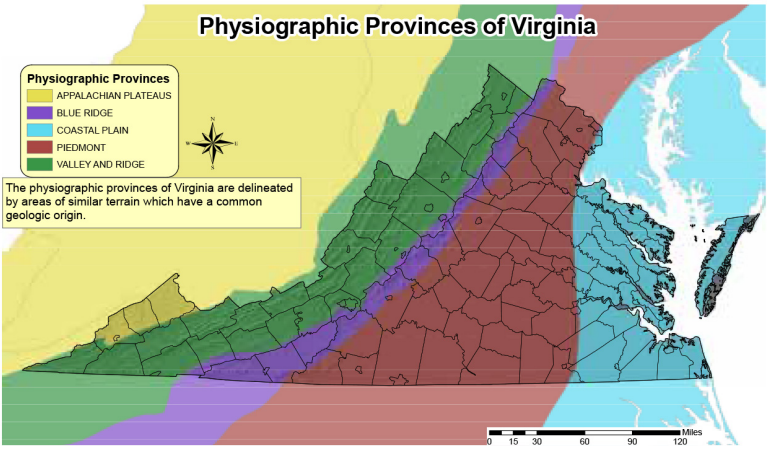
Ecological Roles

The word **ecology** comes from the Greek word *oikos*, which means "life." **Ecology** is the study of the relationships that living organisms have with each other and their environment. Ecology is divided into four increasingly comprehensive levels: **Organism; Population; Community;** and **Ecosystem** (see diagram). Each species' **ecological niche** explains its way of life or role in an ecosystem. Factors used to define an organism's niche include its distribution (where it is found), habitat (where it lives), role in the food web (its feeding relationships) and life history (how it lives and grows).



Distribution

The **distribution** of a species is the geographic region where individuals of that species are found naturally. Virginia has five geographic regions called **physiographic provinces:** the **Coastal Plain; Piedmont; Blue Ridge; Valley and Ridge;** and **Appalachian Plateau**. Each province has unique structures and features resulting from its geologic past.



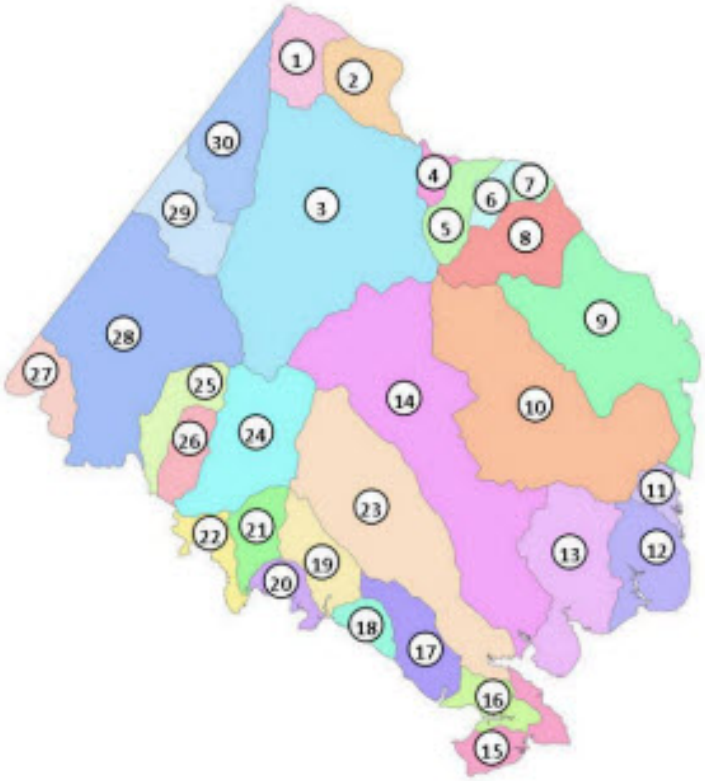
Data provided by the USGS, map design by VirginiaView.net

Southeastern Fairfax County (east of Interstate 95) lies in the Coastal Plain. Northwestern Fairfax County (west of Interstate 95) is in the Piedmont. The dividing line between the Coastal Plain and the Piedmont physiographic provinces is called the **Fall Line**.

A **watershed** is an area of land where all of the water that falls on it drains to the same body of water, such as a stream, river or even the ocean. Watersheds come in all shapes and sizes and can cross physiographic, county, state and even national boundaries. Fairfax County has 30 watersheds that are part of the Potomac River watershed, which in turn is part of the Chesapeake Bay watershed.

The distributions of aquatic animals like fish that cannot move around on land or in the air are defined by watersheds rather than geographic regions.

Because streams and rivers within a watershed are connected, what happens upstream can affect the quality of downstream water bodies.



Fairfax County Watersheds by Number

1. Nichol Run
2. Pond Branch
3. Difficult Run
4. Bull Neck Run
5. Scotts Run
6. Dead Run
7. Turkey Run
8. Pimmit Run
9. Four Mile Run
10. Cameron Run
11. Belle Haven
12. Little Hunting Creek
13. Dogue Creek
14. Accotink Creek
15. High Point
16. Kane Creek
17. Mill Branch
18. Occoquan
19. Sandy Run
20. Ryans Dam
21. Wolf Run
22. Old mill Branch
23. Pohick Creek
24. Popes Head Creek
25. Little Rocky Run
26. Johnny Moore Creek
27. Bull Run
28. Cub Run
29. Horsepen Creek
30. Sugarland Run

Sometimes, either accidentally or deliberately, species are introduced into places outside of their native distributional range. Some introduced species may cause harm to the ecosystem into which they are introduced.

Icon	Name and Description
	Native. An organism living in an area naturally, without any human intervention
	Non-native. An organism introduced to an area outside its normal range, usually through human activity

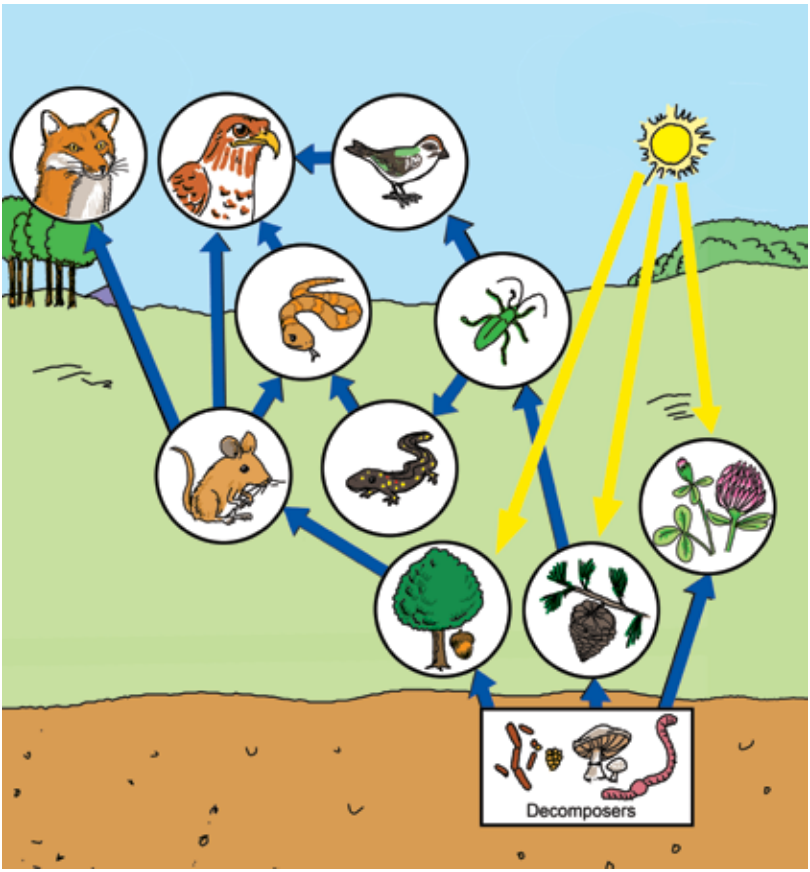
Habitat and Habitat Types

Habitat refers to a physical place where an organism (or a community of organisms) lives, including all living and non-living factors or conditions of the surrounding environment. Habitats in Fairfax County fall into six basic types:

Icon	Name and Description
	Woodlands. Forests, thickets, stream buffers
	Meadows/Fields/Open Areas. Parklands and other open space with few or no trees and vegetated mostly by grasses
	Lakes/Ponds/Wetlands. Non-flowing bodies of water or land saturated with water (bogs, marshes, swamps etc.)
	Rivers/Streams/Creeks. Flowing bodies of water. Fairfax County is in the Potomac River watershed, which is part of the Chesapeake Bay watershed
	Estuaries. Where fresh water and ocean (salt) water mix, such as the Chesapeake Bay and tidal (below Great Falls) Potomac River
	Suburban Areas. Developed areas such as subdivisions, apartment complexes, malls/shopping centers, etc.

Role in the Food Web

A **food chain** is the path of energy from organism to organism. Plants, which convert the sun's energy into food, are usually at the base of a food chain. Since most organisms eat more than one type of animal or plant, food chains are interconnected in a **food web**. Look at the food web diagram below for an example; the arrows show the directions in which energy and nutrients flow.



Within a food web, organisms are grouped based on how they get their energy:

Icon	Name and Description
	Producer. Organisms (mainly plants) that generate and store their own food/energy from the sun or other energy sources
	Consumer-Herbivore. Consumes only plants
	Consumer-Carnivore. Consumes only animals
	Consumer-Omnivore. Consumes plants and animals
	Decomposer. Breaks down dead/decaying organic matter into component elements

Life Histories and Life Cycles

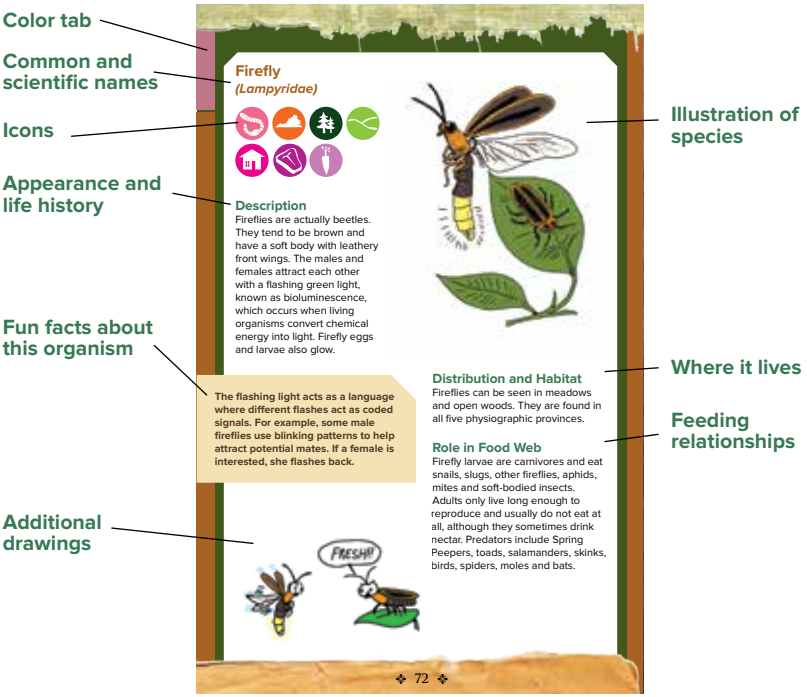
An organism's life history is a series of steps related to the processes of life that help it to survive, such as eating, respiration and migration. The life cycle of an organism is part of its life history, and describes how it reproduces, grows and develops. For some organisms, the life cycle is a gradual process with steps that blend into each other. However, some animals undergo a more radical physical change called **metamorphosis**. The immature form (usually called a larva; more than one = larvae) often has a body plan completely different from that of the adult organism.

How to Use This Book

This field guide is not intended to be a comprehensive list of all of the organisms that might be found in Fairfax County. It is a guide to some of the common organisms that are likely to be observed in typical neighborhoods, schoolyards, parks and other outdoor areas of the county.

The guide is organized into major groups of living organisms: non-vascular plants; vascular plants; decomposers; invertebrate animals and vertebrate animals. Each group has a different color-coded tab on the outside edge of the pages. The colored tabs correspond to the color highlights shown in the Table of Contents and make it easier to find groups quickly. Activities have blue headers and do not have colored tabs.

Each organism page was designed to provide the most information possible in one page. Take a look at the example page below to understand how information is presented throughout the guide.



Now, let's go outside and start exploring!

Field Safety

- Do not approach, disturb or harm wild animals.
- Never attempt to touch, pet or handle any wildlife. If you find an injured or dead animal, leave it alone and inform a teacher or other adult.
- Never attempt to touch, handle or eat wild mushrooms or plants.
- Never handle preserved organisms. The chemicals used to preserve animals may cause skin or eye irritation or breathing problems; and plants that have been dried or freeze-dried may retain their natural toxins/irritants.
- Avoid natural hazards such as poison ivy, ticks, mushrooms, insects, spiders and snakes. Wear bug spray. For more information about mosquitoes, ticks and tips to help you Fight the Bite, visit www.fairfaxcounty.gov/hd/westnile/
- Put safety first when engaging in field activities in, near or over bodies of water. For example, bring an adult or responsible person with you.
- Dress appropriately for forecasted weather conditions, remember sunscreen and carry enough water to stay hydrated.
- Always wash your hands with soap and water after coming in from the field.

My Notes

PLANTS

Plants are organisms that usually grow in the ground, cannot move from place to place under their own power, and are able to grow throughout their lives without taking on a fixed shape or size. Most plants make food for themselves by capturing energy from the sun (a process called photosynthesis), unlike animals which must eat other living things. There are two different types of plants: non-vascular and vascular.

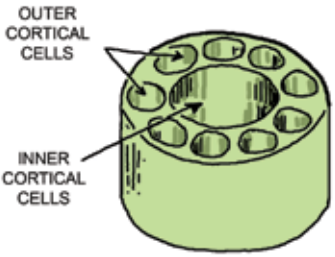
NON-VASCULAR PLANTS

Non-vascular plants lack a vascular system (think veins) to transport nutrients and water throughout the plant. They don't have true roots, stems or leaves that we associate with most plants. Because of this, non-vascular plants are usually much smaller (rarely taller than two to three centimeters) than vascular plants and are found mainly in moist areas that do not get a lot of sun.

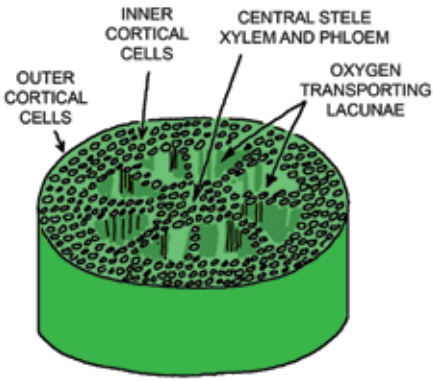
These plants are much older than vascular plants. The oldest known non-vascular plant appeared in the fossil record between 440 and 450 million years ago. Some scientists believe that non-vascular plants may have evolved as early as 475 million years ago. Vascular plants appeared roughly 400 million years ago.

There are three groups of non-vascular plants: algae, mosses and 'worts (hornworts and liverworts).

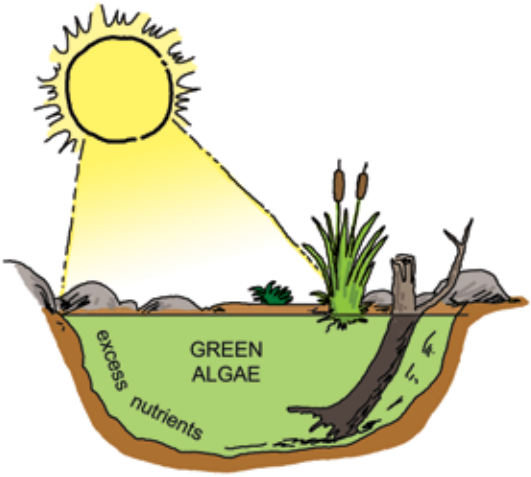
Non-vascular



Vascular



Green Algae



Description

Algae are the most well-known of a group of organisms called phytoplankton. Many species live as single cells, while other species form colonies, long filaments or seaweeds.

Green algae are the most diverse group of algae with more than 7,000 species. These organisms are photosynthetic, meaning that they function as plants and produce their own food from sunlight, and are primarily aquatic.

Distribution and Habitat

Green algae live in mainly fresh water throughout all five physiographic provinces. They can often be found on rocks, floating wood and covering the surface of stagnant water. In fact, algal growth is often what makes partially submerged rocks and wood slippery.

Role in Food Web

Algae are at the base of most aquatic food chains and webs and are one of the primary producers of the oxygen we breathe. However, when excess nutrients enter the water system, green algae can rapidly grow to such a degree that it negatively affects the immediate ecosystem. Thick mats of green algae can prevent sunlight from reaching the bottom of ponds and lakes and prevent other aquatic vegetation from growing. Additionally, when green algae die, the process of decomposition uses oxygen in the water, called “dissolved oxygen.” This process can cause the water to become “anoxic,” which means there is no more oxygen in the water for fish and other aquatic animals to breathe.

Mosses

Description

Mosses are small, soft plants that are typically 1 to 10 centimeters tall. There are approximately 10,000 species of moss, making them the third most diverse group of land plants.

Since mosses cannot transport water, they must have a damp environment to live. But they still need enough sunlight for photosynthesis – after all, they are still plants!

Mosses have rhizoids instead of true roots. Rhizoids act like roots and anchor the plants to the ground or other surfaces such as rocks or trees. Mosses do not have flowers and therefore no fruits, cones or seeds. They rely on spores to reproduce. Think of spores like a seed – once the spore is fertilized, it grows until it is released into the environment to make more moss! Mosses play important roles in their ecosystem such as reducing stream erosion, cycling water and nutrients, and providing shelter to many insects.

Humans use mosses as well. Some types of moss are used by florists in decorations. *Sphagnum*, a specific genus of moss, was used in World War I as first-aid dressings on soldiers' wounds as these mosses are highly absorbent and have mild antibacterial properties.

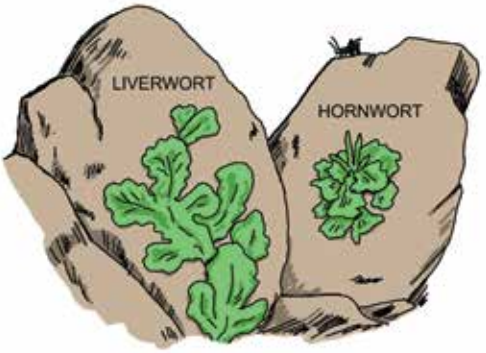
Distribution and Habitat

Mosses grow in all five physiographic provinces. They commonly grow close together in clumps or mats in damp or shady locations.

Role in Food Web

Though moss may be eaten by various animals, it is not a main food source for any particular species. Mosses play a larger role in replenishing nutrients in the soil which are used by other producers.

’Worts (Liverworts and Hornworts)



We’ll cover liverworts and hornworts together. The ‘worts are even simpler than mosses. They are considered to be the simplest of all plants and often grow flat along the ground in large leaf-like structures.

Description

The name “liverwort” comes from the Anglo-Saxon words “lifer,” meaning liver, and “wyrt,” meaning plant. It was thought that the ribbon-shaped margins resembled the lobes of a liver; because of this, ‘worts were believed to be useful for treating liver ailments.

There are 6,000 to 8,000 species of liverworts. Liverworts are typically small, usually from 2 to 20 millimeters wide with individual plants less than 10 centimeters long.

Hornworts are very similar to liverworts. The main distinguishing characteristic is the elongated horn-like structure. This is where the hornwort gets its name. There are only 100 species of hornworts identified at this time.

Like the mosses, ‘worts reproduce by spores.

Distribution and Habitat

Hornworts and liverworts are found throughout all five physiographic provinces. Like mosses, they require a damp environment and enough sunlight for photosynthesis.

Role in Food Web

‘Worts can survive in Arctic regions and on high mountaintops where other plants can’t grow. They provide an important food source for plant-eaters such as Caribou, Musk Oxen, Arctic Hares and lemmings that live in these regions.

Activity: Where is my air?

Nearly all aquatic plants and animals require oxygen to survive and are sensitive to the amount of oxygen in water. The amount of oxygen found in water is called the dissolved oxygen (DO) concentration. The presence of oxygen in water is a sign of a healthy stream, while the absence of oxygen can signal pollution. Aquatic organisms such as fish and insects have gills to use the dissolved oxygen in the water.

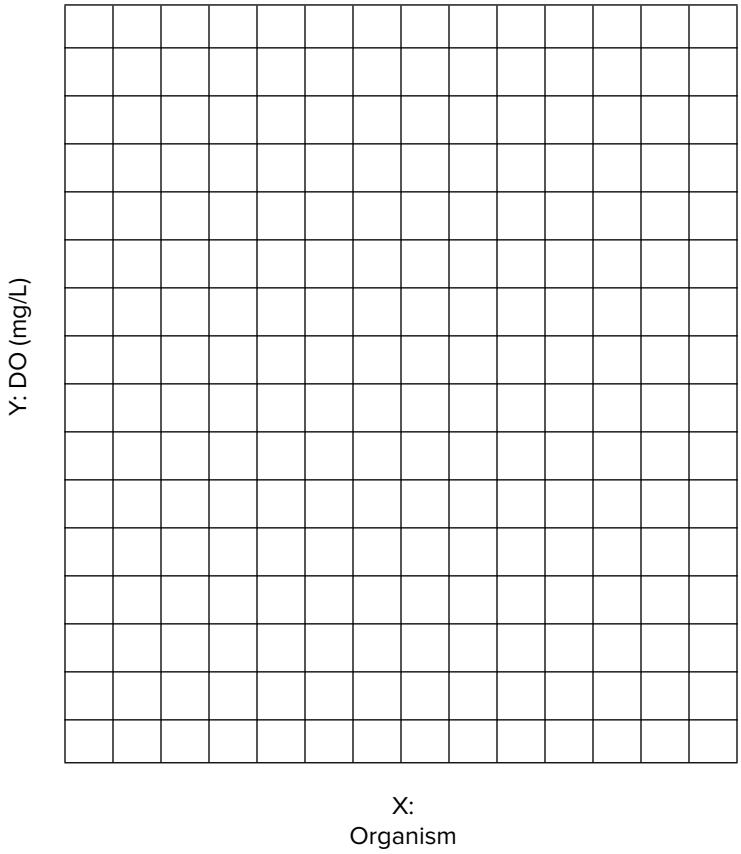
Different organisms can tolerate different levels of DO. The Brown Bullhead (Page 95) can survive oxygen levels as low as 1.0 milligrams/liter (mg/L) by exchanging oxygen through their skin and gulping surface air into their air bladder, which functions as a lung. Mayfly nymphs (Page 75) are very sensitive to pollution and cannot tolerate low levels of DO. They generally require a DO level of at least 6.0 mg/L. Largemouth Bass (Page 98) require a minimum DO level of 4.0 mg/L in order to survive.

Create a bar graph that compares the three different organisms' DO requirements. The X axis (horizontal) should show the three organisms and the Y axis (vertical) should show the required levels of DO in mg/L. Use the graph on the following page to help you get started.

Describe what might happen to these three species if the amount of DO in a stream dropped suddenly due to an aquatic algal bloom (a rapid increase in the population of algae in an aquatic system).

Challenge yourself! List some different reasons that may cause an algal bloom to occur.

Title: _____



VASCULAR PLANTS

Vascular plants have two tubular systems running throughout their roots, stems and leaves (see illustration on Page 14). These systems, which you could think of as roadways, transport water and food to all parts of the plant. Vascular plants include ferns, grasses, vines, flowers, shrubs and evergreen (trees that keep their leaves throughout the year) and deciduous trees (trees that drop their leaves in the fall).

Vascular plants reproduce using either spores or seeds. Ferns and horsetails do not have flowers or seeds and reproduce using spores. The majority of plants reproduce using seeds. A seed is a small embryonic plant and a food source packaged inside a hard protective coating. Think of a seed as an embryo packed in a box with its lunch!

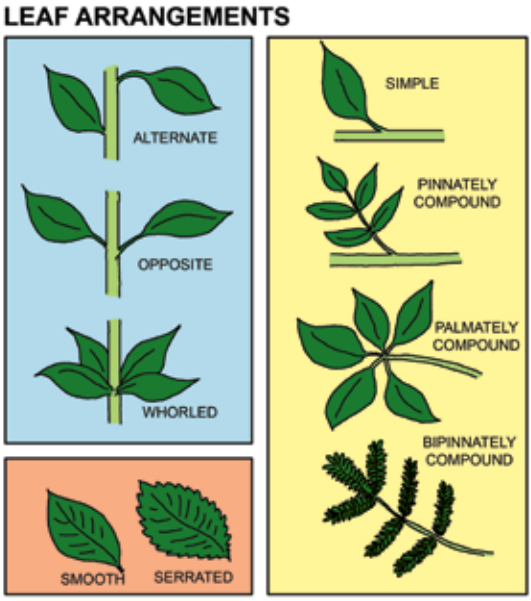
Some plants can also clone themselves using rhizomes, horizontal underground stems which can grow into new plants.

There are two kinds of seed-bearing plants: gymnosperms and angiosperms. Gymnosperms include the conifers (pines, firs, spruces, hemlocks and other "evergreens" with needle-like leaves) as well as gingkos and cycads. The seeds of gymnosperms are partially enclosed in cones or fruitlike structures (*gymnosperm* means "naked seed" in Greek). The angiosperms, also called flowering plants, are the most diverse plant group on Earth and include broad-leafed trees and shrubs, grasses and sedges, crop plants, aquatic plants, wildflowers and a great many others. The seeds of

angiosperms are fully enclosed in an ovary. A ripe plant ovary is called a fruit, even if it doesn't look like what we think of as a fruit! Watermelons, tomatoes, pumpkins, walnuts, acorns, strawberries, corn on the cob, rice...all are "fruits."

A plant's life cycle describes how long it takes to grow, flower and fruit. A plant can be either an annual, perennial or biennial. An annual is a plant that completes its life cycle in one growing season. A plant that needs two growing seasons to complete its life cycle is a biennial. These plants produce leaves one season, rest over winter, and grow flowers and seeds the following spring and summer. A plant that lives through three or more growing seasons is called a perennial.

When identifying plants, some key characteristics to look at are: height, leaf arrangement, leaf shape, flower color and timing (if present), and location (Is it in the sun or shade? Wet or dry area?).



Ferns
(Pteridophyta)

Description
The leafy branch of a fern is known as a frond which is comprised of many leaflets. On the underside of the frond you may notice dark spots; these are spores. Spores are similar to seeds in other plants. However, unlike seeds, spores cannot produce an adult plant. Spores produce what is known as a gametophyte. If the area is moist and conditions are right, the gametophyte will be fertilized and become a complete fern.

This ancient group of plants existed long before the dinosaurs and predates flowering plants by millions of years. Ferns were an important source of nutrition for plant-eating dinosaurs.

Distribution and Habitat
Ferns require moist conditions and cannot grow in dry, sunny areas. They are often found in shady woodlands, stream valleys and wetlands. There are many species of ferns throughout the world, with approximately 12 species native to Virginia.

Common Milkweed
(Asclepias syriaca)

Description
The single thick stem grows 1 to 2 meters in height. From June through August it has umbrella-like clusters of rose to purple flowers. Leaves are opposite and oval in shape. When a leaf or stem is broken a white milky liquid is released. In late summer, a seed pod forms and bursts open releasing hundreds of silky seeds. Seeds are blown by the wind. It reproduces by seeds and rhizomes.

Distribution and Habitat
Milkweed is found in all five physiographic provinces. It thrives in sunny open areas.

Milkweed's downy seeds are used as an alternative to feathers in pillows and mattresses.

In addition to the Common Milkweed there are at least seven other milkweeds in Fairfax County including Butterfly, Swamp and Purple Milkweed. All are butterfly favorites.

Role in Food Web
Monarchs and other butterflies, various bees and wasps, carpenter ants, White-tailed Deer and Eastern Cottontail Rabbits feed on milkweed.

Milkweed is the host plant for Monarch Butterflies and the sole food source for the caterpillars. The caterpillars have adapted to eat Common Milkweed without getting sick from the plant's toxic chemicals. These chemicals protect the caterpillars by making them taste bad to birds and other would-be predators.

Virginia Bluebell
(Mertensia virginica)

Description
This perennial plant is a spring ephemeral. Ephemeral means lasting a very short time. Bluebells appear in March, bloom in April, and disappear by early summer. They reappear the next spring. Growing to a height of 45 to 60 centimeters, the arching stems produce clusters of pink buds that mature into blue bell-shaped flowers. Leaves are alternate, smooth and oval shaped. When the leaves first start appearing in early spring they are deep purple in color, but soon turn green. Plants reproduce by seed and rhizomes and often form large patches.

As the name suggests, Virginia Bluebell blooms are blue. However, the flower buds are pink in color. This color change is due to an increase in pH of the plant's sap. As the sap becomes less acidic the flowers turn blue.

In April, many Virginia Bluebells grow along the banks of Cub Run and Bull Run. Many visitors come to Bull Run Regional Park in Centreville to enjoy their beauty.

Distribution and Habitat
Bluebells thrive in partial to full shade along streambanks and in moist woodlands. They are found throughout Virginia except in the Coastal Plain province.

Role in Food Web
Honeybees, bumblebees, butterflies, moths and hummingbirds feed on Virginia Bluebells.

Black-eyed Susan
(Rudbeckia hirta)

Description
Both the sword-shaped leaves and stem are coarse and covered with stiff hairs. The yellow daisy-like flowers have a dark brown to black center and are present from June until frost. Although a biennial plant, it reseeds easily. It grows up to 1 meter tall.

Black-eyed Susans are a member of the sunflower family and are closely related to coneflowers.

Distribution and Habitat
This plant thrives in full sun and tolerates a range of soil conditions. It is found along roadsides, in open fields and in neighborhood flower beds. It is common in all five physiographic provinces.

Black-eyed Susans are Maryland's state flower. The Preakness Stakes is a horse race run every May in Maryland. This famous race is also known as "The Run for the Black-eyed Susans" because a blanket of Black-eyed Susans is placed on the winning horse. Interestingly, Black-eyed Susans are not blooming at the time of the race. The winner is actually decorated with yellow daisies whose centers are hand-painted black to look like the state flower.

Role in Food Web
Black-eyed Susans are a food source for Eastern Cottontail Rabbits, White-tailed Deer, honeybees, grasshoppers, carpenter ants, various butterflies and moths, American Goldfinches, Northern Cardinals, sparrows and other songbirds.

Bull Thistle
(Cirsium vulgare)

Description
Bull Thistle is a biennial plant covered in sharp spines. During its first year, Bull Thistle forms a whirled rosette of deeply lobed, spiny leaves. During its second summer, the plant grows to a height of 1 to 1.5 meters and produces a pinkish-purple flower (2.5 to 5 centimeters in diameter) in late June through August. The flower turns to seed and releases up to 5,000 downy seeds which are dispersed by wind. Bull Thistle reproduces solely through seeds.

While Bull Thistle is considered a weed here in Virginia, in Scotland it is the national symbol. As legend goes, it gained this high recognition when long ago it saved Scotland from a nighttime Viking attack. While creeping up on a Scottish camp, a barefoot Viking stepped on a thistle causing him to cry out in pain. This cry alerted the sleeping Scots and prevented them from falling to attack. The thistle is considered a sign of nobility, bravery and loyalty.

Distribution and Habitat
Bull Thistle thrives in sunny fields and land that has been disturbed by human activity. It is found in all five physiographic provinces.

Role in Food Web
Eastern Cottontail Rabbits, White-tailed Deer, honeybees, bumblebees, carpenter ants, American Goldfinches, hummingbirds and many types of butterflies feed on Bull Thistle.

Queen Anne's Lace
(Daucus carota)

Description
This biennial can be over 1 meter in height. The umbrella-like, lacy clusters of white flowers are present May through September. Leaves also appear lacy and are alternate and compound.

Distribution and Habitat
Queen Anne's Lace thrives in sunny open areas and is common in areas disturbed by human activity. It is found in all five physiographic provinces.

Role in Food Web
It is a food source for Canada Geese, Wild Turkeys, White-tailed Deer, Eastern Cottontail Rabbits, Red Foxes, Groundhogs, honeybees, bumblebees, grasshoppers and various butterflies.

Queen Anne's Lace is also known as "wild carrot." It is believed that the carrots we eat today are descended from this wildflower.

Queen Anne's Lace is native to Europe and is named after Queen Anne who enjoyed making lace. The story goes that one day, Queen Anne was making lace. She pricked her finger with the needle, and a drop of blood stained the lace. If you look closely at the center of the flower head there are a few bright purple to red flowers.

Dandelion
(Taraxacum officinale)

Description
Although considered a weed, the dandelion is a favorite flower of children since they are easily found. Hollow, purplish stalks are topped with bright yellow flower heads that rise 1 to 10 centimeters from a group of jagged leaves arranged in a whirled ring along the ground. Dandelions produce flower heads throughout the growing season from early spring to autumn. This perennial plant reproduces by seeds.

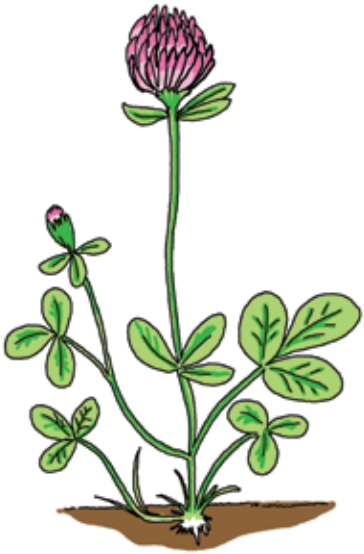
The deeply notched leaves give the plant its name. Dandelion is derived from the French word dent-de-lion, which means the "lion's tooth."

Similar to a birthday candle, many people make a wish and then try to blow all the seeds off a dandelion in hopes that their wish may come true.

Distribution and Habitat
Dandelions thrive in sun and a variety of soil conditions. They are common in open spaces including lawns, community parks and along sidewalks. They are abundant in all five physiographic provinces.

Role in Food Web
Honeybees, various other bees and wasps, grasshoppers, fireflies, Eastern Cottontail Rabbits, White-tailed Deer, songbirds and Wild Turkeys feed on dandelions.

Red & White Clover
(Trifolium pratense & T. repens)



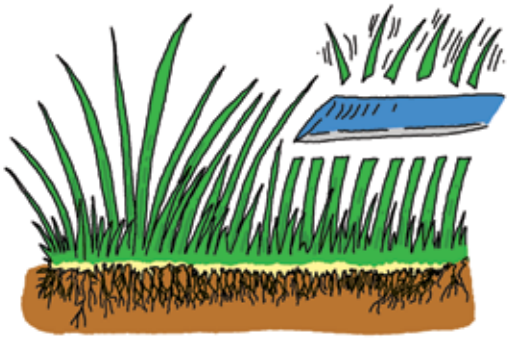
Description
Red and White Clovers are perennial plants with compound leaves usually with three leaflets. Red Clover grows tall and has a red to purple bloom. White Clover grows along the ground and has a white bloom.

Distribution and Habitat
Clover is found in sunny open areas and can tolerate poor soils. It is very common in lawns. It is also planted by farmers in fields since it takes nitrogen from the air and puts it into the soil. This process, known as nitrogen fixation, helps to keep the soil healthy. Clover is common in all five physiographic provinces.

Role in Food Web
Clover is a food source for Canada Geese, Wild Turkeys, White-tailed Deer, Eastern Cottontail Rabbits, Groundhogs, honeybees, Monarch Butterflies and various other butterflies and moths.

Four-leaf clovers (or more appropriately named four-leaflet clovers) are known around the world as signs of good luck. Each leaflet on the clover is said to symbolize something: the first represents hope; the second, faith; the third, love; and the fourth (if there is one) symbolizes luck. Did you find a four-leaflet clover? There is approximately one four-leaflet clover for every 10,000 three-leaflet clovers. Good luck!

Turf Grass (a.k.a. your lawn)



Description

Many different grass species are used for turf grass. The most common in Virginia are Tall Fescue, Kentucky Bluegrass, zoysiagrass, Perennial Ryegrass and Bermudagrass. While some native grasses such as Buffalograss are suitable for turf, most of the turf grass you see is non-native.

Distribution and Habitat

Turf grass is planted widely throughout Virginia's five physiographic provinces. It is used as lawn, open space and for playing fields. Different species are used in sunny areas than in shady spots.

Role in Food Web

Wild Turkeys and various species of geese and ducks feed on turf grass.

Turf Grass (continued)

What's the largest crop grown in the Chesapeake Bay watershed? Turf grass! In fact, roughly half of Fairfax County is covered in turf. The way we manage our lawns makes a big impact on our streams and the Chesapeake Bay. Nearly 215 million pounds of fertilizer and 19 million pounds of pesticides are applied to lawns in the Chesapeake Bay watershed each year! A lot of this washes off during storms and runs into our streams. The excess nutrients and chemicals in the stream impact water quality and hurt fish and other aquatic organisms. Furthermore, when compared to a forest our lawns have very compacted soils. This increases the amount of water that runs off the land instead of soaking slowly into the ground.

How can you help?

- **Reduce the size of your lawn by creating flower beds and planting native tree and shrub borders.**
- **Have your soil tested so you know the type and amount of fertilizer needed. Fertilize in the fall, not the spring and never the summer.**
- **Set your mower high. Only remove the top third of the grass blade.**
- **Leave grass clippings on the lawn. This will cycle nutrients back into the soil.**
- **Reduce, or even better, eliminate your use of pesticides.**

Japanese Stiltgrass
(Microstegium vimineum)

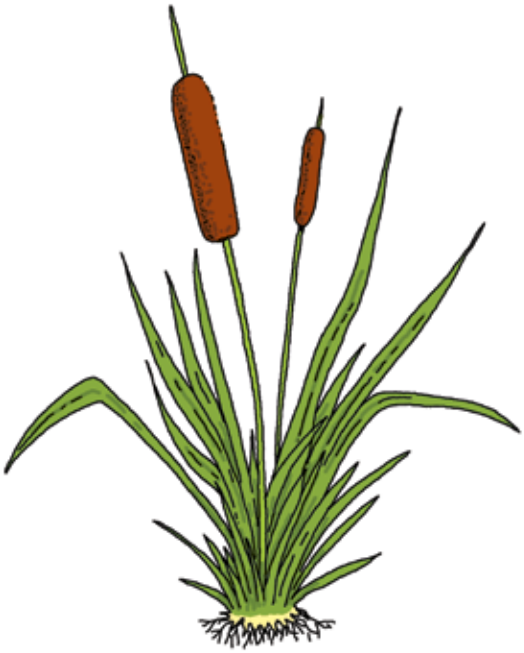
Description
This annual grass spreads and forms thick stands. It can grow up to a meter in length. The alternate, pale green leaves (3 to 8 centimeters long) have a distinctive white or silver line running through the center of each leaf. A thin stalk of tiny flowers is produced from September through October. Each plant can produce 1,000 seeds in the fall.

Stiltgrass is used as a packing material for porcelain and other delicate items. This is probably how this very aggressive invasive plant was introduced to the U.S. Like some other invasive plants, Japanese Stiltgrass changes the chemistry of the soil, making it difficult for native plants to grow. Native plants are very important food sources for butterfly larvae and other insects.

Distribution and Habitat
Japanese Stiltgrass prefers forested and wetland areas but can be found in a variety of conditions, including lawns. It is common in disturbed areas and has spread into all five physiographic provinces.

Role in Food Web
Food source for butterflies, grasshoppers, crickets and other insects.

Common Cattail
(Typha latifolia)



Description
Growing up to 2 to 3 meters tall, these sturdy plants have long leaf blades. The brown cylindrical flower can be seen May to July. In the fall they release lots of fluffy white seeds which are spread by the wind and water.

Distribution and Habitat
Cattails are always found near water and prefer to be in full sun. They form dense stands in shallow, slow-moving or still water, such as along the edges of marshes and ponds. They are found in all five physiographic provinces.

Role in Food Web
Canada Geese, Muskrats and several species of ducks feed on Common Cattails.

Cattails have many uses. The leaves can be used to weave baskets; glue can be made from the stem; its pollen is used in fireworks; and the plant itself is used as a biofuel. It is also great at absorbing pollutants including heavy metals. Because of this, cattails are used to help treat sewage and wastewater in wetlands constructed to treat pollution.

English Ivy
(Hedera helix)

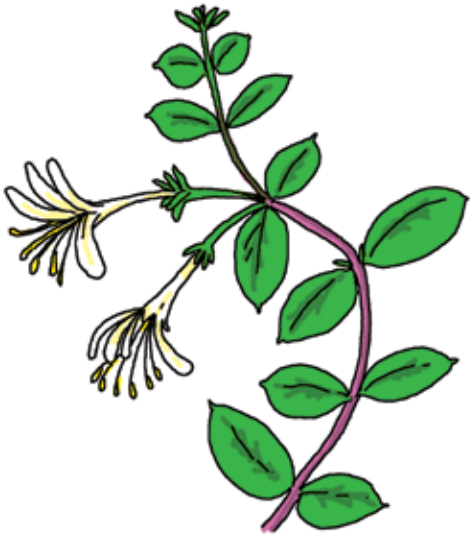
Description
This evergreen, perennial vine climbs 20 to 30 meters high. Leaves are alternate, dark to bright green and waxy. Leaves vary in color and shape but are most often three-lobed. Small greenish-yellow flowers in umbrella-like clusters are present in late summer. Purple-black berries develop in winter. It spreads by seed and broken stems and leaves which can take root.

This non-native vine is very invasive and was introduced to the United States as an ornamental plant. Despite all the problems it causes, people continue to buy and plant English Ivy as a ground cover. The vine quickly escapes the area where it is planted and climbs nearby buildings and trees. As the vine covers a tree, it blocks out the sun and prevents photosynthesis. This can cause the tree to die.

Distribution and Habitat
English Ivy climbs up trees and buildings in woodlands and suburban areas, and can also spread horizontally along the ground. It thrives in shade but can adapt to a variety of soils. It has spread into all five physiographic provinces.

Role in Food Web
It is a food source for bumblebees, honeybees and songbirds including sparrows, American Robins and Cedar Waxwings.

Japanese Honeysuckle
(Lonicera japonica)



Description
This perennial climbing vine is a non-native invasive. In Virginia, the leaves are semi-evergreen as they last into the winter. Leaves are opposite and oval in shape. Sweet-smelling flowers are produced from April to July. The flowers are white at first, and then turn yellow after being pollinated. Small black fruits form in the fall. It reproduces by seed and rhizomes.

Distribution and Habitat
It is common in all five physiographic provinces.

Role in Food Web
Japanese Honeysuckle is a food source for White-Tailed Deer, Eastern Cottontail Rabbits, Groundhogs, honeybees, swallowtail butterflies, Wild Turkeys, hummingbirds and songbirds such as American Robins and sparrows.

There are many different species of honeysuckle. In addition to this vine species, Fairfax County has several bush-type honeysuckles which are also non-native and invasive. There is a native honeysuckle vine called Coral or Trumpet Honeysuckle (*L. sempervirens*) for its spectacular, bright-red tubular flowers. Although it is rare to see the native honeysuckle in the wild, you may find it in a landscaped flowerbed.

Virginia Creeper
(Parthenocissus quinquefolia)

Description
This perennial, woody, deciduous vine climbs using tendrils. Small, green, often unnoticed flowers are produced May to July. It has dark purple to black berries in the fall. It is often mistaken for Poison Ivy. Leaves are alternate and compound, comprised of five leaflets. The vine turns a beautiful shade of red in fall. Plants reproduce by seed and spread by rooting stems.

Virginia Creeper and Poison Ivy thrive in the same environment and are often found growing together. Many people confuse Virginia Creeper with Poison Ivy. However, Virginia Creeper leaves have five leaflets while Poison Ivy's have three. Remember: "Leaves of three-let it be. Leaves of five-let it thrive." While Virginia Creeper is not poisonous, its berries and sap contain oxalic acid. Some people develop a skin rash when they are exposed to this acid.

Distribution and Habitat
It is found in all five physiographic provinces. It thrives in partial shade to full sun and is tolerant of many soil conditions. It can be found growing up trees, along fences and on the ground. Although a native plant to the area, it can outcompete other ground cover plants and slowly kill trees that it grows on.

Role in Food Web
Many birds including Common Crows, American Robins and woodpeckers, and mammals such as Gray Squirrels, White-tailed Deer, White-footed Mice, Red Foxes and skunks feed on this vine.

Poison Ivy
(Toxicodendron radicans)

Description
This perennial, deciduous woody vine can grow along the ground and up trees and buildings. Leaves are alternate and compound. Leaf shape, texture and color vary, but leaves are always comprised of three leaflets. Each leaflet cluster grows on its own stem. Tiny yellowish-white flowers are produced May to July, and become dull white berries in the fall. It reproduces by seed and rhizomes.

Distribution and Habitat
It is found in all five physiographic provinces. Poison Ivy thrives in partial shade to full sun and can tolerate a variety of soil conditions. It is commonly found growing along the edge of the forest, fence rows, roads and other areas disturbed by human activity. It can grow up trees and buildings, as well as along the ground.

Role in Food Web
The berries are a food source for many bird species including Wild Turkeys, Common Crows, American Robins, Carolina Chickadees and Eastern Bluebirds, and mammals such as Raccoons, White-tailed Deer and Eastern Cottontail Rabbits.

Poison Ivy sap causes an itchy and painful allergic skin reaction in most people upon contact. If you have been in an area with Poison Ivy, wash your skin with cold water and soap as soon as possible to remove any oil. Once the oil is washed off, Poison Ivy cannot be spread by touching the rash. If you are one of the lucky few (approximately 15 percent of people) who do not "get" Poison Ivy, you should still avoid contact with this plant. Each time you touch it you may become more sensitive to it.

Activity: How big is it?

Many species look alike, even to scientists. Knowing the size of an organism can help identify what species it is. Sometimes a scientist needs to measure a specific trait of an organism, like the length of a fish's fin compared to the length of its body, to determine the exact species being studied. Find a plant that is shorter than your field guide–this will allow you to use the ruler on the back of the book to measure the plant. Draw the plant, describe it and if possible, identify it. Estimate the height of the plant, the size of the blossom (if any) and the leaves. After you have completed this, use the ruler on the back of the field guide to accurately measure the plant and its components.

Challenge yourself! Measuring something small is easy, but accurately measuring something large (like a tree) can be challenging. What are some ways you could measure large organisms?

Draw species here

Describe species here

	Estimated Size	Actual Size
Height		
Blossom		
Leaf		

Activity: Organism observation

What can you tell by looking at an organism? Look at the three organisms pictured below, paying attention to their physical characteristics (traits) like shape, size and color. Is there anything you can tell about their roles in the food web or their habitats?

Do the organisms share any characteristics? What are the differences between the organisms? Write your observations in the table below.

		
Pine (Page 48)	Mosses (Page 16)	Black-eyed Susan (Page 25)
Traits		
Similarities		
Differences		

Based on your observations, how would you place these organisms into categories?

Challenge yourself! Consider also the Red and White Clover (Page 29), Common Cattail (Page 33) and Flowering Dogwood (Page 45). Do these organisms fit into the categories you created? How do they fit, or why do they not fit?

American Holly
(Ilex opaca)

Description
American Holly is an evergreen. Its leaves are leathery and glossy, 5 to 10 centimeters long, with spines along the edges. Leaves are arranged alternating along the branch. It grows up to 12 to 15 meters in height and 0.3 to 0.6 meters in diameter. Male and female flowers grow on separate trees. The fruits are found only on female trees; they are bright red, round, fleshy and berrylike.

American Holly is the official tree of Fairfax County. It is a popular ornamental tree, and its foliage and berries are used for holiday decorations.

Distribution and Habitat
American Holly is found in the Coastal Plain, Piedmont and Blue Ridge provinces. Trees grow in a variety of habitats, especially those with moist, well-drained, acidic soils.

Role in Food Web
The berries are a food source for a variety of wildlife such as songbirds, White-tailed Deer and Wild Turkeys.

Ash
(Fraxinus americana)

Description
Ash trees grow up to 12 to 18 meters in height and 0.5 meters in diameter. The leaves are compound with seven to nine leaflets and grow opposite of each other on branches. Male and female flowers usually grow on separate trees. The fruits are 2.5 to 5 centimeters long, winged and flattened with a round seed cavity.

Distribution and Habitat
Ash trees are found throughout Virginia in all five physiographic provinces. They prefer rich, moist, well-drained soils on moist river bottoms and stream banks.

Role in Food Web
A variety of wildlife rely on the Ash for food: birds and mammals eat the seeds; White-tailed Deer browse the foliage; and beavers and Eastern Cottontail Rabbits eat the bark.

The best baseball bats have historically been made from ash wood.

An invasive beetle from Asia, the Emerald Ash Borer (Page 149), is threatening the Ash tree. Those purple boxes you might see hanging in trees are part of an effort to track and stop the spread of this infestation.

Did you notice...
The right side of the tree illustrations show the fall colors of the leaves and what the bare branches would look like during the winter.

Black Cherry
(Prunus serotina)

Description
Black Cherry grows up to 18 to 30 meters in height and 0.3 to 1.25 meters in diameter. The leaves are alternate, thick and leathery with serrated edges. In the spring, they have small white flowers in clusters 10 to 15 centimeters long. The ripe fruit is dark purple to almost black.

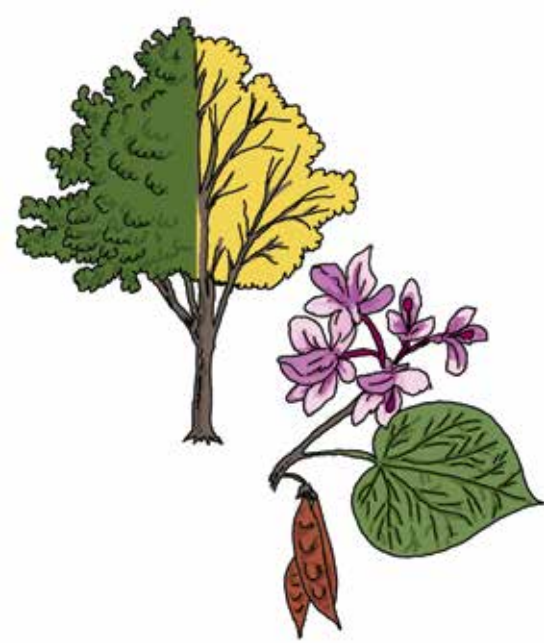
Black Cherry is the largest of the native cherries in the United States. The dense, richly colored wood is used to make fine furniture.

Native Americans used Black Cherry bark to make cough medicine.

Distribution and Habitat
Black Cherry trees are found throughout Virginia in all five physiographic provinces. They grow best in mountains and prefer sites that are not too wet or very dry.

Role in Food Web
The fruit is an important food source for many birds including American Robins, European Starlings, Northern Cardinals, woodpeckers, sparrows and Wild Turkeys, and for mammals such as Virginia Opossums, Red Foxes, Raccoons, squirrels and rabbits.

Eastern Redbud
(Cercis canadensis)



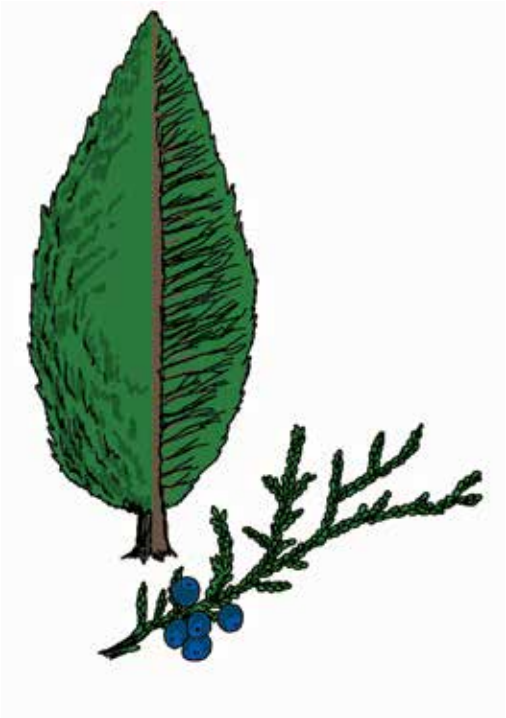
Description
Eastern Redbud is a small tree that grows up to 4.5 to 9 meters in height and 6 to 25 centimeters in diameter. The leaves are alternate and heart-shaped. The bright pink to purple flowers appear before the trees leafs out and are among the first flowers to appear in the spring. The fruits are oblong and flattened, 5 to 10 centimeters long and resemble pea pods. These pods can often be seen on the tree throughout winter.

Native Americans used Redbud bark to make medicines to treat whooping cough and other illnesses.

Distribution and Habitat
Eastern Redbud is found in the Piedmont, Blue Ridge, Valley and Ridge and Appalachian Plateau provinces. Trees usually grow in woodland understories and along forest edges. Redbuds thrive in rich alkaline soils in partial shade. They are also widely planted as ornamentals due to their lovely springtime flowers and heart-shaped leaves.

Role in Food Web
The seeds are eaten by some birds (including Bobwhite Quail, pheasants and American Goldfinches) and White-tailed Deer.

Eastern Redcedar
(Juniperus virginiana)



Description
Eastern Redcedar grows up to 18 to 24 meters in height and 0.3 to 0.6 meters in diameter. Eastern Redcedar is an evergreen and has needles for leaves. The needles are 0.4 centimeters long, shiny, dark green and scale-like. Male and female flowers grow on separate trees. Cones develop in the fall and are found only on female trees; they are round, fleshy and look similar to blueberries. Cedar bark is distinctive as it is very fibrous in appearance.

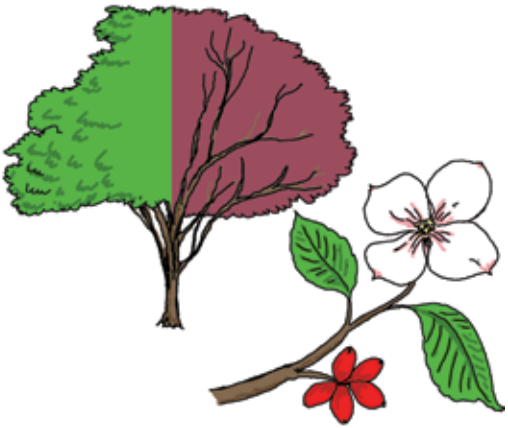
Because its natural oils repel insects, the wood is used to make chests, closet linings and pet bedding.

Despite its name, the Eastern Redcedar is actually a type of juniper.

Distribution and Habitat
Eastern Redcedar trees are found throughout Virginia in all five physiographic provinces. They tolerate a wide variety of soil and moisture conditions. They grow in wetland edges and dry, rocky ridges; they thrive on barren soils where few other trees are found.

Role in Food Web
The berry-like cones are a favorite food for many birds. Eastern Cottontail Rabbits, foxes, Raccoons, skunks, Virginia Opossums and Coyotes also feed on the cones. White-tailed Deer browse the foliage as an emergency food source in the winter.

Flowering Dogwood
(Cornus florida)



Description
Flowering Dogwood is a small tree growing up to 6 to 9 meters in height and 15 to 20 centimeters in diameter. Leaves grow opposite of each other on branches. Male and female flowers grow on separate trees. The actual flowers are very small, yellow-green, buttonlike clusters that are surrounded by four large white or pink petal-like leaves called bracts. The fruits are bright red, oval and berrylike.

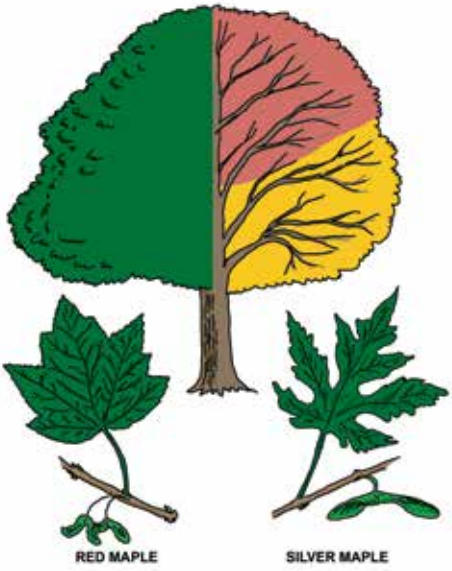
Distribution and Habitat
Flowering Dogwood trees are found throughout Virginia in all five physiographic provinces. Their preferred habitat is hardwood forest understories, but they are also widely planted in suburban areas.

Flowering Dogwood is the state tree and the state flower of Virginia.

In recent years, many dogwoods have been infected with a fungus which kills or seriously hurts the tree. If you choose to plant a dogwood, select the 'Appalachian Spring' cultivar that is resistant to this disease.

Role in Food Web
The fruits are poisonous to humans, but 35 species of birds and many small and large mammals eat them. White-tailed Deer and Eastern Cottontail Rabbits browse the foliage.

Maple
(Acer spp.)



Description
Maples grow up to 15 to 27 meters in height and 0.6 to 1 meters in diameter. The multi-lobed, toothed leaves grow opposite of each other on the branches. The winglike fruits grow in V-shaped pairs. Children often call them “helicopters” because of the way they slowly spin to the ground. Red Maples *(A. rubrum)* are one of the first trees to bloom in the spring, giving the tree a red “glow.” Maples are also known for their vibrant fall colors.

While all maples can be tapped for syrup-making, the Sugar Maple *(A. saccharum)* makes the best syrup. It takes more than 32 gallons of sap to make one gallon of maple syrup!

Distribution and Habitat
Several different species of maple are found throughout Virginia in all five physiographic provinces. The Red Maple tolerates the widest range of soil and climate conditions of any American tree species. They grow in a variety of habitats, including dry ridges, near rivers and streams and in swamps.

Role in Food Web
A variety of wildlife use maples as a source of food: squirrels, mice and birds eat the fruit; White-tailed Deer browse young sprouts; and beavers feed on the bark. Woodpeckers make holes in the bark to get at the sap. Other birds and even bats sometimes visit woodpecker sap holes to enjoy the sweet treat!

Oak
(Quercus spp.)

Description

The oaks are one of the largest and most diverse groups of trees on Earth. There are more than 600 species found worldwide, with 26 species that are native to Virginia. All oak trees make acorns, and most oak leaves have lobes. There are two major oak groups. The red oaks have leaves with pointed lobes (except for the Willow Oak, *Q. phellos*), and their acorns contain large amounts of bitter compounds called tannins. The white oaks have leaves with rounded lobes, and their acorns contain less tannins. The typical oak tree found in our area averages around 15 to 30 meters in height and 0.3 to 1.2 meters in diameter.

The vascular tissues in the wood of the White Oak *(Q. alba)* are plugged with a substance called tyloses, making the wood highly watertight. This makes it very valuable for whiskey and wine barrels, and historically for shipbuilding.

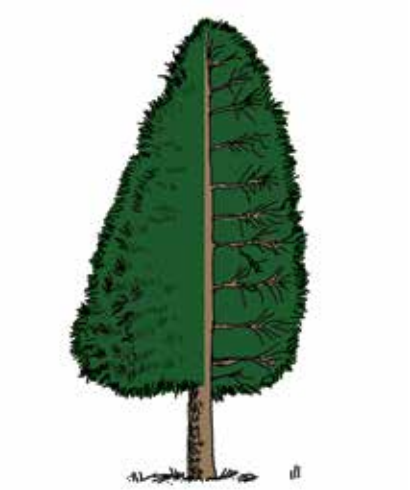
Distribution and Habitat

Different species of oaks are found throughout Virginia in all five physiographic provinces. They grow in a variety of habitats and soil types, including upland and coastal forests as well as near rivers and streams.

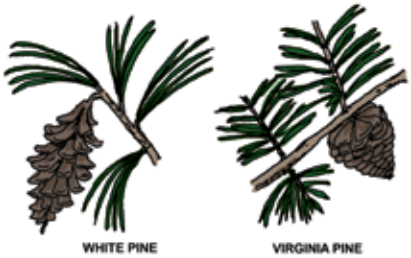
Role in Food Web

Acorns (especially those of the white oak group) are a very important source of food for much of the wildlife in Virginia including White-tailed Deer, Wild Turkeys, Eastern Gray Squirrels, Black Bears and woodpeckers.

Pine
(Pinus spp.)



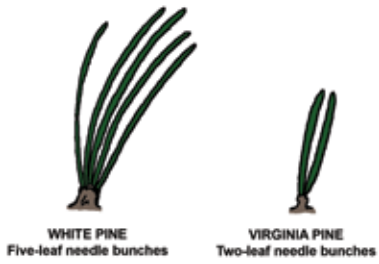
Description
Virginia has 12 species of native pine trees. The typical pine tree grows 15 to 33.5 meters in height and 0.3 to 1 meters in diameter. All pines are evergreens and have needle-like leaves. All species of pines produce cones which contain the seeds.



Distribution and Habitat
Different species of pines are found throughout Virginia in all five physiographic provinces. They are especially abundant in the southern Piedmont and the Coastal Plain provinces. They grow in a variety of habitats including dry, sandy or rocky ridges, old fields and on the margins of swamps.

The Eastern White Pine (*P. strobus*) is the largest conifer in eastern North America.

Role in Food Web
A variety of wildlife use pines as a source of food. Seeds are eaten by squirrels and songbirds, while mice and White-tailed Deer browse on young needles and bark.



Tree-of-Heaven
(Ailanthus altissima)

Description
This fast growing tree grows up to 21 to 24 meters in height and 0.3 to 0.6 meters in diameter. The leaves are compound, 0.3 to 1 meter long, with 11 to 41 leaflets. When crushed, the leaves produce an offensive odor that smells like burnt peanut butter, so it is sometimes called the Stink Tree! Male and female flowers grow on separate trees. The twisted, papery, winged seeds, 2.5 to 3.8 centimeters long, are produced in large clusters on female trees.

Distribution and Habitat
Trees-of-Heaven have spread throughout Virginia into all five physiographic provinces. They grow in sunny disturbed areas such as roadsides, field edges and woodland openings. They are tolerant of pollution and well-adapted to poor soils and urban environments.

Originally from China, the Tree-of-Heaven was introduced to the U.S. in 1784 by a gardener in Philadelphia. The plant produces a chemical that inhibits the growth of many other trees. The sap is also toxic to humans and may cause a skin rash or allergic reaction.

Role in Food Web
Native wildlife usually do not use Tree-of-Heaven as a food source, although White-tailed Deer and small rodents may sometime browse on it.

Activity: What plant can you find?

This field guide includes many different plant and animal species seen in Fairfax County, yet represents only a small percentage of the total species that live in the county. Have you seen a plant near your school or home that does not appear in this guide? Observing a species' physical appearance, size, location and behavior are all important in describing and identifying an organism. Take a few minutes to go outside and find a plant that is not included in the field guide. Use the area below to create your own entry in the field guide describing the plant. Include a sketch of the plant and describe any unique traits that the plant displays. Why do you think this plant was not included in the guide?

Activity: Traits and adaptations (Part 1)

An organism's ecological niche explains its way of life or role in an ecosystem. Each species has traits that are adapted to its niche. A trait is a characteristic, feature, quality or behavior. An adaptation is a trait that helps an organism to survive in its environment. What are some of the traits that the organisms in this Field Guide use to deal with factors in their environment? List four in the chart below (the first row contains an example).

Organism	Environmental Habitat	One Trait	How you think this trait helps it survive in its environment
White Sucker	Aquatic	Downturned mouth	Helps it "slurp up" food from the bottoms of streams and other bodies of water

Activity: Traits and adaptations (Part 2)

Many plants and animals found in Fairfax County are generalists. Another way of saying this is that they have a broad ecological niche: they are able to tolerate a wide range of environmental conditions and are able to use a variety of different resources (such as food, soil conditions, habitats and water availability). Raccoons (Page 143) are generalists because they flourish in a wide range of habitats, eat almost anything, and adapt easily to the presence of people. Organisms that are specialists have more narrow niches and tend to rely on fewer resources. Wood Turtles (Page 123) are specialists because they require very specific environmental conditions in order to survive.

Why do you think the county has so many generalists? Has it always been this way? Have environmental conditions changed since European colonists first arrived in Virginia? In what ways? Re-read the descriptions of the Monarch Butterfly (Page 77) and the Blacknose Dace (Page 93) in the Field Guide. Based on what you know about these organisms' life histories, distributions, habitats and food web interactions, discuss how you think their populations and communities may have changed since colonial times.

DECOMPOSERS

When plants and animals die, they become food for decomposers like bacteria and fungi. All decomposers play an important role in the food web by breaking down nutrients in the dead matter and returning them to the soil. Producers can then use the nutrients to grow.

While decomposition allows the Earth to function, the process can also be harmful to life. Algae blooms occur when excess nutrients, like nitrogen and phosphorus, from the environment are washed into a local water body. When the algae bloom dies, the decomposition process depletes the dissolved oxygen in lakes, ponds or rivers so that little or none is left at the bottom. This lack of oxygen can harm or even kill other aquatic organisms such as fish.

Bacteria

Description

Bacteria are single-celled organisms that are found everywhere on Earth. Bacteria help turn milk into cheese, cucumbers into pickles and cabbage into sauerkraut. Some bacteria help decompose dead plants and animals.

While some bacteria are helpful, some are harmful and cause people to get sick. Fairfax County monitors the level of *E. coli* (a specific type of bacteria found in the intestines of warm-blooded animals) in our waterways to ensure that water recreation activities, like swimming, won't make us sick.

The earliest evidence of cheese-making dates back to 5,500 BCE (Before the Common Era) in what is now Poland. It is thought that cheese was discovered accidentally when milk was stored too long in an animal stomach or intestine. The milk was turned into curds and whey from the bacteria still living in the organs.

Distribution and Habitat

Bacteria can be found everywhere. They live in the water, in the air and on land; even on and in us! You may have up to 100 million bacteria on and in your body right now. The bacteria in our stomach digest the food we eat.

Fungi

Description

Fungi like mushrooms, mildew, mold and toadstools are not plants (i. e. not producers). They don't have chlorophyll so they can't make their own food. Fungi decompose dead plants and animals by releasing enzymes and absorbing the dissolved nutrients.

Around 100,000 species of fungi have been formally classified. Most fungi are invisible to the naked eye and live in soil and dead matter. There are many fungi that are helpful. Penicillin and other antibiotics are made from fungi. Some fungi like mushrooms, truffles and yeast are edible or used in making food. Other fungi are harmful and should not be eaten- NEVER eat mushrooms you find in the woods!

Certain species of mushrooms are highly prized. One of the most sought-after edible mushrooms is the truffle (*Tuber* spp.). Truffles are subterranean mushrooms, meaning that they grow completely under the ground, and are usually found close to trees. They are among the most expensive of the world's natural foods. Specially trained pigs called "truffle hogs" are commonly used to find these mushrooms due to their ability to sniff them out.

Distribution and Habitat

Fungi are found throughout Virginia in all five physiographic provinces and grow in a wide range of habitats.

Role in Food Web

A wide variety of vertebrates (deer, mice, rabbits) and invertebrates (snails, slugs and ants) feed on mushrooms as they are an important source of protein. However, many species of mushrooms contains toxins that may kill the consumer.

Activity: Name game

People usually refer to plants and animals by their common names. However, common names can differ from place to place. For example, what we call a “moose” in North America is called an “elk” in Europe. But the animal we call an “elk” is called a “red deer” in Europe! A common name can also be given to more than one organism. For example, several different kinds of fish are called “bass,” even though they aren’t closely related. This can get very confusing!

Scientists use scientific names (genus + species) to refer to organisms. Latin and Greek words or word parts are often used for scientific names. Scientific names tell you something about an organism’s relationships with other organisms. Sometimes the scientific name and the common name mean the same thing: for example, the scientific name for the White Oak tree is *Quercus alba*, which is Latin for “white oak.” Scientific names can also describe an organism’s appearance, traits or behavior. And did you know that many words in English have Greek and Latin roots, too? If you connect scientific names to words you use every day, it makes it easier to remember scientific names and figure out what they mean. Some examples of Greek and Latin roots are shown below; examples of English words with the same roots appear in parentheses.

Body parts
- *Arthr* = joint (arthritis)
- *Derma* = skin (dermatologist)
- *Dent or Dont* = Tooth or teeth (dentist)
- *Folia or folium* = leaf or leaves (foliage)
- *Ptera or ptero* = wing or fin (pteradactyl)
- *Pod or ped* = foot (pedal, pedestrian)
- *Rhin* = nose (rhinoceros)

Shape
- *Oides* = “shaped like” or “similar to” (android)
- *Variabilis* = changeable (variable)

Size
- *Micro* = small (microscope)
- *Macro* = large (macroinvertebrate)

Where it lives or was discovered
- *ica* = “from,” as in virginica (“from Virginia”) or japonica (“from Japan”)
- *an or ana* = “native of”
- *ensa or ensis* = “native of”
- *Palustris* = lives in marshes

Color
- *Rubus or rubrum* = red (ruby)
- *Alba or albus* = white (albino)

Numbers
- *Uni* = one (unicorn)
- *Bi* = two (bicycle)
- *Deca* = 10 (decade)

Unique attributes
- *Toxi* = poisonous (toxic)
- *Foeti* = bad smelling, stinky (fetid)

Greek or Roman Mythology
- In Greek mythology, a woman named Arachne (ah-RACK-nee) challenged a goddess to a weaving contest. The goddess lost and angrily turned Arachne into a spider. So spiders and their relatives are classified as *arachnids*.

1. Look at the picture of the Largemouth Bass on Page 98. The scientific name for the Largemouth Bass is *Micropterus salmoides*. What does this name mean? Why do you think the animal has this name? (Hint: *Salmo* is the scientific name for salmon.)

_____

_____

_____

2. Look around you and select an animal or plant. Give it a scientific name based on what you can observe about its size, shape, color or other traits. Use at least one root word from the list above. Explain what characteristics or features you think best describe the organism you named.

_____

_____

_____

Challenge yourself! What are some other words that you can think of that use the same Greek and Latin roots shown above? The words do not have to be English.

_____

_____

_____

My Notes

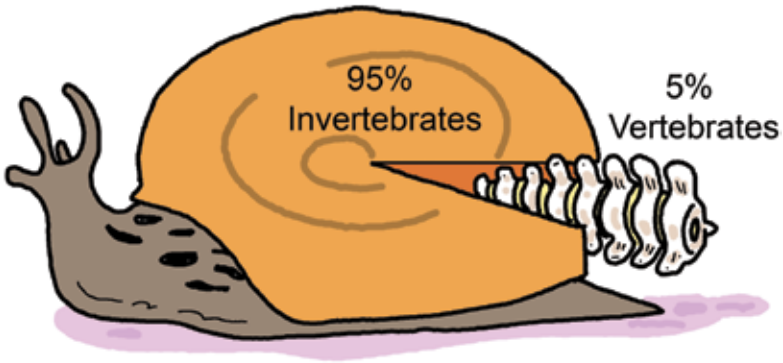
ANIMALS

Animals are organisms that must eat other living organisms in order to survive. Most animals have specialized sense organs and a nervous system and can move around on their own.

INVERTEBRATE ANIMALS

Invertebrates are animals without backbones and are the most abundant creatures on Earth. They include more than 95 percent of all known living animal species. Invertebrates include the sponges, insects, molluscs, jellyfish and worms, among many other groups of animals. Animals with backbones are known as vertebrates and consist of the fishes, amphibians, reptiles, birds and mammals.

Invertebrates were the first animals to evolve around 600 million years ago. They are found just about everywhere in both aquatic and terrestrial habitats. Although they do not have internal bones, they often have a hard outer shell or a type of internal fluid-filled skeleton as seen in the jellyfish and worms. The single largest group of invertebrates is the insects. Many invertebrate life cycles involve a complete change in body plan known as metamorphosis. An example of this is the caterpillar turning into a butterfly



ANNELIDS

Segmented worms make up the group of organisms known as annelids. This group consists of earthworms, leeches and marine worms called polychaetes. Annelids have no legs and no hard shell. Their bodies are divided into many little segments. They have well-developed internal organs. Their name comes from the Latin word *anellus*, which means "little ring."

EARTHWORMS
(Oligochaeta)

Description
Earthworms have little coloration and appear white, gray, pink or reddish brown. Each segment has stiff little hairs that help the worm move. They have a mouth and tiny brain at one end but they do not have eyes or a nose. There are over 1,800 species of earthworms.

Distribution and Habitat
Earthworms are found in all five physiographic provinces. Their main habitat is in the soil, but they may be found in decaying vegetation and streams. They need moist environments to survive. If they dry out, they have trouble burrowing into the soil and may die.

When earthworms eat, they take in nutrients from microorganisms in the material they ingest. Earthworms then pass wastes in the form of casts. Casts are rich in nutrients like nitrogen and phosphorus. Earthworms also help loosen the soil so air can circulate and rain can replenish the groundwater.

Role in Food Web
Earthworms eat dead plants and animals. They may play the part of a decomposer in a food web. Worms have many predators, including ants, mites, centipedes, earwigs, nematodes, fly larvae, termites, springtails, snails, slugs, spiders, birds, rats, mice, moles, toads, turtles, snakes, crayfish and fireflies.

MOLLUSCS

Molluscs include such diverse creatures as squids, octopi, clams and scallops. Molluscs are characterized by having soft bodies with a head and foot region, and an area containing their internal organs called the visceral mass. They do not have legs. They typically have a hard shell for protection, although some do not. They can live in the most extreme of habitats, including deep in the ocean and on mountaintops, although most are marine. Molluscs are an important food source for humans, and their shells were historically used by humans as tools, jewelry and money. All molluscs produce eggs from which larvae or miniature adults emerge.

Leopard Slug
(Limax maximus)

Description
Leopard Slugs can grow up to 10 centimeters long and are grayish yellow with black spots or bands. They are often wrinkled and have four tentacles on their head. Slugs do not have shells. They are nocturnal and produce a mucus slime to crawl over for protection. This slime leaves a trail that they use to return to the same feeding spot the next night. Leopard Slugs are native to Europe, North Africa and parts of Asia.

Distribution and Habitat
Leopard Slugs live in damp, shady places in fields, forests and gardens. They are found in all five physiographic provinces.

Role in Food Web
They eat leaves, flowers, fruits, mushrooms, dead animals and other slugs. Predators include toads, turtles, beetles, birds, flies and fireflies.

Eastern Land Snail
(Gastropoda)

Description
Eastern land snails have a single shell, a muscular foot for creeping, and one or two pairs of tentacles with eyes at the end of one pair. They secrete mucus to give them a cushion to crawl over rough spaces and to keep them from drying out.

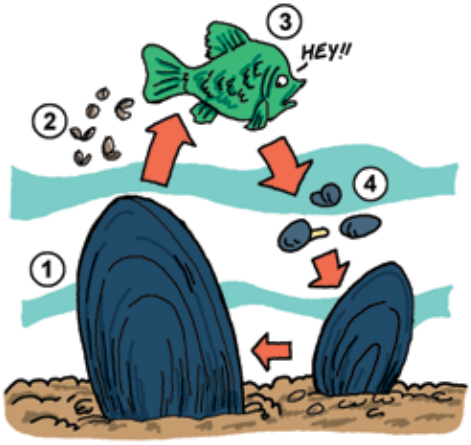
Distribution and Habitat
Eastern land snails live in the leaf litter of forests, old fields and wetlands. They are also found in disturbed habitats such as gardens, river banks, fields and cities. They are found in all five physiographic provinces.

Land snails are important calcium cyclers because their shells are made of calcium carbonate, which passes up the food chain when they are eaten by other predators. Snails may absorb contaminants in the soil into their body tissues. This makes them useful indicators of environmental pollution.

Role in Food Web
Land snails eat a wide variety of organic material such as fresh and decaying plant material, fungi, bark, algae, animal carcasses, feces, empty snail shells, nematodes and other snails. Predators include parasitic mites, nematodes, flies, beetles, other snails, firefly larvae, salamanders, turtles, shrews, mice, small mammals and ground foraging birds such as grouse and turkeys.

Freshwater Mussels
(Bivalvia)

Description
Freshwater mussels consist of two shells (bivalve) connected by a hinge-like ligament with soft body parts inside. They vary in size, shape and color. They use their "foot," a long muscular body part that sticks out from the shells, for movement and burrowing. The wide variety of shapes and colors are reflected in species like Purple Wartyback, Pink Heelsplitter and Threeridge.



1. Adult male mussel releases sperm into the water near female
2. Young mussels are released into the water
3. They attach to a host fish's fins or gills
4. Juvenile mussels release from host and drop to bottom to mature

Mussels can live up to 100 years. Through their siphoning actions they filter bacteria, algae and small particles which improves water quality. Water pollution, dams and exotic introductions threaten many species of freshwater mussels.

Their shells are a key ingredient in the pearl industry. Pieces of shells are ground up into beads and inserted into oysters which form a pearl around them.

Distribution and Habitat
Freshwater mussels live in gravel and sand on the bottom of streams and rivers. They are found in all five physiographic provinces.

Role in Food Web
They eat detritus (tiny bits of dead plant and animal matter) and plankton (living animal and plant material such as bacteria and algae). Predators include Muskrats, Raccoons, catfish, herons and ducks.

Activity: Nature all around

How often do you pause to notice living things around your home, school or local park? Even in urban and suburban areas of Fairfax County, you can find a variety of plants, insects and other small animals. You may have noticed the changing color of leaves in autumn, the hum of a mosquito near your ear, or the smell of honeysuckle at the edge of the woods. What else? Spend five to ten minutes outdoors looking, listening and sniffing for signs of life, then write down what you observed about the environment. Be sure to explain what you infer (what you think it means).

Place: _____

Time: _____

I see... _____

_____

_____

_____

_____

_____

Which might mean... _____

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I hear... _____

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Which might mean... _____

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I smell... _____

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Which might mean... _____

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ARTHROPODS

Arthropods are a group of invertebrates (animals without backbones) that share similar characteristics. The word *arthropod* means "jointed foot." Arthropods are the most diverse group of animals and constitute over 90 percent of the animal kingdom. They include the insects, centipedes, spiders and shrimps. They are able to live on the land, in freshwater and in the ocean. Arthropods share the following characteristics:

- Rigid exoskeleton (skeleton on the outside of the body) made of chitin
- Jointed appendages
- Bilateral symmetry (both sides of the body are the same)
- Segmented body

In order to grow, all arthropods must shed their exoskeleton and form a new one, a process called molting.

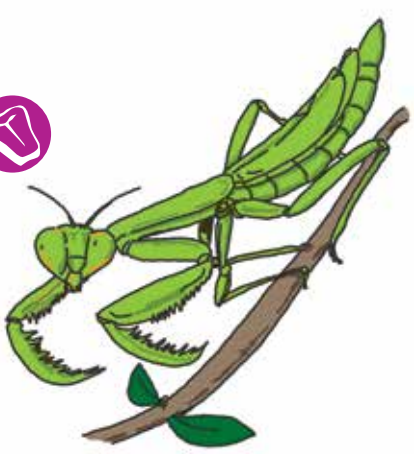
This field guide is focused on the following four groups of arthropods:

- Insects
- Arachnids
- Crustaceans
- Myriapods

The insects make up the largest group of animals on the planet. There are more than one million described species, with many more species that are yet to be discovered.

All insects have three body parts-the head, thorax and abdomen. In certain groups of insects these parts may be fused together. Certain baby (immature) insects do not have all three body parts until they are adults. Insects have six legs attached to the thorax, one pair of antennae and one or two pairs of wings. Insects lay eggs and undergo either complete or incomplete metamorphosis. They are able to adapt to many different habitats and diets.

Praying Mantis
(Mantodea)

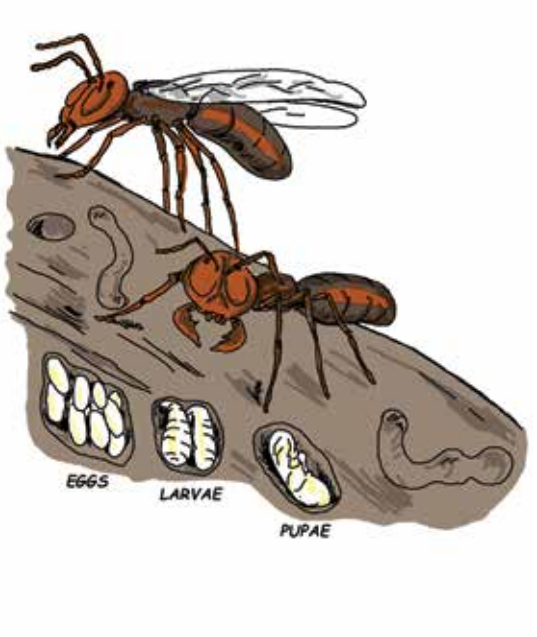


Description
The praying mantis is a large (5 to 7.6 centimeters), elongate, slow-moving insect that has very large front legs which it holds in a praying position. They are able to turn their heads almost 180 degrees and can look over their shoulder.

Distribution and Habitat
The praying mantis prefers warm climates and is usually seen climbing on bushes, trees or any structure where other insects live. They are found in all five physiographic provinces.

Role in Food Web
Praying mantises are highly predaceous insects and feed on a variety of other insects including other mantids. Predators include owls, snakes, bullfrogs and each other.

Carpenter Ant
(Formicidae)



Description
Carpenter ants are social insects and live in colonies where a queen lays all the eggs. The work is divided among different groups of ants. Most of the queen's babies are females which become worker ants that do not reproduce. The major workers, which are larger, defend the nest and forage for food. Minor workers care for the young and maintain the nest. A few babies are males and others become new queens. Each queen ant can lay thousands of eggs per year. Carpenter ants are mostly black and range from 0.6 to 1.2 centimeters long. The queen can be almost 2 centimeters long.

Carpenter ants do not eat wood but they do chew holes in it to make nests and colonies. This can cause damage to wood structures.

Distribution and Habitat
Carpenter ants live in dead wood such as fallen trees, stumps and even houses. They are found in all five physiographic provinces.

Role in Food Web
Some species of carpenter ants are carnivores and eat eggs, other insects, small animals and dead meat. Others are herbivores and eat seeds, fungi, nectar and honeydew (a type of secretion formed by aphids). Predators include birds (especially woodpeckers), bears, toads, spiders and other insects.

Dragonfly
(Anisoptera)

Description
Dragonflies have long thin bodies, very large eyes and two pairs of wings that they hold out flat on either side of their body. They are often very colorful. Dragonfly babies are called nymphs. Nymphs have three pointed structures at the tip of their abdomen and mouthparts that are modified to shoot out and grab prey.

Males fight aerial duels for territory, displaying their size and speed to each other.

Distribution and Habitat
Immature dragonflies live in freshwater. They are most abundant and diverse in small, slow-moving streams and ponds that have no fish, but are found in many shallow freshwater habitats. Adult dragonflies usually stay near water, but sometimes travel away from water while hunting or during migration. They are fast fliers, so they prefer to hunt in open areas, avoiding thick trees or other vegetation. They are found in all five physiographic provinces.

Role in Food Web
Adult dragonflies are often the top predators in ecosystems without fish. They are very important to help control pest populations. Dragonfly nymphs eat aquatic insects, tadpoles, small fish and other invertebrates. Adult dragonflies eat flying insects, especially mosquitoes and other true flies, but also aphids, smaller dragonflies, damselflies and just about any other insects they can grab. Predators include frogs, fish, crayfish, insect-eating birds and large spiders.

Eastern Tent Caterpillar Moth
(Malacosoma americanum)

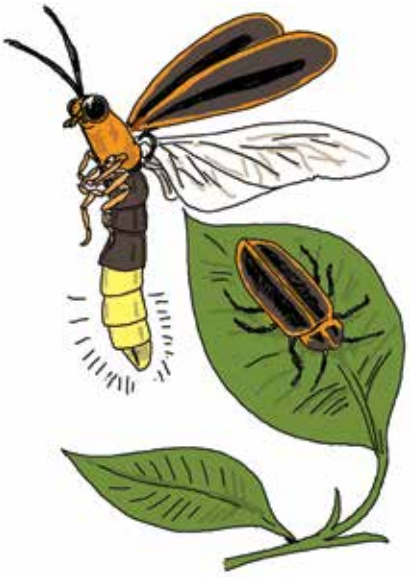
Description
Adult moths are generally reddish brown with white bands on the front wings and a wingspan of 4 centimeters. The juveniles, called caterpillars, are black with a white stripe down the back and blue spots or reddish and yellowish stripes on either side. They are sparsely covered with fine light brown hairs.

Distribution and Habitat
Eastern Tent Caterpillar Moths prefer to lay their eggs in cherry, apple and other trees of the rose family (Rosaceae) because these are the preferred food sources (host species) for the caterpillars once the eggs hatch. They are found in all five physiographic provinces.

When the caterpillars hatch they immediately climb up a tree branch and build a tent for protection. Many people consider them pests because they can quickly eat all of the leaves on a tree.

Role in Food Web
Caterpillars prefer Black Cherry trees as well as other trees and shrubs including apple, hawthorn, ash, birch, Blackgum, oak, Sweetgum, maple and poplar when preferred species are not available. The adult moths live just a few days and do not feed. Predators include American Robins, American Toads, Eastern Box Turtles, fish, Raccoons and Eastern Garter Snakes.

Firefly
(Lampyridae)



Description
Fireflies are actually beetles. They tend to be brown and have a soft body with leathery front wings. The males and females attract each other with a flashing green light, known as bioluminescence, which occurs when living organisms convert chemical energy into light. Firefly eggs and larvae also glow.

The flashing light acts as a language where different flashes act as coded signals. For example, some male fireflies use blinking patterns to help attract potential mates. If a female is interested, she flashes back.

Distribution and Habitat
Fireflies can be seen in meadows and open woods. They are found in all five physiographic provinces.

Role in Food Web
Firefly larvae are carnivores and eat snails, slugs, other fireflies, aphids, mites and soft-bodied insects. Adults only live long enough to reproduce and usually do not eat at all, although they sometimes drink nectar. Predators include Spring Peepers, toads, salamanders, skinks, birds, spiders, moles and bats.

Honeybee
(Apis mellifera)

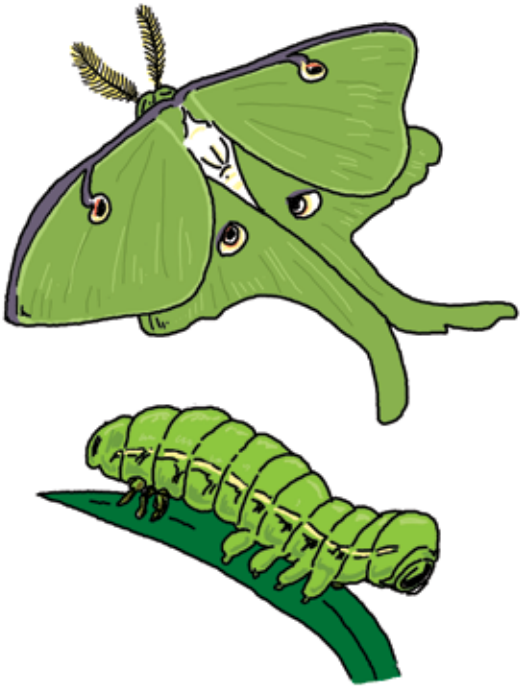
Description
Honeybees live in a nest called a hive ruled over by a queen bee. She is the largest female in the hive and the only one to mate. The male does not work. His only purpose is to mate; then he dies. The queen lays eggs in layers of wax called honeycomb. Eggs may become workers, males or new queens depending on the time of year and age of the hive. The babies hatch and the larvae pupate in the honeycomb to emerge as adults. Female workers take care of larvae, clean up the nest, make wax, build honeycombs, collect pollen and nectar and make honey. When new queens hatch, the old queen bee leaves the hive to start a new one.

Distribution and Habitat
Honeybees prefer habitats that have an abundant supply of suitable flowering plants, such as meadows, open wooded areas and gardens. They usually nest in tree cavities. They are found in all five physiographic provinces.

Honeybees are very important pollinators. They're unable to see the color red, so they never feed on red flowers. Honeybees use a pollen basket on their hind legs to gather and store pollen and carry it back to their hives.

Role in Food Web
Adults eat nectar and pollen from dandelions, clovers, milkweeds, fruit trees and other types of brightly colored flowers. The larvae eat honey. Queen bees eat royal jelly, a paste made by worker bees. Predators include varroa mites, crab spiders, orb-weaver spiders, wasps, toads, birds, Virginia Opossums, bears, skunks, mice, rats, Wax Moth larvae and ants.

Luna Moth
(Actias luna)



Description
Larvae (caterpillars) are bright green with long soft bodies that are sometimes protected by spikes or hairs. They have six jointed legs and five pairs of soft unjointed legs called prolegs. The adults have very large scaled wings with a wingspan of 11 centimeters. Their bodies are white with pinkish legs and pale green wings. The hindwings have eyespots and long tails. Each scale has a color, and together they give these insects their amazing wing patterns. Moths usually hold their wings folded down flat.

Luna Moths only fly on spring and early summer nights. They produce silk to make their cocoon which is formed in a leaf on the ground.

Distribution and Habitat
Luna Moths prefer deciduous hardwood forests. The females lay eggs on the bottoms of Black Walnut leaves. They are found in all five physiographic provinces.

Role in Food Web
Larvae eat leaves from many different species of trees and shrubs including Sweetgum and hickories. Adults do not have a mouth and do not eat. They live only about a week in order to mate. Larvae are preyed on by birds, spiders, stink bugs and paper wasps. Adults are consumed by bats, shrews, birds and large insects such as praying mantises.

Mayfly
(Ephemeroptera)

Description
Mayfly babies, called nymphs, can usually be recognized by gills along their abdomen and three (occasionally two) tails. As adults, mayflies have delicate, slender bodies. They hold their membranous wings vertically when at rest. You can easily identify an adult mayfly by its triangular forewings and two or three long, threadlike tails extending from the abdomen, short antennae and large eyes.

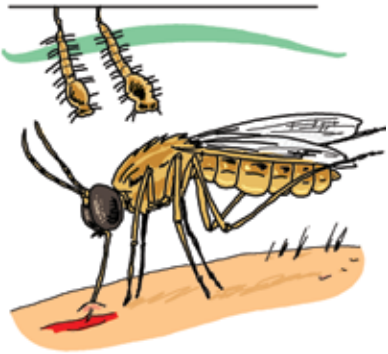
Distribution and Habitat
Immature mayflies live in both fast flowing streams and ponds. Adults live on land near streams and ponds. They are found in all five physiographic provinces.

Mayflies are extremely sensitive to pollution and are used by Fairfax County ecologists as indicators of stream health.

In some parts of the United States mayflies emerge from lakes and rivers in enormous numbers and can pile up on roadways.

Role in Food Web
Most mayfly nymphs feed on algae and detritus and some plant and animal material. A few species are carnivores. Adults do not have functional mouthparts and do not eat. Both adults and nymphs are important food sources for freshwater fishes, birds, amphibians, spiders and predatory insects.

Mosquito
(Culicidae)



Description

Adult mosquitoes are slender true flies, usually less than 1 centimeter long. They have long thin legs and wings. Some other true flies resemble mosquitoes, but only mosquitoes have long thin mouthparts called a proboscis. Adult mosquitoes have long antennae. The male mosquitoes' antennae look very feathery, while the bloodsucking females' antennae are thin and threadlike.

Mosquitoes carry many viruses and parasites that may cause diseases that are harmful and deadly to both humans and domesticated animals, including malaria and West Nile virus.

The mosquitoes most likely to be seen during the day in the county are non-native Asian Tiger Mosquitoes.

Distribution and Habitat

Mosquitoes lay their eggs on the surface of non-flowing fresh or brackish water. The larvae live in the water and come to the surface to breathe. Adult mosquitoes can be found almost anywhere near a water body. They live in all five physiographic provinces, especially in the Coastal Plain province where they are found in huge numbers.

Role in Food Web

The larvae of most mosquito species filter algae and bits of dead plants and animals from the water. A few species are predators on other aquatic insects, including other mosquito larvae. Adults drink nectar from flowers for energy. Before breeding, females bite vertebrates to feed on their blood. Some species specialize in certain groups, like birds or frogs, while others will bite whatever vertebrate they can find. Male mosquitoes do not bite. Predators include mites, damselflies, dragonflies, orb-weaver spiders, other spiders, Bluegills, salamander larvae, frogs, toads and many kinds of birds.

Monarch Butterfly
(Danaus plexippus)

Description
Adult Monarch Butterflies have bright orange wings with black veins and black borders with white spots and a wingspan of 8.9 to 10.2 centimeters. The veins on the female are thicker than those on the male. The caterpillars are banded with yellow, white and black stripes.

Distribution and Habitat
Monarch Butterflies prefer warmer climates and cannot tolerate frost. They can be found in meadows, fields, marshes, roadsides and near water. Females spend much of their time searching for or staying near milkweed because this is the preferred food source (host species) for the caterpillars once the eggs hatch. Monarch Butterflies require thick tree covering during the winter. Monarchs are one of the few butterfly species that migrate. Monarchs in the eastern United States migrate to Mexico in the winter and hibernate in Oyamel Fir trees. They are found in all five physiographic provinces.

Role in Food Web
Monarchs lay their eggs on milkweed plants which are the main food for the caterpillars. Adult monarchs feed on nectar from many kinds of flowers. Monarchs are poisonous to vertebrates due to the Common Milkweed that they eat. Invertebrates do not seem to mind the poison, and spiders, wasps, stinkbugs and ambush bugs will eat both larvae and adults.

ARACHNIDS

Arachnids are found in nearly all land habitats, with a few even able to live in aquatic habitats. They are a large group of animals which includes spiders, mites, scorpions and ticks. Most are carnivores and can consume only liquid food. They eat by injecting digestive chemicals into their prey and then sucking out the juice.

Most arachnids have two body parts, a cephalothorax and an abdomen, although these are fused together in certain species. They have eight legs and no wings or antennae. Many arachnids produce silk which they can use to catch prey. They reproduce by laying eggs which hatch into babies that molt into adults.

American Dog Tick
(Dermacentor variabilis)

Description
The American Dog Tick is reddish brown with white or yellow markings. The male is 5 millimeters long and the female is slightly larger. As its name implies, the American Dog Tick is often found on dogs as an adult.

Distribution and Habitat
The American Dog Tick prefers to live in wooded, shrubby and long grass areas. They are found in all five physiographic provinces.

Role in Food Web
The larvae and adults feed on the blood of small and large mammals including Eastern Chipmunks, Meadow Voles, squirrels, White-tailed Deer and humans. Predators include Wild Turkeys, salamanders, centipedes, harvestmen, toads and skinks.

The American Dog Tick bite may transmit bacteria or parasites that can cause Rocky Mountain spotted fever, tularemia or canine tick paralysis. Male ticks may attach to a host but feed very little (if at all) and therefore do not transmit diseases. Ticks should be removed from the body as soon as possible. Ticks feed slowly and most likely will not transmit diseases until they have been attached for several hours.

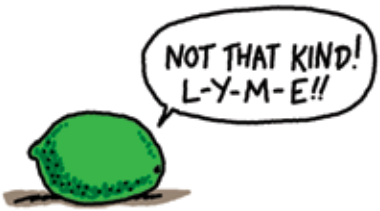
Deer Tick
(Ixodes scapularis)

Description
Female Deer Ticks are approximately 3.5 millimeters in length, much longer than the males which range from 2 to 2.7 millimeters. Adult females are reddish brown in color and have a black shield near the head and black legs. The adult males are black. The nymphs are approximately 1 millimeter in length. The Deer Tick is also known as the Black-legged Tick.

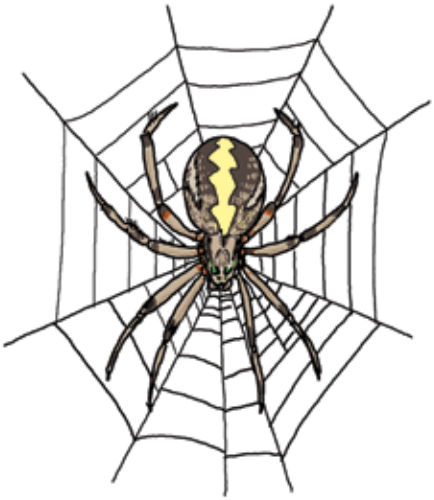
The Deer Tick bite may transmit bacteria or parasites which cause illnesses such as Lyme disease, anaplasmosis and babesiosis. The nymphal stage appears to be responsible for most Lyme disease cases. Male ticks may attach to a host but feed very little (if at all) and therefore do not transmit diseases.

Distribution and Habitat
The Deer Tick prefers to live in grassy areas, open fields and areas where fields and woodlands meet. They are found in all five physiographic provinces.

Role in Food Web
The larvae feed on the blood of birds and mammals, including humans. The adults prefer to feed on White-tailed Deer but will also feed on other mammals and birds. Predators include Wild Turkeys, salamanders, toads, skinks, centipedes and harvestmen.



Orb Weaver Spiders
(Araneidae)



Description
Orb weavers are more physically diverse than other groups of spiders. They usually have a fairly large abdomen, and it nearly always overlaps the back edge of the cephalothorax. The shape of the abdomen varies a lot between species. Sometimes it is spiny, sometimes smooth, or sometimes very irregular in shape. Nocturnal orb weavers are usually brown or gray. Diurnal species are more brightly colored and may be black and yellow or orange. Females in this group are often much larger than males.

Distribution and Habitat
Orb weavers live anywhere there are insects to eat and places to build their webs. They are much more common in humid habitats than in dry ones. They are found in all five physiographic provinces.

Role in Food Web
Orb weaver spiders eat other insects that get caught in their webs. Predators include wasps, birds, beetles and other spiders.

These spiders catch and eat the insects they trap in their webs. When an insect touches the sticky web it gets caught. The spider quickly rushes in and starts spinning and wrapping the insect in more webbing to keep it trapped. All orb-weavers have fangs that they use to bite their prey. The fangs have venom glands that produce toxins which paralyze and digest their prey.

The orb web is very distinctive, and is the easiest way to tell that a spider belongs to this group. Orb webs are flat, and have a neat spiral of sticky silk that goes around and around from the middle to the outer edge.

Sheet Web Spiders
(Linyphiidae)

Description
Sheet web spiders are small, dark, shiny spiders less than 8 millimeters long. Sheet web spiders have eight eyes in two rows of four. They have venomous fangs that they use to bite their prey. Rough spots on their fangs are rubbed together to produce sounds.

Most sheet web spiders are active at night and stay close to their webs. Males and females come together only to mate. Females hide their eggs in special sacs made of silk and attach them to their webs or grass stems. In order to grow, baby spiders must shed their exoskeleton, which they do many times during their lives.

Spiders in this family spin small horizontal sheets of webbing, or domes, and hang upside-down underneath the web. When a small insect or other animal walks across the dome, the spider bites through the silk and grabs its prey, pulls it through and eats it.

Distribution and Habitat
Sheet web spiders are found in all kinds of habitats, anywhere there are small insects and at least a little vegetation to support their webs. They are found in all five physiographic provinces.

Role in Food Web
Sheet web spiders eat insects and non-insect arthropods. Predators include other spiders, centipedes, ants, ground beetles and small amphibians.

Harvestman
(Opiliones)

Description

Harvestmen, commonly known as daddy long legs, differ from spiders because the cephalothorax and abdomen are fused into one unit. Their bodies are about 6 millimeters long with eight very long thin legs. Harvestmen do not have silk glands or venomous fangs and are completely harmless to humans. On either side of their mouth they have short appendages called pedipalps that they use to hold food while they chew it.

These animals have large glands that produce toxic chemicals to keep predators away. They can shed their legs when being pursued by a predator and move fast even if they lose a couple!

Female harvestmen can lay hundreds of eggs in one summer in several separate batches. Females lay their eggs in protected hidden places. Sometimes they guard their eggs and hatchlings and clean any disease-causing organisms off of the eggs. In some species, the male will guard and clean the eggs.

Distribution and Habitat

Harvestmen need humid places to live. They are most often found in forests and caves, climbing on rocks and vegetation. They are found in all five physiographic provinces.

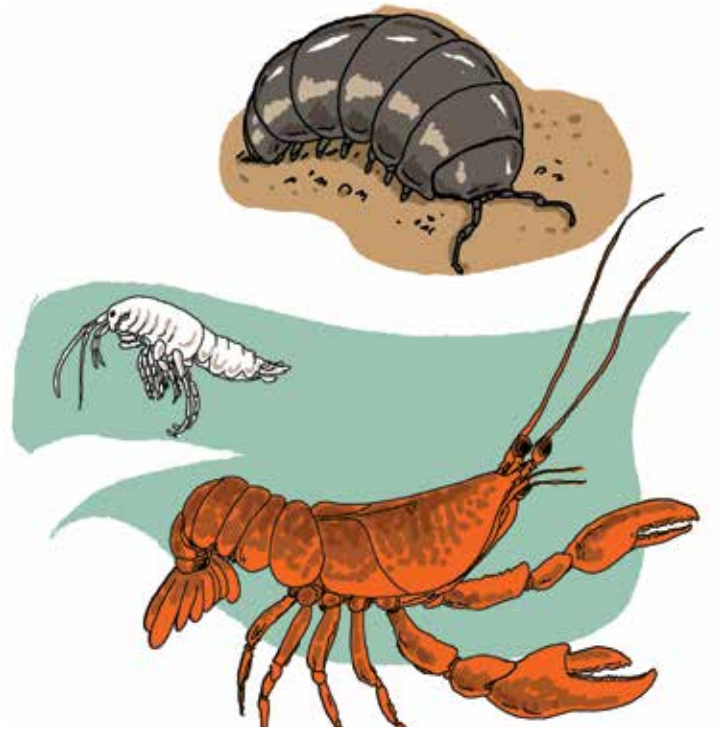
Role in Food Web

Harvestmen eat small invertebrates, larger dead invertebrates and dead plant material. Predators include birds, toads, wasps, ants and spiders.

CRUSTACEANS

The crustaceans are a large group of animals that includes shrimp, lobsters, isopods and barnacles. They inhabit both land and water, but need a damp or moist place to live. Most of them live underwater. Crustaceans are an important food source for humans.

All crustaceans have three body parts, a head, thorax and abdomen, five to ten walking legs and two pairs of antennae. They have special eating appendages to handle food and transport it into their mouth. Most crustaceans hatch from eggs and undergo a complete metamorphosis.



Crayfish
(Cambaridae)

Description
Crayfish have ten walking legs and large claws on the front pair of legs. They use their claws to defend themselves, attack prey and move things. Crayfish breathe dissolved oxygen through gills on either side of the cephalothorax (the head and thorax). The females lay their eggs and carry them on their abdomen until they hatch. When the eggs hatch, they carry the babies around until they are big enough to live on their own.

Distribution and Habitat
Crayfish live under rocks in streams and creeks, ponds, large rivers and swamps. They are found in all five physiographic provinces.

Crayfish are generally very sensitive to pollution and found in relatively unpolluted waters.

Role in Food Web
Crayfish are scavengers and will eat dead plants and animals. They like to eat earthworms, insects, insect larvae, and the eggs of Bluegills, Largemouth Bass, Spring Peepers, toads and Spotted Salamanders. Predators include Raccoons, opossums, Muskrats and snakes.

Isopods
(Isopoda)

Description
Most isopods are small, around 1.2 centimeters long, and have seven pairs of short legs and two pairs of antennae. They have seven armored plates called pereonites for protection. Because isopods are able to roll themselves up for protection, they are sometimes called “roly polys.”

The females carry the eggs in a special pouch called a marsupium. When the eggs hatch, the babies stay in the marsupium until they are old enough to be on their own.

Distribution and Habitat
Most isopods are terrestrial or marine. Like all crustaceans, terrestrial isopods breathe with gills which must stay moist to function. They live under rocks, logs or leaves, in caves and crevices, and in basements and other damp places. The two most common terrestrial isopods found in Virginia are non-natives: the pillbug (*Armadillidium vulgare*) and the sowbug (*Porcellio scaber*), both originally from Europe. Only five percent of North American species live in freshwater. They are restricted to springs, streams and underground waters and are usually found under stones or in detritus. Although the majority of Isopods you will come across are non-native, there are a few aquatic species in the family Asellidae that are native to Virginia. Isopods are found in all five physiographic provinces.

Role in Food Web
Isopods eat fungi and decaying plant matter, young plants and sometimes dead animal matter. Predators include ants, spiders, shrews, toads, frogs, lizards, owls, newts, harvestmen, beetles, foxes and other isopods.

MYRIAPODS

The myriapods consist of the millipedes, centipedes and a few other smaller relatives. They are all terrestrial and have one pair of antenna and many more legs than insects (*myriapod* is Latin for "many feet"). Centipedes and millipedes need a moist environment to survive and are normally found on or below the ground.

Centipedes
(Chilopoda)

Description
Centipedes (meaning "hundreds of feet" in Latin) are elongated, somewhat flattened animals that have one pair of legs per body segment. They always have an odd number of pairs of legs. They are reddish-brown in color. Centipedes breathe through tiny holes called spiracles located on the sides of their body.

Distribution and Habitat
Centipedes can live in a variety of habitats, including forests, grasslands and deserts, as long as they have a moist environment directly around them. They are found in all five physiographic provinces.

Role in Food Web
Centipedes are fast, predatory animals which feed mostly at night. They have a venomous bite and will eat just about anything they can catch. Predators include mice, salamanders, beetles and snakes.

Millipedes
(Diplopoda)

Description
Millipedes (meaning “thousands of feet” in Latin) have round bodies and two pairs of legs on most body segments. They are usually slower than centipedes. They are typically brown or black in color with pink, purple or yellow on the edges of the segments. Millipedes have tiny holes called spiracles on the sides of their segments. They breathe through these holes and must stay in moist places.

If a millipede feels threatened it can roll up tightly in to a coil, with its head and legs turned inward. Its hard exoskeleton (shell) will protect the body. If this doesn’t work, millipedes can emit a foul-smelling chemical that deters predators.

Distribution and Habitat
Millipedes prefer dark cool spots underneath dead wood and leaves. They are found in all five physiographic provinces.

Role in Food Web
Nearly all millipedes are decomposers and eat leaf litter, fungi and non-living organic matter. Predators include shrews, frogs, beetles, lizards and birds.

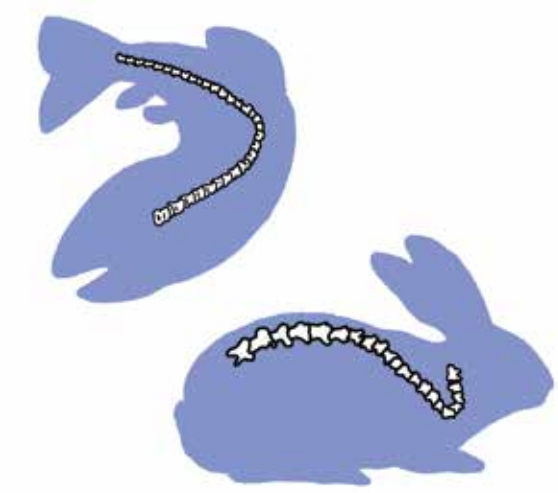
Activity: You are what you eat (Part 1)

A food web is a graphical description of feeding relationships among species in an ecological community, essentially who eats what. Producers like plants which convert the sun's energy into food are usually at the base of a food web, along with decomposers which eat dead plants and animals and return the nutrients to the soil. Consumers such as herbivores and carnivores occupy the higher levels of a food web, while omnivores occupy an intermediate level. Food webs are complicated by the fact that many species feed at various levels.

An example food web is provided below. Using the table on Page 9 as a reference for different feeding groups, fill in the appropriate arrows showing the relationships among species in the community. What does the direction of the arrow signify? (Hint: re-read the section on food webs in the Introduction on Page 8.)

VERTEBRATE ANIMALS

Vertebrates are more advanced than the invertebrates and are often more familiar to people due to their larger size. In actuality, less than 5 percent of all animals on Earth are vertebrates. Vertebrates originated around 500 million years ago when most major animal groups appeared. Vertebrates have an internal backbone or spinal column. This vertebral column is a series of strong bones or cartilage called vertebrae that extend through the core of the body. Cold-blooded vertebrates depend on their surroundings to keep their body temperature stable. Warm-blooded vertebrates regulate their own body temperature and normally have layers of fat, feathers or fur for insulation.



FISH

Fish are a class of vertebrate animals that live their entire lives in water. The species living today can be divided into three groups: jawless fishes (Agnatha) such as lampreys; fishes with jaws and skeletons made of cartilage (Chondrichthyes) like sharks and rays; and fishes with bony skeletons (Osteichthyes) like bass and sunfish. Most bony fishes have scales covering all or part of their bodies. Others, like eels, have very small scales or no scales.

Fish bodies are adapted in many ways to live in water. Fish breathe using gills which have very thin blood vessels called capillaries that absorb oxygen from the water. Fish take in water though the mouth and force it out over the gills.

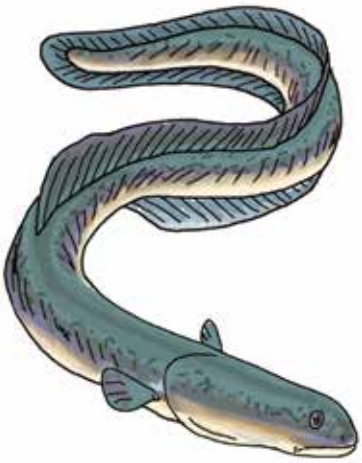
In most fishes, the vertebrae are not linked but are held together by tendons so that the spine is flexible. The spine supports the muscles used for swimming. The eyes have round lenses adapted to see better underwater. Unlike four-legged vertebrates, fish do not have toes or fingers. They use fins to move and steer themselves. Some fishes swim all the time while others stay still and swim in spurts only when they need to. Some fish like sharks can detect electrical changes due to movement. This helps them to find prey and to navigate.

Most species are cold-blooded and keep their body temperatures close to that of the surrounding water. Sharks and a few other species are able to maintain a body temperature higher than that of the surrounding water.

For most species of fish, eggs develop outside the body and fertilization occurs in the water. However, some species give birth to live young. Guppies are an example of livebearers.

Fish are found in many aquatic environments from freshwater streams to slightly salty waters to oceans. Some fish habitats are threatened by water pollution, the building of dams, removal of water for use by humans and the introduction of non-native species.

American Eel
(Anguilla rostrata)



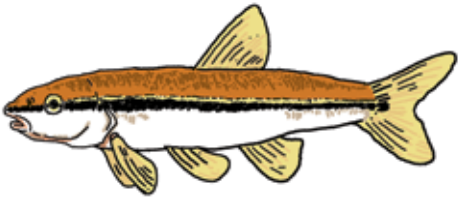
Description
Smooth and covered with mucus, the snakelike eel is greenish, yellowish-brown or blue-black on its back. Its underside is usually a lighter color. Males grow up to 60 centimeters long, while females grow 91 to 152 centimeters long. Adult eels migrate to the Sargasso Sea, west of the Bahamas, to breed and then die. Young eels use ocean currents to return by themselves to rivers and streams on the East Coast of the U.S. American Eels can live in the wild up to 20 years.

Very young American Eels are called "glass eels" because they are transparent. They begin to turn brownish as they grow to approximately 5 to 7 centimeters. At that time, the young are called "elvers."

Distribution and Habitat
American Eels are found in the Coastal Plain, Piedmont and Valley and Ridge provinces. They are catadromous, which means they live in fresh water and go to the ocean to breed. They spend most of their lives in fresh and slightly salty waters. Obstacles like man-made dams affect where American Eels can live. Although American Eels are good climbers, they are sometimes unable to get over dams to reach native habitat in rivers. As a result, American Eels no longer live in some of the places they used to in Virginia.

Role in Food Web
American Eels are generalists that eat invertebrates, small fish, amphibians and carrion (dead animals). Examples of animals they eat are Creek Chubs, Largemouth Bass, Bluegills, Eastern Lamp Mussels, crayfish, Stagnant Pond Snails, Asian Tiger Mosquitos and Southern Leopard Frogs. American Eels are eaten by larger fish and birds including Largemouth Bass, Channel Catfish, Ring-billed Gulls, Bald Eagles and Great Blue Herons.

Blacknose Dace
(Rhinichthys atratulus)



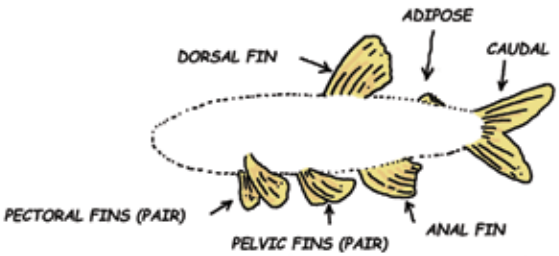
Description
The Blacknose Dace is a small, stout minnow that usually grows up to 5 to 7.5 centimeters long. Its head, back and snout are olive. A black band surrounds its down-sloped snout. It has a tan stripe on the upper sides, a rust-orange stripe below that and a silver or yellow belly. Blacknose Dace mature at two or three years old. In Virginia, they breed from May through July. The adults scatter eggs over sand and gravel in shallow water. They do not give parental care to the young. Blacknose Dace can live up to three years.

Distribution and Habitat
Blacknose Dace are found in all five physiographic provinces. Their habitat is at the bottom of freshwater rocky runs and pools of headwaters, creeks and small rivers.

Blacknose Dace is the most common fish collected by Fairfax County ecologists. Blacknose Dace can survive in a variety of environmental conditions that some other fishes in the county cannot. Streams with many Blacknose Dace but few other kinds of fishes are often streams with poorer water quality or habitat.

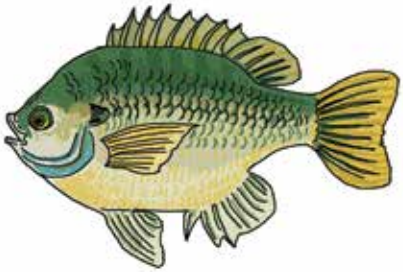
Role in Food Web
Blacknose Dace eat aquatic plants and aquatic and terrestrial insects such as mayflies and fly larvae. They also eat larval fishes, invertebrate eggs, diatoms, other algae and detritus. Blacknose Dace predators include Largemouth Bass, American Eels, Creek Chubs, Great Blue Herons, otters, Northern Water Snakes and crayfish.

Basic Fish Anatomy: Fins



Bluegill

(Lepomis macrochirus)



Description

The Bluegill has a flattened body, short head and small mouth. It gets its name from its bluish-purple cheeks and gill cover. It has a dark spot on the back of its gill cover flap that looks like an ear. There is also a dark spot at the base of its dorsal (back) fin. Its purplish sides are covered with dark olive vertical bands. Its belly is orange to yellowish. Bluegills are the largest of the sunfishes. Adults are usually 10 to 15 centimeters long, but some can grow to twice that length. A Bluegill matures at one or two years old. A breeding male builds a nest for a female to lay eggs. The male fertilizes the eggs and guards the eggs from predators. Young hatch and leave the nest within about a week. Wild Bluegill can live four to six years.

Bluegills usually hide during the day. It is more likely to see them moving around during dusk or dawn.

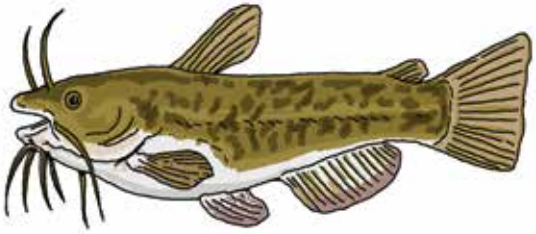
Distribution and Habitat

The Bluegill lives in all five physiographic provinces. Though common in the Chesapeake Bay watershed, it is not native to Fairfax County. It is a freshwater fish that prefers quiet, slow-moving waters with thick beds of vegetation. The Bluegill is tolerant of a wide range of environmental conditions.

Role in Food Web

Bluegills will eat a wide variety of small animals. Bluegill food includes water fleas, earthworms, Eastern Dobsonflies, honeybees, Field Crickets, Eastern Tent Caterpillar Moths, Yellow Perch, Eastern Red-spotted Newts, Tessellated Darters, Spring Peepers and Eastern Mosquitofish. Bluegills are mainly carnivorous, but some may switch to eating plants, like algae, when animal food is scarce. Bluegill predators include Great Blue Herons, Belted Kingfishers, Raccoons, Largemouth Bass, Common Snapping Turtles, humans, American Robins, Yellow Perch and Northern Water Snakes.

Brown Bullhead
(Ameiurus nebulosus)



Description
The Brown Bullhead is a chubby and smooth-skinned catfish with an olive or yellowish-brown body and a yellowish-white belly. Its head is broad and flat. Four pairs of dark, whisker-like barbels surround its mouth. Its dorsal (back) fin and pectoral fin each have a sharp spine and several softer rays. Its tail fin is square-shaped. Adults are usually 15 to 30 centimeters long. They mature by age three. The breeding season is usually late spring through summer. A breeding pair clears a shallow nest on the bottom for eggs. Both parents protect the eggs and defend their territory. The parents also look after the young for several weeks after they hatch. The Brown Bullhead can live up to seven years.

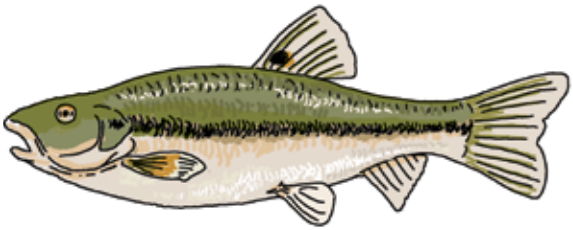
Distribution and Habitat
It is found in the Blue Ridge, Coastal Plain, Piedmont and Valley and Ridge provinces. It lives in pools and backwaters near the bottom of slow-moving creeks, streams and rivers with a soft bottom and lots of vegetation, lakes and ponds.

The Brown Bullhead is nocturnal and eats at night. It doesn't see well, but it uses its barbels to find food.

The color of the barbels is one way to tell the difference between the Brown Bullhead and the Yellow Bullhead *(A. natalis)*. The Brown Bullhead has dark barbels under the chin while the Yellow Bullhead has pale barbels under the chin.

Role in Food Web
Adults eat algae, plankton, aquatic insects, mollusks, crustaceans, crayfish, other fish, leeches and worms. The young eat aquatic insects and small crustaceans. Their predators include larger fish like Sea Lampreys, American Eels, Northern Pikes, Muskellunges, Chain Pickerels, Saugers and Walleyes.

Creek Chub
(Semotilus atromaculatus)



Description
This minnow is long and chubby with a round snout and rounded fins. It has an olive-colored back, silvery sides, a long dark stripe down the side and a dark spot on the back fin. It usually grows to 19 centimeters long. Males mature at three or four years and females at two or three years. Creek Chubs breed in April or May. The male uses his mouth to dig a nest on the stream bottom. The female leaves after laying 25 to 50 eggs, which the male covers with stones and guards. Eggs incubate about six days. The young leave the nest within 30 days. The Creek Chub can live up to seven to eight years.

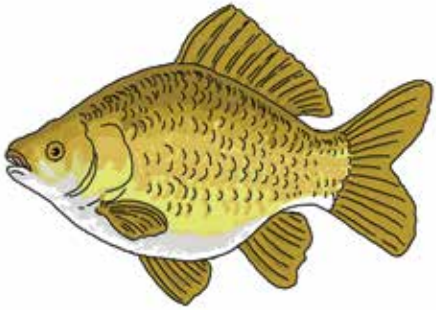
Male Creek Chubs are serious about defending their nests. They may chase each other a long time or face off. They sometimes even chase off the single females that approach the nest.

Distribution and Habitat
They live in all five physiographic provinces. This freshwater fish lives in rocky and sandy pools at the heads of streams, creeks and small rivers.

Role in Food Web
The young eat algae, copepods and water fleas. A few examples of adult foods are Asian Tiger Mosquitos, Water Fleas, Eastern Red-spotted Newts, Large Diving Beetles, Tessellated Darters, Bluegills, Green Algae, Spotted Salamanders and Common Water Striders. Predators include Largemouth Bass, Belted Kingfishers, Great Blue Herons, Common Snapping Turtles, Black Crappies, Yellow Perch, Barred Owls, American Robins, Striped Skunks, Northern Water Snakes and Yellow Bullheads.

Goldfish

(Carassius auratus)



Description

It is stocky with a tall and flattened body. Its triangular head has big eyes, a blunt snout and a forward-pointing mouth. Colors can range from olive to silver or gold to white. Some have black blotches on the body and fins. It can grow up to 41 centimeters long, but 10 centimeters is typical. Goldfish mature at one or two years old. In the wild, Goldfish breed during the summer. Females lay sticky eggs on underwater plants or submerged objects, and males fertilize the eggs. Young hatch in around five days. Goldfish can live about seven years.

Distribution and Habitat

The Goldfish is not native. Originally from China, it has been spread around the world by humans. Goldfish were brought to the U.S. in the late 1600s. In Virginia, Goldfish can be found in the Appalachian Plateau, Coastal Plain, Piedmont and Valley and Ridge provinces. It is a freshwater fish that prefers cold, cloudy water.

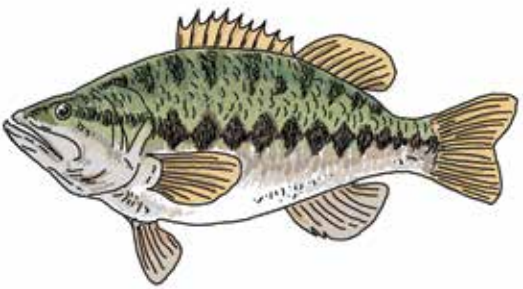
This is the same species that is kept in aquariums, although Goldfish in the wild are less likely to be the same gold color as the ones found in pet stores. There are over a hundred varieties of Goldfish. Despite their common name, colors may differ a lot between the various kinds.

Role in Food Web

In the wild, Goldfish eat phytoplankton, zooplankton, plants, aquatic insects such as mosquito larvae, small crustaceans, small fish and detritus. Predators include Great Blue Herons, Green Herons, Ring-billed Gulls, Belted Kingfishers, turtles and Northern Pikes.

Pet Goldfish released into the wild can quickly become a nuisance. They reproduce easily and can drive down native fish populations.

Largemouth Bass
(Micropterus salmoides)



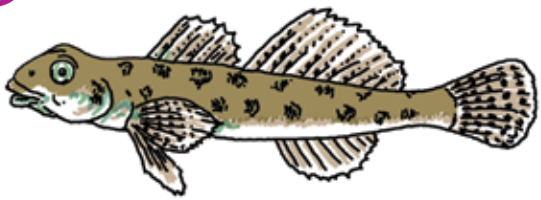
Description
This fish gets its common name from its very large mouth, which extends past its eyes. Its long, stocky body is greenish on the back, white to greenish-yellow on the sides and white on the belly. A dark stripe runs down its sides. Largemouth Bass breed in the spring. The male uses his fins to clear a circular nest. The female lays 2,000 to 40,000 eggs in the nest and leaves. The territorial male guards the eggs. The young stay with their father for protection for up to a month. Largemouth Bass can live about 15 years in the wild.

As a top predator, Largemouth Bass can maintain ecosystem health by controlling populations of animals below them in the food chain.

Distribution and Habitat
It lives in all five physiographic provinces, but it is not native to Fairfax County. Its preferred habitat is clear bodies of fresh water with lots of vegetation to provide places to hide.

Role in Food Web
The Largemouth Bass eats mainly fish including other Largemouth Bass, Yellow Perch, Creek Chubs, Black Crappies, Tessellated Darters and Golden Shiners. It prefers sunfish. It also eats some invertebrates, amphibians and turtles. The young are eaten by other fish (like Yellow Perch and Northern Pikes) and birds (like herons and raptors). Adults have few predators besides humans.

Tessellated Darter
(Etheostoma olmstedi)

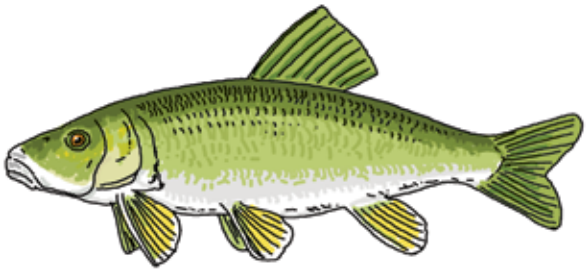


Description
This fish has a slender shape and relatively large fins. The first dorsal fin is very high and spiny. Its olive-colored body is marked with up to 11 dark "x" and "w" shapes on each side. Its belly is yellowish. Males have black pelvic fins and anal fins. The adult is usually 3.5 to 5.5 centimeters long. It matures at about one year old. The breeding season lasts from May through June. They make nests in small crevices under rocks or logs. Females leave after laying eggs, while the males stay to guard them. They nest close together, and three or four males may guard each other's nests. They live two to four years.

Distribution and Habitat
The Tessellated Darter is found in the Coastal Plain and Piedmont provinces. This is the most common kind of darter found in Fairfax County. It lives in quiet freshwater streams and rivers.

Role in Food Web
Tessellated Darters help to control insect populations. They eat midges, water fleas, Asian Tiger Mosquitos, Eastern Dobsonflies, Large Diving Beetles, Green Darners, Green Algae, aquatic worms and Northern Caddis Flies. Predators include Largemouth Bass, Channel Catfish, Yellow Perch, Black Crappies, Bluegills, Creek Chubs, Eastern Red-spotted Newts, Belted Kingfishers, Great Blue Herons and Northern Water Snakes.

White Sucker
(Catostomus commersoni)



Description
This stout-bodied fish can grow to 51 centimeters long. Its blunt snout and downturned mouth are adapted for sucking, which helps it to slurp up small animals near the stream bottom. The adult is dark olive or black on top with greenish yellow to silvery white sides. Its lower fins are yellowish or orangeish. The young are generally brown with dark blotches on the sides. Males are mature at two years, while females are mature at three years. They breed in early spring. Eggs are laid on the stream bottom in an area swept clean of debris. The parents do not care for the eggs or young. White suckers can live up to 12 years.

The hatchling's diet changes as its mouth develops from pointing forward for the first ten days to pointing downward over the next several days. It switches from eating plankton at the water surface to eating more insects on the stream bottom.

White Suckers can be seen feeding during the day or night, but they more commonly eat at night. The adults and young fish often let their meals come to them. They will eat food items that are carried toward them in flowing water.

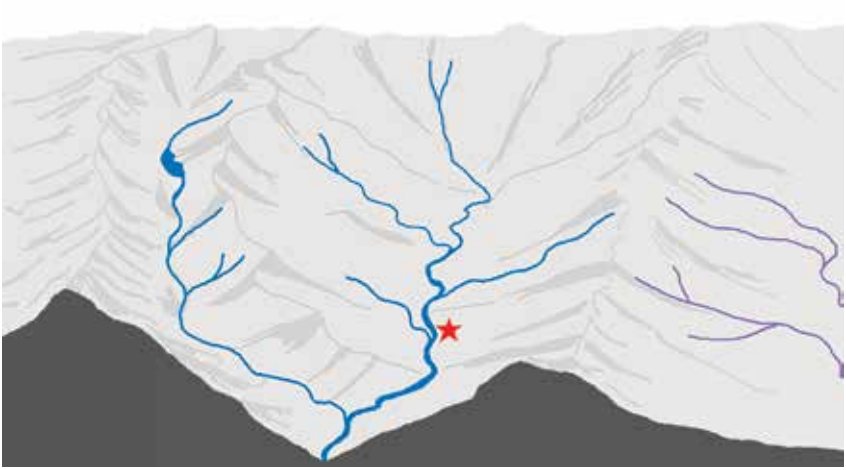
Distribution and Habitat
It lives in all five physiographic provinces. This fish often lives in clear, cool creeks, but it can live in many places from small headwater streams to large lakes. It may migrate into smaller headwater streams in the spring.

Role in Food Web
The White Sucker feeds opportunistically on what it can find. It eats insect larvae and pupae, detritus, small crustaceans, other benthic invertebrates and phytoplankton. Birds, fishes, lampreys and mammals eat White Suckers.

Activity: The watershed around you

A watershed is an area of land where all of the water that falls on it drains to the same body of water. Watersheds are defined by high points in the land such as hills and mountains. Water that falls on one side of the hill drains to a different stream than water on the other side of the hill.

A relief map is a representation of the land surface. Using colors and shading, relief maps provide a sense of the hills, valleys, and slopes.



On the relief map above, use a pencil to draw along the high points or ridge lines surrounding the stream shown in dark blue. (Hint: The streams shown in purple are part of a different watershed.)

After you have drawn your ridge lines, use a green pencil or crayon and lightly shade the area within your outline.

The area you shaded green is the stream's watershed, or drainage basin. This area has a direct impact on the health of the stream.

Challenge yourself! You live along the stream where the red star is and observe the stream daily.

What condition would you expect the stream by your house to be in if most of the area upstream of you was a forest? (Think about water quality. What is living in the stream? Are the stream banks stable?)

What stream conditions might you expect to see if one week all the trees upstream of you were cut down?

MY WATERSHED

Watersheds can be small, such as all of the land that drains to a tiny creek. Watersheds can be large, such as all the land that drains to a river, or to the Atlantic Ocean. When asked where you live, you could correctly say the name of your neighborhood, the name of your town, Fairfax County, Virginia, or the United States of America. Similarly, you also have multiple watershed addresses. All of Fairfax County is in the Potomac River watershed, which is part of the Chesapeake Bay watershed.

If you do not already know, follow the directions on www.fairfaxcounty.gov/dpwes/watersheds/watershedsearch.htm to determine what watershed your school is in.

My school's watershed is: _____
(ex. Accotink)

List three watersheds that your school is part of, from smallest to largest.

_____

_____

_____
(ex. Accotink, Potomac River, Chesapeake Bay, Atlantic Ocean)

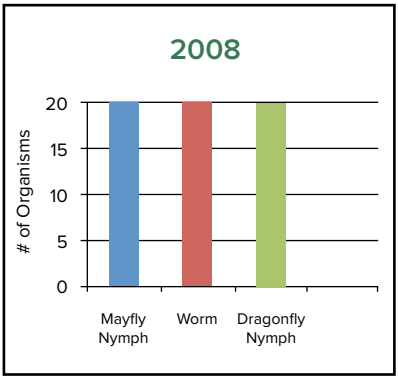
What watersheds do you live in? _____

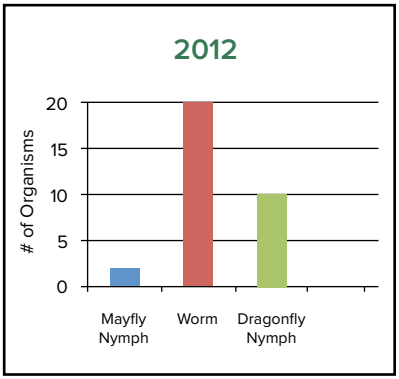
_____

Activity: Where did the insects go?

During storm events, runoff will travel over land until it soaks into a porous surface (like dirt) or reaches a body of water. In urban environments, storm drains are installed along roadways to prevent flooding. These drains send the water from the road directly to the closest stream through a series of underground pipes. This water is not cleaned before it goes into the stream. Runoff may pick up pollutants on nonporous surfaces (like roads and parking lots) before reaching a stream or a storm drain.

The graphs below show the results from sampling the same stream for the number of mayfly nymphs, worms and dragonfly nymphs in 2008 and 2012. Between 2008 and 2012, the forested watershed was developed into an apartment complex. Using the description above and the information from the graphs, answer the questions below:





The above paragraph mentions how pollutants can be picked up by runoff before it enters a stream. Using the 2012 graph, which species can tolerate pollution the best? The least?_____

_____

Challenge yourself! Look for storm drains around your school. What can you do to keep pollutants from going down the drains and reaching a stream?_____

_____

AMPHIBIANS

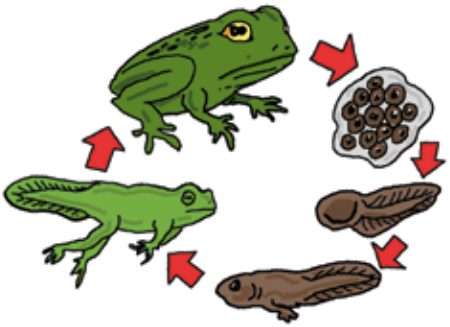
Amphibians are a class of cold-blooded vertebrates with smooth, scaleless, usually moist skin. As their name suggests, these animals depend on water for at least part of their life history. Amphibians have a unique kind of skin that allows both water and air to pass through. This enables them to breathe through their skin both in water and on land. In fact, some amphibians breathe only through their skin and do not even have lungs! Because of their permeable skin, these animals are sensitive to both air and water pollution.

Most amphibians lay soft-shelled, jellylike eggs under water or in damp locations such as under rocks or logs. Typically, eggs hatch into aquatic larvae with gills, which eventually metamorphose into adults. Many amphibians rely on vernal pools (temporary woodland ponds that form in spring) to raise their young. Because vernal pools lack fish, this protects the eggs and larvae from predators. Destruction of vernal pools by development is threatening many amphibian populations.

Fairfax County is home to multiple species of amphibians that can be grouped into two types: frogs and toads; and salamanders and newts.

Frogs and toads have a similar body plan with hind legs modified for swimming and jumping. Both frogs and toads are very vocal animals.

Typical Frog Life Cycle



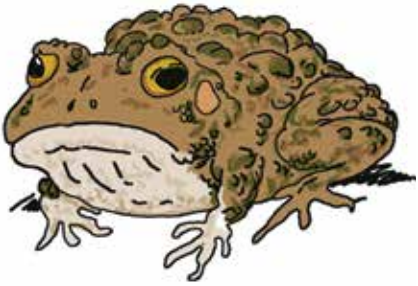
While salamanders and newts resemble lizards, there are several differences:

- Salamanders have smooth moist skin; lizards have dry scaled skin
- Most lizards have claws and ear openings; salamanders do not
- Salamanders have four toes on their front feet; lizards have five

Salamanders are mostly silent unless they are disturbed. They communicate with each other through scents and body language.

Different kinds of salamanders have different life histories. Some species' life cycles are similar to frogs (eggs laid in water hatch into aquatic larvae that metamorphose into adults). Others skip the aquatic larval stage and hatch from eggs as fully formed mini-adults. And the Eastern Red-spotted Newt has a life cycle that is unique and complex (Page 109).

Eastern American Toad
(Anaxyrus americanus)



Description
Toads are warty and chubby frogs (yes, toads are frogs!); colors vary from tan to dull orange with darker warts on the back. Length ranges from 5 to 10 centimeters. They are active mainly at night. Adults begin gathering in vernal pools in March or April. After breeding, the female lays huge numbers of eggs (up to 20,000!) that hatch in about a week. Tadpoles eat continuously and may grow quite large. They mature into adults in about a month. Adult toads are often seen moving around in the fall as they look for places to hibernate.

Distribution and Habitat
This is the toad most likely to be found in Fairfax County. It is replaced in the southeastern Piedmont and Coastal Plain provinces by its close relative, the Southern Toad (*A. terrestris*). Adult toads spend more time on land than other frogs, but must stay near water to keep their skin moist. They hide under logs, rocks, porches and other dark places during the day and come out at night. In winter, toads hibernate in underground burrows.

Toad warts are actually poison glands the animal uses to ward off predators. Most snakes are immune to the poison. You cannot "catch" warts by handling a toad.

Role in Food Web
Tadpoles are omnivorous and eat just about anything including algae, detritus, dead animals and each other. Adults are carnivorous and consume whatever they can catch and fit into their mouths. Common prey items include adult and larval insects, isopods, spiders, harvestmen and millipedes. Their main predators are snakes; the Eastern Hog-nosed Snake (Page 118) preys almost entirely on toads.

Northern Two-lined Salamander
(Eurycea bislineata)

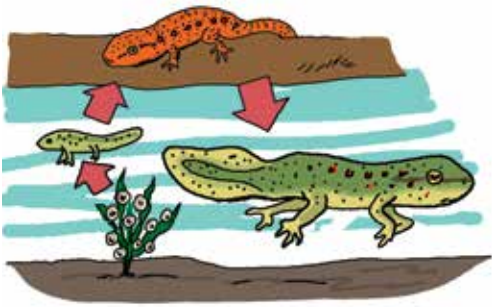
Description
These small, slender salamanders are usually yellow (although the color can range from greenish-yellow to yellow-orange). The species name *bislineata* means "two lines," and refers to the paired dark stripes that run from each eye down the back to the tip of the tail They may also have black speckles. Adults can grow to lengths of 6.5 to 12 centimeters. These salamanders are active mainly at night; they prefer warm, wet weather for hunting. Two-lined Salamanders tend to stay in the same area year-round as long as there is water nearby. Females lay 12 to 36 eggs under rocks and logs or even at the bottom of deep lakes. Once hatched, the aquatic larvae may take two to three years to mature into adults. Some populations may hibernate through the winter, while others may "wake up" to move around and feed if the conditions are right.

Unlike other salamanders, female Two-lined Salamanders guard their eggs until they are ready to hatch.

Distribution and Habitat
This species is widespread in the northern and northwestern parts of Virginia's physiographic provinces (roughly north of Charlottesville). In the southern part of the state, it is replaced by its close relative, the Southern Two-lined Salamander *(E. cirrigera)*. Two-lined Salamanders are found in or near small streams, springs and floodplains. They can also be found in forests under rocks or logs.

Role in Food Web
Adults mostly eat terrestrial small invertebrates, including insects, spiders, worms, snails, centipedes and isopods. Larvae forage on the bottom of streams for small aquatic invertebrates. Predators include shrews, owls, Blue Jays, Garter Snakes, trout and other salamanders.

Eastern Red-spotted Newt
(Notophthalmus viridescens)



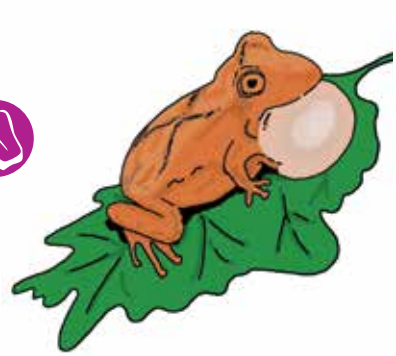
Description
Adults are 3 to 8 centimeters long and colored olive-green to brownish-yellow on the back, with paler bellies, and are covered in red dots edged in black. Juveniles are brick-red to orange with mostly black spots, although there may be a few black-edged red spots near the tail. Red-spotted Newts have an unusual life cycle. Like most amphibians, they lay eggs in water that hatch into aquatic larvae with gills. But unlike other salamanders, the larvae metamorphose into a land-dwelling juvenile stage called a red eft. Newts usually stay in the eft stage from one to three years, then transform into aquatic adults (although some populations in the Coastal Plain province skip the eft stage).

Distribution and Habitat
Occur in all five physiographic provinces. Adults and larvae are aquatic and live in ponds, lakes and pools near streams. Red efts dwell in moist woodland areas. Efts avoid direct sunlight but are often found roaming around on the forest floor during the daytime.

Unlike other salamanders, Eastern Red-spotted Newts do not hibernate but stay active through the winter. They sometimes can be seen moving around under the ice!

Role in Food Web
Larvae, efts and adults are all carnivorous. Prey includes insects, leeches, worms, tiny mollusks and crustaceans, young amphibians and frog eggs. Many creatures feed on newts, with fish, turtles, snakes and Raccoons being the main predators.

Northern Spring Peeper
(Pseudacris crucifer)



Description

This is a tiny frog only 2 to 3 centimeters in length...not much bigger than a paper clip! Females are larger than males. Adults are tan, gray or light brown (even pink!) with a dark band between the eyes and a dark "X" on the back (*crucifer* means "cross-bearing" in Latin). They have sticky pads on each toe to help them grip rocks or vegetation. Northern Spring Peepers are mainly active at night. Males begin calling for mates in early March. After mating, females lay eggs on underwater sticks and plants. Eggs hatch into tadpoles in about 12 days. Tadpoles change to adults in a few weeks. In winter they hibernate under logs or loose bark on trees and can survive being frozen!

Despite their small size, Spring Peepers are one of the loudest animals. Their high-pitched calls can reach levels of 90 decibels or higher. That's as loud as a train whistle! Some people confuse Spring Peeper calls with crickets, which sing mainly during summer and fall. Just remember: "Peepers peep in spring; crickets call in fall."

Distribution and Habitat

Occur in all five physiographic provinces. In early spring, Spring Peepers emerge from hibernation and migrate to vernal pools. Outside of the breeding season they prefer woodlands or brushy undergrowth near marshes.

Role in Food Web

Tadpoles eat algae and zooplankton, small insects and other invertebrates. Adults eat mostly small insects such as beetles, ants and flies, as well as spiders. Eggs and tadpoles are eaten by fish, aquatic insects, turtles and other creatures. Adults have many predators including owls and other birds, snakes, American Bullfrogs, salamanders, some mammals and even large spiders.

Spotted Salamander
(Ambystoma maculatum)

Description

Adults are mostly bluish-black with two rows of yellow or orange spots down the spine. The bright spots warn predators that these salamanders have poison glands in their skin. These large salamanders grow as long as 18 centimeters. Adults are migratory in spring as they search for vernal pools in which they lay their eggs. Spotted Salamanders breed in the pools where they were born, and use the same pool year after year for their entire lives. After breeding, they return to underground burrows that they dig in soft, moist soil and spend most of their time there, except when hunting. They hibernate in their burrows over the winter.

Distribution and Habitat

Occur statewide in Virginia except for the far southeastern part of the Coastal Plain province. Adults prefer moist woodlands near vernal pools, rivers or streams. They are sometimes called Mole Salamanders because they spend most of their time in their underground burrows, but are also found under rocks, rotting logs or in leaf litter.

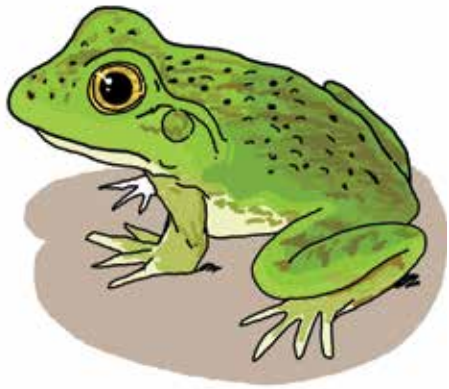
For such a tiny creature they live surprisingly long (up to 20 years).

Salamanders have 10 times more DNA in each cell than humans do.

Role in Food Web

Larvae feed on zooplankton, aquatic insects, isopods and other small aquatic invertebrates. Adults prey on a variety of small creatures including earthworms, mollusks, spiders, insects and even other salamanders. Eggs and larvae are eaten by fish, turtles, aquatic insects, birds, frogs and crayfish. Adults are preyed on by skunks, Raccoons, turtles, Eastern Chipmunks, Gray Squirrels, Virginia Opossums and snakes.

American Bullfrog
(Lithobates catesbeianus)



Description
Virginia's largest native frog, males range from 8.5 to 18 centimeters, and females from 9 to 20 centimeters. Adults are drab olive-green with lighter underparts. Both males and females have an enlarged eardrum (called a tympanum) behind each eye, but the eardrums of males are larger than the females'. Bullfrogs are active mainly at night. They are solitary and very territorial. Male bullfrogs claim and defend their territories by calling, aggressive posturing and even fighting with other males. In Virginia, American Bullfrogs breed from late spring to early fall. After mating, the female lays up to 20,000 eggs on the water's surface. The eggs hatch into tadpoles (also called "pollywogs") in five days. Bullfrog tadpoles can grow to be quite large, and may take one to two years to metamorphose into adults. In winter, bullfrogs dig themselves into the mud and hibernate.

The deep call of the male American Bullfrog ("Jug-a-rum...jug-a-rum") resembles the mooing of a cow (hence its name) and can be heard up to a kilometer away.

Did you know that a group of frogs is called an "army?"

Distribution and Habitat
American Bullfrogs are found in all five physiographic provinces. They live in freshwater ponds, lakes and swampy areas.

Role in Food Web
Tadpoles are omnivorous and can be cannibalistic. Adults will eat almost anything they can overpower and stuff into their huge mouths. Insects, crayfish and other bullfrogs are the most important prey items. Large bullfrogs have even been known to catch and eat birds! Predators include fish, snakes and birds.

Activity:
Stream ecosystem challenge

Study the stream below: 1) Circle all the invertebrates, 2) place a triangle over at least two producers, 3) place a square around all of the mammals, 4) Place an X over the animals that are not native and 5) draw an arrow from a prey species to one or more of its predators.

Challenge yourself! Precipitation is crucial to keeping many small streams wet and flowing. Some streams in Fairfax County are not as healthy as they should be, though. Hard, nonporous surfaces like roads, sidewalks and rooftops keep stormwater from soaking into the ground or moving slowly across the land. Having more nonporous surfaces causes greater amounts of stormwater to run off the land and into streams quickly. Sometimes stormwater flows into underground pipes and comes out the other end fast enough to cause erosion of the stream banks and bottom. How might the organisms in the picture be affected if boulders in the stream and soils along the stream banks were washed away during heavy rains? Would some organisms tolerate the changes better than others? Why?

_____

_____

REPTILES

Reptiles are a class of vertebrate animals that includes turtles, tortoises, snakes, lizards, crocodiles, alligators and tuataras (lizard-like animals that live in New Zealand).

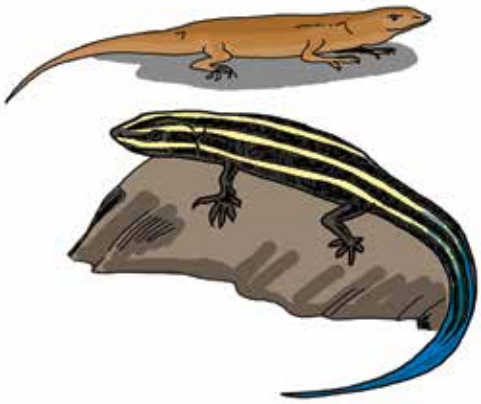
All reptiles have certain traits in common:

- Lungs for breathing
- Most are "cold-blooded;" they do not keep a constant body temperature but are cool in cool environments and warm in warm environments
- A heart with three or four chambers to circulate blood around the body
- Some reptiles have scales
- Except for snakes, reptiles usually have four legs with five toes on each
- Most lay eggs that have a protective membrane that keeps them from drying out; a few species give birth to live young.

Reptiles are important as food for other animals and for controlling populations of species lower in the food web. Some reptiles are predators of insects and small mammals like rodents, so they help to control organisms that humans consider pests.

Some reptiles spend part of the time in the water in order to cool off, feed or mate. Preventing pollutants such as pesticides from running off the land and into bodies of water is one way to help protect reptiles and the plants and animals they eat. Other ways to help reptiles survive include preserving habitat, not capturing healthy animals from the wild to keep, and not releasing non-native species into the wild that may kill or compete with native species for food or habitat.

Common Five-lined Skink
(Eumeces fasciatus)



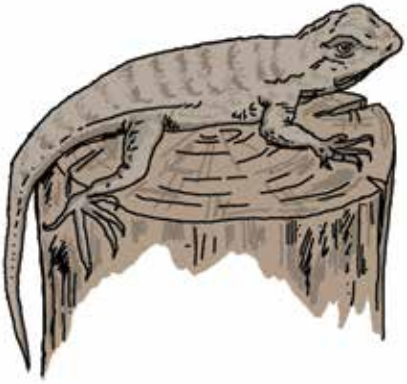
Description
This skink has a slender body shape, small limbs and a wedge-shaped head. The young skink has five whitish stripes running down the back of its dark body and a bright blue tail. Males turn olive brown all over as the tail color and stripes fade with age. An adult is usually 13 to 22 centimeters long. It matures at two to three years old. Skinks mate in May. In June or July, females lay up to a dozen eggs which may take 55 days to hatch. Females keep guard until two days after the eggs hatch. Skinks may live six years.

Distribution and Habitat
They live in all five physiographic provinces. Their habitat is moist, wooded or partially wooded areas with good cover and places to warm themselves. They often stay near small streams or standing water.

Common Five-lined Skinks are diurnal, which means that they move around during the day. If you happen to spot one, it is unlikely that it will stay around for long. They are good at running for cover, and they are quick to find a crevice to hide in.

Role in Food Web
They eat mainly insects. Food items include Differential Grasshoppers, Rabid Wolf Spiders, Leopard Slugs, earthworms, Eastern Tent Caterpillar Moths, Eastern Black Swallowtails, Horned Fungus Beetles, Harvestman Spiders, Garden Centipedes and North American Millipedes. Skinks are eaten by American Crows, Northern Shrikes, American Kestrels, Barred Owls, Red-tailed Hawks, Great Blue Herons, Northern Mockingbirds, Red Foxes, Raccoons, Virginia Opossums, cats, Northern Copperheads and Eastern Hog-nosed Snakes.

Eastern Fence Lizard
(Sceloporus undulatus)



Description
This lizard is covered with rough scales. Its body is gray, brown or rusty in color with rippling crossbands on its back and cream color underneath. The adult male may have blue on its belly and throat. The adult is nine to 19 centimeters long. It matures at one to two years old. They mate from April to August. Females provide no care after laying up to 13 eggs, which hatch in eight to ten weeks. Hatchlings have a high death rate. Eastern Fence Lizards live about four years on average.

Males "jiggle" to attract females. They bob their heads, do push-ups and puff themselves up for four to five seconds at a time.

Distribution and Habitat
This lizard is found in all five physiographic provinces. It lives in sunny open areas in pine, hardwood and deciduous forests, tree stands in old fields and urban or suburban woodlots.

Role in Food Web
The Eastern Fence Lizard eats insects and other arthropods, including ants, beetles, weevils, lady bugs, spiders, centipedes, grasshoppers, stinkbugs, blow flies, moths, roaches, millipedes and snails. Predators include larger lizards, birds, Black Rat Snakes, Prairie Kingsnakes, cottonmouths, Northern Copperheads, dogs and cats.

Eastern Garter Snake
(Thamnophis sirtalis)

Description
The Eastern Garter Snake's back is black, brown, gray or olive. It has three light stripes down its back (one down the center and two alongside). Alternating rows of dark spots look like a checkerboard. Its dark head is wider than its neck. It can grow 46 to 137 centimeters long and matures at about two years old. Mating season is from March to early May. Females bear 10 to 40 live young in late July or early August. It lives about two years in the wild. It is nonvenomous.

Distribution and Habitat
This snake is found in all five physiographic provinces. It is semiaquatic, living in terrestrial and wetland environments. This includes hardwood and pine forests, grasslands, abandoned fields, freshwater marshes, along bodies of water, and agricultural and urban areas. They prefer moist, grassy habitat.

Role in Food Web
Its diet includes Earthworms, Leopard Slugs, Meadow Voles, American Toads, Red-backed Salamanders, Southern Leopard Frogs, White-footed Mice, crayfish, Eastern Mosquitofish, Creek Chubs, Bluegills, Northern Ringneck Snakes, Field Crickets, Differential Grasshoppers, Spring Peepers, small mammals, lizards and baby birds. Its predators include Red-tailed Hawks, Striped Skunks, Northern Water Snakes, Common Snapping Turtles, Raccoons, Virginia Opossums, American Crows, Great Blue Herons, foxes and squirrels.

Venomous or Nonvenomous?

Venomous

TRIANGULAR HEAD SHAPE
LONG FANGS
PITS BELOW EYES
VERTICAL EYE PUPILS

Nonvenomous

ROUNDER HEAD SHAPE
SMALL TEETH, NO FANGS
NO PITS
ROUND PUPILS

It is safest not to harass any snake. Most would rather quietly move away than confront people, so give them room.

Eastern Hog-nosed Snake
(Heterodon platirhinos)

Description
This thick-bodied snake has a wide head and flat, upturned snout. Its color can vary a lot from place to place. Its back may be gray, brown, tan, yellow, olive, orangish, reddish or pinkish with large dark blotches. It can also be all black. It has a dark band behind the eyes and two large spots behind the head. It looks like a rattlesnake, but does not have tail rattles or facial pits like rattlesnakes. It is nonvenomous. It can grow up to 115 centimeters long. It matures at two to three years old. It mates in spring after emerging from hibernation. In June or July, the female lays eggs in a shallow burrow and offers no parental care. Young hatch in August or September. It can live up to nine years.

To discourage predators, the Eastern Hog-nosed Snake will puff up its neck, coil up with head raised, hiss and strike without biting. If it is touched, it tries playing dead by rolling over and over with its mouth open and tongue hanging out before going limp on its back.

Distribution and Habitat
It is native only in Canada and the United States. It lives in all five physiographic provinces. It lives completely on land, in a variety of habitats with loose soils.

Role in Food Web
It is specialized for eating toads and frogs such as American Toads and Wood Frogs. Its diet also includes Eastern Red-spotted Newts, Eastern Chipmunks, Field Crickets, Northern Ringneck Snakes, Mourning Doves, Common Five-lined Skinks and Eastern Box Turtles. Its predators include Red-tailed Hawks, owls, Milk Snakes, Black Racers, Red Foxes, Virginia Opossums and Striped Skunks.

Eastern Kingsnake
(Lampropeltis getula)

Description
The Eastern Kingsnake has a small head and stout body. Its color is shiny black with thin white or yellow bands on its back, white patches on its rounded belly, and white or yellow spots on its head. The adult is 91 to 122 centimeters long. Eastern Kingsnakes are active from about April through October, and during that time they move around during the day (diurnal). They mate in spring. Eggs that are laid in June usually hatch in August. Eastern Kingsnakes usually live 10 to 15 years.

Distribution and Habitat
This snake is found in the Appalachian Plateau, Blue Ridge, Coastal Plain and Piedmont provinces. It lives in hardwood and pine forests, abandoned fields, swamps, freshwater marshes and along creeks and streams in agricultural and urban areas.

Eastern Kingsnakes are constrictors, which means they squeeze their prey. They are nonvenomous.

When threatened, an Eastern Kingsnake will sometimes coil up and hide its head.

Role in Food Web
Eastern Kingsnakes eat lizards, turtle eggs, birds and small mammals, and they are important in controlling rodent populations. Since they seem to be immune to the venom of pit vipers, they can also eat other snakes such as Northern Copperheads. Young Kingsnakes are eaten by American Bullfrogs, hawks and owls.

Northern Copperhead
(Agkistrodon contortrix)

Description

The Northern Copperhead is a pit viper with long fangs for injecting venom. A pit on each side of its face detects heat which helps the snake to find prey. It is coppery-red, orange or pinkish-brown with an hourglass pattern of brown crossbands. It grows to 61 to 91 centimeters. Copperheads hibernate from November through April. They mate in April or May. Copperheads bear live young from August through early October.

The Northern Copperhead is the only venomous snake in Fairfax County.

They may bite if threatened, but Northern Copperheads are sluggish and not very aggressive toward people.

Distribution and Habitat

Northern Copperheads are found only in the U.S. They live in all five physiographic provinces of Virginia. They live in forests, fields, swamps, marshes, hedge rows, upland rocky areas, rock walls, wood piles, forested dunes near beaches, areas around barns and old houses and some suburban areas.

Role in Food Web

Copperheads control rodents. They eat Meadow Voles, Gray Squirrels, Least Shrews, Common Five-lined Skinks, American Bullfrogs, Spring Peepers, Eastern Cottontail Rabbits, Red-winged Blackbirds, American Toads, Field Crickets, American Robins, Muskrats and Northern Ringneck Snakes. Their predators include owls, Red-tailed Hawks, Virginia Opossums, Red Foxes and Common Snapping Turtles.

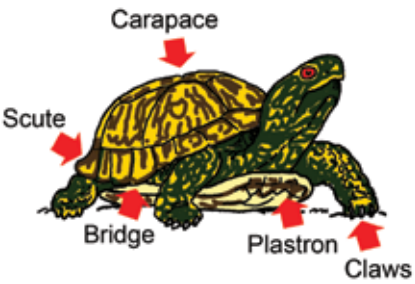
Common Snapping Turtle
(Chelydra serpentina)

Description
The Common Snapping Turtle's carapace is brown or black and often covered with mud and algae. Its plastron is cream or brown. The dark skin is yellowish around the neck, legs and tail. It has a long neck and big head with a hooked upper jaw and beak-shaped mouth. This is Virginia's largest turtle. The shell grows up to 22 centimeters. It cannot pull its head and legs into its shell like other turtles. Males mature in four to six years, and females mature in 10 to 12 years. They mate from May through June and their young hatch in August. A wild Common Snapping Turtle may live 30 years.

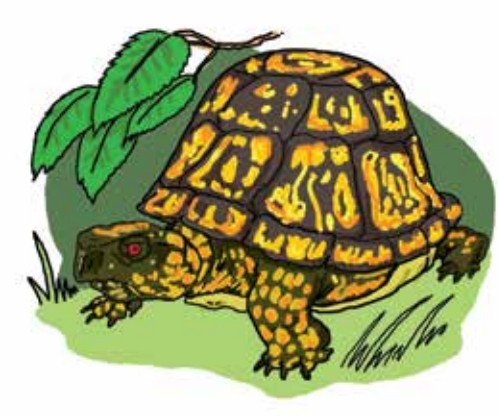
Distribution and Habitat
It lives in all five physiographic provinces. This turtle lives in freshwater or brackish water streams, lakes, ponds, marshes and swamps. It prefers habitat with soft mud bottoms, lots of aquatic vegetation and submerged brush and logs.

Role in Food Web
Its food includes Bluegills, crayfish, bullfrogs, Canada Geese, Creek Chubs, Northern Copperheads, earthworms, Leopard Slugs, Red-backed Salamanders, Meadow Voles, Wood Frogs, Five-lined Skinks, American Toads, Yellow Pond Lilies, Common Duckweed and algae. Eggs and hatchlings have various predators like other turtles, Great Blue Herons, Raccoons, skunks, American Bullfrogs, Northern Water Snakes and Largemouth Bass. Adults are aggressive fighters and have few predators besides humans.

Basic Turtle Anatomy



Eastern Box Turtle
(Terrapene carolina)



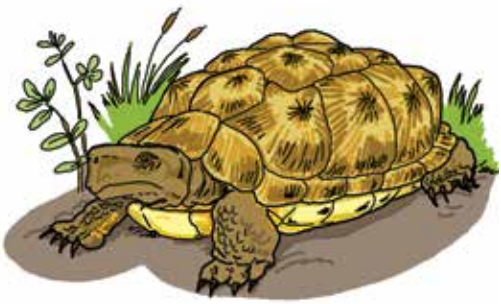
Description
Its carapace is domed and dark brown or olive with bright orange or yellow patterns. The carapace grows to 16 centimeters. Its plastron and skin are also dark with yellow to orange markings. Males often have red eyes while females often have yellowish-brown eyes. It has a down-turned beak. The turtle matures in 10 to 20 years. Mating season lasts April through October. The female lays two to seven eggs in a nest she digs with her hind legs and carefully covers them. They normally hatch in about three months. Eastern Box Turtles can live more than 100 years.

Eastern Box Turtles play an important role in seed dispersal since they eat berries of different kinds of plants.

Distribution and Habitat
The Eastern Box Turtle lives in all five physiographic provinces. It is native only to North America. It prefers woodlands with open canopies, thickets, pastures and marshy meadows. It is often found near streams and ponds. The young are semi-aquatic.

Role in Food Web
It eats a variety of animals, carrion, plants and fungi including Blackberries, Mayapples, Elderberries, Muscadine Grapes, Wild Strawberries, Black Cherries, mushrooms, salamanders, earthworms, Field Crickets, Leopard Slugs, Rabid Wolf Spiders and Eastern Tent Caterpillar Moths. Predators include Red Foxes, Raccoons, Striped Skunks and Eastern Hog-nosed Snakes. Few species prey on the adult turtles because they can close their shells.

Wood Turtle
(Glyptemys insculpta)



Description
An adult's carapace is brown with yellow streaks and deep growth rings that look like they were carved. The hatchling carapace is smoother. The plastron is yellow with black blotches. Adults grow up to 22 centimeters long. Wood Turtles are mature by 20 years old. Mating typically occurs in fall. These turtles return to water and become less active from October through December. They hibernate underwater in muddy stream banks through February. They begin moving around on land again in March. Females make nests from May through July. Females give no parental care after laying and carefully covering the eggs, which hatch in late summer.

Distribution and Habitat
The Wood Turtle is found in all five physiographic provinces. It lives on land and in water, along forested rivers and streams, swamps, marshy meadow and farmland habitats. This turtle is affected by destruction and degradation of riparian habitat (the area where land and streams meet). The Commonwealth of Virginia lists the Wood Turtle as a threatened species.

Role in Food Web
It eats algae, moss, herbs, woody plants, mushrooms, slugs, snails, worms, insects, aquatic crustaceans and tadpoles. It is eaten by large fish, Virginia Opossums, cats and dogs, wading birds and crows. Raccoons and skunks eat Wood Turtle eggs.

Some Wood Turtles hunt by thumping their front feet or plastron on the ground, causing earthworms to come to the surface only to become a turtle's next meal.

When they are not feeding, Wood Turtles spend their mornings or afternoons resting in the sun during the warmer months. Lying on the ground, their body temperatures can reach a toasty 30 to 35 degrees Celsius. (That is about 86 to 95 degrees Fahrenheit.)

Activity: What's in that stream?

Everyone lives in a watershed. A watershed is simply an area of land that drains to a particular body of water like a pond, lake, stream or river. You may have seen a small trickle or a large sheet of water flowing across a road, parking lot or sidewalk during a steady rainfall. That water was on its way to the nearest body of water or stormwater drainage system. Have you ever wondered how stormwater interacts with the landscape and the various activities occurring in it? Take a look at the drawing of a neighborhood. What might it mean for stormwater to come into contact with some of the items in the picture?

How might runoff affect the quality of the water in the stream? How might it affect plants and animals living in the stream? Did you identify any items in the landscape that might benefit or harm the stream's inhabitants?

Challenge yourself! Now think about your own neighborhood. List some of the things that stormwater will come into contact with. Did you list any items that are not in this drawing? What are some of the things your family could do to reduce the chances of stormwater coming into contact with pollutants in your neighborhood?

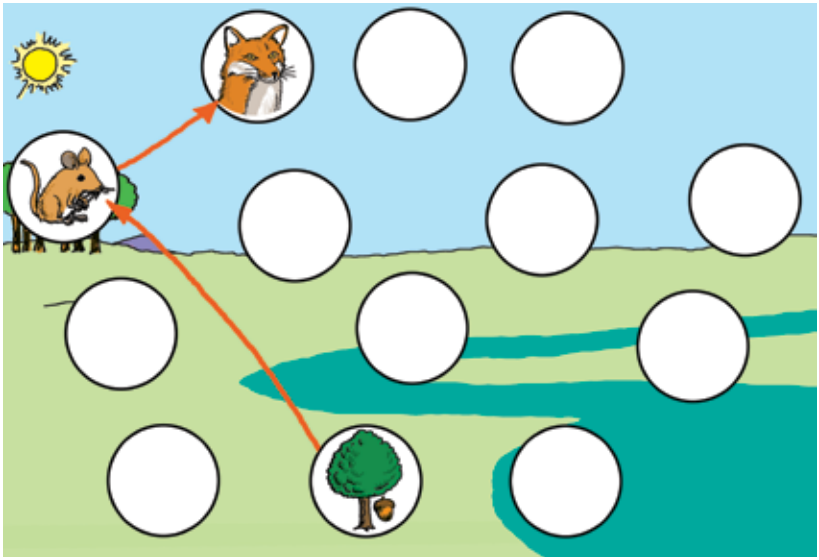
_____

_____

Activity: You are what you eat (Part 2)

Now that you have had some experience designing food webs, let's see if you can take your knowledge to the next level. Below is a diagram of an advanced food web. There are many empty spaces where arrows and organisms belong. Referring to the table on Page 8 as a reference for different feeding relationships, complete the food web diagram below by drawing in different species and the appropriate arrows that describe the relationships among species.

Challenge yourself! What would happen to the relationship between the organisms below if an oil spill occurred?



BIRDS

Birds are a class of warm-blooded vertebrates with feathers for insulation and flight. All modern birds have forelimbs modified into wings, a toothless beak, lightweight hollow bones and other unique adaptations for flight (although not all birds fly). Like reptiles, birds reproduce by laying eggs that are surrounded by a protective shell.

Some birds travel long distances during certain seasons of the year. These seasonal journeys are usually driven by food availability and breeding. Many North American species rely on food sources that are not available during the cold months, such as fruits, insects and nectar from flowers. In the fall, these species migrate south to tropical areas and stay through the winter. As temperatures warm in the spring and food becomes plentiful again, they migrate back north to breed and raise their young. Not all bird movements are true migrations; some species or populations move from place to place during certain seasons, but only travel as far as they need to find food and/or suitable habitat. Species or populations of birds that are non-migratory are called residents.

Because birds are colorful animals, the descriptions in this section emphasize colors and markings on certain parts of the body. In some species, the male and female birds are similar in appearance, while in other species the sexes look different.

Birds are more often heard than seen, so knowing what they sound like can help you to identify them more quickly. Birds vocalize in two different ways. Songs are long musical phrases usually produced by males to define breeding/nesting territories during spring and summer. Calls are less complex, mostly just a few short notes. They are uttered by both sexes and can be heard throughout the year.

Fairfax County is home to a diverse range of species including songbirds, birds of prey and migratory waterfowl and other coastal birds.

Red-headed Woodpecker
(Melanerpes erythrocephalus)

Description

Songbirds about the size of a robin (average 23.5 centimeters in length) with a red head and black-and-white body and wings. Sexes are similar. Red-headed Woodpeckers make a variety of chirps, cackles and other loud calls, but their most common call is a trilling *tchurrr...tchurr...tchurr.* Woodpeckers also rapidly drum on tree trunks, wooden buildings and even aluminum rain gutters! Mated pairs nest in tree cavities they find or dig out themselves. The female lays four to eight eggs on a pile of wood chips. Both males and females incubate the eggs, raise the young and defend their breeding territory.

Distribution and Habitat

These woodpeckers are common, year-round residents of Virginia except for the far southwestern corner of the Appalachian Plateau province, where they are found mainly in spring and summer. They live in streamside and upland forests, wooded swamps, orchards, parks and open areas.

All woodpeckers have exceptionally long tongues which they use to pry out insects. Sometimes the tongue is longer than the bird! Like the string of a yo-yo, the tongue wraps around the skull when not in use and is extended when needed.

Role in Food Web

The most omnivorous woodpecker, they feed on flying insects, nuts and seeds, sap, fruits and berries, other birds' eggs and chicks, and even mice. They sometimes hide food in tree cavities or in cracks in tree bark. Adults are preyed upon by birds of prey, foxes and cats. Eggs and chicks are taken by snakes, Raccoons and Gray Squirrels.

House Sparrow
(Passer domesticus)

Description
These are small, chunky songbirds with an average length of 16 centimeters. Males have a gray cap edged with chestnut, white cheeks and pale gray underparts with a dark bib; females and juveniles are brown on top and mousey-gray underneath with a tan streak over each eye. Song: an almost constantly repeated *cheep* or *cheerup*. Call: a rapid chatter. House Sparrows nest in tree cavities or bird houses. They are aggressively territorial and sometimes kill other birds along with the young and eggs so they can take over the nest. Their own nests are bulky and untidy. The female does most of the incubating, but the male helps feed and raise the young.

This European native was introduced into North America around 1851. The House Sparrow is officially classified as a nuisance species in Virginia.

It was one of the first animals to be given a scientific name in the biological classification system.

Distribution and Habitat
House Sparrows live year-round in all five physiographic provinces. They can be found in almost every kind of habitat, from open woodlands to wetlands to urban areas. They thrive in human-altered habitats like farms and suburban areas.

Role in Food Web
They eat mainly seeds and small insects. In farm country they can damage crops. Urban birds boldly scavenge for discarded food, spilled grass seed, insects killed by cars or bug zappers, and will try almost anything. Their main predators are cats and birds of prey, but many other animals hunt them, including crows, Blue Jays, Gray Squirrels and even humans.

Northern Cardinal
(Cardinalis cardinalis)

Description
These are medium-sized songbirds with an average length of 20 to 23.5 centimeters. Adult males are brilliant red with a black face mask; females and juveniles are a warm red-brown and have a less-defined mask. Both sexes have a cone-shaped orange bill and a crest of feathers on top of the head. Song: a liquid *Birdy, birdy, BIRDY, chew, chew, CHEW*. Call: a bright, cheery *Chip*! Pairs mate for life and stay together year-round. The male brings nesting materials to the female, who weaves them into a cup-like nest. The female lays three or four eggs and does most of the incubating, although the male may help. Pairs often re-nest and lay a new batch of eggs, sometimes while the first brood of chicks is still dependent on the parents. Northern Cardinals may raise up to four families a year this way.

Distribution and Habitat
Northern Cardinals live year-round in all five physiographic provinces. They prefer dense shrubby areas such as forest edges, overgrown fields, bushes and thickets, wetlands and backyards.

This is the state bird of Virginia (as well as Illinois, Indiana, Kentucky, North Carolina, Ohio and West Virginia)!

Role in Food Web
Adults eat mainly seeds, buds, grains, fruits, berries and insects (they feed their young almost exclusively on insects). They also sip maple sap from holes made by woodpeckers. Northern Cardinals are preyed upon by a wide variety of predators including falcons, hawks, shrikes and owls. Predators of chicks and eggs include snakes, Blue Jays, Gray Squirrels, Eastern Chipmunks and cats.

American or Common Crow
(Corvus brachyrhynchos)
Fish Crow
(C. ossifragus)

Description
These are large, stocky songbirds (yes, crows are songbirds, although they sound very unmusical to us!) with shiny black feathers and purple highlights. Juveniles are more brownish than adults. Fish Crows range from 36 to 41 centimeters in length; American crows are slightly larger. Fish Crows have shorter legs than American Crows. Sexes are similar. American Crow calls are a distinctive *Caw, caw*, while Fish Crows utter a sharp, nasally *Nyuh uh*. Crows mate for life. Both partners help build the nest, sometimes with assistance from their older children. The female lays three to nine eggs which hatch in 16-18 days. The entire family helps incubate the eggs and raise the chicks.

Crows are very social and amazingly intelligent. They have a "language" of over 250 different calls. They are able to recognize and remember human faces and can pick them out of a crowd. They can use simple tools such as sticks or nut shells to get food.

Distribution and Habitat
American Crows live in all five physiographic provinces, while Fish Crows are found mainly in the Coastal Plain and Piedmont provinces. The two kinds are often seen together. Crows can use both natural and human-created habitats including farmland, landfills, parks, golf courses, cemeteries, yards and the shores of rivers, streams and wetlands. In winter, crows gather at night into huge communal roosts of up to 2 million birds or more!

Role in Food Web
Crows eat a wide variety of foods including worms, insects, seeds, fruits, roadkill, small mammals, fish, other birds' chicks and eggs and human scraps. Predators include birds of prey, snakes, Raccoons, cats and sometimes humans.

American Robin
(Turdus migratorius)

Description
These are medium-sized songbirds about 20 to 28 centimeters in length.
Males have a gray back and wings, red-orange breast, white rings around the eyes and dark streaks on the throat. The males' heads turn black in spring. Females are brown with a rusty breast. Young birds have a spotted breast. Song: a series of bright syllables repeated in an irregular pattern: *Cheer, cheery, cheerily, cheery, cheer up*. Call: a series of notes *(Erp...erp...erp)*, often preceded by a *Yeep*! The American Robin is one of the earliest birds to nest in spring. The female does most of the nest-building, incubating and feeding of the chicks. Three to five blue-green eggs are laid that hatch in about two weeks. They may rear up to three broods a year. Although their species name is *migratorious*, many American Robins do not actually migrate: some remain in their breeding territory year-round; others roost in large mixed flocks during the winter and return to breeding ranges in spring.

Distribution and Habitat
American Robins live year-round in all five physiographic provinces. They prefer open woodlands, swamps, farms and pastures, and suburban habitats such as parks and lawns.

American Robins love sweet fruits and berries and eat them even after they ferment. If they eat too many, robins may become drunk!

Role in Food Web
Robins eat a wide variety of invertebrates such as earthworms, grubs, caterpillars and insects as well as fruits and berries. They are often seen on the ground with their heads cocked to the side, then pouncing on worms and pulling them up. Eggs and young are preyed upon by Gray Squirrels, snakes and some birds. Adults are taken primarily by hawks, cats and snakes.

Canada Goose
(Branta canadensis)

Description
These large water birds (length 76 to 110 centimeters; wingspan 1.3 to 1.7 meters) have a grey-brown body, long black neck and a white "chin strap." Sexes are similar, although females are smaller than males. Song: a musical, trumpet-like honking. Call: various cackles, honks and hisses. Canada Geese mate for life. The female builds a nest on the ground and lines it with feathers. She lays two to eight eggs and incubates them while the male stands guard. Goslings (baby geese) are able to walk only a few hours after hatching. Both parents care for the goslings as they grow. Goose families usually remain together until the next breeding season.

Angry Bird: Canada Geese may attack if they feel threatened. They hiss, spread their wings and charge, and can bite... hard! They may also strike with their wings.

Resident geese numbers can grow to harmful levels. Geese that stay in the same place year-round leave lots of waste behind. Just 50 geese can produce more than 2 ½ tons of feces a year! Too much goose waste may over-fertilize lawns and pollute waterways.

Distribution and Habitat
These geese are found in all five physiographic provinces, usually near water, grassy lawns or agricultural fields. They are often seen in parks, golf courses and other suburban areas, sometimes in large numbers. Although technically a migratory species, most of the Canada Geese in Fairfax County are year-round residents.

Role in Food Web
Canada Geese eat a variety of aquatic plants as well as grasses, grains and berries. Eggs and young are preyed upon by birds of prey, Common Snapping Turtles, Raccoons, Virginia Opossums, foxes and Coyotes. Adults can defend themselves from most predators (except humans).

Great Blue Heron
(Ardea herodias)

Description

These large wading birds stand 1 to 1.4 meters tall with wingspans of 1.7 to 2 meters. Look for the yellow sword-like bill, a white face and crown, and two long black plumes on the back of the head. The shaggy body is bluish-gray. Great Blue Herons utter a variety of squawks and calls during the breeding season, but are otherwise mostly silent. The male gathers sticks which the female uses to build a nest, usually in a tree. The female lays two to six eggs which both parents take turns incubating. After the eggs hatch, both parents feed the young. Chicks are born blind and helpless, and take two months to mature. As fall approaches, some Great Blue Herons drift south toward Florida and the Gulf of Mexico. However, they're not truly migratory, and some spend the winter in our area, or even further north, if they can find open water.

Distribution and Habitat

Great Blue Herons live year-round in all five physiographic provinces in all kinds of saltwater and freshwater habitats, from coastal areas, estuaries, wetlands, riverbanks and lakes to backyard fish ponds. They also hunt for prey in grasslands and agricultural fields.

Great Blue Herons can choke to death if they try to swallow fish too big for their long skinny necks!

These herons form large nesting colonies during the breeding season. With more than 1,400 nests, the Great Blue Heron colony at Mason Neck National Wildlife Refuge in Fairfax County is the largest in the Mid-Atlantic.

Role in Food Web

Great Blue Herons eat fish, frogs, small mammals, reptiles, crayfish, large insects and occasionally other birds. They are often seen wading or standing statue-like on the shores of rivers, ponds and lakes. When they spot their prey, they strike quickly by uncoiling their long S-shaped neck like a spring. Eggs and young are preyed upon by snakes, foxes and birds of prey.

Red-tailed Hawk
(Buteo jamaicensis)

Description
These chunky hawks are among the most common birds of prey in Northern Virginia. The body is brown, the breast white streaked with brown, and the tail brick-colored on top. Juveniles are duller and streakier and have no red in their tails. Sizes range from 45 to 65 centimeters long with a 1 to 1.5 meter wingspan. Red-tailed Hawks utter a raspy scream *(Keyarrrr!)* that is instantly recognizable. When you hear a hawk screech sound effect on TV or in the movies, it's almost always a Red-tailed Hawk! These birds usually mate for life. When unmated birds meet, they perform a dazzling courtship ritual of flying very high, then locking their claws and spiraling towards the earth, letting go before they hit the ground. Nests are built in tall trees overlooking open areas. Both partners help build the nest, incubate the eggs and raise the young. They are fiercely territorial and aggressively defend their territory. While not truly migratory, Red-tailed Hawks move around a lot in fall and spring.

Distribution and Habitat
Red-tailed Hawks live year-round in all five physiographic provinces. They are usually found in open habitats including coastal areas, wetlands, fields and pastures, parks and woodlands. They're often seen soaring over open areas or perched on telephone poles or trees by the roadside.

These birds have amazing eyesight which is much sharper than a human's. A Red-tailed Hawk can spot a mouse from a height of 100 feet!

Role in Food Web
Red-tailed Hawks hunt mostly small mammals, although they also prey on a wide variety of birds, reptiles, amphibians, fish and invertebrates. They also eat carrion. Eggs and young are preyed upon by snakes and by other raptors.

Activity: The key to success (Part 1)

A dichotomous key (from *dichotomy*, meaning divided into two parts) is a tool scientists use to identify organisms based on their traits. It asks a series of paired questions, each of which narrows down the set of species. There are several kinds of dichotomous keys. In one kind, the questions are written out as descriptive sentences. For example:

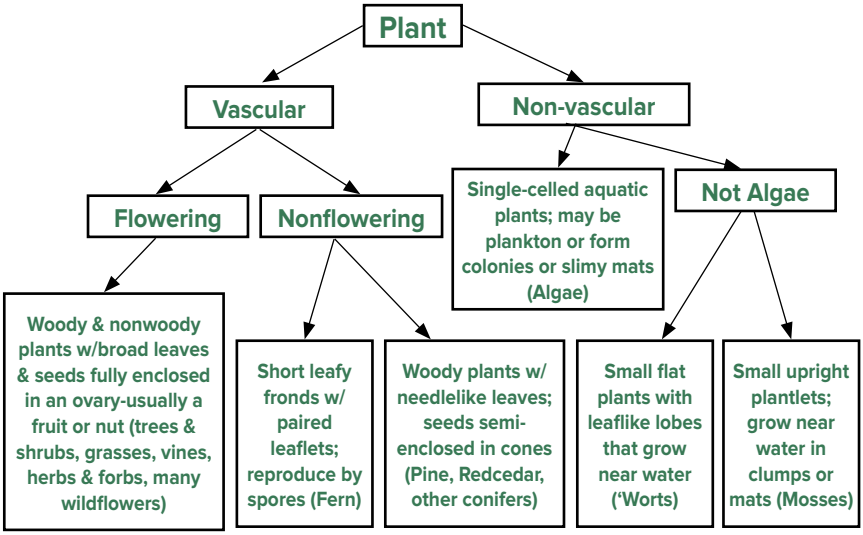
1a. Organism has a backbone..... 2

1b. Organism lacks a backbone.....3

If the organism you're trying to identify has a backbone, you would choose Question 1a, which directs you to Question 2. If the organism has no backbone, you would choose Question 1b, which tells you to skip Question 2 and go to Question 3.

Another kind of dichotomous key uses the same narrowing-down approach in a more visual way. A classification tree also asks paired questions, but the distinguishing traits are described very briefly (or pictured); arrows show you which "branch" of the "tree" to follow to the next set of questions. Whatever the type of key, the basic idea is the same: "If the organism has this trait, then go this way; if it does not (or has a different trait), then go the other way."

Select two plants from the Field Guide. Use the classification tree shown on the next page to identify them.


Plant
Vascular
Non-vascular
Flowering
Nonflowering
Single-celled aquatic plants; may be plankton or form colonies or slimy mats (Algae)
Not Algae
Woody & nonwoody plants w/broad leaves & seeds fully enclosed in an ovary-usually a fruit or nut (trees & shrubs, grasses, vines, herbs & forbs, many wildflowers)
Short leafy fronds w/ paired leaflets; reproduce by spores (Fern)
Woody plants w/ needlelike leaves; seeds semi-enclosed in cones (Pine, Redcedar, other conifers)
Small flat plants with leaflike lobes that grow near water ('Worts)
Small upright plantlets; grow near water in clumps or mats (Mosses)

Activity: The key to success (Part 2)

Select two animals from the Field Guide. Use the classification key shown below to identify them.

Challenge yourself! Go outside and find several plants and animals that are not in this Field Guide. Use the Plant Key on the previous page and the Animal Key on this page to identify them.

MAMMALS

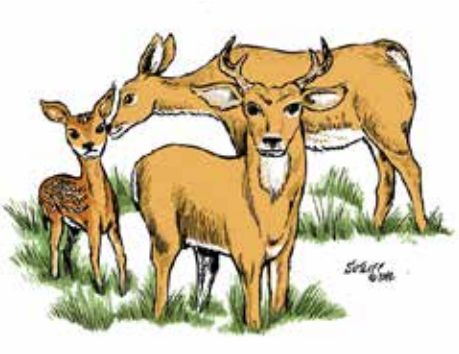
Mammals are a class of warm-blooded vertebrates. Modern mammals range in size from tiny mice to enormous whales and are found in nearly every habitat on Earth: deserts, woodlands, oceans, grasslands, rain forests, polar regions and many others. Although they look very different, all species of mammals share some common characteristics:

- All have lungs and breathe air
- All have fur or hair at some point in their lives
- All (except for the platypus and the spiny echidna) give birth to live young which they nourish with milk produced by the mother

The exact relationships between mammalian groups are not universally agreed-upon, even today. The scientific classifications of mammals (as well as other organisms) are constantly being updated by biologists. Below is a list of the better-known groups of mammals which will give you an idea of how modern species are related to one another:

- Monotremes - egg-laying mammals like the duck-billed platypus
- Marsupials – pouched animals like opossums and kangaroos
- Insectivores - small insect-eaters like moles, shrews and hedgehogs
- Bats – the only mammals that can truly fly
- Carnivores – meat-eaters such as dogs, cats, bears, Raccoons, weasels, seals and their kin
- Ungulates – hoofed herbivores like cows, horses and deer
- Cetaceans – whales and dolphins
- Elephants and manatees
- Lagomorphs – rabbits, hares and their kin
- Rodents – mostly small mammals with large front teeth for gnawing; mice, rats, squirrels, beavers, porcupines and many others
- Primates – lemurs, monkeys, apes and humans

White-tailed Deer
(Odocoileus virginianus)



Description
White-tailed Deer (or whitetails) are the biggest wild animals in Fairfax County. Males (bucks) may be 1.2 meters tall, 1.3 to 2 meters long and weigh up to 135 kilograms. Females (does) are smaller and lighter. In summer, both sexes are red-brown with white patches on the belly, tail and around the eyes; their winter coat is grayish tan. Every year in spring, bucks begin growing antlers on their heads. Growing antlers are covered in soft skin called velvet. Bucks shed their velvet at the start of the breeding season. The antlers fall off as winter approaches. Females and fawns (baby deer) have no antlers. The mating season begins in October. Males and females separate after breeding; bucks play no part in raising the young. Does give birth in spring, often to twins. Fawns are born with their eyes open and can walk within an hour or two. Mothers and fawns stay together until the following spring. Whitetails are most active at night.

Distribution and Habitat
White-tailed Deer are common in all five physiographic provinces. They thrive in human-altered landscapes, preferring woodlands or dense brush near parks, fields, pastures, golf courses and lawns. Stream buffers are important habitat and enable deer to move around unseen.

Deer have a multi-chambered stomach to help break down tough plants. Food is eaten and digested for a while, and then burped back up in tight wads called "cuds" that they chew and re-swallow for more processing. Deer rest during the day, not to hide from people, but to chew their cuds after a night of eating!

Role in Food Web
Whitetails do not eat grass. Even if you see them "grazing" in a yard or field, they are eating clovers, wildflowers or other plants. They also eat fruits, nuts (especially acorns), fungi and leaf buds. They can damage garden vegetables, crops and ornamental plants. Predators include Coyotes, Bobcats, birds of prey, dogs and people.

Red Fox
(Vulpes vulpes)

Description
This carnivore is about the size of a small dog, about 1 meter in length from nose to tail. The fur is rusty red with a white throat, chest and belly. The bushy tail is also tipped with white. Red Foxes are most active at night. They live alone except during the breeding season (December to February). After mating, the pair makes a den in an old woodchuck hole or a burrow they dig themselves. The vixen (female) gives birth to one to nine young (called kits) in March or April. The dog (male fox) hunts for the vixen until the kits can be left alone; then both parents care for the kits until they are old enough to live independently (about seven months).

Red Foxes sometimes "charm" their prey. They roll, leap and bounce around in a playful fashion that fascinates prey animals. The fox gradually moves closer and closer, then pounces and seizes the "charmed" animal in its jaws!

Distribution and Habitat
Red Foxes are found in all five physiographic provinces except for the far southeast corner of the Coastal Plain province. They prefer diverse habitat and thrive on the edges of human-altered landscapes.

Role in Food Web
Red Foxes are omnivorous, although most of their diet is made up of Eastern Cottontail Rabbits and mice. They also eat Gray Squirrels, Muskrats, birds, frogs, insects, carrion, garden and crop plants, nuts and fruits. As one of the few predators in our area, Red Foxes are important to keep rodent populations down. They have few predators, although birds of prey may take young kits.

Gray Squirrel
(Sciurus carolinensis)

Description

This tree-dwelling rodent is usually silver-gray with a white chin and underparts. The brushy tail is fringed with white hairs. There is also a less-common black color phase. Length ranges from 30 to 53 centimeters from nose to tail. Gray Squirrels usually have a breeding season in early spring and another in summer. After mating, the female builds a nest in a tree cavity or in the branches and gives birth to two to four young (called pups). The female cares for the pups until they can live alone. In fall, Gray Squirrels fatten up for winter (many are hit by cars in late fall because they are so fat and slow!). They also store food in tree cavities or bury it in the ground. Both sexes build winter nests for shelter, but they do not hibernate and stay active all winter.

Distribution and Habitat

Gray Squirrels are common in all five physiographic provinces and can be found any place with large, mature trees. They adapt easily to the presence of people and are known to live in attics, garages, chimneys, barbecue pits, crawl spaces and even old cars!

A Gray Squirrel's tail can be used as a shield (for fighting), a balancing pole (for leaping from tree to tree), an umbrella (when it's hot or rainy), or a blanket (when it's cold). It also signals emotions like anger, curiosity, excitement, fear and playfulness.

Role in Food Web

Gray Squirrels are primarily herbivorous and eat nuts, seeds, fruits, berries, fungi, buds and shoots. They also consume insects, carrion and bird eggs and chicks. They sometimes gnaw on old bones or antlers to obtain minerals important to their diet. Predators include birds of prey, foxes, Raccoons, Coyotes, dogs, cats and humans.

Little Brown Bat
(Myotis lucifugus)

Description
These bats are smaller than a human thumb! The average length is 85 to 98 millimeters with a wingspan of 22 to 27 millimeters. Their bodies and wings are dark brown; their undersides are paler. Females are slightly larger than males. Little Brown Bats are active mainly at night. The mating season is in late summer to early fall. Females give birth to one baby (called a pup). At first, females carry their newborns with them while they hunt. Once pups are older, their mothers leave them behind. Pups can fly at about three weeks old, and become independent at around four weeks. In winter when insects are unavailable, bats enter hibernation, a kind of suspended animation during which their heart rate and breathing slow down dramatically. This deep sleep helps reduce wear and tear on their tiny bodies.

Bats use a kind of sonar called echolocation to find their prey.

Bats are not blind, nor do they care about getting in people's hair.

Distribution and Habitat
Little Brown Bats are found in all five physiographic provinces except for the far southeast corner of the Coastal Plain province. These bats live together in colonies and have two kinds of dwellings: summer roosts and winter hibernation sites. Summer roosts are often in man-made structures like old barns, abandoned buildings and large chimneys, usually near water. They hibernate in caves or abandoned mines where temperatures remain stable.

Role in Food Web
Little Brown Bats like to feed over water and eat huge numbers of mosquitos, midges, mayflies and other aquatic insects. Each individual may consume up to 3,000 insects a night! Moths are also important (so they often feed around porches, sports fields and other man-made light sources). Their main predators are carnivorous birds, other mammalian predators, snakes, frogs and even large spiders!

Raccoon
(Procyon lotor)

Description
Raccoons are about 1 to 1.2 meters long from nose to tail. Their fur is grayish brown with black markings, including a black mask across the face and four to six black rings on the bushy tail. Raccoons are active mainly at night. They mate in winter, and three to seven young (called cubs) are born in spring. After nursing her cubs for about eight weeks, the female (sow) teaches them how to climb, swim and find food. Males (boars) take no part in raising cubs. Cubs stay with their mother through their first winter and leave the following spring. Raccoons usually den in hollow trees, small caves or other animals' abandoned burrows, but are equally at home in chimneys, old cars or storm drains. While Raccoons do not truly hibernate, they may sleep in their dens for days or even weeks during the winter!

Distribution and Habitat
Raccoons are common in all five physiographic provinces; they are particularly abundant in the Coastal Plain province. They prefer woodlands near a stream or other water body, but have adapted to multiple environments. Populations can grow quite large in urban areas due to the lack of hunting, absence of predators, and abundant human-supplied food.

Raccoons are highly intelligent and their hand-like paws are amazingly nimble. Contrary to myth, Raccoons do not "wash" their food but use water to moisten and soften it.

Role in Food Web
Raccoons eat almost anything, but are especially fond of creatures found in water—clams, crayfish, amphibians, fish and snails. They also eat insects, slugs, carrion, birds and bird eggs, small mammals, fruits, vegetables, nuts and seeds. Urban Raccoons often eat garbage, bird seed and pet food. Predators include Coyotes, Bobcats, owls and humans, who sometimes hunt them for their fur.

Virginia Opossum
(Didelphis virginiana)

Description

These marsupials (sometimes called "possums") are about the size of a house cat, with an average length of 0.5 to 1 meters from nose to the tip of the long, hairless tail. Their fur is gray tipped with black; the throat and underparts are whitish-yellow. Opossums' tails are prehensile, which means they are able to grasp and hold or wrap around something. It's like having an extra hand! Virginia Opossums are active mainly at night. They live alone, coming together only to breed (January to October). Only two weeks after mating, the female gives birth to six to 13 tiny young, which crawl through her fur to her pouch. They develop in the pouch until they are old enough to ride around on their mother's back (about two months). Young Opossums are able live independently in about three and a half months.

If an Opossum is attacked, it may faint and go into a trance-like state (called "playing 'possum"). Most predators pursue their prey and will ignore a seemingly already-dead (and possibly rotten) corpse. Opossums can remain in this state for up to six hours! Once they sense that they are safe, they wake up and go on their way.

Distribution and Habitat

Virginia Opossums are common in all five physiographic provinces. They live in or near wooded areas, especially those close to water. They are adapted to edge habitats and are abundant in urban areas.

Role in Food Web

Virginia Opossums are omnivorous scavengers. They eat insects, fruits and berries, earthworms, bird eggs, amphibians, crayfish, mussels, snails, slugs and vegetation. Urban opossums also feed in garbage cans, compost heaps, pet food bowls and bird feeders. Carrion is an important part of their diet. Opossums are often killed by vehicles while searching for carcasses along roadsides. Predators include birds of prey, foxes and Coyotes.

Beaver
(Castor canadensis)

Description
These hefty aquatic animals are the largest rodents in North America. The average length is 1 to 1.2 meters. Their thick, waterproof fur is dark brown. Beavers use their flattened, hairless, scaly tail like a paddle to help them swim. They also slap their tails in the water to communicate with others of their kind. The gnawing teeth are very large and bright orange. Beavers mate for life and live in family groups. The male and female build a lodge in the water or dig a burrow on the bank of a lake or river. Mating season is in winter; two to four young beavers (kits) are born in February or March and cared for by both parents. Kits remain with their parents for up to two years, helping to care for their younger siblings, before they become independent. Beavers are long-lived for rodents and may live as long as 20 years.

Distribution and Habitat
Beavers are found in all five physiographic provinces, although not in large numbers. They can live almost anywhere there is water. They are skilled at building dams to create ponds that protect them from predators and enable them to swim to their food supply. However, beavers that live in deep streams, rivers and lakes do not need dams. Urban beavers may occupy stormwater ponds and other man-made water features.

Beaver dams help control flooding and erosion, trap sediments and filter excess nutrients and pollution, all of which improve local water quality and benefit the Chesapeake Bay. Ponds and wet meadows created by beaver dams provide wetland habitat for other mammals, fish, amphibians, reptiles, birds and invertebrates.

Role in Food Web
Beavers eat a wide variety of leaves, twigs, bark, roots and bulbs. Adults have few predators (except humans, who trap them for their fur), but kits may be taken by foxes, Coyotes or birds of prey.

Activity: What animal can you find?

This field guide includes many different plant and animal species seen in Fairfax County, yet represents only a small percentage of the total species that live in the county. Have you seen an animal near your school or home that does not appear in this guide? Observing a species' physical appearance, size, location and behavior are all important in describing and identifying an organism. Take a few minutes to go outside and find an animal that is not included in the field guide. Use the area below to create your own entry in the field guide describing the organism. Include a sketch of the organism and describe any unique behaviors that the organism displays. Why do you think this animal was not included in the guide?

Activity: Dinosaur dilemma

Imagine that a scientist working with dinosaur DNA has been able to bring back the Velociraptor, a small (about 1.5 meters) but speedy feathered carnivorous dinosaur. These sharp-eyed predators will eat anything they can catch and kill. Suppose a population of these dinosaurs was released in Fairfax County. Based on what you have learned about relationships that living organisms have with each other and their environment, what do you think the impact of this introduction would be on organisms, populations and/or communities in the county? What changes might there be to food webs, habitats and other ecosystem components? How might environmental conditions be affected by these changes? Remember, humans are part of the environment, too!

Fairfax County's ten most (un)wanted invasive species

Mile-a-minute weed

A vine with sharp spiny stems and leaves (also called "tearthumb").
Native to Japan, China and southeast Asia.
Grows very fast, forming dense mats that smother native plants.
Fruits float easily in water; storm events increase the likelihood of spreading by seed throughout watersheds.
Considered a highly invasive weed in Virginia.

(Polygonum perfoliatum)

Multiflora rose

Thorny flowering shrub from Japan, Korea and eastern China.
Intentionally introduced in the mid-1800's to control erosion.
Invades both disturbed and natural habitats and outcompetes native plants. Produces large quantities of pollen which cause allergic reactions in some people. Considered a highly invasive plant in Virginia.

(Rosa multiflora)

Chestnut blight

Parasitic fungus from China.
Accidentally introduced around 1900 on chestnuts imported from Chinese nurseries.
The magnificent American Chestnut (*Castanea dentate*) has been almost wiped out by the blight. Few trees are left in the county; the Fairfax County Park Authority works with the American Chestnut Foundation to protect these.

(Cryphonectria parasitica)

Bradford pear

Small tree native to China and Vietnam.
Widely planted as an ornamental.
Easily escapes from cultivation and outcompetes native plants and trees.

(Pyrus calleryana, variety "Bradford")

European starling

Stocky robin-sized songbird from Europe and western Asia.
Released in New York City in 1800's by an eccentric group that wanted to introduce all the birds mentioned in Shakespeare's plays.
Damages crops and native plants; bullies and even kills native birds.
Considered a nuisance bird in Virgina.

(Sturnus vulgaris)

EMERALD ASH BORER

(Agrilus planipennis)

Small green wood-boring beetle from Japan, China and southeast Asia.
Accidentally introduced in the 1990s, probably in shipping containers. Highly destructive to native ash trees. Considered an invasive species of high concern in Virginia. Fairfax County works with the Virginia Department of Agriculture and federal agencies to monitor the infestation.

HEMLOCK WOOLLY ADELGID

(Adelges tsugae)

Sap-sucking insect from Japan and parts of China.
Accidentally introduced in 1920s.
Kills native Eastern Hemlock trees (*Tsuga canadensis*) by sucking sap from the bases of the needles. Hemlocks throughout the county have been decimated by this pest. Fairfax County's Urban Forestry Division has introduced predators to control the adelgid.

NORTHERN SNAKEHEAD

(Channa argus)

Sharp-toothed fish from northern China and eastern Russia.
Sold live at markets.
Can breathe air and survive out of water up to three days. Voracious predator. Competes with native fish for resources. Considered an invasive species of high concern in Virginia.

BROWN MARMORATED STINKBUG

(Halyomorpha halys)

There are many native species of stinkbug in Virginia, but this species is an invasive pest from Japan, China and southeast Asia.
Accidentally introduced in the 1990s, probably in shipping containers.
Causes severe damage to crops and ornamental plants. Moves indoors when weather cools, sometimes in large numbers.

WATER CHESTNUT

(Trapa natans)

Aquatic plant that grows in dense floating mats.
Native of Europe, Asia and Africa.
First observed in U.S. in 1850s.
Limits light. Reduces oxygen levels. Competes with native vegetation. Little value to waterfowl. Limits aquatic recreational activities. Sharp fruits can wound.

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My Notes

Key to Icons


Invertebrate


Vertebrate


Non-vascular


Vascular


Native


Non-native


Woodlands


Meadows/Fields/
Open Spaces


Lakes/Ponds/Wetlands


Rivers/Streams/Creeks


Estuaries


Suburban Areas


Producer


Consumer-Herbivore


Consumer-Carnivore


Consumer-Omnivore


Decomposer

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