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# Mock Strawberry (Duchesnea indica)

#### **Complements the following State Science Standards:**

SC: K.L.2A.6, 1.L.5A.1, 3.L.5A.2, 3.L.5B.1, 4.L.5A.1, and 4.L.5B.2
NC: 1.L.1.1, 1.L.1.2, 1.L.2.1, 2.L.2.1, 3.L.2.1, 3.L.2.3, 4.L.2.1, 5.L.2.1, and 5.L.2.2
GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

#### Identification

The leaves grow in clusters of 3 and have lobed edges. The flowers are yellow and have 5 petals. The flowers can be seen from spring to fall. The fruits look like a strawberry that is approximately 1 cm in diameter. These fruits are inedible.

#### Habitat

Mock strawberry grows well in shady, disturbed sites such as roadsides, yards, and open woodlands. The plant grows low to the ground.

## **General Ecology**

Despite its name, mock strawberry is not a true strawberry. It is actually a member of the rose family. It is a non-native perennial herb introduced from Asia. Mock strawberry is often seen flowering in yards and roadsides from February until the first frost in fall.

# Striped Wintergreen (Chimaphila maculata)

# **Complements the following State Science Standards:**

SC: 1.L.5A.1, 4.L.5A.1, 4.L.5B.2, and 6.L.5B.3
NC: 1.L.1.1, 1.L.1.2, 1.L.2.1, 2.L.2.1, 3.L.2.1, 3.L.2.3, 4.L.2.1, 5.L.2.1, 5.L.2.2, and 5.L.2.3
GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

#### Identification

Dark, leathery evergreen leaves. The leaves have toothed edges and white vein markings on the top surface. The plant grows to a height of 4-8 inches. In May – June, it produces 1-5 white or pink flowers that nod downward from the top of the plant.

## Habitat

Common in dry, upland pine and hardwood forests. Within these forests, it grows in shady locations with acidic soils.

## **General Ecology**

Spotted wintergreen is a perennial plant. Within the flowers, nectar is secreted at the base, attracting pollinators such as bumblebees. The female part of the flower (pistil) has a sticky stigma tip that captures pollen from insects visiting the flower. The pollinators pick up pollen on their body by rubbing against the anthers of the male part of the flower (stamen). This pollen is then transferred to the sticky stigma of other flowers.

#### **Interesting Facts**

Despite the name, spotted wintergreen does not have a wintergreen odor. The name refers to it being an evergreen plant that is green during wintertime. The plant was once used to flavor commercial root beer.

# Carolina Mantis (*Stagmomantis carolina*)

#### **Complements the following State Science Standards:**

SC: K.L.2A.3, 2.L.5A.1, 2.L.5A.2, 2.L.5B.1, 3.L.5A.2, 4.L.5A.1, 4.L.5B.1, 4.L.5B.3, 5.L.4B.1, 5.L.4B.2, and 6.L.4B.2
 NC: K.P.1.2, K.L.1.1, K.L.1.2, 1.L.1.1, 1.L.1.2, 1.L.2.2, 2.L.1.1, 2.L.1.2, 2.L.2.1, 4.L.1.2, 5.L.2.1, 5.L.2.2, and 5.L.2.3

GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

## Identification

The appearance differs by gender, with males being pale green to brownish gray, and females being green. Females are also larger (up to 2.5 inches long) than the males. The Carolina mantid can easily be distinguished from the Chinese mantid in that the wings of the Carolina mantid do not extend to the end of the abdomen.

#### Habitat

Common in yards, gardens, grassy fields, and forests.

#### **General Ecology**

The Carolina mantid is a sit-and-wait predator that waits for prey to come close to it. This feeding style is aided by its green coloration, which helps it to be camouflaged against vegetation. When prey get close, it will sometimes move very slowly towards the prey to aid in its capture. They are the most abundant native mantid in North America. When the prey are sufficiently close, the mantis grabs the prey with its front legs. The spines on these legs help it to hold onto the struggling prey.

The reproductive habits of mantids are quite interesting. Females give off chemicals called pheromones that attract potential mates to approach her. Males must carefully approach the female, though, as they may be attacked and eaten. Because of this, males will often slowly approach the female from behind. On occasion during the mating process, the female will remove the head of the male and eat it during copulation. Despite being decapitated, the male will continue to mate with the female and the decapitation may enhance his reproductive success with the female. After mating, the male may be completely consumed in some instances, providing an energetic meal for the female to produce young. Although this dramatic mating ritual is known to occur in many mantis species, it is not the typical pattern of reproduction in any species.

After mating, females lay distinctive egg cases (resembles a packing peanut) on tree branches. The females lay egg cases in the fall and young hatch out the following spring. Up to 50 young hatch from a single egg case.

#### What do they eat?

Carolina mantids eat a variety of invertebrates, including bees, wasps, flies, and grasshoppers.

#### Predators

Birds, rodents, and bats.

#### Adaptations

They have very mobile heads that can rotate in a wide range, allowing the mantis to search for predators and prey without having to move the body. The large eyes have an overlapping field of view, giving the mantis binocular vision and good depth perception for grabbing prey. The front legs of the mantid are used to grab prey. The spines on these legs help it hold onto captured prey. Some mantids have ears near their legs that can hear the echolocation calls of bats. When they hear the bat calls, the mantid dives to the ground to avoid predation.

#### **Interesting Facts**

The name "mantis" is a Greek reference refers to "prophet". This name reflects its habit of positioning of the front legs out in front of the body in a praying position.

# Eastern Tiger Swallowtail (Papilio glaucus)

#### **Complements the following State Science Standards:**

**SC:** K.L.2A.3, 2.L.5A.1, 2.L.5A.2, 2.L.5B.1, 4.L.5B.3, and 6.L.4B.2

NC: K.P.1.2, K.L.1.1, K.L.1.2, 1.L.1.1, 1.L.1.2, 1.L.2.2, 2.L.1.1, 2.L.1.2, 2.L.2.1, 2.L.2.2, 4.L.1.2, 5.L.2.1, 5.L.2.2, and 5.L.2.3

**GA:** SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

#### Identification

Male butterflies are yellow with black "tiger stripes" on the front wings (forewings). The back wings (hindwings) are also yellow, but with a black posterior margin. Females come in two morphological forms. The yellow morph resembles the male, but has a larger blue patch along the posterior edge of the hindwings. Dark morph females are black, except for a blue patch on the hindwing margin. Both males and females have narrow hindwing projections (swallows) that extend posteriorly from the hindwings.

Young caterpillars resemble bird droppings. As they mature, caterpillars become green and develop a humped anterior end. Caterpillars also possess large eyespots.

#### Habitat

Found in a variety of habitats across the eastern United States, including woodlands, urban parks, gardens, and suburban yards. Caterpillars feed on deciduous trees such as cottonwood and birch.

## **General Ecology**

This large, distinctive butterfly is a common sight across the Piedmont from March – October. There are several broods each year in the south, so adults can be seen throughout much of the year. Butterflies are strong flyers, often being seen flying high near the treetops.

## What do they eat?

Adults feed on the nectar of flowers, particularly those that are red, pink, or purple.

#### Adaptations

Dark morph females resemble the toxic pipevine swallowtail butterfly. This mimicry helps to protect the dark morph females from predation by birds.

Caterpillars are able to feed on tree leaves containing several toxic compounds that typically deter herbivory. The caterpillars possess enzymes that destroy these toxic compounds in the leaves. The morphology of caterpillars also helps protect them from predation by birds. The humped shape of the caterpillar head and large eyespots render a snake-like morphology to the caterpillar. This combination of features has been shown to enhance the survival of caterpillars from predation by birds.

# **Interesting Facts**

The eastern tiger swallowtail is the state butterfly of Georgia, South Carolina, North Carolina, and Virginia.

# Yellow Garden Spider (Argiope aurantia)

#### **Complements the following State Science Standards:**

SC: K.L.2, 2.L.5, 4.L.5, 5.L.4, and 6.L.4
NC: K.P.1.2, K.L.1.1, K.L.1.2, 1.L.1.1, 1.L.1.2, 1.L.2.2, 5.L.2.1, and 5.L.2.2
GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

#### Identification

Females are much larger and more commonly seen than are males. Females have a body length that is roughly 1 inch (2.5 cm) long. Their abdomen has a distinctive yellow and black coloration and the cephalothorax is covered in fine, white hairs. The female legs are black, except near the base where they are orange. The much smaller males are orange and rarely seen.

#### Habitat

Found in grassy fields, backyards, and gardens.

#### **General Ecology**

Female garden spiders construct a large web that is often around 2 feet in diameter. They are a diurnal (active in daytime) spider and often hold their legs in pairs while resting on the web.

#### What do they eat?

Garden spiders consume invertebrates captured on their web. They paralyze their prey with a bite to the back of the head and then wrap the prey in silk. The prey are consumed later.

## Adaptations

The white zig-zaz (stabilimentum) across the center of the web helps to stabilize the web. It is also thought that the stabilimentum may reflect UV wavelengths that attract insect prey to the web. The stabilimentum has also been shown to help birds avoid flying into the web and damaging it. Females often rest in the middle of the stabilimentum.

#### **Interesting Facts**

This species is often called the "writing spider" because of the vertical white ziz-zag pattern (stabilimentum) across the center of the web.

# Spotted Salamander (Ambystoma maculatum)

# **Complements the following State Science Standards:**

SC: K.L.2A.6, 2.L.5A.1, 4.L.5B.3, 5.L.4B.3, and 6.L.4B.2
NC: K.P.1.2, K.L.1.1, K.L.1.2, 1.L.1.1, 1.L.1.2, 1.L.2.2, 2.L.1.1, 2.L.1.2, 4.L.1.2, 5.L.2.1, and 5.L.2.2
GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

## Identification

A large, robust salamander with a black body. It grows up to 10 inches long. It is easily identified by the two rows of yellow or orange spots that run down its back.

# Habitat

Found in moist hardwood and mixed hardwood-coniferous forests. It needs adjacent wetlands or semi-permanent pools of water for breeding. It is most often found in woodlands surrounding shallow wetlands that lack fish. Outside of the breeding period, adults reside in woodlands either underground or under logs.

# **General Ecology**

A fossorial (lives underground) salamander that is rarely seen on the surface. In late winter, it leaves its burrow on rainy nights to breed in small pools of water in woodlands. Females lay eggs on sticks and other submerged structures in the water. The egg mass is then covered in a layer of jelly that is thought to protect the eggs from predators. Larvae hatch from the eggs 1 -2 months later.

The loss of forest and wetland habitat from human development has led to a decline in spotted salamander abundance. Additional threats include acid rain that can alter the pH of wetlands for breeding and heavy metal contaminants.

# What do they eat?

Spotted salamanders eat small, soft-bodied invertebrates (organisms lacking a backbone) such as mosquito larvae, isopods (pill bugs or roly-polys), dragonfly larvae, earthworms, and spiders.

## Predators

Salamander larvae and eggs are eaten by fish, giant water bugs, and frogs. Adult spotted salamanders are preyed upon by great blue herons, raccoons, and snakes. Adults produce noxious skin secretions that deter some predators.

## Adaptations

Spotted salamander egg masses sometimes have a green appearance. This comes from a symbiotic mutualism with algae living in the egg mass. Symbiotic means that two species of organisms live together, whereas a mutualism indicates that both benefit from this close

association. The algae in the egg mass receive nitrogen-rich waste products from the developing larvae within the eggs. In return, the algae perform photosynthesis and increase the oxygen supply to the eggs.

# **Interesting Facts**

Spotted salamanders can live up to 20 years in the wild.

# Eastern Painted Turtle (Chrysemys picta)

#### **Complements the following State Science Standards:**

SC: 2.L.5A.1, 3.L.5A.2, and 6.L.4B.5
NC: K.P.1.2, K.L.1.1, K.L.1.2, 1.L.1.1, 1.L.1.2, 1.L.2.2, 2.L.1.1, 2.L.1.2, 4.L.1.2, 5.L.2.1, 5.L.2.2, and 5.L.2.3
GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

#### Identification

Painted turtles have a dark shell that grows up to 7 inches long. There are two large yellow splotches on the head behind each eye. There are also yellow lines running down the head and neck. There are also red lines running down the legs. The margin of the top shell (carapace) often has a series of red or yellow rectangular splotches.

#### Habitat

Painted turtles are very common in ponds, wetlands, lakes, and reservoirs across the Piedmont. They prefer aquatic habitats with muddy bottoms over those that are covered in a rocky substrate. This species is also very tolerant of human development and can even be found living in roadside ditches. Painted turtles are a common sight, often being seen while basking on rocks and logs.

#### **General Ecology**

Painted turtles are often spotted while basking on logs and rocks in marshes and ponds. As a reptile, painted turtles are ectotherms. This means that their body temperature fluctuates with their environment. By basking in the sun, they raise their body temperature relative to what it would be if they were in the water or in the shade. An out-of-date term for this type of physiology is "cold blooded" but ectothermic is the preferred term today. Mammals such as us are homeotherms, meaning that we have a near constant body temperature and do not depend on our environment to regulate our body temperature.

Painted turtles dig shallow nests in open, sunny habitats. Females will lay 2-8 eggs. The eggs hatch in the late summer or early fall. After hatching, the young stay in the nest for the first winter and emerge the following spring.

## What do they eat?

They eat a wide variety of organisms, including earthworms, insects, crayfish, snails, tadpoles, and will also consume carrion, particularly dead fish.

# Predators

Raccoons are the main predator of painted turtles. Great blue herons, snapping turtles, catfish, and snakes will also consume prey on the young. Domestic dogs and raccoons will dig up the nests and eat the eggs.

# Eastern Box Turtle (Terrapene carolina)

#### **Complements the following State Science Standards:**

SC: K.L.2, 2.L.5, 4.L.5, 5.L.4, and 6.L.4
NC: K.P.1.2, K.L.1.1, K.L.1.2, 1.L.1.1, 1.L.1.2, 1.L.2.2, 2.L.1.1, 2.L.1.2, 4.L.1.2, 5.L.2.1, 5.L.2.2, and 5.L.2.3
GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

## Identification

Individuals grow to a shell length of up to 6 inches. This species is highly variable in appearance. The top shell (carapace) is highly domed and black or brown. Stripes on the top shell are either orange or yellow. Males often have red eyes, while females have eyes that are yellow or brown. The belly shell (plastron) is flat in females, while it is concave in males. In both sexes, the shell is hinged on the belly plate.

## Habitat

Eastern box turtles are highly terrestrial, only being found in water in hot weather or during droughts. They are often seen in hardwood forests or grassy fields. Box turtles are also seen crossing roads in the morning or after rains. They are often crossing roads to travel between patches of forested habitat.

## **General Ecology**

This is a long-lived species. Individuals have been live over 40 years in the wild. Adults are often encountered, but the young are rarely seen. Immature turtles spend most of their life under the leaf litter. Box turtles overwinter by digging an underground burrow. The fragmentation of forested habitat from human development has led to turtles regularly moving across roads between patches of forest habitat. This can often result in mortality from cars.

## What do they eat?

Box turtles have a varied diet, consuming seeds, berries, insects, grubs, frogs, earthworms, mushrooms, persimmon fruits, and muscadine grapes.

## Predators

Adults are occasionally killed by coyotes, but their ability to enclose the head and limbs into the shell is an effective defense against most predators. The hinged belly plate allows them to seal the shell tightly around the head and front legs. The main challenge for adults are being hit by cars while crossing roads and collection from the wild to become pets. Predators such as raccoon, skunks, and foxes will dig up nests and eat the eggs.

# Nesting

Females dig a flask-shaped nest in the soil and lay 3-8 eggs into this cavity. Egg laying typically happens in June or July and the young hatch in September.

# Adaptations

This species is unique among the turtles in our region in that it has a hinged belly plate. The hinge allows it to tightly seal the head and front limbs into the shell in the event of a predator attack.

# Copperhead (Agkistrodon contortrix)

## **Complements the following State Science Standards:**

SC: K.L.2A.3, K.L.2A.6, 2.L.5A.1, 3.L.5A.2, 4.L.5B.1, 4.L.5B.3, 5.L.4B.2, and 5.L.4B.3
 NC: K.P.1.2, K.L.1.1, K.L.1.2, 1.L.1.1, 1.L.1.2, 1.L.2.2, 2.L.1.1, 2.L.1.2, 4.L.1.2, 5.L.2.1, 5.L.2.2, and 5.L.2.3

GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

## Identification

Body is tan to brown, with dark-brown, hourglass-shaped crossbands that run the length of the body. Their head is triangular in shape, with vertical pupils similar to that of a cat. There is a single facial pit on each side of the head. Adult snakes are 2-3 feet long. Juveniles resemble adults, but they have a yellow or green tip to the tail.

## Habitat

Found in forests, swamp margins, and yards. Around the home, they are often encountered near items stacked on the ground such as old boards or pieces of tin. Sawdust piles are another common area to find copperheads.

#### **General Ecology**

Copperheads are the most common venomous snake in the Piedmont. They may be encountered day or night, but are primarily active at night during the heat of summer. The coloration and body pattern of copperheads makes them blend in very well with forest leaf litter. It would be very easy to walk by one and never notice it. Fortunately, they are not an aggressive snake and rarely strike unless they feel threatened. As is the case with many snakes, copperheads will release a musky odor when attacked.

Because they occur in many habitats and very well-camouflaged, copperheads are the most common cause of snake bites in the southeastern United States. Most bites occur when someone tries to kill or harass a snake. The best way to avoid a bite is to simply leave any copperhead you find alone. Fortunately, copperhead venom is not very potent and deaths from bites are exceedingly rare. Copperhead venom kills small prey by destroying their red blood cells.

Females give live birth to 7 - 14 young in late summer. These young hatch from eggs gestated within the female body, a reproductive strategy called ovoviviparity.

Snakes across North America differ reproductively in the manner of young development. Some snakes lay eggs (oviparous snakes). Across the southeastern United States, approximately ½ of all snakes lay eggs (oviparous). Other species produce eggs that are kept in the body and the young hatch from these eggs inside the mother (ovoviviparous), whereas other snakes give birth to live young that are nourished within the mother by a placenta-like structure (viviparous).

Copperheads are ovoviviparous. Females give live birth to 7 - 14 young in late summer. These young hatch from eggs gestated within the female body.

## What do they eat?

Copperheads are opportunistic feeders that consume a variety of prey, including frogs, lizards, snakes, small mammals, birds, and insects. In some areas, they feed heavily on cicadas. Juveniles wiggle their yellow tail to attract prey within striking range. When hunting prey such as rodents, copperheads often strike the prey and then release it. After the venom has had its effect, the snake will track down the rodent based on its odor trail.

## Predators

Very few animals prey on copperheads due to the risk of being bitten. Common kingsnakes are immune to copperhead venom, though, and will eat copperheads.

## Adaptations

Young copperheads have bright yellow tail tips that they wiggle to attract prey such as frogs and lizards. As a pit viper, copperheads have pit organs on each side of their head that detect the body heat of prey such as rodents.

## **Interesting Facts**

In the southeastern United States, more people are bitten by copperheads than by any other venomous snake. The bite is painful, but very rarely causes death. Copperhead venom kills prey by destroying red blood cells and body tissues. Fortunately, the venom is not highly toxic to humans. If you were bitten, however, you should seek immediate medical help.

# Northern Water Snake (Nerodia sipedon)

## **Complements the following State Science Standards:**

SC: K.L.2A.3, 2.L.5A.1, 2.L.5A.2, 3.L.5A.2, 6.L.4B.2, and 6.L.4B.5
NC: K.P.1.2, K.L.1.1, K.L.1.2, 1.L.1.1, 1.L.1.2, 1.L.2.2, 2.L.1.1, 2.L.1.2, 2.L.2.1, 2.L.2.2, 4.L.1.2, 5.L.2.1, and 5.L.2.2
GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

#### Identification

Northern watersnakes are variable in color, being brown, reddish, tan, or gray. They have dark splotches on their back and lateral bands on the back half of the body. As an adult, they reach a length of up to 4 feet.

#### Habitat

Northern water snakes are almost always found near water. Lakes, ponds, marshes, or streams are typical habitat.

#### **General Ecology**

Often seen basking on logs or rocks in the water or along the water's edge. When approached, this snake will often retreat into the water and swim away. If cornered, northern watersnakes may be aggressive and will often bite if they are grabbed. They are not venomous and pose no risk if they bite someone. Each year, many northern watersnakes are killed because they are mistaken for cottonmouths or copperheads.

Snakes across North America differ reproductively in the manner of young development. Some snakes lay eggs (oviparous snakes). Across the southeastern United States, approximately ½ of all snakes lay eggs (oviparous). Other species produce eggs that are kept in the body and the young hatch from these eggs inside the mother (ovoviviparous), whereas other snakes give birth to live young that are nourished within the mother by a placenta-like structure (viviparous). Northern watersnakes are viviparous. In late summer, females give live birth (viviparity) to 20-30 offspring.

#### What do they eat?

Consume aquatic prey such as fish, frogs, and toads. Despite the common perception, northern watersnakes are not detrimental to game fish populations in lakes and streams.

## Predators

Young snakes are eaten by fish.

# Great Blue Heron (Ardea herodias)

## **Complements the following State Science Standards:**

SC: K.L.2, 2.L.5, 4.L.5, 5.L.4, and 6.L.4
NC: K.P.1.2, K.L.1.1, K.L.1.2, 1.L.1.1, 1.L.1.2, 1.L.2.2, 2.L.1.1, 4.L.1.2, 5.L.2.1, and 5.L.2.2
GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

## Identification

This is one of the largest birds in North America. It stands 4 feet tall and has a 6 foot wingspan. They weigh 2-2.5 kg (4.4 - 5.5 lbs) as adults. Their feathers are blue-gray, with rusty patches at the front of the wings and tops of the legs. There is also a bold black stripe above the eyes.

# Habitat

The great blue heron is one of the most adaptable birds in North America, being found in suburban areas as well as wild lands. It is found in coastal and freshwater communities, including rivers, lakes, and marshes. It is a year-round resident in the Piedmont.

# What do they eat?

They are carnivores, feeding mostly on fish and aquatic invertebrates, but also frogs, snakes, and mice. Great blue herons hunt by standing still in shallow water and then quickly grabbing prey with their beak. The inside edge of the bill has ridges that help them hold onto slippery fish and amphibians.

# How do they hunt?

Great blue herons walk slowly through the water or stand still and wait for prey to swim by. When spotted, prey are grabbed by a rapid forward thrust of the head and then swallowed whole.

# Adaptations

Great blue herons have good night vision due to a large number of rods in the retina of their eye. Rods are structures that allow for vision in low light conditions. The 6<sup>th</sup> cervical (neck) vertebrae of great blue herons has a specialized anatomy that allows the heron to thrust the neck and head forward rapidly for prey capture. The middle toe has a small comb-like structure that is used for scratching and spreading powderdown, on the feathers. The powderdown is produced by specialized down feathers that disintegrate over time. As they degrade, the feathers produce a fine dust of keratin protein that resembles talcum powder in consistency. This powderdown acts as a waterproofing layer on the feathers.

## Nesting

Great blue herons nest in colonies of up to several hundred individuals. Nests are often located in trees within swamps or bottomland forests. These habitats help protect the young from predators such as alligators, snakes, and raccoons. The nest is made of sticks and it can be over a meter in diameter. The nest is lined with soft material such as moss, pine needles, or dry grass. Females lay 2-6 eggs per clutch.

# **Interesting Fact**

Great blue herons have been known to live up to 23 years in the wild.

# Heron Heron

# Color the foods the heron eats







FISH

FLOWERS

FROG





CATTAILS

FLY

SNAKE

Circle the places where a heron can live.



MARSH



DESERT



RIVER

#### To read/discuss with students:

The Great Blue Heron (*Ardea herodias*) is one of the largest birds in North America. It stands 4 feet tall and has wings that stretch 6 feet wide. Their feathers are blue-gray, with reddish brown patches at the front of the wings and tops of the legs. There is also a bold black stripe above the eyes.

Heron live on the edges of rivers, and lakes, and in marshes and swamps.

What do rivers, lakes, swamps, and marshes all have? - Fresh water with shallow parts -

Herons' bodies are great for living in shallow fresh water.

The herons can walk on the soft, muddy edges of the water without getting stuck because they have really long toes. The toes help spread out their weight so they don't sink in, like snowshoes help people walk on top of snow.

Herons also have very long legs so that they can wade into the water without getting their bodies too wet.

They hunt by standing still in shallow water and then quickly grabbing prey with their beak. The inside edge of their beak has ridges that help them hold onto slippery food. They are carnivores. They eat mostly fish and crayfish, but also frogs, snakes, birds, and mice.

Do herons eat plants? - No, carnivores eat only animals.

#### What kinds of animals do herons eat? – Anything they can catch

Large groups of families live together in colonies. Similar to neighborhoods. Each pair, a mom and a dad build a large nest of sticks. There, the mom lays eggs where the baby herons grow before they hatch.

NAME

#### Hands-on Activity:

1) Use paper towel tubes to build heron beaks.

2) Cut the tube in half lengthwise to create upper and lower beaks.

3) Tape one semicircular end of each half closed to make a point.

4) With staples, tape, or glue, attach one of the following to the edges of each beak: Waxed paper or acetate sheets, construction paper, sandpaper.

5) Reinforce the back of the top and bottom jaws with a sheet of strong (duct, or packing) tape and by wrapping it.

6) Finish creating a hinge joint with tape to create a beak puppet. Leave the sticky side of the tape exposed inside the finger holes at the hinge of the jaw will allow better grasp by the students.

Students should use these puppets to determine how the serrated edge on the inside of a heron's beak is adaptive for catching prey. A "marsh" may be set up with various model prey items (toys) for the class to catch. Discuss which "beaks" work best.



Draw a line connecting each animal on the left to its type on the right.

Frog	Dragonfly
Minnow	Heron
Snake	Mouse
Mammal	Reptile
Bird	Fish
Amphibian	Insect

Herons live near rivers, lakes, and marshes. They are carnivores who eat mostly fish and crayfish. They also eat frogs, snakes, and mice. Herons hunt by standing still in shallow water and then quickly grabbing food with their beak. The beak has a rough edge to help hold on to their food.

Which animals are PREDATORS and which are PREY in the paragraph above?

Frog	
Heron	
Snake	

Circle the body parts that help herons walk on soft mud and in shallow water.









SHARP BEAK

LARGE FEET

WIDE WINGS

LONG LEGS

NAME

#### Hands-on activity:

Prepare model heron beaks, omitting step 4

1) Use paper towel tubes to build heron beaks.

2) Cut the tube in half lengthwise to create upper and lower beaks.

3) Tape one semicircular end of each half closed to make a point.

4) With staples, tape, or glue, attach one of the following to the edges of each beak: Waxed paper or acetate sheets, construction paper, sandpaper.

5) Reinforce the back of the top and bottom jaws with a sheet of strong (duct, or packing) tape and by wrapping it.

6) Finish creating a hinge joint with tape to create a beak puppet. Leave the sticky side of the tape exposed inside the finger holes at the hinge of the jaw will allow better grasp by the students.

Students should use these puppets to determine how the serrated edge on the inside of a heron's beak is adaptive for catching prey. A "marsh" may be set up with various model prey items (toys) for the class to catch. Discuss which "beaks" work best



Provide a variety of materials. Rough, smooth, fuzzy, sticky, etc. and ask students to attach the material to the edges of the heron beak as in step 4.

Create a "marsh" for the students to try their beaks in. Competitions for lifting smallest, heaviest, grabbing fastest, and being most maneuverable, are possible. Races to determine which beak works best may also work. Discuss what characteristics of each beak led to its strengths and weaknesses.

# White-tailed Deer (Odocoileus virginianus)

# **Complements the following State Science Standards:**

SC: K.L.2, 2.L.5, 4.L.5, 5.L.4, and 6.L.4
NC: K.P.1.2, K.L.1.1, K.L.1.2, 1.L.1.1, 1.L.1.2, 1.L.2.2, 4.L.1.2, 5.L.2.1, 5.L.2.2, and 5.L.2.3
GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

# Identification

Deer are reddish-brown in summer and grayish-brown in winter. Fawns are reddish-brown with white spots. The spots are lost when they molt in the fall. Adult males (bucks) average 3 feet tall at the shoulder and weight from 50 to over 300 lbs. Adult females (does) are slightly smaller than bucks.

## Habitat

White-tailed deer are most abundant in young forests with shrub cover and adjacent agriculture or open fields. Bottomland forests are also a preferred habitat.

# What do they eat?

White-tailed deer are a browsing mammal that feeds on twigs and leaves. In forested habitats, they often eat acorns and beechnuts. In agricultural areas, they feed on crops such as corn and soybeans. Deer often consume 5 – 9 pounds of food per day, primarily feeding at dawn and dusk.

## Growth and use of antlers

Bucks produce antlers each summer, starting with their 2<sup>nd</sup> summer. Antler growth begins in April. Initially, the antlers are covered in a soft velvet layer containing blood vessels that provide nutrients to the growing tissue. Antlers are made of bone and grow to full size by late August. At that time, the velvet dries and sloughs off. Some of the velvet is rubbed off by males rubbing on trees as a territorial marking. Antlers are not the same structure as a horn. Antlers are made of bone and are shed each year. In contrast, horns (such as what a cow has) consist of a bony core surrounded in a keratin sheath. Horns are also permanent. Keratin is a protein that also makes up structures such as your hair, fingernails, and is a major component of your skin.

Each fall, bucks use their antlers during sparring matches with rival males. Bucks shove each other around and a large rack may form a visual signal that inhibits being challenged by rival males.

Around January, a separation layer forms between the antler and the bone of the skull. This causes the antlers to fall off. Contrary to popular belief, bucks cannot be aged by the number of tines (points) on the antlers (e.g. a 10 point buck). The growth of large antlers is based on genetics and diet, not age. Tooth wear is the best way to accurately age deer.

## Predators

Hunters and automobiles are the main causes of white-tailed deer mortality today. Bobcats and coyotes will eat fawns, but rarely capture adults. Historically, the red wolf was a common predator of deer in the southeastern United States. White-tailed deer are likely more abundant today than they were pre-settlement. The lack of natural predators such as red wolves and mountain lions is one factor in this rise in abundance. Another factor is habitat conversion into forest fragments that are a preferred habitat for deer. The abundance of agricultural crops as a food source has also aided the population growth of deer.

#### Adaptations

Odor is an important mode of communication in white-tailed deer. As an example, the interdigital glands between the toes and the tarsal glands on the inner hind leg, are used in scent marking.

Deer are also good swimmers. The shaft of their hairs are hollow, helping to make deer buoyant in the water.

White-tailed deer are a ruminant mammal. As a ruminant, they have a 4-chambered stomach. One of these stomach chambers, the large rumen, contains bacteria help breakdown plant material consumed by the deer.

The white spots on fawns help them blend into their background.

#### **Interesting Facts**

In the early 1900's, deer were eliminated from highly urbanized areas across the Piedmont. Restocking and habitat changes led to deer repopulating virtually every habitat type across the Piedmont today. There are likely more deer today in the Piedmont today than ever before. Fawns often remain in a secluded spot while the mother feeds during the day. Any fawn you may discover should be left alone for the mother to return to the fawn. When alarmed or fearful of danger, deer will often snort or stamp their hooves. Most deer live less than 5 years in the wild

# Strawberry Bush (Euonymus americanus)

# **Complements the following State Science Standards:**

SC: K.L.2, 2.L.5, 4.L.5, 5.L.4, and 6.L.4
NC: 1.L.1.1, 1.L.1.2, 1.L.2.1, 2.L.2.1, 3.L.2.1, 3.L.2.3, 4.L.2.1, 5.L.2.1, 5.L.2.2, and 5.L.2.3
GA: SKL1, SKL2, S1L1, S2L1, S3L1, S4L1, and S5L1

## Identification

Strawberry bush is a shrub that grows up to 2 m tall. The stems are evergreen, making the plant distinctive in winter. It has fruits that are pink or red and covered in pointed warts. The fruits open in the fall to reveal orange or crimson seeds.

# Habitat

Common in mixed coniferous-deciduous forests across the Piedmont.

# **General Ecology**

The green stems are photosynthetic, producing sugars (an energy source) for the plant. Strawberry bush is easily adapted for use as a native landscape plant.

## Predators

White-tailed deer often browse on the green stems of strawberry bush in winter.

## **Interesting Facts**

Another name for this plant is hearts-a-bustin, reflecting the appearance of the fruits after they split open.