

**TEACHING KATE
TEACHING KIDS ABOUT THE ENVIRONMENT**

SNAKES

Grade Level: 2-6

Time Required: 12 class periods

SC Science Standards

This lesson plan was correlated with only the grade level specified unless otherwise noted.

Grade 2:

- I. A. 1. a
- I. A. 4. a
- I. B. 1. a, b
- II. A. 2. a
- II. C. 1. a

Grade 3:

- I. A. 1. a
- I. A. 4. a
- I. A. 6. a
- I. B. 1. a, b
- II. A. 1. b
- II. C. 1. b

Grade 4:

- I. A. 1. a
- I. A. 4. a
- I. A. 6. a
- I. B. 1. a, b
- II. A. 2. c
- II. A. 3. c
- II. B. 2. a

Grade 5:

- I. A. 1. a
- I. A. 4. a
- I. A. 6. a
- II. B. 1. b
- II. B. 2. a, b
- II. B. 3. a, b

Grade 6:

- I. A. 1. a. 1
- I. A. 1. e. 1
- I. A. 2. c

Purpose

Students will observe, interact with and record findings on snakes. The students will learn to differentiate South Carolina's poisonous and non-poisonous snakes. Students will construct a food chain of a rodent eating snake. Upon completion of the thematic unit on snakes, the students will be able to list the characteristics of reptiles, to describe some habitats of snakes and to classify snakes as poisonous or non-poisonous. They will also be able to describe, both written and verbally, the benefits of snakes and their positive impact on the environment. The students will develop an appreciation for a snake's life in order to: avoid senseless killing of them, to share reasons with family and friends and determine the impact absence of snakes would have on the environment.

Skills

Analysis, classification, compare and contrast, description, evaluation, graphing, identification of predator - prey relationships, inference and interpretation, observation, prediction, problem solving, recording and reporting data, verbal and written communication.

Concepts

Because of their large consumption of rodents, snakes perform an invaluable service to humans; elimination of a helpful species can have a tremendously negative impact on the food chain, can send their prey's population out of control and impact human lives and the environment greatly.

Materials Needed

2 snakes (examples: a rodent eater, Kingsnake, and a goldfish eater, Garter Snake)	
South Carolina's poster on poisonous snakes	
assortment of nonfiction books on snakes and reptiles	
copy of <i>The Day Jimmy's Boa Ate the Wash</i> by Trinka Hakes Noble	
diagram of poisonous and non-poisonous snakes' heads	
pictures of poisonous and non-poisonous snakes	
2 aquariums	some substratum
2 heat rocks	water
reptile lid	snake hiding place
mice	goldfish
diagram of food web	construction paper
markers	crayons

Definition of Terms

<u>Anal Plate</u>	A large scale covering the urogenital opening.
<u>Biological Control</u>	Control of population in a certain species under natural predator/prey conditions.
<u>Carnivore</u>	Meat eater.
<u>Constrictor</u>	Snakes that coil tightly around their prey so that it is impossible for the prey to expand its rib cage to breathe.

<u>Disease</u>	Any harmful or destructive condition.
<u>Diurnal</u>	Active during the day.
<u>Dormant</u>	A state of inactivity.
<u>Ecology</u>	The branch of biology that deals with the relations between living organisms and their environment.
<u>Ectotherm</u>	Cold-blooded.
<u>Fangs</u>	Long, hollow or grooved teeth through which poisonous snakes inject their venom.
<u>Food Chain</u>	A sequence of organisms in a community in which each member of the chain feeds on the member below it.
<u>Food Web</u>	The complex and interlocking series of food chains.
<u>Habitat</u>	The region where a plant or animal naturally grows and/or lives.
<u>Herbivore</u>	Plant eater.
<u>Hibernate</u>	To spend the winter in a dormant state.
<u>Intergraded</u>	Animals of related and adjoining subspecies that may resemble either form or exhibit a combination of their characteristics.
<u>Invertebrate</u>	Animals without a backbone.
<u>Niche</u>	The location and function/role of an organism in the ecosystem - what it does and where it does it.
<u>Nocturnal</u>	Active at night.
<u>Omnivore</u>	Eats both meat and plants.
<u>Pits</u>	Heat sensors.
<u>Predator</u>	Living by capturing and feeding upon other animals.
<u>Prey</u>	An animal hunted or killed for food by another organism.

<u>Reptile</u>	Cold-blooded animals that have bodies covered with a thick, scaly skin, most lay eggs and the young are identical to their parents - only smaller.
<u>Sense (Thermal)</u>	The ability of the nerves and the brain to receive and react to heat given off by the prey's body.
<u>Venom</u>	The poison produced and secreted by snakes.
<u>Vertebrate</u>	Animals with a backbone.

Before the Session

Obtain the snakes. Keep the snakes in separate containers. (Some snakes prey on other snakes.) Each aquarium will need a reptile lid, a natural substratum, such as ground corn cobs, a dish of water large enough for the snake to submerge itself, a hiding place and a heat rock. Draw an example of a poisonous and non-poisonous snake's head. Draw an example of the food web. Draw an example of the single and divided anal plates. Obtain an assortment of nonfiction books on snakes and reptiles and a copy of *The Day Jimmy's Boa Ate the Wash* by Trinka Hakes Noble.

Background Information

Snakes have been around for 135 million years. They are found on every continent except Antarctica. Snakes are absent from Ireland, Iceland and New Zealand. Of the 11 families, 5 are represented in the United States and Canada.

All snakes are without limbs, external ear openings or eyelids. Some snakes are diurnal and some are nocturnal. Some occupy terrestrial or subterranean places, some live in trees or in water. All snakes are carnivores and swallow their prey whole, usually head first. The life span for snakes varies with the species. Many snakes' life spans are unknown. The average life span of captive snakes ranges from 8-26 years. Snakes continue to grow (shed their skin) throughout their lives. The growth rate slows after reaching maturity. The shedding usually begins at the snout; and skin is usually shed in one piece.

Snakes mate either in the fall, before becoming dormant, or shortly after emerging from dormancy in the spring. Males locate the females by scent. Most snakes lay eggs, but 1/5 of all snakes give birth to live young.

Be careful if you are gathering wild species. There are some snakes that can inflict nasty wounds even though they are non-venomous. Snakes will avoid humans but when cornered most will fight back. Some will repeatedly strike - sometimes at your face (Coachwhip), some will readily bite and have an anticoagulant in the saliva which will cause profuse bleeding (water snakes).

Other defense behaviors that frightened snakes will exhibit are shaking the tail against dead vegetation to emulate a rattlesnake, hissing, thrashing about violently, spraying musk, flattening head, playing dead and even regurgitating the remains of its prey.

Of the 115 species in the United States and Canada, only 17 are venomous. The coral snake (tri-color, red touches yellow) is related to the cobra, mambas and sea snakes (the most deadly snakes). They are all in the Elapidae family. Viperidae, or Pit Viper family, includes copperheads, cottonmouths and rattlesnakes. The Eastern Diamondback rattlesnake is considered to be the most dangerous snake in North America. All snakes belong to the order Squamata and the suborder Serpentes.

Note: Do not capture the Eastern Indigo snake. It is an endangered species.

Suggested Lesson Plan

Day 1

1. Students will observe physical characteristics of a Kingsnake by examining its physical appearance.
2. Students, in cooperative learning groups, will draw a diagram of the snake and write a descriptive paragraph describing the snake.
3. The teacher will lead a discussion about the students' paragraphs and observations.
4. Students will receive definitions for this unit.
5. The teacher will discuss the characteristics of reptiles and snakes.

Caution: Do not let the children handle the snakes unsupervised.

Day 2

1. Students, in pairs, will discuss a mouse's or rat's habitat.
2. Students will draw a picture illustrating the prey's habitat.
3. Display artwork and discuss whether the pictured habitat is acceptable for snakes. Discuss where else snakes can be found.
4. Have students complete worksheet, "South Carolina Habitat." (Word Search.)

Day 3

1. To observe the behavioral patterns of predator and prey, toss a mouse in the snake's cage. The students will observe closely the snake's techniques for catching, killing and eating the prey.
2. Students will write an expository paragraph detailing the procedure the snake used for catching, killing and eating the mouse.
3. The teacher will guide a discussion by the students on the process a constrictor uses to catch, kill and eat its prey.
4. The teacher will lead a discussion on the behavioral patterns of predators and prey, and its effect on the environment.
5. The teacher will lead a discussion on diseases, destruction and contamination of food and crops attributable to mice and rats.
6. The teacher will lead a discussion on how snakes keep the rodent population in check; and how snakes benefit farmers and people in students' own neighborhoods.
7. Have students complete worksheet "Reptiles of South Carolina." (Word Search.)

Day 4

1. Each student will predict how a Garter Snake will catch and eat a goldfish.
2. The teacher will make a graph of the students' predictions.
3. To observe the behavioral patterns of predator and prey, toss a few goldfish in the water dish. The students will observe the Garter Snake's techniques for catching and eating the prey.
4. Students will take notes on their observations.
5. The teacher will lead a discussion on proving or disproving the students' predictions.

Day 5

1. Students will write a compare and contrast paragraph detailing how a constrictor and a garter snake catch and eat their prey.
2. Students will receive a handout with diagrams of poisonous and non-poisonous snakes' heads.

3. The teacher will lead a discussion comparing and contrasting the poisonous and non-poisonous snakes and how to identify them in the wild. (Habitat, eyes, head, body, etc.)

Day 6

1. The teacher will pass out pictures of snakes to each cooperative learning group. The group must classify the pictures into poisonous or non-poisonous categories.
2. Students will be asked to explain why they classified each snake the way they did.
3. Students will lead a discussion on how to tell South Carolina's poisonous and non-poisonous snakes apart.

Day 7

1. The teacher will lead a discussion on food chains.
2. Discuss the breaking of a link in the food chain (ie. removal of one animal from the food chain). Students will predict/infer the results of such actions on other animals in the chain and on the chain itself.
3. Students, in cooperative learning groups, will construct a food chain mobile.

Days 8-9

1. Students will choose a snake indigenous to South Carolina to research. They will describe its habitat, appearance and life cycle. They will draw and color their snake and its habitat.
2. Encyclopedias and nonfiction books should be used as references.

Day 10

1. Students will make an oral presentation using their research and drawings. Their presentation should include a description of their snake, its habitat and its life cycle.

Day 11

1. Read *The Day Jimmy's Boa Ate the Wash* by Trinka Hakes Noble.
2. Begin a story with a snake that is a hero or is shown in a positive manner.
3. Have each student add on to the story using facts they have learned about snakes.

Day 12

1. Allow students to complete their story.
2. Write the final copy of the story.

Note: Make copies of students' story and present each of them with a copy.

Application

Ask the students to brainstorm ways that we, as a class, could educate and inform other people of the vital role snakes perform in the environment and in the balance of nature; and why they should not be needlessly killed. Snakes are vital to our environment as a biological control mechanism of rats, mice and other vermin (including insects). These vermin have a long notorious history as hosts for vectors and as vectors themselves of diseases such as Black Plague (fleas), Lyme Disease (deer tick) and Hantavirus sin nombre variant (White-footed Deer Mouse). When people indiscriminately kill snakes, due to their fear or repugnance, they are eliminating an organism important for pest control. Educating people to the vital role of snakes in the environment may reduce the number needlessly killed and in the long run, decrease our dependence on chemical methods of vermin population control.

Allow the students to come up with strategies that could save the Eastern Indigo Snake. Ask them to brainstorm what will happen if we lose this species. All organisms fill a niche in the environment. When a species disappears and the niche is no longer filled, the ecosystem where that species was located becomes unbalanced. If the species is a predator such as the Eastern Indigo Snake, the population of its prey species will increase and may overburden the resources of their environment. This is detrimental to the whole system. As the population of prey species increases, their resources decrease; ultimately, resulting in the stripping of lower trophic levels as well as an eventual crash in the population of prey species (once kept in check by the Eastern Indigo Snake) by starvation and disease. Eventually, however, other predators will expand their niches to fill the one left empty and balance will be restored. The decrease in animal diversity, due to the loss of an animal by extinction, can never be restored.

Extension

1. Make a polished story complete with illustrations, covers, brief biography about the author, etc.
2. Submit the stories to children's magazines for publishing.

3. The children can select another “misunderstood” animal (bee, beaver, rat, mouse, etc.) and research the importance and benefits of this animal’s existence.
4. Begin a snake record journal. Record any and all snakes they see, whether in the class, a zoo or in the wild. Write a description of the snake, where seen, temperature, environment, time of day, etc. Discuss sightings in class.
5. Invite a herpetologist to visit the class with some snakes. South Carolina Department of Natural Resources (Jim Edwards) or the Savannah River Ecology Lab (on the Savannah River Site near New Ellenton) are two sources.
6. Visit the reptile area at your nearest zoo. Ask a curator to speak to the group about snakes.

Resources Available

Amphibians and Reptiles of the Carolinas and Virginia. 1980. Bernard S. Martof, William M. Palmer, Joseph R. Bailey and Julian R. Harrison, III. The University of North Carolina Press, Chapel Hill, North Carolina.

Eyes on Nature: Reptiles. 1993. Robert Matero. Kidsbook, Inc.

Life Story: Snake. 1991. Michael Chinery. Troll Associates.

South Carolina Department of Natural Resources.

Booklets: Animals of South Carolina.

Herpetology.

The Vertebrate Animal Kingdom.

The Audubon Society Field Guide to North America Reptiles and Amphibian. 1992. Alfred A. Knopf, Inc.

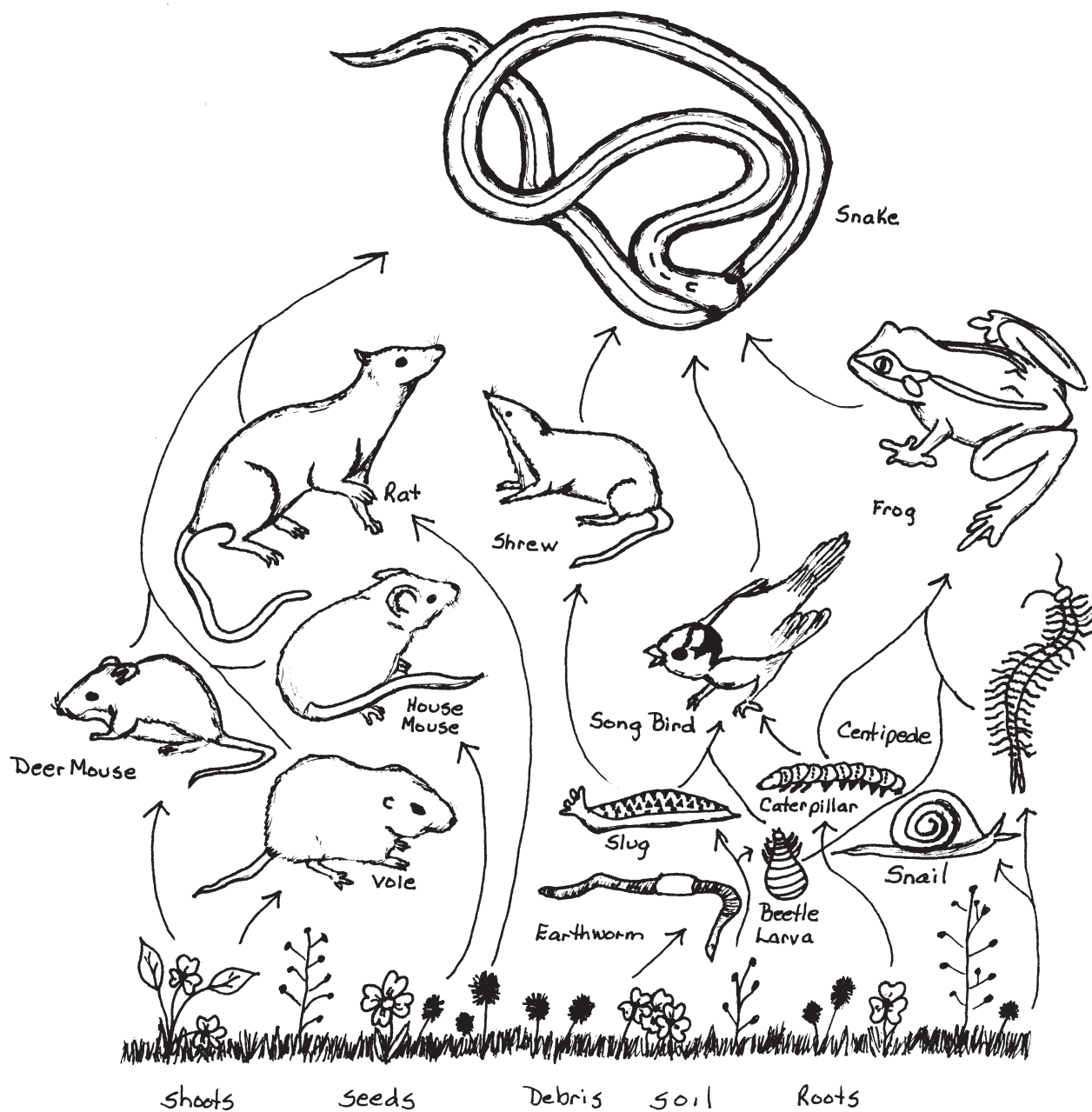
The Day Jimmy’s Boa Ate the Wash. 1980. Trinka Hakes Noble. Dial Press, New York.

Prepared by: Sissy Martin

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SNAKES

FOOD WEB DIAGRAM

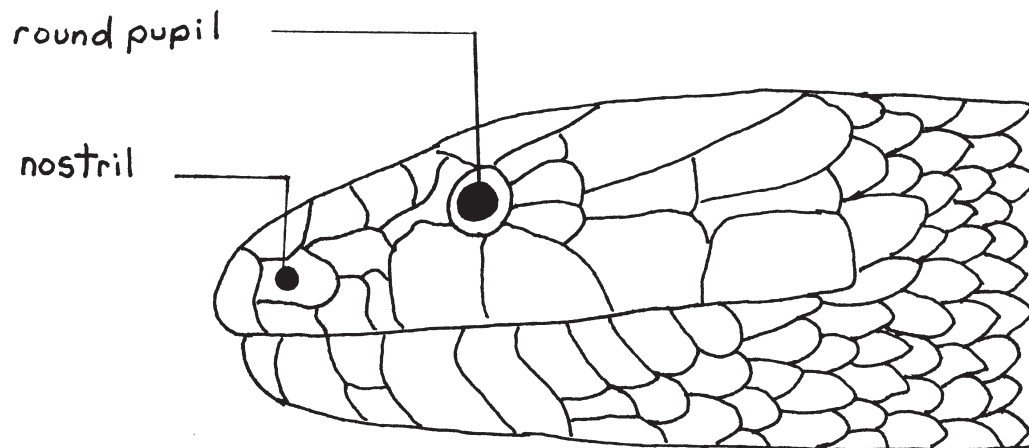


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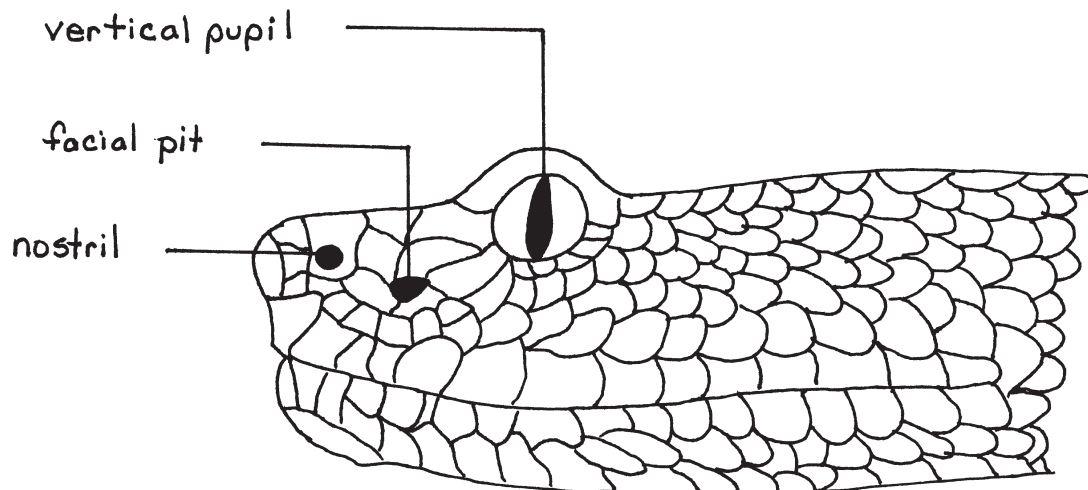
SNAKES

SNAKE HEAD DIAGRAM

Snake head (side view)



Pit Viper (side view)

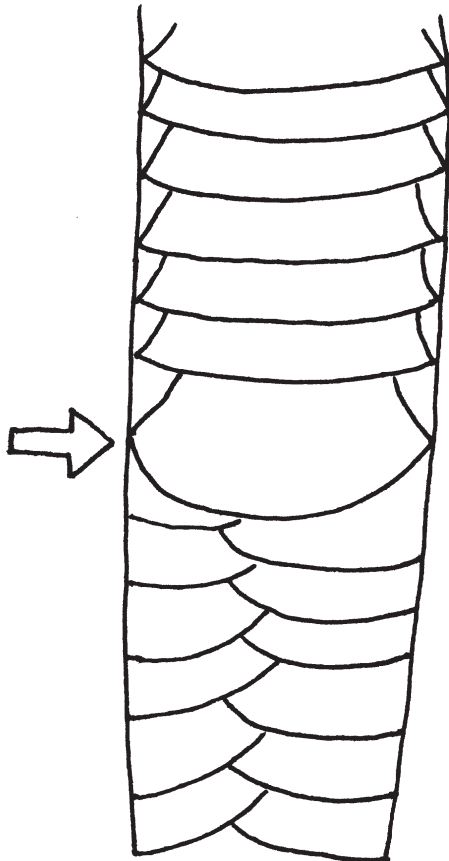


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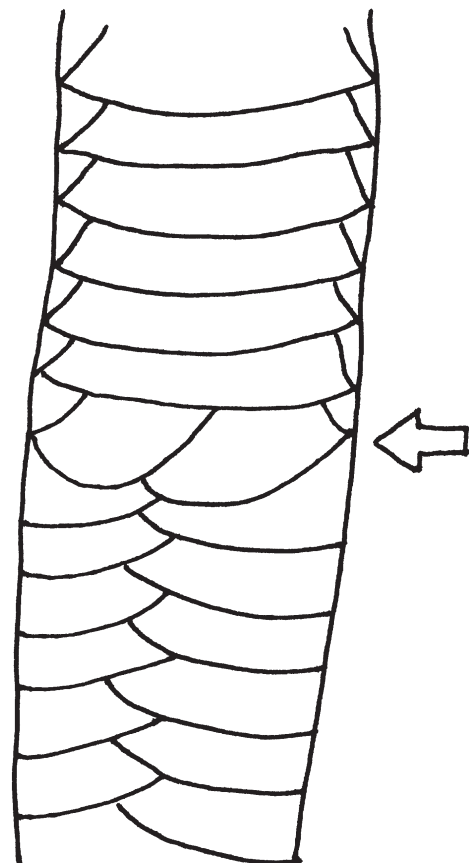
SNAKES

ANAL PLATE DIAGRAM

Single
Anal
Plate



Divided
Anal
Plate



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**SNAKES
SOUTH CAROLINA HABITAT - WORD SEARCH**

Within this puzzle are hidden the names of animal habitats found in our state. They are written backwards, forwards, up, down, and diagonally. Find the following habitats in the puzzle:

- | | | | | |
|---------|----------|---------|------------|------------|
| Marsh | Mountain | Bay | Pond | Wetland |
| Park | Ocean | Estuary | Sea Island | Lake |
| Pasture | Cave | Stream | Forest | Floodplain |
| Swamp | Backyard | Zoo | Bog | Sandhill |
| Meadow | | | | |

S A B X T F E R E D F O X S D O M S G E
W N A E C O O Z Q F O R E S T O M S G P
E V S E M S P I D L P O P O N D W M G A
T E F G A W F U G O B C M A R R A B N S
L R J N I A T N U O M E G A I E B E A T
A U O C O M O T I D N S Y E R C K Z M U
N U R R S P H P E P U K R T V S I A O R
D U G N O T P A B L C E S S T E H F L E
B F L L L I H D N A S A U O S A G S R H
N O W E K U I E B I Y A V T G I D T G U
T P O L M B M I A N P M U E Z S A R D L
R R D L O O L E W M B A A E X L P E C E
P N A L N L F C A R R O R E A A I L T L
I O E E Q O U L O Y I L I K P N D B N C
T C M N S C R O R A S I N C M D I A N S
A T S S T G O E I N G T E E A L U S E U

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SNAKES
SOUTH CAROLINA HABITAT - WORD SEARCH
TEACHER'S GUIDE

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|---------|----------|---------|------------|------------|
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| Park | Ocean | Estuary | Sea Island | Lake |
| Pasture | Cave | Stream | Forest | Floodplain |
| Swamp | Backyard | Zoo | Bog | Sandhill |
| Meadow | | | | |

S A B X T F E R E D F O X S D O M S G E

W N A E C **O O Z** Q **F O R E S T** O M S G P

E V S E M **S** P I D L P O **P O N D** W M G A

T E F G A W F U **G O B** C **M A R R A B N S**

L R J **N I A T N U O M** E G A I **E B E A T**

A U O C O M O T I D N S Y E R C K Z M U

N U R R S **P** H P E P U K R T V **S I A O R**

D U G N O T P A **B L** C E **S S T E** H F L E

B F L **L L I H D N A S** A U O S A G S R H

N O **W** E K U I E **B I Y** A V T G I D T G U

T P O L M B M I A N **P M U E** Z S A R D L

R R D L O O L E W M B A A E X L P E C E

P N A L N L F C A R R O R E A A I L T L

I O E E Q O U L O **Y I L I K** P N D B N C

T C **M** N S C R O R A S I N C M **D** I A N S

A T S S T G O E I N G T E E A L U S E U

**TEACHING KATE
TEACHING KIDS ABOUT THE ENVIRONMENT**

**SNAKES
REPTILES OF SOUTH CAROLINA - WORD SEARCH**

Within this puzzle are hidden the names of reptiles found in our state. They are written backwards, forwards, up, down, and diagonally. Find the following habitats in the puzzle:

- | | | | |
|-------------------|---------------------|-----------------------|--------------------|
| Worm Snake | Scarlet Kingsnake | Spotted Turtle | Black Racer |
| Eastern Coachwhip | Texas Horned Lizard | Corn Snake | Brown Water Snake |
| Five-lined Skink | Rat Snake | Snapping Turtle | Ground Skink |
| Mud Snake | River Cooter | Eastern Glass Lizard | Rainbow Snake |
| Painted Turtle | Carolina Anole | Eastern Hognose Snake | Yellowbelly Slider |

Z R B E A S T E R N C O A C H W H I P E
R I D F M T P A R O P O U C H L W A G A
R V R I A L F S S E A C A A I R E B N S
E E A V A L C T P R C F G L T O B E A T
D R Z E O M A E O C N A D E A C K Z M E
I C I L E O R R T S U O R S V A I M O R
L O L I L K O N T G I E H K N E N E E N
S O D N T N L H E I M R U S C R K S L G
Y T E E R I I O D T N U G O G A D L T L
L E N D U K N G T Y O N D I N Z L R R A
L R R S T S A N U M I B A S X F P B U S
E N O K G D A O R K C O W E N L I L T S
B O H I N N N S T Q I O I R P A D B D L
W C S N I U O E L A B I R G M B K A E I
O T A K P O L S E N G T E N A L U E T Z
L C X W P R E N I L O Y B A S H R O N A
L R E N A G R A T S N A K E T N N P I R
E N T C N C R K O D R G R I E U A P A D
Y A S Z S R R E K A N S M R O W L K P S
B R O W N W A T E R S N A K E K S I E W

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**SNAKES
REPTILES OF SOUTH CAROLINA - WORD SEARCH
TEACHER'S GUIDE**

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