



## **WAVE on Wheels Outreach**

### **Croc Talk**

### **Grades 3-5**

#### **Time requirement**

1 Hour

#### **Group size and grade**

Up to 50 students maximum

#### **Materials**

1 American Alligator  
Crocodilian Artifacts Bin  
WAVE Tablecloth

#### **Goal**

Through a live alligator encounter, students will be excited, engaged, and educated about the wonders of crocodilian life and the importance of conservation.

#### **Objectives**

1. Students will be able to list 5 adaptations a crocodilian has for aquatic life including a combination of internal and external body parts as well as behaviors.
2. Students will be able to physically differentiate between an alligator and a crocodile.
3. Students will be able to describe the relationship between crocodilians and their ecosystem.
4. Students will be able to describe that all energy in a food web originated from the sun.
5. Students will be able to discuss crocodilian conservation efforts as well as how they can help save crocodilians and other aquatic animals.

#### **Theme**

Crocodilians are unique reptilian species that play an important role in their environment.

## **Kentucky Core Academic Standards – Science**

### **Third Grade – 3. Interdependent Relationships in Ecosystems**

3-LS2-1. Construct an argument that some animals form groups that help members survive

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

LS2.D: Social Interactions and Group Behavior

### **Third Grade – 3. Inheritance and Variation of Traits: Life Cycles and Traits**

3-LS3-2. Use evidence to support the explanation that traits can be influenced by the environment

### **Fourth Grade – 4. Structure, Function, and Information Processing**

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

LS1.A: Structure and Function

### **Fifth Grade – 5. Matter and Energy in Organisms and Ecosystems**

5-PS3-1. Use models to describe that energy in animal’s food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.

PS3.D: Energy in Chemical Processes and Everyday Life

### **Fifth Grade – 5. Earth’s Systems**

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.

ESS3.C: Human Impacts on Earth Systems

## **Background**

### *Crocodylians are Reptiles*

Alligators and crocodiles are reptiles. Reptiles are cold-blooded or ectothermic animals, which means they depend on external sources to maintain their body temperature. Scales or scutes protect reptiles from abrasions and loss of body moisture. Reptiles breathe air through lungs. Most reptiles hatch from eggs which are typically covered in soft, leathery shells. Reptiles include crocodylians, snakes, turtles, and lizards.

### *A Crocodile or an Alligator*

The term “croc” is used to describe any member of the crocodylian species: alligators, crocodiles, caimans, and gharials. Alligators and crocodiles are commonly misidentified, but by observing several key differences, it is easy to tell them apart. Alligators reach average lengths

of 15 feet and weigh up to 1,000 pounds while crocodiles can grow over 20 feet long and weigh more than 2,300 pounds. Alligators are primarily freshwater crocs with a “U” shaped snout, whereas crocodiles are capable of living in saltwater and possess a “V” shaped snout. In alligators, the upper jaw is wider than the lower and completely overlaps which results in their lower teeth being almost completely hidden when the mouth closes. In crocodiles, the upper jaw and lower jaw are approximately the same size so upper and lower teeth are visible when the mouth is closed. Both species have specialized glands which secrete salt, but the crocodile’s glands are better adapted to a saltwater environment while the alligator’s glands have faded in function.

Another physical difference is their coloration. The two species of alligator tend to be almost black in coloration while most species of crocodile tend to be a greenish-grey. Darker coloration in alligators allows for better camouflage in muddy, shady freshwater environments. This coloration also allows better heat absorption from the sun allowing alligators to survive in cooler climates. Greenish-grey coloration allows crocodiles to blend in to algae-filled or sunlit saltwater environments. Lighter coloration does not absorb heat as well so crocodiles are restricted to warmer climates.

### *Crocs in the Ecosystem*

Crocodylians serve an important role in the ecosystem. “Gator holes” are dug by a croc using its feet and snout. The holes collect water and are used as a refuge by surrounding wildlife during the dry season and a lure for prey by the croc. Crocodylians are also scavengers, which means they feed on the carcasses of dead animals, which balances populations and rids the area of disease and debris.

### *A Croc’s Adaptations to Aquatic Life*

A croc has many features which make it suitable for living in water. Large, powerful tails are used for propelling through the water, while strong webbed feet are ideal for paddling. The dark, bumpy appearance provides camouflage resembling a floating log. Crocs also have excellent eye sight for both above and below water, and they possess an extra eyelid, called a nictitating membrane, that functions similar to underwater swim goggles. Their ears are hidden behind slits that close when they dive under water. Their bite force is second to none in the animal kingdom, up to 3,700 pounds (the weight of an adult walrus) per square inch (about the size of your thumbnail). Ouch!

Crocodylians are typically thought of as solitary animals. There have been many research studies conducted on the feeding habits of crocodylians to determine if groups observed feeding together are cooperatively hunting or opportunistically feeding in areas with high prey volume. Results are mixed as well as opinions on social hunting behavior. Some crocodylians also show symbiotic relationships with other species including mutualistic relationships between the Egyptian Plover and the Nile Crocodile.

### *Croc Diets*

Crocodylians are carnivores that eat a variety of animals near their habitats which may include but are not limited to: fish, turtles, birds, frogs, pigs, deer, buffalo, and monkeys. Crocs swallow their prey whole rather than chewing. They will tear off large portions, if the animal is too large to swallow whole, by a process called the death roll. After biting the prey the croc rolls around, essentially juggling its food around in its mouth until the right position is reached to toss its head back and slide the food down its throat. Some species of croc can eat up to half of their body weight in one meal. These large meals are converted into fat reserves located in the tail, and these fat reserves may allow a croc to survive over a year without eating.

### *Food Web Connections*

As with most apex predators, crocodilians play a critical role in their ecosystem as a top down control mechanism for the environment's food web. Apex predators consume tertiary and/or secondary consumers, which consume primary consumers, which consume producers, which produce energy from the sun through photosynthesis. The main source of energy for all ecosystems initiates from the sun in the form of solar energy. Through the process of photosynthesis, plants convert this energy into oxygen and glucose. Because of this conversion, green plants, some bacteria, and algae are labeled as producers. An animal, such as a deer, who consumes the plant, is known as a primary consumer, because it receives the energy from the plant which converted the energy from the sun. The croc who eats the deer that feeds on the plant which converted the sunlight is known as a secondary consumer, hence a process that directly related back to the sun as the primary energy source. An apex consumer is the top of the food chain or web with few to no natural predators at adult size.

### *Croc Conservation*

About 40 years ago, American alligators were close to extinction. Because the fashion industry targeted alligator skin for exotic leather products, the American alligator was listed as an endangered species in 1967. Fortunately, by 1987, alligators made a comeback thanks to the conservation efforts of several organizations. These efforts sustained, and the American alligator was removed from the Endangered Species list. As of today, alligator harvesting is being regulated closely by state authorities in the form of hunting permits. Alligator skin and meat is still desired; however, a portion of the profits generated from these goods are contributed to alligator management and research.

Ongoing and future research in the conservation and preservation of crocodilian species is critical. The Association of Zoos and Aquariums' (AZA) Crocodilian Advisory Group (CAG) has supported several conservation efforts and research projects in recent years. These efforts include habitat restoration & reintroduction (including radio tracking) of the Chinese Alligator (*Alligator sinensis*), Funding of travel for crocodilian biologists to India during the large die-off of the Indian Gharial (*Gavialis gangeticus*), and community level education and conservation programs for the Philippine Crocodile (*Crocodylus mindorensis*). The National Park Service, in

partnership with other organizations, is working on another ongoing project in the Florida everglades in the management of the highly invasive species, the Burmese python. These snakes are capable of reaching lengths of 23 feet and having the diameter of a telephone pole. Native crocodilians of Florida are naturally the apex predator; however, these non-native snakes are now competing with, and eating, native crocodilians species.

## **Vocabulary**

Adaptation – the process by which an animal or plant species becomes fitted to its environment through body parts and behaviors

Conservation – the study of the loss of Earth’s biological diversity and ways this loss can be prevented

Consumers – organisms of an ecological food chain that receive energy by consuming other organisms

Diversity – the variety of life found in a place on Earth or the total variety of life on Earth

Environment – the external conditions, resources, stimuli etc. with which an organism interacts

Habitat – the place where an organism or a community of organisms lives, including all living and nonliving factors or conditions of the surrounding environment

Hydroperiod – the period of time during which a wetland is covered by water

Mutualism - two organisms of different species exist in a relationship in which each individual benefits from the activity of the other

Photosynthesis - process by which green plants and some other organisms use sunlight to synthesize foods from carbon dioxide and water

Predator – an animal whose diet consists of other animals

Prey – an animal who is eaten by other animals, or predators

Producers – an organism that produces its own food (i.e. using photosynthesis) serves as a source of food for other organisms in a food chain

Scavenger – an animal that feeds on carrion, dead plant material, or refuse

Symbiotic - organisms that live together; however, the relationship is not necessarily beneficial to both. (ie parasite-host)

## **Extension Activities**

Project WILD Activities. Please contact your state Project WILD coordinator for more information. See <http://projectwild.org/KentuckyCoordinator.htm> (for Kentucky) or <http://www.projectwild.org/ProjectWILDCoordinators.htm> (for other states).

- Energy Pipeline – Students will (1) explain why energy dissipates at each trophic level, (2) contrast the transfer of energy and the recycling of organic material within an ecosystem, and (3) relate the role of each trophic level to ecosystem dynamics.
- Grasshopper Gravity – Students will (1) describe the relationship between the structure and function of grasshopper; (2) generalize that wildlife ranges from small to large organisms and exists in a variety of forms; and (3) recognize that people have influence

on other animals, and with that influence comes the responsibility to act with compassion.

- Graphanimal – Students will identify characteristic life forms in two different environments.
- Playing Lightly on the Earth – Students will (1) distinguish between games that are damaging and not damaging to the environment, and (2) invent games with a benign effect on the environment.
- Surprise Terrarium – Students will (1) identify camouflage as an example of an adaptation, and (2) describe the importance of adaptations to animals.
- Too Close for Comfort – Students will (1) describe possible negative consequences for people and wildlife under conditions of crowding, and (2) identify ways people can behave in order to reduce negative consequences of crowding for wildlife.
- What Bear Goes Where? – Students will (1) identify three species of bears and their habitats, and (2) generalize that animals have adapted in order to live where they do.

Alligator Quiz - <http://animals.howstuffworks.com/reptiles/alligator-quiz.htm>

### **Resources**

WAVE Foundation - <http://www.wavefoundation.org>

Project Wild - <http://www.projectwild.org>

Project Wet - <http://www.projectwet.org>

Project Learning Tree - <http://www.plt.org>

Endangered Species Information -

<http://education.nationalgeographic.org/media/endangered/>

Alligator Information - <http://myfwc.com/wildlifehabitats/managed/alligator/facts/>

Alligator Information - [http://www.biokids.umich.edu/critters/Alligator\\_mississippiensis/](http://www.biokids.umich.edu/critters/Alligator_mississippiensis/)