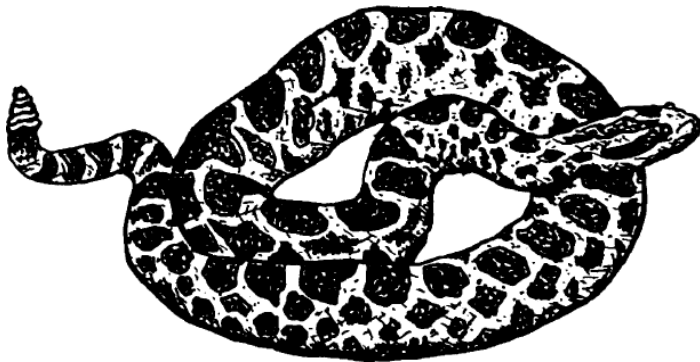
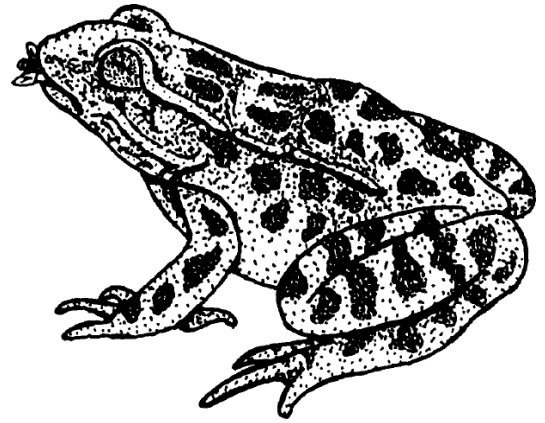
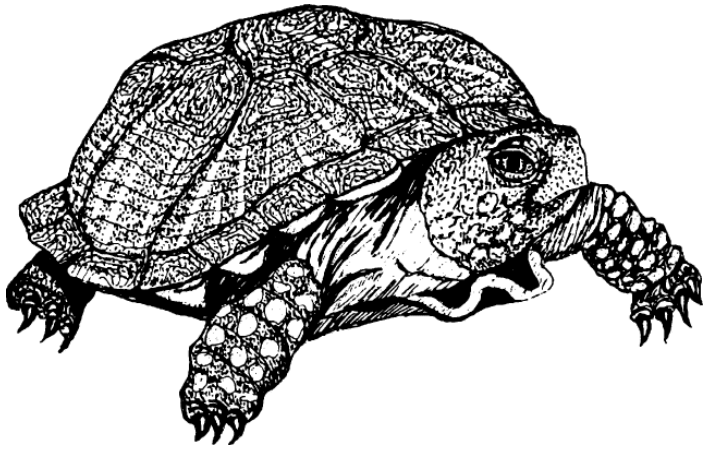


# Rockin' Reptiles and Awesome Amphibians!



# National Mississippi River Museum & Aquarium Environmental Education Curriculum

**Target Grades:** K – 6

**Key Words:** Herpetologist, Reptiles,  
Amphibians

**Subject Areas:** Wildlife, Amphibians & Reptiles

**Duration:** 30 minutes – 45 minutes

Time can be extended by request

**Title:** ***Rockin' Reptiles and Awesome Amphibians!***

Program presented on site at Museum or as an Outreach

**Summary:**

This program discusses the similarities and differences between amphibians and reptiles and other animals. A combination of animal parts, puppets, live animals, and other educational props are used during the presentation.

**Objectives:**

To either introduce or give students more information on reptiles and amphibians, to allow students to experience some live examples of both reptiles and amphibians, and to dispel fear of these animals and foster conservation of these often misunderstood and sometimes feared animals.

**Group Size:** 20-60

**Background for Educators:**

1. Herpetology is the study of reptiles and amphibians (snakes, lizards, turtles, salamanders and frogs).
2. Reptiles and amphibians are cold-blooded; meaning they don't generate their own body heat. They rely on outside sources to regulate their body temperature.
3. In colder climates, herps hibernate during the winter months.
4. Amphibians and reptiles live nearly everywhere on Earth; from the Arctic circle to the southern tips of Africa and South America; in oceans and deserts and every habitat in between.
5. Herps are all vertebrates (have a backbone).
6. Herps lay eggs.
7. Reptiles have some of the same characteristics as amphibians because reptiles most likely evolved from amphibians.
8. Herps eat insects, spiders, larvae, small fish, and small mammals. They are then eaten by larger animals. This makes them very important to the food web in nature.
9. Explanation of classification of animals in Iowa.....
  - Special concern- any species about which problems of status or distribution are suspected, but not documented, and for which no special protection is afforded under this rule
  - Threatened- any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range

- Endangered- any species of fish, plant life, or wildlife which is in danger of extinction throughout all or a significant part of its range

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**Amphibians**

vs.

**Reptiles**

*Eggs*

- no outer shell
- laid in water or moist places
- gelatinous

*Eggs*

- leathery outer shell
- laid on land in nest
- amniotic

*Life*

- go through metamorphosis
- tadpole hatches from egg
- need water to reproduce

*Life*

- no metamorphosis
- hatchling like small adult
- do not need water to reproduce

*Skin*

- smooth, moist skin
- may absorb oxygen through skin
- absorb water through skin

*Skin*

- scales
  - do not
  - scales stop this
- 

**Amphibians (frogs and salamanders)**

1. First vertebrates to leave water and live on land.
2. Lay eggs in water or moist areas because egg has no outside shell (would dry out if not in water).
3. Breeding for most amphibians is seasonal, based on temperature and availability of water
4. Hatch from eggs as tadpoles (larval stage). Have gills and look like fish
5. Go through metamorphosis (period of change).
  - The tail shrinks and is absorbed back into the body (in frogs), legs sprout from the sides, lungs begin to develop. At this time, they are able to leave the water and go onto land
6. As adults, they are predators.
7. Skin of most amphibians is smooth and has many mucous and toxic glands. This gives them a moist, slimy feel.

8. Breathe through lungs, but sometimes lungs are poorly developed so they also absorb oxygen through their moist skin (why you find them in moist places)
9. Have good vision and can hear
10. "amphibia" means double life (part in water and part on land)
11. No amphibians live in the sea. Only in fresh water

### **Frog Facts:**

1. Toads and frogs are closely related. Toads are frogs
2. Strong hind legs make them great jumpers (cricket frogs can jump up to 40x their own length)
3. Tongues are attached at the front of the mouth. It flips out the sticky tongue to catch prey and it is flipped back against the throat on return. No need to chew
4. Male frogs "sing" to attract a mate
5. Close their eyes and push them down to help move the food down their throats (they cannot use their tongue like we do)
6. Many have clear eyelids they close to protect their eyes under water
7. Absorb moisture through skin because they can't drink water

### **Reptiles (snakes, turtles and lizards)**

1. More advanced than amphibians (evolutionarily)
2. Amniotic eggs; leathery skins to keep them from drying out
3. Young look like miniature adults (no larval stage or metamorphosis)
4. Dry skin reduces the amount of water lost from the body
5. Scales increase resistance to water
6. Snakes and lizards have small and overlapping scales whereas turtles have large and adjoining scales
7. Turtle scales grow and thicken throughout life, snakes and lizards shed/molt their skin to replace smaller scales with larger scales (the scales do not grow)
8. Vision is best and most used sense in reptiles
9. Some snakes and lizards have a transparent lower eyelid that is permanently attached to the upper eyelid (so it may look like they have no eyelids at all, but they really always have their eyelids closed)
10. No external ear but eardrum near the surface of the skin
11. Snakes and lizards have a Jacobson's organ; chemical detector on roof of mouth: flicking in and out of the tongue picks up tiny particles placed on the two openings of the organ to identify them
12. Some have been around since the age of dinosaurs and some have changed very little since that time
13. Scales are made of keratin (like your fingernails)

### **Snake Facts:**

1. Found in every county in Iowa
2. Eat worms, slugs, insects, small mammals (mice, rats, ground squirrels) birds, eggs and other snakes

3. Constricting snakes: strike at an animal, stun it, coil around it, and squeeze it tightly until it dies
4. Poisonous/venomous snakes strike and bite their prey, injecting poison through their fangs into the animal. They then let the animal go and follow it until it dies
5. Eat food whole and usually head first
6. Do not hear, but ear bone senses vibrations of low-frequency sounds through the skull bones; can detect vibrations through the ground
7. The lower jaws of snakes are divided in halves that are capable of independent motion and not connected tightly to the cranium like ours. This helps them swallow food that is much larger than the size of their own head
8. In Iowa, snakes usually come out of hibernation in April when the soil temperatures rise. They are unable to search for food until they have basked in the sun and warmed their bodies for several days
9. Most snakes in Iowa hunt during the evening and nighttime hours
10. Snakes use their forked tongue to smell. The tongue collects chemical agents in the air and brings them onto the two Jacobson's organs (small cavities with many sensory nerves) in the roof of the mouth. (they have very poor sense of smell through the nose)
11. Snakes shed their skin as they grow. The number of times they shed each year is determined by age, how much they are eating, and size
12. Courtship is usually in early spring, eggs (have a leathery shell) are laid in late June or early July in loose/moist soil or damp sawdust of a rotten log, young hatch in August or September and are on their own. A few species of snake in Iowa do not form shells around their eggs. Instead the females holds the eggs in her body until August or September when the young are born
13. Snakes move toward their winter home (called a hibernaculum) by the end of September and are there by the end of November
14. During hibernation, the metabolism of snakes drops and they are in a state of "suspended animation" until the soil warms in the spring
15. All snakes have scales

### **Turtle Facts:**

1. Shell covers most of the body
2. Three parts to shell
  - a. carapace- covers top of body
  - b. plastron- covers bottom of body
  - c. bridge- attaches two halves together
3. Lived on Earth around 200 million years ago; about the same time as the first dinosaurs appeared
4. Some native American legends claim the world rests on the back of a giant turtle shell
5. Turtles do not shed their shell. Instead they grow a larger section of shell that pushes up the old section
6. backbone and ribs are fused to carapace
7. Excellent eyesight (can see colors) and sense of smell
8. All lay eggs on land (even sea turtles)

### **Lizard Facts:**

1. Not common in Iowa (can find six-lined racerunner and skinks in Iowa)
2. Have external ear openings
3. Have numerous teeth to chew their food
4. Eat mostly insects
5. No Iowa lizards are poisonous
6. Most Iowa lizards can lose their tail to a predator and grow a new one within weeks

### **American Alligator** (*Alligator mississippiensis*)

1. Reptile
2. Appearance
  - a. large, lizard-shaped reptile
  - b. four short legs and long muscular tail
    - tail used to propel animal through water
    - strong legs for moving on land
  - c. hide is rough and scaled
  - d. adults are a dark color devoid of any bright coloring that may be present in younger alligators but areas on neck, lower jaw and belly may be a cream or white color
  - e. young are dark gray to black with bright yellow stripes for camouflage
  - f. as grow older these yellow stripes will disappear
  - g. some adaptations have made them masters of their domain
    - eyes, nose and ears can be above water while body remains hidden under the water
    - ears and nostrils automatically close when go under water
    - transparent third eyelid aka nictitating membrane covers eyes when submerged while still allowing alligator to see
  - h. have a short rounded snout
  - i. top jaw overlaps teeth of bottom jaw, and bottom teeth fit into depressions in the upper jaw
3. Range/habitat
  - a. native range
    - southeastern US
    - this includes Florida, Georgia, Texas, Alabama, North and South Carolina, Arkansas and Louisiana
  - b. habitat preference
    - found in both natural and man-made freshwater lakes, ponds, rivers, creeks, bogs, bayous, and wetland areas
    - found in the warm-water wetlands and swamps
    - can tolerate a small amount of salinity in the waters
4. Habits
  - a. bask in the sun to warm body
  - b. have been known to create burrows used for shelter and hibernation when the outside temperature becomes cool
  - c. can survive brief periods of freezing temperatures if in water
    - the body is submerged but nostrils stay above the waters surface so they can breath when ice forms (called "icing response")

- have been known to survive eight hours trapped under ice without a breath; the freezing water temperatures slow the metabolic rate down to very low levels

#### 5. Size and growth

- a. females grow to around eight feet long (can be up to nine)
- b. males grow from 10-14 feet on average
- c. weigh from 270-500 pounds
- d. 19.8 feet is the longest ever recorded, but there are doubts as to the truthfulness of this record

#### 6. Diet

- a. carnivore
- b. eat whatever they can catch
- c. young feed on insects, shrimp, tadpoles, frogs and fish
- d. adults feed on turtle, fish, raccoons, birds, dead animals, smaller alligators, dogs, snakes, etc
- e. are unable to digest food in cool temperatures (water temperature has to be at least 70 degrees Fahrenheit)
- f. if lose teeth, they can grow back
- g. can have approximately 3000 teeth in their lifetime
- h. approximately eighty teeth in the mouth at one time
- i. eat prey under water
  - they have a wide flap of skin at the back of the throat to keep water from getting in the lungs while swallowing

#### 7. Reproduction

- a. mate from April to May
- b. males emit roaring bellows and slap their heads on the water to help attract a female
- c. courting the female consists of nose-taps, nudges and shoves before actual mating occurs
- d. lay eggs in nest on land made of vegetation and mud (high enough to keep nest from flooding)
  - rotting of vegetation helps create heat to incubate eggs
  - nest can be up to three feet high and six feet across
- e. lay 25-60 eggs
- f. hatch within about nine weeks
- g. sex of young is determined by temperature of nest
  - below 30 degrees Celsius (86F) all are female
  - above 34 degrees Celsius (93F) all are male
  - any temperature in between get both sexes
- h. mother alligator guards nest and young for at least a year and sometimes up to three years
  - mother will open nest when hears small "barking" noise of new hatchlings
  - she may aid in breaking open shells during hatching and will carry young down to water
  - mother forms a pouch in her mouth with tongue that is able to hold 7-10 young on trek to water
  - a group of young alligators is called a pod



- the young of the pod have a distress call that will alert the adult female who will then respond (this may also cause other adult females to respond)
  - i. young are 7-8 inches long when hatch
  - j. can grow a foot a year until they reach around six feet long when growth slows a bit (the amount they grow each year is dependant on many factors of the surrounding environment)
  - k. reach sexual maturity around the length of six feet
  - l. females often return to same general nesting area every year
8. Life expectancy
- a. 30-50 years in the wild
  - b. 60-80 years in captivity
9. Relatives
- a. crocodile- has a longer, skinnier snout; both sets of teeth show when mouth closed; and found mostly in salt-water in the US: alligators have short, rounded snout; only top teeth and fourth tooth on bottom jaw show when mouth closed; found in fresh to brackish water in US
10. Fun facts
- a. adults can bite down with 1000 pounds per square inch of pressure
  - b. have been clocked at speeds up to 30 mph on land
  - c. *alligator* is derived from; *el lagarto* which means the lizard and *mississippiensis* means belonging to the Mississippi River
  - d. largest reptile in North America
  - e. their jaws are hinged on the bottom jaw, the top jaw is just an extension of the skull
11. Dispel myths
- a. myth: the only edible part of an alligator is its tail
    - fact: while this is said to be the best cut of meat on the alligator, all the meat is edible
  - b. myth: crocodiles and alligators have differently hinged jaws
    - fact: they are the same (see fun facts above for more detail)
  - c. myth: if an alligator is chasing you, you should run in a zig zag pattern
    - fact: alligators can run up to eleven mph for a short time before getting tired. you have longer legs and less weight to carry. you can run faster and longer. **JUST RUN AND DON'T LOOK BACK!** (you could just trip up the person running next to you too)
12. Conservation message
- a. were once listed as endangered because of hunting for meat and skin, but is one of few animals upgraded to the threatened list
  - b. eggs and very young preyed on by raccoon, large fish, male adult alligators, and birds
  - c. alligators form "gator holes" with their tails
    - these holes hold water during periods of drought which provides a place for foraging for other animals
    - alligators then eat the animals drawn to the gator hole
  - d. when alligator use paths through saw grasses, they leave a path that may widen into a creek and, in turn, help flood marshes during the rainy season

**Materials Needed:**

***Rockin' Reptiles and Awesome Amphibians*** presentation trunk. Live animals provided by the husbandry department (may include some of the following animals: toad, frog, salamander, turtle, snake, alligator)

**Procedure:**

Present a background to students on what a Herpetologist does. Talk about the various animal groupings and the characteristics of each. Show the animal parts and live animals to represent each species. Allow the students to touch a few (but not all) of the animals. Perhaps a snake and alligator would be best for touching and perhaps a turtle.

**Evaluation:** teacher evaluation, student questions and reactions to the program.

**Additional resources:**

Reptile and amphibian identification books.

**Extensions:**

Look at other animals in the National Mississippi River Museum & Aquarium or visit a natural area or nature center where some of these animals can be observed in the wild.

Related programs available at the National Mississippi River Museum & Aquarium:

***Mississippi River Life***

**Credits:**

Meggan Daniels - National Mississippi River Museum & Aquarium

