

Sharing the World with Animals

Developed for Grades 3-5, **Sharing the World with Animals** explores in greater depth many of the themes presented in our K-3 activity book, **I Love Animals**. The program also introduces students to more complex topics such as pet overpopulation and the positive and negative consequences our actions have on animals.

Sharing the World with Animals features 30 classroom-ready activities that build students' observation, role playing, discussion and group work skills. Activities such as **How Much Does It Cost to Care for a Pet?**, **Animals in Different Cultures** and **What Did We Do Wrong?** help children view animals as sentient beings with needs similar to our own. All activities are reproducible with easy-to-follow lesson plans.

Sharing the World with Animals is available for \$9.95 plus \$3.95 shipping and handling. Order both **I Love Animals** (Grades K-3) and **Sharing the World with Animals** (Grades 3-5) for just \$23.85. To order send your check or money order to ASPCA Education Department, 424 East 92nd Street, New York, NY 10128-6804 or call 212-876-7700 Ext. 4410.



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424 East 92nd Street
New York, NY 10128





ASPCA AnimalLessons™

Teacher Newsletter of The American Society for the Prevention of Cruelty to Animals



Plop! Hop! Slither and Swim! They were the first vertebrates to venture onto land. They have wet slimy skin, dry bumpy skin, big bulging eyes, and almost no eyes at all. They are the amphibians. About 350 million years ago, some of the lobe finned fishes that used their strong, paddle-like fins to crawl across land to find water when ponds dried out, began to spend more of their time on land. Insects had already appeared and colonized the land, and were a plentiful food source to exploit, while the watery world these fish

came from was filled with a wide variety of highly aggressive predators. The land offered food and safety and these early pioneers rapidly took advantage of the situation. For 50 million years amphibians were the dominant land vertebrates. They developed a wide variety of adaptations for breathing, moving and feeding on terra firma, but they never fully emancipated themselves from their aquatic origins. Many species of amphibians today still require moist living conditions to survive and water for reproduction.

Some of the important adaptations that appeared in the amphibians were the shift in sensory emphasis from the lateral line of fishes to enhanced hearing and olfaction, respiratory alterations to take advantage of the higher oxygen content of air when compared to water and structural changes to support their bodies in the absence of water's buoyancy. The class Amphibia is represented by three surviving groups: the frogs and toads (order Anura), the salamanders (order Caudata) and the little known, worm-like caecilians (order Gymnophiona). Each of these orders has developed unique and sometimes bizarre adaptations.

The caecilians are legless, burrowing amphibians that make their homes in the tropical forests of South America, Africa and Southeast Asia. They can reach lengths of 55 cm. and have small eyes. Many species are blind as adults. Their mouths are small with pointed teeth and they feed mostly on worms and invertebrates found in the soil. Reproductive strategies range from aquatic larval young to live birth.

Salamanders are widely diverse in their variation and

adaptations. They vary in size from the very tiny 3 cm. pygmy salamander to the spectacular Japanese giant salamander that can grow to 1.5 m. Some species are fully terrestrial, although they are restricted to damp wooded areas. Surprisingly, some of these species have no lungs and breathe through their skin! For this reason, it is paramount that their skin stays moist to allow the passage of gases to and from capillaries in the skin. These terrestrial species reproduce by laying eggs in moist pockets of moss or rotting logs. There is no aquatic larval stage and the young hatch as miniature replicas of the adults. Another group of salamanders are semi-aquatic. They hatch as eggs in water, spend a short time as free-swimming aquatic larvae and then metamorphose into adults that may spend part of their time on land. The red-spotted newt may spend 1-7 years living on land as a small brightly colored "red eft" before returning to an aquatic life as an adult. Mudpuppies and waterdogs are two species that are aquatic for their entire lives. These natives of eastern North America possess ornate external gills that can be bright red or purple and are feather like in appear-

ance. Mudpuppies are among the species that retain juvenile characteristics throughout their lives in a condition called neotany.

The best-known amphibians are the frogs and toads. They are a very successful group with over 3,400 species. While there is a family of “true” toads (the Bufonidae), the term toad is typically used for some of the more terrestrial frogs with stouter bodies, and thick, warted skins. The eggs of most frogs and toads hatch into the tadpoles or polliwogs familiar in many lakes, ponds and streams. They undergo a dramatic change as they metamorphose from tailed, swimming herbivores into strong legged, hopping adult carnivores. Even when we do not see frogs, we may be alerted to their presence by the cacophony of male frogs calling for mates. Many spring and summer evenings are filled with which vary from the high-pitched peeps of little green tree frogs to the deep “jug-o-rum” rumbles of bullfrogs. A number of frogs and toads have developed truly bizarre methods of reproduction in the absence of water. Some tree dwelling species lay their eggs in the hollows of leaves where rainwater has collected. Others use their legs to churn foam from female secretions. The eggs are then laid in the foam and when they hatch, the tadpoles drop down into water. Two of the most unusual reproductive tactics are breeding pouches or mouth brooding. In a number of species, fertilized eggs are placed into pouches on the male’s or female’s body. There the young complete their full development and emerge as small adults. In the mouth brooding species, an adult may swallow up to 20 eggs. The eggs hatch inside the parent’s mouth, surviving on the food stored in their tails until they metamorphose and emerge as miniature adults.

Amphibian populations around the world have suffered rapid declines in recent years and scientists are still uncertain as to the causes. Like so many other animals, amphib-

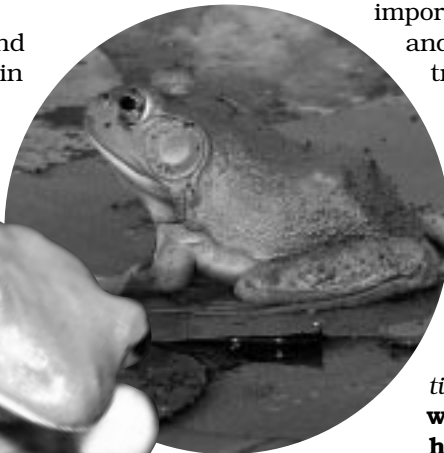
ians are threatened by habitat destruction and deterioration especially wetlands, lakes and ponds that are critical to their survival. Because of their dependence on both aquatic and terrestrial environments, they are subject to problems manifest in both. Frogs are particularly vulnerable. Unable to travel very far in search of water when their home is destroyed, the local frog population is pretty much eliminated when the pond or marsh in which they have been living in is filled in.

Water quality is also an important issue. Most frogs lay their eggs in water, develop there as tadpoles and may spend a significant amount of time there as adults. Unlike fish, they do not have scales to protect their skin which is thin and permeable to water and oxygen. This exposes them to changes in water quality. The lowering of the pH caused by acid rain may play an important role in reduced reproductive success and higher mortality. Frogs may also be negatively affected by the depletion of the ozone layer. Increased levels of ultra-violet radiation may interfere with the development of eggs. Frogs also face some serious challenges when it comes to predation by introduced species, especially fish and at times other frog species.

Each year many students have their most poignant experience with an amphibian when they are asked to dissect a frog in biology class. This traditional practice is coming under greater scrutiny for several different reasons. Taking frogs from the wild is having a significant impact on the environment and the chemicals used to preserve the frogs may have deleterious effects on the students. Educational research has also indicated that dissection may not be the best method to teach the concepts of anatomy. Biology is a rapidly changing discipline and the need to cover important topics related to the environment, ecology and genetics is reducing the time available for traditional dissection exercises. Finally, asking students to dissect an animal may compromise respect for life provided for this purpose. A wide variety of options now exist to support the study of frog anatomy, behavior and ecology. These materials provide both the student and teacher with exciting and interactive opportunities to study amphibians and their many fascinating adaptations.

The following are useful web sites for alternatives to frog dissection:

www.froguts.com,
<http://oslovet.veths.no/NORINA/>,
www.navs.org, www.aavs.org



Teacher's Instructions



Activity Sheet 1: Grades K-2

Photocopy the frog coloring page for students. You may wish to cut the sheet in half and enlarge the two images. First, ask students to color only the leaves and branches around each frog. They are not to color in the frogs yet. Second, ask the students to color the French Guiana poison dart frog. Write on the board what color each of the body parts are: blue legs, yellow stripes on the back and a black body. Third, have them color in the bullfrog. Bullfrogs are brown or green.

You may wish to show them photos of what these frogs really look like. Helpful websites include: French Guiana poison dart frog (<http://jajhs.kana.k12.wv.us/amazon/froggallery.htm>); Different poison dart frogs (<http://www.fantasticfrogs.com/suriname.htm>); bullfrogs (<http://www.npwrc.usgs.gov/narcam/idguide/bullfrog.htm>). Next, ask the students which frog is easier to see. Why? Ask them why a frog would want to hide. From what would it hide? Why would a frog want to stand out? You may want to give them a hint by saying that the French Guiana poison dart frog would make someone very sick or even die if they tried to eat it. It wants to stand out because it is poisonous and wants to warn predators not to eat it. By standing out with distinctive coloration, a predator could not eat it by mistake. The bullfrog is not poisonous; it must blend in so that it can hide from predators.

Standard: (McRel) Science 5: Understands the structure and function of cells and organisms.

Activity Sheet 2: Grades 3-5

This mystery math activity utilizes basic addition and subtraction skills while introducing students to some of the problems that threaten frog populations. Answers: 1,300, 700, 525, 400, 450, 525, 315, 220, 180, 80 and Total: 80. After students have found the number of frogs left at Croaking Pond, the class can discuss other events or conditions that may affect frogs and what we can do to save them. A few of the terms used in the activity (global warming, pesticides) can lead into further discussions about how they affect not only frogs, but other animals and plants including humans.

Standard: (McRel) Mathematics 3: Uses basic and advanced procedures while performing the processes of computation. (NCTM): Number and Operations

Activity Sheet 3: Grades 3-8

Students will have an opportunity to learn some new vocabulary words that are associated with amphibians. Have students determine which of these words are unique to amphibians (e.g. tadpole, caecilians) while others can be applied to other animals (e.g. life cycle, metamorphosis). Part two of this activity involves filling in the blanks with the appropriate vocabulary word. Defining the words and being able to see how the term is used in a sentence will increase both word retention and comprehension. Answers: 1) vertebrates, 2) terrestrial, 3) caecilians, 4) wetlands, 5) life cycle and tadpoles, 6) metamorphosis, 7) permeable, 8) toad, 9) axolotl and 10) acid rain.

Standard: (McRel) Language Arts 5: Uses word reference materials (e.g. glossary, dictionary, thesaurus) to determine the meaning, pronunciation and derivations of unknown words.

Activity Sheet 4: Grades 3-8

Creating an animal folktale is a wonderful opportunity for students to use their imagination and writing skills as well presenting animals in a positive aspect. The activity has a brief introduction to folktales and an example involving a tiny tree frog native to Puerto Rico. Students can write their folktale on an amphibian or any animal of their choice. The teacher should choose the length of the story based on the students abilities. If time allows, you may have students read their folktales aloud in class and peer edit each other's papers.

The following two web sites have information on animal folklore from all around the world: <http://www.ferrum.edu/applit/bibs/tales/animals.htm> and <http://www.planetozkids.com/oban/legends.htm>.

Standard: (McRel) Language Arts 1: Uses the general skills and strategies of the writing process. (NCTE) Language Arts 5: Students employ a wide range of strategies as they write and use different writing process elements appropriately to communicate with different audiences for a variety of purposes.

A Frog of Another Color



Activity Sheet 2: Grades 3-5

What's Happening at Croaking Creek?

The Situation

Professor Sally Mander needs your help! She thinks the reason there are so few Prince Charmings left in the world is because frogs are disappearing. She would like you to watch the frog population at Croaking Pond for one year to see if the number of frogs who live at the pond is growing or shrinking. At the beginning of the year, 1,300 frogs live in Croaking Pond. Throughout the year, events take place around the pond and frogs are lost or gained as a result. Read each event and write the correct number of frogs in the column to the right. At the end of the year, how many frogs live at Croaking Pond?

Event Log



March 15:

A large part of Croaking Pond is filled in with dirt to build a new department store. The pond loses 600 frogs.



April 1:

Too many trout and bass are released into the pond. These fish eat up lots of frog eggs. The pond loses 175 frogs.



April 4:

Air pollution makes the frogs sick and 125 frogs are lost.



May 5:

Warm weather wakes up more frogs who have slept through the winter! The pond gains 50 frogs.



July 4:

Some of the spring's tadpoles have grown into frogs! There are 75 new frogs in Croaking Pond. The sound of singing frogs fills the warm summer nights.



October 29:

A bad drought makes the pond lose 210 frogs! Some scientists think that global warming made the drought so bad.



October 31:

Garbage is illegally dumped into the pond. The pond loses 95 frogs.



November 22:

People take 40 frogs from the pond. Some people take the frogs to be pets or to use in the classroom.



December 7:

Pesticides (chemicals put on plants to kill insects) are washed into the pond from farms and homes. The pond loses 100 frogs.



Total:



At the end of the year, how many frogs are left? What other things do you think could happen that might make Croaking Pond lose more frogs? What could you do to help keep frogs living at Croaking Pond?

Activity Sheet 3: Grades 3-8

All About Amphibians

The following words are associated with amphibians. Find them in a dictionary or encyclopedia and write a brief definition of each word.

- 1 Acid Rain _____
- 2 Metamorphosis _____
- 3 Wetlands _____
- 4 Axolotl _____
- 5 Terrestrial _____
- 6 Caecilians _____
- 7 Vertebrates _____
- 8 Life Cycle _____
- 9 Permeable _____
- 10 Tadpoles _____

- 1 Amphibians were the first _____ to adapt to life on land.
- 2 Most amphibians live double lives?the first part of their lives is in water or aquatic and the second part on land or _____
- 3 There are three main groups of amphibians: frogs and toads, salamanders and the rarest group, the _____, which have no limbs and looklike earthworms.
- 4 _____, lakes and ponds are critical to the survival of frogs, salamanders and other amphibians.
- 5 The familiar amphibian _____ has three stages: egg, larva and terrestrial adult.are the larval stage of frogs.
- 6 When amphibians undergo _____ their bodies change in ways that make them better suited to life on land than in the water.
- 7 Most adult amphibians breathe through their lungs and their skin, which is _____ to gases such as oxygen.
- 8 The term _____ is typically used for some of the more terrestrial frogs with stouter bodies and thick, warted skins.
- 9 The _____ (from the Aztec language Nahuatl) is a large salamander that remains in its larval form its entire life, keeping its feathery gills and tail fins and maintaining an aquatic lifestyle.
- 10 Chemical pollutants, such as _____, pesticides, herbicides,and fertilizers, are believed to be contributing to the decline in many species of amphibians.

