Using Reptile and Amphibian Activities in the Classroom

By: Terry Tomasek and Catherine E Matthews

Tomasek, T. & Matthews, C. (2008). Using Reptile and Amphibian Activities in the Classroom. *Science Activities 44 (4), 123 - 127.*

*****Note: Figures may be missing from this format of the document**

Abstract:
Reptiles and amphibians are a diverse and interesting group of organisms. The four activities described in this article take students' curiosity into the realm of scientific understanding. The activities involve the concepts of species identification; animal adaptations, communication, and habitat; and conservation. Keywords: amphibians, herpetology, reptiles

Article:
Butterflies, bunnies, and birds of various types are common in elementary school classrooms. The study of living organisms is an important part of the elementary science curriculum. We challenge all elementary teachers to move beyond these common organisms and enter the world of herpetology, the study of reptiles and amphibians (collectively known as herps).

The interrelationships among living organisms can be a complicated concept. However, through simulations, games, and simple activities, students in grades 2-5 can gain a deeper awareness of this important biological principle. In this article, we describe four activities that correlate with the National Science Education Standards (National Research Council 1996; see Table 1), to help students understand this idea in relation to amphibians and reptiles. A habitat fragmentation simulation will help students experience how animals may respond to disturbances in their habitat. Where do I belong? is a game that will assist students with species identification and teach students about animal adaptations. A frog call activity is provided to help students understand how some amphibians communicate, and a habitat exploration activity allows students to make connections between particular reptile and amphibian species and habitat type. After conducting these activities in the classroom, we took the children outside to practice their new skills. We describe our fieldwork in the companion article in this issue, "Toads Give You Warts-Not!"

Habitat Fragmentation Simulation

This simulation allows students to experience some of the ramifications of habitat fragmentation. Students are forced into larger and larger groups of children while the availability of snack items, activity resources, and space decreases. Food, space, and resources are the limiting factors during this simulation.

Table 1. National Science Education Standards Addressed by Activities in this Article

Standard and applicable grades	Habitat Fragmentation Simulation	Where Do I Belong? Game	Frog Call Activity	Habitat Exploration
Characteristics of organisms (K–4)		✓	✓	✓
Life cycles of organisms (K–4)				✓
Organisms and environments (K–4)	✓		✓	✓
Structure and function in living systems (5–8)	✓	✓	✓	✓
Populations and ecosystems (5–8)	✓		✓	✓
Diversity and adaptations of organisms (5–8)	✓	✓	✓	✓
Characteristics and changes in populations (K–4)	✓			✓
Changes in environments (K–4)	✓			✓
Populations, resources, and environments (5–8)	✓			✓
Risks and benefits (5–8)	✓			✓

Source. National Research Council. 1996. *National science education standards*. Washington, DC: National Academy Press.

Materials

* One package of minimarshmallows or another snack item

* Materials for habitat exploration activity (see p. 126)

Procedure

1. Put students into groups. Make sure each group has plenty of materials and snack items.

2. Ask students to begin to look at the materials on their table. After several minutes, tell them that a delivery of materials is being made to the classroom and they must clear off several tables. Remove the snack items and materials from these tables and tell students to move to remaining tables. Students should experience difficulty with this task.

3. As soon as some frustration has built up, ask students to explain why they are having trouble (possible sugges-tions: too crowded, not enough materials, not enough snacks for everyone, not enough room for everyone).

4. Ask students to go back to their original tables. Tell students that animals experience some of the same things they just experienced. If a construction company clears part of the forest to build new homes, what happens to the animals that lived there? (They move or die.) What happens in the surrounding forest areas when the displaced animals move in? (They experience crowding, not enough materials to build homes, not enough food, and competition.)

Where Do I Belong? Game

This activity is useful before taking students into the field to identify amphibians or reptiles. The purpose is to help students focus on key identification features of each major group of amphibians and reptiles at the site.

Materials

* One fact sheet for each amphibian or reptile being studied (use local species)

* An ID-card necklace for each student (see Step 2 of the Procedure below)

* Post-it Notes

* Dichotomous classification key for organisms being studied (see Figure 1)

Procedure

1. Spread the fact sheets evenly throughout the room, grouping common organisms. We used two salamanders, two tree frogs, two true frogs, two toads, one skink, and one box turtle. Each fact sheet had the common and scientific names of the organism, a distribution map, a picture, and general information (e.g., major identification features, habitat, habits, diet, breeding). We created the fact sheets using pictures, maps, and information from the Internet and local field guides.

2. Place an ID-card necklace over each student's head so that the card is hanging down the student's back. This ID card is a 3 × 5 index card. One side has a picture of an animal; the other side has a list of anatomical features. For example, "This animal has a tail, a hard high-domed shell, a dark brown to black shell with yellow and orange spots, streaks, and lines. Hint: This animal is the North Carolina state reptile." The index card should have two holes punched in the top through which a piece of yarn can be tied (long enough to go around the student's neck so that the card hangs at the middle of the student's back). There should be a Post-it Note placed over the picture.

3. Tell students to walk around and find at least three others who can look at the picture and write something about that reptile or amphibian on the Post-it Note. The information on the back of the index card is used for clues if a child has trouble writing an observation. After a student has three observations, a teacher should look at his or her list of observations to see if there is enough information to identify the type of organism.

4. If the student has enough information, the teacher removes the Post-it Note, gives it to the student with a simple classification key, and tells the student to use the observations and key to find out to which group the animal belongs.

5. Once the student has identified the organism, he or she should find the appropriate fact sheet and read about that organism. Several students can have the same animal on their necklaces.

6. Once all students find their groups, talk about the major groups of herps represented, how to differentiate between them, and in which general habitats they can be found.

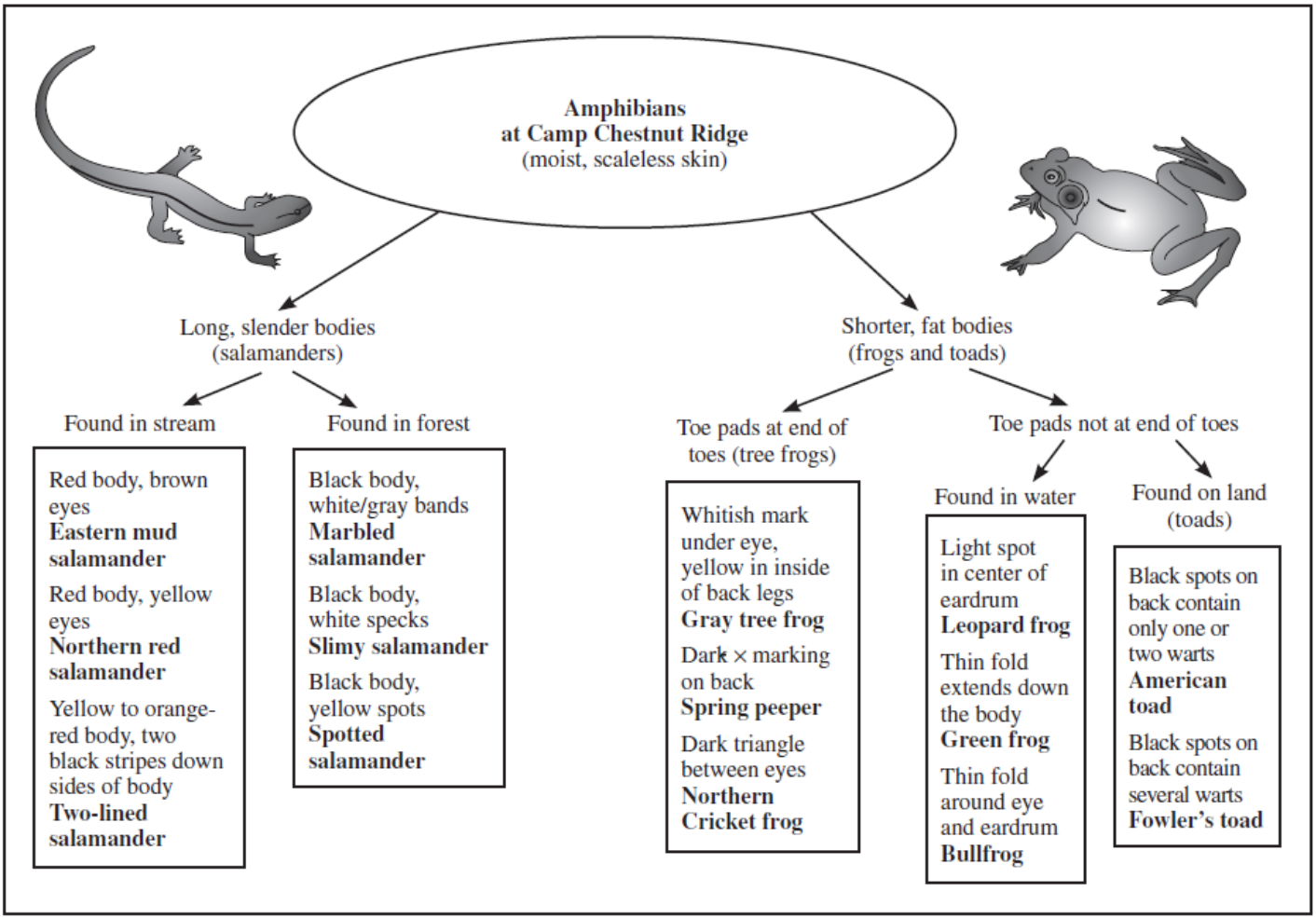

FIGURE 1. Dichotomous key.

Frog Call Activity

Some frogs and toads produce sounds by inflating their lungs and vocal sacs with air and then forcing the air across the larynx and into the vocal sacs, or moving the air back and forth between the lungs and vocal sacs, which amplifies the sound. Usually male frogs call with the intent of attracting females, although some male frogs call for other reasons, such as marking territory, warning rival males, sounding alarms, or making release calls when mistakenly grabbed by another male.

Materials

* Dark-colored, empty 35-mm film canisters with lids

* Various household materials that can fit into the film canisters (e.g., pennies, macaroni, small pieces of spaghetti, rice, sugar, paper clips, thumb tacks, assorted hardware)

* Frog call CD (optional)

Procedure

1. Make similar pairs of film canisters by filling two canisters with the same items. For example, two canisters can have three pennies, five pieces of macaroni, or four thumbtacks. Make sure you have enough pairs of film canisters so that each student will have one canister. With experimentation, you might be able to find materials

that actually simulate the tone and character of some frog and toad calls. For example, many people think that the call of the northern cricket frog sounds like two marbles hitting together.

2. Introduce the concept of frog calls used during breeding season. Discuss the various species of frogs in your area that call.

3. Give each student a film canister. Tell students to put their thumb on the bottom of the canister and their index finger on the top. Ask students to shake the canister in an up-and-down motion and try to find their "mate" by listening for the "call" that is similar to theirs. We have used as many as four similar canisters. Students quickly recognize how difficult it is for frogs to hear other similar frogs when everyone in the pond is calling.

4. An extension activity is to ask students to mimic the calls made by frogs or toads in your area. Pick two or three calls that are very distinct (in our area, bullfrogs, spring peepers, and toads are common and make very different sounds). Give students written descriptions of the frog calls on slips of paper. For example, one slip of paper would read, "Fowler's Toad: a loud- or medium-pitched trill (say 'blaa' and hold for 3-4 seconds)," and another slip would say, "Eastern Narrow-mouthed Toad: a high-pitched bleating sound (say 'baaaaaa' and hold for 1-2 seconds)." Ask students to give their best rendition of the calls.

Habitat Exploration

Different amphibians and reptiles need different habitats. Some require permanent water sources, whereas some depend only on vernal pools (natural depressions that contain water for only part of the year, during which time they serve as breeding grounds for reptiles and amphibians). A variety of reptiles and a few species of amphibians are primarily terrestrial. Check local field guides for the types of amphibians and reptiles common in your area and the habitats they prefer.

Materials

* Pictures of habitats common to your area (we used photographs of actual places where we would be studying herps: a forest, lake, stream, pond, road rut, and vernal pools).

* Replicas or preserved specimens of amphibians and reptiles (use local species)

* Dichotomous classification key of organisms being studied (see Figure 1)

* Sketch of surrounding area with habitats identified (see Figure 2)

* Field guides (optional)

Procedure

1. Give each group of students a habitat picture and either replicas or preserved specimens of various animals that are most common to the respective habitat. (We borrowed preserved specimens from our state museum. In many states, it is illegal to collect reptiles and amphibians.)

2. Give a brief introduction: different animals live in these different habitats, and some animals spend part of their lives in one habitat and part of their lives in another.

3. Give each student a classification key and a sketch of the surrounding area with each habitat identified (see Figure 2).

4. Instruct students to use the classification key to determine the name of each organism. Once students identify an organism, ask them to write the name of that organism in the appropriate habitat on the sketch. Students will make this prediction on the basis of their observations of the anatomical features of each specimen. For example, webbed feet on a frog would indicate a habitat placement such as a pond or lake.

5. Rotate student groups through as many habitats as possible given your time limitations.

6. Possible elaborations for class discussions are habitat needs of organisms; habitat fragmentation, destruction, or degradation; why animals move from one habitat to another; and amphibian and reptilian life cycles.

7. An extension of this activity is to allow older students to select an amphibian or reptile to research and become an expert on it. Using local field guides, students can find out about scientific names, breeding seasons, special characteristics, and call descriptions.

Teacher Resource Materials

* The National Science Teachers Association has published a comprehensive book of herpetology-related activities entitled Hands-on Herpetology: Exploring Ecology and Conservation (Schneider, Krasny, and Morreale 2001).

* Let's Hear It For Herps! (National Wildlife Federation 1987) in the Ranger Rick's NatureScope series is an activity-based magazine designed for teachers of students in grades K-8. Two of our favorite activities are Hands-on Herps (general characteristics of reptiles and amphibians) and Built to Survive! (adaptations that help amphibians survive).

* The Massachusetts Audubon Society has published a handbook, Vernal Pool Lessons and Activities (Childs and Colburn 1995). Our favorite activity is the Migrating Amphibians game, which simulates the difficulty amphibians have in migrating to a water source to reproduce.

* Animals Alive! An Ecological Guide to Animal Activities (Holley 1997) provides background information on herps and how to care for them in the classroom.

* Matthews and Cook (2004) wrote an article entitled "Herpetologist Transports Third-Graders to Frogland," which offers several simple activities related to amphibians and reptiles.

* The Oregon Coast Aquarium has created a Web-based murder mystery, The Case of the Disappearing Frogs, in which students (3rd grade and up) work to unravel the causes behind the mysterious disappearance of 3,000 frogs. That activity can be accessed at http://www.aquarium.org/disappearing frogs/corepage.htm.

* Our Web site, http://www.uncg.edu/soe/herpetology, has a variety of free materials related to the study of reptiles and amphibians.

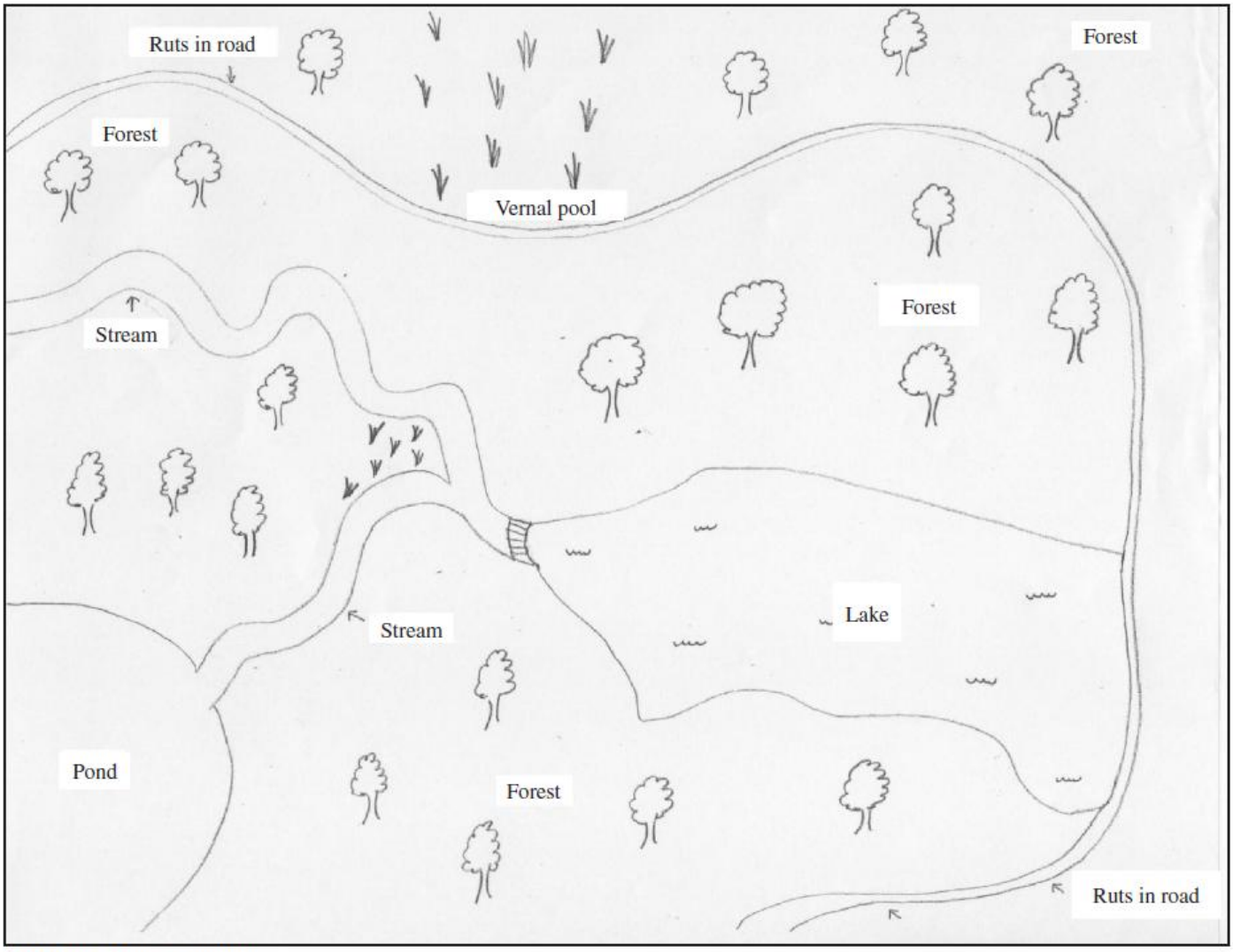

FIGURE 2. Habitat sketch.

Conclusion

Our firsthand experience with the excitement of 2nd through 5th graders in learning about reptiles and amphibians keeps us continuously looking for ways to integrate the study of these fascinating animals into all parts of the elementary science curriculum. The educational value of these activities is multifaceted. Students not only learn important science content but also experience a variety of ways in which scientists develop knowledge, such as making observations, using tools such as dichotomous keys, using evidence to support explanations, asking questions, and communicating ideas. Students are given the opportunity to explore the interrelationships among organisms and habitats. Reptiles and amphibians are not commonly used in the elementary school science classroom, but teachers can incorporate them into their curricula to broaden the scope of elementary education.

References

Childs, N., and B. Colburn. 1995. Vernal pool lessons and activities. Lincoln: Massachusetts Audubon Society.
Holley, D. 1997. Animals alive! An ecological guide to animal activities. Niwot, CO: Roberts Rinehart.
Matthews, C., and H. M. Cook. 2004. Herpetologist transports third-graders to frogland. Science Activities 41 (3): 26-34.
National Research Council. 1996. National science education standards. Washington, DC: National Academy Press.
National Wildlife Federation. 1987. Let's hear it for herps! New York: McGraw-Hill.

Schneider, R. L., M. E. Krasny, and S. J. Morreale. 2001. Hands-on herpetology: Exploring ecology and conservation. Arlington, VA: National Science Teachers Association.