Hoptoad Habitats:
Vernal Pool Study Visit

Summary: Students will visit an actual vernal pool to study the organisms that reside there and their interrelationships, including amphibians, insects, clams, plants, etc. Students will use their personal "Puddle Jumpers" field journals to collect and examine organisms in the pool, generate questions, and create a food web for the pool. (If a vernal pool absolutely cannot be found, other wetlands or the edges of ponds can be used when there is shallow, open water present.)

Objective: Students will collect organisms from the vernal pool using nets and other tools, observe and describe one organism, and consider it's relationship to amphibians and other species that utilize the habitat. Students will also generate investigable questions from inquiry, as guided by the "Puddle Jumpers" field journal.

Grades: 3-5

Subject: Science, language, art

Skills: observation, communication, inquiry, teamwork, art

Materials: "Puddle Jumpers" field journals, clipboards (pieces of cardboard), pencil or pens, dip nets, small sieves, transparent cups, paint brushes, white tubs (dish pans work well)

Preparation

The Pre-visit lessons developed for Hoptoad Habitats may be used for preparation, or at a minimum, a basic knowledge of habitats and amphibians. The teacher or students will need to download the Puddle Jumpers field journal from the Wildlife Habitat Council website (http://www.wildlifehc.org), or the Three Rivers Habitat Partnership (http://trfn.clpgh.org/trhp). **Please note that the Journal requires the 8 ½x 14 inches paper size.** The pages can then be copied onto both sides, folded, and stapled. Students should then color the Puddle Jumper field journal pages accurately by using resource materials such as field guides. This will familiarize students with the field markings of these species, which they may or may not see during the visit.

A vernal pool needs to be located prior to the visit in late winter, or the spring prior. Students and teachers may search nearby woods for these pools as extra credit, and local natural resource organizations can be contacted for assistance. Since the pools are

temporary in nature, timing is important if you cannot find a knowledgeable resource person. If there is not a vernal pool nearby, a small pond or wetland area with open water can also be used.

Background

Vernal pools are temporary pools of water found each spring caused by snow melting and high rains (Vernal is Latin for spring). They are temporary, lasting only several weeks to several months in the spring before drying up in summer. They are important habitat for amphibians, especially many salamanders and frogs. Some amphibians such as the wood frog and spotted salamander are called "obligate" vernal pool species, meaning they require vernal pools for breeding and cannot exist without them. Other amphibians are considered "facultative" species, meaning they often use vernal pools but can use other bodies of water as well.

Because vernal pools dry up in summer, fish, a major predator of amphibian eggs and young, do not survive. The pools stay wet just long enough for the amphibians to hatch and mature. Unfortunately, many people view these amphibian nurseries as waste places or just huge puddles, and drain or pollute them. Other wildlife besides amphibians depend on them as well, including fairy shrimp, fingernail clams, caddis flies, turtles, birds, trees, and plants.

Now that the students are prepared with a background and appreciation for amphibians, field study will enhance their learning and show them a real-world example of this habitat. Review the concepts of habitat, amphibians, and issues facing them. Students will examine the wildlife in the pools, as well as the soils nearby, and record their findings in the Field Journal.

The teacher or activity leaders should visit the vernal pool ahead of time to locate areas that may be too sensitive for disturbance. Stations for each work group can be flagged with red survey tape, and other areas marked off to avoid disturbance or dangerous spots. One assistant adult leader per team of students is recommended to assist the students, and ensure the safety of both the students and the habitat. A location in the forest should also be flagged off for the soil study.

Activity

1. Divide students into work teams of 4-5, with an adult assistant leader. To add to the fun and sense of teamwork, have each group choose an amphibian-related name, such as the Tadpoles, Bullfrogs, Newts, etc. If students have work teams from earlier activities, these may be maintained.

2. While walking to the vernal pool, stop at the pre-marked wooded location near the trail for the soil stop. Explain that here is where the salamanders reside, under the soil, the logs, the rocks. Ask students to grab a fistful of soil and feel its texture.

What does it feel like? Dry or wet? Hard or soft? Gritty or smooth? Place the soil in the sieve and examine the contents. Is it only dirt? What else is in it? Leaves, bark, insects? If you don't know, sketch what you find. Would a salamander prefer this soil, or a lawn to dig through? (On the way back, stop at a lawn or open field area for another quick soil stop to compare and contrast the woodland soils).

3. Once the class arrives at the vernal pool or pond, review ground rules (no running, stay in work stations, do not enter water, etc.). Explain that these rules are required in order to be effective wildlife detectives and to protect the amphibians. Ask each team what they expect to find in the vernal pool. Then the teams should collect their materials and move to their respective stations along the pool's edge. Field Journals may be left at the gathering location near the pool.

Phase I: Critter Collection

4. At the stations, the teams should take turn using the large dip nets to collect organisms in the pool for about 20 minutes. Remind them to sweep the bottom and carefully sift through mud and leaves, where the majority of organisms reside. Once students begin to look through the muck, they should transfer organisms with the cup or paintbrush to the tub of water, with as little much as possible which will cloud the water and hide their findings. Teams may wish to have two tubs for transfer so that one remains clear and free of muck. Leaders should make certain that all muck is promptly returned the water since organisms are likely still hiding within. Organisms that may be found include tadpoles, caddisfly larvae, fingernail clams, beetles, snails, etc.

Phase II: Critter Identification

5. At the end of the collection period, all teams should bring their white tubs with organisms back to the gathering spot for examination. Identification is not as important as the discovery of the biodiversity that lives within such a shallow, small area. Each team will choose one mystery organism, and follow the Field Journal to record pertinent information. Leaders should help students observe their tiny finds, looking at the number of legs, appendages, color, etc. "The Golden Guide to Ponds" may help teams identify less common finds. Charts such as those available from the Pennsylvania Fish and Boat Commission are also excellent for general identification (see **Tools** for contact information). Once again, identification is not as important as developing careful observation skills and recording them.

6. At the end of the Critter Identification, teams should share their findings. Discuss the mystery organisms' relationship to one another and amphibians, both the larval and adult stages. Any questions about the organisms or their behavior can also be discussed. If tadpoles, eggs, or salamander larvae are found, extra attention should be spent on observation, including sketching by all teams. Eggs should never be

removed, however. Once finished, all organisms should be gently released back into the pool.

7. Students should now return to the gathering space. Have them write the names of all the organisms the entire class found randomly on a clean sheet of paper. Be certain they don't forget plants and algae. Amphibians they found (any life stage), should be drawn near the center, since that is the focus of study. If students did not find any amphibians, have them draw a tadpole and a frog in the middle. Other nonliving items found in the pond should also be written in, such as leaves, mud, logs, bark, etc. Then let the students connect the organisms that might depend on them for food, shelter, etc.

8. Once complete, ask students what their work looks like. Some students may say a web. Explain the web of life concept that all organisms depend upon one another, either directly or indirectly, and are woven together like a spider web. As an example, take one of the strands, such as the tadpole and algae, and explain how the absence of algae or other small plants would affect a tadpole. Or the caddisfly larvae and a frog. Let students pick out strands of the web, and discuss. Then also mention, or let the students uncover, the dependence of living things on nonliving things, such as the water, dead leaves, and so on.

9. Lastly, or during the web creation, students should be given time to generate questions about the vernal pool and its inhabitants in the "I wonder.." section of the Field Journal. Investigable questions can be topics for the students to conduct follow-up research, particularly if there are several issues that many of the students are curious about.

10. There are further follow-up activities and resource information if the teacher chooses to in this module. Please also share your comments, suggestions, and stories with us.