Don't Get Warts or Cast Any Spells: Catching and Raising Frog or Toad Eggs

Age: Elementary to Middle School

Objective

- **To introduce students to basic concepts of biology by observing frogs and toads. Older and advanced students can also learn how to set up and maintain an aquarium/terrarium.**

Background Lesson

Frogs and toads are a great way to introduce students to the basic aspects of biology. Most species throughout North America are harmless, easy to find, identify, raise quickly and grow to a kid-friendly handling size. Scientists also observe frogs as they tend to be more sensitive to pollution or other changes in their environment. Preparation and research is very important for this exercise.

Assignments and activities can be adjusted depending on the student's age as well as the time and resources available. Younger students can learn about local frogs and toads before catching and releasing frogs and tadpoles in a week, or older students can collect eggs to hatch, feed and raise, watching their metamorphosis into tadpoles and frogs over the course of a semester.

The Activity

Materials

- **Dip nets**
- **Clean jars**
- **Tall buckets**
- **Appropriate clothing that you do not mind getting**
- **wet/dirty (i.e. boots, old pants and shirts)**
- **Note-taking materials (pencils, waterproof paper, clipboards)**
- **Valid fishing, small game or collection licenses**
- **(research what is appropriate for your local area)**
- **Water thermometer**
- **Field guide (optional)**
- **Hand or baby wipes (optional)**

For older or advanced students to raise eggs and tadpoles:

- **Insulated coolers**
- **Aquariums/terrariums**
- **Air pumps**
- **Filters**
- **Moss, rocks and driftwood collected from the site if possible**
- **Aquarium chillers and heaters**

- **Water treatment and testing kits**
- **Food – research what is appropriate for your species**

Preparation

Research which species are common to your area, their general appearance, as well as what the local laws are about where, if and when you can collect eggs and tadpoles. If you are in the United States, the Department of Natural Resources for your state should have this information. Canadians should contact their provincial Ministry of Natural Resources or local Conservation Authority (Ontario only). Other good resources are local naturalist or amphibian enthusiast clubs and field guide books. This is also an excellent preparatory research exercise for older or advanced students. Be sure that younger students understand that frogs and toads need to be held firmly, but gently so as not to hurt them and placed into a bucket or jar to minimize handling.

Study your local laws and make sure you are not collecting any species that are inappropriate, endangered or protected in your area. Some local areas do not allow the collection of frog/toad eggs and tadpoles, but if this is the case, it may be possible to obtain a permit for scientific purposes. The Northern Cricket Frog (*Acris crepitans*) is common in the United States, but is Endangered in Ontario and illegal to collect. The Mink Frog (*Rana septentrionalis*) is common in many portions of Eastern and Central North America, but tends to give off a bad smell when handled. Tiny species such as the Spring peeper (*Pseudacris crucifer*) and Chorus Frog (*Pseudacris triseriata*) are more delicate and likely to escape or lose in the classroom.

Find a safe and appropriate site and time to collect. The best places to look for eggs and tadpoles are generally the still edges and shallows of ponds, small lakes, drainage ditches and creeks. Adults not only occupy these areas, but also damp areas on land such as under wet leaves, logs and even some gardens. Frogs and toads can be generally found throughout any month except winter, but tend to lay their eggs in spring and summer. Adults are most active at dawn and dusk, from spring until early summer.

If you plan to raise eggs and tadpoles into adults, the recommended species for this is the American Toad (*Bufo americanus*). This species has healthy populations that are widespread throughout Eastern North America, grows very large, is easy to identify, easy to handle and grows from egg to small adult in approximately 2 months. Other fairly large, common species that will undergo metamorphosis from egg to adult within a school semester are the Green Frog aka the Bronze Frog (*Rana clamitans*), the Leopard Frog (*Rana pipiens*), Woodhouse's Toad (*Bufo woodhousii*) and the Wood Frog (*Rana sylvatica*). The American Bullfrog (*Rana catesbeiana)* is also very large and common throughout the United States, but does not undergo metamorphosis until its second year of life.

Be sure to set up your aquariums/terrariums and make sure everything is running properly before placing your eggs or tadpoles. Many tadpoles will eat

fish food or algae tablets from the aquarium or pet store, frogs and toads will need small insects that can be collected from outside, or crickets and mealworms fortified with vitamin and mineral supplements can be purchased. Water should ideally be collected from the site, but tap water can be used if it is dechlorinated by leaving it in an open container in the sun for a couple of days or treating it using formulas from the aquarium or pet store. Different species require certain water temperature, so check your guide for the proper conditions and make sure you are able to regulate the temperature with the heaters or chillers. Keep in mind that some toads can secret a mild white poison from their paratoid glands (glands on the side of the neck, above the shoulder or behind the eye), that can make a person sick if swallowed, so do not allow students to put their hands in their mouths while handling and have them wash their hands thoroughly before and after the exercise.

Procedure

1. **After finding a site, fill the buckets and jars with some pond or creek water before looking for eggs or tadpoles, or leave them with a small amount of water if you want to hold adults to keep them moist. Encourage students to note the date, time, water temperature, air temperature and weather conditions before sampling, as well as anything else of interest (i.e. a sewer pipe nearby). Take photographs if possible and mark the location on a map if you are removing eggs and tadpoles to return to the exact spot when they are to be released.**
2. **Gently scoop up eggs or tadpoles with the dip net and place them into the jars or buckets for students to look at. Try to catch adults by slowly sneaking up on them, before clamping you hands or a container on top of them, as their first instinct is to try and jump to escape; minimize handling by placing them into a bucket or large jar. Encourage students to try and identify species using the field guide, make general observations and take notes. If you do not intend to take them back to the classroom to raise, then gently release them exactly where they were found. Be sure students clean their hands after handling; hand or baby wipes are good for this if no washrooms are nearby.**
3. **If you are collecting eggs and tadpoles to raise, then try to keep them close to the temperature of the water where they were found by keeping the containers in the cooler. Be sure to collect some algae, gravel and enough pond water to fill the aquariums with. You will need about 3.75 L (1 gal) per 2 tadpoles so as not to crowd them. Do not take any more then is necessary.**
4. **Have students care for and observe the tadpoles. Set up the water thermometer in the aquarium and have students record the temperature every day. Set up a feeding schedule to ensure tadpoles are fed on time and make sure students do not add too much food, or it will not be eaten and could rot in the water. Encourage students to draw the tadpoles every few days to track how long it takes for their legs to grow and tails to shrink. As the tadpoles become juvenile frogs or toads and are able to leave the water, be sure there are partially submerged rocks, plants or driftwood which they can climb onto and be transferred to the terrarium or they may get tired and drown. Adult frogs and toads require more work and different food, so it is usually best to release them soon after they have finished developing.**

5. **It is best to release the juvenile frogs/toads while the weather is still warm, to give them time to find a place to hibernate for the winter. Be sure to release them exactly where they were found.**

Post Activity Discussion

Ask students to discuss what changes were observed and why. Here are some possible sample questions:

- **How long and in what order did changes such as legs growing and tails shrinking occur as the tadpoles developed? How long did it take?**
- **What species of frogs/toads developed? How soon were you able to tell? What features did you look for?**
- **What kind of threats do frogs and toads face at different life stages?**

Possible Assignments

- **Students can research/report on the general common characteristics and taxonomy of frogs and toads. All frogs and toads are amphibians in the order *Anura* and approximately 85-90% of all amphibian species are estimated to be frogs. Older or more advanced students can also be encouraged to go into more detail about one or two families. Frogs and toads are currently grouped into 33 families. The families *Leptodactylidae* (frogs found in Southern and Tropical Climates), *Hylidae* (the tree frogs), *Ranidae* (the true frogs) and *Bufo* (the true toads) contain the most species. Some interesting recommended families are *Centrolenidae* (the glass frogs), *Rhacophoridae* (the tropical tree and 'flying' frogs) and *Dendrobatidae* (the poison dart frogs).**
- **Students can write about the life cycle of frogs and toads, drawing and/or explaining how eggs become tadpoles and then adults and the compare the differences at each life stage (i.e. tadpoles live in water and have gills while eating algae, adults live on land, have lungs and eat invertebrates such as worms and insects).**
- **Ask students to design an ideal pond habitat for frogs, toads and other aquatic life. Explain what plants and objects they would place into and around the pond and why.**
- **Students can research and learn about invasive species by studying the case of the Cane Toad (*Bufo marinus*), (as referenced in The Simpsons episode 'Bart vs. Australia', except with bullfrogs). It was deliberately introduced in regions where sugar cane was cultivated in the late 19th and early 20th centuries in an attempt to control sugar cane pests. They are most well known for their introduction to Australia, but populations are also established in Hawaii, the Caribbean, Fiji, New Guinea, several Islands in Japan and parts of the Southern United States.**
- **A creative assignment would be to suggest inventions or innovations which could be developed by studying frogs and toads. For example, the suction pads on some frog toads could lead to the development of a device to climb walls. Or their jumping abilities could be studied to develop a new toy or jumping shoes. As a few real life examples; scientists are currently researching the ability of the wood frogs (*Rana sylvatica*) to freeze solid**

and thaw out to see how we can prevent cell damage from freezing such as in people affected by frostbite. The toxins in poison dart frogs are being examined to develop new medicines.