



Amphibians Post-visit

Classroom Activities

Brief Synopsis

The unique world of amphibians will be explored as students catch live specimens in our ponds, forests, and river. Participation in an amphibian life cycle activity and an amphibian calls game will help round out the visual identification portion of class. Emphasis is placed on the role of amphibians as bio-indicators, and how amphibians are clues that tell us about the health of the environment.

Ages: Designed for 5th–8th grade

Time Considerations: 3 or 4 15-minute sessions

Materials: 5 raw eggs, 6 inch string, marker, ruler, 5 glasses or jars, vinegar, corn syrup, water, colander or strainer, 2 bowls, 1/2 cup dry beans, 1/2 cup salt, and food coloring.

Vocabulary: Amphibian, Bio-indicator, Contaminants, Deformity, Membrane, Permeable, Pollution

Outcomes:

1. Students will be able to list the characteristics of all amphibians.
2. Students will describe the life cycle of a toad using props.
3. Students will use sounds to re-create frog behavior.
4. Students will use careful observations to identify different species of local amphibians.
5. Students will understand how counting amphibians can be a good way to measure the health of our environment.

Minnesota Academic Standards:

Science: 4. IV. B.1 & 4.V.B.1

Math: 4.V.B.1

Language Arts: 4.I.A.1, 4.I.B.1&2, 4.III.A.1&2, 5.I.A.1, 5.I.B.1, 5.III.A.1&2, 6.I.B.4, 6.III.A.1&3, 7.I.A.1, 7.I.B.1&5, 7.III.A.1

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Background:

Part of the reason amphibians are such important animals for helping us to understand the health of the aquatic environments, is because of the permeability of all their life stages.

Activity: The Egg-cellent Experiment

Understanding the concept of permeability can be more easily understood through visuals. This activity is actually a demonstration and an experiment to help students actually visualize how permeability works.

Procedures:

1. Carefully soak each egg in its own jar of vinegar for 2-3 days (until the bubbling stops). This is something that could be started on a Friday so it is ready to be continued on Monday. The shell of a chicken egg is hard in part because of the calcium in it, which helps to protect what is inside the egg. Vinegar removes the calcium from the hard shell, leaving behind the egg's soft outside membrane.
2. Have students gently rinse off each egg. Using the string and rulers (or flexible measuring tapes), measure the circumference of each egg and record measurements on an observation sheet.
3. Include other observations about how the eggs feel, what they look like, what changes have occurred since they were soaked in vinegar, and if they think any changes have happened on the inside of the egg.
4. Choose one of the eggs to open up and see if there was any observable impact on the inside of the egg.
5. Gently place each of the remaining eggs in a jar, filling one with clear corn syrup, one with clear water, and one with water with food coloring added. Make sure each egg is completely covered.
6. Let the eggs sit in their new jars for another three days.
7. Some time during the three days, discuss how the removal of the hard outer shell makes the chicken egg more like an amphibian egg. The revealed outer membrane is permeable like the outer envelope of amphibian eggs.
8. To help demonstrate how permeable membranes work, pour salt and dry beans into a bowl and mix the contents well.
9. Hold the colander over an empty bowl and pour the mixture through it, gently shaking the colander several times over the bowl.



10. Have the students discuss how this demonstration relates to a permeable membrane. What might the salt and beans represent for an amphibian egg?
11. After the three days have elapsed, have your students observe the soaked eggs as they did before, recording their observations on the appropriate sheets. Allow your students to open their eggs to see any changes to the inside, after they have completed their observations and measurements from the outside.

Discussion:

Discuss their findings and possible explanations for the observed changes. Compare the water and corn syrup to the salt and bean demonstration. Membranes are structured to allow certain things in and keep out others. A simple example of this is a membrane that allows small items such as oxygen, carbon dioxide, and water to pass through, but not larger things like mud and algae. The problem can be if there are things in the surroundings that are small like water, but are harmful to the cells inside, they will pass through as well.

Because amphibian eggs require a wet environment to develop and grow, they can be exposed to any pollutants that end up in that water. If the pollutants are small enough to pass through their permeable membranes, the amphibians' development can be altered or stopped completely. Amphibians also have permeable skin throughout their life cycle, making them vulnerable to contaminants over their entire life span. Scientists are finding deformed frogs in the upper Midwest at a higher frequency than historic records show. Pollutants in the water is believed to be the most likely cause of these deformities.

Extension:

Have your students look further into the studies being done on deformed frogs. Use the first website listed in the side bar to the right to help get them started.

Teacher Tips

- Have your students use the scientific method to develop hypotheses about what will happen when the eggs are soaked in the different liquids.
- Set up the experiment to include more eggs (one or two per student) to set up an opportunity for studying range, mean, median, and mode of a data set. This could also include graphing, either of beginning and end sizes or of the change in size, etc.

Additional Resources

www.aquarium.org/edonlineadventures.asp?sid=4

Interactive website designed for kids to navigate through the "Case of the disappearing frogs" to have kids learn about how water quality impacts frog health.

<http://www.exploratorium.edu/frogs/>

Click on the "Inside the lab and out in the field" button for the story of the major researcher looking into frog health and water quality.

<http://>

www.animaldiversity.umm2.umich.edu/site/topics/frogcalls.html

Has pictures and frog calls.

www.midwestfrogs.com

Video clips with information on amphibian deformities and how to help amphibians.

www.pwrc.usgs.gov/frogquiz/index.cfm

A somewhat difficult quiz for frog calls.

www.allaboutfrogs.org/weird/general/cycle.html

Life cycle of frogs.