

Elementary Lesson Plan

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Introduction/Abstract to Lesson Plan	This lesson plan uses frogs to familiarize students with several life science concepts including characteristics for living things, life cycles, introduction into habitats, and basic needs for life.
Learning Objectives using Measurable Verbs (what students will be able to do)	At the completion of this lesson, students will be able to describe, illustrate, and label the life cycle of a frog, name the requirements for tadpole survival, and identify habitat requirements for tadpoles and frogs, and compare frog skin with human skin.
Appropriate Grade Levels	1-3
Group Size/# of students activities are designed for	<30
Setting (e.g. indoors, outdoors, lab, etc.)	Classroom. Egg masses/tadpoles will be collected by the teacher outdoors
Approximate Time of Lesson	~45 minutes for the classroom lesson. It will take approximately 1.5 -3 months for tadpoles to complete development.
Resources Needed for Students	Scissors, paper, pencils, glue, crayons
Resources Needed for Educators	Poster board/construction paper, PowerPoint, Clear Tupperware or small aquarium, Frozen spinach (or fish flakes), De-chlorinated tap water or pond water, small aquarium net.
Apps/Websites Needed	Teaching Videos on life cycle: 1.) http://bit.ly/1pUWGXo (links to: http://www.youtube.com/watch?v=pNkuj2Ftccg) 2.) http://bit.ly/11kYLkl (links to: http://www.youtube.com/watch?v=39s2-6qPYvU)
Lesson Activity	<ol style="list-style-type: none"> 1. Introduce students to amphibians using PowerPoint slides. At this time, habitat characteristics, requirements, and life cycle will be introduced. 2. Show students video clips of amphibian life cycle (links located at end of ppt and at website). 3. Have students gather around the egg mass that you collected and engage the class in a discussion based on what they just learned. <ul style="list-style-type: none"> • Questions may include, “What stage are they in now?” “What stage is next?” “How long until they begin to grow?” (<i>slow process, may take weeks!</i>) “Why do they have a tail during this stage?” (<i>to allow them to swim to find food so they can grow</i>). “Why don’t they have a tail during this stage?” (<i>Because they no longer live in the water and need legs to move around like you and me!</i>) Students should recall that after they hatch, they will turn into tadpoles, which will turn into froglets, which will turn into frogs. 4. Students may work on activities and worksheets provided (all supplementary worksheets and activities available on my website). 5. Over the subsequent weeks, the teacher should occasionally students in observations of the developing tadpoles. Students can be asked about changes and what each stage is called. 6. As the frogs develop, illustrations depicting the stage shifts can be attached onto a large mural (Poster Board) to track progress and changes.

	<p>7. After the froglets sprout all four legs, they will leave the water and climb out of the water. At this time, they can be released back into the wild (preferably to the same site that you collected them from).</p>
Final Product	A complete and illustrated class mural or diagram depicting a frog's life cycle within a wetland habitat for display in the classroom.
Assessment/Evaluation	To assess student understanding and retention, students can be asked to complete a frog life cycle using the supplied worksheets. The older students (2 nd and 3 rd grades) may be asked to label the worksheets using the terms, "egg", "tadpole", "froglet", and "frog" to label an illustration of a frog's life cycle. Younger students (1 st grade) may be asked to cut out and glue the life stages to the appropriate life cycle bubbles.
NC Essential Standards	<p>1.L.2.1: Summarize the basic needs of different animals (air, water, food for energy and growth).</p> <ul style="list-style-type: none"> • Supplementary teaching point (STP): Do these tadpoles need oxygen? (<i>Yes</i>). How do they get the oxygen they need? (<i>Gills like fish absorb oxygen from water or they gulp/swallow air – do not breathe like humans</i>). <p>2.L.1.1: Summarize the life cycles of animals (birth, development, reproducing, aging)</p> <ul style="list-style-type: none"> • STP: Use life cycle to demonstrate life cycle. May be compared to human or butterfly life cycle. <p>3.L.1.2: Explain why skin is necessary protection for body to remain healthy.</p> <ul style="list-style-type: none"> • STP: Discuss how adult frogs use skin to drink and breathe. Humans drink and breath through mouths but frogs use their skin. They can do this because it is porous (<i>has many tiny holes that allow air and water to flow through</i>). Do humans have "porous" skin? (<i>Not really... our skin is mostly water tight</i>)
Next Generation Science Standards	<p>1-LS1-1: Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.</p> <ul style="list-style-type: none"> • STP: How do these tadpoles swim? (<i>Tails</i>). How do tails help these tadpoles survive and grow? (<i>By helping them swim to food and nutrients</i>). What do we use to find food? (<i>Using legs to walk to kitchen or cafeteria</i>). <p>2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats.</p> <ul style="list-style-type: none"> • STP: What other animals might live in a wetland with a frog? (<i>Fish, raccoons, squirrels, bugs, bears, birds, grasses, trees like cypresses, algae</i>). <p>3-LS-4-2: Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.</p> <ul style="list-style-type: none"> • STP: If one tadpole has a larger tail, will it be able to swim faster than another frog? (<i>Yes</i>). If it can swim faster, do you think it will get more food and grow faster? (<i>Yes</i>). If it can swim faster, do you think it will be able to escape a predator better? (<i>Yes</i>). Do you think growing a big tail is an advantage? (<i>Yes</i>). <p>3-LS-4-3: Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.</p> <ul style="list-style-type: none"> • STP: What would happen if their pond dried up? (<i>They might die</i>). What might help them avoid that? (<i>Develop/grow faster</i>). If you have a big tail and can get to more food faster, do you think you will be able to grow fast and therefore have a better chance of surviving if the pond begins to dry up? (<i>Yes</i>.) <p>3-LS-4-4: Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.</p> <ul style="list-style-type: none"> • STP: If pollution and chemicals contaminate the water and make the tadpole tails shrivel up, will they be able to grow very fast? (<i>No</i>.)

Egg mass identification:



Sample aquaria:



How to collect frog eggs:

Around March, frogs will emerge from hibernation and begin to breed. Luckily, we live in North Carolina with plenty of wetlands (and therefore lots of frogs!). Finding eggs and tadpoles is fairly quick, as frogs are eager to breed and will lay eggs in water-filled roadside ditches, tire ruts, ponds, and swamps. The best time to go looking for eggs is the morning after a big spring rain. Look for gelatinous clumps with black dots in the center (see pictures above). Egg masses float on the surface or may be attached to branches/plants near the surface. To collect the eggs, dip your container below the egg mass and scoop it up with water. Try not to shake or disrupt the egg mass too much. Eggs should hatch about 7 days later, but you'll be able to see them developing inside the eggs. (Note: if they do not show development within a week, you may have unluckily grabbed an unfertilized clutch...)

Tadpole care: Tadpoles are very easy to maintain which makes this an ideal classroom “pet” and activity. Tadpoles feel very vulnerable out in the open and would love some hiding places in their tanks. A few rocks/leaves from outside will be excellent. Since they are cold-blooded, placing them in a sunny window location will help keep them warm. After hatching (~2-7 days) they will feed for a couple days on stored yolk (during this stage they will be immobile and look like they are dead) and will begin foraging after begin to swim freely. Depending on the species that you collect, they may take between 1.5 months to 3 months to fully develop.

They can eat frozen boiled spinach (allow to thaw first), fish flakes, or Spirulina. However, be careful not to overfeed as the excess food will rot and will kill the tadpoles. A filter helps keep water clean – but you do not need a filter if you do a quick water change every week or so. (Note – when tadpoles are small, they are not strong enough to swim against the suction of a filter. Be sure to install a piece of thin sponge, screen, or fabric onto the intake to ensure tadpoles do not get sucked into the filter.) To complete a water change, net the tadpoles into a different water container, rinse the aquarium, and pour the tadpoles back into the original aquarium. You can either use more pond water, or use de-chlorinated tap water (Note: do not use water straight from the tap as the chlorine is lethal to tadpoles). Froglets will sprout back legs first and will remain bipedal in the water for several weeks until the front limbs emerge. They will then

climb out of the water onto the sides of the tank or onto a platform and begin to reabsorb their tails in the final stages of metamorphosis. To assist with this process, provide with a platform to sit upon. Good platforms are pieces of floating Styrofoam, or rocks that rise out of the water. It would be ideal to pull these individuals out after they emerge and place them in a separate container lined with a moist paper towel. These frogs are now ready to be released back to the wild, and should be kept in a moist container until you return them to the wetland. As long as you release them within a week, you do not need to feed these individuals, as they do not start feeding for about 7 days. However, if you keep them for longer, fruit flies are an ideal temporary diet.

Notes:

1. There is a chance that the egg mass you collect will not develop as fertilization is external and not always successful.
2. Be careful about allowing students to touch the tadpoles, as they are very small and fragile. Frog skin easily tears and limbs are easily broken.
3. If the water becomes dirty or you decide to change it – if you use tap water, be sure to dechlorinate it first (dechlorinators are available at any pet store). Untreated pond/lake/wetland water can be also used to replace/supplement the water in the aquarium.

Appendices:

Talented teachers have created several excellent frog life cycle worksheets and activities. Rather than re-inventing the wheel, I have compiled several of those resources into one location on my website. There you can pick and download whichever worksheets and activities will work best in your classroom.