



Pond Study: Life Cycles Grade Two

Objective: Students will:

- a.) Treat all pond creatures with respect by ensuring they stay in ample water
- b.) Observe and describe the similarities and differences in appearance of tadpoles
- c.) Identify the sequential changes that occur in metamorphosis

Grade Two Science Standards

2a: Students know that organisms reproduce offspring of their own kind and that the offspring resemble their parents and one another.

2b: Students know the sequential stages of life cycles are different for different animals such as butterflies, frogs, and mice.

Materials:

- Plastic Tanks (stay on table)
- Tupperware containers (student use)
- Plastic cups for collecting (student use)
- Magnifier Boxes
- Insect body diagram & tadpole body diagram
- Life Cycle Diagram
- Pond creature laminated photos

Theme: "Many creatures go through their life cycle in the watery world of the pond!"

Adult use only!

Turkey basters and pipettes for sucking up tiny creatures (not tadpoles!) and placing them in depression slides or in plastic cubes for viewing.

TADPOLES ARE VERY FRAGILE!!

Adults may carefully collect a total of 5 Tadpoles! They must be kept in the tanks and not placed under microscopes. They may be kept for a brief time in specimen jars with water. They are very fragile!

1.) Let's take a good look at the pond. Many creatures call this pond their home! We can also call this pond a "HABITAT"- that is a scientist's word for home. What are some of the things that make up this habitat? Have students observe: algae (green mushy stuff), water, mud, plants under water, plants at the edge of the water, air bubbles in the water, etc. Many creatures are born here, grow up here in the pond habitat and then as adult animals live here year-round, others live here only during certain seasons!

[Show laminated photos as you present each pond animal]

Western Pond Turtles: Year 'round residents, females lay their leathery eggs in the ground nearby.

Pacific Tree Frogs and **Western Toads** come to the pond to lay eggs and their tadpoles develop in the pond and then metamorphose (change into adult frogs & toads) and hop away from the pond to find food, usually insects!

Bullfrogs Live here year 'round. Bullfrogs are an introduced species; they are native to the southeastern US. We are concerned that bullfrogs may be eating our turtles and native frog and toad species.

Fish: At least 5 species live here- Largemouth Bass, Catfish, Mosquitofish, Crappie and Bluegill.

2.) Before the activity, the leader has collected live creatures from the pond: fish, tadpoles and/or insects. Leader demonstrates showing respect for the aquatic life
Students must:

- Always keep the pond life in water. Fish, tadpoles and many aquatic insects breathe their oxygen right from the water! Holding them out in the air is deadly to them!
- Please be gentle! They smush easily and we do not want to hurt them!
- Carefully place them back in the same place you found them when done!

Take the Pond Caretaker's Oath:

Raise your right hand and repeat after me: "I promise to treat all creatures carefully, to keep them in ample water at all times, and to return them to the same place I found them. I can take good care of our environment."

Activity:

3.) Show the students the tadpoles you have collected in the tanks. Explain that these tadpoles are very fragile so we must only observe them in the tanks. How did these tadpoles get here??? If you come here to the pond on an evening in springtime, you will hear many sounds. Ribbet-ribbet-ribbet (have the group imitate) that is the sound of the pacific tree frog males calling. Croak-croak-croak (imitate) is the sound of the Western Toads. Bur-ump, bur-ump, bur-ump (imitate) is the sound of the bullfrog males calling!

The frogs call to attract a mate. The female frog comes to the pond, lays eggs. The male fertilizes them immediately by holding onto the back of the female and as soon as the eggs leave her body, the male fertilizes them. The eggs are jelly-like. Toad eggs are in a long string like a necklace. Frog eggs are laid in clusters, tree frogs attach their eggs to a plant stem.

Do these frog eggs [show photo] look like their parents? Why not? What must happen? [Metamorphose, grow up, etc.]

Now many changes must take place for a frog egg to turn into an adult frog! We call these changes "metamorphosis"! Metamorphosis is the scientific word for the drastic changes that take place from egg to adult! Butterflies and other insects go through metamorphosis. Toads and frogs also go through metamorphosis!

We start with the eggs being fertilized. The frog embryo grows and can hatch in as little as 4 days! What hatches out of the egg? A tadpole frog! Now I want you to make careful observations of the tadpoles in the tank in front of you. What body parts does a tadpole have? [Head and Tail] Encourage them to look for a mouth and eyes- they are there but may be difficult to see. How does a tadpole breathe? [gills on the side of the head allow the tadpole to breathe oxygen from the water] Now, I want you to make observations and raise your hand when you can describe one change that occurs as a tadpole metamorphoses into a frog.

Some possibilities:

TADPOLE	Metamorphoses into FROG
Swims with tail	Grows legs and hops
Breathes with gills in water	Grows lungs and breathes O ₂ from air
Tail	Is absorbed into body
Sometimes one color	Camouflage color on toads, and mask on tree frogs

There are many other changes such as:

- ➔ The eyes are elevated and moveable lids develop
- ➔ Mouth cavity increases in size
- ➔ Arms and legs develop simultaneously, but the arms are concealed under the opercular membrane (the gills)
- ➔ When tadpoles rush to the surface or rest out of water we know that the lungs are taking on the respiratory work
- ➔ Tadpoles are tadpoles for 2 - 3 weeks or as long as many years in some species. Cool temperatures slow development and warmer temperatures speed development.
- ➔ Color and distinctive markings appear on adult toads & frogs. Tree frogs can change color and markings to camouflage themselves to their surroundings.

4.) With adult supervision, students gather specimens using collecting containers (remind them that tadpoles are very fragile, so no collecting those!) Place the creatures found in tanks & containers on the examining tables.

5.) Participants observe specimens using magnifiers, microscopes & magnifying cubes.

6.) Encourage the children to make further observations of the creatures in the tanks. With adult help, they may use the identification sheets to identify the kind of insects they have found (Mayfly, damselfly, dragonfly, etc.) Point out the life cycle of those creatures & identify the stage in the creature's life cycle.

7.) Quiet group & demonstrate exactly how you want them to return creatures to the pond or stream. Review the life cycle concepts learned, ending with "Many creatures go through their life cycle in the watery world of the pond!"