

# Northern Leopard Frog Lesson Plan: From Eggs to Legs



**Grades:** K-2

**Materials:**

- Teacher Backgrounder
- Frog Lifecycle Transparency (or electronic copy to project on screen)
- Transparency projector
- Student Copies of Frog Lifecycle
- Pencils/Colours
- Testing Material

**Keywords:**

- Amphibian
- Egg
- Spawn
- Tadpole
- Polliwog
- Froglet
- Metamorphosis

**Objective:**

Frogs are an important part of the ecosystem, living in both water and on land. They need a healthy environment to complete their lifecycle from egg to adult frog, and are well-known for their sensitivity to pollution. The Northern Leopard Frog (Rocky Mountain population) is endangered and is only found in the Creston Valley of southeastern B.C.

In this activity, students learn about the various stages of the frog lifecycle. They will explore names and key characteristics of metamorphosis, learning ways to identify different stages in a frog's lifecycle.

**Procedure:**

1. Read the *Teacher Backgrounder* provided with this lesson plan. This information is meant to supplement a teacher's understanding, not only of the frog's lifecycle and associated terminology, but also of the concerns facing frogs and the importance of habitat protection. This message can be conveyed with varying degrees of detail throughout the lesson.
2. Tell the class that many species change forms throughout their lifecycle and that this process is called metamorphosis.

**Metamorphosis:** a biological process that helps an animal change form. It usually, but not always, requires a change in habitat.

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3. Show the Frog Lifecycle diagram to the class and indicate each stage of metamorphosis. Include key information on each stage (found in the *Teacher Backgrounder*), such as timeline and physical appearance. Have students colour and label their own copies of the lifecycle diagram.

### **Extension Activities (grade 3):**

Review the word *metamorphosis* and the terminology for the stages of the frog cycle. Have students draw the various habitats needed for each life stage, so that each image of the diagram is in its proper habitat. Refer to the *Teacher Backgrounder* for habitat information.

### **Fine Arts Extensions (all grade levels):**

Lifecycle drawings can be cut out and mounted on construction paper and displayed in the classroom or hallway. For a super froggie classroom, have students build mobiles out of their artwork and hang them from your classroom ceiling.

### **Evaluation (K-2):**

Evaluation can be done early in the lesson while the Frog Lifecycle is being displayed to the class. Cover the answers and have students indicate the proper names for each lifecycle. For a more formal evaluation in older classrooms, use the testing materials included.

### **Evaluation (extension activities):**

Collect artwork and mark for accuracy in labeling, detail of habitats, creative design and imagination.



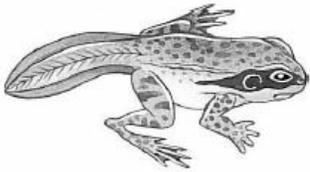
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## Testing Material

Student name: \_\_\_\_\_

Date: \_\_\_\_\_

Below are five pictures of a frog at different times in its life cycle. Beside each picture, write the letter that best matches it.



\_\_\_\_\_

A. Adult Frog



\_\_\_\_\_

B. Froglet



\_\_\_\_\_

C. Tadpole with legs



\_\_\_\_\_

E. Tadpole



\_\_\_\_\_

D. Eggs or Spawn

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## Teacher Backgrounder

### Importance of Frogs

Frogs are an important part of the ecosystem. Within the food web they act as both **predator** and **prey**, holding the role of a **population balancer**. Additionally, frogs have smooth, moist skin that is very permeable to substances in water or the atmosphere. Adult frogs absorb part of the oxygen they need (and most of the water) through their skin, making them vulnerable to pollutants. To complete their lifecycle from egg to adult, frogs need a healthy environment both on land and in the water. Because of this, they are considered **bio-indicators** (able to tell us whether an environment is healthy or unhealthy).

Frog eggs, larvae, and adults are food for many fish, birds, and mammals. When amphibians are contaminated, they pass toxins along to their predators. When amphibians disappear, this can affect the animals who eat them to survive. A decline in amphibians is like a red flag, warning us that something is wrong with the environment we all share.

Other factors play a part in the decline of frog populations. The **Northern Leopard Frog** is threatened by **exotic fish and bullfrogs** in breeding grounds, **habitat loss, disease**, in addition to **pollution**. It is on the provincial **Red List** of species and is considered **endangered** by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Threats to all frog populations include: increase in ultra-violet radiation (and damage to the Ozone layer), pesticides, industrial pollution, acid rain, changes in temperature and climate change.

### Amphibians

The frog is an **amphibian** in the order of *Anura*, meaning “tail-less” in Greek (*an*= without, *oura*= tail). An amphibian means the various stages of a frog’s lifecycle are carried out both in water and on land. Adult frogs are characterized by long hind legs, a short body, webbed digits, protruding eyes, and (usually) the absence of a tail. Most frogs have a semi-aquatic lifestyle but move easily on land. They lay their **eggs** in puddles, ponds, or lakes, and their larvae (called **tadpoles**), have gills and develop in water. Adult frogs eat a carnivorous (flesh, not plants) diet of bugs and worms. They are mostly noticeable by their calls, which can be widely heard during mating seasons.

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## Northern Leopard Frog - *Lithobates pipiens*

### Appearance

This medium-sized frog is between 5.5 and 10 cm, and is either green or brown with dark spots. The dark spots have paler halos and the dorsolateral ridges (long ridges along the back) are pale. It also has a distinctive white stripe from the upper lip to behind the shoulder.



Photo: Brian Gratwicke, Wikimedia Commons

### Range & Habitat

This frog prefers open, grassy sites and damp soil. Once found throughout the Kootenays and Okanagan, the Northern Leopard Frog is now only found in the Creston Valley of southeastern B.C.

### Diet & Behaviour

This frog will eat just about anything! It prefers insects, and waits for the prey to come close enough to leap at it (often 15-40 cm).

### Lifecycle

They breed in the early spring when the temperature approaches 10°C. Males gather first and float at the water's surface while calling and the females stay near shore. The females can lay between 1000 and 5000 eggs!

### The Frog Life Cycle

Frogs are amphibians (class: Amphibia, order: Anura). In general, eggs and tadpoles spend their time in the water, while frogs (with the help of their newly developed legs) will spend much of their time on land. Read below for a detailed account of a frog's lifecycle.

1. In the Spring, the male frog will move to watery breeding sites and start calling to attract females. They also will warn other males to keep away from their territories.
2. Once a male and female pair up, the male clasps the female in a piggyback position called *amplexus*, releasing his sperm as she releases her eggs. The eggs are fertilized outside the female's body.
3. **Spawn**, the name given to this group of fertilized frog's eggs, is a mass of soft, jelly-coated eggs, and usually will stick to water plants or other vegetation. In general, eggs remain in this stage of the lifecycle for about 21 days. The Northern Leopard Frog's eggs will hatch after 9 days.
4. The eggs hatch into tiny, fish-like **tadpoles** that have gills to breathe while in the water. Due to their poorly developed gills, mouths, and tails, the first 7-10 days in this stage are spent feeding on the remaining yolk, which is actually in its gut, and clinging to vegetation. After 10 days it will start free-swimming and feeding on algae or tiny organisms in the water.

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5. At 4 weeks into the tadpole stage, a layer of skin grows over the gills and they disappear. Tiny teeth appear and the tadpole will develop a long coiled gut which helps to digest food. Legs sprout from the tadpole's body, and the tadpole's tail becomes smaller (it is actually absorbed into the body). The tadpole also develops lungs to help it breathe out of water.
6. At 6-9 weeks, the **tadpole has legs** and the head is more distinct. The diet may now include small insects, and to accommodate this change in diet, the gut begins to shorten. A bulge appears where the arms will pop out (elbow first). It is thought that during **metamorphosis** the immune system is largely shut down to accommodate all the physical changes. At this time, tadpoles are especially susceptible to disease, parasite attacks, and have increased sensitivity to their environment.
7. After 12 weeks of being a tadpole, it is now a **froglet**, looking much like an adult frog but with a stumpy tail. These froglets have survived the tadpole stage and if they escape being eaten by fish, birds, or other frogs, will continue their transformation into adults.
8. After 16 weeks, the transformation is complete and **adult frogs** can move out of the water and live on land. The Northern Leopard Frog's metamorphosis takes 3 to 6 months from egg to adult. Depending on the availability of food and water, it is now fully developed and is spending most of its life out of water eating a carnivorous diet.
9. In the spring, adult frogs move back into the water for breeding and the cycle starts all over!

### Key Words

**Amphibian:** a cold-blooded vertebrate (having a backbone) animal of the class *Amphibia*. There are five classes of vertebrates: fish, amphibians, reptiles, birds, and mammals. There are three living *orders* of amphibians: frogs and toads, salamanders and newts, and limbless amphibians (a little-known tropical group).



**Bio-indicators:** a living organism that is able to tell us about our environment, particularly if it is healthy or unhealthy.

**Froglet:** a stage in the lifecycle of the frog in which all parts of the frog have developed but its stumpy tail still remains.



**Global Warming:** an increase in the near-surface temperature of the earth, a part of climate change.

**Metamorphosis:** a biological process that helps an animal change form. It usually, but not always, requires a change in habitat.

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**Population:** a group of individuals of the same species that live within an area.

**Red-listed Species:** species that are of endangered, extirpated (have gone extinct in one particular area), or threatened in British Columbia.

**Spawn:** fertilized frog eggs, found in a mass of soft, jelly-coated eggs and numbering in the hundreds to thousands.

**Tadpole (sometimes called a polliwog):** the larval, aquatic stage of an amphibian. After hatching from the egg, the tadpole has gills to breathe and is legless, propelling itself with a tail.



### Sources and More Information

**B.C. Frogwatch Program:**

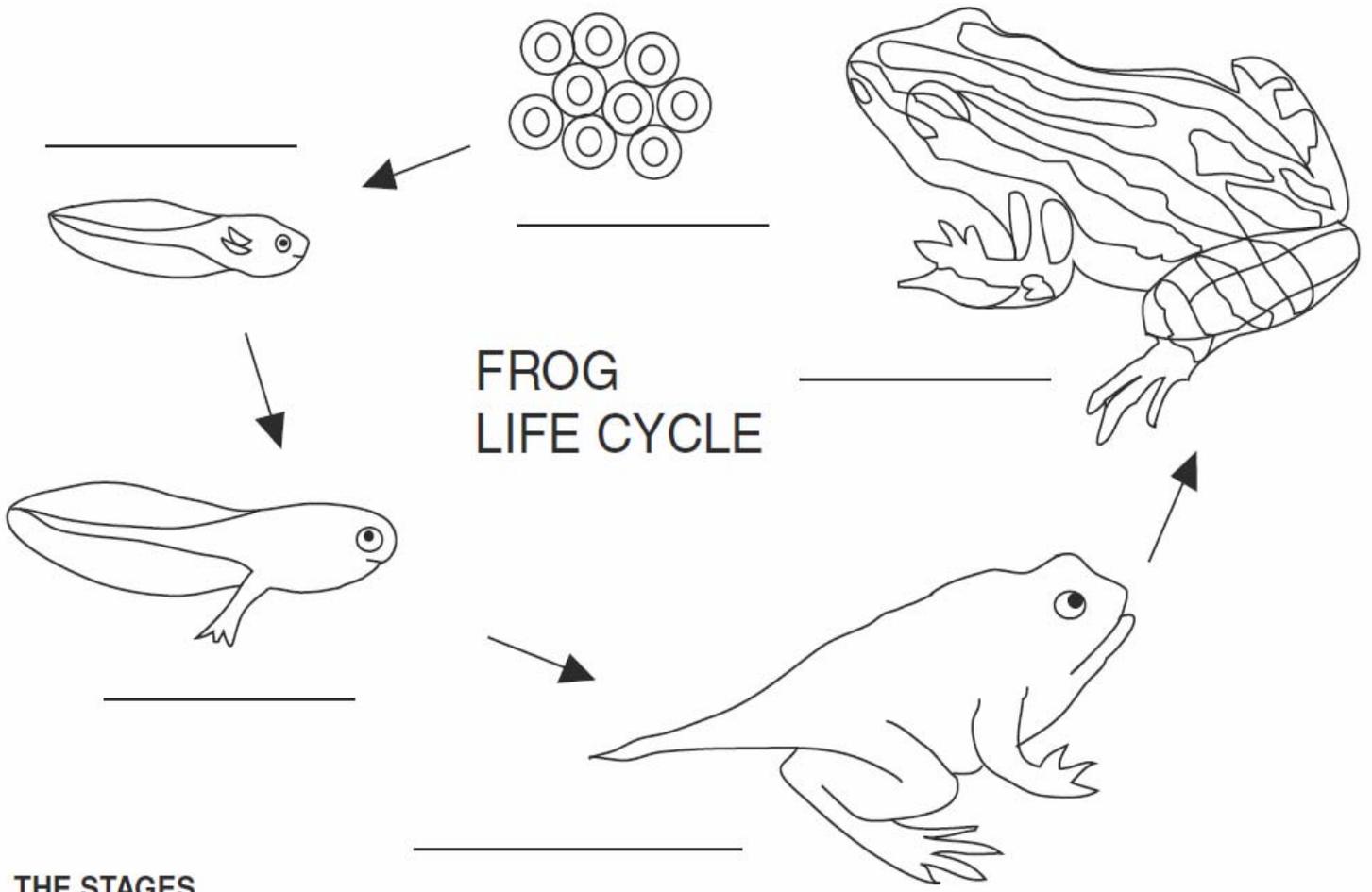
<http://www.env.gov.bc.ca/wld/frogwatch/publications/factsheets/frogs/northern-leopard.htm>

**COSEWIC- Northern Leopard Frog (Rocky Mountain population):**

[http://www.cosewic.gc.ca/eng/sct1/searchdetail\\_e.cfm?id=551&StartRow=1&boxStat us=All&boxTaxonomic=All&location=All&change=All&board=All&commonName=northern%20leopard%20frog&scienceName=&returnFlag=0&Page=1](http://www.cosewic.gc.ca/eng/sct1/searchdetail_e.cfm?id=551&StartRow=1&boxStat us=All&boxTaxonomic=All&location=All&change=All&board=All&commonName=northern%20leopard%20frog&scienceName=&returnFlag=0&Page=1)

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Label each stage of the Frog's lifecycle with choices 1-5 and then colour.



### THE STAGES

- 1. EGGS or SPAWN
- 2. TADPOLE (or polliwog)
- 3. TADPOLE WITH LEGS
- 4. FROGLET
- 5. ADULT FROG