

Build-A-Frog Adaptations Lessons



NATIONAL
WILDLIFE
REFUGE SYSTEM

Build-A-Frog

Summary of Activities

This binder includes a variety of activities and background information related to frogs and their adaptations. The trunk also contains supporting materials for the activities in this binder as well as extra materials to use for additional activities at your own leisure. Feel free to use the lessons in this binder and materials in the trunk how it best fits your goals and needs.

Please be respectful with the artifacts and items. Handle skulls carefully and leave talons in their case.

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Season:

All

Objectives:

Students will be able to...

- Define metamorphosis and determine the differences between the frog life cycle and other animal life cycles

- Discover the importance of different adaptations and the purpose they serve in a frog's life

Key Concepts:

- Metamorphosis
- Life Cycle
- Adaptations
- Amphibians

State (SEEd) Standards

Kindergarten

Standard K.2, Living Things And Their Surroundings

Standard K.2.1, Obtain, evaluate, and communicate information to describe patterns of what living things need to survive.

Standard K.2.3, Obtain, evaluate, and communicate information about how living things affect their surroundings to survive.

First Grade

Standard 1.2, The Needs Of Living Things And Their Offspring

Standard 1.2.3, Obtain, evaluate, and communicate information about the patterns of plants and nonhuman animals that are alike, but not exactly like, their parents.

Second Grade

Standard 2.2, Living Things And Their Habitats

Standard 2.2.1, Obtain, evaluate, and communicate information about patterns of living things in different habitats. Emphasize the diversity of living things in land and water habitats.

Standard 2.2.2, Plan and carry out an investigation of the structure and function of plant and animal parts in different habitats.

Third Grade

Standard 3.2, Effects Of Traits On Survival

Standard 3.2.1, Develop and use models to describe changes that organisms go through during their life cycles.

Standard 3.2.3, Construct an explanation that the environment can affect the traits of an organism.

Fourth Grade

Standard 4.1, Organisms Functioning In Their Environment

Standard 4.1.1, Construct an explanation from evidence that plants and animals have internal and external structures that function to support survival, growth behavior, and reproduction.

Build-A-Frog Trunk Materials List

Activity Books/Materials

- "Growing Frogs" Book & CD
- Frog Life Cycle Floor Puzzle
- Frog Life Cycle Zipper Puppet
- Magnetic Frog Life Cycle Set
- Inflatable Frog Life Cycle Set

Build-A-Frog Costume Items

- Flippers (3)
- Goggles (3)
- Snorkel
- Suction Cups (2)
- Garden Shovel
- Drum (Empty Colored Container)
- Face Mask
- Camouflage Bandana
- Bag Of Party Noise Makers
- Pillowcase

Miscellaneous Items

- Frog Masks Craft Materials
- Alcohol Cleaning Wipes

What is an Amphibian?

Background Information

Amphibians are cold-blooded or **ectothermic** animals with a backbone or **vertebrate**. Unlike their other cold-blooded relatives, reptiles, amphibians do not have scales. Instead, they have a thin, moist, **permeable skin** which allows them to breathe and absorb water through their skin. This **adaptation** is essential to amphibians because they live a two-part-lifecycle.

Similar to insects, such as butterflies and moths, amphibians also go through the process of **metamorphosis** or a change in their physical structure. During their juvenile stage of life, amphibians live within the water as tadpoles or efts. After metamorphosing, they then spend their adult life breathing air on land.

There are a few different types of amphibians including frogs, toads, salamanders, and caecilians. All amphibian species serve as important biological indicators or **bio-indicators**. Because amphibians have thin, permeable skin that can absorb liquids, amphibians are more susceptible to changes in habitat conditions such as too much sun or too many chemicals and pesticides being added to an area. When these changes in habitat start to take effect, amphibians are often the first species to start dying off or losing members of their population demonstrating the surrounding habitat is going through a drastic change. In fact, about half of the world's frog species are in danger of extinction because of habitat disturbances.

Besides indicating the health of habitats, amphibians also serve an important role in the ecosystem food chain. As adults, amphibians are important carnivorous species that eat insect pests that threaten agriculture as well as mosquitos. Amphibians are also an important food source, themselves, to larger animals such as foxes and raccoons. All species serve an important purpose within the ecosystems they live in.

Amphibians VS. Reptiles

Adaptation	Amphibians	Reptiles
Method of Breathing	Gills and Lungs.	Lungs.
Metamorphosis	(Yes) Breathes Water Through Gills Until it Develops Lungs.	(No) Looks Like a Miniature Adult When Born.
Defense	Toxic Skin Secretions and Bites. No Teeth or Nails.	Bites, and Has Nails and Teeth. Some Reptiles Have Venom.
Skin Texture	Thin, Moist, Permeable Skin. Mucous Glands Present.	Dry and Scaly Skin. Scales are Made of Keratin. Skin is Underneath Scales.
Eggs	Anamniotic Eggs. Eggs are Surrounded With a Soft Gel With No Hard Covering. Usually Found in Water or Damp Places.	Amniotic Eggs. Eggs Have Hard, Leathery Shell. Typically Laid on Land, or Eggs are Kept in Their Bodies Until Hatching.

Frog & Toads of Utah



Colombia Spotted Frog
(Northern Part of State)



Northern Leopard Frog
(Statewide)



Lowland Leopard Frog
(Southwestern Utah)



Canyon Tree Frog
(Southern Half of Utah)



Pacific Tree Frog
(Western Edge of State)



Boreal Chorus Frog
(Northern Utah)



American Bullfrog
(Northern Utah)

Frog & Toads of Utah



Arizona Toad
(Southwest Corner of Utah)



Great Plains Toad
(Southern Half of Utah)



Red Spotted Toad
(Southern Utah)



Western Toad
(Western Utah)



Woodhouse's Toad
(Statewide)



Great Basin Spadefoot Toad
(Statewide)



Mexican Spadefoot Toad
(Southeastern Corner of Utah)



Plains Spadefoot Toad
(Southern Edge of Utah)

Frog Life Cycle

Summary

Frogs depend on the process of metamorphosis to change from their juvenile to adult form. Because they are an amphibian, frogs start their lives in the water and slowly change forms throughout their life cycle.

In this activity, students will work together to discuss what they know about frogs and what a life cycle is. Students will then work together to correctly put the frog life cycle in order and demonstrate their understanding of metamorphosis.

Materials Included

- Frog Life Cycle Floor Puzzle
- Magnetic Frog Life Cycle Sheet
- Inflatable Frog Life Cycle Set
- Frog Life Cycle Zipper Puppet

Supplies You Will Need To Provide

-You may want to make a copy of the Frog Life Cycle Diagram on the “Frog Life Cycle Activity” page for each student.

Time:
30 minutes

Season:
All

Objectives:
Students will be able to...

- Define metamorphosis and determine the differences between the frog life cycle and other animal life cycles

Key Concepts:

- Metamorphosis
- Life Cycle
- Adaptations

Frog Life Cycle

Background Information

Similar to insects, such as butterflies and moths, amphibians also go through the process of metamorphosis. **Metamorphosis** is the process of change from a juveniles to an adult through multiple distinct phases. Amphibians go through a **two-part life cycle** where they will spend their juvenile life in the water and their adult life on land. In the case of frogs, frogs typically transition from eggs to tadpoles to full-grown adults.

Adult frogs lay their eggs in large clumps or groups called **frogspawn**. These clumps of eggs can consist of hundreds of young frogs. Frogspawn are found in shallow, still water where eggs are not under as much disturbance.

Between one to three weeks later, the frog eggs hatch into tadpoles. In this form, these young frogs have gills, allowing them to breathe underwater, and a long tail. As a tadpole, young frogs typically eat aquatic plants. This diet is different than what they eat as full-grown adult frogs which are primarily carnivorous animals.

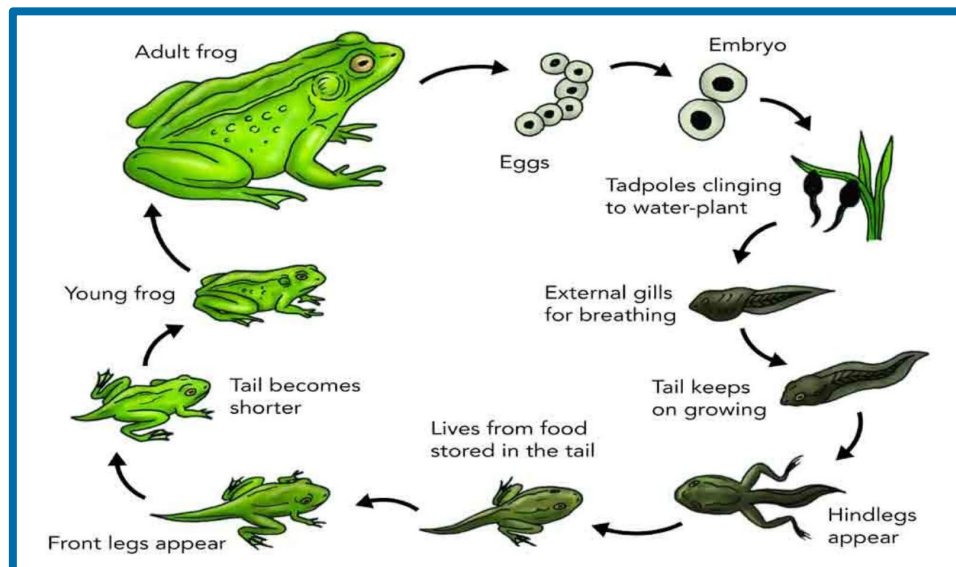
On average, it takes tadpoles about fourteen weeks to metamorphosize from a juvenile to adult frog. During this process, tadpoles will slowly start to lose their long tails and gills. They will also start to develop four legs over time as well as lungs and eardrums. These new **adaptations** are important for frog's when preparing to live their adult life on land.

Finally, once all of these new adaptations have fully formed, frogs are officially in their adult form and ready for life on land. As a fully formed adult, frogs no longer must always remain in the water. However, because they are amphibians and need to keep their skin moist, frogs do typically remain near water. This is also where they will lay their own eggs eventually beginning the life cycle all over again.

Frog Life Cycle Activity

Instructions

1. Discuss with a group of partner...
 1. What do you know about frogs?
 2. How do you feel about frogs?
 3. Is there anything about frogs that make them special?
2. As a class, talk about the frog life cycle.
 1. What is a life cycle?
 2. What is metamorphosis?
3. Have groups or partners test their knowledge by rotating through the life cycle activities. Have students put each of the life cycle activities in order/together with their groups or partners. Life cycle activity stations include...
 1. Magnetic Frog Life Cycle Set
 2. Inflatable Frog Life Cycle Set
 3. Frog Life Cycle Floor Puzzle
4. Wrap-up discussion as a whole class. Talk about what students discovered and how the frog life cycle is different than the life cycle of a human or other animals.



Build-A-Frog

Summary

All frogs have important adaptations that help them to live successfully in their habitats. However, not all frogs have exactly the same adaptations.

In this activity, students will discover the purposes of the different adaptations frogs have by dressing up a student volunteer as a human-sized frog.

Materials Included

- Flippers (3)
- Goggles (3)
- =Snorkel
- Suction Cups (2)
- Garden Shovel
- Drum (Empty Colored Container)
- Face Mask
- Camouflage Bandana
- Bag Of Party Noise Makers
- Pillowcase

Supplies You Will Need To Provide

- Extra Face Mask

Time:
30 minutes

Season:
All

Objectives:
Students will be able to...

- Discover the importance of different adaptations and the purpose they serve in a frog's life

Key Concepts:

- Adaptations

Build-A-Frog Activity

Instructions & Background

1. To start the activity, place all of the frog adaptation costume materials inside the pillowcase.
2. Ask for a student volunteer to become a frog.
3. Ask for volunteers to pull one adaptation (costume material) from the pillowcase at a time.
4. For each adaptation, ask the class questions such as...
 1. What is this adaptation?
 2. What might a frog need this adaptation for?
5. Use the “Laminated Frog Adaptations Pictures” to show what this adaptation looks like on a real frog and discuss what this adaptation is used for.
6. After discussing each adaptation, have the student volunteer slowly start to dress up like a frog wearing each adaptation.

Build-A-Frog Adaptations & Costume Parts

1. Eyes (Goggles): Frogs have various eye types. The colored part of the eye, or the iris, can be different colors just like human eyes! This includes brown, green silver, red, bronze, and gold. The pupils of frog eyes can also be various shapes. This can include...

Round Pupils: Good for seeing during the daytime.

Vertical Pupils: Good for night vision and can quickly adapt to changes in surrounding light. Similar to the vision of a cat.

Horizontal Pupils: This is the most common pupil. This is also good for vision during the daytime.

Heart-shaped Pupils: Help with vision during daytime and for capturing prey.

Build-A-Frog Activity

Build-A-Frog Adaptations & Costume Parts

2. Tongue (Party Noise Makers): Many frogs have tongues that are long and sticky. This adaptation is important for catching and eating fast insects. These long and sticky tongues roll out similar to an upside-down party noise maker. Typically, frogs with long tongues go by the “see it, snap at it” technique of feeding.

Toads, on the other hand, typically have tiny tongues and have to snap at their food using just their mouth. Similar to a cat, toads will often stalk their food and will strike right before their prey runs away.

3. Ears (Drum/Empty Plastic Container): Although frogs do not have external ears, similar to human and mammal species, they are still able to hear. On the sides of a frog’s head, they have round ears called the tympanum. Tympanum means drum. These “drums” are thin layers of skin that vibrate when sound waves hit the tympanum. Depending on the frog, sometimes the tympanum is large and obvious and sometimes it is not visible.

***Have the student tap on the lid like they are playing a drum.**

4. Frog Feet (Suction Cups, Flippers, Garden Shovel): Frogs have various sized and shaped feet depending on their habitat...

Suction Cups: Tree frogs and frogs that prefer to climb trees often have feet designed similar to suction cups. These stickier feet allow for these frogs to climb trees and other flat surfaces. Tree frogs are even able to climb up glass.

Flippers: Frogs that prefer to live a more aquatic lifestyle in the water, such as leopard frogs, have webbed feet to help them swim. These frogs need feet adapted for swimming well in order to catch their prey and escape predators.

Garden Shovel: Some toads have thicker back feet. This adaptation allow them to dig holes or burrows underground in order to keep cool from the sun and hide from predators.

***Have student choose which type of frog feet they would like to have.**

Build-A-Frog Activity

Build-A-Frog Adaptations & Costume Parts

5. Bio-indicators (Face Mask): Frogs have thin, permeable skin. While this allows them to breathe and absorb liquids easier, it also means that they are more susceptible to pollution and toxins in the water and environment. This is demonstrated by the facial mask. When a pond has a large frog population, it demonstrates that the water is healthy and clean. However, when a habitat has few frogs, this may demonstrate an unhealthy habitat for frogs and other animals.

6. Camouflage (Camouflage Bandana): Camouflage means to blend in with your surroundings. Frogs often have a camouflaged pattern to protect them from predators and to help them sneak up on their prey within their environment.

Frog Hibernation

Background Information

Similar to many mammal species, frogs also need to find ways to survive the long, cold winter months. Because most of their food sources have disappeared and the temperature is much colder, especially for a cold-blooded animal, frogs will **hibernate**. However, not all frogs use the same methods in order to successfully hibernate.

Aquatic frogs, such as the northern leopard frog and American bullfrog, typically hibernate underwater. Frogs that hibernate underwater will lay on top of the mud at the bottom in order to continue receiving oxygen from the surrounding water. Frogs are able to absorb the oxygen through their skin allowing them to breathe successfully.

Terrestrial frogs, as well as most toads, that can dig well, are able to dig and burrow down deep beneath the frost line. This helps them to stay warmer during hibernation. Terrestrial frogs that are not as adapted for digging will find deep crevices or cracks in logs or other features in order to survive the winter.

All frog species, whether aquatic or terrestrial, also have an important adaptation that allows them to survive the colder temperatures. Because frogs are cold-blooded, their body temperature matches the temperature of the environment around them. Even though they are hibernating, frogs are still subjected to colder temperatures than normal. Therefore, frogs have an **antifreeze method** where they will partly become a frozen frog. However, even though their outside body is frozen, their body still produces a high level of glucose which prevents a frog's vital organs from freezing. When the temperature finally starts to heat up outside, the frog will slowly thaw and resume its normal lifestyle.

Reflection

Ask Students...

- 1. In your opinion, which frog adaptation is the most important to their survival? Why do you think that is?**
- 2. Why are frogs so important? What is their role in the food chain and what do they do for the environment?**
- 3. How is the life cycle of a frog different that a human life cycle? Can you think of other animals that also go through a life cycle pattern similar to frogs?**
- 4. If you could be any frog, what special adaptation would you have and why?**