

SCIENCE QUEST GAZETTE



Volume 8

April

Why Frogs Croak—A Tale from Native American Literature

Once, long ago, the days and nights were of varying lengths. Brother Sun made some of the days very long and the following nights could also be very long. Many of the animals did not like this. They wished the days were more regulated and even, as they are now.

The animals got together and formed a committee to ask Brother Sun to better regulate the day length. There were many animals on the committee but two of the notable ones were Frog and Grizzly Bear. They were the two chosen by the rest of the committee to survey the rest of the animals.

Grizzly wanted one long day and one long night. He ate all day and slept all night. Long days and nights seemed very logical to him. Frog, on the other hand, wanted shorter days and nights. Frog did not live very long and he wanted his rest and feeding time to be spread out so he could enjoy them. Grizzly was a big bully of a bear. He sauntered around, speaking to each of the animals about the length of the days and the nights. Because he was a bully, he growled to each animal "SIX MONTHS DAY AND SIX MONTHS NIGHT," showing his big teeth and long claws. He growled to Fox, "SIX MONTHS DAY AND SIX MONTHS NIGHT." Grizzly growled to Owl, "SIX MONTHS DAY AND SIX MONTHS NIGHT." He saw Fish, "SIX MONTHS DAY AND SIX MONTHS NIGHT." After every animal was talked to, Grizzly wandered off to a den and took a long nap.

Frog, on the other hand, was a sociable sort of fellow. He hopped from place to place, listening to what the animals had to say. It didn't matter to Fish what the day length was. Swimming could be done at night as well as during the day. Fox preferred dawn and dusk and wanted many of those at fairly regular intervals. Owl, on the other hand, liked to hunt at night but enjoyed sleeping during the day. Periods of six months of day and six months of night were too long for Owl.

After listening to all of the animals, Frog returned to the committee to report. After Frog's report, the committee looked around for Grizzly. Grizzly, being a big bully, was sure that the rest of the animals would vote his way and did not bother to wake up from his long nap to return to the committee to report.

The committee weighed all the possibilities and choices, taking into consideration the opinions of all the animals surveyed. They voted. Eagle was sent to tell Brother Sun of their decision. Brother Sun agreed that their choice was possible and he changed the day length to be what we know today. The days in winter were to be short and progress to being longer until mid-summer when they were again begin to shorten. The nights were to be just the opposite, going from long in winter to short in summer.

Frog was so happy about his part in the decision that he hopped from place to place, croaking, in a chirpy little voice, "One day, one night. One day, one night." He was so proud of himself and his descendants are also proud. In fact, if you listen qui-

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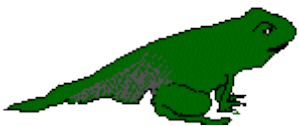
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How to Raise Tadpoles

1. First you'll need a suitable container, like an aquarium, fishbowl, plastic garbage bin, paddling pool, or garden pond. Be sure it has good shade---about 3/4 shade is ideal. If you are planning on having a frog pond, be sure there are no Oleanders, Pine trees or other poisonous plants near it! The fallen needles and leaves can be toxic to tadpoles.
2. Tadpoles absolutely depend on having fresh, clean water. If you take the water from a local stream, creek or pond, be sure it isn't polluted. Ideally, you can get it upstream from any suspected sources like factories, sewers, etc. If using tap water, let it stand exposed to full sunlight for 5 to 7 days. This will allow the Chlorine to be removed by evaporation. If you don't have that much time, you can buy de-chlorinating drops at your local fish-carrying pet store. But at least leave the water out overnight, even after using the droplets. Even a little chlorine is deadly to tadpoles. It is always a good idea to keep a little de chlorinated water on hand.
3. What do tadpoles eat? Well, I hear they LOVE lettuce. Boil the lettuce for 10 to 15 minutes and then drain it. Chop it up a little, and then you can lay it on a tray to freeze it. For average home ponds, use an icecube tray- 1 cube every couple of days should be enough. For smaller tanks, just lay some flat on a tray and freeze it, and keep it in a baggie in the freezer. Give the tadpoles a pinch every few days. Remember: too much food will get the water all dirty, and too little will make the tadpoles get nutty and go after each other. If your water gets dirty really fast, slow down on the feeding...and be sure to replace the dirty water with some fresh spare water.
4. The length of frog development from egg to tadpole to frog usually takes between 6 to 12 weeks. But it is also temperature dependant, so during cold spells it may take a bit longer or even be suspended till the temperatures go up. For example, eggs laid towards the end of summer may hatch, but tadpoles may stay tadpoles until the Spring/Summer period. So if it's cold and your tadpoles don't seem to be growing up very fast, it's no reason to panic.
5. The length of time a tadpole takes to develop really depends on what kind of frog it came from! I've even heard that some tadpoles can remain in their tadpole stage as long as 8 months, while others only take 6 to 9 weeks! When the tadpoles start getting close to developing legs, they will need some sort of perch so they can get out of the water. Floating water lily leaves and branches are ideal, but you can also create ledges using stones or even tilting slopes of plastic in tanks. The tilt of the ledge may be important depending on what type of frog you have. Young tree frogs can climb smooth vertical surfaces such as the plastic pond liners and glass, but the ground dwelling frogs will need a rough slope when the time comes to climb out of the water. At this point, if they aren't big enough to eat crickets but are too large to eat lettuce, you can try starting them off with small insects. A good substitute is bloodworms (live is best) which are usually found in pet stores that carry fish. You can try feeding them to the frogs by taking the lid of a jar and turning it upside down. Fill the cap with a bit of warmish water and lay a bunch of the gross wiggly worms in and usually the frogs will find them. Or you can put the worms directly into their water...One Frogland visitor writes, "*Also, in addition to crickets and meal worms, I have found that in the froglet/young frog stage, aphids are a good food source. They are easily found on a certain type of dandelion, so I just snip off a stem and place it in the cage, and the tadpoles have a feast!*"
6. If you're rearing the tadpoles outside, keep the garden well watered and well vegetated. Young frogs will need a lot of ground cover to hide. There is not much point in rearing frogs in a totally hostile environment. In tanks, the same rules apply as for full grown frogs. After all, even if you're not a frog predator, they still like to hide under plants and rocks when they can!
7. Frog ponds kept year-round may establish a permanent breeding pond. If you're worried about mosquito problems, drop in a few 'Blue Eyes' fish. I hear they thrive on mosquito larvae and won't hurt the frogs. These fish should be available from your local fish-carrying pet stores.



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Egg

Frogs and Toads tend to lay many many eggs because there are many hazards between fertilization and full grown frogness! Those eggs that die tend to turn white or opaque. The lucky ones that actually manage to hatch still start out on a journey of many perils.

Life starts right as the central yolk splits in two. It then divides into four, then eight, etc.- until it looks a bit like a raspberry inside a Jell-O cup. Soon, the embryo starts to look more and more like a tadpole, getting longer and moving about in it's egg.

Usually, about 6-21 days (average!) after being fertilized, the egg will hatch. Most eggs are found in calm or static waters, to prevent getting too rumbled about in infancy!

Some frogs, like the Coast foam-nest tree frog, actually mate in tree branches overlooking static ponds and streams. Their egg masses form large cocoon-like foamy masses. The foam sometimes cakes dry in the sun, protecting the inside moisture. When the rain comes along, after development of 7 to 9 days, the foam drips down, dropping tiny tadpoles into the river or pond below.

Tadpole

Shortly after hatching, the tadpole still feeds on the remaining yolk, which is actually in its gut! The tadpole at this point consists of poorly developed gills, a mouth, and a tail. It's really fragile at this point. They usually will stick themselves to floating weeds or grasses in the water using little sticky organs between its' mouth and belly area. Then, 7 to 10 days after the tadpole has hatched, it will begin to swim around and feed on algae.



After about 4 weeks, the gills start getting grown over by skin, until they eventually disappear. The tadpoles get teeny tiny teeth which help them grate food turning it into soupy oxygenated particles. They have long coiled guts that help them digest as much nutrients from their meager diets as possible.

By the fourth week, tadpoles can actually be fairly social creatures. Some even interact and school like fish!

Tadpole with legs

After about 6 to 9 weeks, little tiny legs start to sprout. The head becomes more distinct and the body elongates. By now the diet may grow to include larger items like dead insects and even plants.

The arms will begin to bulge where they will eventually pop out, elbow first.

After about 9 weeks, the tadpole looks more like a teeny frog with a really long tail. It is now well on it's way to being almost full-grown!



Young Frog, or Froglet

By 12 weeks, the tadpole has only a teeny tail stub and looks like a miniature version of the adult frog. Soon, it will leave the water, only to return again to lay more eggs and start the process all over again!



Frog

By between 12 to 16 weeks, depending on water and food supply, the frog has completed the full growth cycle. Some frogs that live in higher altitudes or in colder places might take a whole winter to go through the tadpole stage...others may have unique development stages that vary from your "traditional" tadpole-in-the-water type life cycle: some of these are described later in this tour.

Now these frogs will start the whole process again...finding mates and creating new froggies.

Books about Frogs:

- **Near One Cattail: Turtles, Logs and Leaping Frogs (Sharing Nature With Children)**
Anthony D. Fredericks (Author)
- **The Birds and the Frogs**
Brian D. McClure (Author), Buddy Plumlee (Illustrator)
- **Put a Frog in your Pocket!: Educational Art Activities for Young Children**
Mary L. Blansett (Author)
- **The Icky Sticky Frog**
Dawn Bentley (Author)
- **Growing Frogs: Read and Wonder**
Vivian French (Author)

Web Sites about Frogs:

- **All About Frogs For Kids And Teachers** - www.kiddyhouse.com/Themes/frogs/
- **Frogs** - webtech.kennesaw.edu/jcheek3/frogs/htm
- **FROGLAND! ALLAboutFrogs.ORG** - allaboutfrogs.org/
- **Frog Websites** - leapinginto5thgrade.com/frogwebsites.htm