# Toadally Frogs
# Frog Wranglers

**Program Theme:**
- Frogs are toadally awesome!

**Program Messages:**
- Frogs are remarkable creatures
- A frogs ability to adapt to its environment is evident in it physiology
- Frogs are extremely sensitive to their surroundings and as a result are considered to be an indicator species

**Program Objectives:**
- Gallery Participants will observe live frogs face-to-face
- Gallery Participants will be able to describe several physical features and unique qualities of the White's tree frog
- Gallery Participants will get excited about frogs

# Frog Wrangling Procedure

1. **Wash and dry your hands.** You may use regular tap water and light soap, but insure that you rinse your hands thoroughly.

2. **Move frog from the Public Programs suite into carrying case.** Whenever you transport your frog from the Public Programs suite to the exhibit, please carefully remove them from the habitat terrarium and place them in the small red carrying case (cooler). This will prevent the animal from becoming stressed as it is moved through the Museum.

3. **Prepare your audience.** Prior to bring out the live frog, ensure that everyone is seated and that you have asked your audience not to move quickly. Sit on the floor as well; this will ensure that if the frog leaps from your hands, it would not have far to fall.

4. **Wet your hands.** When you are ready to show the frog as part of your demonstration, please moisten your hands with the spray bottle. This will help minimize your dry skin from sucking the moisture out of the frog.

5. **Allow the frog to rest in the center of your palm**, with your other hand close by in the event the frog attempts to jump. White's tree frogs are especially docile, however, they will be less likely to leap if create a cave-like environment with both of your hands. If your frog becomes extremely active, apologize to your audience and replace him in his carrying case. The frog may have become agitated.

6. **Do not allow visitors to touch the frog.** Because of their sensitive skin, the public is not allowed to hold or touch the frog. The purpose of the demonstration is to allow the visitor to view the frog up-close.

7. **Limit the handling of the frog to no more than 5 minutes at one time.** The frog could become stressed and dehydrated by being handled for too long.

8. **After your demonstration, spray the frog.** When you are ready to replace the frog back into his carrying case, please do so then moisten him using the spray bottle.

9. **Interchange frogs to avoid stress.** If you are conducting multiple presentations during your shift, please swap between the four frogs to minimize the amount of stress that each animal will experience.

10. **Return frogs to their habitat terrarium.** When you return the frog, please again use the carrying case. Again spray the frog once you have placed it back in its home.

11. **Complete the "Frog Log" for that day.** Be sure to write your name, the date, the time, the frogs you used, the number of visitors you saw, and any comment you have about the frogs. If you notice an injury or heath concern please let Paulmichael know right away.

12. **Please do not feed the frogs.** The frog husbandry staff keeps track of their diets and how often they eat.

# Frequently Asked Questions
# About the White's Tree Frogs

**WHY IS IT CALLED THE WHITES TREE FROG?** In 1790, John White wrote A Journal of a Voyage to New South Wales, which described many Australian species of for the first time. Journal had 65 copper-plate engravings of birds, animals, and botanical specimens, and during the next five years was translated into German and French. White was the first to describe the South-East Asian frog Litoria caerulea, which was subsequently named White's tree frog.

**HOW BIG DOES THE WHITE'S TREE FROG GET?** It is a rather large tree frog, ranging in length from three to 4.5 inches (7 to 11.5 cm). Females are usually slightly bigger than the males. Our White's tree frogs are adults (larger than 3". Young adults to adults range from 1.5" to 3" and Juveniles range from .5" to 1.5".

**WHAT COLOR IS THE WHITE'S TREE FROG?** The color of these frogs ranges from light blue to emerald green or almost gray dorsally. As with many tree frogs, this species is capable of some color change. The ventral surface is a milky white and rough in texture.

**HOW CAN YOU TELL IF THEY ARE MALES OR FEMALES?** The males have a grayish wrinkled vocal sac underneath their throat region. The females have a white throat.

**DO WHITE'S TREE FROGS HAVE BIGGER TOES THAN MOST FROGS?** Yes, these frogs have enormous toe pads with partial webbing between fingers and almost complete webbing between toes.

**ARE THE EYES OF THE WHITE'S TREE FROGS DIFFENT FROM OTHER TREE FROGS?** Yes, their eyes have horizontal pupils, where most tree frogs have vertical pupils. The fatty ridge over the eye is a distinct White's tree frog trait. As an adaptation to arid areas they secrete a waxy covering over their skin that helps retain water.

**IS THE WHITE'S TREE FROGS SCARED OF HUMANS?** These frogs are very tame in nature and have little fear of humans.

**WHEN ARE THEY ACTIVE?** They can be active in day or night. The male calls year round from high positions in the trees. When threatened they emit an ear-piercing distress call. During the dry season they cover themselves in a cocoon of sloughed epidermis and mucus and burrow to keep moist. During the summer rainy season they feast for a few days then start to breed.

**WHERE DO THEY LIVE?** They are found in northern and eastern Australia, the islands in Torres Straits, New Guinea, and have been introduced to New Zealand. These tree frogs have adapted to seasonally dry or wet habitats. They prefer moist forested environments, but have skin that can adjust to drier situations. White's tree frogs do not typically live in or near water, but instead live in trees. Rain collects on leaves, in cup-shaped plants, and in crevices in tree trunks, giving the frogs access to water. These places are replenished with water from the almost daily rains, and the frogs always have a source of water to keep themselves moist.

White's tree frogs are not found strictly in tropical rainforests. In other forests, these frogs avoid desiccation in the dry season by taking refuge in tree hollows or covering themselves in a cocoon, as described above.

**WHAT KIND OF CAPTIVE ENVIROMENT IS BEST FOR THE WHITE'S TREE FROG?** We keep the their habitat between 80 and 90 degrees and the humidity between 80 and 85 percent. The live on substrate of pea gravel and spagma moss. The plant in their habitats is a pathos.

**WHAT DO THEY EAT?** In the wild, they eat mainly insects such as moths, locusts, and roaches. At the Museum, they are fed crickets 4-5 crickets 3 times a week.

**WHEN DO THEY BREED?** The White's tree frogs reach sexual maturity in their second year. Breeding takes place in the summer rainy season. It often takes place in very moist places, such as drainage systems, water tanks, or grassy semi-permanent water systems. The female expels her eggs with such a force that they go through the deposited sperm cloud and stop up to 1.5 feet (.5 m) away. A clutch can contain from 150 to 300 eggs. Once fertilized, the eggs sink to the bottom substrate. Hatching begins about 28 to 36 hours after laying. Metamorphosis can occur in two to three weeks in good conditions.

**HOW LONG DO THEY LIVE?** The average life span is about 16 years, but one is recorded to have lived 21 years in captivity.

**WHAT IS THEIR STATUS?** Neither threatened nor endangered, this species is reportedly still common in parts of its natural range.

**WHAT ARE SOME FUN FACTS?** The waxy blue-green color and the rolling skin folds of fatty material have earned the White's tree frog the nickname "dumpy tree frog."

Some scientists believe that these amazing animals can control how much water is evaporated through the skin, and thus have ability to control their body temperature. This frog's adaptability allows it to share suburban and agricultural areas with humans. They have been found in lavatories, water tanks, and city reservoirs.

During the hot summer months they may appear on the verandas of people's homes, or actually enter people's homes, while looking for moisture.

In 1999, a Zoo pathologist published his discovery of a then- mysterious infection that was afflicting and eventually killing poison arrow frogs and White's tree frogs. Through his efforts, cutaneous chytridiomycosis was documented for the first time as a vertebrate parasite.

The veterinarians along with keepers and pathologists also developed a treatment for the chytrids. The same antifungal that is used to kill athletes' foot in humans can be used with the frogs and toads.

# Frequently Asked Questions
# About Frogs in General

**WHAT IS AN AMPHIBIAN?** In evolutionary terms, amphibians lie somewhere between fish and reptiles. Amphibians are characterized as cold-blooded, vertebrates with smooth, moist skin. As amphibians we're pretty lucky - we lead dual lives: first as a tadpoles (when we're babies), and then as air-breathing adults that can live in the water, on land, or a combination of both. Because we're cold blooded, our body temperature is dependent upon its environment; its not internally controlled like a human's. One benefit: unlike warm-blooded animals, amphibians do not need to eat frequently to maintain our body temperature. One drawback: if it gets too hot or too cold, we may die.

**WHAT IS THE DIFFRENCE BETWEEN A FROG AND A TOAD?** All toads are frogs, but not all frogs are toads. Confused? All this really means is that a toad is a special type of frog--one that has adapted to a land-based lifestyle. Generally, "true toads," are frogs that have warty skins that resist drying out, short hind legs for hopping, and can often be found away from water. Most "true frogs," have smooth, moist skin, long hind legs for jumping, and usually live in or near water. Here's the catch… Unfortunately, there are no hard, fast rules to distinguish between frogs and toads (some frogs do not live near water and have little or no webbing on their feet, and some toads have a smooth skin). We frogs are complex characters – we don't fit easily into one category or the other, so unless a particular species is specified, the term "frog " includes toads as well.

**WHAT DO FROGS EAT?** We will eat almost any live food that we can catch, as long as it can fit in their mouth--frog's can't bite off chunks or chew their food. Our diet usually consists of insects, worms, centipedes, spiders and the like. The biggest frogs have heartier diets, and will eat small mammals, fish, snakes and even birds! Most tadpoles are vegetarians, but some eat small insects and even other tadpoles.

**HOW DO FROGS DRINK?** Its pretty uncommon for frogs to drink water with their mouths. Instead, we have the ability to absorb water through their skin.

**DO FROGS BREATH THROUGH THEIR SKIN?** Frogs breath primarily through their moist skin, and so their skin is a poor barrier to pollutants in the environment.

**CAN FROGS CHANGE THEIR SKIN COLOR TO BLEND IN?** Most frogs have their camouflage colors "built in" permanently. The Whites tree frog, however, can change its colors. If the frog is cold, it will change to a dark purple, which allows the frogs body to absorb more heat from the sun. It will also change colors if it is stressed

**CAN FROGS TALK?** We frogs are very musical creatures. Each species of frog has its own particular set of calls. These may be clicks, croaks, whistles or trills, and vary in volume and duration. These consist of both low- and high-frequency vibrations that frogs make by vibrating the vocal cords in their voicebox. Frogs have a variety of calls that they use to communicate with each other. They may have one call to attract a mate ("Hey baby!"), a call to warn other frogs of danger ("Look out!"), a call to warn off rivals ("Back off, jack!"), and even a call they use when it's raining ("It's raining!"). Some frogs can even scream if attacked by a predator.

**WHERE DO FROG LIVE?** We live in an astounding variety of climates and habitats. We can be found just about anywhere that there's fresh water--from the mountains to the swamps, from the deserts to the rainforests! In fact, they can be found on every continent except for Antarctica! Fresh water is the key for us to survive.

**DO FROGS LIVE IN UTAH?**
There are more than 15 species of frogs in Utah, including: the American bullfrog, the canyon treefrog, the Great Basin Spadefoot, the Great Plains Toad, the northen leopard frog, the Western Toad, and the Woodhouse's toad. Next time your outside, take a look and see if you can observe one of us.

**WHATS SO SPECIAL ABOUT FROG FEET?**
There are many different types of frog feet--each specially suited that frog's unique lifestyle. For example, Treefrogs have large, round toe pads that help them cling to branches. These toe pads work like suction cups to help the frog cling on to wet leaves and other smooth surfaces. They can even walk straight up a pane of glass. Spadefoots get their name from the hard, horn-like growths on their hind feet. These claw-like "spades" help them dig cool underground burrows in the dry climates where they live. And the Malaysian flying frog soars from branch to branch with the help of its feet. Lots of webbing between the frog's toes puffs up with air like a parachute, holding the frog aloft as it sails from tree to tree.

**ARE ALL FROGS GREEN?**
Frogs come in many different colors and patterns. We are masters of staying hidden from predators and potential prey. Our skin colors and markings help them blend in to the natural surroundings. Shades of leafy green and muddy brown are common colors that help us blend in with the landscape, and blotchy or spotted patterns help break-up the outline of our body. Some species mimic other things -- like leaves or even bird droppings -- to avoid being seen. P-r-e-t-t-y clever, huh?

**WHAT KIND OF FROG RESEARCH ARE SCIENITIST DOING THESE DAY?** Many scientist use the chemicals that frogs secret to create medicine that helps humans? For example, medicine that helps heal joints is made from the chemicals in the Holy Cross Toad, diabetes medicine is made from the Sahara Frog, and the green tree frog's chemicals helped create a natural mosquito repellent. World-renowned researcher Tyron Hayes has been studying the harmful effects of the weed-killer Atrazine on frogs. The frogs negative reaction to Atrazine indicates that that Atratzine maybe also be extremely harmful to humans. Scientists from Utah are pretty interested in frogs too. Local biologist Julie Stahli observes frogs to better understand environmental changing in Utah. University of Utah's Bill Newmark studies the spray toad in order to better understand the environmental impact of hydropower dams. And University of Utah's geneticist Monica Vetter uses frogs DNA to better understand how the human eye and central nervous system develop.

**HOW MANY SPECIES OF FROG ARE THERE IN THE WORLD?** Scientists have now described about 4740 species of frogs world-wide.

**WHAT DO YOU CALL A SCIENTIST WHO STUDIES FROG?** People who study amphibians and/or reptiles are called herpetologists - although frog biologists could also be called batrachiologists.

**WHAT IS THE MOST ENDANGERED SPECIES OF FROG IN THE WORLD?** To answer that you have to think about what endangered means. Is it the frog species with the smallest number of individuals? Or is it the frog species in which the number of individuals is being reduced the most quickly? Either way you ask the question, for most species we don't have the numbers to actually say which is the most endangered. But we do know that many kinds of frogs have been reduced to a very small number of individuals and many frogs have numbers which appear to be declining rapidly. For example, the Ramsey Canyon Leopard Frog *Rana subaquavocalis* in the United States is known from only about 100 individuals and Hamilton 's Frog *Leiopelmahamiltoni* from a small island in New Zealand appears to consist of only about 300 individuals. In general, the more restricted a species habitat is, the more endangered it is likely to be. That is why is so important to save habitats and not just keep rare frogs breeding in zoos.

**HOW DO FROGS JUMP SO WELL?** Frogs are good jumpers because they have relatively long rear legs and short bodies and lack tails. The legs give them power to jump, the short body helps them withstand the impact of landing, and there is no tail to get in the way or add unnecessary weight.

**HOW DO FROGS DO "IT"?** Male frogs and toads are not particularly bright when it comes to sex. They'll attempt to mate with anything that moves, including other males and floating leaves. Eventually they'll figure out they've made a mistake and try again with a different target. When they finally find a female, they'll climb on her back so that they can fertilize her eggs as she lays them. This mating grasp is called amplexus. Male frogs have specially adapted thumbs so that they can hang on to the female's back even if she gets bored and tries to hop away. The male frog also needs to hang on tightly to the female because sometimes *more* males try to join.

**ARE ALL FROGS POSIONOUS?** All frogs have many glands in the skin and these glands produced many different compounds which cover the skin. Many of these compounds have evolved to deter a whole range of organisms that might infect the skin of frogs, such as bacteria, fungi and other microbes or that might eat the whole frog, such as snakes. Therefore, it seems likely that these compounds might also be generally toxic to other animals that would not ordinarily bother frogs such as humans. [Maybe that's why you never see smart people walking around with a frog in their mouth].

**WHICH FROG IS THE MOST POISONOUS?** This is difficult to answer because not many people ever die by coming into contact with frogs. However, we do know that many frogs have powerful toxins in their skins, and these toxins can range from mildly irritating to eyes and skin to deadly if swallowed. The Cane Toads, are known to be deadly to humans, and the skin secretions of arrow-poison frogs of tropical American are used to tip the hunting arrows of the indigenous people.

**WHAT COLOR ARE POISONOUS FROGS?** Like many really deadly poisonous animals, poisonous frogs often have very bright and conspicuous colour patterns generally made up of reds, oranges, yellows and blues. These kinds of bright colours and patterns say: "You had better not eat me, because remember how bad something as colourful as me tasted last time you tried?"

**HOW DID FROGS EVOLVE?** Frogs evolved from ancestors that looked like living salamanders which themselves look like lizards with smooth moist skins instead of dry scaly skins. Frogs probably evolved in the Triassic, more than 200 million years ago. The first fossil that everyone agrees is almost certainly a frog is *Triadobatrachus* from the Lower Triassic in Madagascar. The Lower Triassic was approximately 240 to 245 million years ago. But imagine how difficult it is to identify the "first" of any kind of plant or animal. You need a fossil that shows the critical feature of that group of animals. What part of a frog do you think you would need to tell that it was a frog. One tooth? One toe bone? A leg bone?

**CAN TOADS REALLY GIVE YOU WARTS?** Toads do not give people warts. Amphibians have many glands in their skin, and several species produce highly toxic secretions for protection. Toads do secrete a substance from the skin that can be very irritating if it comes into contact with mucous membranes like the eyes, nose, mouth, etc.

**WHY DO FROGS EYES BULDGE OUT?** The eyes protrude from the head so a frog can see in several directions at the same time, even though they seem to stare blankly. Even though many frogs are quite dependent on aquatic environments, they can't see very well underwater. Instead, the eyes of most water-going frogs are located on top of their head. This way, a frog's large eyes stick up above the water like the periscope of a submarine, while the rest of its body remains safely submerged. This helps to keep the frog hidden, perhaps from a bird that might want to eat it or from a tasty prey item that may be buzzing by.

**HOW DO FROGS HEAR?** All frogs can hear very well, even though at first glance it appears that they have no ears at all. If you look closely, you'll see that they have an external eardrum behind each eye, called a *tympanum.* These tightly stretched pieces of skin can pick up sound vibrations in the air *and* in the water (they're waterproof, so frogs don't have to worry about swimmer's ear!). As we'll explain later, this is especially useful during mating season, when frogs become "croak experts." The size of and distance between the ears are related to the wavelength and frequency of the sound of the male's call, making them specially "tuned" to be extra-sensitive to that call.

**WHAT IS A GROUP OF FROGS CALLED?** An army.

**WHAT IS A GROUP OF TOADS CALLED?** A knot.

**IS THERE A FROG THAT CAN BE FROZEN AND ALIVE?** The hardy wood frog (*Rana sylvatica)* can be found in areas north of the Arctic Circle, where it survives some seriously chilly temperatures. This frog uses glucose in its blood as kind of antifreeze that concentrates in its vital organs, protecting them from damage while the rest of its body *freezes solid!*

**WHAT IS THE LARGEST FROG?** The largest Frog is the Goliath Frog (*Conraua goliath)* from Cameroon in West Africa. Its body can reach nearly a foot long, plus its legs can be *at least* that long. They can weigh as much as 7 pounds, as much as a decent-size housecat!

**WHAT IS THE SMALLEST FROG?** Two frogs share the record of the world's smallest: *Psyllophryne didactyla* from Brazil and *Eleutherodactylus iberia* from Cuba. Fully grown, each of these tiny hoppers measures only 3/8 of an inch long. Each could sit comfortably on top of a pencil's eraser!

**CAN IT REALLY RAIN FROGS?** Yes! It doesn't happen very often, but there are several known instances where frogs have been sucked up by tornadoes or violent winds associated with thunderstorms, and dropped down out of the sky miles from their ponds.

**WHY DO FROGS COME OUT ON ROADS WHEN IT RAINS?** Frogs need to keep their amphibian skin moist. They come out to move over land without drying out when it's rainy and wet. They come out on rainy days or nights to forage.

**DO FROGS HIBERNATE?** We casually say they hibernate, but frogs actually estivate. That means to pass the time in a state of dormancy or torpor. Frogs estivate to escape unusually hot or dry weather as well as the freezing temperatures of winter.

**WHERE DO FROGS GO IN WNTER?** Different species have different strategies for surviving winter. Northern leopard frogs, for example, pass the winter at the bottom of deeper lakes, far beneath the ice. They settle quietly on the lake bottom in deep water. They stay concealed behind a log or other debris to escape predators. Other types of frogs may hibernate under leaf litter. The frogs hibernate in burrows or bury themselves in mud. Toads and frogs are cold-blooded and their body processes slow down as the outside temperature drops. This is why you sometimes find frogs sunning themselves in the spring. Their body temp needs to rise for them to move well. Frogs' bodies have some natural antifreeze chemicals built into them, but a few kinds of frogs who live in especially cold climates can even survive being frozen solid.

**DO FROGS MIGRATE?** Frogs migrate when they go between their shallow summer breeding ponds and deeper lakes where they overwinter. Sometimes they have to cross busy roads to do this, which results in many frog deaths during spring and fall migrations.

**WHAT IS A FROGS ROLE IN AN ECOSYSTEM?** They eat insects, small fish, and other small aquatic and terrestrial animals. In turn they provide food for fish, some large insects, snakes, lizards, larger frogs, birds, and small carnivorous and omnivorous mammals.

**DO FROGS HAVE TEETH?** Frogs have teeth only in the upper jaw. These are called maxillary teeth and are used to hold their prey before swallowing. Tadpoles have teeth too! They are made of keratin, the same property that makes fingernails, horns and hair! Strangely enough, toads do not have teeth.