

Amiable Amphibians

<p>Standard V: Students will understand the physical characteristics of Utah’s wetlands, forests, and deserts and identify common organisms for each environment.</p>
<p>Objective 3: Use a simple scheme to classify Utah plants and animals.</p>
<p>Intended Learning Outcomes:</p> <ol style="list-style-type: none"> 1. Use Science Process and Thinking Skills 2. Manifest Scientific Attitudes and Interests
<p>Content Connections:</p>

Science
Standard
V
Objective
3

Connections

Background Information

Amphibians are a group of cold-blooded animals that includes frogs, toads, newts, and salamanders. They typically spend part of their life in water, part on land. They are distinct from reptiles in that their eggs must be laid in moist conditions and their soft skins have no scales. The larvae usually live in the water, while the adult lives on the land and is generally four-legged and carnivorous. The process of metamorphosis, hatching from eggs into gilled larvae that later develop into land-loving adults with lungs, is a distinct characteristic of amphibians.

Eighteen different kinds of amphibians can be found in Utah. There are eight toads, nine frogs (two of which are not native), and only one salamander. Amphibians exhibit a wealth of amazing adaptations that help them survive, including many protective and warning colors, poisonous secretions to avoid being eaten, many types of feet for various means of travel such as climbing, swimming and even gliding, and natural anti-freeze in their blood to keep them from freezing.

Frogs and toads are not exactly the same. Frogs have bulging eyes, webbed feet, and powerful hind legs useful for jumping great distances. Toads are more at home on land, however, they return to the water to lay their eggs. Toads have shorter hind legs than frogs and move in short hops. Because escape from predators is difficult, toads have poison glands on both sides of their necks. If an animal bites a toad, the animal may get sick from the poison.

This activity is further work in the classification of Utah animals, specifically amphibians. Studying them provides practice in classifying animals in Utah by physical characteristics. The word “dichotomy” means “division into two.” A dichotomous key reduces the task of identifying something into a series of questions that are based on physical

features. Each set of questions eliminates others, eventually leading to the name of the mystery item.

Fourth graders do not need to know specific animals, but a general knowledge of them is helpful. Some of the more common species in Utah are:

- Woodhouse's Toad
- Canyon Tree Frog
- Great Basin Spadefoot Toad
- American Bullfrog (not native)
- Northern Leopard Frog
- Red-Spotted Toad
- Boreal Chorus Frog
- Tiger Salamander (Utah's only salamander)

Research Basis

Adams, D., & Hamm, M. (1998). *Literacy in Science, Technology and the Language Arts: An Interdisciplinary Inquiry*. Connecticut: Bergin and Garvey, p.10.

This text deals with science and mathematics inquiry processes as tools that enable students to gather and discover data for themselves through the process of scientific inquiry. As information is observed and identified, recording it becomes an integral part of the process and leads to integration in language arts.

“By constructing their own knowledge in a meaningful context, children can gain a conceptual understanding and develop the means for integrating language and science knowledge into their personal conceptions. To really learn the skills of language and science, students must follow a learning cycle: explore new phenomena, construct their own understandings, examine, represent, solve, transform, apply, prove, and communicate.”

Lemlech, J.K. (June 2001). *Curriculum and Instructional Methods for the Elementary and Middle School*. New Jersey, Prentice Hall.

This text covers how children learn, delivery of instruction, implementing curriculum and professional growth. It explores the “how” and “what” in preparing instruction. There is emphasis on interdisciplinary use of journals, cooperative learning, and a variety of other strategies to teach in all subjects.

The science journal is “a practice manual, a workbook that allows students to wrestle with ideas in a manner that is comfortable and productive for them as individuals. Journals created in this manner allow

teachers to see how a student thinks and where to aim instruction to assist individual and class development.”

Martin, D. (2000). *Elementary Science Methods: A Constructivist Approach*. California: Wadsworth Thomson Learning, pp 79, 83.

This text is for college students preparing to teach elementary science using the constructivist theory to learn methodology for teaching inquiry and other science processes. It is also an introduction to National Science Standards and how to identify developmentally appropriate science material for grades. The text identifies learning styles and how to adapt science instruction to meet the needs of all students.

Text remarks concerning teaching classification (emphasis added):

“Classifying objects by considering relationships that are subordinate to a larger group as a whole is called class inclusion and is a skill that is learned in the early concrete operational stage of cognitive development. It is important to note that the ability to sort (or classify) does not come spontaneously to children; they must be exposed to the phenomenon. They must be encouraged to do many sorting activities using many different kinds of things to gain experience in the skill of classification. ... Hierarchical (sub-groups with two or more sub-groups) systems of classification require higher levels of cognitive skills.”

Assessment Suggestions

- The quiz at the beginning of instruction is a good pre-assessment for this activity.
- As students categorize their amphibian cards, it will be easy to see who understands division of animals by characteristics. Some will only categorize; other students will begin to use dichotomous keys.
- On a large map of Utah, assign each student to plot the habitat location of an amphibian specie. They will need to draw their animal and correctly show its physical characteristics. They might need to duplicate their picture for more than one location. Display the map next to their classification charts.

Invitation to Learn

Teach a short song to the students. It is sung to the tune of “Are You Sleeping?”

Classifying, Classifying

What’s it got?

What’s it got?

Let’s identify it

Come on and just try it

“Have,” “Have not”

“Have,” “Have not”

Try singing it as a round. Discuss what the song is about and define classification and identifying animal groups with dichotomous keys.

Instructional Procedures

Materials

- Amphibian True/False* handout
 - Amphibian Information Cards*
 - Characteristics of Frogs and Toads* chart
 - Dichotomous Key For Common Utah Amphibians* handout
 - Envelope Journal Instructions* handout
 - Utah’s Amphibians and Reptiles* Booklet
 - Chart paper
 - Small cards for game (2” x 2”), blue, green, red (more blue than others)
- Optional:
- Party favor “blowers”
 - Straws

Ask the following oral True/False questions and have students answer with the “Thumbs Up, Thumbs Down” game (Up=True, Down=False) to pre-assess prior knowledge for this investigation:

- Frogs live in all Utah environments. (T)
 - Toads can give you warts. (F)
 - Frogs can leap farther than toads. (T)
 - All frogs are nocturnal. (F)
 - Toads have moist skin (F)
 - Some toads live in Utah’s deserts (T)
 - Toads must live near water. (F)
 - Toads are poisonous. (T)
 - Amphibians lay eggs. (T)
 - Frogs have rough, dry skin. (F)
1. Frogs and toads are amazing! Have students cut apart the *Amphibian Information Cards* and read about the different amphibians that live in Utah.
 2. Have each student organize the cards in some way on the paper provided. Leave this direction open so that the activity allows for some inquiry to take place. Tell them to be prepared to explain to the group their system of organization. Students record this system in their science journals.

3. Discuss systems within tables. Display all the charts.
4. Review the similarities and differences between frogs and toads. (Use the *Characteristics of Frogs and Toads* chart as a reference, but have students do this individually and copy information in their journals.) Allow time to adjust the organization of their cards if they wish to change.
5. Review the concept of a dichotomous key (see background information). Be sure students understand that even though all their charts are different, one isn't right and the other wrong. We are using a system that is used by scientists to communicate information in a similar way so that all scientists understand the information. This system is called a dichotomous key. Identify the charts within the group that use dichotomous keys.
6. Tell students there is a different dichotomous key. This type helps to identify the names of amphibians based on their physical characteristics, but also helps us learn the animal's name.
7. Practice one together that models this kind of key for students. (See sample within lesson.)
8. Students work together to "key" out their amphibian cards. Teacher should be available to answer questions and correct any misconceptions.
9. Create an *Envelope Journal* for their amphibian cards to go into their science journals.

Curriculum Extensions/Adaptations/Integration

- Using the *Amphibian Information Cards*, underline or highlight only pertinent information that special needs students might need to complete the activity. This allows them to do a minimum of reading for task.
- Have special needs students do a Venn Diagram of the similarities and differences between frogs and toads, rather than a dichotomous key. (See research for explanation.)
- Play a version of "How Many Frogs Can Live in this Pond?," a Project WILD Activity. This helps students use kinesthetic learning, as well as logic, to process information about frog adaptations and survival. (The game may be requested from Project WILD (801) 538-4719.)
 1. Game is played by having 3 sets of colored cards, with at least one for each student. Blue is dragonflies, green is frogs/toads, red is herons. There should be a high ratio of dragonflies to everyone else.

2. Dragonflies can run forwards, backwards, sideways.
 3. Frogs have party favor blowers and can only hop two-footed forwards.
 4. Herons have straws and take only giant steps.
 5. Set up a perimeter. Everyone begins on the perimeter's edge. At the signal, frogs/toads look for food (dragonflies) and herons look for food (frogs/toads) within the borders.
 6. Food is captured by frogs blowing out "tongues" and touching dragonflies, who are then "eaten" and out. Herons hold straws in their mouths and touch frogs/toads, who are "eaten" and out.
 7. Play several rounds and see what happens to the different species.
 8. Switch roles until everyone has had an opportunity to be an amphibian!
- Create mini-journals for amphibian classification (see *Envelope Journal* handout).

Resources

Books

Project WILD, (801) 538-4719 has publications, *Growing Wild* and *Nature's Call* issues about amphibians. They also have an "Amphibian and Reptile" trunk with information/books/videos available to teachers who have attended a Project WILD training.

Reptiles and Amphibians: A Golden Guide, by Herbert S. Zim and Hobart M. Smith; ISBN 1-58238-131-3

Web sites

<http://dwrcdc.nr.utah.gov> This web site is provided by the Division of Wildlife Resources as a resource on plants and animals of Utah.

<http://www1.teleport.com/~dstroy/frogland.shtml> "Frogland" fun and interesting site with basic information, trivia, etc.

<http://cgee.hamline.edu/frogs> "Thousand Friends of Frogs" interactive and informative site.

Family Connections

- Have students take home the *Amphibian True/False* handout and see how much their family knows about Utah's frogs and toads.
- Have students walk home from school as if they were a toad one day (with short hops) and another day like frogs (big long leaps). Which is easier? Why?
- At home, think like a frog. Notice what you eat for dinner. Are there things you eat that would be difficult to enjoy if you could only use your tongue? Remember, you have to swallow it whole!

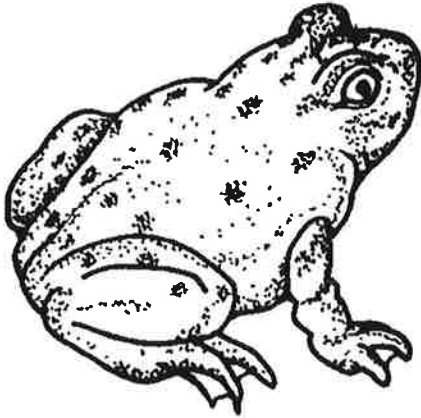
Amphibian True/False

- Frogs live in all Utah environments.
- Toads can give you warts.
- Frogs can leap farther than toads.
- All frogs are nocturnal.
- Toads have moist skin
- Some toads live in Utah's deserts
- Toads must live near water.
- Toads are poisonous.
- Amphibians lay eggs.
- Frogs have rough, dry skin.

Amphibian True/False

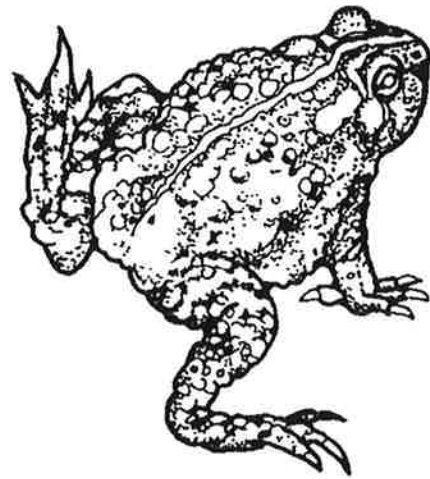
- Frogs live in all Utah environments.
- Toads can give you warts.
- Frogs can leap farther than toads.
- All frogs are nocturnal.
- Toads have moist skin
- Some toads live in Utah's deserts
- Toads must live near water.
- Toads are poisonous.
- Amphibians lay eggs.
- Frogs have rough, dry skin.

Amphibian Information Cards



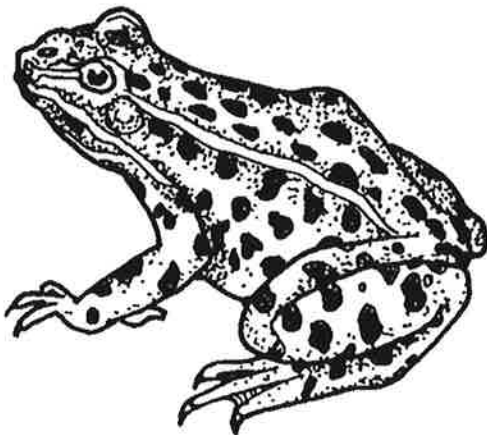
Great Basin Spadefoot Toad

Small, 1 1/2-2 1/2 inches.
Common throughout Utah.
Rough, warty skin. Grayish green.
Wedge-shaped spade on each hind foot. Bump between eyes.
Light stripes on sides.



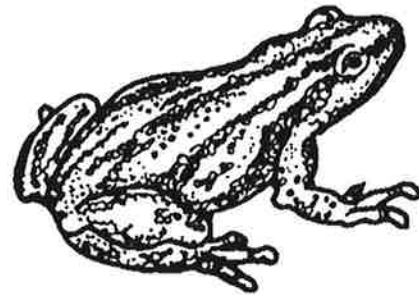
Woodhouse's Toad

2 1/2-4 inches long.
Common throughout Utah. Nocturnal.
Head ridge. Prefers deep soft soil for burrowing. Rough, warty skin.
Color varies, but usually dark with irregular spots.



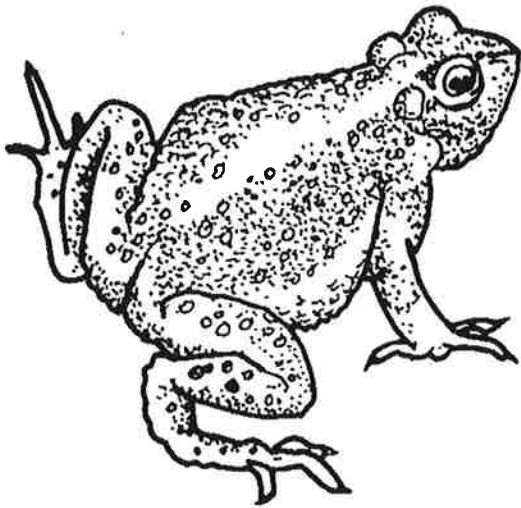
Northern Leopard Frog

Medium-sized, up to 5 inches long.
Lives near cattails and other aquatic vegetation throughout Utah.
Slim, long-legged. Moist skin with green or brownish-colored back with dark spots.



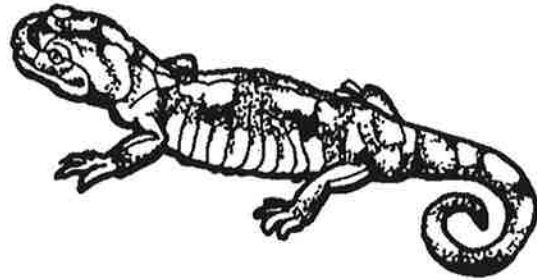
Boreal Chorus Frog

Small, 3/4-1 1/2 inches long.
Lives in grassy areas, damp marshes, woodlands, river swamps. Seldom seen. Moist skin, greenish gray/brown colored. Three stripes on back.
Dark stripe that runs through eye all the way across back.



Red Spotted Toad

Small, 1-1/2-2 1/2 inches long.
Found in southern Utah; climb and live among rocks near water. Rough, dry skin with many red or orange warts.
Nocturnal



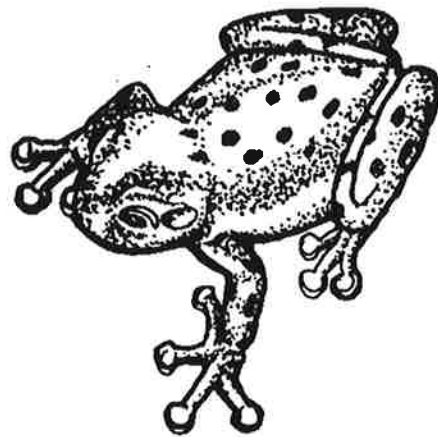
Tiger Salamander

Grows up to 13 inches in length.
Short legs, feet, not webbed feet.
Found in ponds, reservoirs, lakes, rain pools, and streams. Except in West Desert, rarely seen.
Dark with yellow or pale green "tiger-like" markings.



American Bullfrog

Largest frog in Utah.
NOT native, taking over habitats.
Usually green.
Moist and smooth skin.
Distinctive spot/ear drum.



Canyon Tree Frog

Small, less than 2.5 inches.
Found in southern Utah.
Like bottom of rocky canyons.
Does not often climb trees—prefers ground.
Nocturnal.
Moist, smooth skin.

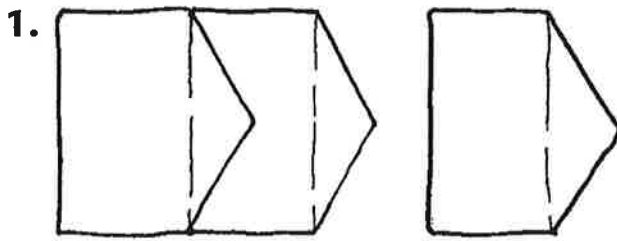
Characteristics of Frogs and Toads

	Frog	Toad
Skin	Moist, secretes mucus	Rough, “warty”
Legs	Powerful, long legs	Short hind legs
Feet	Webbed feet	Usually no webbing
Moves	Jumps great distances	Moves in short, quick hops
Lives	Near water, lays eggs in water	Prefers land, returns to water to lay eggs

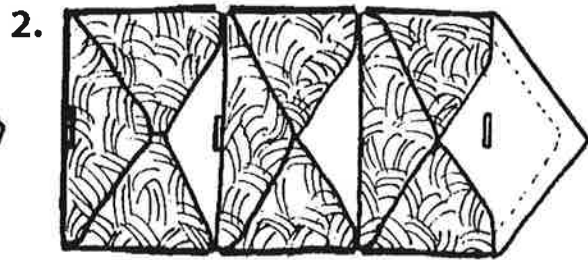
Dichotomous Key for Common Utah Amphibians

1a. Adult with long tail.	It is a Tiger Salamander
1b. Adult without tail.	Frogs and Toads Go to 2
2a. Skin rough and warty.	It is a Toad <i>Go to 3</i>
2b. Skin moist and smooth.	It is a Frog Go to 4 5
3a. Red, spotty warts on tan or gray body.	It is a Red Spotted Toad
3b. No red spotty warts, but still warts.	Go to 4a
4a. Spadefoot (a wedge-shaped shovel on back toes), light stripes on side.	It is a Great Basin Spadefoot Toad
4b. No spadefoot, irregular spots.	It is a Woodhouse's Toad
5a. Large, over 5 inches long.	It is an American Bullfrog
5b. Not large, less than 5 inches long.	Go to 6
6a. Three stripes on back with a dark one through eye.	It is a Boreal Chorus Frog
6b. Has both spots and/or stripes.	Go to 7
7a. Has large, irregular, dark spots, greenish color.	It is a Northern Leopard Frog
7b. Can have spots, has big toepads.	It is a Canyon Tree Frog

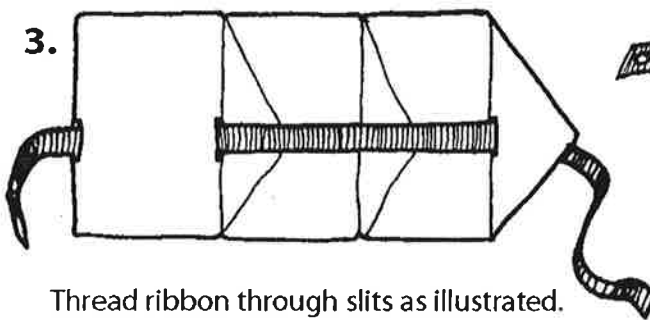
Envelope Journal Instructions



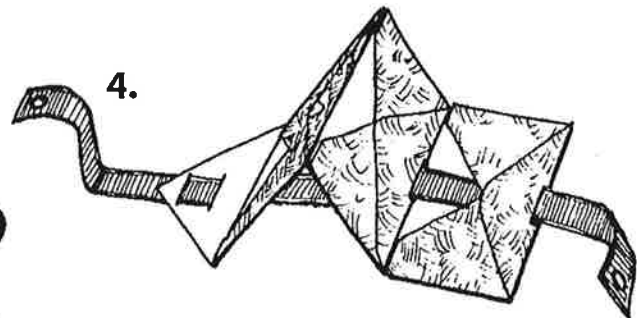
Glue flap of envelope to the back of another. Do this for each pocket of the journal.



Make slits or cuts the size of the ribbon you will use. (See illustration.)



Thread ribbon through slits as illustrated.



Decorate envelopes and label. Use to store classification cards in journal.