

Coqui Frog Camouflage

Summary: Through observation, art, fiction and non-fiction, students will learn about the Coqui frogs, which are well-adapted to survive in the varied terrain of Puerto Rico

Background Information:

Description: A Coqui is a type of tree frog, an amphibian, with cold-blooded vertebrates. It is not web-footed and is not much of a swimmer. The color patterns and marks can vary from gray, brown, or olive to yellowish-gold. It may be plain or have lines that go down the center of its back, bordered with tiny black spots. Its eyes are brown to gold, protruding slightly from the sockets. All Coquies have disks or pads on the tips of their toes, to help them cling or stick to slippery surfaces like moistened leaves. Even though the female Coqui is about 30% larger than the male, they are tiny—about the size of a dime or a quarter.

Reproduction: One Coqui characteristic that makes them different from other amphibian frogs is that they don't have their babies over water. Coquies do not pass through a tadpole stage. Fertilized eggs (about 28 per clutch) are laid in humid places on land, which is usually in a rolled leaf or frond. Females are aggressively forced away from the nest soon after laying eggs by the male Coqui. Then, the male guards and protects the eggs with their bodies to prevent dehydration. After 17-27 days of incubation, a froglet hatches directly as tiny replica of the adult from each egg. The only difference between them is a tiny tail, which quickly disappears when it is born.

Habitat: The Coqui lives in the rainforest and all over the island. Even though these species mostly stick to their tree homes, you can find the Coqui in a variety of habitats from the dry to the very wet rainforest. The Coqui thrives in subtropical moist forests that receive 1100 to 2200 mm of rainfall every year, and that has an average temperature between 18 and 24 degrees C. During the dry season the most available moisture comes from

Grade Level: 3/4 grade

Goal: Students learn about Puerto Rican Coqui frogs and how they blend in with their rainforest habitat, visually and aurally.

Key Concepts: Habitat, Adaptation, Survival techniques, Camouflage, Animal communication

Objectives: Upon completion of this lesson, students will:

- 1) Detail and explain some behaviors of a Coqui frog.
- 2) Describe a Coqui frog and explain how it fits into its habitat, and depends on it for survival.
- 3) Describe how animals disguise themselves in different ways
- 4) Think creatively about what animals need to communicate.

Teaching Location: classroom

Lesson Time: two sessions of 50 mins. - 1 hr. each: Intro & act. 1 on Day 1, Act. 2 and start of conclusion on Day 2. Coqui Cartoons are a multi-day homework project.

Subject Areas for Infusion: Environ. Ed., Science, Language Arts, Art

heavy dew condensation that is produced at night. Coquies feed on small insects.

Unique Sound: This national mascot produces a loud “ko-kee” sound from which it get its name. The Coquies begin to sing when the sun goes down, and continue all night until dawn. It increases in volume with rainfall. Only the male Coqui sings, searching to win the heart of the perfect mate.

Endangered Status?: In the last 20 years part of the Coqui family has been extinguished. Actually two specific kinds are already extinct. The Coqui’s threatened status is based on the potential loss of habitats due to development of homes, agriculture use, and over-collection of the species. It is also due to the low reproductive rate and inability to disperse to other areas. In addition, recent studies indicate that acid rain and other types of contamination on the island of Puerto Rico may play a role in the decline of this species.

Standards:

Science:

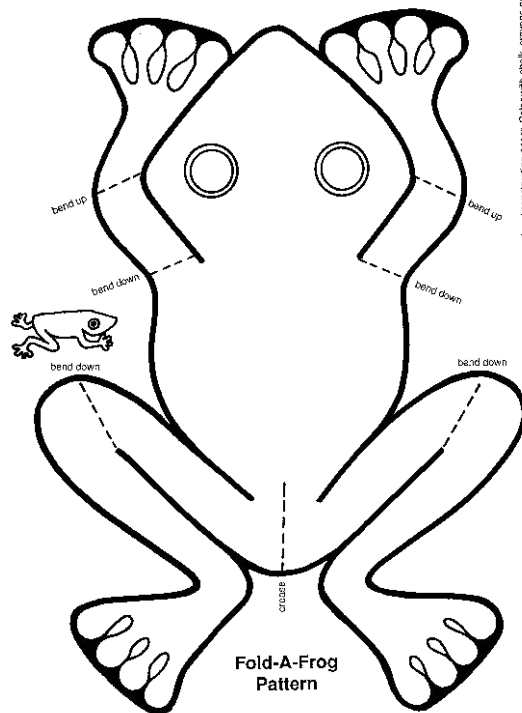
- F.4.1
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- F.8.2
- F.8.7

Environ. Ed.

- A.4.4
- B.4.6
- B.8.3.
- B.8.5
- B.8.8

Materials:

- Images of coqui frogs, one per student pair
- 9"x12" or larger tagboard per student pair
- Fold-A-Frog pattern, one per student pair
*source: Jo Anna Poehlmann, Copycat Press
- Pencils and paper
- Lots of magazine
- Markers, paint, or crayons
- Scissors
- tape
- push-pins
- one balloon per student
- students’ writing notebooks



Vocabulary

Froglet: a newly transformed frog (typically after the tadpole stage, and with a remaining tail)

Camouflage: hiding or disguising to blend in with a background

Protective Coloration: skin covering that camouflages with the environment

Ventriloquist: someone skilled at making a voice seem to come from a different source

Legend: a story passed on through a culture whose truth is accepted but cannot be checked

Set-Up:

1. Enlarge and photocopy the Fold-A-Frog pattern onto cardstock
2. Gather or print (from the internet) photos of different sub-species of Coqui frogs to share with the class. Laminate them to pass around during art activity.
3. Clear a space where the habitat cards can be set up or tacked up so they can be viewed from a distance of about 15 ft. Fairly dim light works best.

Procedure:***Introduction***

1. Tell the students that today they are going to learn about a tiny creature that resides on the island of Puerto Rico. It's a little frog that stays out of sight, but sure makes a lot of racket! It's called the Coqui frog, named for the "Ko-KEE" sound it bellows at night. (*If the classroom is equipped with internet, play a sound bite that is available from a number of Coqui websites.*)
2. Ask the students what they already know about frogs. Mention a few other facts that are particular to the Puerto Rican Coqui (from the lesson background) to get the students excited about the lesson. For example, be sure to point out that Coqui frogs never go through a tadpole stage.
3. Remind the students that frogs come in a variety of shapes, colors, and sizes. In fact, there are more than 2,500 different varieties of frogs in the world. While some physical features are standard frog equipment, others are designed to fit a frog's special habitat. The frog population in the rainforest is one of the densest frog populations in the world. Unlike other rainforest frogs that use bright colors to warn animals that they are armed and dangerous, Coquies are a type of tree frog that use their patterns and colors to camouflage or disappear into their environment for protection.

Activity 1: Coqui Camouflage

1. Pass out photos of Coqui frogs for the students to observe in groups of two. Play music or Coqui sounds and instruct them to pass around the cards, taking note of their *protective coloration* until the music stops. When the music stops, the partners should hold onto the cards in their hand. This is the frog they are going to replicate.
2. They should take a good look at their frog, and write down everything they observe about the shape, color, size, and texture.
3. Pass out a copy of the Fold-A-Frog pattern for each group. Partners are to first color in the frog using markers, crayons, paint, etc., replicating the color and pattern of their Coqui picture as much as possible.

4. Groups cut out their frog and fold it as indicated on the instruction. This should enable their frog to "sit up" on a table, as shown in the small image on the reproducible.
5. Now pass out a 9" x 12", or larger, piece of tagboard to each group. Here is their chance to make a colored habitat that will camouflage their frog.
6. To do this, the students flip through magazines and tear out colors they think will make their frog disappear. Place the colors on the board. Remember: the habitats will be seen from halfway across the room. They can crumble, curl, loop, or otherwise make textures for the background habitat. Test out the frog against the background. When they have a habitat that works, students glue the colors in place and trim the edges.
7. Offer a teacher sample to help them understand their task, and to see a successful camouflage as seen from a distance.
8. Students use a loop of tape to stick the frog in the best hiding position.
9. Tack up all the cards, along with the frogs, to a communal viewing spot. Have students come up and look at cards close up, and then step back and check them from halfway across the room.
10. Have students discuss with their partner their success at creating a camouflaged habitat. As they check out other students' work, ask them to talk about what all the good hiding places have in common. Bring these ideas to a class discussion.

Activity 2: Communication Commotion

1. Read or summarize the following description. If possible, quietly play sounds of Coquies off the internet or a recorded cassette in the background.

Puerto Ricans can't help but hear the Coquies sing at bedtime; to many it's a graceful melody, and others it's an annoying chorus. Every night until dawn, male Coquies searching for a mate make loud, shrill "ko-KEE!" screeches loud enough to travel for miles. Their teeny bodies are adapted to "speak up" so a potential mate can hear them. Like most animals, Coqui frogs communicate with one another using sound waves (which are vibrating waves of energy). They send and receive these vibrations so they can defend their homes and keep in touch with their loved ones.

Female Coquies are attracted to the male that makes the loudest call. Just like humans and other animals, a Coqui creates sound by blowing air out of its lungs. This thrust of air moves the frog's vocal cords.

To beat their competitors in the fight for females, these tiny frogs have a built-in volume control: an inflatable vocal sac (balloon-like pouch) beneath the mouth. To make a louder croak, many frogs inflate their vocal sacs while calling. They contract their bodies and squeeze air past their vocal cords into the sac. The air vibrates the vocal sac and produces an even louder sound!

2. Pass out a balloon to each student. Think of the vocal sac in the description. Have students blow their balloon vocal sacs to see how big they can inflate them with one puff. Although they won't make noise, students can visually see the inner "volume control" of a Coqui in singing action.
3. Ask the students to creatively brainstorm why the Coqui frogs make the "Ko-KEE" sound they do. Think of legends they've heard in the past (such as Why mosquitoes buzz in people's ears, How the leopard got its spots, etc.) Remind students that this is going to be a creative writing activity, and there are no right or wrong answers.
4. In their writing notebooks, students will write their theories about the "Ko-KEE" sound. These will be narrative legend-type stories that offer a silly or insightful explanation for this sound.
5. If time, select students to share their writing with the class. This can be elaborated into a multi-draft, published project, or can be left as a day-long brainstorm activity.
6. When the students are finished, read the following "scientific" justification:

The unique chant of the Coqui serves two purposes. The first syllable "Ko," which reaches 1,160 hertz, is for warning nearby males, a "go away" message. The second syllable "KEE," which reaches 2,090 hertz, is used to invite the female to reproduce. Males typically call from 1-2 meters above the ground while sitting on a leaf, and female Coquies travel long distances to answer the male's calling. Like a ventriloquist, often times this frog is able to "throw" his voice, making predators think he is father away than he really is. This survival strategy hides and protects him.
7. Answer any questions the students may have on this behavior. Discuss how it's possible for the Coqui to be saying "go away" and "come here" at the same time.

Conclusion

1. Discuss as a class why camouflaging is an advantage to frogs. Ask, if you had a choice, would you rather be good at hiding or armed with poison, as other tree frogs are?
2. How is protective coloration a similar strategy as a frog "throwing his voice" with a the Ko-KEE sound? How does this *adaptation* make the frog suited to his environment?
3. What other animals demonstrate a similar kind of behavior? Make a list on the board, citing specific examples.
4. Students could write in their journals their feelings about this fascinating frog.
5. Create a super-hero Coqui Cartoon! Students may start this assignment in class, and finish as homework over the next few nights. Remind students how Coquies are adept at climbing different surfaces, due to their sticky, clingy feet. They are also skilled in the art of hiding. Sounds like a recipe for a super hero! Have students think of some adventures this frog might go on. Illustrate a story, complete with thought bubbles and dialog bubbles. Make a

comic strip that tells of a Coqui saving the rainforest from destruction, or a Coqui rescuing baby Puerto Rican Parrots. Students could brainstorm ideas as a class, and let their imaginations run from there. Perhaps provide paper with 6 comic "frames" outlined as a guide for their illustrated tales.

Assessment:

- Note each student's level of participation during the camouflage activity. Assess based on effort rather than success.
- Note student understanding of what's the best strategy for camouflaging.
- Consider students' verbal suggestions during the parrot population discussion. Reward particularly insightful thinking.
- Grade students' Coqui legends based on creativity and completion or on the entire Six Traits of Writing.
- The Coqui super-hero cartoon could be assessed for detail as well.

Adaptations:

This activity could be adapted for older grade levels by increasing the sophistication of vocabulary terms. There could be an increased emphasis on defense mechanisms as species adaptations. Gifted and Talented students may have extra time to devote to further internet investigations. For students with special needs, instead of writing a legend, they could write or draw a story about a Coqui frog and his friends in the forest. For students who may find the camouflage activity extremely difficult, have available some pre-designed frogs and habitats for the students to match up.

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