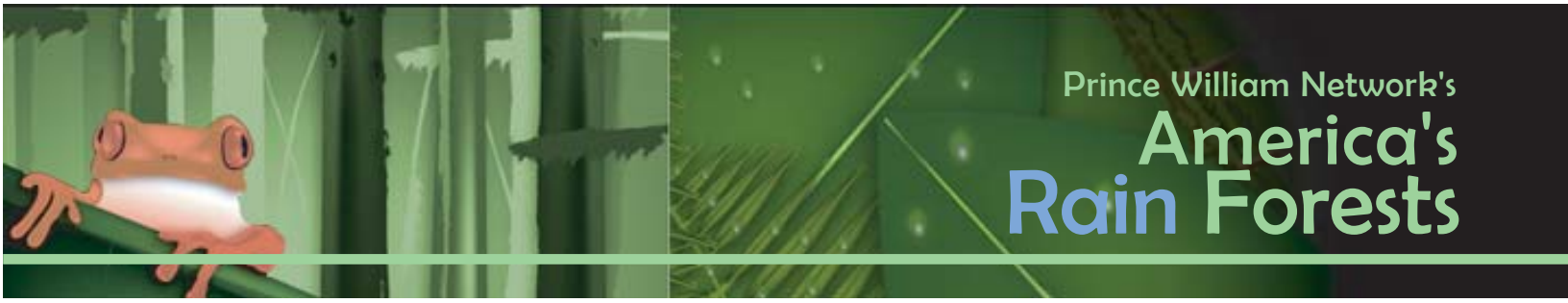


Can It Be Real?

Rain Forest Ecology

National Science Education Standards

- Standard C: *Life Sciences* — Reproduction and heredity.
- Standard C: *Life Sciences* — Diversity and adaptation of organisms.
- Standard C: *Life Sciences* — Populations and ecosystems .

OVERVIEW

A beetle that drinks fog. A flower that smells like rotting meat. A fish that "shoots down" its prey. Are these plants and animals for real? In this activity, your students will discover extraordinary plants and animals, and will gain insight on how they are uniquely adapted to environmental conditions.

OBJECTIVES

Students will:

1. Study the characteristics of unusual plants and animals.
2. Describe how plants and animal species are adapted to a particular set of environmental conditions.

SUBJECTS

Science, Language Arts

VOCABULARY

Adaptation, species, climate, natural selection, fictitious

TIME

Part A: Two 50-minute periods

Part B: 50-minutes

MATERIALS

Part A: Copies of Student Page 1 and pencils or pens.

Part B: Research books on plants and animals, access to internet for research, poster board, drawing paper, markers or crayons and other art supplies, copies of Student Page 2.

BACKGROUND

Scientists estimate that we share this planet with 40 to 80 million different species of plants and animals, most of which are insects. So far, scientists have identified only about 1.5 million different species.

When an organism's environment changes, the organism must either move, adapt, or die out. The changing of an organism over time that makes it suited to its environment is called ***adaptation***.

Adaptation is the result of the combined effects of variation and the selecting power of the environment. For example, plants in a population have differing capacities for producing cutin (a waxy, outer coating) on their leaves. Some individuals are heavily covered with this protective layer, and others are only thinly covered. If the ***climate*** becomes drier, as it did in the Sahara Desert, plants with thicker cutin will not dry as fast as those withthin cutin and may live to set a crop of seed. They have been "selected." Succeeding generations will also show variability, and those with the best protection against drying will be the only ones to live and reproduce. In this instance, only one feature, cuticular covering, has been pointed out, but in reality a plant would have to possess a whole range of features that work together. It is the species, not the individual, that adapts.

BEFORE THE ACTIVITY

Make copies of student pages 1 & 2.

ACTIVITY

PART A: STRANGER THAN FICTION

1. Pass out copies of student page 1. Introduce the word fictitious. Discuss how the creators of movies and comic books invent "mutant" and "alien" life forms by combining and/or exaggerating attributes of real plants and animals. Have the students give examples.

2. Tell the students that you're going to read descriptions of eight plants and animals whose pictures are on student page 1. They should listen carefully and try to decide if the plant or animal is real or fictitious. If they think it is real, they should check the box for "Real". If not, they should check "Fictitious." Explain that all of the animals and plants may be real, all of them may be fictitious, or there may be a mix.

3. Read aloud each of the descriptions under "Who's Who" on page 4. Read only the information that appears in italics. Do not tell the students the names of the animals and plants.

4. Once you have read all the descriptions to the students, review each picture and ask the students to raise their hands if they thought it was real. List on the chalkboard the class' majority opinion for each organism. Ask several students why they thought an organism was real or fictitious.

5. Tell students that all of the plants and animals on the page are real. Discuss each animal or plant using the additional information provided in "Who's Who."

6. Ask the students to describe animals or plants they have actually seen that have unusual characteristics. Encourage them to name local examples, not just exotic ones. Discuss how these life forms benefit from their unusual characteristics.

ACTIVITY

PART B: THE ADAPTABLES

1. Brainstorm with the students to generate on the chalkboard a list of plants and animals with unusual char- acteristics. Give the students copies of "Amazing Animals & Plants," page 4, and have each student choose a species from the page. Explain that each species has unique adaptations that help it to survive in its environment. It is the student's job to find out what these adaptations are.

2. Tell the students that after research- ing their plant or animal, they should create a poster describing it. The poster should include a drawing of their plant or animal in its habitat and an explanation of how it is adapted to its environment.

3. Give students plenty of time to do their research and create their posters. If they're having trouble finding information, you might suggest they search the internet, look in books or encyclopedias about animals. (You may need to bring in your own books, borrow from the public library, or have your school librarian help you gather resources.)

4. Have the students display and explain their posters to the rest of the group, then hang the posters on the wall. After all the presentations, the students could make up special award categories such as "The Funniest Looking Animal" or "The Craftiest Plant," and vote for which entries should get these awards.

EXTENSIONS

Have teams of students pretend that they are writers for a movie and they need to come up with a really outrageous alien creature. After each team has developed a creature, have students explain to the rest of the group what real-life animals inspired the various attributes of their fictional creature.

ASSESSMENT

Assess the students' presentations for understanding of the relationship between species adaptations and habitat conditions.

CREDIT

This activity is adapted with permission from Project Learning Tree (PLT). PLT is a program of the American Forest Foundation. Go to *http://www.plt.org/* for more information about this award-winning environmental education curriculum.

Teachers to read....

WHO'S WHO

1. Ogre-faced Spider

When it's time to catch a meal, this spider has a special trick: first it spins a web a/silk. Then it grabs the comers of the ueb with its four front legs. And then it hangs upside down and waits for insects to crawl by along the ground. When they do, the spider drops the web over them like a net and pulls up its meal. Ogre-faced spiders live in the southeastern United States and in tropical areas around the world. They're usually active at night. In addition to dropping their web over crawling insects, they may hold their web out in the air so that flying insects get caught in it.

2. Rafflesia

This plant with an enormous reddish, rotten-smelling flower is a parasite that lives inside the roots of a tropical forest vine. The flowers may be more than three feet (91 cm) across and weigh over 35 pounds (16 kg). They bloom for only three days and depend on flies to pollinate them. Rafflesias grow in the rain forests of Indonesia. Large, hoofed mam- mals in these forests transport the seeds from place to place on the bottoms of their hooves and push seeds into the soil as they walk. The plant's flowers may take two years to develop.

3. Satin Bower Bird

At breeding time, the male bird builds a house of sticks. Then he decorates the stick house with shells, feathers, flowers, clothespins, jewelry, and other objects that he fancies. His favorite color is bright blue. He may also paint the inside of the stick house using berry juice and charcoal sticks. Female birds are attracted to the male's handiwork. These birds live in the forests and woodlands of Australia. Females are attracted to the bower, but once a female has mated with a male she goes off on her own to build a nest and raise her young.

4. Black-eyed Susan

These yellow and black flowers seem to be just like any other wildflower you might find in a field. However, they have special ultraviolet markings on their petals that can't be seen by human eyes. These markings serve as an illuminated landing pad for pollinating insects. Black-eyed Susans have colored markings that seem to advertise, or lead pollinators to, their food source. Patterns of lines, dots, or solid colors lure insects to the spot where they will inadvertently pollinate the flower. Markings on the petal reflect ultraviolet light, which is visible to many pollinating insects but not to humans. The petals of the black-eyed Susan appear to be solid yellow to people. To bees, however, the petals have two tones, with ultraviolet markings near the blossom's center, at the source of the nectar.

5. Archer Fish

When this fish wants a meal, it looks for insects above the surface of the water When it spies one, the fish spits water up at it. The fish can hit an insect accurately at four feet (122 cm), knock it into the water, and gobble it up. Archer fish live in Southeast Asia in mangrove swamps and other areas along the coasts, as well as in rivers. They have a groove on the roof of their mouth that, with their tongue pressed against it, becomes like the barrel of a pistol. If an archer fish misses its first shot at an insect, it can adjust its aim quickly and fire again.

6. Tenebrionid *(tuh-NEE-bree-AH-nid)* Beetle

This beetle gets all the water it needs from fog. Standing on a dune in the desert where it lives, the beetle raises its back end into the fog. Droplets of water form on its body and run down toward its mouth.

These particular tenebrionid beetles live in the Namib Desert in southwestern Africa. However, there are many other kinds of tenebrionid beetles throughout the world.

7. Skunk Cabbage

This plant is like an outdoor hot tub. The temperature inside its flowers is 36-63 degrees Fahrenheit warmer than the. outside air. It gives insects a nice warm place to stay when it's cold out. Skunk cabbage flowers produce little pollen or nectar. Therefore, they rely on their warmth to attract pollinating insects. By successfully capturing warmth from the sun, the flowers attract insects without needing to use their own food energy to produce much pollen. The skunk cabbage provides insects with a warm place in the cold. In turn, the insects end up transporting pollen from one flower to another.

8. Strangler Fig

This tree starts out as a small, non-threatening seed that sprouts on the branch of another tree. Yet as it grows, its stems, roots, and leaves wrap com- pletely around the host tree, stealing its water and blocking its sunlight. The host tree eventually dies a long, suffocating death. There are many different species ofstrangler fig (*Ficus sp*.) in the rain forest. The small seeds are dispersed by the many birds and monkeys that eat fruit. Now and again one of these seeds gets lodged in the branch of a tree and germinates. The seedling first sends out a long aerial root. When contact with the ground is made, the young fig starts to grow, putting out more roots from its perch to the ground, and developing stems and leaves. Eventually the host tree is smothered by the fig's foliage, the trunk is encased in its roots, and the tree dies. In this way, the fig avoids competition, taking the place of a tree that already stands

Name _____

Student Page 1

WHO'S WHO

1

☐ REAL ☐ FICTITIOUS

2

☐ REAL ☐ FICTITIOUS

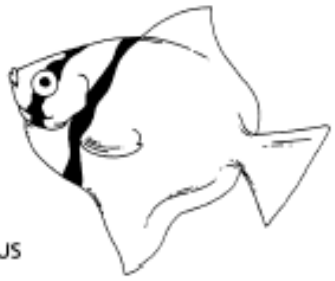
3

☐ REAL ☐ FICTITIOUS

4

☐ REAL ☐ FICTITIOUS

5



☐ REAL ☐ FICTITIOUS

6

☐ REAL ☐ FICTITIOUS

7

☐ REAL ☐ FICTITIOUS

8

☐ REAL ☐ FICTITIOUS

Name _____

Student Page 2

Amazing Animals and Plants

Angler Fish—many different kinds in tropical and temperate seas around the world; has worm- like flap of skin on its first dorsal fin; uses flap to lure small fish close enough to catch for food

Aye-aye—mammal-primate; rain forests of Madagascar; bizarre- looking mammal that eats insects and has a similar role to wood- peckers of temperate forests

Axolotl—amphibian-salamander; lakes in Mexico; usually repro- duces while still in its larval state

Basilisk Lizard—reptile; rain forests of Latin America; can run across water on its hind legs

Bolas Spider—southeastern United States; eats only male moths, which it catches on the end of a line of silk that it swings through the air

Cleaner Wrasse—fish; coral reefs; feeds on parasites that live on larger fish and sets up "cleaning stations" to remove those para- sites

European Water Spider—lakes and ponds in Europe; creates an underwater, air-filled space to rest; can swim under water with an air bubble attached to its abdomen

Fringe-lipped Bat—mammal; forests in Latin America; feeds mostly on frogs it finds by detect- ing and recognizing the mating calls of male frogs

Golden Plover—bird; winters in South America, breeds in the Arctic; adult birds flv south for winter before young can fly; young make their first journey from the Arctic to Argentina alone

Hoatzin—bird; South America; bizarre-looking bird whose young can climb through trees using hook-like claws on their wings.

Honey Guide—bird; forests of Africa; guides Pygmies to honey-bee nests; Pygmies break open nests and collect honey; bird feeds on the beeswax

Hooded Seal—mammal; in water and along coasts mostly in the North Atlantic; in displays of aggression, male may inflate a hood on his snout or force his nasal membrane through either one of his nostrils, creating a red "balloon"

Kangaroo Rat—mammal-rodent; deserts of North America; gets all the water it needs to survive from the seeds it eats.

Leaf-cutter Ant—insect; rain forests of Latin America; ants grow their own food in gardens in their underground nests and collect leaves and other material to use as compost.

Matamata—reptile-turtle; South America; bizarre-looking turtle that's perfectly camouflaged in river bottoms where it lives.

Monarch Butterfly—insect; breeds in eastern North America and winters in Mexico and Central America; adults migrate north, lay their eggs, and die; then, at the end of the summer— and three or four generations later—adults of the last brood migrate south for the winter—to the same areas their "great-great-grandparents" came from

Nudibranch—mollusk-marine invertebrate; can transfer the stinging cells of its prey to us own skin and then use them to protect itself from predators.

Pitcher Plant—bogs and wetlands in North America: traps insects in long tube and then digests them.

Platypus—mammal-monotreme; streams, rivers, and lakes in Australia; bizarre-looking mammal that lays eggs.

Poison Dart Frog—amphibian; many dinereni kinds; rain forests of Latin America; bright skin colors warn predators the frogs are poisonous.

Starnose Mole—mammal; wet ground near lakes and streams in eastern North America; its bizarre-looking nose is divided into many fleshy tentacles.

Suriname Toad—amphibian; lakes and ponds in South America; eggs develop in spongy skin on back and hatch as tiny toads after about three months.

Thorny Devil—reptile-lizard; deserts of Australia; the scales on its skin form a network of canals; when dew gets on its skin, it travels through these canals directly to the animal's mouth.

Welwitchia Plant—Namib Desert in southwestern Africa; has only two leaves and may live to be more than 1,000 years old.

Brown Bee Orchid (genus *Ophrys*)—plant; resembles bee that attracts males of certain bee species who try (unsuccessfully) to mate with the flower; pollen sticks to the bee and is transferred to another flower.

Bromeliad—spiky leaves channel water into (lie center of the plant, which may hold as much cis 18 pints (H.5 liters); captures falling leaves, which rot, thus providing nutrients the bromeliad cannot retrieve from the soil; also provides a habitat for a number of different animals.

Bottle Tree—dry forest of Australia; swollen trunks are self-contained reservoirs that store water lor long, dry spells.