Can It Be Real?

Activity 11

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.

Levels
Grades 4-8

Subjects
Science, Language Arts

Concepts
- Biodiversity results from the interaction of living and nonliving environmental components such as air, water, climate, and geological features. (1.1)
- Organisms are interdependent; they all depend on nonliving components of the Earth. (2.1)
- Organisms adapt to changes in the environment according to the genetic and behavioral capacity of their species. (2.3)

Skills
Analyzing, Inferring, Predicting, Identifying Relationships and Patterns

Differentiated Instruction
Curricular/Personal Connections, Higher Order Thinking, Nonlinguistic Representations, Oral/Reading/Writing Skills, Prior Knowledge Links

Technology Connections
Presentation Software, Internet Resources

Materials
Part A: Copies of the "Who's Who?" student page
Part B: Poster board, drawing paper, markers or crayons, and other art supplies; copies of "The Amazing Animals and Plants" student page

Time Considerations
Preparation: 10 minutes
Activity: Part A-Two 50-minute periods; Part B-50 minutes

Related Activities
Charting Diversity, Planet Diversity, Picture This!

OBJECTIVES

- Students will predict whether unusual plant and animal characteristics are real.
- Students will research a plant or animal to understand how organisms are adapted to their particular environments.

ASSESSMENT OPPORTUNITY

- Assess the students' presentations for understanding of the relationship between species adaptations and habitat conditions. Assessment criteria could include whether the presentation has: (1) one or more accurate, labeled drawings of the plant or animal, (2) an accurate description of the organism's habitat, including climate, vegetation, and temperature, and (3) a clear explanation of how that organism is adapted to its environment.

BACKGROUND

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. Here is an example of how it works. Suppose the 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 with thin 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.

Some scientists estimate that we share this planet with 10 to 30 million different species of plants and animals, most of which are insects. Each of these species possesses an array of adaptations that enable it to live in its environment. While some of these adaptations may seem peculiar to us, they help to ensure the survival of the species.

GETTING READY

Make copies of the student pages.

DOING THE ACTIVITY

PART A—Stranger Than Fiction

1. Ask students what they think the word *fictitious* means and have them give examples from stories or films. (Creators of movies and comic books often invent "mutant" and "alien" life forms by combining or exaggerating attributes of real plants and animals.)

2. Give students copies of the "Who's Who?" student page. Explain that you're going to read descriptions of the eight plants and animals shown on the student page. 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 on the "Who's Who?" teacher's page. 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, have all the students stand in the middle of the room. Label one side of the room "Real" and the other "Fictitious," putting these words on the board. For each picture, have students go to the appropriate side of the room based on their selection. On the board, list the class's 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 nonnative ones. Discuss how these life forms benefit from their unusual characteristics.

PART B—The Adaptables

1. Help students brainstorm a list of plants and animals they know of that have unusual characteristics. Choose one or two and ask students how each organism's characteristics help it to survive in its environment.

2. Give the students copies of "Amazing Animals & Plants." Explain that each species has unique adaptations that help it to survive in its environment. It will be the students' job to find out what these adaptations are. Have each student choose a species from the student page or from the class list.

3. Tell the students that after researching their plant or animal, they should make a visual presentation (such as a poster, diorama, or slide show) describing it. The presentation should show what the plant or animal looks like and should explain how it is adapted to its environment. See www.plt.org for an example of a slide show.

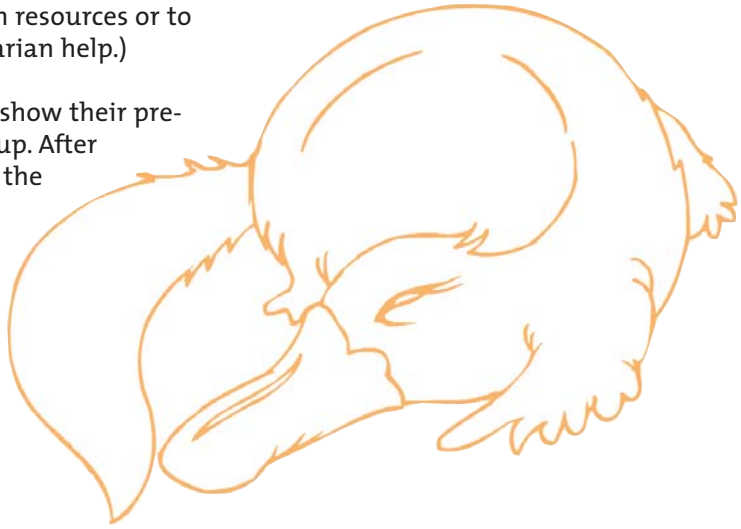
4. Make a class list of possible places to look for information. Students might look on the Internet, or in encyclopedias or books about plants and animals. (You may need to help them track down resources or to have your school librarian help.)

5. Have the students show their presentations to the group. 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.

Enrichment

- **Hollywood Here We Come**
  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.

- **Plants and Animals of the Future**
  Talk about ways that the local environment may be changing over time. Ask students for ideas about what plant or animal characteristics might enable species to survive these changes. Have students draw pictures of a new plant or animal species that would be adapted to the environment of the future.



READING CONNECTIONS

Carmichael, Nicole (ed.) *Nature's Wild!* World Book. 1996. Provides information on a variety of developments in the plant world, from trees of record-breaking size to plants that eat animals. Grades 2-7. ISBN: 0716617366.

Heller, Ruth. *Plants That Never Ever Bloom*. Penguin Putnam. 1999. Rich, colorful illustrations and informative, rhyming verse unlock a world where mushrooms glow at night and seaweed grows to be gigantic - without a flower in sight. Grades K+. ISBN: 0698115589.

Souza, Dorothy M. *Wacky Trees*. Scholastic Library Publishing. 2003. Trees play an indispensable role in the lives of all living organisms on Earth, but as common as they are, many are far from ordinary. This book explores the wackiest of trees, from the weird-looking Welwitschia to the bizarre banyan. Grades 4-6. ISBN: 0531122107.

Wechsler, Doug. *Bizarre Bugs*. Cobblehill Books. 1995. A visit to the fascinating world of some very unusual creatures, both in appearance and behavior. Most of the insects live in tropical habitats, but the text does relate similarities in behavior to those found in North America. Grades 3-7. ISBN: 1590780957.

Wright, Joan Richards. *Bugs*. Wright, Greenwillow Books. 1987. Includes general information, jokes, and brief descriptions of the physical characteristics, habits, and natural environment of a variety of common insects. Grades K-3. ISBN: 0688082963.

Available @ http://shop.plt.org

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 of silk. Then it grabs the corners of the web with its four front legs. 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 on 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 mammals 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.

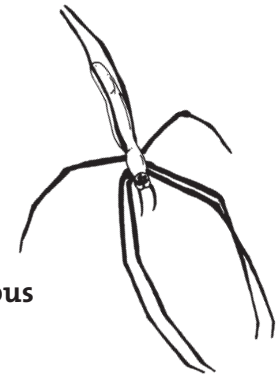
6. Tenebrionid *(tuh-NEEbree-AH-nid)* Beetle
This beetle gets all the water it needs from fog. Standing on a dune in the desert where it lives, the beetle raises its back end into the fog. Droplets of water form on its body and run down toward its mouth. These particular tenebrionid beetles live in the 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 completely around the host tree, stealing its water and blocking its sunlight. The host tree eventually dies a long, suffocating death. The strangler fig (Ficus sp.) has small seeds dispersed by animals and some become lodged in tree branches. The seed grows a long aerial root that makes contact with the ground. The young fig then grows more roots, stems, and leaves; eventually smothering and killing the host tree. In this way, the fig avoids competition, taking the place of a tree that already stands tall.

Who's who?

1.



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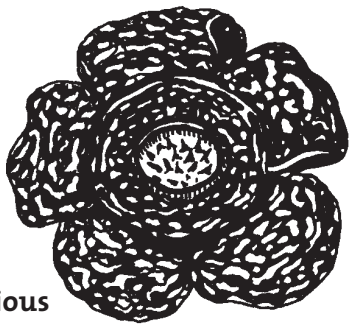

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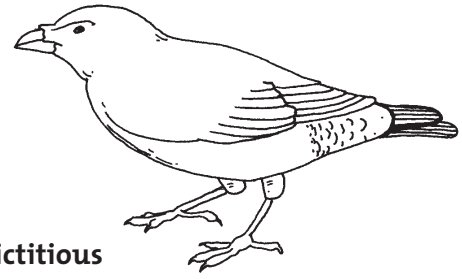

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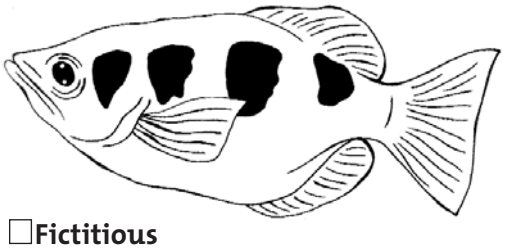

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☐Real ☐Fictitious

Amazing Animals and Plants

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

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

Axolotl—amphibian; lakes in Mexico; usually reproduces while still in its larval state

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

Bolas Spider—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

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

Bromeliad—plant; spiky leaves channel water into the center of the plant, which may hold as much as 18 pints (8.5 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

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

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

European Water Spider—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 detecting and recognizing the mating calls of male frogs

Golden Plover—bird; winters in South America, breeds in the Arctic; adult birds fly 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 hooklike claws on their wings

Honey Guide—bird; forests of Africa; guides Pygmies to honeybee 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"

Jack-o-Lantern Mushroom—fungus; forests of North America; is bright orange like a pumpkin with gills underneath that glow in the dark; poisonous

Kangaroo Rat—mammal; 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; South America; bizarre-looking turtle that's perfectly camouflaged in river bottoms where it lives

Monarch Butterfly—insect; mostly 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; can transfer the stinging cells of its prey to its own skin and then use them to protect itself from predators

Pitcher Plant—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

Pogonophoran—tube worm; floor of deep oceans; has no mouth, stomach, or gut, but absorbs nutrients directly from the water

Poison Dart Frog—amphibian; 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; 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