FIT THE NICHE

Materials:

- ☆ Niche cards: Reproduce each of the six niche categories (for insects or for mammals) on different colored paper. Cut the category requirements apart so that each student will have one requirement from each of the six categories.
- ☆ markers or crayons
- ☆ paper

Rationale

Understanding the concept of niche is essential to understanding the importance of biological diversity. Creating a mammal or an insect to fit a particular niche described by a randomly selected set of descriptors will help students to develop this understanding.

Objectives

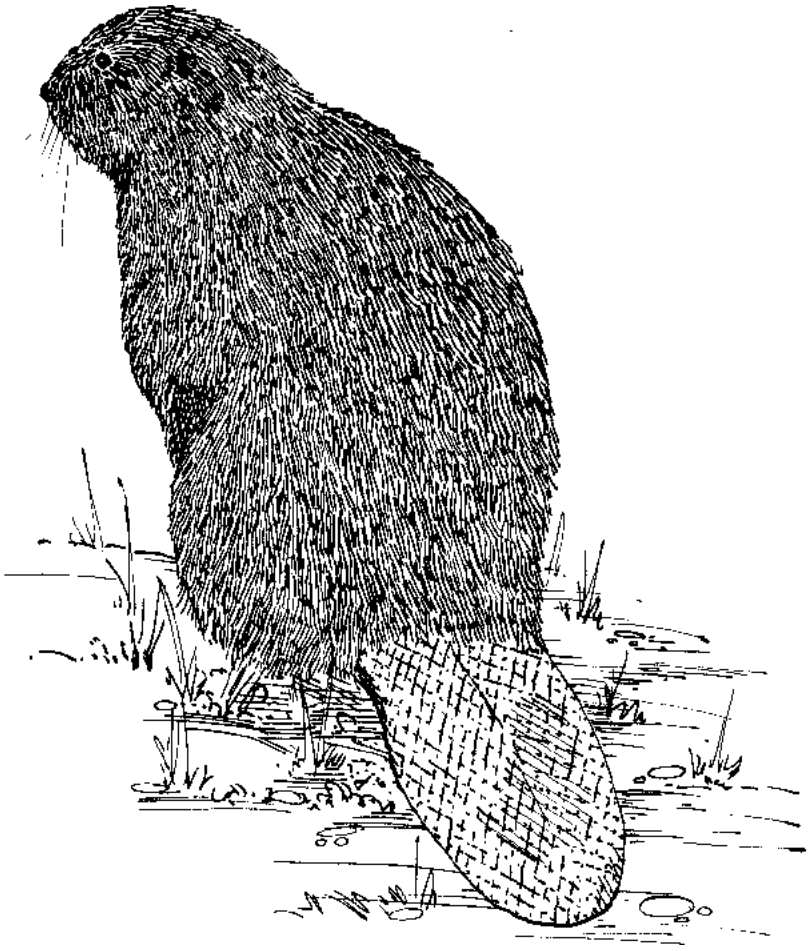
1. Students will be able to define the concept of niche
2. Students will recognize the components of a niche, including food source, shelter requirements, behavioral adaptations (special behaviors and timing of activities), reproduction, and place in the food web.

Procedure

1. Tell students they have received a $100,000 grant to study the niche of a certain animal for a year. Have them brainstorm what kinds of things they can learn about this animal with intensive observation over the year's time. Ask students to use these ideas to form a definition for the term niche. NOTE: Niche in its simplest form, is defined as a sheltered place. The biological concept of niche, however, is more complex. Biologists define niche as the total way of life, or the functional role of a species within a community. A species' way of life includes everything it does to survive and reproduce: Where it lives, what it eats, what eats it, how it reproduces, how much and what kind of nutrients it needs, its tolerance for changes in surroundings, and how it interacts with other living things.
2. Decide whether your students will work with insects or mammals. Have each student select one niche card from each of the six categories for the appropriate animal. They will now create an insect or a mammal that fits the described niche. They may draw it using crayons or markers, or use art supplies to build a 3-dimensional model.(*A teacher page follows with an example of a created animal).*
3. Allow each student to share his/her animal and explain how the animal fits its niche. You may also have students write a paragraph describing the niche of their animal.

Extensions

1. Some people think that insects are a nuisance and that there is no good reason for them to exist. Have students discuss a pro-con list for the existence of insects. What organism would fill the vacated niches if the insects were gone?
2. Go on an insect egg hunt. Look on twigs, tree branches and trunks, fence posts and walls, in cracks, and on leaf surfaces. Insect eggs come in many shapes and colors. Some have sculpted patterns. They may be laid singly, in rows, in clusters, or on top of one another. Each egg type fits its own niche.
3. Collect and compare shed cicada exoskeletons. They are usually found clinging to the bark of tree trunks or on the ground just below. You may also find the burrows from which they emerged at the base of the tree. What other factors make up the niche of the cicada?
4. Examine goldenrod stems for galls (swollen plant tissue caused by insects laying their eggs). If there is no hole to show where the adult has emerged, then the larvae are still inside. Cut away the galls and keep them in separate jars to see what emerges. Elongate galls usually yield moths, and round galls probably will produce a fly. Are these insects sharing a niche? Why or why not?



Correlation to National Science Standards
Unifying Concepts of Science
Life Science

Correlation to Arkansas Frameworks
Science: 5-8: LS2.8, LS2.10
9-12: LS2.7, LS2.9

INSECT NICHE CARDS

Reproduce each category on different colored paper. Cut the category requirements apart and give each student one card from each of the six categories. You may wish to add HABITAT as a seventh category.

Food Source **Oak leaves**	Food Source **Dung**
Food Source **Ants**	Food Source **Rotten wood**
Food Source **Mushrooms**	Food Source **Sap**
Food Source **Dead animals**	Food Source **Blood**
Food Source **Wild cherries**	Food Source **Nectar & pollen**
Food Source **Grass seeds**	Food Source **Tadpoles**

INSECT NICHE CARDS

Requirements for Shelter: **Twigs**	Requirements for Shelter: **Under bark**
Requirements for Shelter: **Under logs**	Requirements for Shelter: **Damp area**
Requirements for Shelter: **Under soil**	Requirements for Shelter: **Underwater vegetation**
Requirements for Shelter: **On top of soil**	Requirements for Shelter: **Leaf litter**
Requirements for Shelter: **Rocks/crevices**	Requirements for Shelter: **Sandy soil**
Requirements for Shelter: **Under green leaves**	Requirements for Shelter: **Under rocks in streams**

INSECT NICHE CARDS

Timing of activities **Diurnal**	Timing of activities **Diurnal**
Timing of activities **Nocturnal**	Timing of activities **Nocturnal**
Timing of Activities **Crepuscular**	Timing of activities **Crepuscular**
Timing of activities **Diurnal**	Timing of activities **Diurnal**
Timing of activities **Nocturnal**	Timing of activities **Nocturnal**
Timing of activities **Crepuscular**	Timing of activities **Crepuscular**

INSECT NICHE CARDS

Reproduction **Spins cocoons**	**Reproduction** **Chews wood for paper nests**
Reproduction **Lays eggs in water**	**Reproduction** **Live birth**
Reproduction **Tends eggs**	**Reproduction** **Builds mud nests**
Reproduction **Paralyzes spiders for larvae to eat**	**Reproduction** **Builds paperlike hanging nest**
Reproduction **Lays eggs in live caterpillars**	**Reproduction** **Lays eggs on carrion**
Reproduction **Lays eggs in tree galls**	**Reproduction** **Lays eggs on clusters of leaves**

INSECT NICHE CARDS

Habitat **Swamp**	Habitat **Tall grass prairie**
Habitat **Rocky outcrops on mountains**	Habitat **Glade**
Habitat **Hardwood forest**	Habitat **Pine forest**
Habitat **Meadow**	Habitat **Hot springs**
Habitat **Stream**	Habitat **Caves**
Habitat **Pond**	Habitat **Soybean field**

INSECT NICHE CARDS

Provides food for **Birds**	Provides food for **Fish**
Provides food for **Snakes**	Provides food for **Insectivorous mammals (i.e. shrews)**
Provides food for **Lizards**	Provides food for **Omnivorous mammals (i.e. black bears)**
Provides food for **Decomposers**	Provides food for **Spiders**
Provides food for **Other insects**	Provides food for **Too nasty to eat**
Provides food for **Frogs/Turtles**	Provides food for **Insectivorous plants**

MAMMAL NICHE CARDS

Reproduce each category on different colored paper. Cut the category requirements apart and give each student one requirement from each of the six categories.

Consumer Type	**Carnivore**	**Habitat Type**	**Prairie**
Consumer Type	**Herbivore**	**Habitat Type**	**Wetland**
Consumer Type	**Omnivore**	**Habitat Type**	**Glade**
Consumer Type	**Carnivore**	**Habitat Type**	**Forest**
Consumer Type	**Herbivore**	**Habitat Type**	**Aquatic**
Consumer Type	**Omnivore**	**Habitat Type**	**Riparian**

MAMMAL NICHE CARDS

Timing of activities	**Diurnal**
Special adaptations	**Camouflage**
Timing of activities	**Nocturnal**
Special adaptations	**Mimicry**
Timing of activities	**Crepuscular**
Special adaptations	**Gliding Flight**
Timing of activities	**Diurnal**
Special adaptations	**Echolocation**
Timing of activities	**Nocturnal**
Special adaptations	**Specialized scent glands**
Timing of activities	**Crepuscular**
Special adaptations	**Specialized vocalizations**

MAMMAL NICHE CARDS

Reproduction	**Marsupial**
Predators	**Mammals**
Reproduction	**Oviparous**
Predators	**Birds**
Reproduction	**Eutherian**
Predators	**Reptiles**
Reproduction	**Marsupial**
Predators	**Mammals**
Reproduction	**Oviparous**
Predators	**Birds**
Reproduction	**Eutherian**
Predators	**Reptiles**

TEACHER MODEL

Each student should draw the following six cards (one from each of the niche components):

- Carnivore
- Prairie
- Crepuscular
- Gliding flight
- Eutherian
- Reptile

The student might create the following organism, given the above characteristics:

The organism is named the "Evening Kinimod." It is a strange mammal that nests in prairies adjacent to wetlands and riparian zones. Brown with reddish vertical barring, the Kinimod feeds at dusk and dawn by gliding from tall prairie grasses to these nearby sites. There it feeds on various minnows, while its favorite meal is the Banded Sculpin. The Evening Kinimod is only 8 inches from head to tail. It is most vulnerable to its primary predator, the prairie snake, during its 4-month gestation period. Unable to fly during this time, the females rely on vast energy stores and constant attention from their multiple male partners. The Evening Kinimod is federally endangered. Its strange habits and reproductive strategies limit its potential habitat choices, and habitat destruction further limits habitat availability.

Evening Kinimod

DEFINITIONS FOR NICHE CARD TERMS

Carnivore—an animal that feed chiefly on flesh

Herbivore—an animals that feeds on grass and other plants

Omnivore— an animal that eats both animal and vegetable food

Prairie— a large area of rolling land with grass but few or no trees

Wetland—land having wet or spongy soils; a swamp, marsh, or bog

Glade—dry, open places in forests with a plant community similar to prairies

Forest—land covered in trees

Aquatic—growing or living in water, such as ponds, lakes, streams, and rivers

Riparian—land along river or other body of water

Diurnal (die-urnal)—active during daylight, such as eagles

Nocturnal—active during night, such as bats and owls

Crepuscular (cre-pus-cular)—active during dusk and dawn, such as deer

Hibernation— to spend a period of winter in a state of deep sleep

Estivation— to sped the summer in a dormant or torpid condiction

Camouflage—to hide or disguise oneself with surroundings

Mimicry— the close outward resemblance of an animal to its surrounding or to some different animals, especially for protection or concealment

Gliding flight—the ability to glide using skin flaps

Echolocation— a radarlike system or mechanism of orientation is the sensory organs of certain mammals, such as bats and whales, by which they translate their own echoes into directional signals

Symbiosis (sim-bye-oh-sis)—the association or living together of two unlike organisms for the benefit of each other

Scent glands—glands that produce an odor

Marsupial (mar-soup-ial)—a mammal that carries its young in a pouch, such as kangaroos and opossums

Oviparous (ovip-arous)—producing eggs that hatch after leaving the body (mammal example—platypus)

Eutherian (youth-erian)— placental mammals which bear young alive, such as deer and coyotes