



Frisch's Outreach: Animal Communication (Gr.7-12) Extensions

At a glance

This program will allow students to understand how animals will communicate in a variety of ways.

Goal

This lesson will allow students to explore the many ways animals communicate.

Objectives

- 1) Upon completion of this program students will be able to identify specific adaptations animals utilize in their communications.
- 2) Students will be able to list the reasons why communication is vital to an animal's survival.
- 3) Students will be able to list at least four examples of audible animal communication.
- 4) Students will be able to explain why audible communication is effective for an animal's survival needs.
- 5) Students will be able to list three examples of inaudible animal communication.
- 6) Students will be able to explain why inaudible communication is effective for an animal's survival needs.
- 7) Students will be able to compare and contrast the advantages/disadvantages of audible and inaudible communication.

Theme

Animals use communication to survive.

Sub-themes

Animals use diverse communication to survive.

Ohio Science Academic Content Standards- Science	<p>Life Science</p> <p>Grade 6 <i>Diversity & Interdependence of Life</i> 2</p> <p>Grade 10 <i>Diversity & Interdependence of Life</i> 13,14,15</p> <p>Grade 11 <i>Diversity & Interdependence of Life</i> 10</p> <p>Grade 12 <i>Diversity & Interdependence of Life</i> 7</p> <p>Grade 7 <i>Evolutionary Theory</i> 8</p> <p>Grade 8 <i>Evolutionary Theory</i> 3</p> <p>Grade 10 <i>Evolutionary Theory</i> 21</p> <p>Grade 5 <i>Characteristics & Structure of Life</i> 5</p>
Kentucky Core Content— Science	<p>Life Science</p> <p>Grades 5-6 <i>Regulation & Behavior</i> SC-M-3.2.2, SC-M- 3.2.3</p> <p style="padding-left: 100px;"><i>Diversity & Adaptations of Organisms</i></p> <p style="padding-left: 100px;">SC-M-3.4.1</p> <p style="padding-left: 100px;">SC-M-3.5.2</p> <p>Grades 7-12 <i>Behavior of Organisms</i> SC-H-3.2.1</p> <p style="padding-left: 100px;">SC-H-3.2.2</p> <p style="padding-left: 100px;">SC-H-3.2.3</p>

Background

Within the community of animals survival is dependent on how well an animal can acquire and maintain food, water, shelter, and stay safe in their space. Each animal’s unique adaptations allow them to attempt to succeed in these tasks.

Animals can use communication to aid them in their challenge for survival. The types of animal communication are as diverse as animals themselves and we are just beginning to uncover some of the fascinating secrets held within their communications.

Communication by an animal is any behavior on one animal’s part that has an

effect on the current or future behavior of another animal. Communication can take many forms that we can observe and some mysterious forms that are not so readily understood by man.



Audible communication is perhaps the easiest for us to identify but our understanding of its intricacies is still very basic. Birds, monkeys, gibbons, frogs, etc. use vocalizations to mark territories, court mates, warn of danger, locate/ beg for food, stay in groups, and

attempt to frighten predators, etc. over short spaces or long distances. Howler monkeys can be heard ten miles away which helps keep their groups together. Hyenas “laugh” to keep their pack cohesive. Owls, during courtship, will call alternately to each other (“dueting”) and the calls’ pitch can identify the sex of each owl. The audible begging response among many baby birds will trigger a feeding response from the adult bird. Some research suggests that certain clucks made by chickens tell what kind of food is located for the flock. Some monkeys have separate, distinct alarm calls which will tell the group if the predator is on the ground or in the trees (leopard) or in the air (eagle). Recent research suggests that birds also have these identifying alarm calls. Animals that belong to social groups will alarm call so that individuals can run for cover, freeze, or gather as a group. Dolphins and whales have distinct clicks and squeaks to communicate with each other under water over many miles. It has been discovered that Killer Whales may have accents or dialects for hunting that are individual pod specific. At times alarm calls are not vocally produced. Rabbits will pound their feet in warning.

There are communicating sounds made by animals that are sub-audible or infra-sonic. Elephants can hear low sounds undetected by humans Their feet can detect low frequencies of sound not perceived by man. Echolocation, although not true communication, enables bats, dolphins, etc. to locate their food by emitting sound that is then reflected back from the food source to them.

Animal communication can also be conducted chemically. The olfactory sensibilities of animals can unlock many

secrets of communication from animal urine, feces, and scent glands. Cats have scent glands on their flanks and foreheads that can help them identify each other and their territories. Many animals mark their territories with urine and feces so that possibly harmful physical confrontations with trespassing animals are avoided. Female receptiveness to mating can be chemically transferred among animals. Some predatory animals can gain information about the health and vigor of their prey animals by smelling the scent left by bodies, urine, and feces. Ants can leave chemical trails for the colony so that food can be located. Honey bees carry nectar in a “nectar pouch” back to the hive that identifies them as a member of their hive. Amoebas even seem to communicate chemically. Our understanding of pheromones used in animal communication is just beginning to unfold.

Can plants communicate? Yes! If you consider the use of chemicals! Tannin imbedded in some plants will turn away insects before they try to dine on the plant. There has been some research to determine if plants do emit some form of communication other than chemically.

Another realm of communication that is just beginning to be studied is electro communication. Sharks, Rays, Lampreys, and some fish have electroreceptors on their bodies to perceive electrical impulses generated by other animals. This can enable them to locate objects and food in the murky waters of the sea. Some of these animals can actively generate electric fields to detect distortions and food in their habitat. Weakly electric fish can modulate their generated electric waveform to communicate with each

other when finding a mate. Monotremes such as echidnas and platypuses have electroreceptor to locate their food. Could that mean they could also carry on electro communication?

Visual displays, though inaudible, communicate between specie members and between different species. Brilliant colors on male birds will attract females and advertise a healthy mate. Anoles flash their dewlaps in silent communication to protect their territories or find a mate. Bright warning colors on amphibians, as well as other animals, ward off would be predators. Flashes of color can work as a startling stimulus to catch predators off guard or to frighten them away.

Bioluminescence, in animals of the deep sea that possess chromatophores (cells bearing pigment that can expand and contract in tissues), enables them to quickly change color to camouflage for defense, to get food, or signal each other. Octopi, squids, and cuttlefish can flash color change much faster than any other animals. Lantern fish seem to be able to recognize each other by these colorings. Bioluminescence can happen on land too! It can be seen in Lightening Bugs (aka. Fireflies, glow worms). A male lightening bug will flash a signal or pattern, to a female and if she chooses she will respond. When lightning bugs sense danger, they turn their light off, and fly up.

Do animals always tell the truth when they are communicating? Visually mimicking the color pattern or shape of another more dangerous or toxic animal can provide safety for some animals. Blending in or camouflaging colors enable animals to hide within their surroundings to avoid detection. Alligator Snapping Turtles have a

“fishing lure” within their mouths. A small fleshy piece of tissue that resembles a worm wiggles in the water as the Turtle’s mouth gapes. Fish are lured in by the “food” and become an easy catch for the Snapping Turtle.

At times visual displays of certain behaviors are a form of silent communication. Visual displays, which often must follow prescribed patterns during courtship, may determine the success or failure of mating between many members of some species. Many times pair and group bondings are cemented by silent ritualized behaviors. Thompson’s Gazelles display a pursuit deterrent behavior by running and leaping very high in the air. “Stotting” tells all potential predators- “you will need to expend a lot of energy to catch and eat me!” The “Waggle Dance” Honey Bees display in the hive is believed to communicate the exact location of food for the rest of the bees in the hive. Submissive behavior in social animals will do much to avoid injury for individual animals and it can order the animals’ society so that the group as a whole can survive.

Among many animals, especially primates and canines, facial expressions can communicate aggression, fear, threats, willingness to play, etc. These often very quickly changing displays do much to keep social groups in tact, avoid harmful physical confrontations, and teach youngsters the “manners” of group life.

Are animals communicating in ways other than those that humans have observed and recorded? Are these communications transcending the forms of communication known to man? Are there ways animals can communicate that are beyond our traditional

understandings? All of these questions will provide interesting scientific study and may reveal astonishing insights into our natural world.

Vocabulary

Adaptations- (noun) - Something that helps an animal survive.

Audible- loud or clear enough to be heard

Behavior- Activity or change in relation to an environment; the way an organism acts in response to a stimulus.

Bioluminescence- the generation and emission of light by organisms such as fireflies, some bacteria and fungi, and many animals that live in the ocean

Cephalopod- octopids, squids, mollusks that possess a foot modified into arms that surround a head

Chromatophores- a pigment-containing cell in many animals that, when it expands or contracts, causes a change in the animal's skin coloring. Octopus, squid, and some frogs and lizards contain these cells.

Communicate- to transmit or reveal a feeling or thought by speech, writing, or gesture so that is easily understood

Communication- the exchange of information

In Animals- any behavior on one animal's part that has an effect on the current or future behavior of another animal

Display- A means of attracting attention.

Disruptive coloration- color pattern that helps break the outline of organisms

Electroreceptors- an organ in fish such as sharks, electric eels, and catfish that detects electric charges

Inaudible- not loud enough to be heard

Metacommunication- communication that is beyond traditional communication previously understood

Mimicry- The superficial resemblance which some animals exhibit to other animals or to the natural objects among which they live; thereby, securing concealment, protection or the like.

Pheromones- a chemical compound produced and secreted by an animal that influences the behavior of other members of the same species

Photophores- a luminous light organ on many deep-sea and some nocturnal fish, squids, and shrimps

Scent marking- using a smell produced by the body to identify territory or ability to mate

Survival- Living or continuing longer than something else.

Resources

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Websites

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www.cincinnati-zoo.org

ENature

www.enature.com
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National Geographic: Animals

[http://www3.nationalgeographic.com/ani
mals/](http://www3.nationalgeographic.com/animals/)

<http://www.youtube.com/watch?v=-7jil-g4jHg>
See the Bee Waggle Dance.

[http://www.nature.nps.gov/naturalsound
s/](http://www.nature.nps.gov/naturalsounds/) - project to record natural sound in
wild places and offers some examples