ANIMALS' SENSES AND ABILITIES

SENSES

HEARING

Sound, like light, is carried by vibrations, travels long distances, and moves around objects such as trees without dissipating.

Infrasonic Sound (below the audible range of humans)

Sound vibrations travel through water at five times the speed they pass through air, and they travel much farther than they would on land. Sounds produced by fin whales have been recorded at a distance of 4,800 kilometers (3,000 miles).

For animals who can hear it, infrasonic sound serves as an early warning system. Natural disasters like earthquakes, tsunamis, volcanos, and severe weather produce infrasonic sound, as do man-made processes such as sonic booms and explosions. When prairie dogs hear the infrasonic sound of an approaching thunderstorm, they respond by building a circular dyke to keep rain from flooding their underground burrows.

Ultrasonic Sound (above the audible range of humans) and Echolocation

Ultrasonic sound is above the range humans can hear. Some bird sounds and the laughter of dogs are above human hearing range. (See lesson plan **Laughter the Best Medicine**.)

Echolocation is similar to radar. Animals like toothed whales (which include dolphins), bats, and some shrews use it to navigate and find food. High-frequency sound pulses emitted by animals bounce off objects and return a three-dimensional picture of their surroundings. The insect-eating bat of North America can detect and avoid objects no wider than a hair. (See lesson plans **Loving the Nightlife** and **Dolphin Trust**.)

SMELL

The Indian luna moth can detect a pheromone-emitting female from 11 km away (6 ½ miles). Fish emit an alarm pheromone to warn other fish.

TOUCH (including distant touch)

Fish sense movement through their skin using a lateral line system, which works like sonar. They feel vibrations from objects or other creatures reflected back against their bodies. Mexican cave fish are blind and live in dark, underwater caves, but they can detect objects smaller than a pinhead. Some fish use their lateral line system not only to navigate, but also to communicate, vibrating their fins in specific ways to warn others of danger.

Spiders detect vibrations in the air from far away, through sensitive hairs on their limbs. Vibrations made by insects in flight alert them to their approach.

When alarmed or disturbed, elephants stomp the ground, sending a warning up to 50 km (31 miles) away.

Many animals, including fish, like to be petted the way we pet dogs and cats.

SIGHT

Many animals have more acute eyesight than humans, and some animals can see things that are invisible to humans. Hawks' eyesight is eight times greater than that of humans, enabling a hawk to spot the movement of a rabbit more than a kilometer and a half (a mile) away. A jumping spider can see 360 degrees around himself. The four-eyed fish's eyes are split in half horizontally, with each half having its own retina and iris so the fish can watch for predators from above and scan below the water for food at the same time. The dragonfly sees 300 images per second and detects movement six times faster than humans.

Scientists used to believe that human color vision was as good as or better than that of other animals, and that other animals see just what we see. Recently, however, scientists learned that some birds, fish, amphibians, reptiles, insects, and mammals see parts of the spectrum that are invisible to humans.

Certain insects, like bees and butterflies, and many species of birds can see ultraviolet light, which helps them find fruit, flowers and seeds because these objects contrast with their background more strongly in ultraviolet light than in light visible to humans. Bird feathers may actually be more colorful to other birds than to humans, or they may be colorful in different ways than humans can see. Mother birds know how healthy their chicks are because only feathers of healthy chicks can reflect ultraviolet light.

While a human may see a flower with yellow petals, a bee may see a pattern of lines that point to the flower's nectar.

The mantis shrimp sees 11 or 12 primary colors, from ultraviolet through infrared. Humans, by comparison, see only 3.

Goldfish and pit vipers, such as rattlesnakes, can see infrared radiation, so they can detect the body heat of other animals at night.

MAGNETIC SENSE

Humans use familiar landmarks or the sun's position to locate north, but they cannot always do it with ease. Some animals have a magnetic sense that allows them to easily identify direction and navigate long distances. Honeybees, sharks, sea turtles, rays, homing pigeons, migratory birds, tuna, brown trout, and salmon can sense and use the Earth's magnetic field. Scientists do not know yet how animals are able to sense the Earth's magnetic field, but they know that the animals have deposits of small magnet-like crystals called magnetite in their nervous systems. These crystals align themselves with the Earth's magnetic fields and may act like tiny compass needles.

Recently, scientists learned that cows, also, have a magnetic sense and perhaps this is how they are able to find their way home if they are taken to a new location. (See lesson plan **A Special Knowing**.)

Some marine mammals, such as whales, have a magnetic sense. Cows and cetaceans (whales, dolphins, and porpoises) share a common ancestor. Between 40–50 million years ago, some of their ancestors became cows and some (called cetaceans) evolved from land to marine animals. Perhaps this is why both cows and whales have a magnetic sense.

EXAMPLES OF AMAZING ANIMAL ABILITIES (see more stories of animal abilities in the lesson plan **Extraordinary Ordinary**)

- Godwit birds fly 11,655 kilometers (7,242 miles) without stopping.

- A single strand of spider silk can mold to turbulent wind currents, and the spiders can ride the strands away from danger, parachute hundreds of kilometers/miles out over the ocean, and colonize new islands.

- Birds can make two simultaneous sounds using both sides of their voice box – a rising or high note on one side, a falling or low note on the other. Canaries breathe through one side and sing with the other. Humans must pause to breathe when singing or speaking because our sound is only produced as we breathe out, but birds can make sounds while breathing in and out.

- Birds, like humans, compose music not only for courting and friendship, but to show off in competitions, and just for fun. An individual song sparrow may compose about 20 different songs, a solitary vireo bird 75, and a marsh wren as many as 100. A red-eyed vireo can sing up to 85 songs a minute, each a variation on their main theme. An individual red-eyed vireo was once heard to sing 22,197 songs during a single day.

- Marsh warblers who migrate through Africa learn songs from both European and African birds. With such a wide variety of phrases gathered on two continents, marsh warblers can sing uninterruptedly for an hour without becoming monotonous.

- Slugs make a mucous lubricant that keeps them from drying out and allows them to travel over rough terrain without bruising. It is more effective than any lubricant made by humans—so effective that slugs can glide across razor blades without cutting themselves.

- The salamander can regenerate limbs, tail, upper and lower jaws, eye lens and retina, and intestine. The zebra fish can regrow fins, scales, the spinal cord, and part of the heart. Scientists say humans have the same regeneration genes as these animals, but have lost the ability to evoke them.

- The dragonfly can reach almost 97 kilometers per hour (60 mph), and two sets of wings allow flight in any direction, including backwards, and hovering.

Resources

Lesson Plans:

A Special Knowing
Dolphin Trust
Extraordinary Ordinary
Laughter the Best Medicine
Loving the Nightlife

HEARING

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