Facts: *Nature’s Superheroes: Life at the Limits*

- Tardigrades have been known to survive temperatures far above boiling, and colder than the surface of Pluto.
- More than 1,000 tardigrade species populate the globe. They live everywhere with a bit of moisture, from Arctic ice to African rainforests, from the Himalayas to the ocean floor.
- When a bowerbird bachelor is ready to mate, he builds a nest-like structure, which he decorates with flowers, shells, stones and other eye-catching baubles to attract females.
- There are 20 bowerbird species, and 17 build mating bowers, each in a different style.
- The satin bowerbird favors blue accents, while the great bowerbird prefers white and green.
- Some species of bowerbird will catch and kill colorful beetles just to adorn their pied-à-terre.
- The titan arum unfurls at night, emitting a foul aroma that attracts sweat bees as well as flies and carrion beetles—-insects that typically dine on decaying animal remains.
- A rich bouquet of aromatic compounds blends to create the scent of the titan arum: Dimethyl trisulfide, like cooked cabbage; Isovaleric acid, like sweaty feet; Trimethylamine, like rotten fish; Acetic acid, like vinegar.
- In male fiddler crabs, one claw grows much larger than the other. Males beckon to females by waving their big claw up and down.
- The twisting horns of a male markhor can tower five feet. Males joust with their horns to impress potential mates.
- The left tooth of a male narwhal grows forward out of his jaw, forming a tusk up to 10 feet (three meters) long. Studies suggest that the most fertile males have the longest tusks.
- With a voice box so large it fills half his body, a male hammer-headed bat honks to attract a mate, flapping his wings in time with his song.
- When it’s time to mate, periodical cicadas appear in swarms, raising a ruckus that can be almost deafening.
- Each male cicada produces a sound about as loud as a hairdryer.
- A cricket’s mating call speeds up as the weather gets warmer.
- Coral sex is timed by moonlight.
- Male mandrills have brilliant blue on their rumps and faces. The brighter a monkey’s colors, the better his luck in love.

- When courting, male flasher wrasses change colors and parade past females, flashing their neon stripes and fluttering their tails.

- Lizards in the anole family flirt by flicking out colored dewlaps—folds of skin under their chins.

- A single ant, the colony’s queen, lays all the eggs – about 120,000 eggs every 36 days. Other females, called worker ants, take care of her young.

- The ocean sunfish produces more eggs at one time than any other animal – 300 million.

- Compared to the size of their bodies, kiwis lay the largest eggs of all birds.

- A female brown kiwi is no bigger than a hen, but her egg weighs nearly a pound (430 grams), as much as six jumbo chicken eggs.

- The brown kiwi, a flightless New Zealand bird, lays about 100 eggs in a lifetime. Each one grows so large, it barely fits in its mother’s body.

- The beaked whale can dive nearly two miles (3,000 meters) before surfacing, twice as deep as any mammal recorded.

- Some species of loricifera live their entire lives in an oxygen-free brine lake in sediments under the Mediterranean Sea, at a depth of about two miles (3,000 meters). They are the first animals found to live totally without oxygen.

- A southern elephant seal can hold its breath for two hours.

- Pound for pound, an elephant seal has 3 times the amount of blood that a human has.

- When a bear settles into its winter den and enters the remarkable state called hibernation, its oxygen intake plummets. The bear may only inhale once a minute; its heart slows to five beats a minute from its usual 55; and blood flow to vital organs, including its brain, dwindles to 10 percent of normal.

- When some land snails sense winter coming, they withdraw into their shells and build a mucus door between themselves and the outside.

- Buried in the mud at the bottom of a frozen lake, hibernating painted turtles survive four or five months without oxygen.

- Bats that hibernate sometimes do it longer than almost any other mammal—up to six months.

- A hibernating bat consumes only 1/40th the oxygen an active bat does.

- Blood can be blue, violet, green or clear.

- If you’ve been vaccinated against measles, mumps, and smallpox, you can thank a horseshoe crab.

- Axolotls have the amazing ability to regrow entire limbs repeatedly with no scarring; they can even regrow a crushed spinal cord.

- Every year, the Arctic tern flies 25,000 miles (40,000 kilometers) from its Arctic breeding grounds to the Antarctic coast.
• Over its lifetime, an Arctic tern will cover a distance equal to three trips to the Moon and back.

• Humpback whales hold the mammalian record for longest-distance migration. A group of seven humpbacks, including a calf, was recorded swimming from calving grounds off Costa Rica to feeding grounds in Antarctica more than 5,000 miles (8,000 kilometers) away.

• Lanternfish migrate from depths of 2,300 to 4,000 feet (700–1200 meters) to near the surface every day.

• Sawfishes, sharks, and their relatives detect prey using hundreds or thousands of tiny electrosensory organs.

• The oddly shaped head of a hammerhead shark is loaded with finely tuned organs called ampullae of Lorenzini, which can detect electric fields emitted by prey.

• Large schools of hammerhead sharks migrate hundreds of miles each spring and fall. The same electrosensory organs they use to hunt may also help them navigate by sensing Earth’s magnetic fields.

• Scallopss see in all directions. Their mantle—the thin body part that secretes the shell—is fringed with up to 100 miniature eyes, each with its own tiny retina and lens.

• Many animals that hunt at night have eyes lined with mirrors, which help capture more of the available light. When we shine a bright light on them, they shine back.

• Scallops, snails, jellyfish, and many other animals with simple eyes see light and dark but can’t see color.

• Birds, lizards, turtles, and many fishes have four kinds of cone cells. They can see ultraviolet, as well as a dazzling array of other colors we’ll never see.

• Most animals that live deep in the ocean are adapted to see only shades of blue.

• Pit vipers sense infrared light—the radiation released by their warm-blooded prey.

• Giant clams may hold the world record for largest number of eyes, with several hundred sprinkling the edge of the mantle.

• Tarsiers have gigantic eyes, each one about the size of their brain.

• Giant squid have the world’s largest eyes—they can reach the size of a volleyball.

• Birds of prey have the keenest eyesight of any animal and can also see ultraviolet (UV) light, which is invisible to humans.

• A whale can hear the low, rumbling call of a family member hundreds of miles away.

• Bats listen to echoes of their own voices to “read” objects around them even on a pitch-black night.

• Owls have extremely sharp hearing. By listening for faint rustling sounds, they can track down a mouse on a moonless night, nibbling seeds or tunneling under snow.

• The front feather on an owl’s wing has a ragged edge that helps disrupt airflow and prevent the usual rushing sound of a bird in flight.

• Shads and herrings can hear at frequencies far above the hearing range of humans. These fishes have evolved the ability to detect the high-frequency clicks of dolphins hunting them by echolocation.
• Elephants communicate over long distances using low-frequency rumbling sounds that we can't hear.

• An elephant can recognize a familiar voice from a mile (1.5 kilometers) away.

• Mammals follow their noses, lizards sample the air with their tongues, and lobsters pick up odors by flicking a pair of slender appendages at the front of their heads.

• Humans have about 400 different types of nerve cell in the nose, and each reacts only to certain odor molecules.

• Studies suggest that humans can distinguish more than 3 trillion odor molecules.

• Some of the world’s most sensitive odor detectors are insects, which use their antennae to catch molecules of scent.

• Moths and many other insects communicate through pheromones, aromatic compounds released by one animal and picked up by another.

• Often, a single species of orchid produces a blend that attracts a specific bee.

• Star-nosed moles use their keen sense of smell to find worms, snails, fishes and other small prey and can even track scents underwater.

• Male ring-tailed lemurs often fight over females by blasting each other with smells.

• The honey mushroom is the largest living organism known is a fungus that feeds on roots of evergreen trees. Filaments from a single, 2,400-year-old honey mushroom have spread over four square miles (10 square kilometers).

• The corpse flower from the rainforests of Southeast Asia is the largest in the world.

• One deep-sea fish called the black swallower can gulp down prey 10 times its own weight.

• A blue whale, the world’s largest animal, consumes up to 40 million krill, or 8,000 pounds (3,600 kilograms), in a day.

• A viperfish has teeth so long they don’t fit inside its head.

• A female deep-sea anglerfish attracts prey to her gaping jaws with a built-in lure—a spine tipped with a bauble of flesh that emits light.

• Tunas, billfishes, and some species of shark can regulate temperature in certain parts of their body.

• Humans are the only animals known to cook their food.

• The giant anteater has toothless jaws to support a long, sticky tongue that can extend nearly two feet (61 centimeters) beyond the tip of the snout.

• Pileated woodpeckers drill into dead trees searching for carpenter ants, which they extract from the wood with their barbed tongues. These birds hammer hard, sometimes pounding so deep that small trees break in two.

• Bird tongues are supported by thin, springy bones.
- In woodpeckers, the tongue bones are extraordinarily long: they loop around the skull and often tuck into a nostril on top of the beak.

- The tongue of Parson's chameleon stretches up to twice the length of its body.

- Cookiecutter sharks take neat bites out of much larger animals, leaving their prey wounded, but alive.

- Saltwater crocodiles clamp down with the most powerful bite force tested so far, more than three times as strong as a tiger's.

- A harpy eagle's grip is strong enough to catch and subdue an animal close to its own body-weight, up to 20 pounds (nine kilograms).

- A harpy eagle has claws as long as a grizzly bear's.

- Mantis shrimp throw some of the deadliest punches in the animal kingdom, swinging at speeds up to 50 miles (80 kilometers) per hour.

- In order to get enough nutrients, giant pandas need to consume more than 20 pounds (nine kilograms) of bamboo every day.

- Olms can go without food for long periods and may live for up to 80 years.

- Plunging down nearly 1.4 miles (2,200 meters)—equivalent to seven Eiffel Towers—the Krubera Cave in the Republic of Georgia is the deepest cave yet discovered.

- New Mexico's Carlsbad Cavern is actually the eroded remains of a fossilized coral reef from 250 million years ago.

- The deepest cave in the continental United States is the Tears of the Turtle limestone cave at 1,629 feet (497 meters) deep.

- 3,000 tardigrades were into space for 12 days, making them the first animals to survive direct exposure to the vacuum and cosmic rays of space.

- The bacterium Deinococcus radiodurans can survive over 1,000 times more radiation than a human can.

- A marine iguana swallows seawater and sneezes out the excess salt—often leaving a white cap of dried, encrusted salt on the top of its head.

- Some microbes can remain alive inside salt crystals for months or even years, in tiny drops of liquid called fluid inclusions.

- Scientists once revived a 34,000-year-old archaea found in a salt crystal.

- To survive in Africa's torrid Sahara Desert, the fennec fox radiates excess heat through its enormous ears.

- The arctic fox has tiny ears to conserve heat.

- Wingles midge is the only true insect species makes its home on the icy continent of Antarctica, where it is considered the largest animal that lives exclusively on land.

- The emperor penguin is the world's largest living penguin, standing up to four feet (1.2 meters) tall.
- The emperor penguin has a layer of fat up to 1.2 inches (three centimeters) thick.
- The emperor penguin has around 100 feathers per square inch (15 per square centimeter), more than any other bird.
- With its water-tight feathers and fat, the emperor penguin can dive for more than 18 minutes at a time in water that is just 28.8˚F (–1.8˚C).
- The mimic octopus (Thaumoctopus mimicus) appears to transform into multiple, different species at will.
- The pink fairy armadillo has two dozen strips of flexible armor on its back.
- Barely four inches (10 centimeters) long, the pink fairy armadillo is the world’s smallest armadillo.
- Many lizards have little bony plates called osteoderms inside their skin, underneath their keratin scales.
- The scaly scutes on chicken feet are actually formed from modified, undeveloped feathers.
- Bombardier beetles can spray boiling-hot chemicals in any direction.
- Birds called hoopoes can deter attacks from prowling mammals by spraying a foul-smelling oil from a gland beneath their tail.
- Several species of American horned lizards can squirt blood from their eyes to scare off predators.
- The desert tortoise urinates when threatened.
- Many skunks can only see clearly for about 10 feet (three meters)—which is also about as far as they can spray.
- A porcupine can have 30,000 quills.
- Baby porcupines are born with soft, flexible quills that don’t impale their mother on the way out. Their quills harden into sharp spikes only after they are born.
- African termites build towering mounds that are typically 10 feet (three meters) tall but can reach 30 feet (nine meters).
- An African termite colony can consume as much oxygen as a cow.
- A single nest of sociable weavers may contain compartments for 100 different families and 400 birds. These giant nests can be used for generations—one remained in use for 100 years.
- Lobsters’ cells don’t age; instead, the animals keep getting bigger and reproducing for their entire lives.
- The two-ounce Brandt’s bat has the longest lifespan for its size of any mammal.
- Bowhead whales commonly have lifespans of more than 100 years and the maximum recorded is 211 years.
- A giant tortoise’s heart may beat only six times a minute and it breathes very slowly.
- Clamshells—like tree trunks—bear annual growth rings. One clamshell discovered had 507 such rings, making the clam the oldest individual animal known to science.