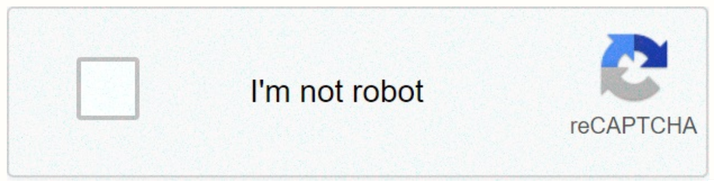

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Owl adaptations beak

A large gray in perfect camouflage © KURT LINDSAYAn adaptation is a feature that helps give an animal or plant its best chance of survival in the environment where it lives. Owls live in many different environments, but have evolved to stay at the top of the food chain. Below are descriptions of some important adjustments. Ears? Horns? No, the two bunches of feathers that look like ears are called clumps. Tufts are specialized feathers that rise from the heads of many species of owls and have nothing to do with hearing. Owls use clumps to camouflage or disguise themselves. When the clumps are raised, they resemble small twigs or branches. They help the owls stay hidden from predators. Owls also hide from songbirds, as the birds dive and make a noise when they spot an owl, a behavior called mobbing. The commotion warns other songbirds that there is an owl in the area. Owls without visible

bushes are called round owls. Some round owls raise their face or eyebrow feathers to mimic clumps. Where are the ears of an owl anyway? If you looked deep under the head feathers of an owl, you'd find that it has a crack on each side of its skull. Each slit is a flap of skin, called an ear conch (pronounced konk), which opens into a large ear canal, as shown above. An owl opens and closes its ear conches using muscles under the rings of feathers around the owl's face. The rings of feathers are called the facial disc. The facial disc captures and funnels sound into the owl's ears, just like a TV satellite dish funneling signals in the antenna. Some owls have ears that are directly opposite each other, in symmetrical placement. Others have asymmetric placement, where an ear on one side of the head is located above one side of the head, increasing their ability to locate sound on a vertical axis. These owls use their uneven ears to assess exactly where the sound comes from. If an owl hears a mouse rustle, perhaps even under a blanket of snow, the sound can reach one ear before it reaches the other ear. The owl moves its head until the sound reaches both ears at the same time. Once an owl has done this, it has pinpointed the location of the sound and is ready to strike - even if it hasn't seen its prey. The beautiful eyes of owls come in three colors. Owl species that live in North America have bright yellow or brown eyes. Some European owls have orange eyes. A thin tissue, called the iris, covers the front of the eye and gives the eyeball its color. In the middle of the iris is the dark, round pupil. The student determines how much light in the eye. In the bright glare of a sunny day, the student shrinks to block some of the light. At night, the student expands to let in a lot of light. The large pupils of an owl help the hunting in the People once thought owls were blind during the day. This is false – the Ferruginous Pygmy-Owl, for example, is one of the many owl species that hunt in broad daylight. Some owl species have eyes that are larger than humans. The eyes of an owl contain cells that are sensitive to light, just like human eyes. Named after their shapes, these cells are called rods and cones. Rods help to see in low light. Cones help to see color. The eyes of an owl are full of rods, so they look very good in the dark. Their eyes contain very few cones, however, so what people see in color usually looks black and white to an owl. Binocular Vision Some birds have an eye on each side of their head, such as a robin, who sees a scene with his right eye and a very different scene with his left. People and owls, with eyes on the front of their faces, have what is called binocular vision. What we see through one eye overlaps a lot of what we see through the other eye. We see an object in front of us with both eyes. Binocular vision helps owls assess how far away an object is, what size it is, and how fast it moves. By moving our eyes from side to side, people have 180 degree field of view, of which 120 degrees is seen through both eyes. Owls have about 125 degrees of field of view, with up to 50 degrees seen with both eyes. When people blink, our eyelids close from above, like window tones, which briefly cover our eyes. The eyelids of an owl are not so simple. An owl has top lids, just like us, that cover the whole eye when it blinks. The lower eyelids rise from below, affecting the eyes of the owl when it sleeps. The third set of eyelids, called nictitating membranes, extends from the inner corner to the outer corner of each eye. These thin, cloudy membranes close diagonally to cover the eyes and are supposed to protect, moisten and clean the eyes of the owl. Not really, although owls have the ability to look behind themselves. While people can look to the side just by shifting our eyes, an owl must rotate its entire head to look left or right. Every huge eyeball is locked in a position by benety plates called the sclerotic ring. An owl would have to turn its entire head to the right and then turn to the left to take a normal human field of view. No problem, however. Owls have 14 neck bones – double the number of people. These neck bones, along with a special bone at the base of the skull, allow movement. An owl can turn its head 270 degrees in either direction – that's more than halfway up its body, but not quite a full turn. This gives owls the ability to turn their heads around to see who is sneaks up from behind. Owls fly expertly without much effort because their wings are large compared to the size and weight of their bodies. With large wings and a light body, owls can carry, carry, carry, thick vegetation and trees, and hover above open fields. If you were to sit outside a moonlit night and were very quiet, you would see an owl fly past, but you probably wouldn't hear it. Thanks to their special feathers, many owls fly almost silently. The outer edges of their front wing feathers have a stiff fringe, as does the teeth of a comb. The feathers of the rear wing have a soft, hairy fringe. These fringed edges soften the airflow as it moves over the wings. The fine velvety surface of the flight springs absorbs the sound the feathers make as they glide over each other. The ability to fly so calmly gives the owl a great advantage. It can hear scampering from its prey, but the prey probably won't hear the owl coming for the catch. Many owls look bigger than they actually are, because they are heavily covered with feathers from top to bottom. In most species, female and male owls have similar feather colors and markings, but the female is usually larger than the male. Adult owls lose their feathers and grow new ones every year. But every owl stays the same color throughout its life. The colors of an owl's feathers help it blend into the natural environment and, of course, keep it warm. Snowy owls have white feathers that help them hide in their snowy habitat. Flammulated Owls' have dark feathers that help camouflage when tucked against a tree. Grassland species have light brown feathers that match the brown grasses and brown earth. Feather colors are not the only things that help camouflage owls. They have other tricks to hide. Many stand tall and pull their feathers tightly, making the owls leaner and harder to see. When trying to hide, owls raise the whitish feathers around the bill. Tufted owls also raise their bushes, and circular owls lift their face and 'eyebrow' feathers. When an owl tries to hide by changing its shape, it is in concealment position. In this position, the rounded circumference of the owl is broken off and it is less likely to be seen. Owls have four toes on each foot. Two toes point forward, a toe points backwards, and the 'reversible' outer toe of each foot can point forward or backward, as the owl desires. Sometimes three of the owl's toes point forward, sometimes only two. With two toes pointing forward and two backs, known as a zygodactyl, the owl can safely perch on a branch. When the owl holds its prey, its toes spread so that the owl can gain a firm grip. When the has three toes facing forward and one backwards, it is known as anisodactyl. At the end of each toe is long, sharp claw called a talon. The owl uses its claws to snatch, squeeze and kill prey animals. It also uses claws to defend itself against predators such as hawks, other owls, badgers and raccoons. Many owls have feathered legs and feet for front Snowy owls, for example, who live in the cold Arctic, have heavily feathered legs and feet. Eleven Owls, who live in warm, southern climates, have slightly feathered legs. Owls swallow their food whole or in large pieces, without chewing it. The stomach of an owl does not contain the digestive juices needed to break down swallowed fur, feathers, teeth, beaks, bones, insect shells or other hard body parts. In the owl's stomach, these hard pieces are wrapped in tight, sausage-shaped clumps called pellets. Owls usually spit pellets on the ground under their favorite sleeping places. Owls vomited pellets ten to twenty hours after each meal. Researchers study pellets to determine what each species of owl eats. Using special tools, they gently tease open the pellets and pluck them apart. Sometimes they can recreate the skeleton of the prey animal with pieces of bone, such as putting together a jigsaw puzzle. The skeleton may turn out to be an animal that was not known to live in the area where the owl hunted, killed, and ate. In this way, owl grains help scientists make important discoveries.© DANIEL J COX / NATURAL EXPOSURES.COMFEMALE SNOWY OWL WITH EXPOSED BREAD PATCHFemale owls will generally lay one to fourteen round white eggs. Females of different owl species lay different numbers of eggs. The number also depends on how much food is available. For example, if nearby mouse populations are in high, a female short-eared Owl can lay ten eggs. If the mouse population is low, she might only lay four eggs. Eggs are usually laid one to four days apart. The female owl sits on the eggs to keep them warm. This is called incubation. During the incubation period, the female loses the feathers on her abdomen to transfer more body heat to the eggs. She presses the warm bare skin, or brood patch, against the eggs. She lies on the nest in the incubation position, with her head low and stomach down, keeping the eggs warm all the time. Baby owls, called owlets or litters, hatch 22 to 40 days after the eggs are laid. Because eggs are laid over different days, owlets break away from their shells on different days. This is called asynchronous incubation. The first owls that hatch can be one to two weeks older than the last ones that hatch. When young owls hatch, they are covered with white, dejected feathers and their eyes are closed. A few days after hatching, their feathers turn grey and their eyes open. When the female sits on a nest of hatched chicks, it is called breeding. For the first few weeks of life owlets are helpless; they are unable to see, fly, or thermoregulate (maintain their own Their mother breeds them by keeping them safely under and around her in the nest. Male owls hunt and bring food to the nest. Female owls tear away small pieces of meat from the prey animals and feed them to the nests. Owls Owls Quickly. In just three or four weeks, the owlets begin to eat prey whole and spit pellets. Nests compete with each other for food. Because the older litters are larger and stronger than those born a few days later, they often get the most meat. If food is scarce, the younger owls can even starve. When the owlets are two to three weeks old, both parents can leave the nest to hunt. Owls call their parents for food; these are called food begging calls. The text for the adaptation page comes from the children's book Owls, Whoo are they? written by Kila Jarvis and Denver Holt Illustrated by Leslie Leroux and Courtney Couch In collaboration with the Owl Research Institute Institute Institute