

Big Questions: How do owls see in the dark?

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Image 1. Owls are nocturnal, which means they are active at night. Their huge eyes have special features that help these creatures hunt in the dark. Photo: Ozkan Bilgin/Anadolu Agency/Getty Images.

There's a faint rustle in the dead leaves on the forest floor. A tiny mouse peers around in the dim starlight, listening carefully. Without a sound, an owl swoops down from the night sky. In a swirl of leaves, the mouse becomes the owl's midnight snack.

Although some owls hunt during the day, most prefer to hunt at night. Nocturnal animals, like owls, foxes, deer and cats, have huge eyeballs that help to gather as much light as possible. The eye of the snowy owl is as big as a human's, but they have much smaller heads. If our eyes were that big, they'd be the size of oranges!

Owls have binocular vision, meaning that the view they see with each eye overlaps. This kind of vision helps the owl figure out the distance from its perch on the tree to the mouse below. Try closing one eye, then reach for an object an

arm's length away. It's hard to know exactly how far to reach, isn't it? Owls can shift focus from close up to far away very quickly. They can zoom in on a mouse 200 yards away.

An owl can't move its eyes in its sockets — it can look only straight ahead. But an owl has a very long and flexible neck. It can turn its head so far back it can see what's going on behind it. In fact, an owl can move its head a full 270 degrees without moving its body.

An owl's eyes are good at making use of very little light. Some, like the tawny owl, can see in light 100 times less bright than we can. The opening in the eye that lets in light is called a pupil. At night the owl's pupils open wide to let in as much light as possible. The light hits a big light detector at the back of the eye called the retina.



The retina is made up of tiny cells called rods and cones that sense different kinds of light. Cones see bright light and colors. Rod cells can see in dim light and at night, but they don't see color. For example, try finding a blue T-shirt in a dark closet in a dark room. Pretty tough to do, isn't it? Nocturnal animals have more rods than cones, so they see well at night, but with less color.

Sometimes owl eyes seem to glow at night because the rods and cones don't catch all the light. This is called eyeshine. It happens because of a mirror-like layer behind the retina called the tapetum. Some light entering the eye passes through the retina without being absorbed by the cells. The tapetum reflects the light back into the eyes, giving the cells of the retina a second chance to absorb it. Even a small amount of light shining into the eyes will make them glow. Whales, deer, cats, sharks, crocodiles, fruit-eating bats and some snakes also have this eyeshine.

Some people think owls can't see well during the day, but that isn't true. Owls' eyes adjust to the amount of light entering them, just like yours. Their pupils open wide at night, and close up tight during the day. They have three eyelids — one for blinking, one for sleeping and one for keeping the eye safe. All of these layers protect the sensitive eye cells from bright sunlight. Many animals, including owls,

combine their ability to see at night with their other keen senses to hunt and to avoid being hunted. And although owls must be proud of their hunting abilities, the mice probably don't appreciate those skills very much.

Quiz

- 1 Which sentence supports the idea that an owl's eyes are designed to help them see in the dark?
- (A) At night the owl's pupils open wide to let in as much light as possible.
 - (B) Sometimes owl eyes seem to glow at night because the rods and cones don't catch all the light.
 - (C) Some light entering the eye passes through the retina without being absorbed by the cells.
 - (D) They have three eyelids — one for blinking, one for sleeping and one for keeping the eye safe.
- 2 Which piece of evidence BEST explains the cause of eyeshine?
- (A) The retina is made up of tiny cells called rods and cones that sense different kinds of light.
 - (B) Nocturnal animals have more rods than cones, so they see well at night, but with less color.
 - (C) The tapetum reflects the light back into the eyes, giving the cells of the retina a second chance to absorb it.
 - (D) Whales, deer, cats, sharks, crocodiles, fruit-eating bats and some snakes also have this eyeshine.
- 3 Which sentence would be most important to include in a summary of the article?
- (A) An owl can't move its eyes in its sockets — it can look only straight ahead.
 - (B) In fact, an owl can move its head a full 270 degrees without moving its body.
 - (C) Some people think owls can't see well during the day, but that isn't true.
 - (D) Their pupils open wide at night, and close up tight during the day.
- 4 Which statement is a CENTRAL idea of the article?
- (A) Owls can only look straight ahead but they have long flexible necks to help them see all around.
 - (B) Owls are nocturnal animals that enjoy hunting mice and other small creatures.
 - (C) The special features of an owl's eye help them to be strong nighttime hunters.
 - (D) The eyes of an owl are almost exactly the same size as the eyes of a human.