

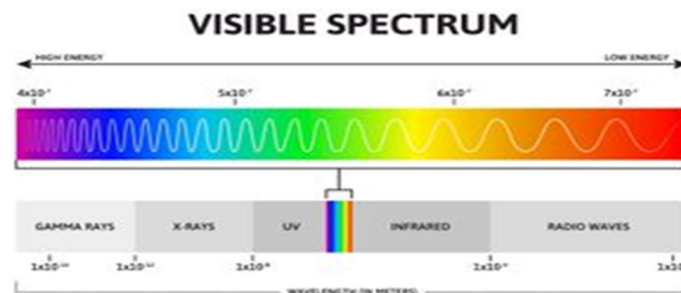


Do we see what they see?

Ink Free # 7

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Expert on sight or behavior of living creatures, I am not. But I know we see a tiny sliver of the electromagnetic spectrum of light. And it appears we believe that is what every other eye sees, too. Not so the scientists say. We admire animals enough to give them names and likely interpret their actions in terms of what we would do. A lot of this must be true, yet assumptions we make offer explanations in human terms. Do they see what we see? Nope!



Humans do not see ultraviolet, Infrared, or any of the spectrum. In contrast, Elk, Deer, and other related animals have dichromatic vision, meaning they see yellow and blue,

along with black, white, and shades of gray. They **don't see** red and green, and the upper end of the color spectrum appears yellowish to them. Elk are less sensitive to long wavelength colors such as red and orange and can distinguish longer (orange-red) wavelengths. So why do we camouflage up a mega business? Baffles me.

Humans see colors through the combination of signals from three types of photo pigments in cones: red, green, and blue. Each type of cone is sensitive to different wavelengths of visible light. The retina is covered with millions of light-sensitive cells called rods and cones. When these cells detect light, they send signals to the brain, which produces the sensation of color.

Cats can see colors, but not as many different shades as humans. Cats' eyes have two types of cone cells, while humans have three types. Humans have ten times more cone cells, which allows them to see a broader range of colors. Cats' best colors are to be blue and yellow. Red and green appear to them as shades of gray. Dogs have limited color perception, also known as dichromatic vision, which means they can only see blue and yellow. They may not see an object's actual color; for example, red may appear dark brownish-gray or black to a dog. Yellow, orange, and green may all look a bit yellowish to a dog. Purple may look the same as blue to a dog.

Polar bears likely have dichromatic vision, meaning they have two types of cones; they are not great at seeing green. Bears can distinguish between colors in containers of different shades. Bears trained to associate food with blue could distinguish between blue, blue-gray, blue-green, blue-red, and blue-yellow.

Polar hummingbirds can see various invisible colors to humans, including purple, ultraviolet+green, ultraviolet+red,

and ultraviolet+yellow. They can also tell the difference between two different mixes of ultraviolet+red or tell them apart from their components, like pure ultraviolet or pure red. Eagles can see a broader range of colors than humans, including ultraviolet (UV) light and shades and contrasts that allow them to spot traces left by prey, such as urine or fur, which makes their prey stand out against the uniform color of a field. For example, a bald eagle can spot prey the size of a rabbit three miles away. Rabbits can only see two colors: blue and green. They may not perceive green and blue like humans, but they can tell them apart. Rabbits are somewhat color-blind by human standards.

Most snakes can only see blue and green, along with ultraviolet light. Snakes have cones and rods in their eyes that enable them to see in two-dimensional color. Meaning they can only see two primary colors, blue and green. Many animals, including cold-blooded animals, fish, and frogs, can see infrared light. Infrared light has longer wavelengths and lower energy than visible light, and humans can't see it. However, some animals can use parts of the infrared spectrum. Pit vipers, like pythons, boas, and rattlesnakes, have pits on their upper and lower jaws lined with heat sensors that allow them to sense infrared rays. The pit organs work like a second pair of eyes, detecting heat instead of light, allowing them to strike at their prey accurately, especially at night when small animals are active.

Many animals, including bees, birds, and even mammals like reindeer and mice, can perceive ultraviolet light. Indeed, humans' lack of UV sensitivity is more of an exception than the rule. Many animals use ultraviolet to see. Your cat and dog have UV vision, as do rats, mice, moles, and bats. The birds and the bees see ultraviolet light, as do all insects, fish, amphibians, and reptiles.

Birds can see ultraviolet (UV) light because, unlike humans, their lenses and other ocular media transmit UV. Depending on the species, they possess a class of photoreceptor, which is maximally sensitive to violet or UV light. Mantis shrimps (Stomatopoda) Mantis shrimps probably have the most sophisticated vision in the animal kingdom. Their compound eyes move independently, with 12 to 16 visual pigments compared to our three. They are the only animals known to be able to see circularly polarised light.

Some animals that only see in black, white, and shades of gray include bats, golden hamsters, flat-haired mice, raccoons, seals, sea lions, walruses, some fish, whales, and dolphins, to name a few. Elephants can see red and green hues. Elephants can see colors similar to what a color-blind person can, including blues and yellows, but cannot distinguish between reds and greens. In their environment, shades of beige and green are predominant, while blues and bright colors are more prominent.

So the next time you see an animal, remember they do not see you the same. Their sight, and likely all senses, are different! Evolution at work. I resist naming them as if they are human; they are not, and I demand respect for what they are: different from us.

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Pondering along in old age without fear, excepting what I can do
Enjoying every minute of it!