

Your Munsterlander's Vision

By Sande Mustain

The other day I noticed that our dog Abi was laying on the bed, staring at the TV, and I was surprised because I've seen pictures of dogs watching TV but ours never do – they may bark if there's a dog barking on TV, but it's directed more at the sound than at the TV. That made me wonder if she was seeing the same things I see and how her vision differs from mine so I did a little research.

I had always thought that dogs basically see the same as we do only in black and white, but that's not true – dogs do see in limited color and other factors make their vision very different than ours. Normal human eyes contain 3 kinds of color-detecting cells called cones, which allows our brains to distinguish red from green and blue from yellow. Dogs eyes only contain 2 kinds of cones, so they can tell blue from yellow, but not red from green. Several articles associated the way dogs see color to a colorblind person.

How humans see color:



Human vision with full color range possible because of specialized retina including cone photoreceptors and macula

How dogs see color:



Animals rely on contrast and movement to identify objects. This type of normal vision is restored following cataract surgery with implantation of a replacement lens.

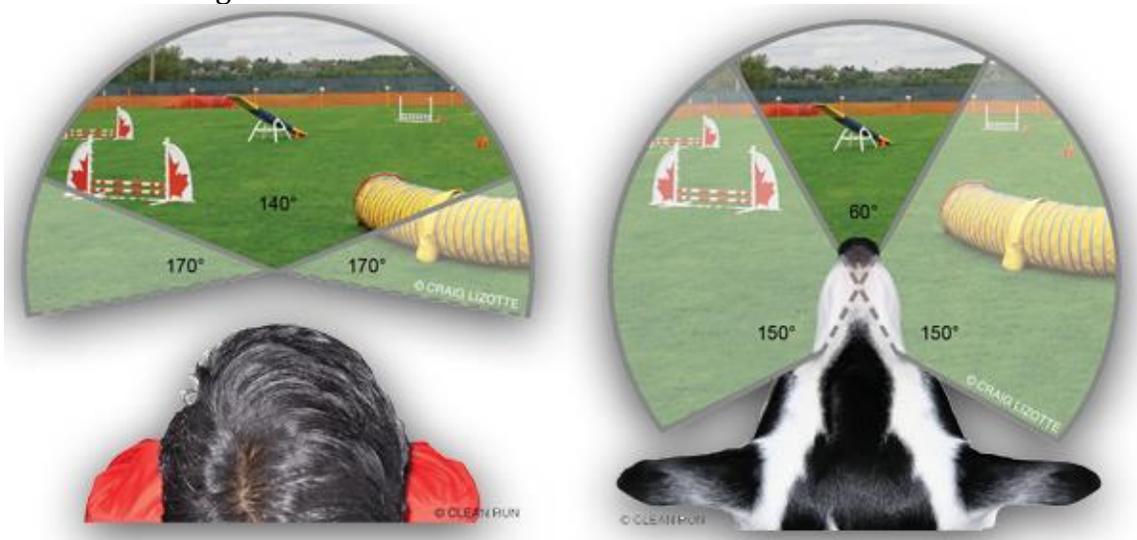
Vision involves several factors: field of view, depth perception (ability to judge distances), acuity (ability to focus), perception of motion and color differentiation. Although dogs don't see a full range of color, they have other vision advantages over humans like night vision. Dogs have a tapetum which is a layer of reflective cells behind their retina. Once light passes through the retina it reflects off the tapetum and passes back through the retina so the rods and cones can receive even more light – dogs can actually see 4 times better than humans in the dark and their sight is most effective at dusk (the time when it's best for spotting prey, probably evolving from when they were nighttime hunters). The mirror effect of the tapetum also causes the "eye shine" in pictures of dogs using the flash of a camera.

Dogs also outperform humans in the area of detecting motion. The same rods that help dogs see perfectly in dim light also helps them detect even slight motion anywhere from 10 to 20 times more sensitive than humans. Dogs can detect a wave of a hand for example up to a half mile away.

Although dogs can detect movement from greater distances than humans, they can have trouble seeing stationary objects close to them, which is why your dog may seem confused if you hold a treat right in front of them. If you wiggle the treat, your dog's eyes will immediately focus on it. That's because dog's eyes detect movement by instinct. Motion in their peripheral vision triggers a chase reflex so their eyes are drawn to the movement without thinking.

Dogs also are not great at seeing small details. Dogs see with considerably lower accuracy and clarity compared to humans and their vision has been compared to someone who wears bi-focal glasses – without the glasses. But this isn't a big problem for dogs as they rely mainly on their sense of smell for information, which is estimated to be up to 100 million times more sensitive than humans!

Dogs also have a wider field of vision than humans. We can see 170-180 degrees in front of us – dogs, whose eyes are closer to the sides of their heads, can see a vision of about 240 degrees.



Dogs can also see things more quickly than us. Dogs and humans see images in a series of quick still shots. The retina takes a fraction of a second to receive light and translate that into an image for the brain. For humans, this happens about 60 times per second. For dogs, it happens between 70-80 times per second – this is why when you throw a ball, it takes your dog a fraction of a second less than it takes you to see where it's going, which is why dogs so rarely miss a catch! And I found out that this exceptional eye for movement is why most dogs have no interest in TV – to humans, TV images are perceived as fluid movement, but to dogs, it just looks like a very quick slideshow of still photos.

So the next time you throw a **red** ball in the **green** grass – you'll understand why your Munsterlander may have difficulty finding it right away!

References: How Dogs See the World by Natalie Wolchover; Through a Dog's Eyes by Jon Bastian; Science Shows What the World Looks Like to Cats and Dogs by Kiona Smith-Strickland; Veterinary Vision, Inc.