



## **Vision of the Horse**

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Understanding how horses see helps us understand, predict, and modify an animal's behavior in certain instances. We have a tendency to assume that a horse's view of the world around us is similar to our own, but this is not the case.

Unfortunately science does not give us an exact picture of what a horse sees; only a horse could do that (which of course they can't). Evaluation of the anatomy and physiology of the horse's eye does give us some very good hints as to what they see.

The vision of the horse has evolved to help avoid predators while grazing and allow for fast flight on difficult terrain. The eyes of the horse are set very far to the side and relatively far back on the skull, allowing him to see behind while grazing. When the head is held normally there is a narrow blind area behind the rump, although with head movement, the horse is also able to view the blind area. The horse can see straight ahead with binocular vision and to each side and rear with monocular vision. There are even two different neurological visual pathways, binocular and monocular.

Lateral vision is enhanced by the fact that the horse's pupil is horizontal, so that its constriction in bright light does not decrease the lateral field of vision. Peripheral vision is more important for the horse than man and the peripheral retina appears relatively more useful, as it is effectively stimulated by movement. This ability to see well almost 360 degrees around the horse when considered in conjunction with the peripheral retina being stimulated by movement and the horse's defense mechanism of flight explains the propensity of horses to spook easily from movement behind them.

Horses do see some color. They appear to differentiate yellow, green, and blue but have difficulty with red, similar to red-green color blindness in humans. How color vision is important for horse survival is unclear, but it is apparent the equine eye has evolved to handle both very bright days and dark nights. The equine pupil constricts quickly but does not dilate as rapidly as humans. This is why horses do not adapt quickly when walking into a dark barn or after a light is turned off. Large dark granules on the edge of the pupil called corpora nigra are thought to aid the constricting pupil to shield excessive light on bright days. A special reflective layer of the retina behind the sensory nerves, called the tapetum lucidum, allows dim light to be reflected back onto the nerves after it has passed through once, improving night vision.

The globe of the horse's eye is not spherical in shape. This allows the lens to focus different distances more easily when viewed from certain angles. This means that a horse may focus on certain things of interest by tipping its head to certain angles. Movement of the head can also affect binocular and monocular vision and the neural pathways involved. One example of how vision plays into behavior is exhibited by catching a nervous horse. Approaching from the rear usually evokes a startle response, the horse will trot off then turn to face his stalker. He will view with binocular vision and usually move the head up and down to focus. Usually if you slowly approach from the side in monocular vision, when the horse finally resolves itself to being caught it will turn its head to binocular vision and relax. The way the horse views the world around it shapes behavior. Understanding the horse's view should leave us better able to manage its behavior.