

Which color do dogs prefer?

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Table of Contents

Acknowledgments	1
Purpose and Hypothesis.....	2
Background research.....	3
Materials	7
Procedure.....	8
Date graphs.....	9
Result.....	10
Conclusion.....	11
Work cited.....	12

Acknowledgements: I would like to thank Mrs. Yee for helping me with my science fair paper and my parents for helping me.

Purpose: The purpose of my experiment is to find which color dogs prefer.

Hypothesis: My hypothesis is that the dog will go to the purple sheet of paper because it's gray color and dogs see gray instead of most colors.

Dogs have been domesticated pets since before the Industrial Revolution. They were the first domesticated animals. People raised puppies long before kittens, chickens, cows, goats, pigs, and sheep. Some say wolves were domesticated about 10,000 years ago, while other people say 30,000. Some think it happened in Europe, others think it happened in the Middle East, or East Asia. Some people think early human hunter-gatherers actively tamed and bred wolves. Others say wolves domesticated themselves, by scavenging the bodies left by human hunters, or waiting around campfires, growing tamer with each generation until they became forever companions.(Yong, 2016)

Dogs do have a rare way of seeing the world. Most people think that dogs see black and white which is not true. Dogs can see color, but not all colors that people can see. This is because dogs only have two kinds of color-detecting cells (or cones) within their retinas. Unlike people with red-green colorblindness, dogs perceive colors differently than humans with normal color vision. For dogs, most people see red but for dogs it will most likely appear to be dark brown, while green, yellow and orange all look like yellow. Something that looks blue-green to humans for example, the ocean or a pool of water looks gray to a dog, and purple objects just look blue (Palermo, 2016).

A dog's eye works much like a camera. Light enters through the pupil. The iris is a structure that can grow larger and contract, controlling the amount of light allowed in. Light then passes through the clear cornea and lens, which focus the light on the retina which is a

light-sensitive layer. This layer contains color-sensitive cones and motion- and light-sensitive rods, all of which change into light into electrical signals. The cones and rods send these signals via the optic nerve to the brain, which constructs an image from them. Dogs have only two types of cones, compared with the three types in human eyes. As a result, dogs don't see as many colors as people do (Roberts, 2020)

Eyes also contain structures such as the gel-like vitreous humor that fills the eyeball and gives it shape. Canine eyes have some structures that human eyes don't. Dogs have a nictitating membrane which is a thin whitish-pink tissue that acts as a third eyelid and protects the eye. The tapetum lucidum is a reflective lining behind the retina. This lining is what makes dogs' eyes glisten eerily when light hits them. A tapetum lucidum doesn't let dogs see in dimmer light which would otherwise happen. (Roberts, Oct 2020)

The visual streak is a parallel band in the retina right above the optic nerve. This area has the highest concentration of rods and cones and vision is sharpest here. The visual streak varies greatly among breeds, and studies suggest that different breeds see the world differently. In wolves and in dogs with a long head, the streak is wide, with the nerves evenly distributed. The shorter a breed's head, the narrower (more circular) the streak tends to be. Pugs, for example, have a small spot of sharp vision—an "area centralis"—as humans do. Even within breeds, the visual streak can vary from type to type. (Roberts, 2020)

These features and others equip the dog to be a good hunter under various light conditions. The tapetum lucidum improves vision in poor light, as does the high proportion of rods to cones. A rod-dense retina also makes dogs great detecting motions and shapes. Because

most dogs' eyes angle slightly to the side, they have a wider field of view than humans. When a wide field of vision combines with a wide visual streak, as in a German Shepherd, the dog can see the whole horizon at once (instead of having to scan the eyes back and forth as humans do).

As hunters of large prey with alert senses of smell and hearing, dogs don't need to see well close up, and near vision is blurry in long-nosed dogs. (Short-nosed dogs, with their human-like area centralis, do appear to see well close up. Though the area centralis may lessen their ability as hunters, it may make them better lap dogs, more able to "read" their owners' faces.) Overall vision is also less sharp. (Roberts, Oct 2020)

Veterinarians used to believe that dogs saw only black and white, but recent studies suggest that they actually do have some color vision, but it's not as bright as a human's. As it turns out, dogs have only 20% of the cone photoreceptor cells which is the part of the eye that controls the perception of color that humans have.

While dogs cannot read an eye chart or pick out colors, behavioral tests suggest that dogs see in shades of yellow and blue and lack the ability to see the range of colors from green to red. In other words, dogs see the colors of the world as basically yellow, blue, and gray. One amusing fact is that the most popular colors for dog toys today are red or safety orange. The problem, of course, is that the color red is difficult for dogs to see and may appear to them as a very dark brownish gray or even black. So if a dog runs right past a red toy that was tossed, he may not be stubborn; he's probably just having a hard time seeing it from the green grass of the lawn.

A dog's visual acuity is also less developed than humans. Some experts believe that dogs only have 20 to 40% of our visual acuity. That means an object a human can see clearly may appear blurry to a dog looking at it from the same distance. Canines, on the other hand, are able to see in much lower light and can detect motion more easily than we can, something that served them well in the wild as nocturnal hunters of camouflaged prey. (Mars and Affiliates, 2020)

7.

Materials: 4 dogs, Colored piece of paper: Red, Green, yellow, purple, and blue. A person to hold the dog. Leash.

Procedure:

Put the dog in a different room so he doesn't see what you are doing

Set the colored pieces of paper on the floor.

Set a treat down on each set of paper.

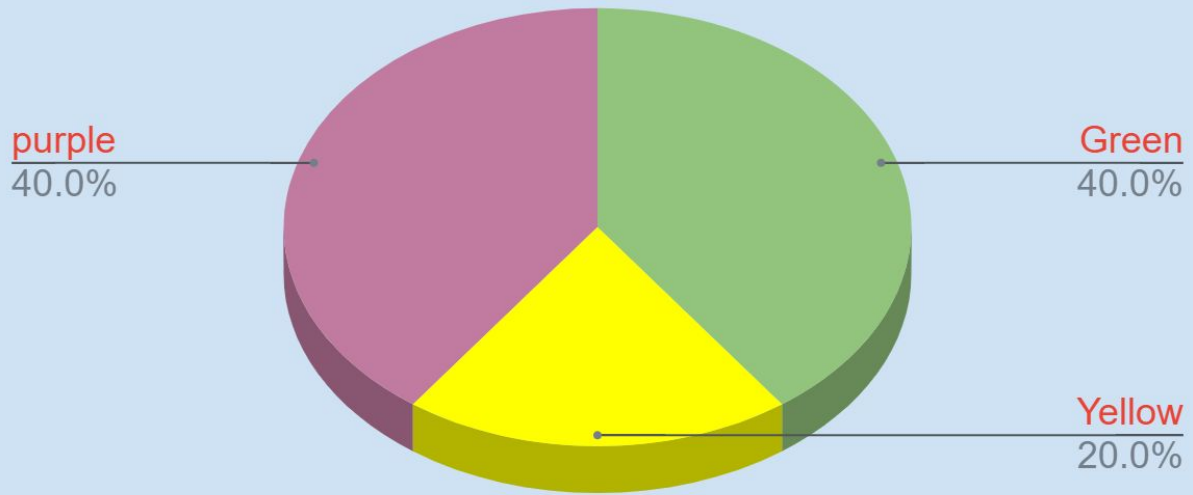
Get the dog from the other room and bring him into the room with the colored paper.

Let the dog go and don't push him to the color you want him to go to.

See which piece of paper the dog goes to.

Repeat this for every dog.

Zeke and the colors he chose



Result: The first time I did my experiment my dog went to the purple piece of paper. The second time was again purple. The third time i tried my experiment the dog went to the green colored sheet of paper. Then again it went to the green. Then the last time it went to the yellow piece of paper.

Conclusion: In Conclusion my hypothesis was incorrect. I thought that the dog would go to the purple one all 5 times but instead the dog went to the green and yellow one as well.

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