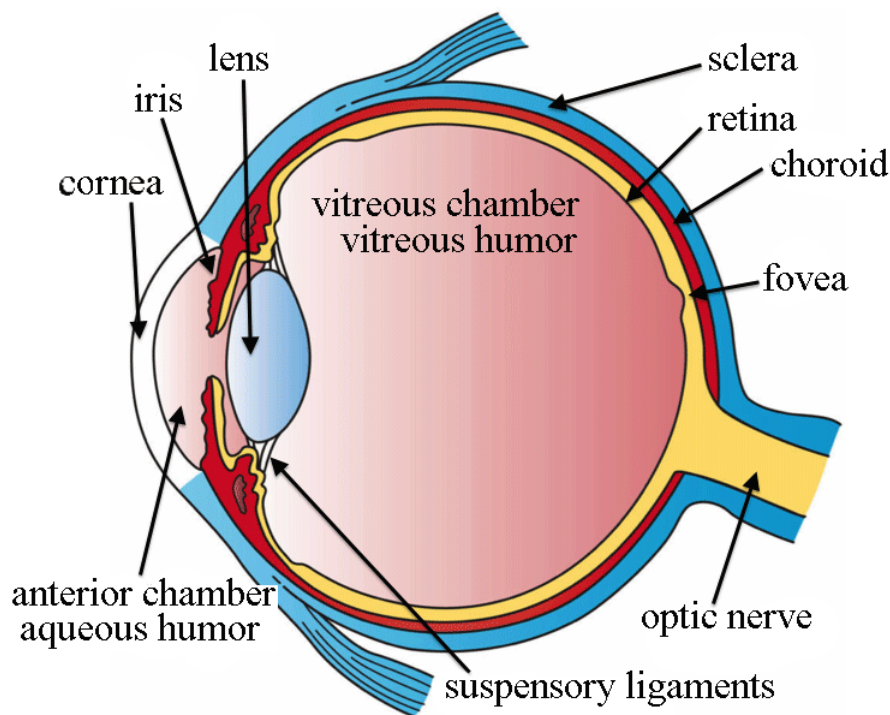


4.2: The Human Eye

An Introduction to your Eyes

The eye is a marvelous sensor! With sight as one of our five senses, the eye allows us to experience our world — our Universe. The eye as a sense not only allows us to see our Universe, but to determine color, shapes, basic identifications, and relative sizes of objects. Think of the eye as a sensor that allows our brain to collect, organize, and interpret things around us. What would the beauty of a sunset be without color? Or the distance to a coffee cup as you are trying to pick it up without the eye and brain working together to determine depth perception? Our brain stores these experiences, building on what we see and experience in our universe.

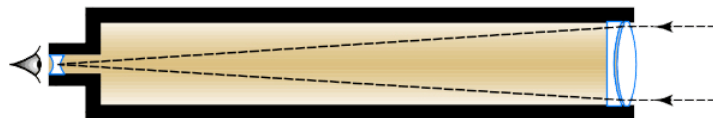
Science has revolved around the human ability to observe, among other things like reasoning, whether it be what occurs when one puts two chemicals together, how the location of sunrise changes over a period of time, the different feather patterns on a male and female bird of the same species, or variations in clouds, shells, and rocks. Astronomy fully used the visual senses to observe the Universe. The eye, as a sensor, is very sensitive to an object's brightness as well as its color.



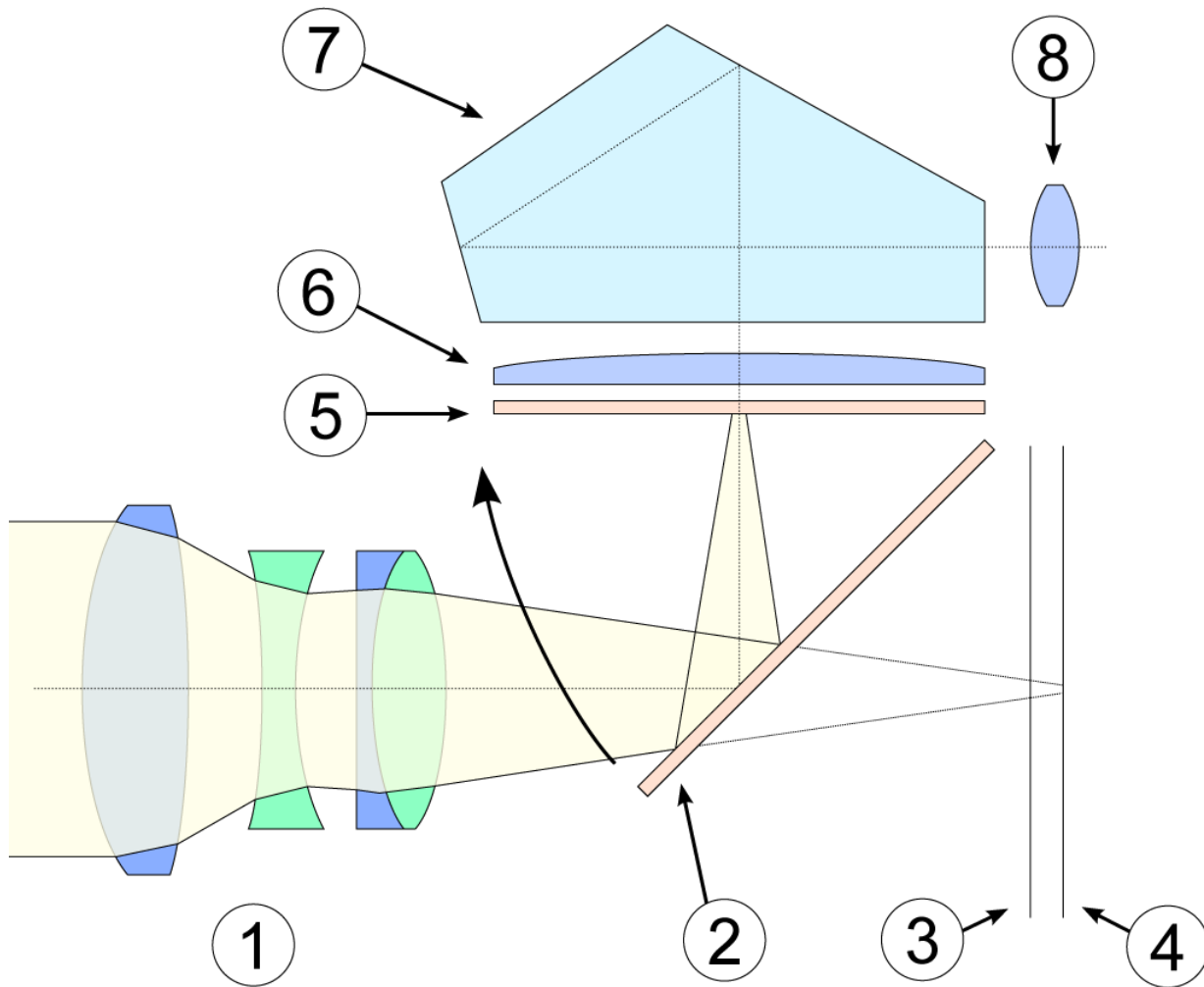
The structure of the human eye. “Three Main Layers of the Eye” by Holly Fischer is licensed under CC BY 3.0

Before the late-19th century, all astronomy was visual. Both professional and amateur astronomers used only their eyes to examine the universe around them. And, although the eye is a tiny light-gatherer, it is incredibly sensitive to both brightness and color. It also is adaptable. The human eye can function in bright sunlight and faint starlight — an intensity range of more than 10 million.

Understanding the eye allows one to better understand the workings of optical instruments, such as the telescope and camera. All use a lens to focus, and many of the features of the eye are incorporated in a direct or indirect way into these instruments. ⁽¹⁾



The Achromatic Refractor “The Achromatic Refractor” by Dr. Mike Reynolds, Florida State College at Jacksonville is licensed under CC BY 4.0



The Single Lens Reflex Camera “Single Lens Reflex Camera” by Antilived is licensed under [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

The Human Eye

The human eye has a number of parts which must function together to assure eyesight. Failure or weakness of any one of these can impair eyesight, or cause blindness.



Human eye by by Alexageev is licensed under [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)



Calliphora vomitoria Portrait by JJ Harrison is licensed under [CC BY-SA 3.0](#)

Note that the human eye is different both functionally and structurally than most eyes in the Animal Kingdom; for example, many insects feature compound eyes.

Cornea

The transparent “front window” of the eye. It is a thick, nearly circular structure covering the lens. The cornea is an important part of the focusing system of the eye.

Pupil

The round black hole in the center of the iris. The size of the pupil changes automatically to control the amount of light entering the eye.

Iris

The pigmented (colored) membrane of the eye, the iris is located between the cornea and the lens. Its color varies from pale blue to dark brown.

Lens

A transparent biconvex structure located behind the iris. It focuses light rays entering through the pupil in order to form an image on the retina.

Retina

A thin multi-layered membrane which lines the inside back two-thirds of the eye. It is composed of millions of visual cells and it is connected by the optic nerve to the brain. The retina receives light and sends electrical impulses to the brain that result in sight.

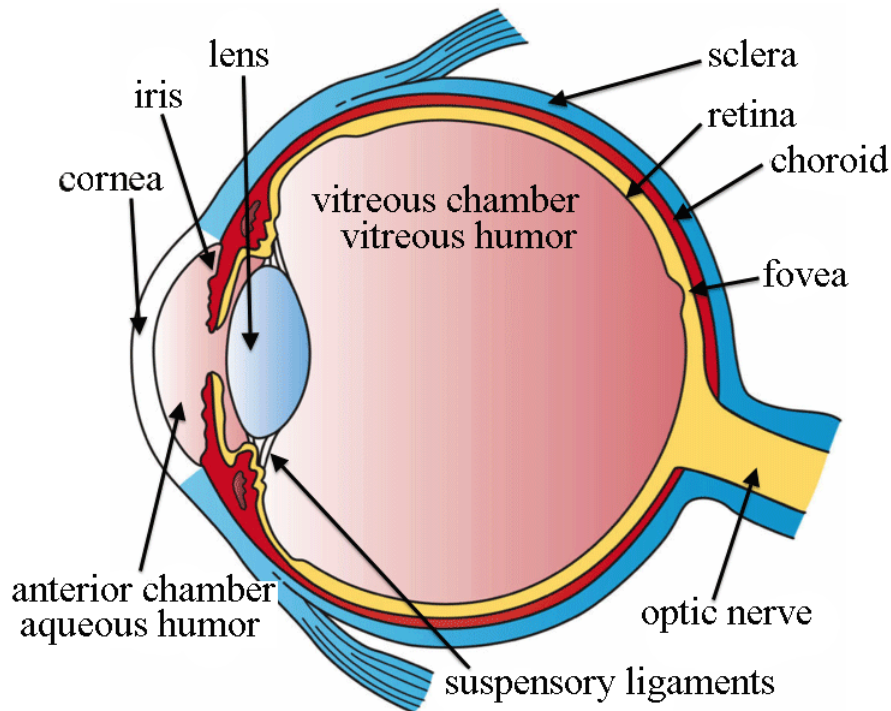
Macula

An area of the eye near the center of the retina where visual perception is most acute. The macula is responsible for the sharp, straight-ahead vision that is used for seeing fine detail, reading, driving, and recognizing faces. It is one hundred times more

sensitive to detail than the peripheral retina. The macula is sometimes referred to as “the bull’s eye center of the retina.”

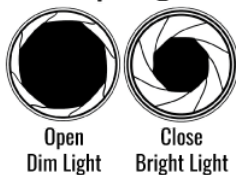
Optic Nerve

Cable-like structure composed of thousands of nerve fibers that connect the macula and retina with the brain. The optic nerve carries electrical impulses from the macula and retina to the processing center of the brain where they are interpreted into clear, colorful sight. ⁽¹⁾



The structure of the human eye. “Three Main Layers of the Eye” by Holly Fischer is licensed under CC BY 3.0

Diaphragm



The camera diaphragm or aperture — works like the iris in human eyes. Aperture diaframma, Florida State College at Jacksonville is licensed under [CC BY 4.0](#) / A derivative from the original work
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