1. Cone cells, or cones, are photoreceptor cells in the retinas of vertebrate eyes (e.g. the human eye). They respond differently to light of different wavelengths, and are thus **responsible for color vision** and function best in relatively bright light, as opposed to rod cells, which work better in dim light.

2. Color blindness is not a form of blindness at all, but a deficiency in the way you see color.

If you are colorblind, you have difficulty distinguishing certain colors, such as blue and yellow or red and green.

Color blindness (or, more accurately, color vision deficiency) is an inherited condition that affects males more frequently than females. According to [Prevent Blindness](https://www.preventblindness.org/) , an estimated 8 percent of males and less than 1 percent of females have color vision problems.

Red-green color deficiency is the most common form of color blindness.

Much more rarely, a person may inherit a trait that reduces the ability to see blue and yellow hues. This blue-yellow color deficiency usually affects men and women equally.

**What causes color blindness?**

Color blindness occurs when light-sensitive cells in the [retina](https://www.allaboutvision.com/resources/retina.htm) fail to respond appropriately to variations in wavelengths of light that enable people to see an array of colors.

[Photoreceptors](https://www.all-about-vision.com/glossary/definition.php?defID=259)

in the retina are called rods and cones. Rods are more plentiful (there are approximately 100 million rods in the human retina) and they are more sensitive to light, but rods are incapable of perceiving color.

The 6 to 7 million cones in the human retina are responsible for color vision, and these photoreceptors are concentrated in the central zone of the retina called the macula.

The center of the macula is called the fovea, and this tiny (0.3 mm diameter) area contains the highest concentration of cones in the retina and is responsible for our most acute color vision.

Inherited forms of color blindness often are related to deficiencies in certain types of cones or outright absence of these cones.

Besides differences in genetic makeup, other causes of color vision defects or loss include:

* **Parkinson's disease (PD).** Because Parkinson's disease is a neurological disorder, light-sensitive nerve cells in the retina where vision processing occurs may be damaged and cannot function properly.
* **Cataracts.** Clouding of the eye's natural

[lens](https://www.all-about-vision.com/glossary/definition.php?defID=439)

that occurs with cataracts can "wash out" color vision, making it much less bright. Fortunately, [cataract surgery](https://www.allaboutvision.com/conditions/cataract-surgery.htm) can restore bright color vision when the cloudy natural lens is removed and replaced with an artificial [intraocular lens](https://www.allaboutvision.com/conditions/iols.htm).

* **Certain medications.** For example, an anti-seizure drug called tiagabine has been shown to reduce color vision in about 41 percent of those taking the drug, although effects do not appear to be permanent.
* **Leber's hereditary optic neuropathy (LHON).** This type of inherited [optic neuropathy](https://www.allaboutvision.com/conditions/optic-neuritis.htm) can affect even carriers who don't have other symptoms but do have a degree of color blindness. Red-green color vision defects primarily are noted with this condition.
* **Kallman's syndrome.** This inherited condition involves failure of the pituitary gland, which can lead to incomplete or unusual gender-related development such as of sexual organs. Color blindness can be one symptom of this condition.

Color blindness also can occur when aging processes damage retinal cells. An injury or damage to areas of the brain where vision processing takes place also can cause color vision deficiencies.

3. **The "Visible" Spectrum**  
Probably the most well-known of human sensory limitations, the typical human eye is only capable of perceiving light at wavelengths between 390 and 750 nanometers. Of course, calling it the "visible" spectrum is a bit of a misnomer, as plenty of animals are capable of perceiving light with frequencies outside this relatively narrow band of electromagnetic radiation.