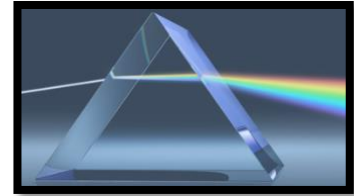


# What About Color

By Dave DeWitt



## What Is Color?

For most of history, people believed color came from the object observed. Just as everything has a size and shape, it was thought to have a color. The first scientific work on color came from the Christian physicist and mathematician Isaac Newton in the 1660s. Newton shined sunlight through a prism and observed what he determined to be seven basic colors, like a rainbow. If white (clear) light could consist of different colors, then the color was not in the observed object. What makes Newton's observation so significant is that anybody can do it. For example, I have some glass panels in my front door. Every morning, when there is no cloud cover, the sun shines through the glass panels and makes a rainbow of colors on my floor. Anybody can make a rainbow by spraying water from a regular garden hose in the air, if they are between 40 and 42 degrees from the sun. Newton said there were seven colors. Some have suggested there are three basic colors, but the reality is our eyes combine the light waves to recognize over a million different colors.



But Newton opened the door for further scientific research. Today, we know some people do not see color the same. About 8% of men and 1% of women have some form of color impairment. Although this can be explained by a malfunction of the eye, it means color is determined by the eye, not just the object observed. Also, most animals do not see color the same as we do. Whales, dolphins, bulls, sharks, rats, and owls see very little color. Dogs see color in shades of blue and yellow. Cats see color in shades of blue and green. This led some scientists to conclude that there is actually no such thing as specific colors. Color was thought to be only in the eye of the beholder.

But that is not right either. There is an objective element to color. Rainbows, and the rainbow of colors coming through the glass in my front door, would be there, even if there were no one on earth to observe them. When light began to be measured in wavelengths, we could understand how Newton's prism could show different colors. Vedantu reports this [for reference, a nanometer is one billionth of a meter]:

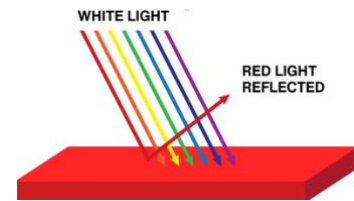
Wavelength is the distance between two consecutive crests or two consecutive troughs in a transverse wave. The wavelengths of the visible light range between 400-750 nanometers, this is between the infrared having longer wavelengths and the ultraviolet having shorter wavelengths ... The forms of radiation such as radio waves, gamma rays, microwaves, and X-rays are all different forms of the light, which we cannot see. Different colors are observed at different wavelengths. What Newton did with his prism was to divide white light from the sun into different wavelengths, which displayed itself into different colors. [vedantu.com › physics › wavelength-of-light]

Colour	Wavelength in nm
Red	750 - 610
Orange	610 - 590
Yellow	590 - 570
Green	570 - 500
Blue	500 - 450
Indigo	450 - 425
Violet	425 - 400

For example, x-rays have very small wavelengths, between 0.03 and 3 nanometers. So x-rays are part of ultraviolet radiations which have wavelengths between 10 nm to 400 nm. But we have no idea what colors x-rays might reflect because we cannot see them.

With our increased knowledge of the eye, we can determine how the eye transmits its observations to the brain. Pantone.com has this excellent summary statement and this diagram:

Light receptors within the eye transmit messages to the brain, which produces the familiar sensations of color. Newton observed that color is not inherent in objects. Rather, the surface of an object reflects some colors and absorbs all the others. We perceive only the reflected colors.



White reflects all of the light, and black absorbs all of the light. It is like when black things get hotter in the sun and white things stay cooler. Pantone goes on to say:

Light travels into the eye to the retina, located on the back of the eye. The retina is covered with millions of light receptive cells called rods and cones ... Rods are most highly concentrated around the edge of the retina. There are over 120 million of them in each eye ... Six million cones in each eye transmit the higher levels of light intensity that create the sensation of color and visual sharpness ... When white light strikes a white object, it appears white to us because it absorbs no color and reflects all color equally. When it strikes a colored object, this color light is reflected back. A black object absorbs all colors equally and reflects none, so it looks black to us. [pantone.com/articles/color-fundamentals]

There are many things involved, of course, but this is one of the key reasons that the stealth aircraft, like the B2 bomber, are undetected by radar. The surface of the aircraft is covered with a material that absorbs the infrared microwaves that are sent out to detect it. So, none (or almost none) of them are reflected back. [ebSCO.com › research-starters › technology]

One more observation about light should be discussed because it is relevant to understanding the Bible. There are two kinds of gemstones. Most of these stones are the type that will not allow light to pass through them. But there are some that do when turned at a specific angle to polarized light. [Polarization of light is when the direction of the oscillation is perpendicular to the direction of motion of the wave.]

**Isotropic:** material always remains dark under cross polarized light.

**Anisotropic:** light passes through the crystal as it is rotated under crossed polars. When viewed in crossed-polarized light (“pure” light), anisotropic stones produce a colorful array—reflecting all the colors of the rainbow. [afloodofhope.com/post/gems-and-minerals]

## Summary and Conclusions about Color

1. White (clear) light contains all the colors of the rainbow. Wherever there is light, there can be color.
2. Light travels in wavelengths. Only wavelengths between 400 nm and 750 nm can be seen by humans, and they display themselves in the colors of the rainbow.
3. There is a subjective element to color in that the eye must be designed (created) to perceive it.
4. There is an objective element to color in that it exists even if no one sees it, like a rainbow.
5. We see an object as having a certain color because it absorbs all other colors and reflects the color we see.
6. Polarized light (directed white light) will shine through some gemstones displaying all the colors of the rainbow.

## Color In the Bible

God Himself Dwells In Color

- **1 Timothy 6:16**, *who alone possesses immortality and dwells in **unapproachable light**...*
- **Revelation 4:3**, *And He who was sitting was like a **jasper** stone and a **sardius** in appearance; and there was a **rainbow** around the throne, like an **emerald** in appearance.*

Since light is wavelengths, some of which we can see as color, light includes color. Since God dwells in unapproachable light, God is also surrounded by color, some of which humans can see (400–750nm). John describes that light as a rainbow, with a focus on jasper (most commonly red) and emerald (which is usually green).

In His Glorified Body, Jesus Is Seen with Light and Color

- **Matthew 17:2**, *And He was transfigured before them; and His face **shone like the sun**, and His garments became as **white as light**.*
- **Revelation 1:13-15**, *...and in the middle of the lampstands I saw one like a son of man, clothed in a robe reaching to the feet, and girded across His chest with a **golden sash**. His head and His hair were white like **white** wool, like snow; and His eyes were like a **flame of fire**. His feet were like **burnished bronze** when it has been made to glow in a furnace...*

Here we see some glimpses of Jesus in His glorified (normal) state. His face and much of His attire was shining like the sun. So that light is being reflected out and John saw it as white. But John could also see gold and the color of fire, which were somewhere between 570 and 750 nm.

There Was Color In Heaven at the Creation of Angels

The farthest back the Bible takes us in time is at the creation of angels. Ezekiel records God's statement about the creation of the angel Lucifer, who fell from heaven and became Satan (the devil). ["Lucifer" (KJV) is Latin for the Hebrew *Helel* ("shining one"), in English "Morning Star" (Isaiah 14:12 NAS).] When he was created, he was placed in a garden, described with stones of many colors that seem to be emitting or reflecting light so they appear like *stones of fire*.

- **Ezekiel 28:13-14**, *You were in Eden, the garden of God; every precious stone was your covering: the **ruby**, the **topaz** and the **diamond**; the **beryl**, the **onyx** and the **jasper**; the **lapis lazuli**, the **turquoise** and the **emerald**; And the **gold**, the workmanship of your settings and sockets, was in you. On the day that you were created they were prepared. You were the anointed cherub who covers, and I placed you there. You were on the holy mountain of God; you walked in the midst of the **stones of fire**.*

There Was Color In Heaven When John Was Given the Book of Revelation

- **Revelation 4:2-6**, *Immediately I was in the Spirit; and behold, a throne was standing in heaven, and One sitting on the throne. And He who was sitting was like a **jasper** stone and a **sardius** in appearance; and there was a **rainbow** around the throne, like an **emerald** in appearance ... And there were seven lamps of **fire** burning before the throne, which are the seven Spirits of God and before the throne there was something like a **sea of glass, like crystal** ...*

God Created Color on Earth the First Day of Creation on the Earth

God created light, which we know contains the wavelength humans can see as color (from 400 to 750 nm).

- **Genesis 1:2-4**, *The earth was formless and void, and darkness was over the surface of the deep, and the Spirit of God was moving over the surface of the waters. Then God said, "Let there be light"; and there was light. God saw that the light was good; and God separated the light from the darkness.*

Interestingly, color could not have evolved because it is not alive. It could be said (fanaticized) that the human eye evolved to see color, but the color we see had to already exist in the form of wavelengths, some of which we see as color. But when God created light, it was made up of wave lengths that included those we see as color. But light also was created as infrared rays, ultraviolet rays, radio waves, gamma rays, microwaves, and X-rays. All these are different forms of the light which could not have evolved because they are not alive.

## God Put Color In the Sky In the Form of a Rainbow

Now, everyone could see that color was associated with light. The rainbow colors appear on the earth when, after the Flood:

- **Genesis 9:12-16**, *God said, "I set My bow in the cloud, and it shall be for a sign of a covenant between Me and the earth..."*

Before the Flood, the earth was covered with what appears to be a water-vapor canopy. On the second day of creation,

- **Genesis 1:6-7**, *God said, "Let there be an expanse in the midst of the waters, and let it separate the waters from the waters." God made the expanse, and separated the waters which were below the expanse from the waters which were above the expanse; and it was so.*
- **Ezekiel 1:28**, *As the appearance of the **rainbow** in the clouds on a rainy day.*

It seems that this expanse God created became rain at the time of the Flood of Noah. After that, the sun could reflect off water drops, displaying the colors of the rainbow, as the light waves from the sun were bent to between 400 and 750 nm.

## God Built Color Into the Tabernacle Constructed In the Wilderness

- **Exodus 26:1**, *Moreover you shall make the tabernacle with ten **curtains** of fine twisted linen and **blue and purple and scarlet** material; you shall make them with cherubim, the work of a skillful workman.*

Also, the Ark of the Covenant, the implements for the tabernacle, and the lampstand, were all made of **gold** or overlaid with gold (Exodus 37). The robe of the high priest was **blue, purple, and scarlet** material, with 12 stones corresponding to the twelve tribes: **ruby, topaz, emerald, turquoise, sapphire, diamond, jacinth, agate, amethyst, beryl, onyx, jasper**, all set in gold (Exodus 39). Also, the stones in the high priest's breastplate were different colors.

## God Put Color Into the New Jerusalem, the Huge City of the New Earth

- **Revelation 21:19-20**, *The foundation stones of the city wall [the New Jerusalem] were adorned with every kind of precious stone. The first foundation stone was **jasper**; the second, **sapphire**; the third, **chalcedony**; the fourth, **emerald**; the fifth, **sardonyx**; the sixth, **sardius**; the seventh, **chrysolite**; the eighth, **beryl**; the ninth, **topaz**; the tenth, **chrysoprase**; the eleventh, **jacinth**; the twelfth, **amethyst**.*

We learned that light does not pass through most gemstones (called Isotropic stones). But we have discovered that there are some gemstones (called Anisotropic stones) that polarized light will pass through, when the stone is turned at a specific angle. When that light passes through the stone, it produces a colorful display, reflecting all the colors of the rainbow. What is fascinating about this is that **all** the foundation stones of the New Jerusalem are Anisotropic stones. The technology that discovered that some stones were Anisotropic began in the 1800s. There is no way the Apostle John would know which stones were Anisotropic, since the appearance of the stone does not reveal its ability to let light pass through it. For example, jasper appears to be a solid red stone, but it is Anisotropic, whereas diamonds look like light would pass through them, but it doesn't. It has been estimated that for John to choose all 12 stones to be Anisotropic by chance would be over 16,000-to-one. And each of these stones are producing a rainbow of color as polarized light is passing through them. The New Jerusalem seems to be a very colorful place! [afloodofhope.com/post/gems-and-minerals]

## Questions

- Since we are created a little lower than the angels but higher than animals, do angels see more color than we do?
- Will we see a bigger range of color in heaven (1 Corinthians 2:9)?