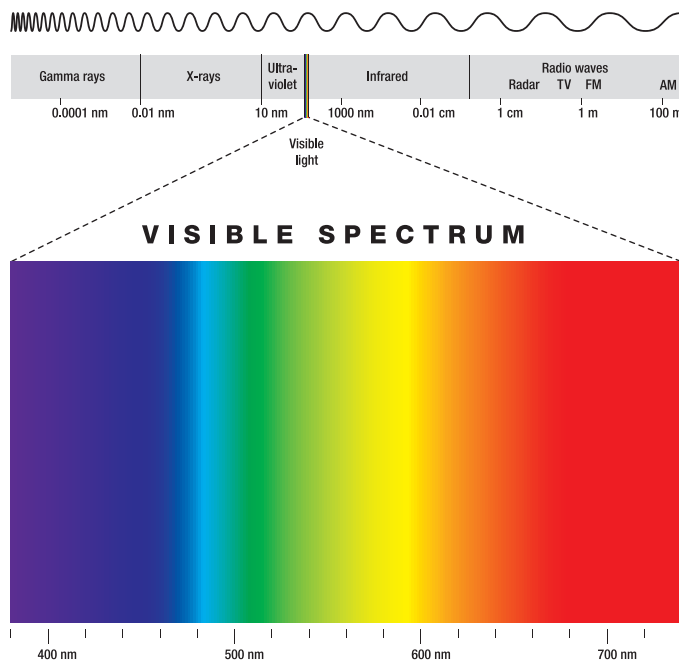


# Blue Light and Your Eyes

## What is blue light?

Sunlight is made up of red, orange, yellow, green, blue, indigo and violet light. When combined, it becomes the white light we see. Each of these has a different energy and wavelength. Rays on the red end have longer wavelengths and less energy. On the other end, blue rays have shorter wavelengths and more energy. Light that looks white can have a large blue component, which can expose the eye to a higher amount of wavelength from the blue end of the spectrum.



## Where are you exposed to blue light?

The largest source of blue light is sunlight. In addition, there are many other sources:

- Fluorescent light
- CFL (compact fluorescent light) bulbs
- LED light
- Flat screen LED televisions
- Computer monitors, smart phones, and tablet screens

Blue light exposure you receive from screens is small compared to the amount of exposure from the sun. And yet, there is concern over the long-term effects of screen exposure because of the close proximity of the screens and the length of time spent looking at them. According to **a recent NEI-funded study**, children's eyes absorb more blue light than adults from digital device screens.



# Blue Light and Your Eyes—Continued

## What are the benefits of blue light?

Blue light is needed for good health:

- It boosts alertness, helps memory and cognitive function and elevates mood.
- It regulates circadian rhythm – the body’s natural wake and sleep cycle. Exposure to blue light during daytime hours helps maintain a healthful circadian rhythm. Too much exposure to blue light late at night (through smart phones, tablets, and computers) can **disturb the wake and sleep cycle**, leading to problems sleeping and daytime tiredness.
- Not enough exposure to sunlight in children could affect the growth and development of the eyes and vision. **Early studies** show a deficiency in blue light exposure could contribute to the recent increase in myopia/nearsightedness.

## How does blue light affect the eye?

Almost all visible blue light passes through the cornea and lens and reaches the retina. This light may affect vision and could prematurely age the eyes. Early research shows that too much exposure to blue light could lead to:

**Digital eyestrain:** Blue light from computer screens and digital devices can decrease contrast leading to **digital eyestrain**. Fatigue, dry eyes, bad lighting, or how you sit in front of the computer can cause eyestrain. Symptoms of eyestrain include sore or irritated eyes and difficulty focusing.

**Retina damage:** **Studies** suggest that continued exposure to blue light over time could lead to damaged retinal cells. This can cause vision problems like **age-related macular degeneration**.

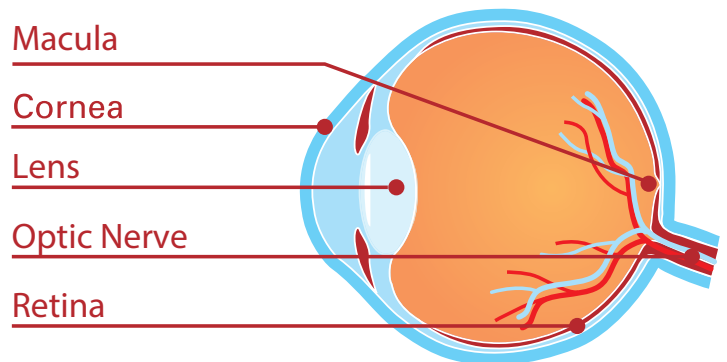
## What can you do to protect your eyes from blue light?

If constant exposure to blue light from smart phones, tablets, and computer screens is an issue, there are a few ways to decrease exposure to blue light:

**Filters:** Screen filters are available for smart phones, tablets, and computer screens. They decrease the amount of blue light given off from these devices that could reach the retina in our eyes.

**Computer glasses:** Computer glasses with yellow-tinted lenses that block blue light can help ease computer digital eye strain by increasing contrast.

**Anti-reflective lenses:** Anti-reflective lenses reduce glare and increase contrast and also block blue light from the sun and digital devices.



## Blue Light and Your Eyes—Continued

**Intraocular lens (IOL):** After **cataract** surgery, the cloudy lens will be replaced with an intraocular lens (IOL). The lens naturally protects the eye from almost all ultraviolet light and some blue light. There are types of IOL that can protect the eye and retina from blue light.

Talk to an eye care professional about options about ways to protect your family and your eyes from blue light.

### For more information:

Prevent Blindness: Computers and Your Eyes

<http://www.preventblindness.org/computers-and-your-eyes>

All About Vision: Blue Light: Bad for Your Eyes?

<http://www.allaboutvision.com/cvs/blue-light.htm>

American Optometric Association: Light and Eye Damage

<http://www.aoa.org/Documents/CRG/Blue%20Light%20and%20Eye%20Damage.pdf>

The Vision Council: Digital Eye Strain

<https://www.thevisioncouncil.org/content/digital-eye-strain>

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