



taking on disability together

Lumos Maxima!...Not So Fast!

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Disclosure: I have no relevant financial or nonfinancial relationship to disclose other than being an employee of Easterseals Crossroads.

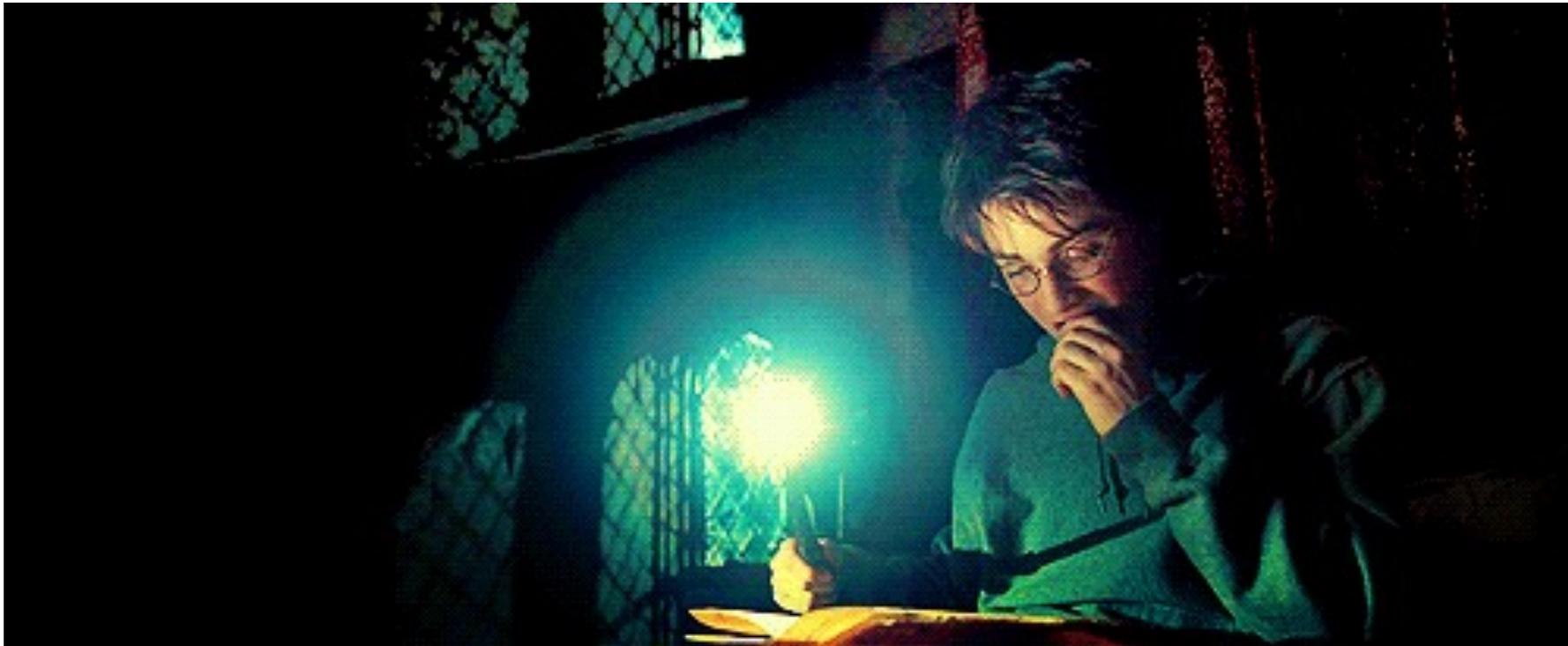
Learning Objectives

1. To explore the lighting effects on our daily activities.
2. To learn how to measure the brightness levels and color temperatures wherever you are with Assistive Technology.
3. To learn how to detect light, scan and read text, identify objects, faces and colors with the Sullivan+ app.
4. To understand what to look for when shopping for light bulbs and lamps for your home and the options in the market.
5. To identify solutions beyond lighting in an environment that you cannot control.

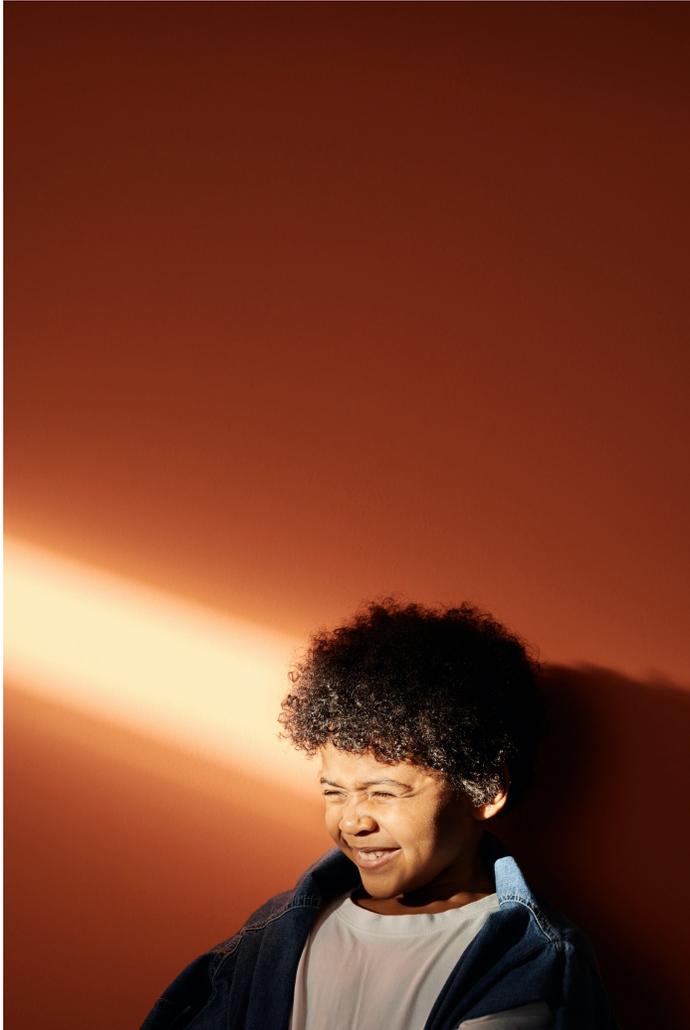
Lumos Maxima!

What does this charm do?

Lumos Maxima!



Lumos Maxima!



Four Main Lighting Effects

1. Sleep

2. Focus

3. Mood

4. Health

Lighting Effect on Sleep

- According to the Cleveland Health Clinic's research using data from the Defense Meteorological Satellite Program, "those who had [light exposure](#) while sleeping got about 10 minutes less sleep per night. They also were more likely to report fatigue, wake up confused during the night, and have excessive sleepiness and impaired functioning during the day."



Lighting Effect on Sleep

- “Those who lived in cities with a population of 500,000 or more were exposed to street-lights three to six times more intense than those who lived in lesser-populated areas.”

~ Courtesy of <https://health.clevelandclinic.org/light-night-can-interfere-sleep/>.



Bright Light Effect

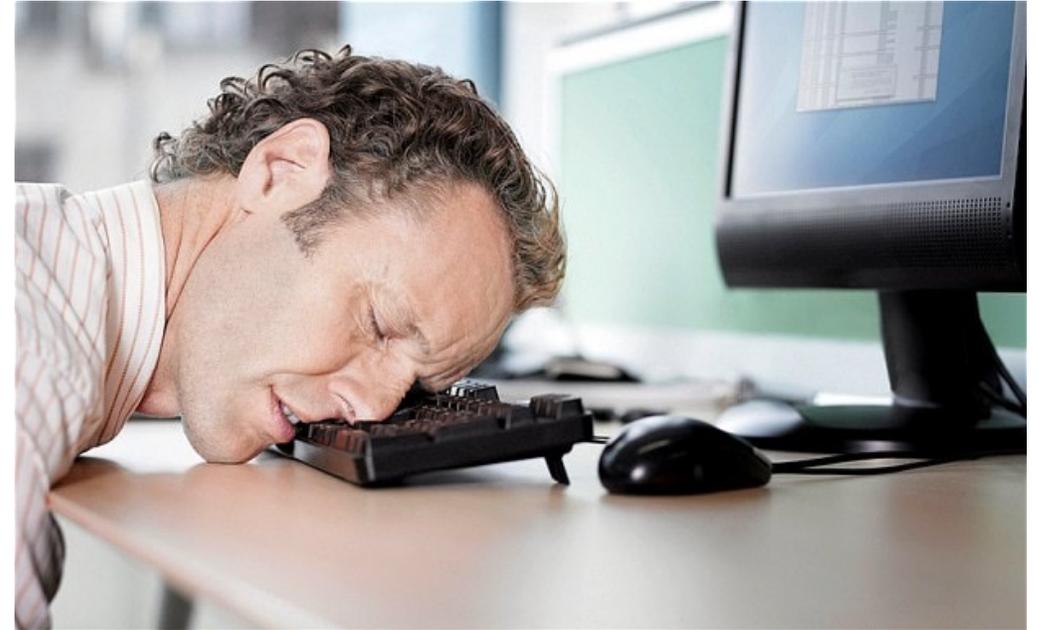


Lighting Effect on Activities

- Will staring at direct sunlight hurt your eyes?
- Absolutely! Please do not do that. According to University of Utah Health, <https://healthcare.utah.edu/healthfeed/postings/2021/11/reading-in-low-light.php>, “the sun produces ultraviolet rays that can damage your cornea, lens, and retina. Even the best sunglasses can't block UV rays completely. And never, ever look directly at a solar eclipse, as that can cause blindness.”

Lighting Effects on Focus

A study conducted by the American Society of Interior Design indicated that 68 percent of employees complain about the lighting situation in their offices. Studies are finding that poor lighting can be [detrimental to productivity at work](#), specifically dim lighting. Working in a room with lights that are too dim can cause the eyes to be strained and even results in headaches and/or migraines. Insufficient lighting can also lead to drowsiness at work and difficulty maintaining focus and motivation.



Lighting Effect on Activities

- Will reading in dim light cause permanent damage in your eyes?
- There is no evidence that it will do so directly. However, some studies suggest that it will put strain on your eyes. According to New York University Health – Scienceline Newsletter, <https://scienceline.org/2007/10/ask-peck-darkeyesmyopia/#>, to read close objects in the dark, “the ciliary muscle around the lens of your eye contracts, reshaping it so that light flooding in is redirected to a focal point at the back of the eye.”
- “Many people report headaches and even nausea, the reason being they become tense from muscles that are working harder than normal to focus images.”

Lighting Effect on Activities

- If not dim light, should we always read with bright light?
- Not always, it depends.



Lighting Effects on Focus

- Harsh lighting can be just as detrimental. Excessively bright, fluorescent lights can also trigger headaches and/or migraines, and employees working in these conditions are found to be less satisfied with their jobs.



Some Lighting Solutions

- Install high-quality, flexible lighting.
- Have a dimmer on the lighting systems in your home and in your office.
- Have the freedom to change the morning lighting and evening lighting in your home.
- Change the surroundings beyond lighting.
- Some other solutions for the scenarios that you cannot change your environment.

Lighting Psychology

- According to Border States, <https://solutions.borderstates.com/how-lighting-affects-mood/>, “Lighting Psychology helps us understand how people respond cognitively and emotionally to light. Once you know how different lighting choices impact people, you can adjust it to reflect the purpose of the room.”
 1. Impact of Positioning
 2. Impact of Brightness
 3. Impact of Hue and Saturation

Lighting Psychology

1. Impact of Positioning

According to TCPI, <https://www.tcpi.com/psychological-impact-light-color/>, “lighting positioned *above eye level* can create a feeling of restraint, creating a more formal atmosphere. On the other side, lighting positioned *below eye level* can provoke a feeling of individual importance, creating a more informal atmosphere.”

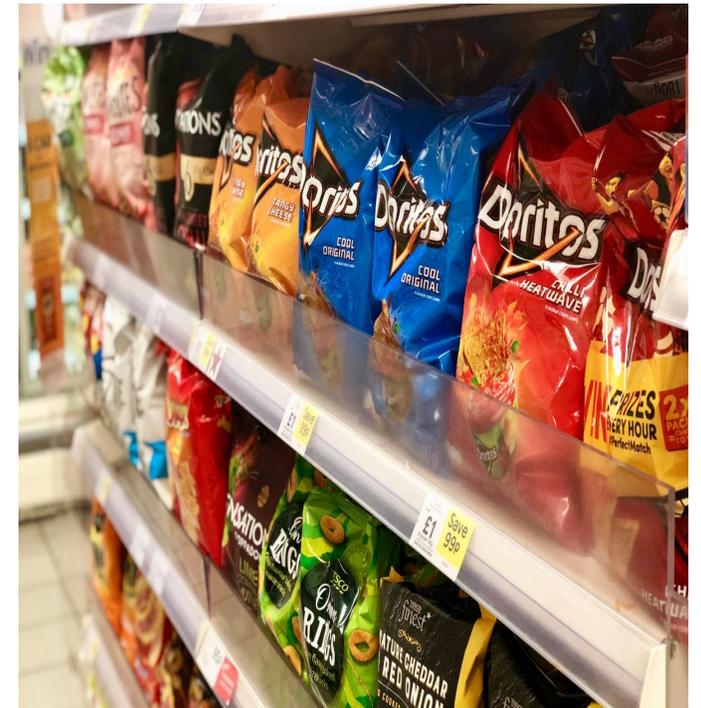


Lighting Psychology

2. Impact of Brightness

A bright light “helps to make sense of an environment ... making it a more pleasant space,” according to [Robert Davis](#), who has a doctorate in cognitive psychology. Here are some more research findings:

- A light’s relative brightness compared to surrounding light can also impact us psychologically, according to an [Electrical Contractor](#) magazine article. In a grocery store, for example, relative brightness can draw attention to snacks on shelves in the checkout lane.
- [One study found](#) that people eating in dimly lit restaurants ordered 39% more calories than people sitting in brighter restaurants. Those in well-lit areas were also more likely to order healthy foods.



Lighting Psychology

3. Impact of Hue and Saturation

According to an article on office lighting from the UNC Kenan-Flagler Business School,

Cool, blueish light or daylight improves alertness and productivity, so it's a good choice for brainstorming rooms.

White light is welcoming and works well in conference rooms.

Warm, red to yellowish light creates a relaxed atmosphere, so it's best in break rooms.

“Blue wavelengths — which are beneficial during daylight hours because they boost attention, reaction times, and mood — seem to be the most disruptive at night,” a Harvard Health letter explains.

Lighting Psychology

3. Impact of Hue and Saturation

One 2017 research study, though, concluded that the interactions between hue, saturation and brightness can affect heart rate and emotions.

The study found that red, saturated and bright colors had the greatest emotional effect. Blue also influenced emotions, but only when highly saturated.



Lighting Psychology

- Depends on one's personal experiences, cultural patterns and situational trends.
- We subconsciously make a “mental match” between the lighting and the surrounding and remind ourselves what the environment means to us in future similar situations.



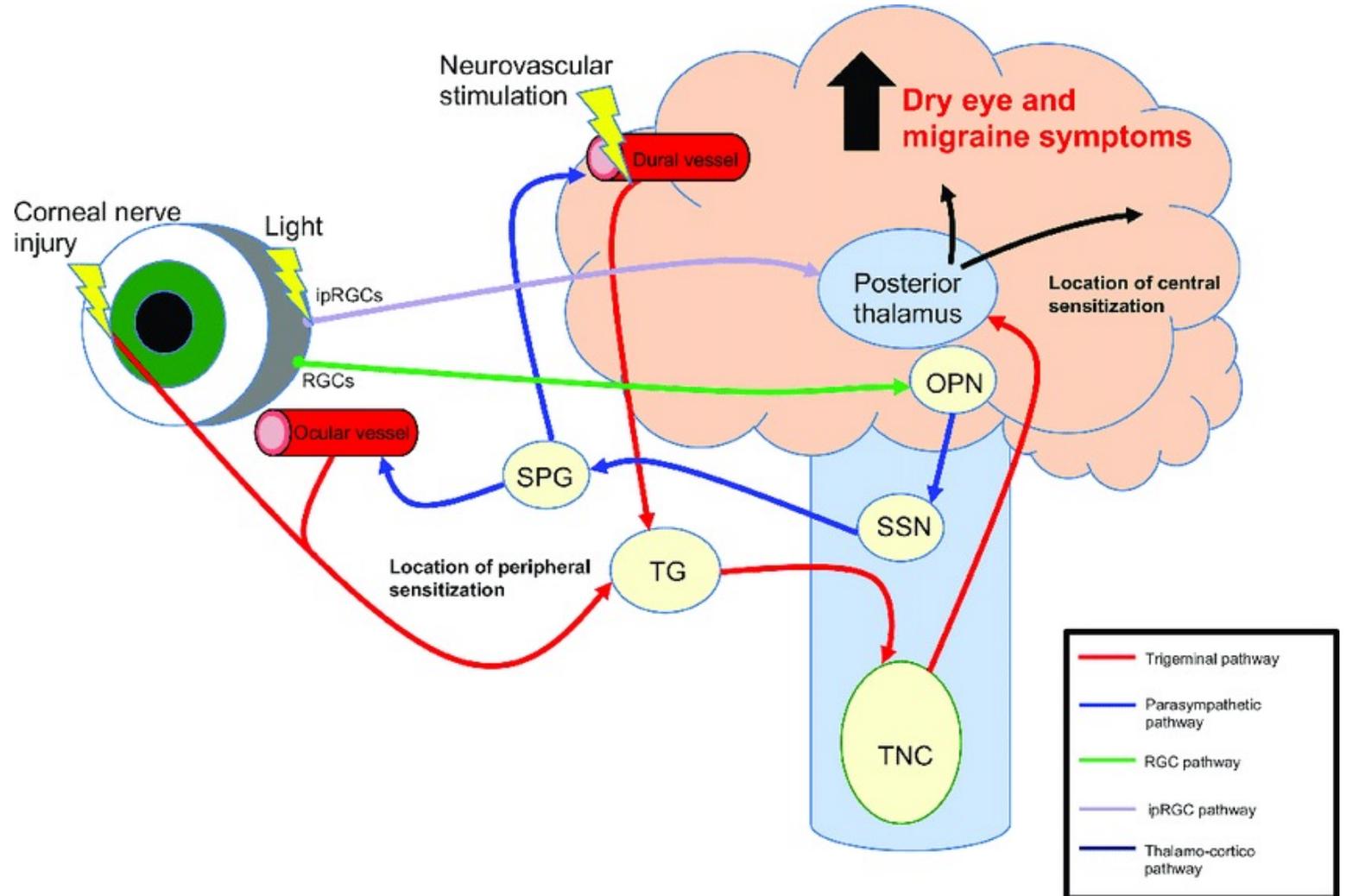
Photophobia - Light Sensitivity

- According to WebMD, “If you have Photophobia, you’re not actually afraid of light. But you are very sensitive to it.”
- Migraine headaches, dry eyes, and swelling inside your eye are commonly linked to light sensitivity.

Photophobia - Light Sensitivity

Cause:

- Linked to the connection between cells in your eyes that detect light and a nerve that goes to your head.



Photophobia - Light Sensitivity

A few brain conditions can cause photophobia, including:

- Meningitis (swelling of the protective coverings of your brain and spinal cord)
- Serious brain injury
- Supranuclear palsy (a brain disorder that causes problems with balance, walking, and eye movement)
- Tumors in your pituitary gland

Photophobia - Light Sensitivity

Some eye diseases cause this symptom, including:

- Dry eye
- Uveitis (swelling of the inside of your eye)
- Keratitis (swelling of your cornea, the clear layer that covers the colored part of your eye)
- Iritis (swelling of the colored ring around your pupil)
- Cataracts (cloudy coverings over the lenses of your eyes)
- Corneal abrasion (a scratch on your cornea)
- Conjunctivitis (inflammation of the conjunctiva, the clear tissue that sits over the white part of your eye)
- Damage to your retina, the light-sensitive layer in the back of your eye
- Blepharospasm (a condition that makes your eyelids close uncontrollably)

Photophobia - Light Sensitivity

Photophobia may also affect some people who have these mental health conditions:

- Agoraphobia (a fear of being in public places)
- Anxiety
- Bipolar disorder
- Depression
- Panic disorder
- You can also get photophobia after you have LASIK or other surgery to fix vision problems.



Light Sensitivity Disabilities

- Migraine Sufferer – LED light can trigger a debilitating migraine
- Autism – The unnatural characteristics can trigger severe emotional trauma.
- PTSD – A high luminance light may trigger flashbacks.
- Epilepsy – A flashing, high luminance light may trigger a seizure.
- Cancer – LED light at night can affect the immune system and reduce the body's ability to fight cancerous cells.
- Lupus – LED light can trigger inflammation and pain

How to Properly Light Your House



Glossary for Lighting

Lux

A unit of illumination in the International System of Units (SI). One lux (Latin for “light”) is the amount of illumination provided when one lumen is evenly distributed over an area of one square meter.

Courtesy of www.britannica.com/science/lux

Lumens

A lumen is a measure of the amount of brightness of a lightbulb -- the higher the number of lumens, the brighter the lightbulb.

Courtesy of www.energy.gov/energysaver/lumens-and-lighting-facts-label

Kelvins

The kelvin (abbreviation K), less commonly called the degree Kelvin (symbol, ° K), is the Standard International (SI) unit of thermodynamic temperature.

Courtesy of www.techtarget.com/whatis/definition/kelvin-K

CFL Bulbs – Compact Fluorescent Lightbulbs

LED Lightbulbs – Light Emitting Diode Lightbulbs



LED Brightness

LED Brightness

LED LUMENS TO WATTS CONVERSION CHART

BRIGHTNESS IN LUMENS		200+	400+	700+	900+	1300+
	STANDARD	25W	40W	60W	75W	100W
	HALOGEN	18W	28W	42W	53W	70W
	CFL	6W	9W	12W	15W	20W
	LED	4W	6W	10W	13W	18W

Lighting Recommendations by Room or Task

Courtesy of:

<https://www.thoughtco.com/lighting-levels-by-room-1206643>

Kitchen	General	300 lux
	Countertop	750 lux
Bedroom (adult)	General	100–300 lux
	Task	500 lux
Bedroom (child)	General	500 lux
	Task	800 lux
Bathroom	General	300 lux
	Shave/makeup	300–700 lux
Living room/den	General	300 lux
	Task	500 lux
Family room/home theater	General	300 lux
	Task	500 lux
	TV viewing	150 lux
Laundry/utility	General	200 lux
Dining room	General	200 lux
Hall, landing/stairway	General	100–500 lux
Home office	General	500 lux
	Task	800 lux
Workshop	General	800 lux
	Task	1,100 lux

Devices to Measure Lighting



URCERI Light Meter
Digital Illuminance
Meter \$29.99



Light Meter LX1330B
Illuminance Digital
Luxmeter \$55.72



REED Instruments
R8100SD Data Logging
Light Meter \$199

ILT350 Chroma Meter

Cost: \$1,441

Features:

- 3.5" full color display
- Hand-held, ergonomic, compact design
- Measures Illuminance, Irradiance, PPF, Lux, Foot-Candles, CCT, CRI, CIE1931 color spectrum & more
- Measurement Range: 380 - 780 nm
- Lux Measurement Range: 20 to 100,000 lux
- <https://www.intl-lighttech.com/products/ilt350-chroma-meter?msclkid=1cdc1bbc0aed155899e37975e34cf9c0>



Apps to Measure Lighting or Detect Light

- Lux Light Meter Free
- Lux Light Meter Pro
- Helios

Lux Light Meter Free

Cost: Free

Platforms: iOS and Android

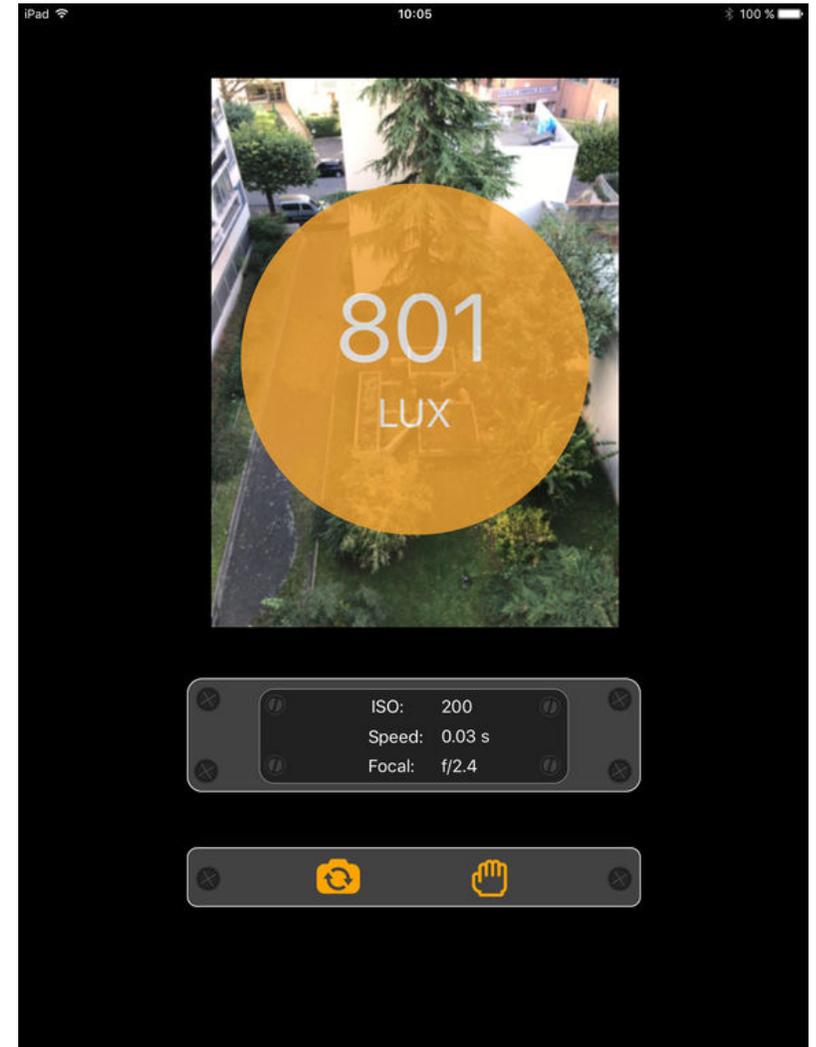
Seller: Nipakul Buttua

Rating: 2.8 out of 5



What does it do?

- Measures the amount of light instantly in lux.
- A camera view allow you to view the area you want to measure. you can choose between the front and rear camera.



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Cost: 3-day free trial, then \$1.99 per month or \$7.99 one-time purchase

Platforms: iOS

Seller: Marina Polyanskaya

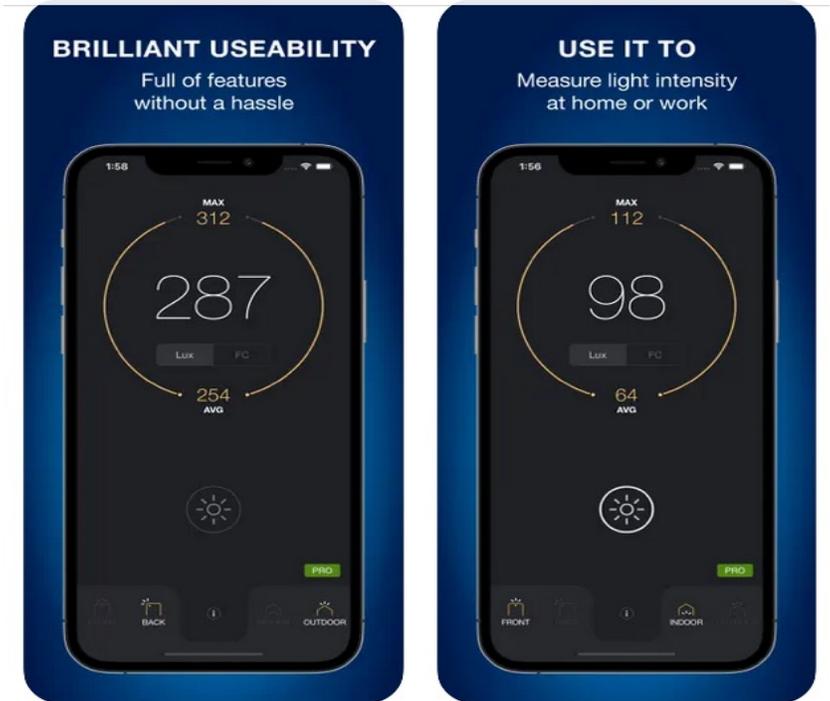
Rating: 4 out of 5

There are many similar apps with the same names on Android.

What does it do?

Collects light intensity data, such as the maximum and average lux, for setting up your greenhouse light settings, avoiding workplace lighting induced eye strain, or checking if your desk or craft station needs a bit more light.

Lux Light Meter Pro



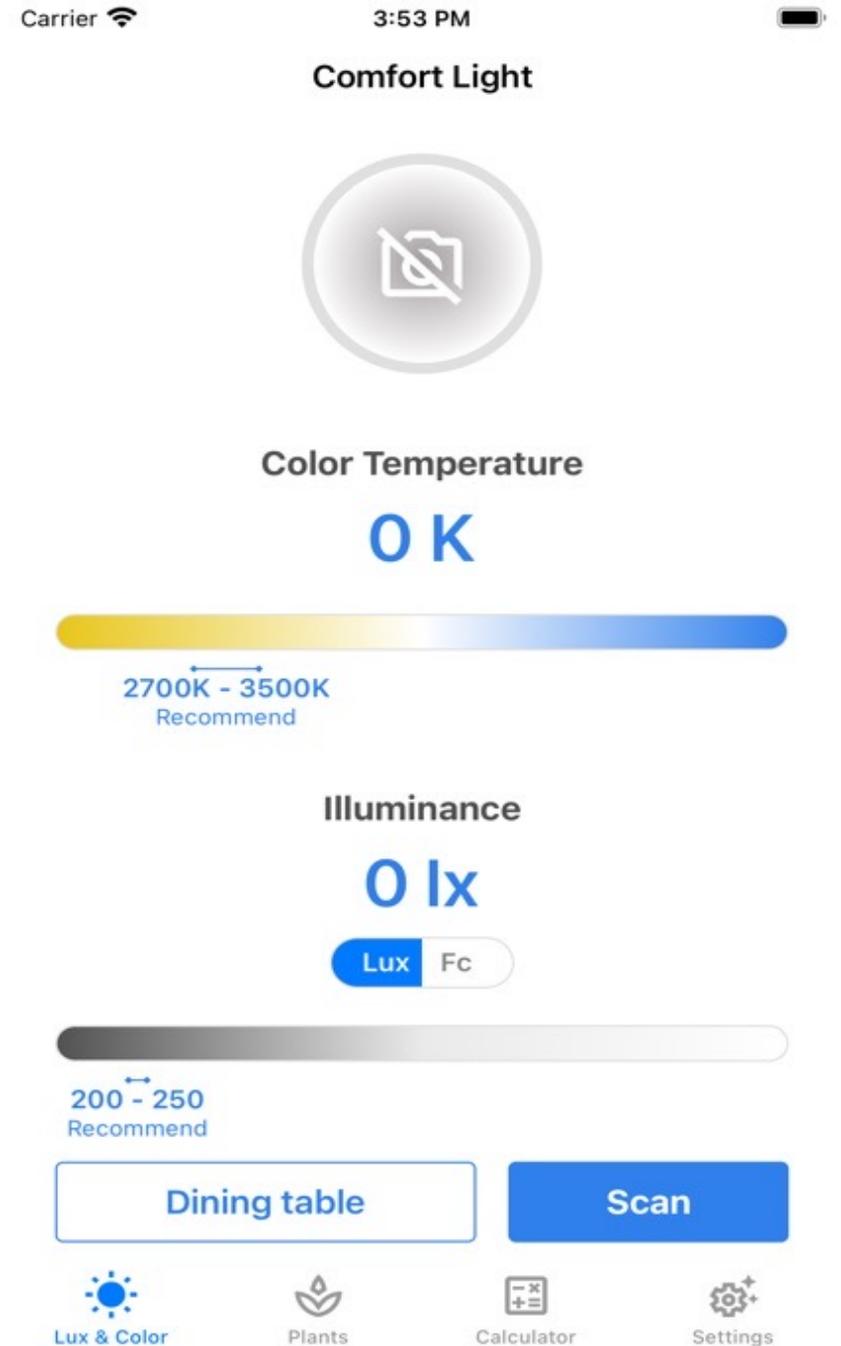
The Helios

Cost: Limited Version is Free.

Premium Access: 3-day free trial, \$3.99 per 7 days, \$9.99 per 3 months

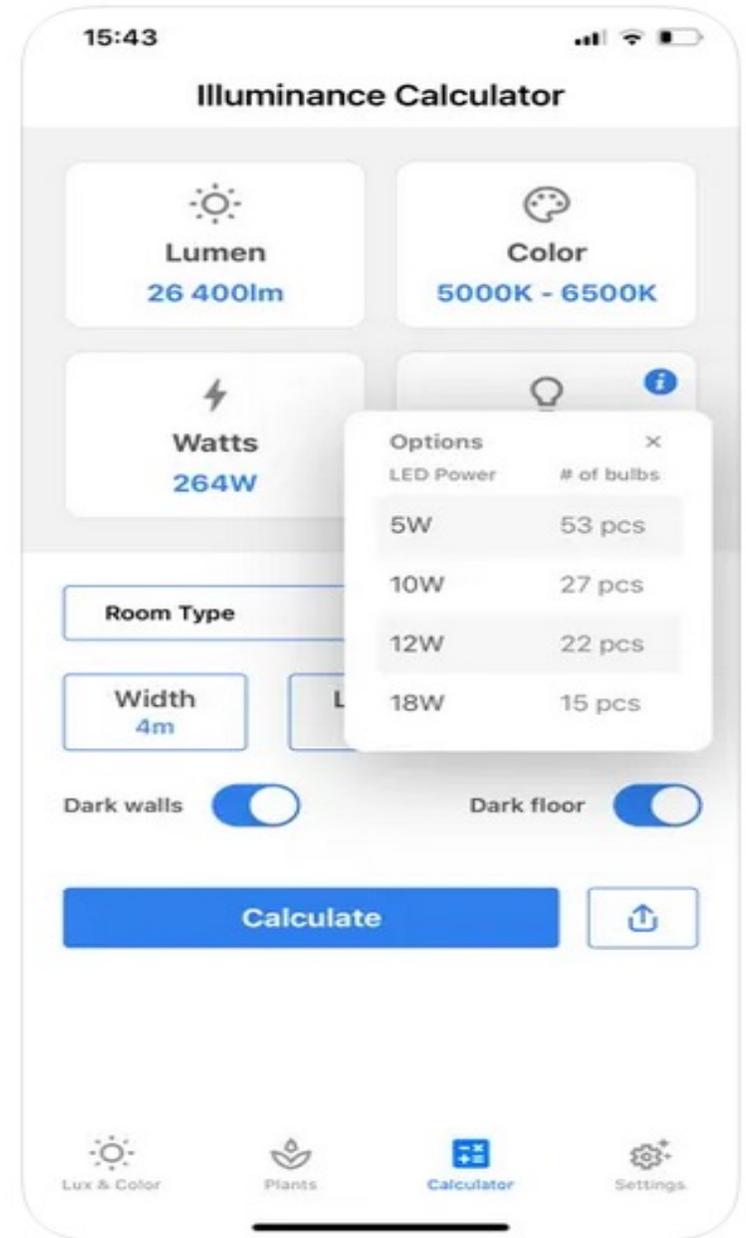
What does it do?

- Recommends the lux and color temperature for the room chosen.
- Uses the rear camera to measure the lighting and color temperature in the current room.



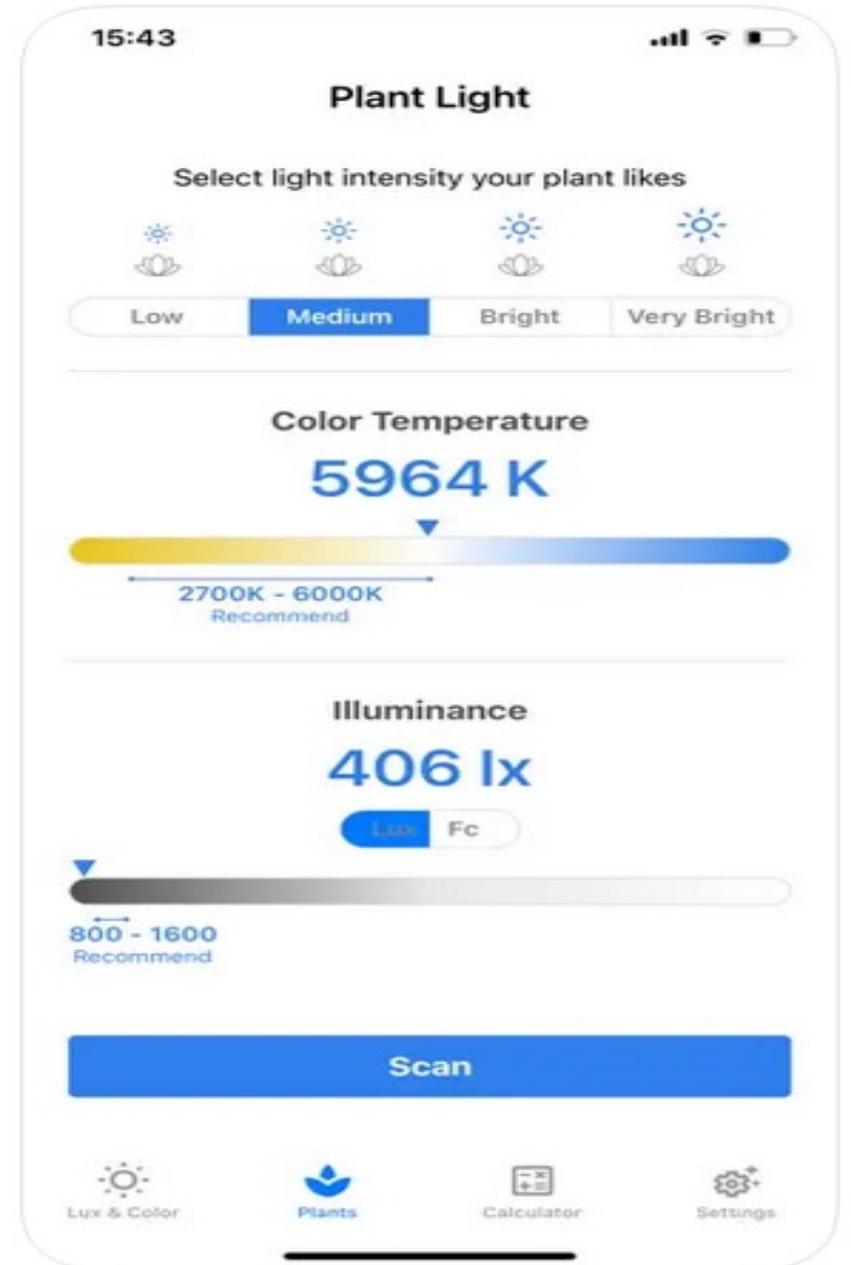
The Helios

- Calculates the lumen, color, watts and the number of LED bulbs to light up the room once you enter its width, length and height.



The Helios

- Recommends the color temperature, illuminance for the light intensity your plant likes, and scans the environment.



Sullivan+

- Cost: Free
- Developer: TUAT Corp
- Platforms: iOS, iPadOS and Android
- Various modes to inform users about information perceived by their smartphone camera lens

Sullivan+

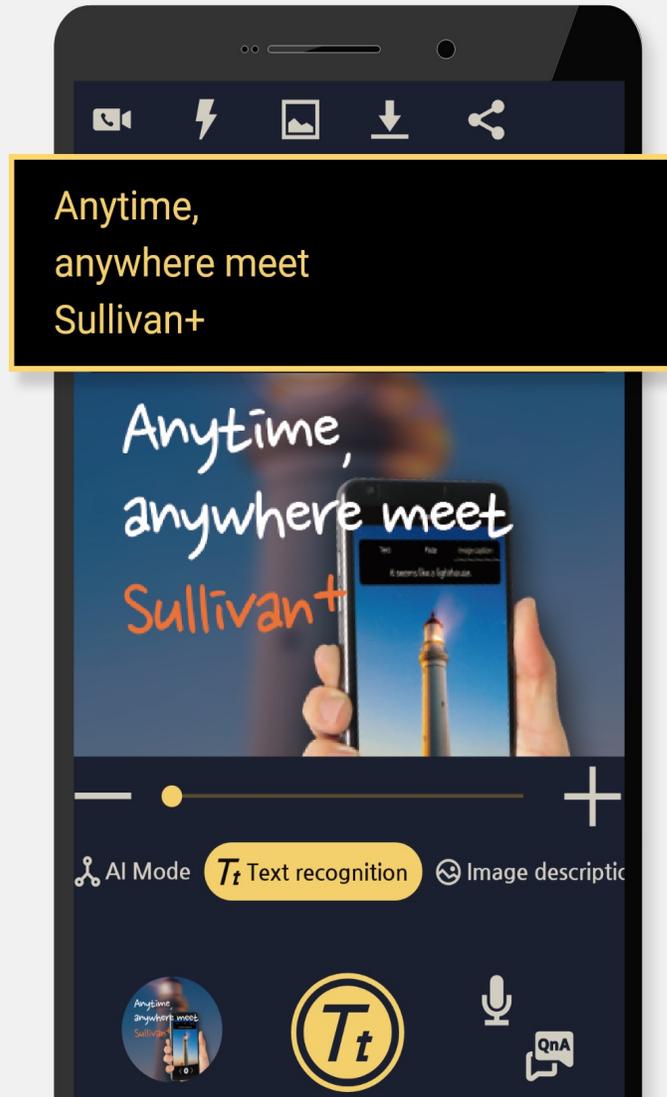
- Reads text (via the text recognition mode or the fast text mode if it is on Android)
- Recognizes objects or images
- Recognizes faces
- Identifies colors
- Magnifies images and text
- Detects the brightness
- AI mode automatically informs the most appropriate results in either text, face or image recognition mode.



Sullivan+

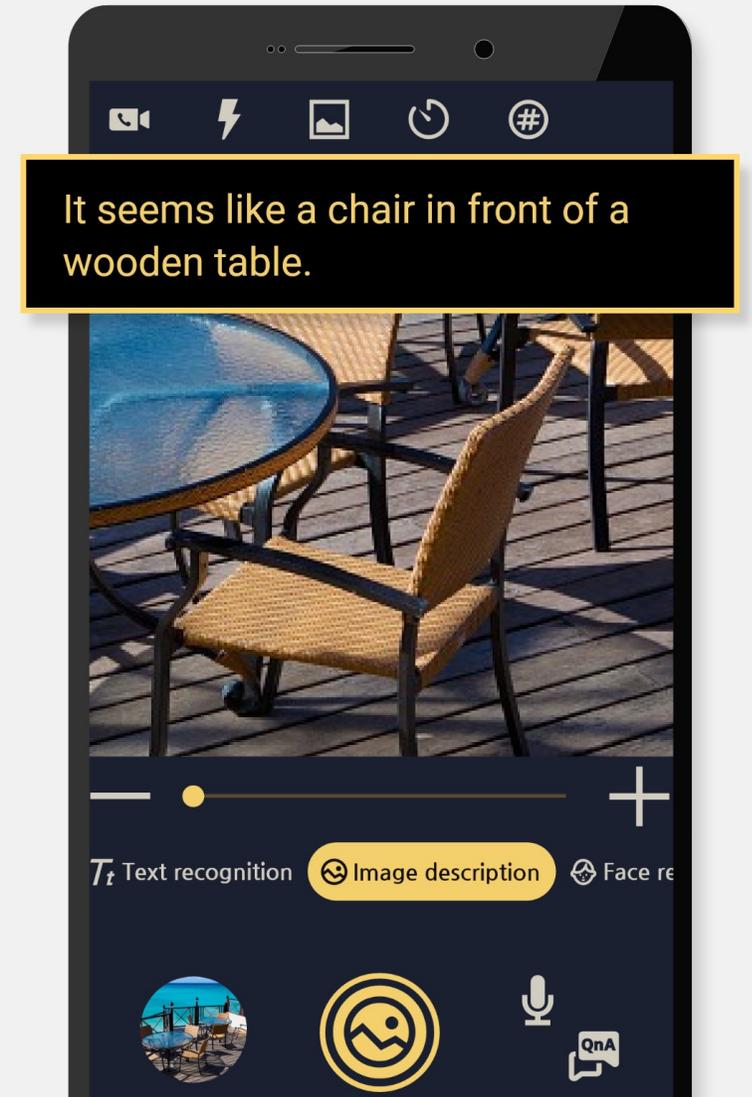
The function to extract the texts included in the shot image.

Text Recognition



The function to identify nearby objects and make sentences.

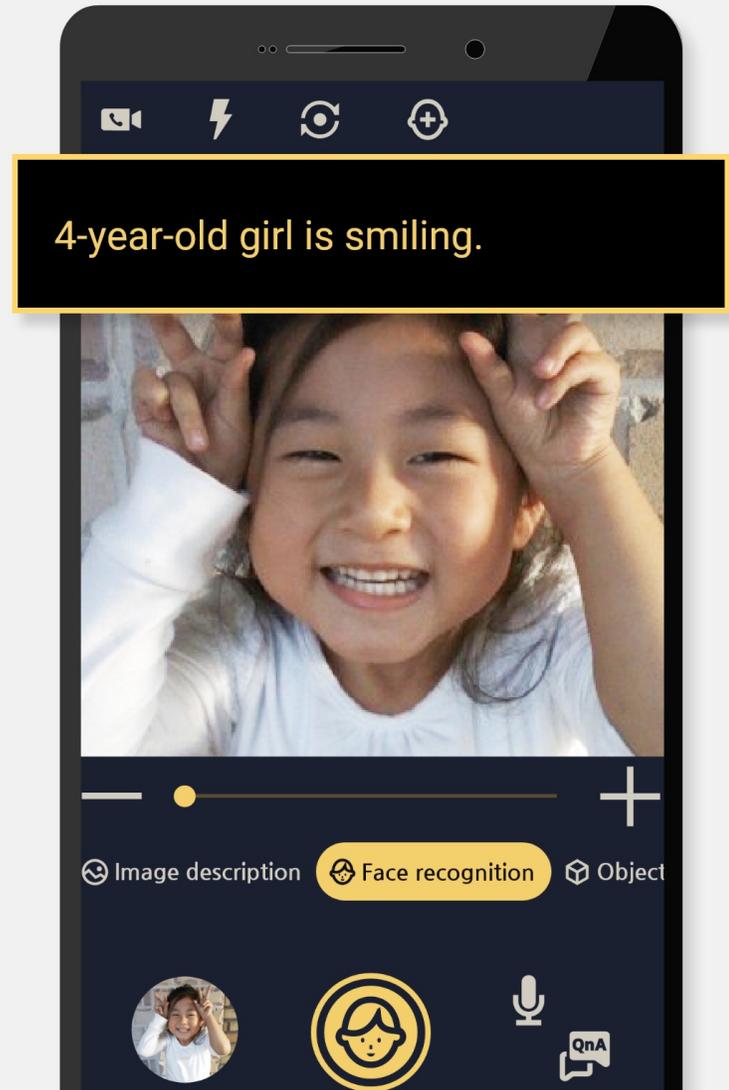
Image Description



Sullivan+

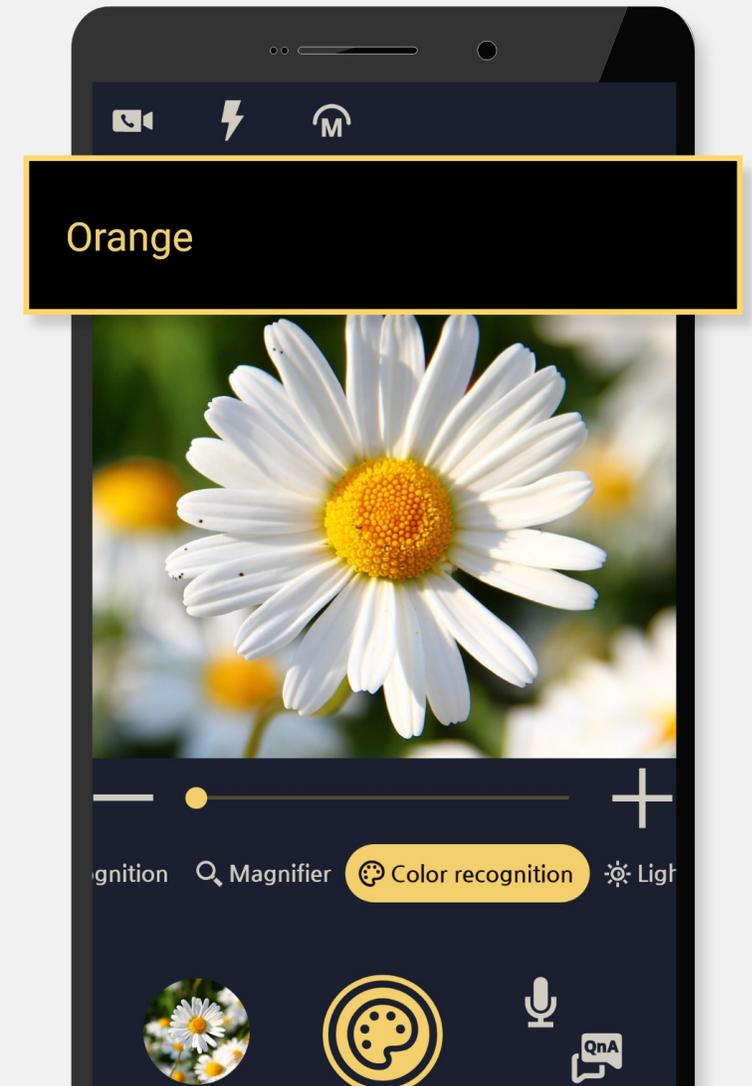
The function to identify people,
to estimate age and gender

Face Recognition



The function to inform a single color
or an entire color in the shot image

Color Recognition



Sullivan+

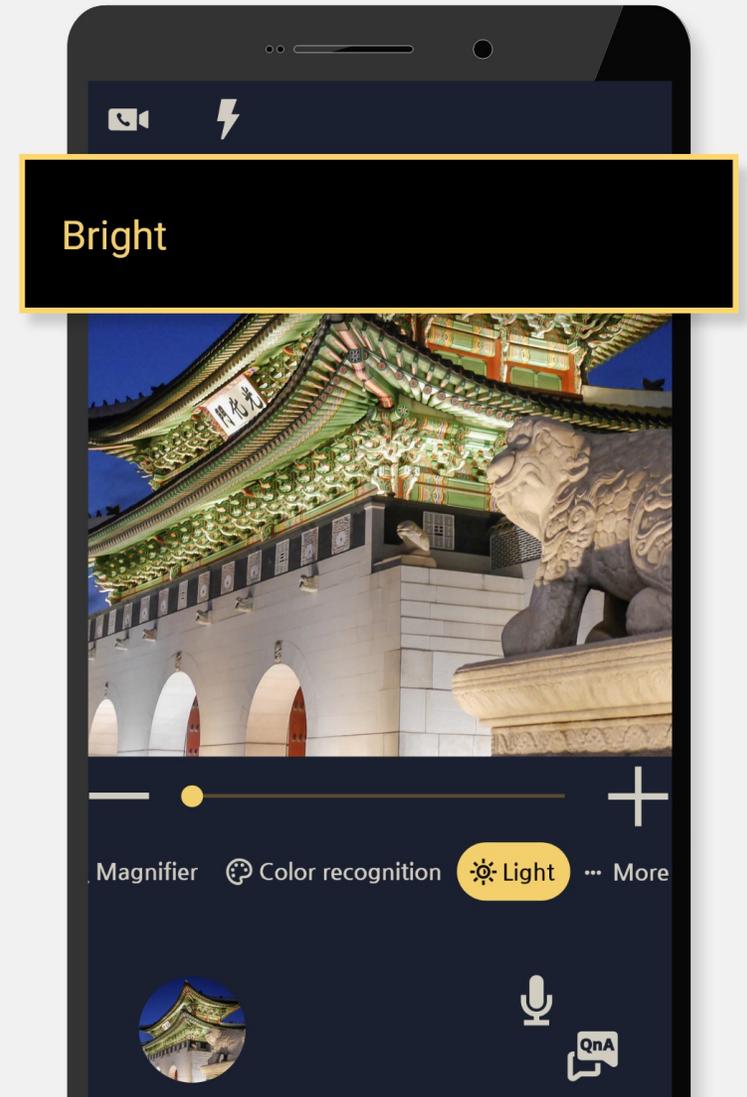
The function to enlarge, reduce and reverse to color

Magnifier



The function to inform light brightness through sound

Light Brightness

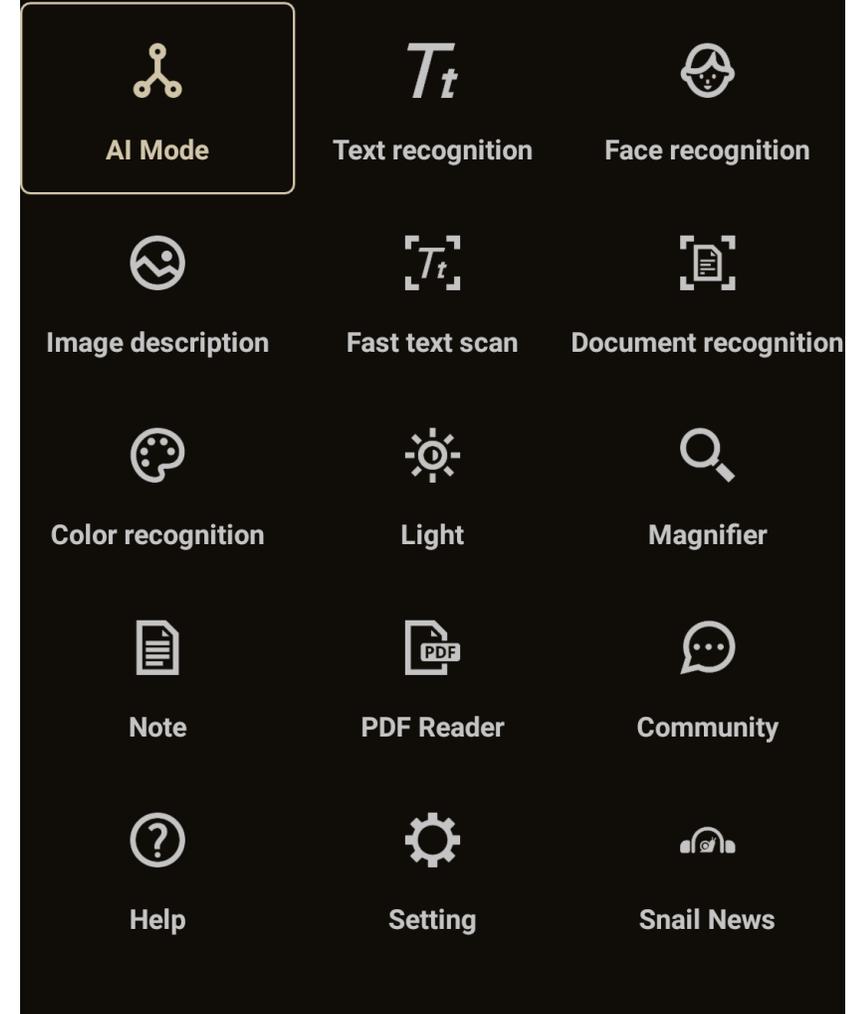
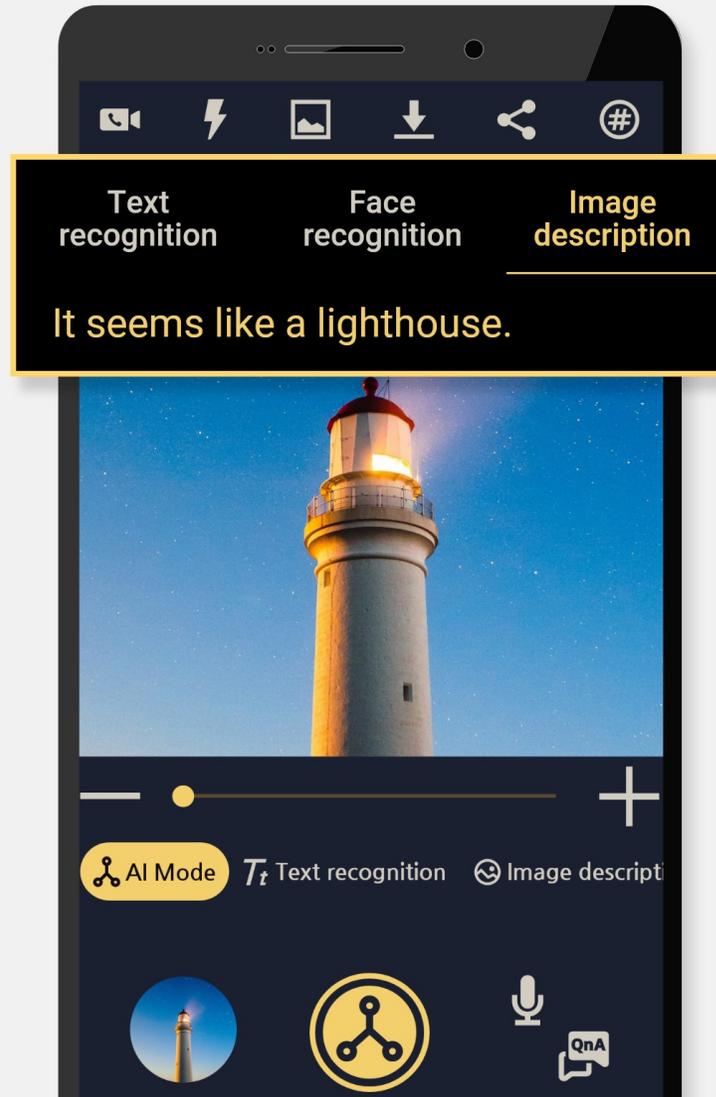


Sullivan+

- Creates notes
- Reads PDF Files
- How to Use Guide
- Tutorials
- Guidance in mode, function and permission

Automatically, the ability to inform the most appropriate results

AI Mode



Ways to Control Your Lighting in Your Environment

1. Lamps
2. Adjustable LED Lightbulbs
3. Blackout curtains
4. Walls Paint Colors

Types of Lamps

1. Floor Lamps
2. Desk Lamps
 - Computer Monitor Lamps
 - Smart Sleep Lamps
3. Wearable Lamps
4. Adjustable LED Lamps and Lightbulbs

Types of Lamps

1. Floor Lamps

- Lighting affects the whole room.
- Locations of activities
- Kinds of activities

Floor Lamps



Adjustable Floor Lamp

- Mukuxin Floor Lamp 36W 3000LM Upgraded Super Bright Torchiera LED Floor Lamp with Remote & Touch Control (around \$55)
 - Utilizes 36W 132 LEDs, emitting 3000 lumens ultra bright lighting to illuminate the entire room.
 - Stepless adjustment of 5%-100% brightness (10 brightness levels) and 2700K-6500K warm white to cool white (4 color temperatures)
 - Structured with 180° up-down flexible and 350° rotatable lamp head



Types of Lamps

2. Desk Lamps

- Lighting affects a particular spot on a desk or table.
- Kinds of activities

Desk Lamps



Types of Lamps

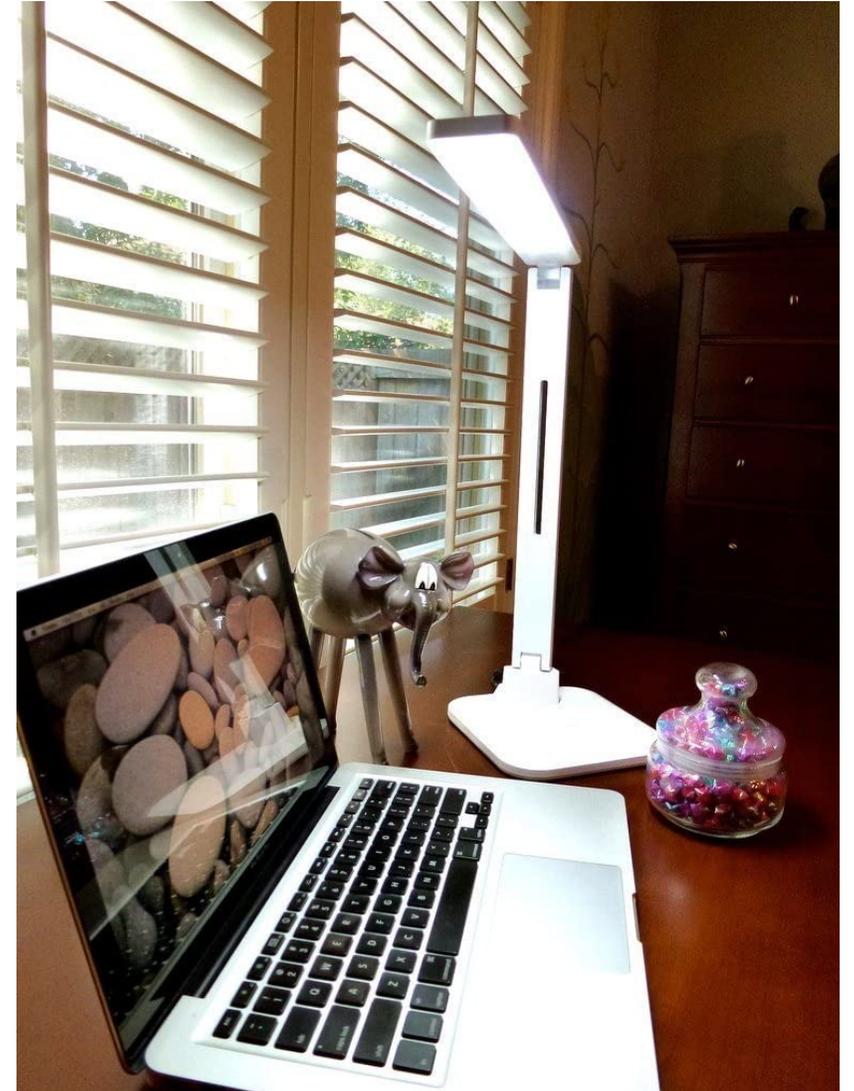
3. Computer Monitor Lamps

- Lighting around computers and monitors

Desk Lamp

Lightblade 1500S by Lumiy (Series 2) LED Desk Lamp (around \$60)

- Best brightness at 1500 lux
- 4 color temperatures and 20 brightness levels
- 10 W LED bulb
- Pivoting Head
- Captive Touch Controls for Brightness and Color Temperature



Computer Monitor Lamp

Kary Store LED Desk Lamp, 24W Architect Desk Lamp with Clamp 31.5" Wide Office Light for Dual Monitors (Around \$60)

- 1800 Lumen
- Detects surrounding light intensity and auto adjust to the best brightness level for your work environment.
- 5 color temperature modes (3000K - 6500K), 5 Dimmable brightness levels
- Generates soft bright light without flickering, relieves eye-fatigue from long-time work and reading



Types of Lamps

3. Bedroom Lamps

- Lighting is conducive to sleeping and / or light reading.

Philips Smart Sleep Lamp (Around \$180)



Features:

- Simulates a natural sunrise to wake up refreshed.
- Light-guided breathing helps you relax to sleep.
- Sunset simulation prepares your body for sleep.
- Choose the sound or music you wake up to.
- Select the brightness level that's right for you.
- A soft light to guide you in the dark.

Philips Sunrise Wake-up Light Therapy Lamp (Around \$60)

Features:

- 30 minutes of natural sunlight increase, followed by soothing natural sounds for a peaceful wake-up experience.
- Stop the alarm with a simple tap of the device and a 9-minute snooze function.
- Features 10 light intensities and 4 display brightness settings.



Types of Lamps

3. Wearable Lamps



YOCTOSUN LED Head Magnifier (Around \$18)

- Switch between 5 optical lenses
- Magnification power of the head magnifier: 1.0X, 1.5X, 2.0X, 2.5X, 3.5X
- 2 brightness levels
- For detailed, hands-on work like sewing, crafts, beauty, needle work, knitting, cross stitch, embroidery, painting and coins.



Vekkia Neck Reading Light (Around \$16)

- Only 3.6 oz weight, no pressure on neck
- 2 LED bulbs
- 3 color temperatures and 3 brightness levels
- Book lights for reading in bed, knitting, cross stitch



Smart Lamps or Lightbulbs

- Connected with Wi-Fi
- Brightness, color temperature, timer, on/off can all be set up in a smart phone app
- Voice controllable via a smart speaker



Philips Hue Smart Lightbulbs

Light color

Soft warm white

Warm-to-cool white and color

Brightness

800

1100 |

75W

\$99.99

- Philips Hue 75W, 1,100 Lumens, WiFi LED Color Changing, E26 Bulb 100W Equivalent Dimmable, 2000K-6500K RGBCW
- A pack of 2 costs \$99.99
- <https://www.philips-hue.com/en-us/p/hue-white-and-color-ambiance-2-pack-e26/046677548612#overview>

3Stone Smart Lightbulbs



- Smart Light Bulbs, 3Stone 16W 1600 Lumens WiFi LED Color Changing A21 Bulb 100W Equivalent Dimmable 2700K-6500K RGBCW
- A pack of 4 costs around \$50
- <https://www.amazon.com/stores/3Stone/3Stone/page/85AD4B3A-6EA3-4155-9502-F6513450D491>

Smart Life App



- 1600 lumens, equivalent to traditional 100W bulbs.
- More than 16 million colors are available to choose from to suit your mood anyhow.
- 2700K-6500K Tunable White - from a warm 2700k light to a cool 6500k daylight.
- Certified 100% Perfectly Works with Amazon Alexa and Google Home and can be voice-controlled.
- Built-in Scenes & Timer Option Available
- Easy to Install – via the APP “Smart Life”, use the APP to control the Wi-Fi bulb (No Hub Required).

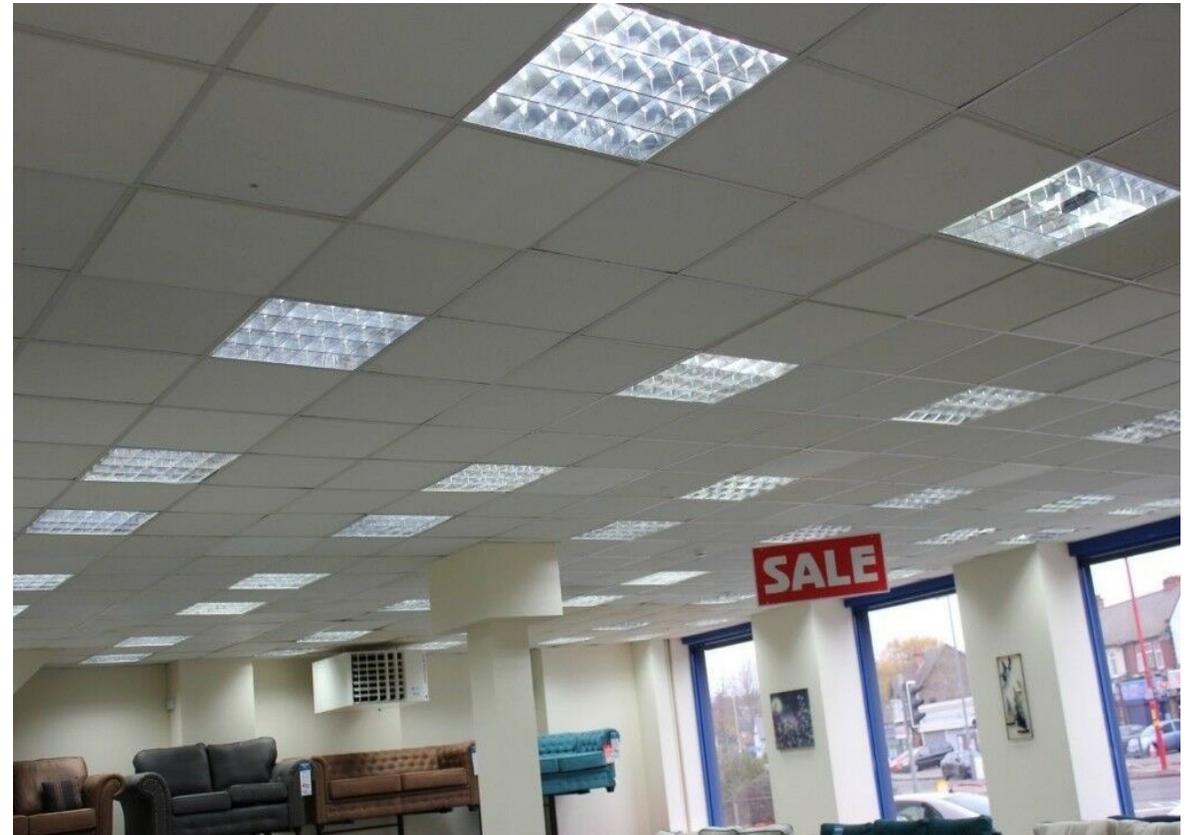
Blackout Curtains

- Blackout curtains of good quality not only can block the sunlight, but also regulate the indoor temperature and be soundproof.
- What to look for:
 - Materials: triple-weave fabric, polyester, velvet or cotton, additional lining
 - Layers: Some have detachable felt-fabric liner
 - Size and weight: up to 3 times as wide as the window and at least 10 inches longer or floor-to-ceiling
 - Wrap-around curtain rods

Wall Paint Colors

- All colors, except black, reflect light.
- According to Shortline Painting, <https://shorelinepaintingct.com/blog/best-paint-colors-for-rooms-with-little-natural-light/>, “when you’re looking for the best colors to use in low-light rooms, your best bet is to go with shades that increase the sense of space.”
- If your goal is to make your low-light room feel brighter, light colors are a great way to go.
- If you want to embrace the coziness of a dark room while expanding its look, dark colors may be the way to go.
- If you do not want walls to reflect a lot of light, avoid high-gloss paint or bright lemon yellow or alike.

What about in an environment that you cannot have a lot of control?



Remove or Replace Lightbulbs



Remove one
of the
overhead
light bulbs



Replace the
light bulb
with other
kinds that are
adjustable in
brightness,
temperature
and color.

Reposition Your Desk

Reposition it away from the glare-producing ceiling light, perpendicular to a window, or away from a window where the bright sunlight comes in.



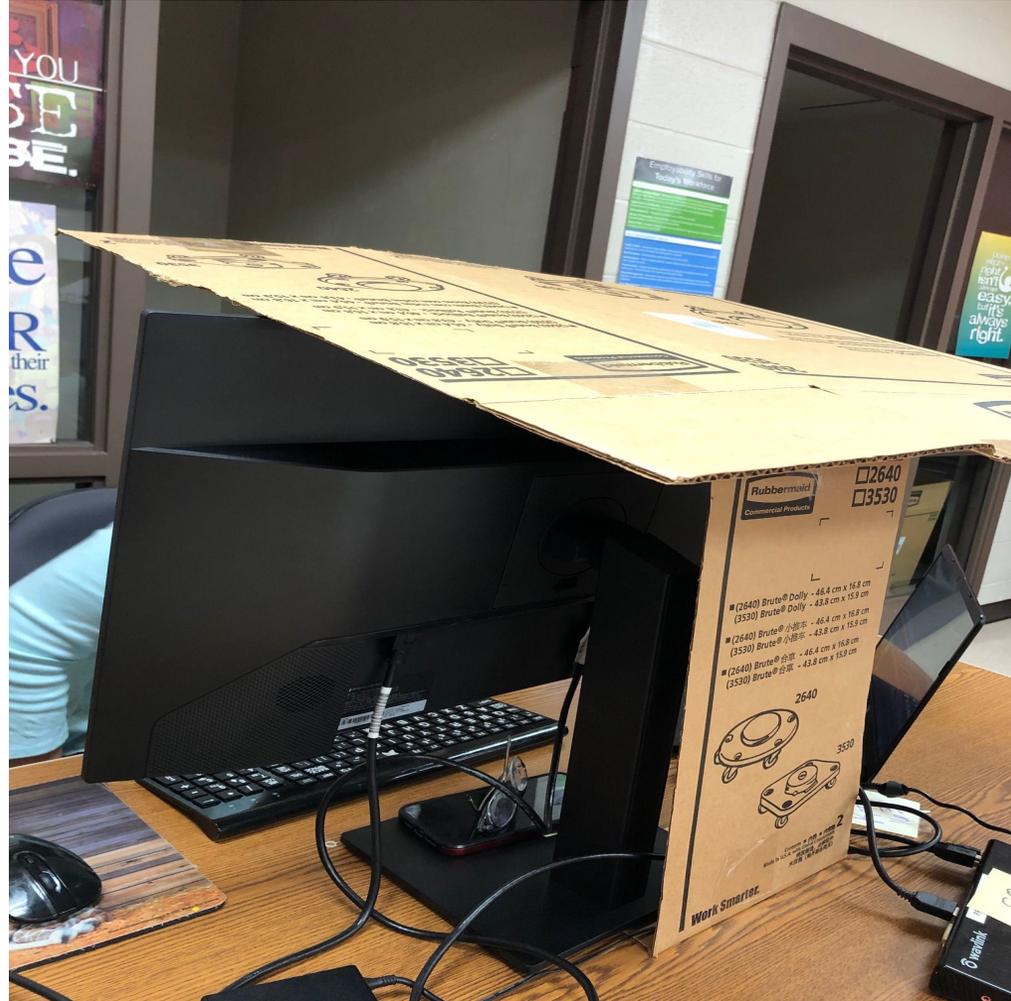
Monitor Hoods (around \$71)

Office Monitor Hood

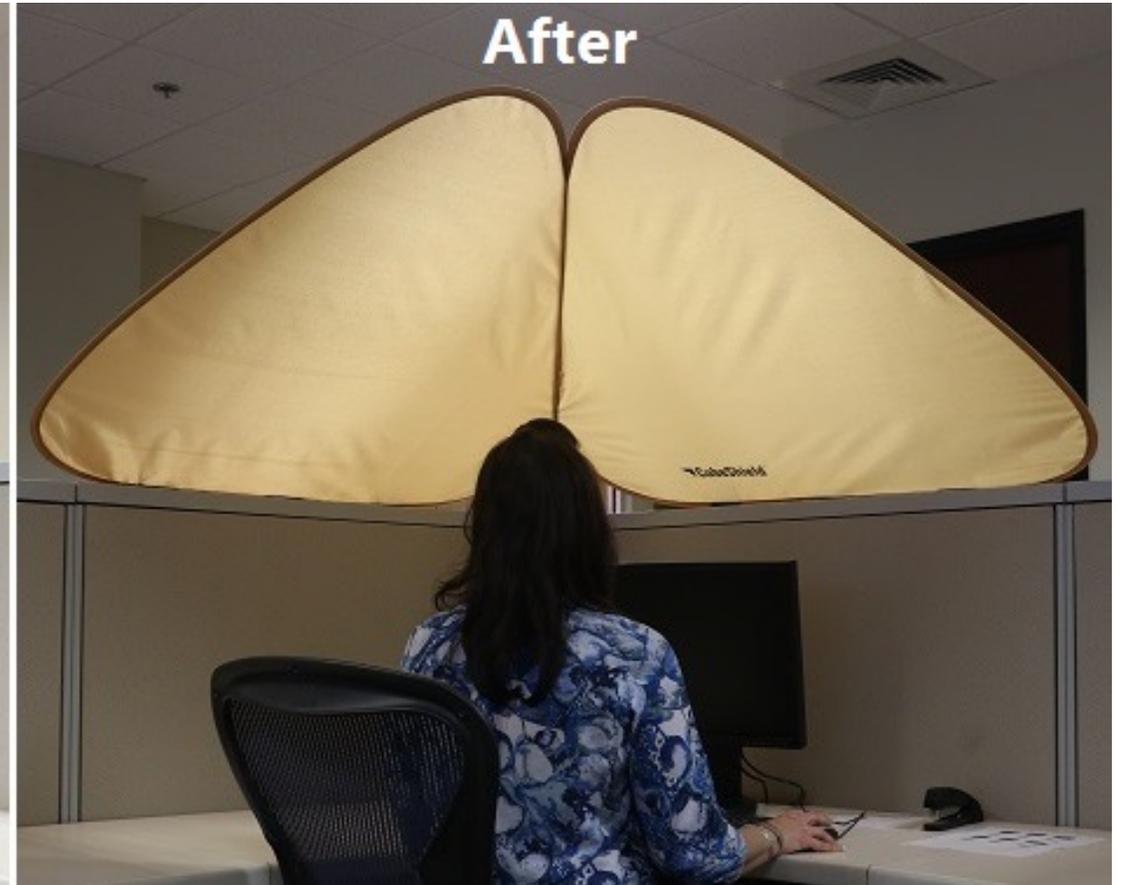
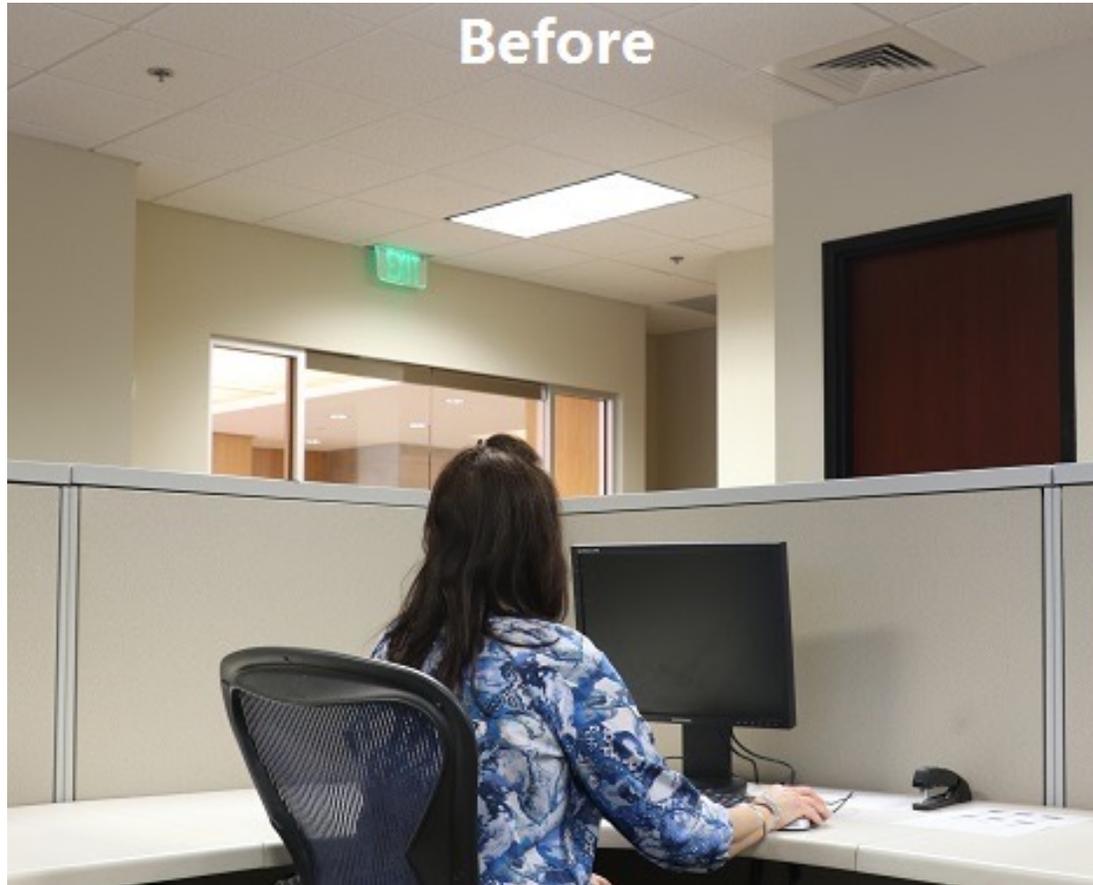


DUAL MONITOR HOODS

Make-Shift Monitor Hood



Cube Shield (around \$46)



Light-Protection Spectacles (between \$73 and \$100)

- IV PROSHIELD light protection spectacles with blue blocking and comfort filter lenses, <https://www.visionenhancers.com/collections/improvision-filter-sunglasses/products/iv-proshield-fit-over-sunglasses>
- fit over and wrap-around sunglasses
- Various tints available, e.g., yellow, orange, grey, amber, etc.
- High magnification levels available



Consider the following...

- Take a walk in a different environment.
- Take a break from staring at the computer screen.
- Request for a different cubicle which is more shielded from direct ceiling light or sunlight.
- Request for permission to work remotely.
- Change the timing of activities.



taking on disability together

**Thank you for your Time!
Any Questions??**

**Please check out our website,
www.eastersealstech.com**

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