

THE DISRUPTION OF CIRCADIAN RHYTHMS



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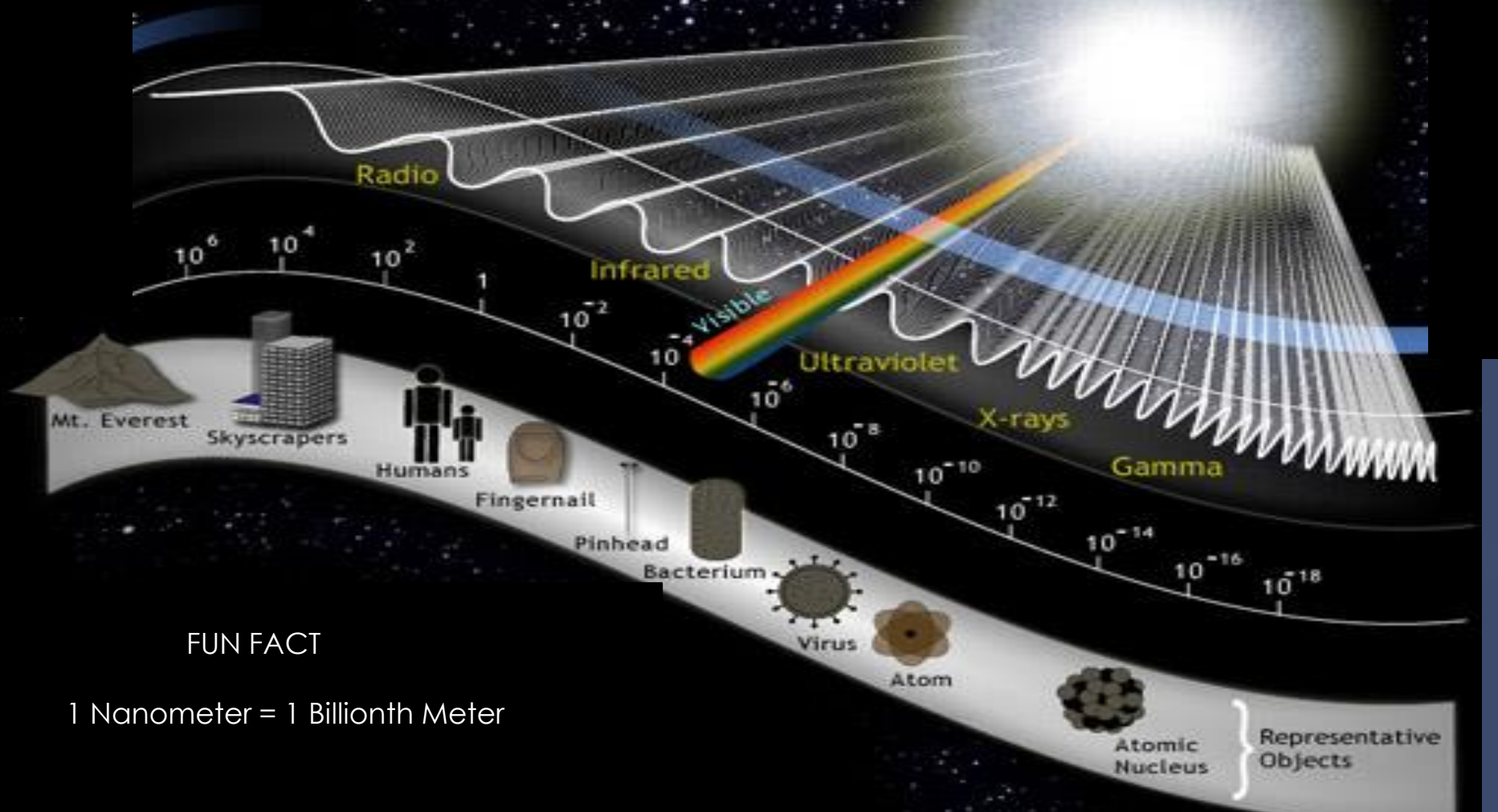
2023

Technical Level 2

PROPERTIES OF LIGHT

- Reflects
 - Off Surfaces
- Refracts
 - Through Air, Water, Lenses
- Absorbed
 - Dissipates As Heat.

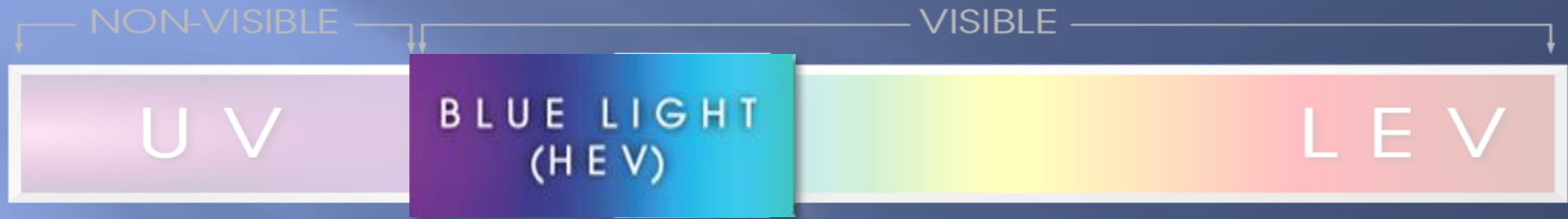




FUN FACT

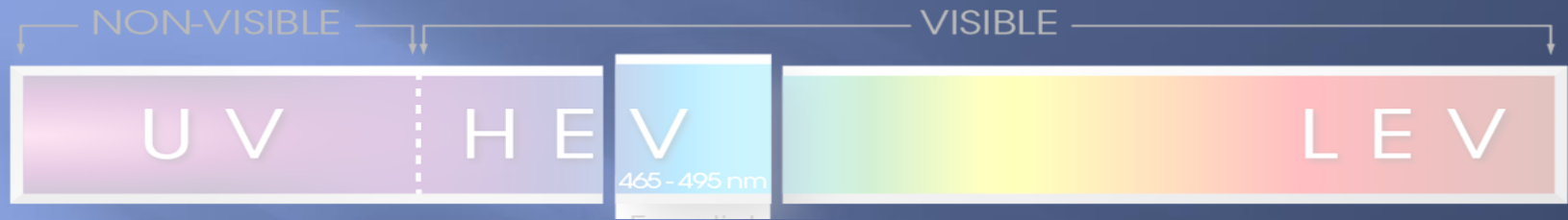
1 Nanometer = 1 Billionth Meter

BLUE VIOLET (365NM-465NM)



- Induced/Accelerated Retinal Cell Damage
 - May
- MD Perspective
 - IOL 5 Years Later
 - 50% ARMD
 - No HEV Protection vs Can's See Past Cataract
- Visual Fatigue

BLUE TURQUOISE (465NM-500NM)



- Increased Visual Acuity
- Increased Color Perception
- Pupil Constriction Reflex
- Human Biological Clock Synchronization.

BLUE LIGHT BOOSTERS

Daytime Benefits

- Boosts Attention
- Reaction Time
- Mood

• Disruptive Evenings

- Before Artificial Lighting
- Nightlight 4 Lux
- 8 Lux Affect
- Throws Off Natural Rhythms



CIRCADIAN RHYTHMS

- Circa = Around
- Diem = Day
- Earth 24 Hours
- Mars 24 Hours 39 Minutes
- Master Clock In The Brain
- Coordinates All Body Clocks
- Self-sustained
- Environmentally Adjusted



CIRCADIAN RHYTHMS

- Core Body Temperature

- Typical 97.7 – 99.5
- Minimum 5:00 am
- Morning Peeps 4:00 am
- Night Peeps 6:00 am

- Light Factor

- Light/Dark Cycle Play a Primary Role
- Artificial Light Today Plays a Role Too



ARTIFICIAL LIGHT

- LEDs

- $\leq 35\%$ Harmful Blue
- More Efficient
- Smart Phones, Tablets, Gaming

- Compact Fluorescent Lamps (CFL)

- $\leq 25\%$ Harmful Blue
- Inside Coated = Less Blue

Plasma TV

- From 5 Feet Away
- 475nm



BLUE LIGHT

- Sunshine Exposure
 - Back To The Sun
 - Up to 100X

- Sunshine Exposure
 - Facing The Sun
 - Up to 500X



CIRCADIAN RHYTHMS

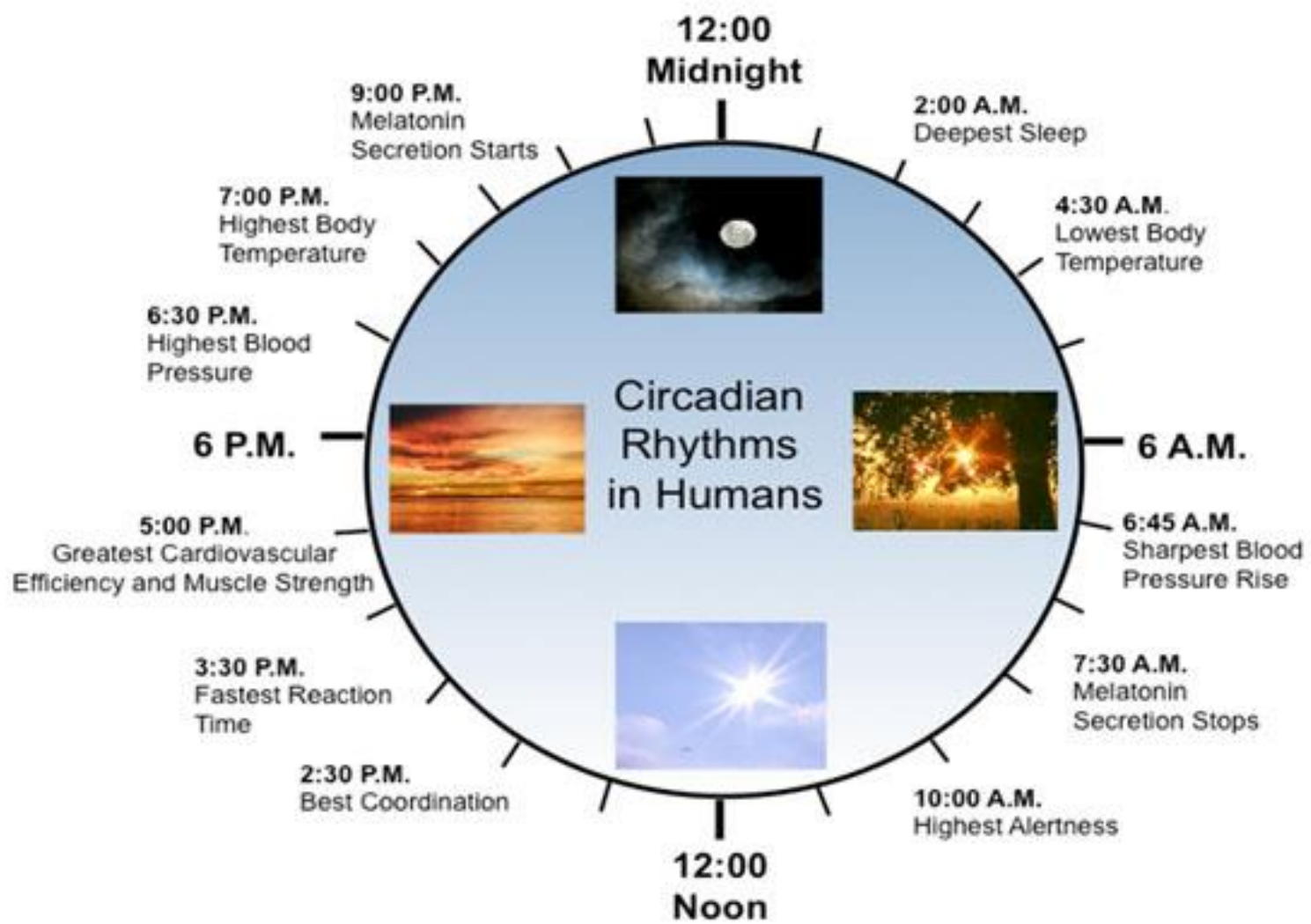
• Body Clock

- Designed to Burn During Day
- Designed to Restore/Reprogram Night
- Consistent Disruption
- Can Cause Long Term Health Issues
- Jet Lag, Shift Work
- Irregular Eating Times

• Concerns

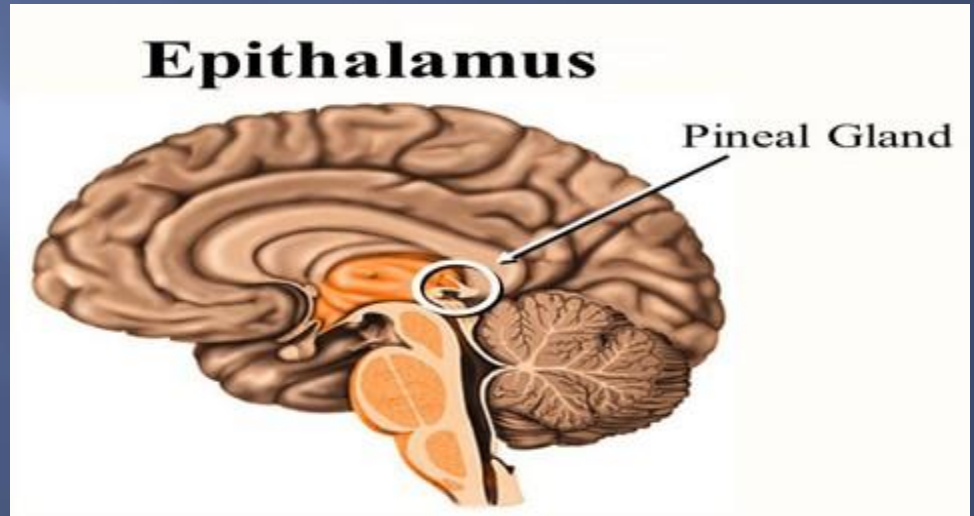
- Suppressed Immune System
- Altered Insulin Sensitivity
- Higher Body Mass
- Obesity
- Increased Hypertension
- Depression





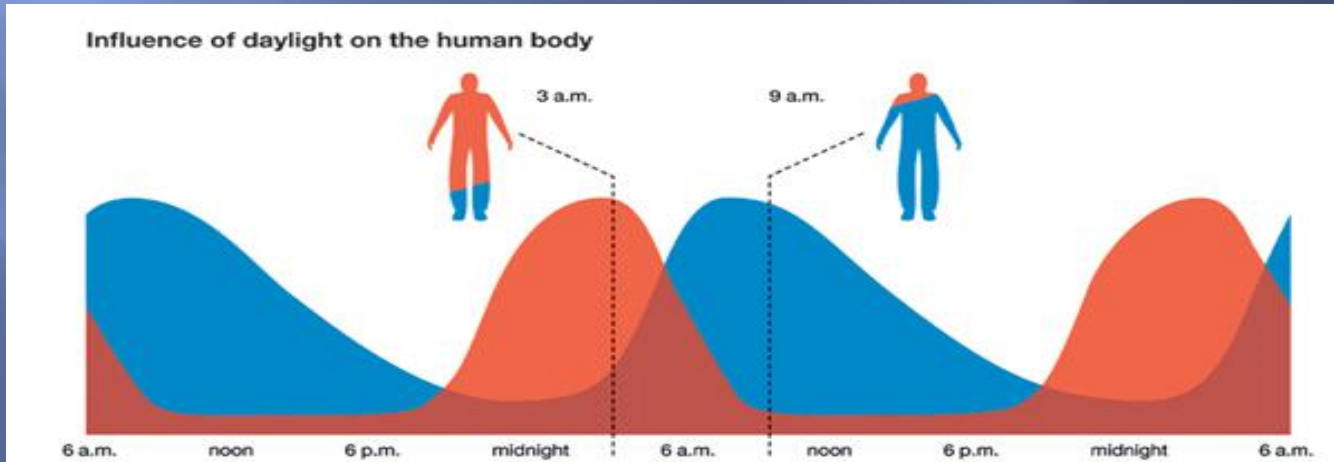
MELATONIN

- Hormonal Release
- Forebrain
- Epithalamus
- Pineal Gland
- Measured In Blood/Saliva
- Lack of Blue = We Release



SEROTONIN

- Hormonal Release
- Happy Chemical
- Stay Awake
- Regulates Emotions
- Reduces Depression
- Natural Mood Stabilizer
- Laughing Release
- Blue Light = We Release



Orange
Melatonin

Blue
Serotonin

UNIVERSITY OF TORONTO

- Bright Indoor Light – No Blue Blocking
- Low Melatonin Levels
- High Serotonin Levels

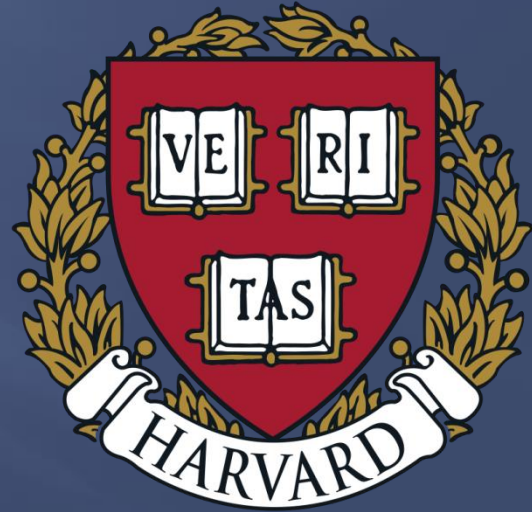
- Bright Indoor Light – Blue Blocking
- Equal Melatonin/Serotonin Levels

- Hypothesis = Blue Light Suppresses Melatonin



HARVARD UNIVERSITY

- Research
- 6.5 Hours Blue Light Exposure
- 6.5 Hours Green Light Exposure
- Blue Light
 - Suppressed Melatonin 2 X Longer
 - Shifted Circadian Rhythms 2 X (3 hours vs. 1.5 hours)



NATURE'S CRUEL JOKE

- Newborns

- No Protection

- 7-10 Year Olds

- Most Damage

- 40's-50's

- Cataracts Begin

- 80's

- Best Protection

- Post-Op Cataract Concerns



PREVENTION

- OCT Testing
- Nutraceuticals
- ARMD Patients Genetic Testing
- Health Counseling
- Prescribe Selective HEV Blocking



A TISKET A TASKET



Use Night Shift on your iPhone, iPad, and iPod touch


Night Shift automatically adjusts the colors of your display to the warmer end of the spectrum—making the display easier on your eyes.

About Night Shift

Night Shift¹ uses the clock and geolocation of your iOS device to determine when it's sunset in your location. Then it automatically shifts the colors of your display to warmer colors. In the morning, it returns the display to its regular settings.

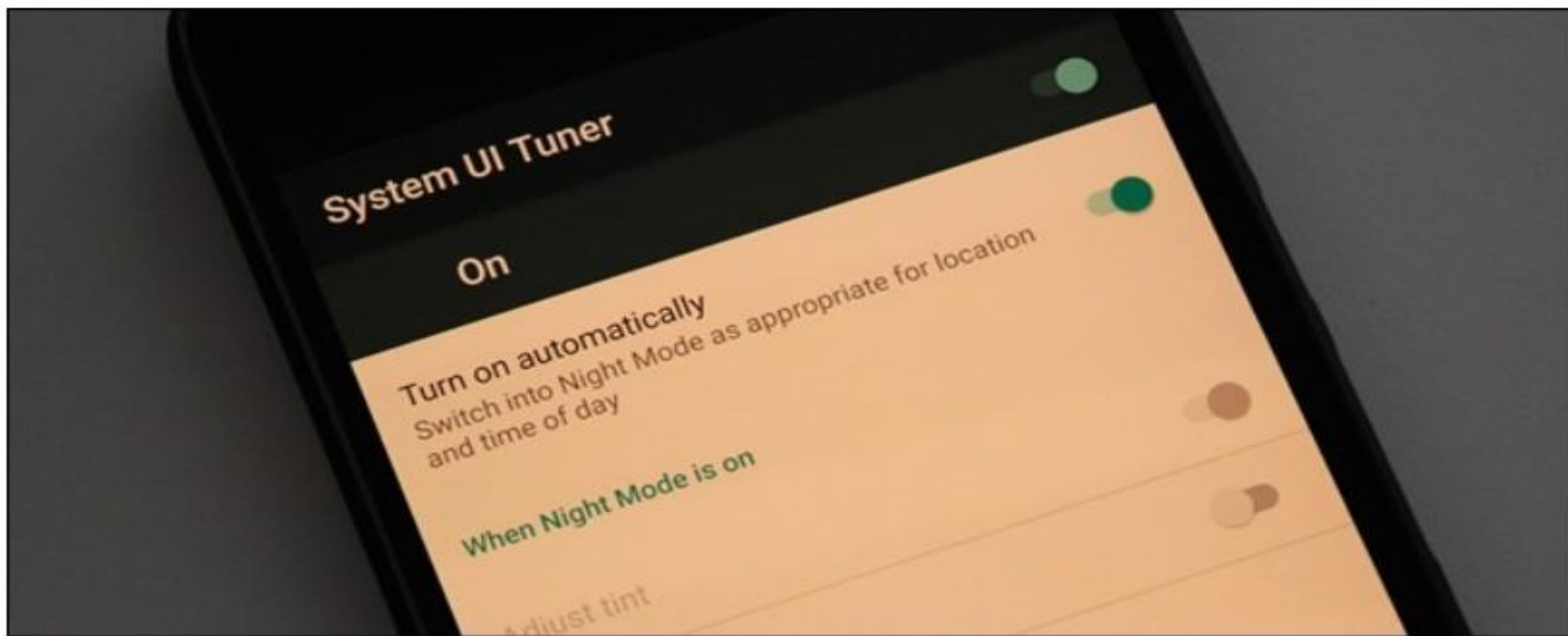
Turn on Night Shift

There are two ways to turn Night Shift on and off:

- [Open Control Center](#). Firmly press the Brightness control icon, then tap  to turn Night Shift on or off.
- Go to Settings > Display & Brightness > Night Shift.² On the same screen, you can schedule a time for Night Shift to turn on automatically and adjust color temperature.

By default, Night Shift turns on from sunset to sunrise.



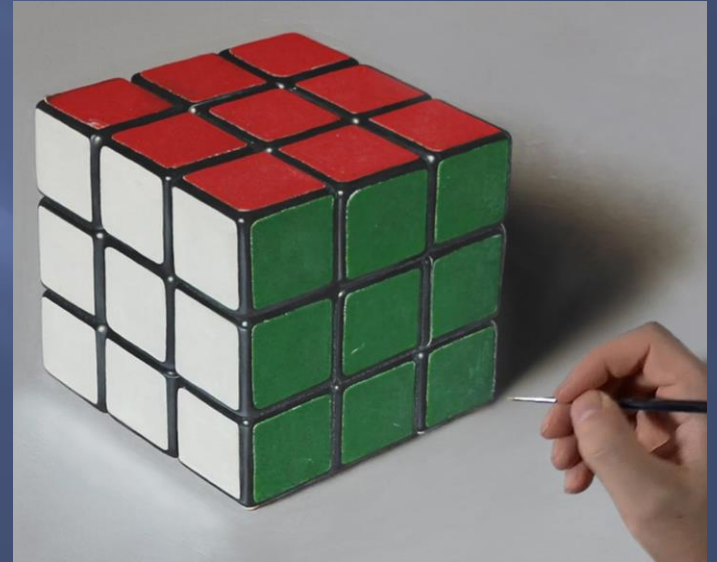


They say that [blue spectrums of light are bad for your eyes](#), especially at night when you're more likely to be looking at your phone in a dark environment. This also supposedly leads to poor sleep, which leads to poor health. Here's how to combat that on your Android phone.

RELATED: [Artificial Light Is Wrecking Your Sleep, and It's Time to Do Something About It](#)

SOLUTIONS

- Dim Red Night Lights
 - Least Power To Shift Circadian Rhythms
- Avoid Bright Screens
 - 2-3 Hours Before Bedtime???
- Night Owls
 - Consider Blue Light Eyewear
- Breathing Technique
 - 4/7/8 Technique



SOLUTIONS

- APPS

- Meditation
- Soundscapes

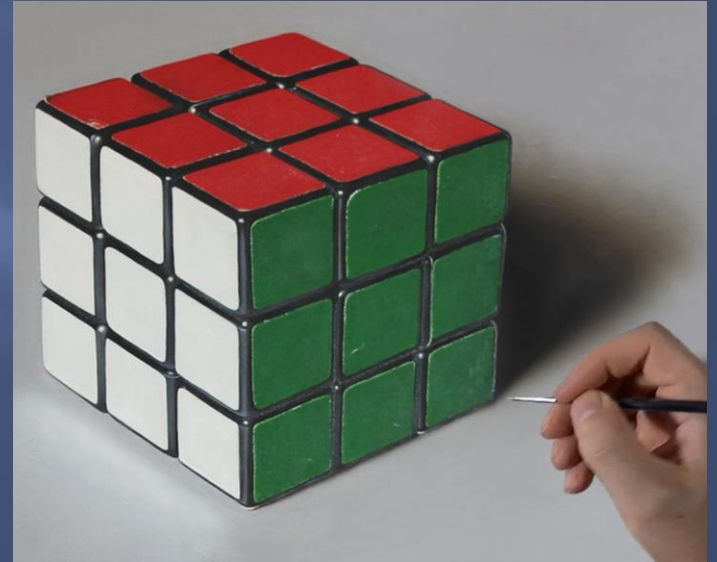
- Calm

- Headspace

- Healthy Minds Program

- Smiling Mind

- Breethe



TELL THE STORY

- Block/Filter HEV Light
- Reduce Levels Blue Light Exposure
- Sustain Natural Circadian Rhythms
- Assure Human Wellbeing.



NEVER APOLOGIZE

- Not even once...

