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LIGHTING DESIGN FOR QUALITY LIVING

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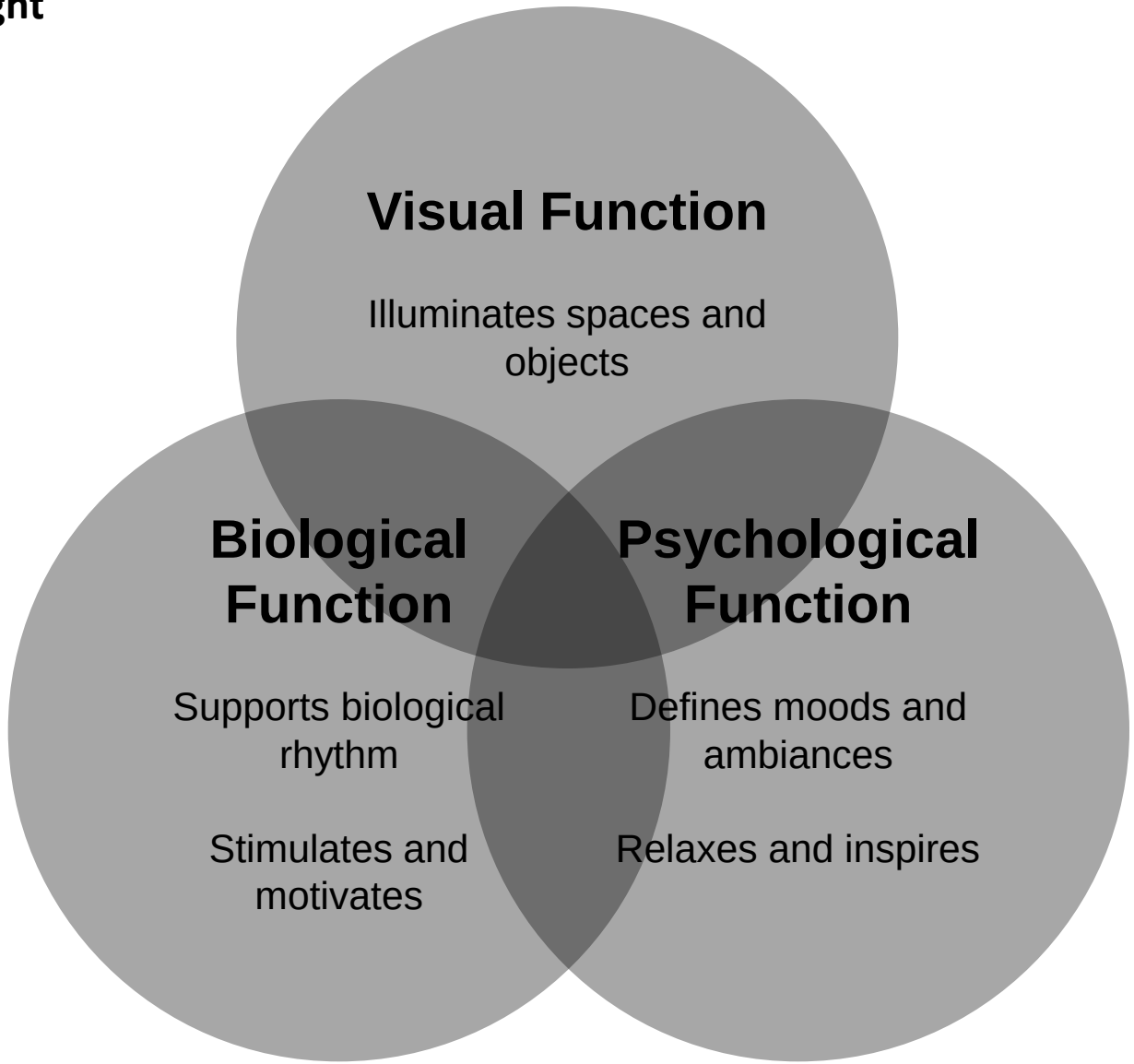
Function of Light



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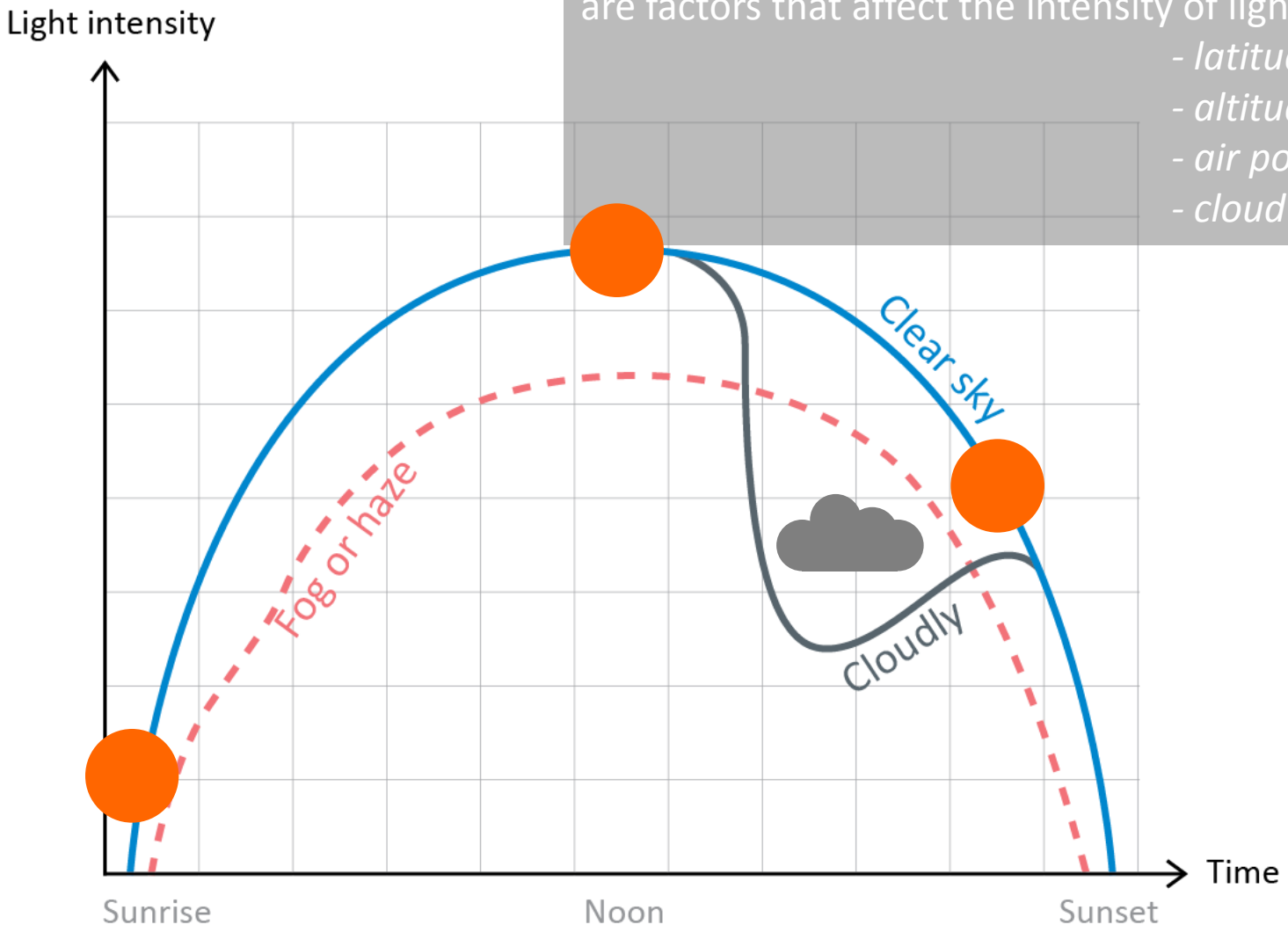
How do we regconise time? During a day, skylight evolves its itself by dimming up & down, that triggers our daily activity & control our regconition of a day. Human had been depending strongly on daylight to seize time for activities. The intensity of daylight master our daliy rhythm.

Light Intensity

Light intensity & the Sun

The closer the angle the sun strikes the earth are to **90 degrees**, the more energy is received. Meanwhile there are factors that affect the intensity of light:

- *latitude of location*
- *altitude of location*
- *air pollution*
- *cloud cover*



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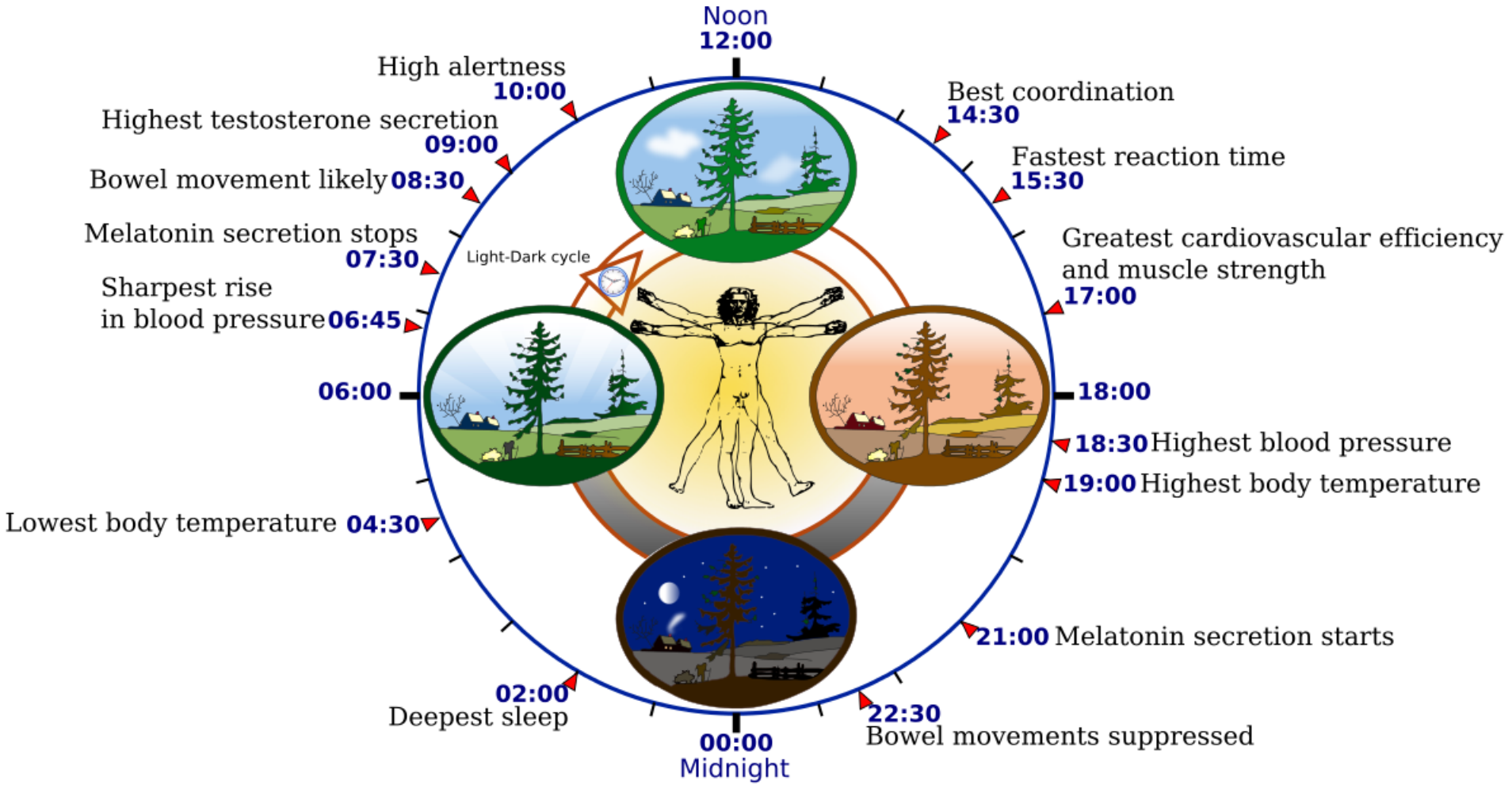
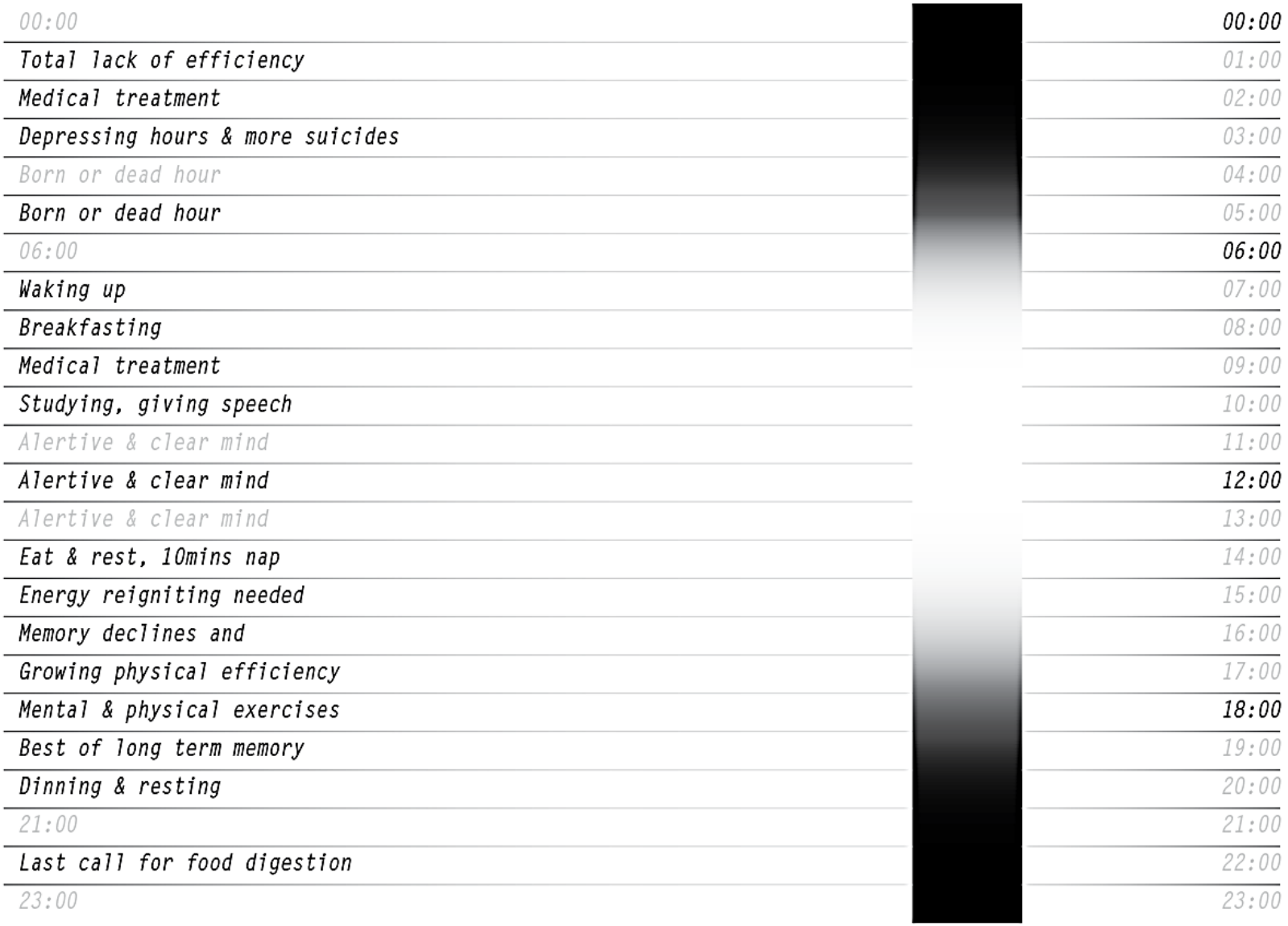
Light Intensity

Light intensity & our Circadian Cycle



Light Intensity

Light intensity & Circadian Rhythm



Light Intensity

Light intensity & Circadian rhythm

At the end of the day when skylight intensity is at its lowest...

00:00		00:00
Total lack of efficiency		01:00

We're at a stage of lacking efficiency.

Depressing hours & more suicides		
Born or dead hour		04:00
Born or dead hour		05:00
06:00		06:00
Waking up		07:00
Breakfasting		08:00
Medical treatment		09:00
Studying, giving speech		10:00
Alertive & clear mind		11:00
Alertive & clear mind		12:00
Alertive & clear mind		13:00
Eat & rest, 10mins nap		14:00
Energy reigniting needed		15:00
Memory declines and		16:00
Growing physical efficiency		17:00
Mental & physical exercises		18:00
Best of long term memory		19:00
Dinning & resting		20:00
21:00		21:00
Last call for food digestion		22:00
23:00		23:00

Light Intensity

Light intensity & Circadian Rhythm

00:00	00:00
Total lack of efficiency	01:00
Medical treatment	02:00
Depressing hours & more suicides	03:00
Born or dead hour	04:00
Born or dead hour	05:00
06:00	06:00
Waking up	07:00
Medical treatment	09:00
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Mental & physical exercises	18:00
Best of long term memory	19:00
Dinning & resting	20:00
21:00	21:00
Last call for food digestion	22:00
23:00	23:00

In the midst of the day when skylight intensity is highest...

The circadian scheme shows we're at the most aleartive status of the day!

Light Intensity

Light intensity & Human response

Florence Nightingale (1820–1910), Pioneering English nurse
First persons to recognize light as “necessary for a faster recovery” of the patient.
Since then, numerous research efforts have demonstrated the impact of light on human well-being.

Jacob Liberman, American oculist and light therapist (one of examples)
Observed that, under optimal lighting conditions, office workers were able to concentrate up to 8 hours and fully focused for 2 hours under artificial light.

Angela Wright, British psychologist
Noted that light can produce specific psychological reactions such as a feeling of ease.
And had explored the correlation between light, color and patterns of human behavior.

Light Intensity

Light intensity & Human response

The drop of skylight intensity leads our emotion to drop from

Focused	12:00-14:00
Energetic	14:00-15:00
Soothed	15:00-17:00
Relaxed	17:00-19:00
Calm	19:00-21:00
Melancholy	21:00-23:00
…	
Depressed	03:00-05:00

(omit colour temperature)

Total lack of efficiency	00:00-02:00
…	02:00-03:00
Depressing hours & more suicides	03:00-04:00
Born or dead hour	04:00-06:00

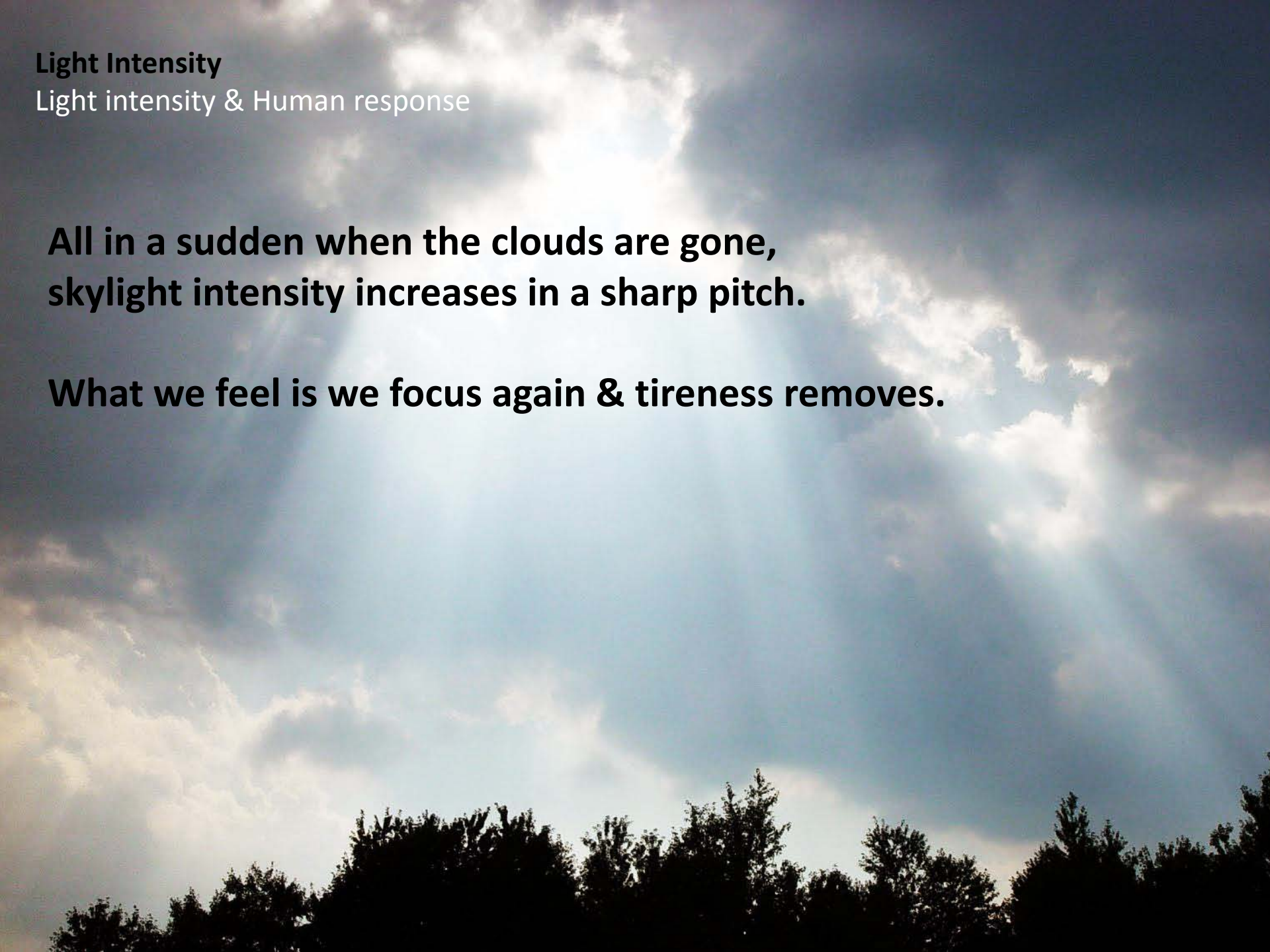
Light Intensity

Light intensity & Human response

Under cloudy sky, skylight intensity drops, we mostly feel inactive & moody.

Light Intensity

Light intensity & Human response



All in a sudden when the clouds are gone, skylight intensity increases in a sharp pitch.

What we feel is we focus again & tireness removes.

Light Intensity

Light intensity & Proven facts

Light influence on specific biochemical processes within our body. Our nerve and endocrine “translates” light stimulating messages for the nerve system. Depending on its intensity, light can either have an activating or a calming effect. This explains why most of us feel lively and fresh during a sunny day and rather tired during a cloudy day.

It also why our biological clock is closely connected to the daily cycle of day and night, or why some people experience seasonal mood variations.

Closed rooms, such as examination rooms and those used for medical interventions, mostly lack adequate stimulating light putting both patients and health care professionals into a kind of “biological darkness”.

Light Intensity

Light intensity & control

By understanding how human response to light intensity,
we can master the quality of a defined space, for example we can:

- Brighten up a room in dark winter days to **Lift up moods**
- Sustain high light intensity period to **Increase productivity**
- Extend lights-on hours to **Allow longer shopping hours**
- Lower light intensity to **Decrease level of tense**
- Practise different light intensity in a defined space **to separate areas of focus**

Optimising the light intensity control can uplift our living quality definitely.

Colour Temperature

**“The truth is,
that color affects us physiologically as well as emotionally.”**

Angela Wright, British color psychologist

The effect of colors

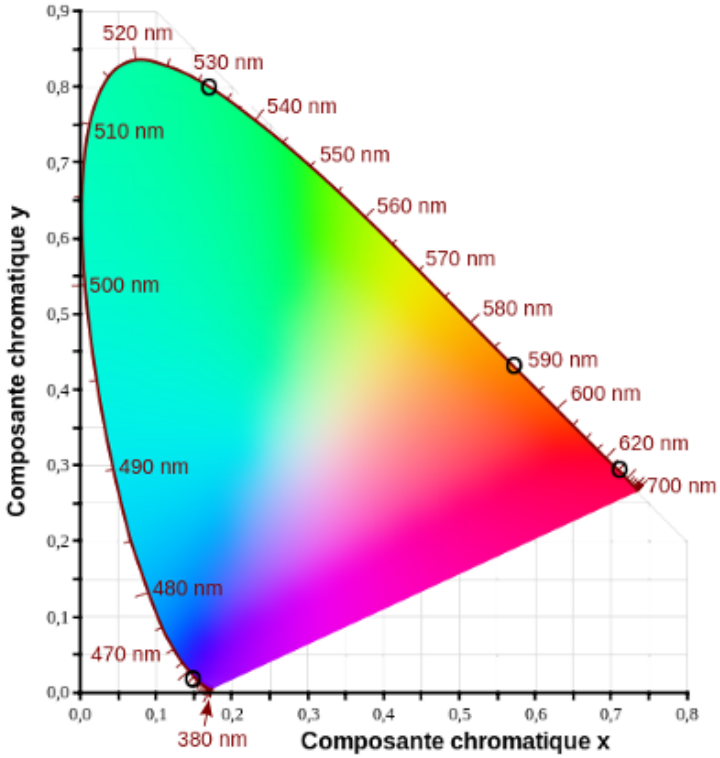
Colors have an impact that by far exceeds purely aesthetic concerns.

Since colors stimulate our nervous system, they are able to influence mood and provoke reactions. The use of color can be exploited to make an environment less intimidating, and situations or procedures to become less anxiety-provoking. Less anxiety and a more positive mood may translate into a better physical state for better & faster recovery.

Colour Temperature

What is Colour temperature

As colour is closely linked to mood that causes psychological reaction, color temperature of light is critical.



(Chronmaticity Diagram)

Higher color temperatures (e.g. 5000K or above) are perceived as “cool” (blue and green tones)

Lower color temperatures (e.g. 2700-3000K) appear to be “warm” (yellow and red tones)

Colour Temperature

Colour temperature & Emotional response

Green is the most reassuring color.
It creates a feeling of stability , but only when used in soft tones.

Orange is a strong stimulus.
It is very sensual, but also contributes to activity.

Red symbolizes activity and passion; it can also stimulate appetite.

Pink is the color of feminity and has a physically soothing effect.

Purple can provoke a feeling of spirituality, but may be perceived very differently – positively or negatively – by different people.

Blue has a mentally calming effect and serves perfectly to sooth anxiety, especially when warmer tones of blue are used.

Colour Temperature

Application of different Colour temperature

Let’s take a look on how **designers** can bring in lighting element from the nature, to change, to enhance, to up lift a the quality of living environment, with the application of nowadays lighting equipments.

Orange

The colour of rise & set

Pink / Purple

The colour of love and romance

Aqua blue

The colour of retreat & silence

Aqua green

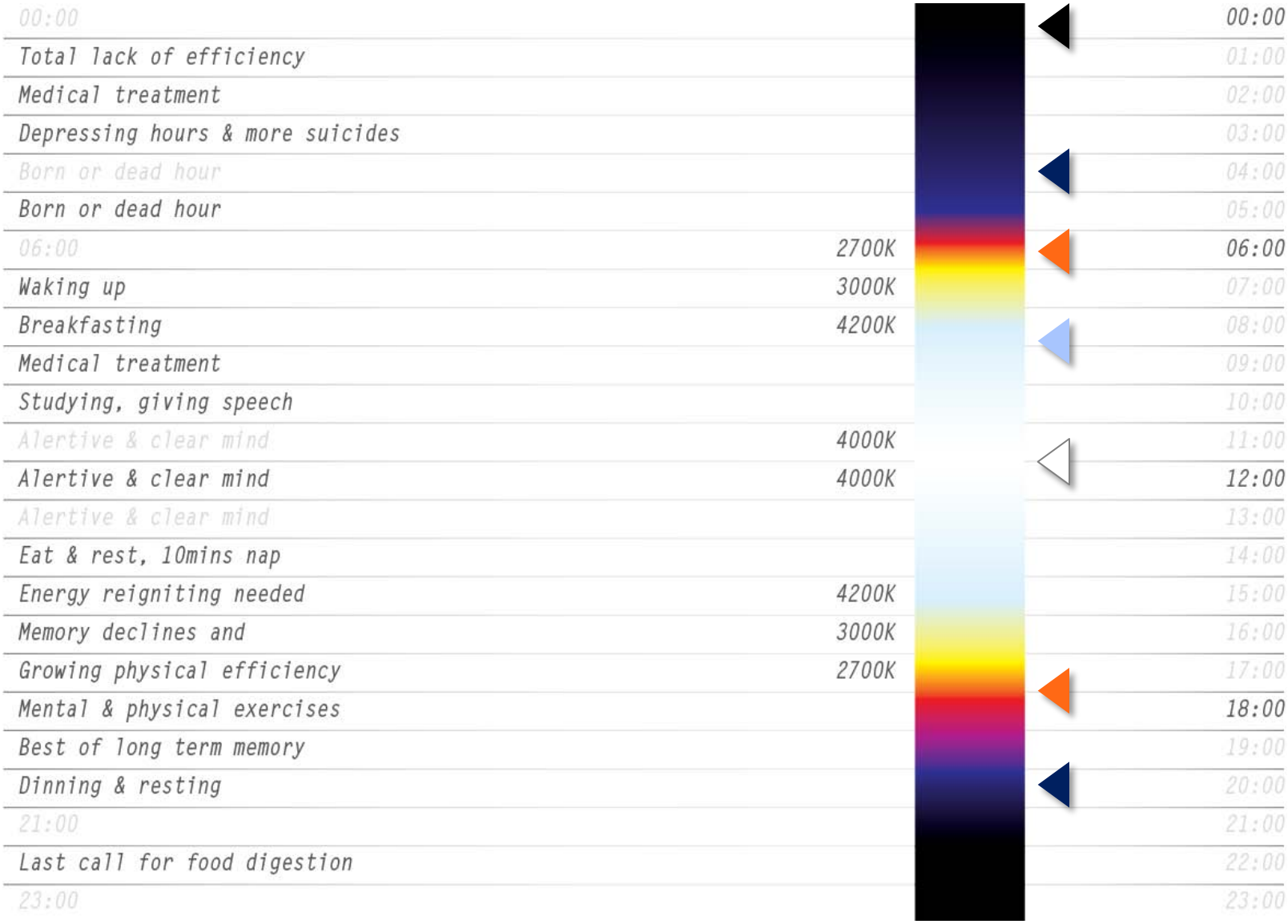
The colour of spirit & inspiration

Red

The colour of exotic & danger

Colour Temperature

Colour temperature & Circadian Rhythm



Colour Temperature

Colour temperature & Realisation in design

Nowadays coloured LED lighting equipments can achieve accurate colour tuning, in both static & changing effect. More then that, time schedule design controling the speed & rhythm of each change could be done by various lighting control system.

Lighting design with the above elements are most commonly found from hospitals for better medical quality, in shopping arcades enhancing shopping moods, in light art studios, even domestic lighting products are designated for compact environment to create moods upon personal preference.

Colour Temperature

Colour temperature in medical field

Colour Theory

Tuesday, September 28, 2010

Behavior and Light

Examine how the presence or absence of light has affected your behavior in a particular space (public and private):

1) Hospitals:

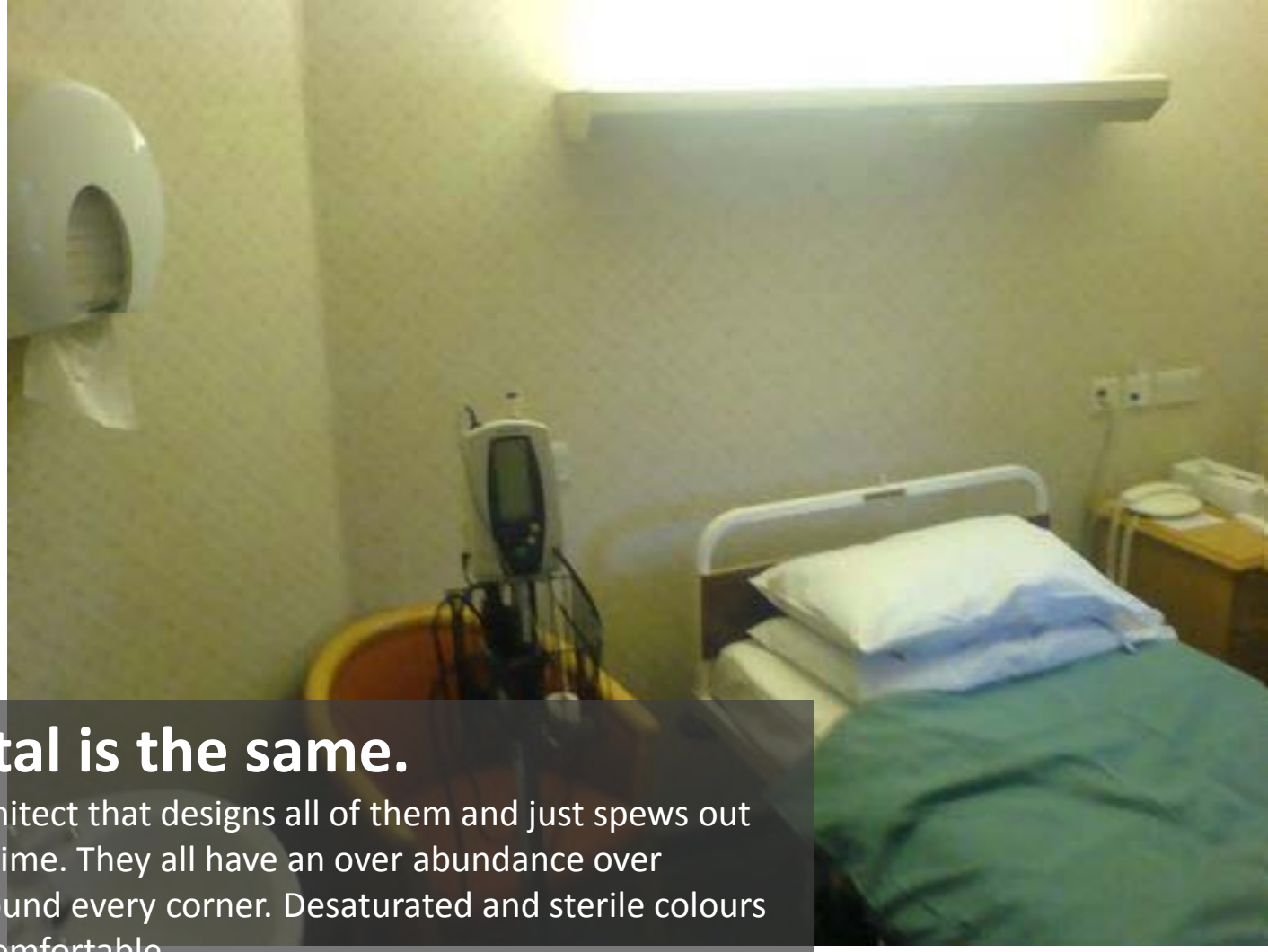
Every hospital is the same. I think there is one architect that designs all of them and just spews out the same design each time. All have an over abundance over fluorescent lighting around every corner. Desaturated and sterile colours that make me feel:
-Uncomfortable - They feel like places where you will be a test subject. There is no personality because of the lack of colour and the blandness of it all. The lighting is irritating and and bright keeping you on constant alert.

2) My Nana's House:

Not actually my Nana's house but a good representation of it

Colour Temperature

Colour temperature in medical field



“Every hospital is the same.

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Colour Temperature

Colour temperature in medical field

Fairview Hospital in Cleveland, OHIO

Colour Temperature

Colour temperature in medical field

Colour Temperature

Colour temperature in medical field

Phoenix Children's Hospital
Phoenix, ARIZONA

Colour Temperature

Colour temperature in miscellaneous applications

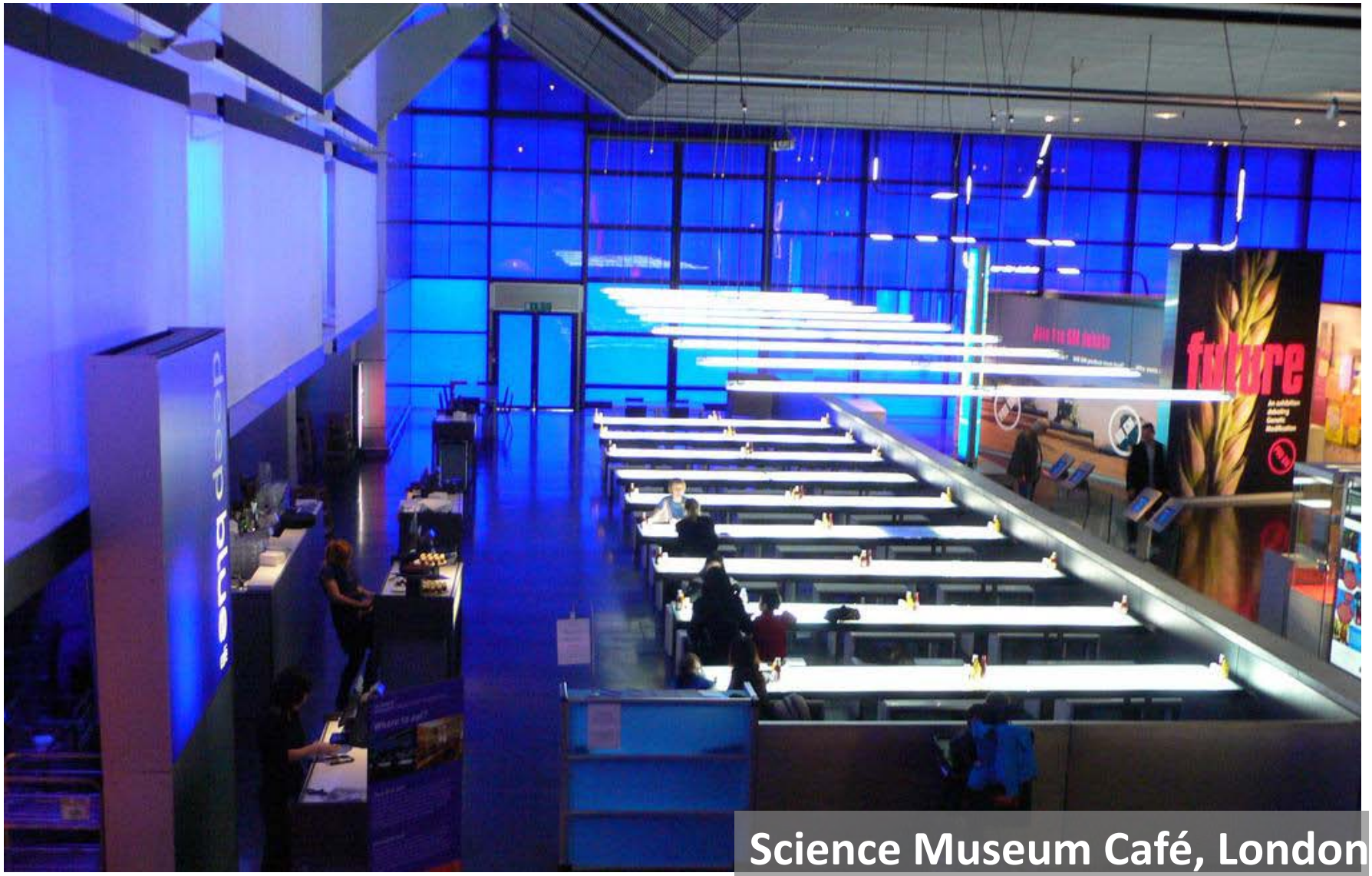
Bar & Restaurant, Birmingham

Colour Temperature

Colour temperature in miscellaneous applications

Colour Temperature

Colour temperature in miscellaneous applications



Science Museum Café, London

Dynamic White

Fine-tuning the colour of White

When obvious change in RGB colour of light is not applicable. Still, the change of colour temperature in a limited range could enhance or refine an atmosphere & transform human behavior, which uplift quality of life in an unobservable way.

That is what we call **Dynamic White**

Dynamic White

Fine-tuning the colour of White

What is Dynamic White?

Dynamic White lighting devices enable users to select a color temperature range from yellowish white to bluish white. Even such tiny change in the colour of white can deliver different moods to users, in seperated space, or same space but different time slot throughout the day, or upon different functions.

Dynamic White

Fine-tuning the colour of White

Where to use?

-Offices	Adjusting lighting to stimulate productivity at different hours
-Classroom	To relax over excited emotions & lift concentration
-Conference hall	To stimulate rapid thinking & interactions
-Museum Lighting	Themes upon changeable exhibits
-Jewelry lighting	Lighting with luxurious products which are classified by slight colour different
-Display Case	With all possibility of exhibits
-Retail shop	With seasonal displays

Dynamic White Fine-tuning the colour of White

Dynamic White Fine-tuning the colour of White

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Lighting Design for Quality Living

Technology & modern living

wireless control

touch sensitive control

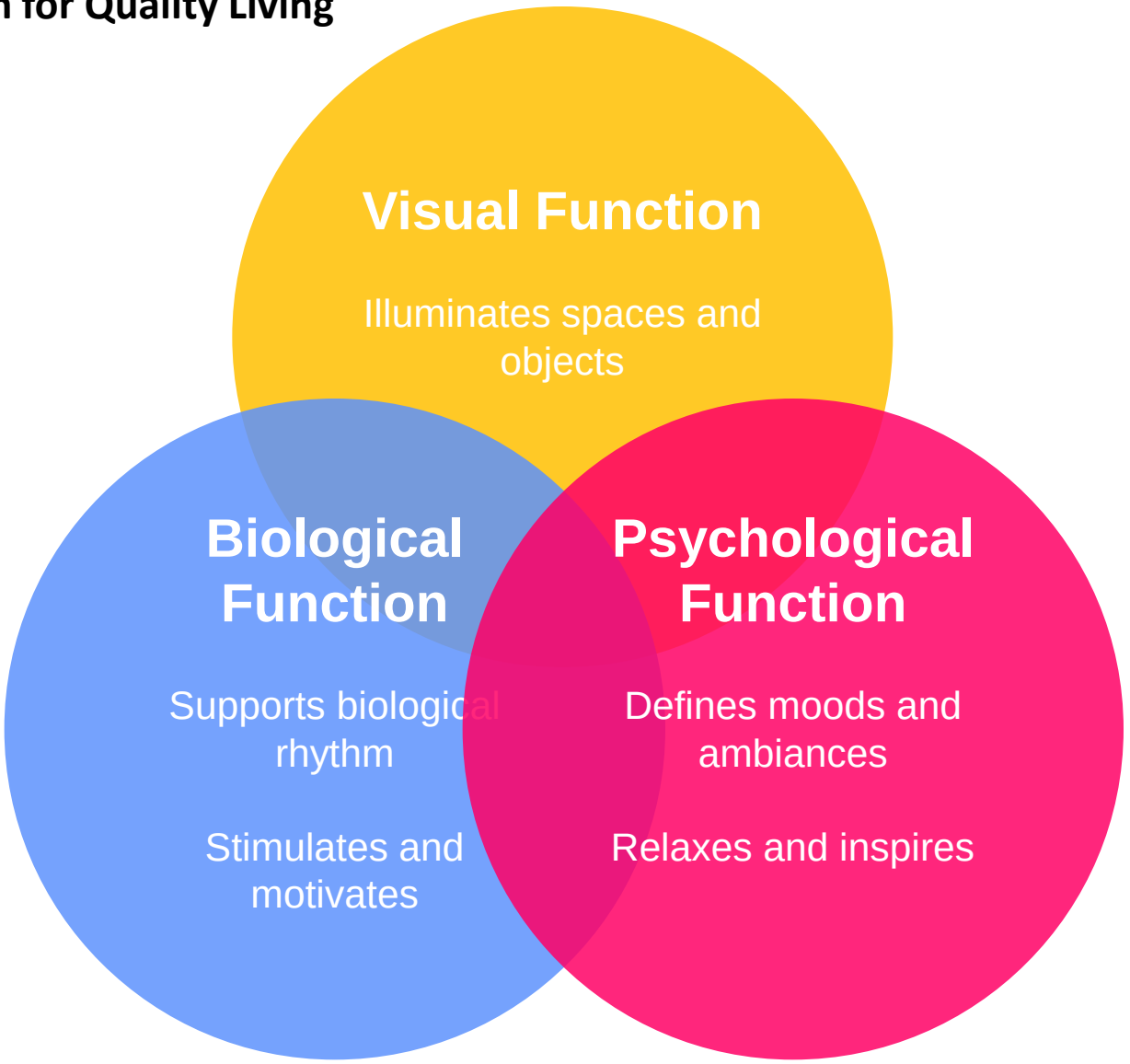
default setting upon scenes

To achieve colour changing, dimming & scheduling.

Colour Temperature x Light intensity x SCHEDULING

Lighting Design for Quality Living

"Life in Light"




Lighting Design for Quality Living
It’s all about Nature.
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