



What is



Light Pollution?



Firefly Playground / Kim, SoonYi / 2014 winner

Light Pollution?

Light pollution is the pollution concerning the light among other elements that make up the environment around us. Incorrect lighting environment, unwanted light, excessive light is giving serious damage to humans and ecosystems.

Light pollution can be defined as following: the night when you cannot sleep due to the light coming from neighbors, excessive light occurred by street lamp without lampshade, starry night without stars glowing, damage to crops due to night lights, fire-fly missing from nature, cicada singing in summer night and nocturnal animals having hard time finding food due to light. These are side effects of light pollution that we are currently experiencing.

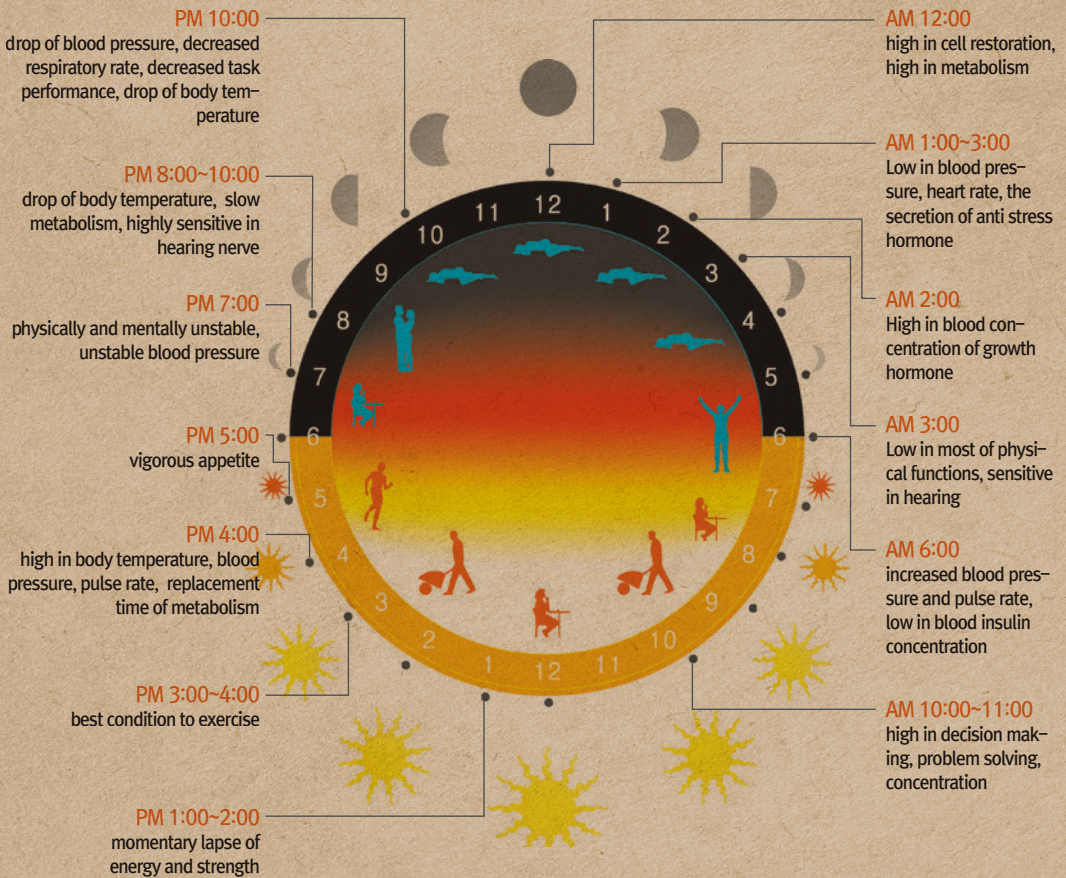


2009 빛공해사진모전 장려 최상식 <불면의 밤>

Reducing light pollution, Healthier world
Human and nature will be happier.



biological clock & natural period






Since the earth was born, all the earth creatures has existed in accordance with light and darkness that applied to earth for a long time and seasonal cycle.

However, changes in the industrial society of human civilization began springing up against the side effects of artificial lighting based on the period of natural light.

If we leave this light pollution as of now, our health and ecological extinction of animals and plants, as well as destruction of the environment, the damage will reach uncontrollable level. Light pollution causes serious damage by disturbing the natural order and destroying the habitat, furthermore, human health and as well as plants and animals growth, controlling hormones, breeding, migration, sleeping and predator prey relationships.

kind of Light Pollution

Type	Sky Glow	Glare	Lig
example			
Definition	Artificial light is refracted and scattered by vapor, mist or pollutants in the air. And illuminate the night sky.	Intense light come directly to the eye, it cause momentary paralysis and visual discomfort	Lighting unintentional human
Classification	Direct upward light, reflected light, sidelight	Car headlights, bright advertisements, strong outdoor lights	Street lighting installed for
Consequence	disturbance in astronomical observation, plant growth and the migratory routes of birds, rising air temperatures cause global warming, Sleep disorders,	blinding glare, disability, discomfort glare, car accident, roadkill	Disturbance in human rhythm and ecological

Light Trespass



Light effect is permeated to undesired areas and affecting humans and animals.

Light sources that are carelessly installed without a plan, leak light from outdoor light

Disturbance of biological rhythms of plants and animals in the natural environment.

Light Clutter



Excessive concentration of light in one place.

High intensity of advertising light, Incorrect street lights,

Risk of accidents from visual confusion and distraction, Car accident

Over-Illumination



Leaving unnecessary light or using the light more than required

Brighter illumination than the required amount

Energy waste from excessive use of energy, future energy depletion

Shooting star

Baby star fall out from the water of the galaxy
While playing and jumping into it.

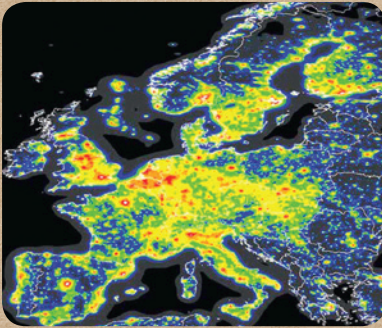
What should do if baby star spill blood
From falling right at rough rocks

Friends let' s go together with lantern light
To find fallen baby star.

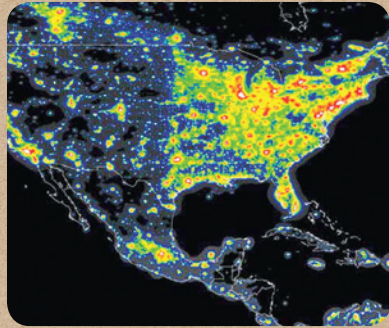
– Suk Joong Yoon

World map of Light Pollution

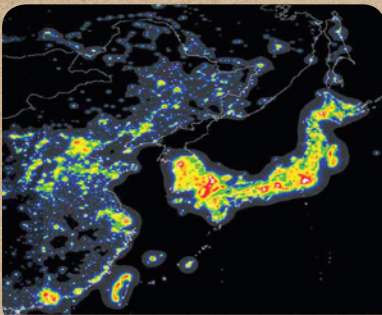
There are no borders in light pollution.
The more developed countries have greater
responsibility to light pollution.



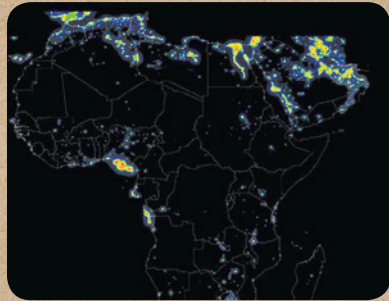
Europe



North America



East Asia



Africa

World map of light pollution, light pollution is more severe in more glowing area.

Night like night, countries with dark sky are gradually decreasing.

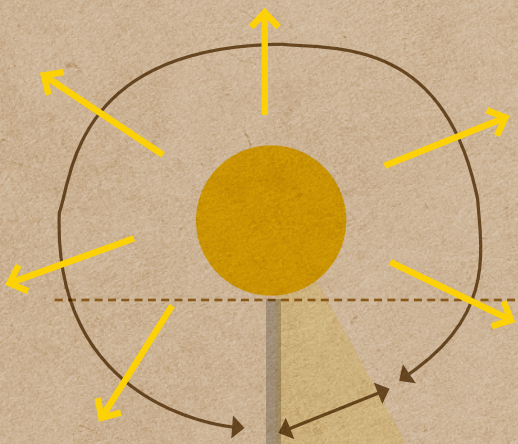
Later, we might have to travel to see stars and even pay an admission fee to watch stars.

<http://www.lightpollution.it/worldatlas/pages/fig1.htm>



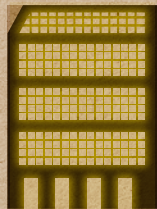
Examples of light pollution around us

Unnecessary light



disturbance in astronomical observation

Necessary light



energy waste, co2 emissions



causes of various diseases
(adult diseases, stress, cancer, myopia)



glare, visual attack



sleep disorders

Disturbance in fish ecology
(salmon, herring, etc..)





hindrance in the visibility
of aircraft

disturbance in the migratory routes of birds

destruction of insect ecology
(cicada, moth, firefly etc..)



disturbance in nocturnal animals
(owl, bat, etc..)



Wildlife roadkill



harvest interference

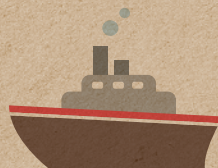
(rice, barley, bean, sesame red bean,
millet, corn, chili pepper, pumpkin, etc..)



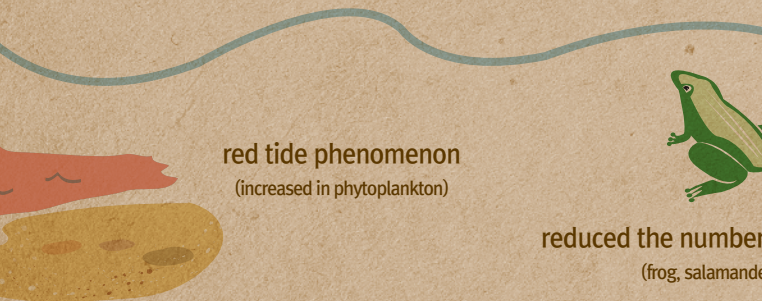
disturbance in
plants growth



decreased in reptile breeding
(turtle, lizard, etc..)



inhibition of ves-
sel visibility



red tide phenomenon
(increased in phytoplankton)



reduced the number of amphibians
(frog, salamander, etc..)



Countermeasures of light pollution in countries.

USA

More than 100 cities have been established regulations on exterior illumination. In 1972, Arizona was first state to establish prevention of light pollution law, California arrange standard of lighting zone.

Japan

In 1989, Okayama legislated light pollution protection law. In 1998, they implemented local lighting environment plan program, support with guideline of measures of light pollution.

Italy

Starting from Lombardy, each region spread light pollution protection law, every October 4th is set as <recognition day of light pollution> in Italy.

United Kingdom

Inserted additional clause on illegal violations of artificial lighting to Clean Neighborhoods and Environment Act 2005. Fines and objections for the light that infringe privacy.

Australia

Light pollution due to excessive light regard as illegal acts and it's supervised by <the environmental protection law>

Korea

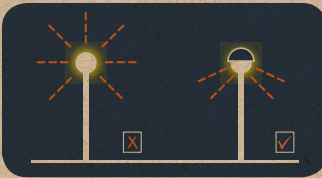
In 2011, Seoul city announced and enforced <Light pollution prevention and city lighting management ordinance>. In 2012, ministry of environment legislated <light pollution prevention law from artificial lighting> and enforced from 2013.



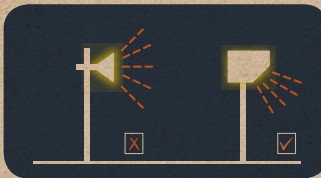
2008 빛공해사진공모전 장려 한상진 <갈려버린 지구>

How to decrease light pollution

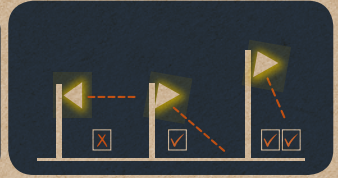
- ✓ Pay more attention to Light pollution
- ✓ Share information on Light pollution and the ecosystem
- ✓ Not using unnecessary light at night
- ✓ Not using upward light
- ✓ Shade on street lights
- ✓ Use indirect light instead of direct light
- ✓ Put shade film or install shade louver
- ✓ Install shade board or curtain
- ✓ Use dimmable light
- ✓ Use efficient lighting to prevent light pollution
- ✓ Participate in Earth Hour campaign
(Turning off lights for one hour, from 8:30 to 9:30 p.m. on the last Saturday in March)
- ✓ Participate in light pollution photo UCC contest



Minimize upward lighting



Illuminate the only where it is needed



Minimize glare



Not illuminating the neighbors



For details on light pollution,
Please refer to these WebPages.

- Healthy light information center (Ministry of Environment)
- Light pollution photo and UCC contest (Light museum)

References

- Story of emotional light – Feelux, Si-Chung Noh, 2004
- 2011 light pollution seminar – Lighting Museum, 2011
- Healthy light Harmful light – Lighting Museum, 2012
- Making Healthy light environment – Ministry of Environment
- Research of managing night city lights – Korean city administration
- Light protection law of Seoul city that protecting human and natural ecosystem

References Links

- Healthy light information center (Ministry of Environment) <http://www.goodlight.or.kr/main.do>
- The International Dark-Sky Association <http://www.darksky.org>
- Florida Atlantic University Astronomical Observatory http://www.physics.fau.edu/observatory/about_ob.html
- The night sky in the World <http://www.lightpollution.it/>



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