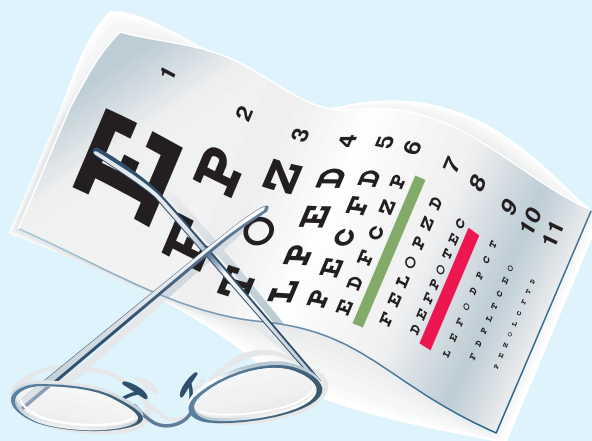


Editorial

Round and black, intelligent and bright. Look around during the day and accompany you in your dream at night. (Source: Journal Vakio of Macau, 6 Oct 2008 issue). What do you think is the body part it is describing? Correct, they are our eyes. I am sure that we all are concerned with the health of our eyes. The feature article here introduces the protective effect of sunglasses. Are sunglasses for fashion only? Or are they just a pair of dark glasses? Even during sunny days, wearing sunglasses is not very common. This may be due to inconvenience, or not feeling the need. However, if we ignore the harmful effect of ultra-violet



light on our eyes, the damage may be very severe. Optometrists tell us that wearing suitable sunglasses are protective against ultra-violet light and encourage us to know more about ultra-violet light, ultra-violet index, exposure category and measures to reduce the harm caused by ultra-violet light.



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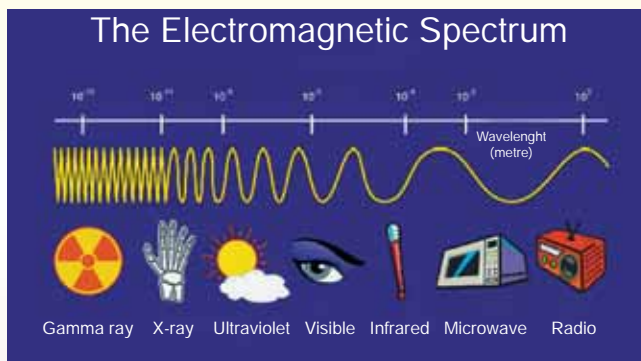
Ultra-violet Light and Sunglasses

Wallace CHEUNG, Optometrist
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Introduction "...The average ultra-violet index recorded in King's Park is 3, the intensity belongs to moderate..." Everyday, we hear this familiar announcement on the television and the radio. We also come across it when we travel in public transport or surf through the Internet. However, do we understand what ultra-violet is? What is its significance? How does it affect our eyes and how can we protect against it?

What is ultra-violet?

In our daily living, we may encounter various types of electro-magnetic radiations. Ultra-violet light (UV light) is one of them. The sun is the main source of ultra-violet light. The electro-magnetic radiations emitted from the sun include radiations of different wavelengths. Some of them we can see, like the different colors in the rainbow. Some are invisible, like UV light. The wavelength of UV light falls just outside the range of that of violet visible light. The ozone layer of the atmosphere can absorb part of the UV light. The thicker the ozone layer, the less UV light will reach the ground. Clouds, rain, fog and mist can also absorb or disperse UV light. If the amount of UV light reaching the ground increases, excess exposure to it may cause harm to human health.



Ultra-violet type A, B, C

UV light is classified into type A, B and C according to its wavelength. Since all UV C and most UV B is absorbed by the atmosphere, the UV that reaches the ground is mostly UV A and some UV B.

Characteristics of different kinds of UV light

	Ultra-violet A	Ultra-violet B	Ultra-violet C
Wavelength (nm)	315 – 400	280 – 315	100 – 280
Proportion absorbed by atmosphere	Not absorbed at all.	Mostly absorbed	Practically all absorbed
Proportion measured on the ground	100% reach the ground	Less than 2%	Nearly zero

(1 nanometer = 0.000000001 meter or 1×10^{-9} meter)

(Source: <http://www.hko.gov.hk/wxinfo/uvindex/english/whatisuv.htm>)

Significance of ultra-violet index

It is an international scale developed by the World Health Organization, the United Nations Environment Program and the World Meteorological Organization. The idea of such index is to highlight the underlying danger to health. It emphasizes the importance of self-protection against UV light. The Hong Kong Observatory has set up instruments in King's Park to measure the intensity of UV light that reaches the ground. The UV index is a measurement that indicates different degree of damage to human skin. The higher the index, the higher the chance of having adverse effect on human skin and eyes and the shorter the time needed to cause such effect.

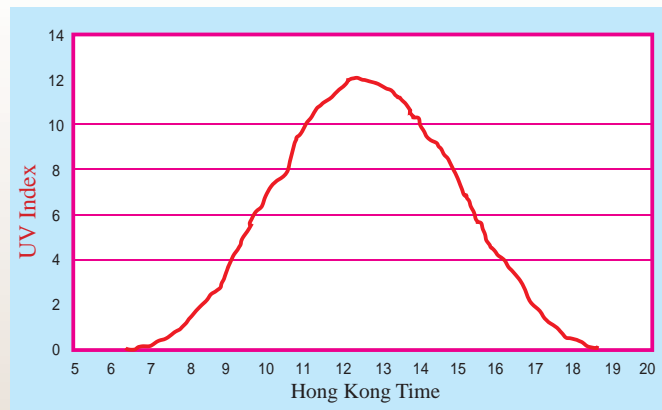
UV index scale and corresponding exposure category

The World Health Organization classified the UV index according to their intensity. It ranges from low (green) to extreme (purple).

UV Index	Exposure Category
0 - 2	Low
3 - 5	Moderate
6 - 7	High
8 - 10	Very high
≥ 11	Extreme

(Source: leaflet on "Safety under the sun – protect yourself against UV radiation" produced by the Department of Health and the Hong Kong Observatory, 2007 http://www.hko.gov.hk/wxinfo/uvindex/english/uvi_e.pdf)

The Hong Kong Observatory measures and announces the UV index. It also forecasts the next day's maximum index. In cloudy or rainy days, the UV index would be low. However, in sunny days in summer, the UV index may go up to 10. If the forecast index reaches 11 or higher, the public would be advised to avoid prolonged exposure to sunlight or outdoor activities. The figure below shows the higher ultra-violet index around noon in a typical sunny day.



(Source: <http://www.hko.gov.hk/wxinfo/uvindex/english/whatisUVI.htm>)

The effect of ultra-violet on eyes

During summer activities such as surfing, wind-surfing and winter activity such as skiing, our eyes would be exposed to high intensity of UV light in a relatively short period of time. It can cause damage to the retina. The symptoms include pain around the eyes, tearing, blurring of vision and photophobia. Such symptoms are called snow blindness. Researches showed that if the eyes are not protected by sunglasses when they are exposed to sunlight during outdoor activities, the eyes may be hurt by UV light, resulting in cataract, keratitis, conjunctivitis, pterygium and macular degeneration.



According to the World Health Organization, 12 to 15 million people suffer from blindness caused by cataract annually. Cataract is a condition in which the transparent lens in the eye becomes cloudy, so that the person cannot see clearly. It is estimated that around 20% of them, that is, 3 million cases per year, are due to over exposure to UV light. (Source: <http://www.who.int/uv/health/en/>). The damage caused by UV light will accumulate with time, longer exposure and higher UV intensity would cause more severe effect. Thus, the chance of getting cataract would increase with age.

Sunglasses can reduce the damage caused by UV light

Participation in outdoor activities under strong sunlight may lead to excessive exposure to UV light and cause harm to our health. The World Health Organization recommends that protective measures are needed if the UV index is 3 or higher. Apart from tree shade, umbrella and broad-brim hat, sun-glasses are very important. During outdoor activities, we need to wear suitable sunglasses to protect our eyes. It is even more important for children because their pupil is larger and more UV light could enter the eyes. Moreover, children have thinner lenses through which UV light could penetrate more easily and cause damage.



The ability of filtering UV light

When we choose sunglasses, the most important factor we need to consider is whether it can filter UV light, not the style or price. The ability of the lenses to filter UV light does not depend on the intensity of the color. It depends on whether the lenses have treatment material applied on them for blocking the UV light. The World Health Organization advises people to wear "UV400" sunglasses which block 99 to 100 percentage of UV A and UV B. That means all UV light with wavelength under 400nm will be filtered by the sunglasses.

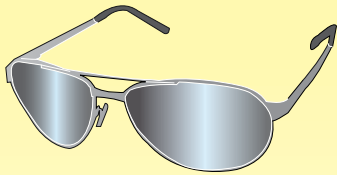
The color of lenses

When safety and UV protection ability are the main concern, we must consider the color tone and color type of sunglasses. Many people think that sunglasses with darker tone are better. However, darker tone only reduces light transmission, it does not mean better UV protection. In fact, reducing light transmission may increase the pupil size and, if the sunglasses do not provide effective UV protection, more UV could enter the eyes and cause more damage on retina and cornea.

For ordinary outdoor activities, the degree of light transmission through sunglasses can reach 10%-30%. However, transmission should be less than 10% for activities under strong sunlight, such as skiing and hiking. Grey, dark green and brown lenses have higher ability to block sunlight and therefore are always the first choices. Other colors such as orange or pink are not advised because they distort the natural color of objects, causing minor problem such as discomfort of the eyes, or serious life threatening problem such as not identifying the color of traffic light. Therefore when we buy sunglasses, we should not just choose one with dark lenses, but one that is comfortable, natural, without color distortion and most importantly, with UV light protection.

Comparison of sunglasses of commonly used colors

Grey	Dark green	Brown
No color distortion, show the natural color of objects.	Most comfortable to the eyes. Mild color distortion, color of objects appeared a little bit blue-green.	Mild color distortion, color of objects appeared softer and a little bit yellow-brown.



Types of lenses

The lenses used for sunglasses can be classified into single colored, double colored, photochromic, polarized and metallic mirror coated. Each has its advantages. Single colored lens gives a uniform light transmission in the whole lens. Color tone of double colored lens gradually decreases from the top to the bottom. This type of lens is suitable for drivers since the darker tone in the upper part of the lens blocks the strong sunlight, while lighter tone in the lower part allows the driver to have good vision on the control panel. Polarized lens can selectively block the light reflected from the snow or water surface. Metallic coated lens increases the light reflection ability. Photochromic lens automatically changes its color according to the brightness of the surrounding environment.

Photochromic lenses

Recently, we see a lot of advertisements on photochromic lenses. Actually, photochromic lenses have been around for many years but it was not popular because the photochromic ability was not good. However, such ability has improved a lot recently and also people are more concerned about eye care, so photochromic lenses are much more popular now. Photochromic lenses can be classified into plastic and glass. Glass is less popular because it breaks more easily and is not suitable for outdoor activities. Moreover, glass cannot block UV light and anti-UV coating cannot be applied on it. It only changes its color tone according to the light intensity of the surrounding environment. It cannot effectively block UV light or protect the eyes. Also, the choice of color is restricted to brown only.

On the other hand, plastic photochromic lenses are much more durable, so it is very suitable for outdoor activities. Anti-UV coating can be applied on plastic lens; such coated lens can block all ultra-violet light even in indoor environment when the lens has not changed color. When the UV light of the surrounding environment increases, it becomes darker and protects the eyes from strong light. In cloudy days, the lens will also change color since there is still some UV light. When compared with glass, there are more choices of color for plastic photochromic lens, which could satisfy the needs of different people. Because the price of photochromic lens is higher, and not many people feel the need to have their glasses change color in different environment, many people would choose other types of lenses.

Conclusion If the eyes are not well protected against sunlight, the damage to the eyes by UV light will build up silently. However, if we wear sunglasses that do not offer enough protection, exposure to UV would be even higher because we thought we are safe. So, when we choose sunglasses, we should consider its UV A and UV B blocking ability, light transmission ability, color and whether it is suitable for our activity. We should choose a pair of sunglasses bearing a label of "UV400", with suitable lens type and color. We may find out the UV index of the day as well as the forecast of the maximum UV index of the next day through public media such as TV, radio, newspaper and the "Dial-a-weather" service (Telephone number 1878200) of the Hong Kong Observatory and the Observatory web site. If we have questions about choosing sunglasses, we could seek professional advice from optometrists. This way, we can protect our eyes against UV light.

We use our eyes to observe, to know and to learn. When we communicate with others, our eye contact helps communication. Our students are very conscious about protecting their eyes. Let us see what their ideas are.



We must protect our eyes – the window of the soul. Play less computer games, keep a distance when reading.



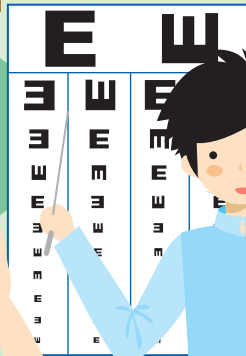
Make sure there is adequate light, don't let your head go down too low when you read or do homework.

Don't read in bed or when riding in a car.

Protect the eyes, don't play too much video games.

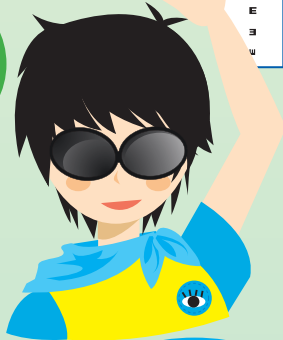


Have a vision check every year. Wear glasses if you have short-sightedness.



For protecting our eyes, we should not look at the sun directly, even wearing sunglasses

Don't look at the sun directly with your eyes.

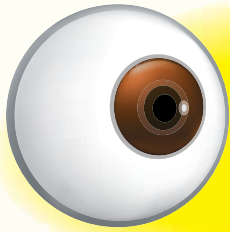


We should use sunglasses in sunny days

Remember to let your eyes rest.



Don't watch TV for too long. Look at distant objects to relax your eyes. Sleep early and wake up early. Keep good hygiene.



Eyes are the window of our soul, so we have to take good care of them. It would be a positive step to healthy living if students become aware of caring for their eyes. Let's read one of the letters from our readers and appreciate her initiative in gaining knowledge about eye care.

Dear Health Box,

Hi! My name is Lo Wing Kay. I am nine years old. I am studying in Primary four. I was told that I got short-sightedness and astigmatism during my last visit to optometrist of Student Health Service. What can I do to stop my vision from getting worse?

Lo Wing Kay



Dear Wing Kay,

Thank you for your letter!

It is encouraging to know that you are concerned with the health of your eyes and you are also eager to learn more about that.

During the vision assessment, if the optometrist confirmed that you have short-sightedness and astigmatism, you may need to get suitable glasses to correct your vision.

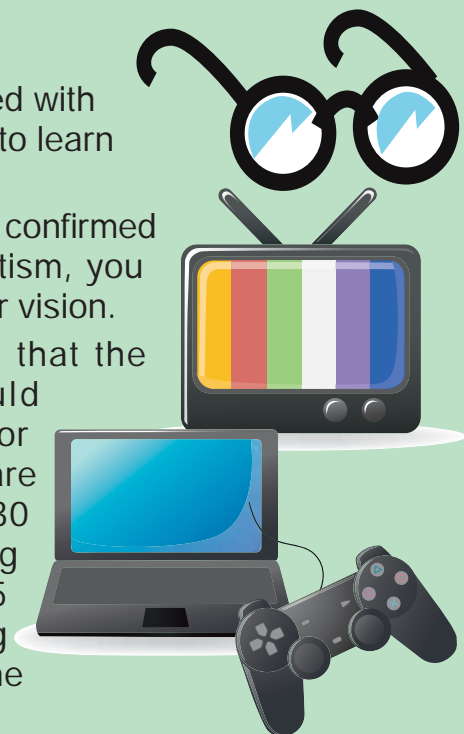
I also suggest you adopt healthy habits so that the short-sightedness and astigmatism would not deteriorate so quickly. When you read or write, proper posture and adequate lighting are important. Place reading materials at least 30 cm from your eyes and do not read in a moving vehicle. Taking a 5-minute break every 30 to 45 minutes of eye-straining work such as watching TV, computer work and playing electronic game allows adequate rest for your eyes.

If you would like to know more information on eye care, you may visit our website: http://www.studenthealth.gov.hk/english/health/health_ev/health_ev_nea.html

Hope that it helps you learn about eye health.

Wish you good vision and good health

Health Box

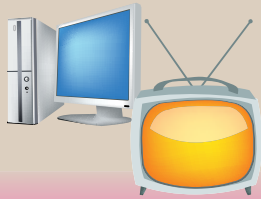




Interesting knowledge Q&A

Question:

What should we take note when we use computer or watch TV?



Answer:

- A. After using the computer for 30 to 40 minutes, take a break of 3 to 5 minutes or look at distant objects to relax your eyes.
- B. When you watch TV, turn on the light in the room.
- C. Keep a distance of at least 6 times the size of the TV screen.
- D. The height of the screen should be about the level of the eyes
- E. All the above.

(Answer: find it out from the newsletter)

Vitamin A is good for the retina. Deficiency of vitamin A may lead to night-blindness or affect the development of the retina. However, small amount of vitamin A is sufficient. Larger amount does not provide extra help to our vision and would not prevent worsening of short-sightedness. Milk products, eggs or food with bright color such as carrot are rich in vitamin A. Usually, so long as we keep a balanced diet and include the above food, we are not in shortage of vitamin A and no vitamin A supplement is needed. Excessive amount of vitamin A, on the contrary, could be harmful.

Health Tips



Health Box

For enquiries of student's health problem, please write to "Health Box"

Please write your name & address, contact tel. no. in the letter.

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4/F, Lam Tin Polyclinic,
99 Kai Tin Road,
Kwun Tong,
Kowloon