

SunSmart America™ High School Curriculum

Integrated Lessons for High School Classes

Play the Part... Be SunSmart!



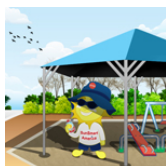
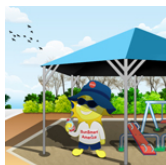


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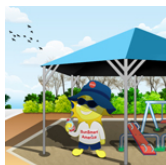
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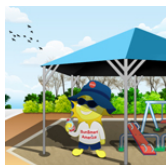


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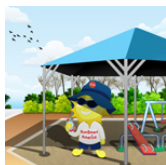
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Acknowledgements

This resource material was originally developed as a revision of the SunSmart America™ Middle School Curriculum. In 2001, The Richard David Kann Melanoma Foundation bought the rights to the SunSmart Australia Curriculum and with help from the School District of Palm Beach County adapted the curriculum to meet United States standards.

This revised edition has been developed by the Richard David Kann Melanoma Foundation with contributions from the SunSmart, Cancer Council Victoria and SunSmart, Cancer Council Western Australia and the Cancer Council National Skin Committee, Australia and the American Academy of Dermatology.

Founder & President

Debbie Schwarzberg – Founder & President, Richard David Kann Melanoma Foundation

Executive Director

Lisa Richman – Executive Director, Richard David Kann Melanoma Foundation

Educational Contributors

SunSmart, Cancer Council Victoria

SunSmart, Cancer Council Western Australia

Cancer Council National Skin Committee

American Academy of Dermatology

Medical Contributors

John Kinney, M.D. – Palm Beach Dermatology, Inc.

Abraham Schwarzberg, M.D. – Cancer Center of South Florida

Donna A. Zeide, M.D. – Palm Beach Gardens, FL

Barbara A. Gilchrest, M.D. – Boston University School of Medicine, Department of Dermatology

Mike Nowak, M.D. – Diagnostic Dermatopathology



Academic Contributors

E. Wayne Gent – Superintendent of Schools – Palm Beach County School District

William S. Graham – Chairman, Board of Directors – Palm Beach County School District

Eric Stern – Administrator for Physical Education, Curriculum Development and School Improvement, Palm Beach County School District

Angela Fitch – Language Arts Resource Teacher for Secondary Education, Curriculum Development and School Improvement, Palm Beach County School District

Chad Phillips – Elementary Science Administrator, Curriculum Development and School Improvement Palm Beach County School District

William Stewart – Health Education Specialists, Secondary Education Curriculum Development and School Improvement, Palm Beach County School District

Kathleen Fuller, Ph.D. – AnthroHealth

Financial Contributors

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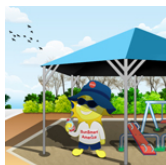
Dr. & Mrs. Lawrence Katzen – Katzen Eye Care Center

Dr. & Mrs. John Kinney, Palm Beach Dermatology, Inc.

The Schwarzberg and Kann Family

The Walter and Adi Blum Foundation, Inc.

SunSmart America™ is adapted from SunSmart Australia with permission from SunSmart, Cancer Council Victoria and SunSmart, Cancer Council Western Australia and the Cancer Council National Skin Committee, Australia



Letter from the President

The Richard David Kann Melanoma Foundation is a not for profit 501 (c) 3 organization that was established in 1995 to educate the public on the prevention and early detection of skin cancer. The Foundation provides school-based curricula, SunSmart America™, in grades K through 12 to teach information and life-saving sun safe behavior skills to children, educators and families to help reduce the incidence of skin cancer.

More than one million Americans will be diagnosed with skin cancer this year – that number is more than all other cancer cases combined – and more than 8,000 will die from this disease. This is tragic, as this disease is highly preventable and curable if you know and follow the simple steps for prevention and early detection.

The Foundation was established in memory of Richard “Dicky” Kann who died at the age of 45 from a late-detected melanoma – the deadliest form of skin cancer. Had Dicky been aware of skin cancer prevention and simple early detection techniques, he might still be alive today.

The Foundation would like to recognize its Board of Directors for laying the groundwork for the relationship the Foundation has developed with the School District of Palm Beach County and other school districts around the State and the Country. We also want to thank School Board member, Bill Graham and Superintendent, Dr. Art Johnson, whose unending enthusiasm and constant support has been more than invaluable over the years.

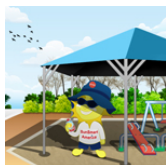
A special thanks to the School Districts Curriculum Specialists, Eric Stern, Angela Fitch, Chad Phillips, and William Stewart. Without their expertise, precious time and support, we could not have made the inroads we did so quickly and efficiently. And of course, thank you to all the teachers throughout the country who utilize SunSmart America™ in the classroom. Your efforts will help save the lives of our children. It is our hope and expectation that SunSmart America™ will continue to meet the Foundation's goal of decreasing the morbidity and mortality from skin cancer for decades to come.

With heartfelt wishes for a sun safe environment for children everywhere,

Debbie

Debbie Kann Schwarzberg

Founder & President



High School Sun Safety Educational Resource



THE SCHOOL DISTRICT of
PALM BEACH COUNTY, FLORIDA

SUPERINTENDENT'S OFFICE
3330 FOREST HILL BOULEVARD, C-316
WEST PALM BEACH, FL 33406-5869

Phone: 561-434-8200 Fax: 561-434-8571
www.palmbeachschools.org

E. WAYNE GENT
SUPERINTENDENT

FRANK A. BARBIERI, JR., ESQ.
CHAIRMAN

DEBRA ROBINSON, M.D.
VICE CHAIRMAN

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MONROE BENAM, M.D.
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CHARLES E. SHAW

September 25, 2012

Dear Richard David Kann
Melanoma Foundation,

An Opportunity to Save Lives

This year marks a renewed effort in education, as we recognize the need to solve a hard problem that plagues our young people - skin cancer, especially melanoma. During the first 18 years of a child's life, they are exposed to more sun than they most likely will experience for the rest of their adult lives. This is the time when they are susceptible to burn which increases their risk of developing melanoma. These are also the years when they are the most malleable and the knowledge that we provide will sustain them during adulthood. One person dies from melanoma every 50 minutes, one in every 50 people will be at risk to get melanoma, and Florida is the state with the second highest incidence of melanoma in the country.

The School District of Palm Beach County partners with the Richard David Kann Melanoma Foundation as we support their development and implementation of a body of work that educates students in grades K-12. These life-saving programs include the SunSmart America™ K-12 curriculum (www.melanomafoundation.com), peer-based Students Against Melanoma (SAM) Clubs in middle and high schools, and the K-12 Melanoma Monday Art Contest in May.

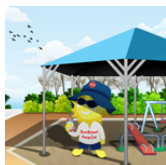
The SunSmart America curriculum contains grade appropriate lessons and activities that have been adapted to meet all FCAT and Next Generation Sunshine State Standards. Students will learn the basics regarding skin cancer, and ***most importantly, the prevention and early detection of a disease that is almost 100% preventable with education!***

I want to thank the Richard David Kann Melanoma Foundation of Palm Beach County for providing valuable resources and educational materials regarding sun safety education. The Foundation has been an active member of our Wellness Task Force.

Sincerely,

E. Wayne Gent
Superintendent

EWG/JA/KO/LP/ES:du



Teacher Notes

Introduction to the SunSmart America™ Curriculum

Welcome to the new SunSmart America™ Curriculum for high school students. This curriculum-based resource promotes the SunSmart America™ message and provides teachers with information and a range of classroom activities on skin cancer and sun protection. These materials were developed with the help of The Cancer Council in Australia, Palm Beach County School District Teachers and Curriculum Specialists and the Medical Education Committee of the Richard David Kann Melanoma Foundation (which was lead by Dr. John Kinney of Palm Beach Dermatology, Inc.). This resource is available to teachers and schools throughout the country.

History of SunSmart America™

In 1998, the Foundation bought the rights to the Australian SunSmart program and adapted it to educational standards in the United States. The curriculum, called SunSmart America™ consisted of age-appropriate lessons for grades K-12 and is widely used in the Palm Beach County School District and in School Districts across South Florida.

In 2003, the Foundation was awarded a grant from the Health Foundation of South Florida to begin a sun safety program in the Monroe County School District, educating the residents of the Florida Keys. In 2004, the Foundation in collaboration with the University of Miami, received a grant from the National Institutes of Health for \$1.5 million to study the effectiveness of the Foundation's award-winning SunSmart America™ Elementary School Curriculum.

Over the years, the Foundation has received many accolades and awards for its curriculum and programs. Just to name a few, the Foundation is a eleven-time winner of the American Academy of Dermatology's Gold Triangle Award. The Melanoma Foundation has also been featured in several news articles and medical journals for its work in the area of raising sun protection and early detection awareness.

The Melanoma Foundation's staff has provided more than 1,500 presentations in public and private schools reaching over 75,000 students and more than 5,000 teachers and administrators. In addition, the Foundation has conducted presentations for community groups and businesses in South Florida reaching over 150,000 residents.



High School Sun Safety Educational Resource



In 2009, The Foundation's staff, Board of Directors and Palm Beach County School District Teachers revised and updated the SunSmart America™ Curriculum to include up-to-date medical and scientific information.

Use of SunSmart America™

The lessons and activities in this resource are arranged in five cross-curricular topics. Each topic contains a Pre & Post-Test, Information Sheet and several activities. In order to meet Florida Sunshine State Standards all SunSmart America™ lessons are benchmarked to correlate with required teaching for the Florida Comprehensive Assessment Test (FCAT). The lessons and activities can be used in Physical Education, Health, Science and Language Arts.

A sample letter to parents and grandparents has been included in this resource. This letter seeks family support by acting as SunSmart role models and participating with their children/grandchildren in sun safe behaviors.



Background Information

Skin Cancer in the United States

The United States has the third highest rate of skin cancer in the world with almost one in five developing some form of skin cancer during their lives. More than 1 million cases of basal and squamous skin cancers and 68,720 cases of melanoma are expected in 2009. There are expected to be approximately 8,650 deaths from this disease.

Skin cancer is a disease that develops when the skin has been damaged by UV radiation from the sun. Children have delicate skin, which places them at particular risk of sunburn and skin damage. In fact, sun exposure during the first 15 years of life has a significant impact on the likelihood of developing skin cancer later in life.

There are three main types of skin cancer. Skin cancers are named after the type of cells they develop in and each type has different features. Basal cell carcinoma and squamous cell carcinoma (known as non-melanoma skin cancers) are the most common types of skin cancer. Melanoma is the least common of the three but the most dangerous form of skin cancer.

Unlike many other types of cancers, skin cancers give you early warning signs and can be removed before they become deadly. As a matter of fact, **there is a 95 % cure rate for skin cancer if detected early.**

UV Ratio

The sun gives us light in the form of visible radiation. It gives us warmth in the form of infrared radiation. It also gives us a third type of radiation that we can neither see nor feel: ultraviolet radiation. Ultraviolet (UV) radiation can seriously threaten our health. UV rays can cause cancer by damaging cell's genetic material. The damage allows cells to form cancerous tumors.

Ultraviolet rays do not give off heat or light. UV radiation is made up of three parts: UVA, UVB, and UVC; invisible rays that are part of the energy that comes from the sun.



UV Index

The Ultraviolet (UV) Index was developed in the United States by the National Weather Service and the U.S. Environmental Protection Agency (EPA) following successful use of UV alerts in other countries. The UV Index provides a daily forecast of the expected risk of overexposure to the sun. The Index predicts UV intensity levels of the sun's rays when it is at its highest (this is called "solar noon"). The Index ranges on a scale from 1 to 11+, where 1 indicates a low risk of overexposure and 11+ signifies an extreme risk. Calculated on a next-day basis for every zip code across the United States, the UV Index takes into account clouds and other local conditions that affect the amount of UV radiation reaching the ground in different parts of the country.

UV radiation is greatest when the sun is highest in the sky and rapidly decreases as the sun approaches the horizon. The higher the UV Index forecast is, the greater the rate of skin and eye damage. Consequently, the higher the UV Index, the smaller the time it takes before skin damage occurs. Reflective surfaces, such as snow, sand, water and concrete will intensify UV exposure to varying degrees.

The UV Index is based on several things:

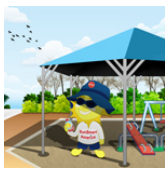
- latitude
- elevation/altitude
- day of year
- time of day
- total ozone in the atmosphere
- predicted cloud conditions

UV and Vitamin D

Vitamin D is a hormone which controls calcium levels in the blood. It is needed for development and maintenance of healthy bones, muscles, and teeth. Vitamin D is stored in fat and muscle and it is released slowly. The body stores enough vitamin D to last between 30 and 60 days. Vitamin D is made in the skin when the skin is exposed to ultraviolet-B (UVB) radiation from the sun; this is the most important source of vitamin D in the body. There are small amounts of vitamin D in some foods such as oily fish and eggs, or it may be added to foods such as margarine and some milk, however food sources usually only provide a small amount of total vitamin D. Vitamin D supplements are also readily available over the counter in pharmacies.

All skin types can be damaged by too much UV radiation, however naturally very dark skinned people are relatively protected from skin cancer by the large amount of skin pigment (melanin) in their skin. People with this skin type rarely or never get sunburned and often come from countries around central and northern Africa.

There is very little research available to determine exactly how much sun exposure is needed to maintain adequate vitamin D levels. Variations in age, skin color, latitude, time of day, and time of year means it is not possible to provide a single message about vitamin D and sun exposure which suits all people. Research suggests that people with naturally very dark skin require more UV exposure to produce enough vitamin D, as the pigment in their skin reduces UV absorption.



SunSmart Rules

When the UV Index reaches 3 and above use these five SunSmart rules

Slip on some sun protective clothing

Wear loose-fitting, close weave clothing that covers as much skin as possible during outside activities. School uniform or dress codes should include tops with elbow length sleeves, and if possible, collars and knee length or longer style shorts and skirts.

Slop on SPF 30+ sunscreen

Apply SPF 30+ broad spectrum, water resistant sunscreen 20 minutes before going outside to ensure maximum effectiveness. Reapply every two hours or more often if involved in physical or water activities. Sunscreen should never be the only method of sun protection.

Slap on a hat

To protect the neck, ears, temples, face and nose.

Seek shade

Stay out of the sun as much as possible between the hours of 10:00 a.m. and 4:00 p.m. Try to use shade whenever possible. UV radiation can reflect from surfaces such as water, sand and concrete, so it is important to wear a hat, appropriate clothing and sunscreen even while in the shade.

Slide on some sunglasses

Eyes can be damaged by exposure to UV radiation. Where practical, wear close-fitting, wrap around sunglasses that cover as much of the eye area as possible. Look for sunglasses that block 100 percent of UV rays and that also absorb most high-energy visible (HEV) radiation, or blue light.



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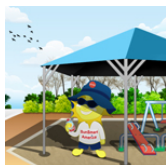
Role Models

Children often copy those around them and learn by imitation. Research shows if you adopt sun protection behaviors the children in your care are more likely to do the same. It is important to use a combination of five sun protection actions at school and home. Sun exposure for staff is also an occupational health and safety issue.

Family Intervention

The link between children's sun protection education and their family can be significant. Parent's behavior influences their children's behavior, and their interest and willingness to participate in sun safety activities may motivate their children. Parents can teach and reinforce sun protection knowledge and behaviors in an everyday context. For example, they can model appropriate behaviors such as hat and sunscreen use when going outside, encourage their children to play in the shade and remind them to wear sun protective clothing. Parents can also act as advocates for sun safety with the school.

It is helpful if families understand the school's sun protection policy and are aware of how they can assist by supporting the school's uniform/dress code, providing appropriate hats, and possibly sunglasses and sunscreen, and being good role models themselves. Newsletters, assemblies and notices on the school website are an ideal way of keeping the school community informed.



Dear Parents and Grandparents,

We are pleased to provide you with the following information on being **SunSmart**.

Our goal is to encourage young people and families to protect themselves from melanoma and other skin cancers by **playing it safe in the sun!**

Skin cancer affects over 1 million people each year in the United States. Melanoma-the deadliest form of skin cancer- will kill approximately 10,000 in 2009.

Skin cancer does not discriminate. Although people with lighter skin are more at risk, all races, colors and nationalities can and do get skin cancer!

Protect yourself and your family by following these simple SUNSMART rules:

- **Slip** on some sun protective clothing
- **Slop** on SPF 30+ sunscreen
- **Slap** on a hat
- **Seek** shade
- **Slide** on some sunglasses
- **Don't burn!**

Remember: take good care of your skin and teach your children to do the same. "KNOW THE SKIN THAT YOU'RE IN" It's worth it!

In good health,

Richard David Kann Melanoma Foundation

Call us with your SunSmart questions!

Phone: (561) 655-9655 Fax: (561) 655-9650



Important Points to Remember

Skin cancer is the most common type of cancer. It is increasing at an alarming rate.

Melanoma is a serious type of skin cancer and can be deadly.

One person every hour dies from melanoma.

The incidence is increasing faster than any other cancer.

1 million people will develop skin cancer each year; over 50,000 will develop melanoma.

Best treatment is PREVENTION!

Sunscreens are essential!

Apply it correctly!!! 30 minutes **before** going out.

Wear sunscreen with UVA/UVB protection.

Always wear sunscreen with SPF (Sun Protection Factor) 30 or higher, and reapply every 2 to 3 hours.

Protect your lips too.

Clothing is great protection.

Long sleeve shirts and pants.

Wide brim hats to protect your face, ears & neck.

Sunglasses with UVA/UVB protection.

Avoid the sun during peak hours (10:00am – 4:00pm)

A TAN IS NOT HEALTHY!!!

It is a sign of skin damage and could lead to skin cancer.

A single sunburn increases your chances of getting skin cancer.



High School Sun Safety Educational Resource



Early detection means CURE:

ABCDE characteristics of Melanoma Detection.

(Moles or any spot on the skin)

Asymmetry: one half unlike the other half.

Border irregularity: scalloped or poorly circumscribed border.

Color Variation: from one area to another; shades of tan and brown; black; sometimes white, red or blue.

Diameter: >6 mm (diameter of a pencil eraser).

Evolving: look for changes!!!!

Check your skin and beware of any changes!

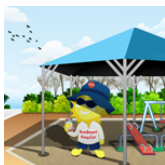
Consult a dermatologist regarding any new lesions or changes in existing moles, spots or freckles.

Contact the RDK Melanoma Foundation if you have any questions

Phone: (561) 655-9655 Fax: (561) 655-9650

2751 South Dixie Highway Suite 2A, West Palm Beach, FL 33405

E-mail: info@melanomafoundation.com Website: melanomafoundation.com



Topic 1 Skin





SunSmart America™

Topic 1: Skin

1996 Benchmark: SC.F.1.4.2, SC.F.2.4.3, SC.G.2.4.3, LA.A.1.4.2, LA.A.2.2.7, LA.A.2.4.1, LA.A.2.4.4, LA.A.2.4.7, LA.B.2.4.3, LA.E.2.2.1

Next Generation Health SSS: HE.912.C.1.1, HE.912.C.1.3, HE.912.C.1.4, HE.912.C.1.5, HE.912.C.1.7, HE.912.C.1.8, PE.912.C.1.9, PE.912.L.1.6, PE.912.R.1.5, PE.912.M.1.35, SC.912.L.14.7, SC.912.L.14.9, SC.912.L.15.1, SC.912.L.15.10, SC.912.L.15.13, SC.912.L.15.15, LA.910.1.6.3, LA.112.1.6.3, LA.910.1.6.8, LA.112.1.6.8, LA.910.1.7.7, LA.112.1.7.7, LA.910.1.7.3, LA.112.1.7.3, LA.910.1.7.5, LA.112.1.7.5, LA.910.6.1.2, LA.112.6.1.2, LA.910.6.2.2, LA.112.6.2.2, LA.910.4.2.1, LA.112.4.2.1, LA.910.1.7.4, LA.112.1.7.4

Academic Benchmark: HOPE-PE, HOPE-Core, Health 2-Personal Health, Life Management Skills

Knowledge Objectives

1. Students will learn the functions of the skin.
2. Show the mechanism of natural selection of skin types in varying environments and the importance of avoiding risk-taking behaviors in order to protect their skin from the burning rays of the sun.

Behavioral Objectives

1. Students will complete a pre-test in order to assess their awareness of personal risk.

Learning Objectives

Students will:

1. Differentiate between cells, tissues, and organs.
2. Describe the different layers of the skin.
3. Describe the behaviors to avoid in order to protect skin from sun exposure



High School Sun Safety Educational Resource

Materials

1. Pre -Test
2. Information Handouts
3. Visual Handouts
4. Activities 1-4
5. Post -Test

Procedure

1. Distribute pre-tests
2. Distribute student information handout and visual handout and choose a student activity. Allow time for students to read through the material and answer questions.
3. Distribute post-tests.



Pre/Post Test

- _____ 1. Differences in our size, shape, and skin color are determined by 50% of our genes.
- _____ 2. Melanocytes are found in the epidermis (upper) layer of the skin.
- _____ 3. People with dark skin have more melanocytes than people with light skin.
- _____ 4. Tanning results from melanosomes (products of melanocytes) being transferred to the predominant upper layer skin cells named keratinocytes.
- _____ 5. African-Americans typically have a skin type of I or II.
- _____ 6. UV radiation can break down certain B vitamins.
- _____ 7. UV radiation can break down vitamin D.
- _____ 8. A change in climate may influence a population's reproductive success.
- _____ 9. The skin is composed of two layers the inner layer called the dermis and the outer layer called the sebum.
- _____ 10. Family history is not related to skin cancer



Pre/Post-Test – Answer Key

False 1. Differences in our size, shape, and skin color are determined by 50% of our genes.

Only one percent of our genes determine these differences.

True 2. Melanocytes are found in the epidermis (upper) layer of the skin.

False 3. People with dark skin have more melanocytes than people with light skin.

Melanin is a special type of pigment that creates the colors of human and animal skin. There are two types of melanin--pheomelanin, which is reddish yellow in color, and eumelanin, which is deep brown to black.

The specialized cells that produce melanin are called melanocytes. Everyone has about the same number of melanocytes in their skin, whether it is light or dark. The shade of someone's skin depends on both the amount of melanin and the type of melanin their melanocytes make. People with darker skin produce more eumelanin, and people with lighter skin produce more pheomelanin.

True 4. Tanning results from melanosomes (products of melanocytes) being transferred to the predominant upper layer skin cells named keratinocytes.

False 5. African-Americans typically have a skin type of I or II.

Most have a skin type of V or VI.

True 6. UV radiation can break down certain B vitamins.

False 7. UV radiation can break down vitamin D

UV rays synthesize vitamin D.

True 8. A change in climate may influence a population's reproductive success.



High School Sun Safety Educational Resource

False 9. The skin is composed of two layers the inner layer called the dermis and the outer layer called the sebum.

The skin is composed of two layers. The inner layer is called the **dermis** and the outer layer is called the **epidermis**

False 10. Family history is not related to skin cancer.



Information Handout

Skin Color

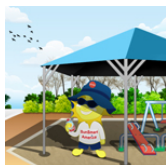
The sun provides us light (visible radiation) and warmth (infrared radiation). Another part of the solar spectrum that we cannot perceive with our senses are UV rays. UV rays can cause physiologic and disease causing events in the skin.

Genetically, we are 99.9% identical to each other. The other 0.1% contributes to the diversity we see in size, shape, and skin color which varies from person to person.

Skin color is determined by the activity of melanin, a pigment, in the skin. Melanin is made by special cells called melanocytes that form in the deeper layers of the epidermis. All people, no matter what their skin color, basically have the same amount of melanocytes. Those with darker skin have a higher rate of melanin deposit in the upper layers of the skin. Exposure to the sun also increases the rate of melanin deposit in the process called tanning. Melanin can protect the cells from UV light and its harmful effect.

The following is a chart that shows how skin types are categorized. Find yours and check your Sun History.

<u>Skin Type</u>	<u>Sun History</u>	<u>Example</u>
Type 1	Always burns easily, never tans, extremely sun sensitive skin	Red hair, freckles
Type 2	Burns easily, tans minimally, very sun sensitive skin	Fair skin, fair hair, light eyes
Type 3	Burns moderately, tans gradually to light brown, sun sensitive skin	Light skin
Type 4	Burns minimally, always tans to moderate brown, minimal sun sensitivity	Medium skin color
Type 5	Rarely burns, tans well, sun insensitive skin	Dark skin color
Type 6	Never burns, becomes deeply pigmented, sun insensitive skin	Very dark skin color



Did populations evolve different skin colors to survive certain environments?

In order for evolution to occur, individuals with traits that allowed their survival led to greater success in reproduction, thus allowing those desirable traits to become greater in the gene pool. Therefore, different environments would select for different traits. Two opposing factors are at work where skin color is concerned. The first is folate levels. Folate is part of the B vitamin complex and necessary for prevention of anemia. Lack of folate has been shown to increase the rate of neural tube defects (i.e., spina bifida) in a developing fetus and a decrease in sperm capable of fertilizing an egg. Folate in the human body breaks down very quickly during exposure to ultraviolet (UV) radiation, especially in light skinned people. Much of the breakdown can occur in less than one hour in the sun. Since melanin can block the harmful UV rays, people with darker skin had a lower incidence of folate breakdown, increasing their reproductive success in sunnier climates. In addition to this, they were less susceptible to sunburn and resulting mutations of DNA that led to skin cancers. UV rays also suppress the immune system which increases the odds of developing skin cancer. All of these factors influence a person's odds of reproductive success, and therefore led to evolutionary success in a population. Dark skin most likely became an essential human trait at least 1.5 million years ago in our ancestors from Africa who had less body hair for protection and a more sun-exposed habitat.

As later ancestors started to roam the globe, new climates and environments were encountered. Dark skin in a different climate, no longer was beneficial with lower light levels. Sun penetrating our skin starts production of vitamin D which is essential for absorbing calcium that we need to strengthen our skeleton. Without enough vitamin D, people risked rickets and osteoporosis. Lighter skin was an advantage in a climate that was not sunny because melanin did not block the absorption of the little light that was available. Lighter skin in these climates led to greater reproductive success and dark skin was selected against.

Why there is a range of skin color?

In the early 1990s, satellite data allowed us to map the levels of UV radiation at the Earth's surface. When this data was plotted on a map, it revealed three distinct skin tones.

Zone 1 falls within the tropics and includes most of Africa, Mexico, Central America and Asia. People from these countries have highly melanized skin. This protects them from UV damage causing skin cancer, yet the ability to synthesize vitamin D is not compromised due to the huge exposure to UV light.

Zone 2 is the larger part of the Northern Hemisphere and includes most of the United States and Southern Europe. People with this ancestry have moderately pigmented skin and another important adaptation; the potential to alter their skin tone through exposure to sun when available. People with this ability can increase



melanin to prevent folate loss in the summer. When the sun diminishes in the fall, the tan lightens to take advantage of a dimmer amount of light.

Zone 3 includes mountainous and polar regions, where people face the greatest risk of vitamin D deficiency. They typically have very light skin or their diets include substances such as blubber and fish which naturally containing high levels of vitamin D to aid those with darker skin.

All of these adaptations led to a delicate compromise between getting too little or too much sunlight. Evolution is great at perfecting this type of balancing act. With a more mobile society, not all people live in the same type of environment that is the same as their ancestors. There are only three choices to an organism when an environment changes: adapt, move, or die.

Layers of the Skin

Distribute to students - Visual Handout 1 - Layers of the Skin

The skin is the largest and one of the most important body organs. It protects against microbes, chemicals, UV radiation, cuts and tears. It has sensory functions and regulates body temperature through blood flow and perspiration. As much as 3000 calories of body heat are released in a single day.

The skin is composed of two layers. The inner layer is called the **dermis** and the outer layer is called the **epidermis** (epi means above). The epidermis is composed of flat scale-like cells (**squamous epithelium**) arranged in several compacted layers. The outermost layer, the **stratum corneum**, consists of keratin-filled cells that are continually sloughed off. The deepest layer is called the **stratum germinativum**. Cells of this layer divide and reproduce themselves. As cells from this layer move up through the epidermis to the stratum corneum, they become filled with keratin. **Keratin** is a waterproofing protein that allows the stratum corneum to be a protective barrier against moisture, light, and infection. Pigment cells called **melanocytes** are located in the bottom layer of the epidermis. These cells produce the dark pigment **melanin** that is able to absorb damaging ultraviolet light from the sun.

The dermis lies under the epidermis and is much thicker than the epidermis. It is composed of loosely arranged connective tissue with many fibers interspersed between. The surface area of the dermis is increased by parallel rows of fingerlike projections called **dermal papillae**. The dermal papillae help bind the epidermis and dermis



together and form ridges and grooves. The ridges and grooves form fingerprints. The lower portion of the dermis consists of a dense network of interlacing fibers. These fibers provide the skin with strength and elasticity.

The dermis is also well supplied with blood vessels, nerve endings, muscle fibers, sweat and oil (**sebaceous**) glands, and hair follicles. The roots of hairs are embedded deep in **follicles** and the hair shafts extend from the follicles. The hairs are raised and lowered by **arrector pili** muscles that extend from the dermis to the side of the hair follicles. Sebaceous glands open into hair follicles and secrete oil called **sebum**. Sebum oils the skin and hair.

Subcutaneous tissue lies under the dermis. It consists of a thick layer of connective tissue and fat. The **fat** regulates body temperature and stores energy from food. The subcutaneous tissue also acts as a shock absorber and protects underlying tissues from injury.

Photoaging is a term used to describe irreversible changes in the skin. These changes result in the generalized wrinkling, sagging, scaling, and blotchiness of skin once thought to be characteristic of chronological aging. Through overexposure to UV radiation, the skin changes in structure at the microscopic level. The epidermis exhibits variable pigmentation due to melanosomes (products of melanocytes) being transferred to the predominant upper layer skin cells named keratinocytes. The epidermis also becomes thinner (atrophy) and the dermal papillae become flatter. Within the dermis, elastic fibers unravel and there are changes in the cellular activity of the skin factory cells named fibroblasts resulting in accumulation of abnormal elastotic material and changes in collagen fibers. The result at the macroscopic level: the skin discolors unevenly, wrinkles, sags, and loses elasticity, texture, and smoothness. Overexposure to UV radiation can also result in localized skin lesions including freckles, lentigos, skin cancers and precancers. Freckles and lentigos are associated with localized thickening and darkening of the epidermis. Actinic keratosis (precancer) and squamous cell carcinoma (skin cancer) are associated with enlargement and abnormal alignment of keratinocytes. A benign mole is associated with an accumulation of small uniform melanocytes. The deadly skin cancer, malignant melanoma, results from multiplication of enlarged melanocytes, which can extend upward, peripherally, and downward.



Risk Factors of Skin Cancer

People of all skin types and of all ages need to protect their skin from the sun to reduce the risk of skin cancer.

This risk of skin cancer increases with age, however most of a person's lifetime sun exposure actually occurs before the age of twenty-one. Exposure to UV radiation during childhood and adolescence is a key factor in the development of skin cancer later in life.

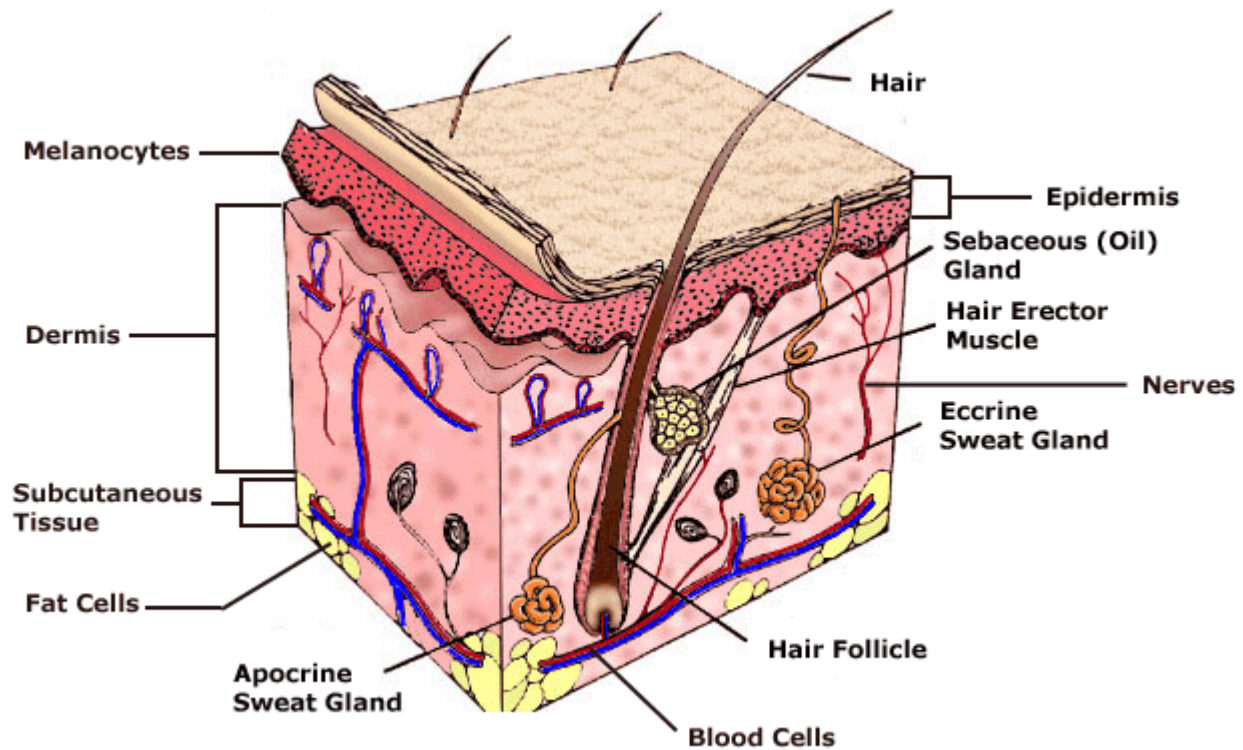
You are most at risk for skin cancer if:

- You have skin type 1 or 2
- You had one or more blistering sunburns as a child
- You have a lot of moles on your skin
- You have a lot of freckles
- You have red or blonde hair
- You have light-colored eyes
- You have fair skin
- You have a family history of skin cancer



Visual Handout 1

Layers of the Skin



Source: The Wonders of the skin: Looking Good, Being Healthy Website



Student Activity 1

Answer the following questions on a separate sheet of paper.

1. How does melanin protect your skin?
2. Refer to the skin type chart on the information handout of the reading.
3. What is your skin type?
4. In the last year, how many times have you burned your skin?
5. What are the advantages of having high levels of melanin in your skin if you live in Florida?
6. If you suddenly moved to Canada, what is the disadvantage of having high levels of melanin? What could you do to allow you to adapt?
7. What are the disadvantages of having low melanin in your skin if you live in Florida? How can you protect yourself from problems resulting from this?
8. A person with light skin is ten times more likely to develop skin cancer than someone with dark skin. If the rate of skin cancer in the United States is 800,000 cases per year, how many of those cases would be people with darker skin?
9. Based on the math in the problem above, do people with dark skin need to be concerned about protecting their skin from the sun? Why or why not?
10. What evolutionary advantage did people with skin types III and IV have in living in climates that were sunny in the summer and dark in the winter?



Student Activity 1 – Answer Key

Answers

1. How does melanin protect your skin?

Melanin blocks harmful UV rays from other cells.

2. Refer to the skin type chart on page 1 of the reading.

3. What is your skin type?

Answers will vary.

4. In the last year, how many times have you burned your skin?

Answers will vary.

5. What are the advantages of having high levels of melanin in your skin if you live in Florida?

You are not as prone to sunburn and the melanin blocks harmful UV rays making you less at risk (although still at risk) for skin cancer. Also, folate will not break down as quickly.

6. If you suddenly moved to Canada, what is the disadvantage of having high levels of melanin? What could you do to allow you to adapt?

UV light is blocked which causes vitamin D production which influences calcium absorption. You would be at greater risk of osteoporosis and rickets. A diet high in vitamin D would be a behavioral adaptation you could make.

7. What are the disadvantages of having low melanin in your skin if you live in Florida? How can you protect yourself from problems resulting from this?

You are more susceptible to sunburn and potential skin cancer. Folate breaks down quickly leading to anemia. Other problems included immune system suppression.



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8. A person with light skin is ten times more likely to develop skin cancer than someone with dark skin. If the rate of skin cancer in the United States is 800,000 cases per year, how many of those cases would be people with darker skin?

80,000 ($800,000 \times .1$)

9. Based on the math in the problem above, do people with dark skin need to be concerned about protecting their skin from the sun? Why or why not?

Yes, even though less susceptible people with dark skin are not immune to skin cancer and should still be cautious about unprotected time spent in the sun in our climate.



Student Activity 2 - Skin Deep

Test your knowledge:

Part 1: **Skin Structure:** Label the diagram on the right with the number from the correct term or description listed below.

Hair shaft

Sweat gland

Fat cells

Arector pili muscle

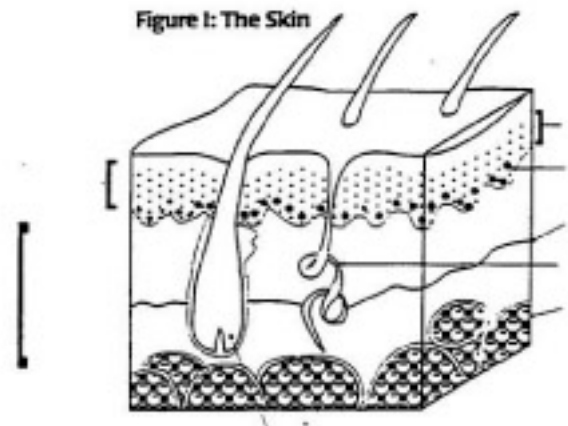
Thin layer of dead stratum corneum cells

Epidermis

Dermis

Area of epidermis where basal cell carcinoma forms

Basal layer of epidermis where melanoma forms



Part 2: Fill in the blank:

As skin cells approach the surface of the skin, they are filled with a water proof protein called _____.

_____ of the upper dermis form fingerprints.

_____ is another name for oil gland.

The lower part of the hair shaft is embedded within a _____.

The part of the skin which functions to control body temperature is the _____ layer.

Part 3: Written:

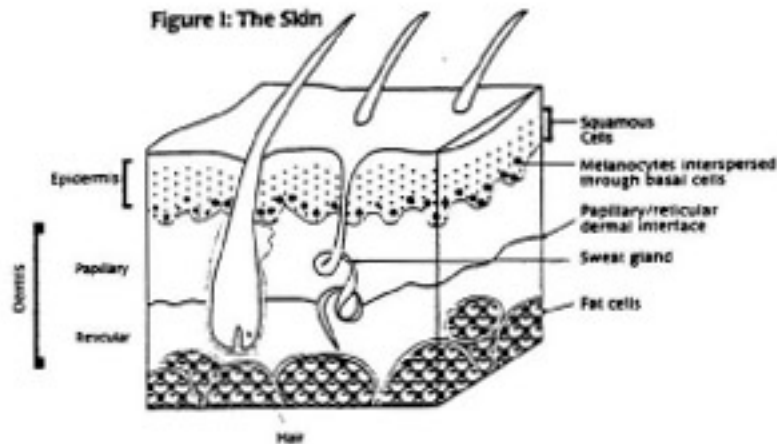
Create an advertisement that promotes healthy skin.



Student Activity 2 – Skin Deep Answer Key

Part 1: Skin Structure

See Figure 1: The Skin



Part 2: Fill in the blank:

As skin cells approach the surface of the skin, they are filled with a water proof protein called keratin.

Dermal papillae of the upper dermis form fingerprints.

Sebaceous gland is another name for oil gland.

The lower part of the hair shaft is embedded within a hair follicle.

The part of the skin which functions to control body temperature is the subcutaneous layer.

Part 3: Written:

Create an advertisement that promotes healthy skin.



Student Activity 3

Activity 3: Skin Types

Type of Activity: group

Type of Skill: synthesis

Learning Style: linguistic

Materials Needed: attached Worksheet 1t entitled "Skin Types"

Divide students into group paying attention to the group composition so that each group has a variety of skin types represented.

Give each group a copy of the worksheet etc. etc

Explain how skin color and natural hair color can tell you

Review the chart together as a class

Have each group of students write a group story using the information in the chart.

Rationale:

The lighter your skin and hair color, the more susceptible to sunburn you are. Everyone needs to be careful not to sunburn or tan, but those people who are very fair in skin and hair color need to be extra careful because they burn so much faster than those with darker skin and darker hair.



Student Activity 4 – Skin Types

Name (s) _____

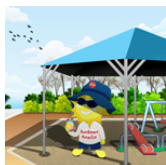
Directions: Fill out the form below with the names of the students in your group.

	SKIN TYPE	Burns very easily	Burns easily	Burns sometimes	Slow to burn
TYPE 1	Very fair skin color, always light hair, freckles				
TYPE 2	Fair skin, light eyes, dark hair				
TYPE 3	Light olive skin, any hair color				
TYPE 4	Medium olive skin color, any hair color				
TYPE 5	Dark olive skin color, dark hair				
TYPE 6	Very dark skin color				

How easily does your skin burn?

Are your friends the same?

From the information in the chart write a story about how the students in your group need to protect themselves.



Student Activity 5 – Risk Factor Survey

Name _____

You have been learning about skin types, the layers of the skin possible and the risk factors of skin cancer. Complete the Risk Factor Survey located below to predict your families risk for developing melanoma.

RISK FACTORS	MYSELF		FAMILY MEMBERS			
	YES	NO	YES	NO	YES	NO
Skin type 1 or 2 or 3						
Blue, green or hazel eyes						
Blonde or red hair						
Freckles when out in the sun						
Burns easily out in the sun						
Lots of moles/freckles						
Family history of melanoma*						
Lives in sunbelt						
Lives at high altitudes						
History of 2 or more blistering sunburns						
Use of tanning beds						
Skin mole changes on darker skin						

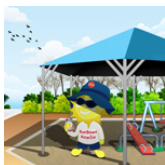
* If you have marked yes to this question you are at a higher risk level

Risk Level (based on the number of times “yes” is marked above)

9-12 Higher risk

4-8 Moderate risk

0-3 Lower risk



Topic 2 The Sun & The Earth





SunSmart America™

Topic 2: The Sun & The Earth

1996 Benchmark: SC.F.2.4.3, SC.G.2.4.6, LA.A.1.4.2, LA.A.2.2.7, LA.A.2.4.1, LA.A.2.4.4, LA.A.2.4.7, LA.E.2.2.1,

Next Generation SSS: HE.912.B.1.6, HE.912.C.1.1, HE.912.C.1.3, HE.912.C.1.7, HE.912.C.1.8, HE.912.C.2.5, HE.912.C.2.6, PE.912.C.1.9, PE.912.L.1.6, PE.912.R.1.5, PE.912.M.1.35, SC.912.L.15.13, SC.912.L.15.15, SC.912.L.17.16, SC.912.L.17.20, LA.910.1.6.3, LA.1112.1.6.3, LA.910.1.6.8, LA.1112.1.6.8, LA.910.1.7.7, LA.1112.1.7.7, LA.910.1.7.3, LA.1112.1.7.3, LA.910.1.7.5, LA.1112.1.7.5, LA.910.6.1.2, LA.1112.6.1.2, LA.910.6.2.2, LA.1112.6.2.2, LA.910.1.7.4, LA.1112.1.7.4,

Academic Benchmark: HOPE-PE, HOPE-Core, Health2-Personal Health

Learning Objectives

1. To understand the correlation of the UV Index to sunburn and skin cancer
2. To learn preventive measures to use when exposed to UV light intensities
3. To compare the amount of ultraviolet radiation at two different localities

Behavioral Objectives

1. Students can listen to the daily weather reports either on the news (television) or other media. They will keep a record of the UV index for 5 days and report back to their class.
2. Students will write a persuasive response to a sun-safety scenario (getting sunburned on a ski vacation).

Procedure

1. Distribute pre-tests
2. Read the background information
3. Construct a bar graph comparing the incidence and mortality rates for different types of cancer
4. Answer the questions
5. Distribute post-tests



Pre/Post - Test

1. What is the relationship of ozone to UV radiation?
 - a) Ozone reflects harmful UV radiation
 - b) Ozone causes harmful UV radiation
 - c) Ozone absorbs harmful UV radiation
 - d) All of the above are correct

2. UVA rays causes_____ and UVB rays causes_____.
 - a) aging; burning
 - b) asthma; burning
 - c) burning; aging
 - d) burning; asthma

3. UV rays can be reflected from which surface(s)?
 - a) asphalt
 - b) grass
 - c) sand
 - d) water
 - e) all of the above

4. The ozone layer (circle one)
 - a) helps the world spin on its axis
 - b) protects us from the sun's burning rays
 - c) lets us see the planets
 - d) provides us with oxygen

5. UVB rays _____ (circle one)
 - a) burn our skin if we don't protect it
 - b) never reach the earth
 - c) cure cancer
 - d) come from the moon

6. The UV Index _____ (circle one)
 - a) tells whether or not it is going to snow
 - b) tells what time the sun will rise
 - c) tells the daily forecast of UV radiation
 - d) tells whether or not it is safe to fly a plane



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7. The UV Index ranges from (circle one)

- a) 5-12
- b) 1-15
- c) 10-100
- d) 8-12

8. Ground level ozone is found in:

- a) fog
- b) oceans
- c) smog
- d) the stratosphere

9. _____ The farther the sun is from the surface of the earth, the greater the UV index is likely to be.



Pre/Post - Test Answer Key

1. What is the relationship of ozone to UV radiation?
 - a) Ozone reflects harmful UV radiation
 - b) Ozone causes harmful UV radiation
 - c) Ozone absorbs harmful UV radiation**
 - d) All of the above are correct

2. UVA rays cause _____ and UVB rays cause _____.
 - a) aging; burning**
 - b) asthma; burning
 - c) burning; aging
 - d) burning; asthma

3. UV rays can be reflected from which surface(s)?
 - a) asphalt
 - b) grass
 - c) sand
 - d) water
 - e) all of the above**

4. The ozone layer (circle one)
 - a) helps the world spin on its axis
 - b) protects us from the sun's burning rays**
 - c) lets us see the planets
 - d) provides us with oxygen

5. UVB rays _____ (circle one)
 - a) burn our skin if we don't protect it**
 - b) never reach the earth
 - c) cure cancer
 - d) come from the moon

6. The UV Index _____ (circle one)
 - a) tells whether or not it is going to snow
 - b) tells what time the sun will rise
 - c) tells the daily forecast of UV radiation**
 - d) tells whether or not it is safe to fly a plane



High School Sun Safety Educational Resource

7. The UV Index ranges from (circle one)

- a) 5-12
- b) 1-15**
- c) 10-100
- d) 8-12

8. Ground level ozone is found in:

- a) fog
- b) oceans
- c) smog**
- d) the stratosphere

9. **E** The farther the sun is from the surface of the earth, the greater the UV index is likely to be.

The closer the sun, the greater the UV Index



Information Sheet - Facts about the Sun!

1. The sun is a star
2. It is a big ball of gases, mostly hydrogen (70% by mass) and helium (28%), as well as small amounts of other elements such as oxygen, nitrogen, and carbon. When they mix together lots of energy is created
3. It can take millions of years for the sun's energy to be turned into light, heat (infrared radiation), and ultraviolet (UV) radiation.
4. It takes about eight minutes for the sun's light, heat, and UV radiation to reach the earth.
5. It can only take about 15 minutes for UV radiation to burn people with very fair skin.

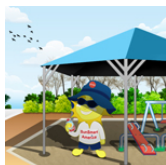
The Earth and the Sun

The Earth travels around the sun. It takes $365 \frac{1}{4}$ days for earth to travel around the sun once. The earth is on a slight angle so sometime the United States is closer to the sun than other times. That is why we have different seasons. We are closer to the sun in the summer and that's it is warmer and more UV radiation reaches us.

The Ozone

The ozone layer is located from 12 to 30 miles above the surface of the earth. Its job is to protect life on earth from the burning ultraviolet rays of the sun. It does this by creating a barrier that rays must pass through to reach the earth's surface. If the ozone layer is thick, the more protection it gives us from the sun's rays. If the ozone layer is thin, or has holes in it, then there is less protection from these ultraviolet rays. There is good and bad ozone. The ozone that remains up high in the atmosphere and creates the layer that shields us is good ozone. Ozone that falls to the earth is bad ozone. Ozone that falls to the earth causes smog and smog is unhealthy. Many years ago, scientists discovered that chemicals people were using in air conditioning, refrigerators, and spray cans were destroying the ozone layer. These chemicals are called CFCs (chlorofluorocarbons). By the 1980s, scientists had actually found a hole in the ozone layer that they believe had been caused by these chemicals. Without an ozone barrier, powerful rays from the sun continually beating down can create problems for the earth and its inhabitants such as:

1. **An increase in skin cancer** caused by overexposure to the sun and sunburns.
2. **A break in the food chain** if too much unfiltered and powerful sunshine causes living creatures in the sea to die and produce fewer fish.
3. **A decrease in plant production** if the rays become too strong.



The ozone layer can repair itself over time if it is properly cared for and not damaged further. Meanwhile, if the sun's rays become stronger due to a decrease in the ozone, it becomes more and more important for everyone to be sun smart and protect their skin from sun damage.

Ultraviolet Radiation

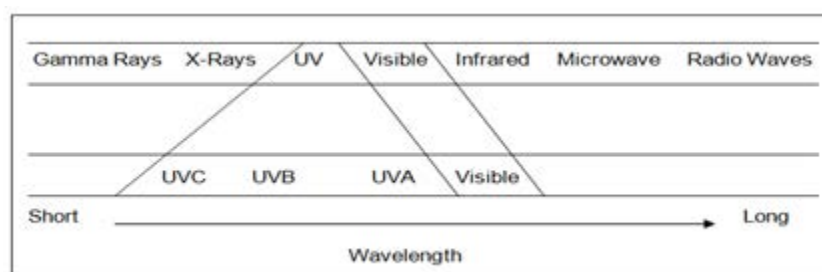
The sun gives us light in the form of visible radiation. It gives us warmth in the form of infrared radiation. It also gives us a third type of radiation that we can neither see nor feel: ultraviolet radiation. Ultraviolet (UV) radiation can seriously threaten our health. UV rays can cause cancer by damaging cell's genetic material. Ultraviolet rays do not give off heat or light. UV radiation is made up of three parts: UVA, UVB, and UVC.

Electromagnetic Spectrum

Visible, infrared, and ultraviolet radiation are all forms of electromagnetic radiation. Electromagnetic radiation moves through the air as a waveform. We measure its wavelength as the distance between two successive peaks or valleys of the waveform.

Wavelengths are measured in nanometers. A nanometer is one billionth of a meter. The short form of nanometer is "nm."

Our eyes sense only a very small part of the electromagnetic spectrum. We only see the wavelengths of visible light, from red to violet.



Wavelengths of UV Radiation

UV rays have wavelengths shorter than visible light. There are three types of UV rays. They are grouped by wavelength from longest to shortest: UVA, UVB, and UVC.



UVA

UVA rays are the longest rays and have the ability to do lasting damage to the skin. They are responsible for making skin wrinkle and age more quickly. UVA rays can also damage eyes and the immune system. The immune system protects our bodies from getting sick. It can also cause skin cancer. UVA rays are not absorbed by the ozone layer.

UVB

UVB rays are shorter wavelength rays. UVB rays are partially absorbed by the ozone layer but some still come through normally. UVB rays affect the Epidermis (top layer of skin). UVB rays are responsible for burning our skin and causes skin cancer if we don't protect it.

UVC

UVC rays are even of shorter wavelength and are totally absorbed by the ozone layer.

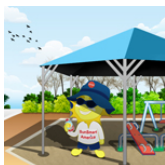
UV Index

The Ultraviolet (UV) Index was developed in the United States by the National Weather Service and the U.S. Environmental Protection Agency (EPA) following successful use of UV alerts in other countries. The UV Index provides a daily forecast of the expected risk of overexposure to the sun. The Index predicts UV intensity levels of the sun's rays when it is at its highest (this is called "solar noon"). The Index ranges on a scale from 1 to 11+, where 1 indicates a low risk of overexposure and 11+ signifies an extreme risk. Calculated on a next-day basis for every zip code across the United States, the UV Index takes into account clouds and other local conditions that affect the amount of UV radiation reaching the ground in different parts of the country.

UV radiation is greatest when the sun is highest in the sky and rapidly decreases as the sun approaches the horizon. The higher the UV Index forecast is, the greater the rate of skin and eye damage. Consequently, the higher the UV Index, the smaller the time it takes before skin damage occurs. Reflective surfaces, such as snow, sand, water and concrete will intensify UV exposure to varying degrees.

The UV Index is based on several things:

1. latitude
2. elevation/altitude
3. day of year
4. time of day
5. total ozone in the atmosphere
6. predicted cloud conditions



UV Index: Risk and Protective Factors

UV INDEX	RISK	PRECAUTIONS
2 or lower	low	A UV Index reading of 2 or lower means low danger from the sun's UV rays for the average person. Wear a hat with a wide brim and sunglasses. In winter, reflections off snow can nearly double UV strength. Skiers and swimmers should take special care. Use a sunscreen with an SPF of at least 30, and cover up with long sleeves and pants.
3-5	moderate	A UV Index reading of 3 to 5 means moderate risk of harm from unprotected sun exposure. Use sunscreen. Be sure to protect sensitive areas like the nose and ears. Use lip balm containing sunscreen. Use sunglasses to protect the eyes.
6-7	high	A UV Index reading of 6 to 7 means high risk of harm from unprotected sun exposure. Apply a sunscreen with a SPF of at least 30. Wear a wide-brim hat and sunglasses to protect your eyes. Protection against sunburn is needed. Reduce time in the sun between 10 a.m. and 4 p.m. Cover up, wear a hat and sunglasses, and use sunscreen.
8-10	very high	A UV Index reading of 8-10 means very high risk of harm from unprotected sun exposure. Avoid sun during the midday hours (10 a.m. - 4 p.m.). Use sunscreen and lip balm. Seek shade and don't forget that reflective surfaces, like water, sand or cement can cause burning even in the shade. Cover up with clothes made of tightly woven fabric to block UV rays.
11+	Extreme	A UV Index reading of 11 or higher means extreme risk of harm from unprotected sun exposure. Burn may occur in fair-skinned people in less than 5 minutes. Apply sunscreen liberally every 2 hours. Avoid being in the sun as much as possible. Wear sunglasses that block 99-100% of all UV rays. Wear a wide-brimmed hat. Cover up exposed areas of the body with clothes made of tightly woven fabric.



UV Index Forecast Map

To find the daily UV Index for your area you can refer to the EPA's website at:

<http://www.epa.gov/sunwise/uvindex.html>.

Or

Sign up for the free EnviroFlash Service at:

<https://enviroflash.epa.gov/core/Start.do>

Latitude and Season Change UV Index

Changes in latitude and day of year alter the distance between the sun and a person on Earth. The UV Index is higher closer to the equator and during the summer months. Thus June would have the highest UV Index for the Northern Hemisphere, but the lowest for the Southern Hemisphere.

Cloud Conditions Affect UV Index

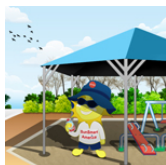
Clouds also affect the amount of UV radiation that reaches the Earth's surface.

- Clear skies allow 100 percent of UV rays to reach the surface.
- Scattered clouds allow 89 percent of UV rays to reach the surface.
- Overcast clouds allow 32 percent of UV rays to reach the surface.

The Ozone Layer Lowers UV Index

The ozone layer absorbs UV rays. But it is not the same over the entire surface of the Earth. Satellites measure the total ozone. Total ozone is then inserted with the other variables into a model. This model calculates the level of UV radiation reaching the Earth at a given time and place.

- The farther UV rays must travel from the sun to the Earth's surface and the more ozone present, the less UV radiation reaches the surface.
- The shorter the distance from the sun and the less ozone present, the more UV radiation reaches the surface.



Reflective Surfaces Make UV Exposure More Intense

At a given UV Index, will your exposure be the same if you are playing soccer on a grassy field or skiing down a snow-covered mountain? No way! Reflective surfaces intensify UV exposure to varying degrees. Water, snow, and sand reflect the most.

Consider these facts

- Grass reflects from 2.5 to 3 percent of UV rays hitting its surface.
- Sand reflects 20 to 30 percent of UV rays.
- Snow and ice can reflect 80 percent of UV rays.

Other Dangers of UV Rays

Skin cancer is the most dangerous and deadly risk of UV radiation. But it is not the only one. Other risks include:

- Sunburn
- Premature (early) wrinkling and sagging of skin
- Sun sensitivity [how sensitive (burn) ones' skin is to the sun]
- Immune system depression (this can put you at greater risk of getting sick.)
- Eye damage

Tanning without burning can still damage skin tissue and cause premature aging of the skin (wrinkling, sagging, uneven texture and coloring). All sources of UV rays can cause damage, not just natural ones. Most tanning beds have more UVA than UVB rays. But they can still damage your skin. UVA rays go deeper into the skin. They are the rays that cause premature aging of the skin.

Vitamin D

Vitamin D is a hormone which controls calcium levels in the blood. It is needed for development and maintenance of healthy bones, muscles, and teeth. Research suggests that people with low levels of Vitamin D are more likely to suffer from autoimmune disorders, heart disease and are more likely to develop prostate, breast, colon and melanoma cancers. Vitamin D is stored in fat and muscle and it is released slowly. The body stores enough vitamin D to last between 30 and 60 days. Vitamin D is made in the skin when the skin is exposed to ultraviolet-B (UVB) radiation from the sun; this is the most important source of vitamin D in the body. There are small amounts of vitamin D in some foods such as oily fish and eggs, or it may be added to foods such as margarine and some milk, however food sources usually only provide a small amount of total vitamin D. Vitamin D supplements are also readily available over the counter in pharmacies.



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All skin types can be damaged by too much UV radiation, however naturally very dark skinned people are relatively protected from skin cancer by the large amount of skin pigment (melanin) in their skin. People with this skin type rarely or never get sunburned and often come from countries around central and northern Africa.

There is very little research available to determine exactly how much sun exposure is needed to maintain adequate vitamin D levels. Variations in age, skin color, latitude, time of day, and time of year means it is not possible to provide a single message about vitamin D and sun exposure which suits all people. Research suggests that people with naturally very dark skin require more UV exposure to produce enough vitamin D, as the pigment in their skin reduces UV absorption. People with fair skin can usually get enough vitamin D by exposing their face, arms, and hands to the sun for 2-5 minutes three times weekly between 10:00 am and 4:00 pm. If you are wearing a sunscreen with SPF 30+ maximum, vitamin D synthesis for the day characteristically occurs after 30 minutes at mid-day during mid-summer, so one may maximize vitamin D production on many days, even while wearing a high SPF sunscreen. Given the concern about “vitamin D insufficiency,” it is suggested that you can take a daily supplement of 1,000 international units of vitamin D and maintain adequate vitamin D levels that are recommended by the strongest vitamin D advocates, even in the complete absence of sun exposure.



Activity 1

FCAT Writing

(Read “Ultraviolet Radiation” before completing this activity.)

Your friend is going to the Colorado Mountains to go skiing for the winter holidays. You remind her to take along her sunscreen. She laughs at you and says, “It’s too cold to get sunburned!” Write a persuasive essay explaining three reasons why she is incorrect. Remember to begin with an introductory paragraph and end with a conclusion.



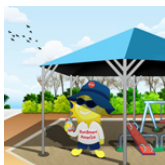
High School Sun Safety Educational Resource

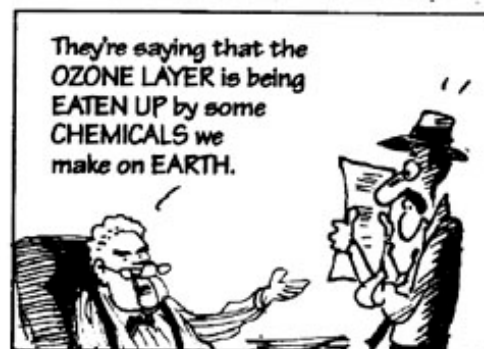
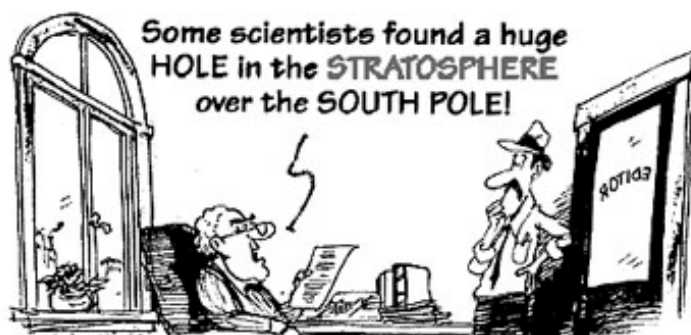
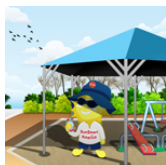


Activity 2

On the Trail of the Missing Ozone

Activity Handout



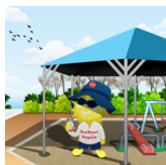


Farley meets with a scientist...

Let me see if I've got this... you're telling me the ozone is a thin layer of atmosphere that protects us from the sun.



It wraps all the way around the Earth, about 10 to 30 miles straight up. From the beginning of time, the ozone has blocked the sun's most dangerous ultraviolet, or UV, rays from reaching us. And it continues to keep UV radiation from harming life on the planet.



That's right. Each ozone molecule is made up of three small oxygen atoms that act like a safety net to catch most of the UV rays and keep them from getting down to the Earth's surface.

The ozone layer's big enemy is the
CHLOROFLUOROCARBONS...



We call them CFCs. CFCs are chemicals we humans invented and we use them in many products that make up modern life. CFCs are used in manufacturing, to clean the insides of computers and to make plastic foam containers. We use CFCs inside refrigerators and to produce the cold air that blows out of every kind of air conditioner.

Chloro-
flower-
whatzits?

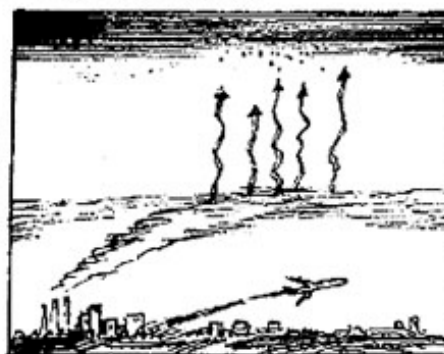


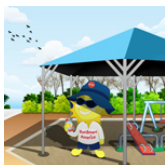
Air
conditioners
are
dangerous!?!

No, no, no. There's nothing *dangerous* about things that use CFCs in order to run, or things that we manufacture using CFCs. CFCs only become harmful when they escape into the air. They escape from leaks in air conditioners or refrigerators, or when someone throws away a used appliance without draining the leftover CFCs into a tank to be reused. CFCs can also get into the air during manufacturing.



Once CFCs escape, they can float around in the atmosphere for years and years before they break down. Finally, they drift into the upper atmosphere, and that's where the trouble starts...



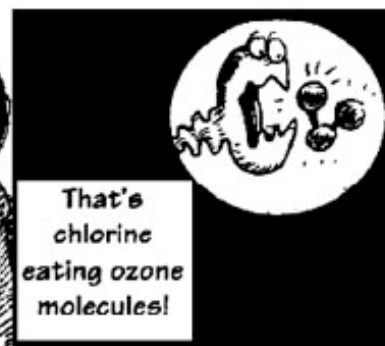


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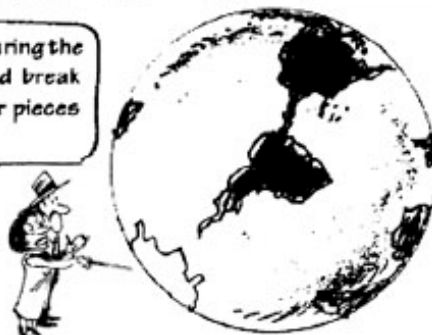
But why should my readers care
about CFCs?
You can't even see them, and the
hole over the South Pole is 8000 far
away...



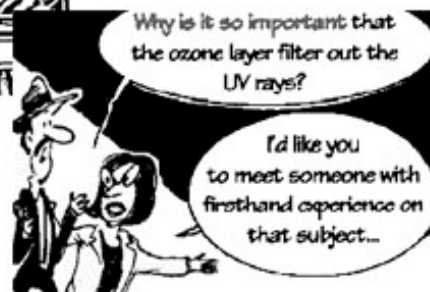
Look closely into my
stratospheric visio-peeker. It
will show you what's going on
up there.

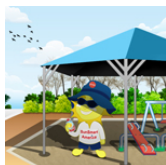


The South Pole has very long, super cold nights. During the
night, tiny ice crystals trap CFC molecules and break
them into smaller bits. One of these smaller pieces
of CFC is ozone's worst enemy - chlorine.



When the sun rises after the freezing
night, sunlight wakes up the chlorine,
triggering an attack on the ozone
molecules. Chlorine bites into one of
ozone's oxygen atoms, and then an-
other, and another. It's like a shark
biting its way through a net, until
finally the net is so frayed that it
can't catch any fish. When the chlorine
is finished, the ozone layer is so thin, it
can't catch enough UV rays.



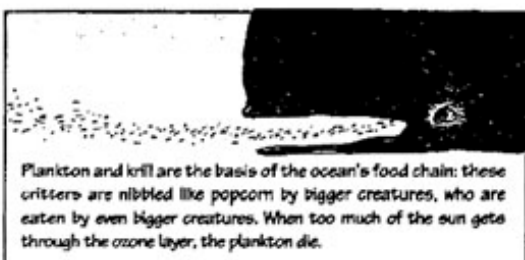


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As the ozone gets thinner, more and more harmful UV rays reach the Earth's surface...and that starts an awful chain reaction among everything that lives and breathes in the oceans or on land.

In the ocean, the smallest creatures like plankton and tiny shrimps, called krill, are among the first victims of too much UV radiation.



If all of these tiny one-celled critters are fried up by the UV rays, then each set of bigger creatures loses its food supply and they all begin to starve.



Like plankton in the ocean, plants form the base of the Earth's food chain. When some kinds of plants are exposed to too much UV radiation, they grow slower and produce less food. As the ozone layer thins, the food supply shrinks all over the Earth.

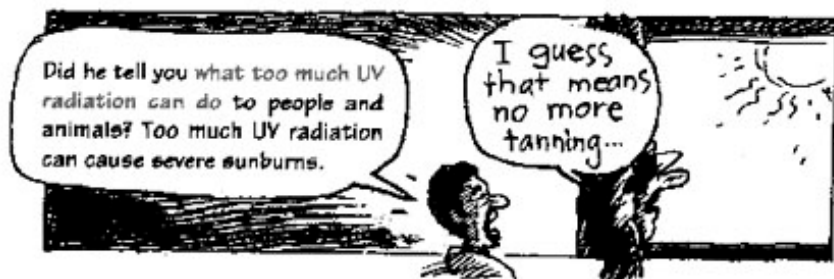
Animals can't get enough food from the plants to survive, and eventually people don't get enough food either.

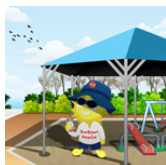


Farley goes to a doctor...



The headaches started when this little round guy, George Global, was telling me about the effects that destruction of the ozone layer can have on life as we know it.





High School Sun Safety Educational Resource

Even with a sun screen, the longer you stay out in the sun, the more you're exposed to UV rays. Extra UV rays can cause early aging, wrinkling of the skin, and even worse—skin cancer. It's been proven to cause eye damage, like cloudy vision, after years of exposure. If we could phase out the use of CFCs, it would be like curing skin cancer in millions and millions of people, erasing millions of cataracts from people's eyes, or growing billions of dollars worth of food to feed people all over the world.



SOMEONE must be working on a solution to this..



Farley goes on a search...and finds an inventor working on a refrigeration invention that won't use CFCs.



My company really has something to crow about. We're trying to re-invent air conditioners and refrigerators that run on a new liquid that doesn't contain any CFCs—like this model!

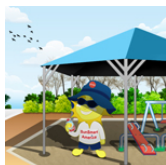
GREAT!

Some solutions are really simple. At our plant, we used to use liquid cleansers made with CFCs to wash off microprocessors—the computer's "brains"—to get them squeaky clean before they went into the computer. We found out we can use lemon oil and water to do the same thing!



I make sure my garage has the right equipment to repair the air conditioner in your car. This gizmo captures cooling liquids that contain CFCs, so they don't escape into the air, and then I can use 'em again. You know—recycle 'em!





Farley returns to the newsroom...

Great OZONE story, Farley. Sounds like the HOLE in the OZONE is something our readers REALLY need to know about!



The control and elimination of CFCs is the most important thing we can do to stop the thinning of the ozone layer. New ozone is still being created by nature. So if we can slow down the damage by phasing out CFCs in products and manufacturing, the ozone layer could gradually come back.



By working together, people, governments, and businesses can stop making and using CFCs. In fact, many nations of the world have already agreed to stop making any new CFCs after 1995. Some countries—like the United States—have passed laws designed to keep the CFCs we're still using from getting into the atmosphere. And, eventually, CFCs will not be used at all.



If we're smart, we can keep all life on the planet safe from too much UV radiation by protecting the ozone layer.





Activity 2 – On the Trail of the Missing Ozone

What is the ozone? _____

What does the ozone do? _____

What are CFCs? _____

When do CFCs become harmful? _____

Where are holes and thinning of the ozone found? _____

When CFCs are broken down, what does the chlorine do to ozone? _____

What is the difference between stratospheric ozone and ground ozone? _____

Why is it so important that the ozone layer filters out UV rays? _____



High School Sun Safety Educational Resource

What can too much UV radiation do to people and animals? _____

List three things that UV rays can do to you. _____

What are some companies doing to help reduce ozone depletion? _____

What are two things we can do to reduce ozone depletion? _____



Activity 2 – On the Trail of the Missing Ozone Answer Key

What is the ozone? **The ozone is a thin protective layer of atmosphere that protects us from the sun.**

What does the ozone do? **The ozone blocks the sun's ultraviolet rays and keeps UV radiation from harming life on the planet.**

What are CFCs? **Chlorofluorocarbons are chemicals used in manufacturing, refrigerators, and air conditioners.**

When do CFCs become harmful? **CFCs become harmful when they leak into the atmosphere and the chlorine starts breaking apart the ozone.**

Where are holes and thinning of the ozone found? **South pole, Antarctica, Australia, and North America**

When CFCs are broken down, what does the chlorine do to ozone? **The chlorine breaks apart the ozone molecule causing the layer of ozone to thin.**

What is the difference between stratospheric ozone and ground ozone? **Stratospheric ozone is the protective shield around the earth. Ground level ozone is found in smog and is bad for us.**

Why is it so important that the ozone layer filters out UV rays? **The UV rays can kill off organisms at the base of the food chain, reducing food on our planet. It can also cause health problems.**

What can too much UV radiation do to people and animals? **It can cause sunburns, aging, wrinkling of skin, skin cancer, eye damage**

List three things that UV rays can do to you. **Cause early aging, wrinkling, skin cancer, eye damage.**



High School Sun Safety Educational Resource

What are some companies doing to help reduce ozone depletion? **They are trying to develop appliances that can run without CFCs.**

What are two things we can do to reduce ozone depletion? **Replace CFCs with less dangerous chemicals; recycle CFCs.**



Activity 3

Graph the following data as a line graph. One line will indicate the most susceptible skin type to UV rays; the second line will represent the least susceptible skin type to UV rays. Since the number of minutes until burning depends on the UV value, this will be the dependent (Y axis). The X axis will be the UV index value. Be sure to give your graph a title, label your axes and your lines.

<u>UV Index Value</u>	<u>Minutes to Burn</u> (most susceptible)	<u>Minutes to Burn</u> (least susceptible)
1	30	120
2	25	100
3	20	90
4	15	75
5	12	60
6	10	50
7	9	40
8	8	35
9	7	33
10+	5	25

Note: The UV Index goes as high as 11+, with a fair skin person burning in less than 4 minutes and a darker skinned person burning in about 20 minutes.

Answer the following questions:

What protection do darker skinned people have against UV rays? Can their skin still be damaged by the sun? Explain.



High School Sun Safety Educational Resource

Why is sunburn dangerous?

What are five precautions you could take to avoid sunburn?

Although people consider a tan to be attractive, what are reasons that can make it unattractive later in life?

Using your graph, predict how long it would take someone with a skin type of III or IV to burn on a day that the UV Index was 5.



Activity 3 – Answer Key

What protection do darker skinned people have against UV rays? Can their skin still be damaged by the sun?

Melanin blocks harmful UV radiation from other cells. Their skin can still be damaged by the sun and they are still at risk for skin cancer.

Why is sunburn dangerous?

The more sunburns one has, the more susceptible they are to skin cancer later in life. UV radiation can cause skin cancer by damaging cells.

What are five precautions you could take to avoid sunburn?

Use a sunscreen with an SPF of at least 30, avoid sun at the peak times of day, wear a hat, cover up with long sleeves and pants, seek shade, stay inside when the UV index is high.

Although people consider a tan to be attractive, what are reasons that can make it unattractive later in life?

Overexposure to the sun can lead to skin cancer. It also causes premature aging of the skin, skin thickening, age spots, and wrinkles.

Using your graph, predict how long it would take someone with a skin type of III or IV to burn on a day that the UV Index was 5.

Approximately 36 minutes, or an average of the fairest and darkest skin.



Activity

Using the following information, create a bar graph and compare the UV Index for South Florida over the year. Place the month of the year on the x-axis and the UV Index level on the y-axis. Then complete the questions.

<u>MONTH</u>	<u>AVERAGE UVR in South Florida</u>
January	5.5
February	7.0
March	9.0
April	12.0
May	12.5
June	14.0
July	11.5
August	11.5
September	10.0
October	8.5
November	6.0
December	5.0

When during the year does the UV radiation peak? Give two possible explanations for this.

When is the UV radiation the lowest? Give two possible explanations for this.

Typically, the average temperature in South Florida in December and January is 70 degrees F, about 20 degrees cooler than in June. Why is it still important to use sun protection during the cooler winter months?

The data table lists the average UVR per month. The range within a single month might be from 2 to 14. What can cause this variation?



High School Sun Safety Educational Resource

The lowest average UVR for South Florida is 5 according to the data table. What protection should be used to prevent skin damage from the sun?

What should be done when UV Index levels reach 11+?



Activity 4 – Answer Key

When during the year does the UV radiation peak? Give two possible explanations for this.

In South Florida, UV radiation peaks during June. The sun is closest to the earth at this time and there is typically less cloud cover. The length of the day is longest at this time.

When is the UV radiation the lowest? Give two possible explanations for this.

In South Florida, UV radiation is lowest in December and January. The sun is farthest from the earth. Cloud cover and the length of the day also influence this.

Typically, the average temperature in South Florida in December and January is 70 degrees F, about 20 degrees cooler than in June. Why is it still important to use sun protection during the cooler winter months?

UV rays can be just as strong and can reflect off sand, pavement, and water. It is easy to burn even if it is cloudy.

The data table lists the average UVR per month. The range within a single month might be from 2 to 14. What can cause this variation?

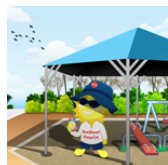
Differences in reflecting surfaces, cloud cover, differences in ozone levels

The lowest average UVR for South Florida is 5 according to the data table. What protection should be used to prevent skin damage from the sun?

Use sunscreen with an SPF of at least 30. Use lip balm to protect the lips and sunglasses and a hat to protect the face and ears.

What should be done when UV Index levels reach 11+?

Avoid the sun by staying indoors.



Activity 5 – The Vitamin D Controversy

Vitamin D per 100 Grams of Food	IU	Source
Fish oil, cod liver	10,000	USDA
Anglerfish liver	4,400	WT
Summer pork or bovine blood (1 cup)	4,000	WT
Lard (pastured pork fat)	2,800	WAPF
Marlin, Indo-Pacific	1,400	WT
Salmon, chum	1,300	WT
Herring	1,100	WT
Duck egg	720	WT
Atlantic herring, pickled	680	WAPF
Eastern oysters, steamed	642	WAPF
Trout, grunt and rainbow	600	WT
Catfish, steamed/poached	500	WAPF
Mackerel	400	WT
Salmon	360	WT
Fish, sardine, Atlantic, canned in oil, drained solids with bone	272	USDA
Fish, caviar, black and red, granular	232	USDA
Egg, yolk, raw, fresh	107	USDA
Bologna, pork	56	USDA
Butter	56	WAPF
Cream, fluid, heavy whipping	52	USDA
Pork liver	50	WT
Braunschweiger (a liver sausage), pork	48	USDA
Cheese, swiss	44	USDA
Milk, cow, whole, 3.25% milkfat (fortified)	40	USDA
Frankfurter, beef	36	USDA
Egg, whole, raw, fresh	35	USDA
Egg, whole, cooked, scrambled	34	USDA
Beef liver	30	WT
Pork	28	WT
Mushrooms, cooked, boiled, drained, without salt	21	USDA
Beef tallow	19	WAPF
Mushrooms, white, raw	18	USDA
Cheese, cheddar	12	USDA
Milk, goat, fluid	12	USDA
Milk, human, mature, fluid	4	USDA
Milk, cow, whole, raw	4	USDA
Abbreviations		
IU - International Units		
USDA - United States Department of Agriculture		
WT - Wise Traditions: From Seafood to Sunshine by Chris Masterjohn		
WAPF - The Miracle of Vitamin D by Krispin Sullivan		



High School Sun Safety Educational Resource

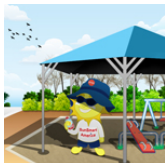
Answer the following questions:

What food(s) from the table do you eat on a regular basis? _____

In the space below, list all the foods from the table you ate yesterday and add up the number of International Units (IU) you got from those foods.

The recommended daily allowance for Vitamin D is 400 IU. Did you get that much in your diet yesterday? _____ How many additional IUs did you need to reach 400 IUs?

Estimate how much time a day you spend in the sun without wearing sunscreen. _____ (Remember to include time waiting for the bus, going into and out of stores, sitting outside...this does not just include time at the beach!)



Topic 3 What is Cancer?





SunSmart America™

Topic 3: What is Cancer?

1996 Benchmark: SC.F.1.4.1, SC.F.1.4.5, SC.F.1.4.8, SC.F.2.4.2, SC.F.1.4.2, SC.F.1.4.7, SC.G.2.4.6, SC.F.2.4.3, LA.A.1.4.2, LA.A.2.2.7, LA.A.2.4.1, LA.A.2.4.4, LA.A.2.4.7, LA.B.2.4.3, LA.C.2.4.1, LA.C.2.4.2, LA.E.2.2.1

Next Generation SSS: HE.912.B.1.4, HE.912.B.3.1, HE.912.C.1.3, HE.912.C.1.4, HE.912.C.1.5, HE.912.C.1.7, HE.912.C.1.8, HE.912.P.1.1, PE.912.C.1.9, PE.912.L.1.6, PE.912.R.1.5, PE.912.M.1.35, SC.912.L.18.1, SC.912.L.18.2, SC.912.L.18.3, SC.912.L.18.4, SC.912.L.16.3, SC.912.L.14.7, SC.912.L.14.9, SC.912.L.15.1, SC.912.L.15.10, SC.912.L.17.15, SC.912.L.17.16, SC.912.L.17.20, SC.912.L.15.13, SC.912.L.15.15, LA.910.1.6.3, LA.1112.1.6.3, LA.910.1.6.8, LA.1112.1.6.8, LA.910.1.7.7, LA.1112.1.7.7, LA.910.1.7.3, LA.1112.1.7.3, LA.910.1.7.5, LA.1112.1.7.5, LA.910.6.1.2, LA.1112.6.1.2, LA.910.6.2.2, LA.1112.6.2.2, LA.910.4.3.1, LA.1112.4.3.1, LA.910.5.2.2, LA.1112.5.2.2, LA.910.1.7.4, LA.1112.1.7.4

Academic Benchmark: HOPE-PE, HOPE-Core, Health 2-Personal Health

Background Information

Student Information Handout

Knowledge Objectives

1. Students will understand the information about biological basis of, incidence, treatment, and prevention of cancers
2. Students will have the opportunity to learn more about cancer and its causes by engaging in a variety of research projects.
3. To gain an understanding of the different types of skin cancer and the frequency in which they occur.
4. To gain an understanding of prevention and early detection of skin cancer
5. To familiarize students with current findings in cancer genetics



Behavioral Objectives

6. Students will be able to provide a definition for cancer.
7. Students will identify and describe the 3 types of skin Cancer
8. Students will research the skin cancer rates in different countries and will complete a comparative chart to record their data.
9. After learning about skin cancer, students will demonstrate their ability to name at least 5 different ways to practice sun-safety.

Materials

10. Pre-test
11. Information Handouts
12. Visual Handouts
13. Activities 1-7
14. Post - Test

Procedure

15. Distribute pre-tests
16. Distribute student information handout and activity to students
17. Allow time for students to read through the information sheet and write down any questions that arise from the reading
18. (Optional) Students can work in pairs to research answers to the questions they have formulated
19. Distribute post-tests



Pre/Post - Test

Draw and describe the five signs that are common to the appearance of skin cancer. Write a paragraph explaining why it is important to seek help immediately if you notice anything unusual about your skin, including new moles or spots, or changes in old moles or spots.

Answer True or False.

- ___1. Cancer cells grow faster than normal cells.
- ___2. A tumor that does not spread is termed “malignant”.
- ___3. A change in the color, size, or shape of a mole is a health warning and a doctor should be seen as soon as possible.
- ___4. Lung cancer is the most common cancer in the United States.
- ___5. The occurrence of skin cancer is higher than all the other cancers combined.
- ___6. Melanoma is more likely to spread to other parts of the body.
- ___7. Everyone, beginning as a teenager, should get a full-body skin cancer screening by a dermatologist at least once a year, and more often if something unusual is found on the skin.
- ___8. Squamous cell carcinoma begins in the upper layer of the epidermis
- ___9. Carcinogens can act on the DNA of a cell's cytoplasm to cause the wrong message to be produced, and a cancer can start.



Pre/Post – Test Answer Key

Draw and describe the five signs that are common to the appearance of skin cancer. Write a paragraph explaining why it is important to seek help immediately if you notice anything unusual about your skin, including new moles or spots, or changes in old moles or spots.

Five signs of Melanoma:

Asymmetry: *One half of a mole or pigmented spot on your skin is unlike the other half.*

Border Irregularity: *The edges of the mole or spot are uneven. They can look scalloped like a puzzle piece.*

Color: *Color varies from one area of the mole or spot to another. These colors can be shades of tan and brown, black, or sometimes white, red, or blue.*

Diameter: *The diameter of the mole or spot is larger than 6 mm (the size of a pencil eraser).*

Enlargement: *Change in the thickness of the mole.*

Drawings and explanations will vary.

Answer True or False.

T 1 Cancer cells grow faster than normal cells.

F 2 A tumor that does not spread is termed “malignant”.

A tumor that does not spread is benign

T 3 A change in the color, size, or shape of a mole is a health warning and a doctor should be seen as soon as possible.

F 4 Lung cancer is the most common cancer in the United States.

Skin cancer is most common.



T 5. The occurrence of skin cancer is higher than all the other cancers combined.

T 6. Melanoma is more likely to spread to other parts of the body.

T 7. Everyone, beginning as a teenager, should get a full-body skin cancer screening by a dermatologist at least once a year, and more often if something unusual is found on the skin.

True 8. Squamous cell carcinoma begins in the upper layer of the epidermis

False 9. Carcinogens can act on the DNA of a cell's cytoplasm to cause the wrong message to be produced, and a cancer can start.

Carcinogens can act on the DNA of a cell's nucleus to cause the wrong message to be produced, and a cancer can start.



Information Handout

All plants and animals are made up of cells. In an adult person, there are about 10-trillion cells. They are not alike, but have particular characteristics that enable them to do their particular job. For example, a cell on the surface of the skin is flat to allow it to protect against light and damage.

Normally, what happens inside each cell is carefully controlled, as is the normal division of cells. Cells divide for growth or replacement of other cells that have died or have worn away. The main method of control are “messages” that are passed from the nucleus of the cell to the surrounding cytoplasm and organelles.

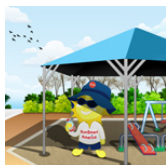
Occasionally, in one or two cells, something happens in the nucleus that causes the message to be changed. Then the cell does not know how to behave and is no longer under normal control. Cancers are caused by cells that receive the wrong message from their nuclei. This wrong message usually causes these cells to divide faster than those around them. They fail to develop the features and activities of their normal counterparts. As a result, a group of abnormal cells is formed. Sometimes these cells circulate through the body; sometimes they form a lump or tumor. Tumors can be **benign** or **malignant**.

Benign tumors have a definite boundary, do not spread beyond it, and are not cancers. Malignant tumors have no definite boundary and are **cancers**. Some cells from these cancers can separate from the tumors and circulate in the blood or lymph systems. They can settle elsewhere in the body. This is called **metastasis**.

Cancer can affect many different body organs. In addition, several forms of cancer can affect the same organ, such as the skin. Some types of cancer are more treatable than others. Skin cancer is usually preventable because the majority of skin cancers are due to overexposure to the sun. However, if it does occur, early detection greatly improves the chances of survival.

Healthy Skin

The skin is the largest organ in the body. It functions to protect our internal organs and to protect us against environmental threats and germs. It prevents the loss of too much water. The skin also acts as a receptor to send messages to the brain about touch, cold, and pain to keep us from harm. The skin has three layers called the epidermis, dermis, and subcutis.



Skin Cancers

There are several forms of skin cancer depending on where they occur. Basal and squamous cell carcinomas make up 96% of skin cancers; melanoma is responsible for 4% of cases. Unlike many other types of cancers, skin cancers give you early warning signs and can be removed before they become deadly. As a matter of fact, **there is a 95 % cure rate for skin cancer if detected early.**

Basal cell carcinoma: This type of cancer begins in the basal cell layer, the lowest layer of the epidermis. About 80% of all skin cancers are basal cell carcinomas. They usually begin on areas exposed to the sun. This type of cancer is slow to develop and usually doesn't spread to other areas of the body. Overexposure to the sun in children and teenagers typically results in basal cell carcinoma later in life.

Squamous cell carcinoma: This type of cancer begins in the upper layer of the epidermis. About 15% of all skin cancers are squamous cell carcinomas. They usually appear on areas exposed to the sun such as the ears, neck, lips, face, and hands. This type of cancer is slightly more likely to invade other parts of the body than basal cell carcinoma. Prevention and early detection greatly decrease the risk of this cancer.

Melanoma: This type of cancer begins in the melanocytes, which are pigment producing cells deep in the skin. About 4% of all skin cancers are melanomas. Melanoma is the most dangerous type of skin cancer because they are more likely to spread (metastasize) to other parts of the body if not detected early. The major cause of melanoma is overexposure to sunlight, especially when sunburn and blistering occurs. It is important to keep from burning and tanning when we are young, and to know the **warning signs of melanoma and seek help immediately.** Melanoma is the 6th most common cancer in males and the 7th most common cancer in females. Even those under 25 years old can be victims of melanoma and other skin cancers. **Melanoma can be curable if detected early.**

The following are the warning signs of melanoma. It is important to understand that unlike many other types of cancer, skin cancer is easy to see and, therefore, usually can be taken care of before it spreads and becomes deadly.

WARNING SIGNS OF MELANOMA: THE ABCDE RULE

Asymmetry: One half of a mole or spot is unlike the other half.

Border Irregularity: scalloped or poorly circumscribed border



Color: variation of color within the same mole or spot. Can be black, tan, brown, pink, red or blue

Diameter: larger a pencil eraser (approximately 6 mm)

Enlargement: enlargement of an existing mole or spot

What causes cancers?

We know that **carcinogens** can act on the DNA of a cell's nucleus to cause the wrong message to be produced, and a cancer can start. Carcinogens are chemical, physical, and biological. Certain carcinogens are not easily identified. Others, such as chemicals in tobacco, asbestos, and radiation are well known. Eighty percent of skin cancers are caused by overexposure to the sun's rays.

Can cancers be prevented?

Some cancers can be prevented by reducing the risky behavior that can place a person in danger. For example, if we don't smoke, our chances of developing lung cancer will decrease significantly. If we are not overexposed to the sun, chances are most of us will not develop skin cancer. If cancer does occur, early detection and treatment can save lives.

How are cancers treated?

Some cancers are treated by surgery to remove the abnormal cells. Some are treated with radiotherapy that uses radiation to kill the cancer cells or stop cell division. Other cancers are treated by chemotherapy, special drugs that kill the cancer cells. Sometimes a combination of treatments is necessary.

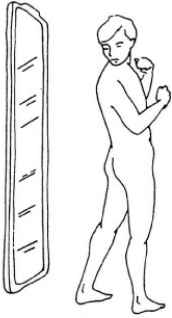
The following pages have copies of photographs of melanoma and the directions for self-examination. The photographs and drawings give a clearer picture of how and what to look for when examining the skin. However, keep in mind that these photographs should be used only as guidelines and that melanoma can appear in different shapes and colors. Any change in a mole, freckle or spot on your skin should be checked by a doctor.



Your Skin Self Exam

The best time to do this simple monthly exam is after a bath or shower. Use a full-length mirror and a hand mirror so you can check any moles, blemishes or birthmarks from the top of your head to your toes, noting anything new—a change in size, shape, or color, or a sore that does not heal.

1. Examine your body front and back in the mirror then right and left sides, arms raised.



2. Bend elbows and look carefully at forearms and upper underarms *and* palms

3. Sit, if that is more comfortable, to look at backs of the legs, feet—spaces between toes *and* soles.



4. Examine back of neck and scalp with the help of a hand mirror, part hair (or use blow dryer) to lift it and give you a close look.

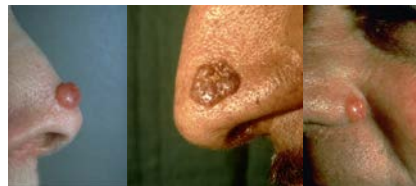
If you do the exam regularly, you will know what is normal for you and feel confident. Remember the ABCDE's and check with your dermatologist or clinic if you find something unusual or a spot, freckle or mole that is new or changed.



Basal Cell Carcinoma



An enlarged image of a basal cell carcinoma that appeared as a sore that never fully heals.



Patients all have nodular basal cell carcinoma, a type of basal cell carcinoma that appears as a well-defined growth with rolled edges. It may be pigmented or translucent with visible blood vessels. Also known as cystic basal cell carcinoma, it usually appears on the face.

Squamous Cell Carcinoma



Squamous cell carcinoma can appear to be crusted or scaly area on the skin with a red, inflamed base; persistent, non-healing, ulcerated (skin not covering) bump or thickened skin on the lower lip; wart-like growth or plaque; or sore that does not heal, red, scaly patches or bumps.

Melanoma

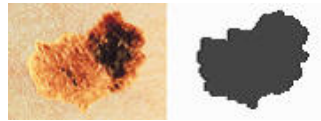
Melanoma often develops in a pre-existing mole that begins to change or a new mole.

Warning Signs

Asymmetry. If you could fold the lesion in two, the two halves would not match



High School Sun Safety Educational Resource



Border. Melanomas often have uneven or blurred borders.



Color. Melanoma typically is not one solid color; rather it contains mixed shades of tan, brown, and black. It can also show traces of red, blue or white.



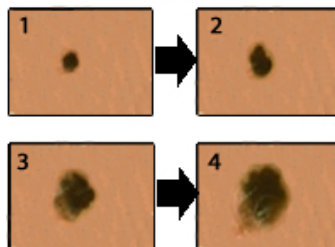
Diameter. While melanomas are usually greater than 6 millimeters (about the size of a pencil eraser) when diagnosed, they can be smaller. If you notice a mole different from others, or which changes, itches, or bleeds even if it is smaller than 6 millimeters, you should see a dermatologist.



Evolving. A mole or skin lesion that looks different from the rest or is changing in size, shape or color.

(Photos obtained from the American
Academy of Dermatology
National Library of Dermatologic
Teaching Slides)

Example





Activity 1 - Student Activities

You and your friend are at the beach. You notice that your friend has a weird-looking mole on his back. He tells you it's nothing, that he has had it for years. You have just had a biology class that taught you about skin cancer. You know the importance of prevention and early detection. You ask your friend when was the last time he looked in the mirror at the mole. He said he did not remember, that it was on his back and he really could not see it.

Using the "What Is Cancer?" Information Handout provided, write a short essay persuading your friend to have his mole checked by a doctor. Make sure you include the following points:

1. How is a cancerous cell different from a healthy cell?
2. What happens when a cell becomes cancerous?
3. What are the characteristics of skin cancer?
4. What are the benefits of early detection?



Activity 2

Answer the following questions:

Cells double in number each time they divide. $1 \times 2 = 2 \times 2 = 4 \times 2 = 8 \times 2 = 16$, etc. How many times must a cell divide to produce 100,000 cells?

Give two reasons why cells normally divide.

Which part of the cell controls cell division?

What can happen if this part of the cell is damaged?

How is a cancer cell different from a normal cell?

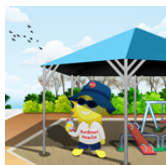
Explain the difference between a benign tumor and a malignant tumor.

How can cancer cells spread through the body?

What are the five early warning signs of melanoma?

List the three treatment methods used for cancer.

What are two methods to reduce the risk of death from cancer?



Activity 2 – Answer Key

Cells double in number each time they divide. $1 \times 2 = 2 \times 2 = 4 \times 2 = 8 \times 2 = 16$, etc. How many times must a cell divide to produce 100,000 cells?

After 16 divisions, there will be 65,536 cells, after 17 divisions there will be 131,072 cells

Give two reasons why cells normally divide.

Growth of an organism and repair of tissue.

Which part of the cell controls cell division?

The nucleus, specifically, the DNA in the nucleus.

What can happen if this part of the cell is damaged?

Mutation can cause cell division to become unchecked, causing cancer.

How is a cancer cell different from a normal cell?

Its rate of division is not controlled leading to tumor formation and cancer.

Explain the difference between a benign tumor and a malignant tumor.

Benign tumors have a boundary and do not spread. Malignant tumors may spread to other areas of the body.

How can cancer cells spread through the body?

Cells from the tumor can separate and enter the blood or lymph. They are carried to other parts of the body where they may start dividing, forming secondary tumors.

What are the five early warning signs of melanoma?

Asymmetry, border irregularity, color, diameter greater than 6 mm, enlargement

List the three treatment methods used for cancer.

Chemotherapy, radiation therapy, tumor removal or a combination of two or more therapies



High School Sun Safety Educational Resource

What are two methods to reduce the risk of death from cancer?

Prevention by avoiding known carcinogens and early detection



Activity 3

Graph the following data on a bar graph that compares the number of cases and the number of deaths for each type of cancer. Then answer the following questions.

Cancer Rates in the United States (2004) *

<u>Type of cancer</u>	<u># Cases</u>	<u># Deaths</u>
Breast	215,990	40,110
Lung	173,770	160,440
Prostate	230,110	29,900
Skin (Basal/Squamous)	950,000	5,000
Skin (Melanoma)	55,100	10,000
Colon	146,940	56,730

* Information provided by Cancer Facts & Figures, American Cancer Society

Questions

Which cancer is the most common? The least common?

Which cancer seems to be the least treatable? The most treatable?

Give a possible explanation for the high rates of basal and squamous skin cancer.

How could the rate of skin cancer be lowered?



High School Sun Safety Educational Resource

Using skin cancer as an example, calculate the percent survival for both basal and squamous cell cancer and melanoma. ($\# \text{ cases} - \# \text{ deaths} \times 100$)

Survival rate of basal and squamous cell = %

Survival rate of melanoma = %

Why is the survival rate of melanoma lower than the other two types of skin cancer?

List five ways that skin cancer can be prevented.

Of all types of cancer, at what percent rate does skin cancer occur? $[(\text{Basal/Squamous} + \text{Melanoma}) / \text{Total of all cancers} \times 100]$



Activity 3 – Answer Key

Which cancer is the most common? The least common?

Basal and squamous cell is most common; melanoma is least common (but the most dangerous).

Which cancer seems to be the least treatable? The most treatable?

Lung cancer is the least treatable cancer; squamous cell and basal cell cancer are the most treatable.

Give a possible explanation for the high rates of basal and squamous skin cancer.

The most accurate explanation is due to the fact that children and teens burn their skin which leads to these types of cancers later in life. Not paying attention to changes in your skin and letting it go can lead to skin cancer.

How could the rate of skin cancer be lowered?

Practicing sun safe behaviors: use of sunscreen, wearing a hat and sunglasses, reducing sun exposure at peak UV levels, covering up with long sleeves and pants: knowledge of early detection and follow-up with a dermatologist are all important

Using skin cancer as an example, calculate the percent survival for both basal and squamous cell cancer and melanoma. $(\# \text{ cases} - \# \text{ deaths}) / \# \text{ cases} \times 100$

Survival rate of basal and squamous cell = 99.47%

Survival rate of melanoma = 81.85%

Why is the survival rate of melanoma lower than the other two types of skin cancer?

It is more likely to metastasize or spread to other parts of the body.



High School Sun Safety Educational Resource

List five ways that skin cancer can be prevented.

1. Prevent early childhood and teen sunburns.
Use a sunscreen with an SPF of at least 30, avoid sun exposure between 10 am and 4 pm.
Wear a wide-brimmed hat; cover up with tightly woven clothes.
2. Detect and treat early changes in moles or freckles.
3. Avoid the sun and stay indoors when the UV Index is high.

Of all types of cancer, at what percent rate does skin cancers occur? [(Basal/Squamous + Melanoma) / Total of all cancers X 100]

56.7%



Activity 4

An important part of prevention education is to take the information that you have learned and relay it to your peers. Using the data from the Information Handout, create a poster that promotes the importance of early detection of skin cancer. Make sure the poster is visually attractive and includes information about the different types of skin cancer and the warning signs. Remember, you are promoting early detection and that means encouraging others to pay close attention to **any** changes on their skin.



Activity 5

Think about all of the consequences of using tobacco products. Think about how tobacco companies promote smoking to young people. Think about why young people smoke. Then think about sun products and sun exposure. Compare and contrast using tobacco and exposing oneself to the sun, unprotected. The following steps will help with the compare and contrast.

How are they similar?

How are they different?

What similarities and differences seem significant?

What patterns do you see in the significant similarities and differences?

What interpretation or conclusion can you draw?



Activity 5 - Answer Key

How are they similar?

Unhealthy risk-taking behaviors, can cause cancer, health problems usually not seen for years but sometimes occurs during adolescence, behavior encouraged by advertising and media and peers, offer a false sense of being cool, negatively affects the aging of the skin later in life

How are they different?

Tobacco illegal for those under 18, tobacco is a drug, smoking affects the health of others as well as the smoker, smells, turns teeth yellow, tobacco products and ads have warnings and sunscreens and ads promoting them do not

What similarities and differences seem significant?

Unhealthy behavior, encouraged by media and peers, affects appearance, warning on products

What patterns do you see in the significant similarities and differences?

Outside pressures, importance of education to curb this behavior

What interpretation or conclusion can you draw?

Behavior can be changed and as a result lives can be saved



Activity 6

Video can be found at :

http://www.sunsmart.com.au/news_and_media/media_campaigns

Show video

Have students interview someone who has had skin cancer removed, have them ask the following 5 questions. Record their answers and discuss in class. Have the students hand-in their answers.

What type of skin cancer did you have?

Where was your skin cancer?

How was it removed?

How often do you see a Dermatologist now?

Do you practice sun safe since you have had you cancer removed?

Details regarding the use of this resource is outlined at:

http://www.sunsmart.com.au/about_us/about_this_website/sunsmart_intellectual_property.html

Permission for use of campaign materials granted by SunSmart, Cancer Council Victoria



Activity 7 – Skin Cancer in different countries

Ask students to rank the following countries from highest incidence of melanoma to the lowest incidence of melanoma.

Denmark

New Zealand

Scotland

Australia

Italy

United States of America

(ANSWERS)

Australia

New Zealand

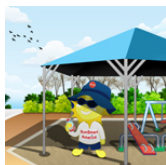
United States of America

Denmark

Scotland

Italy

Ask Students what factors could contribute to a higher rate of skin cancer? (ie Position on earth, closeness to the equator, and lifestyle)



SunSmart America™

Topic 4: Sun Safety

1996 Benchmark: SC.F.2.4.2, SC.G.2.4.6, SC.F.1.4.2, SC.F.1.4.5, SC.F.1.4.7, SC.H.1.4.7, SC.F.2.4.3, SC.H.3.4.6, LA.A.1.4.2, LA.A.2.4.1, LA.A.2.4.2, LA.A.2.4.4, LA.A.2.4.8, LA.B.2.4.3, LA.D.2.4.5, LA.E.2.2.1

Next Generation Health SSS: HE.912.B.3.1, HE.912.B.3.2, HE.912.B.3.4, HE.912.B.3.6, HE.912.C.1.5, HE.912.C.1.8, HE.912.C.2.7, HE.912.P.2.1, HE.912.P.2.2, HE.912.P.2.3, HE.912.P.2.4, PE.912.C.1.9, PE.912.L.1.6, PE.912.R.1.5, PE.912.M.1.35, SC.912.L.16.3, SC.912.L.17.15, SC.912.L.17.16, SC.912.L.17.20, SC.912.L.14.7, SC.912.L.14.9, SC.912.L.15.1, SC.912.L.15.10, SC.912.L.18.4, SC.912.N.1.3, SC.912.N.4.1, SC.912.L.15.13, SC.912.L.15.15, SC.912.N.4.1, SC.912.N.4.2, LA.910.1.6.3, LA.1112.1.6.3, LA.910.1.6.8, LA.1112.1.6.8, LA.910.1.7.3, LA.1112.1.7.3, LA.910.1.7.5, LA.1112.1.7.5, LA.910.1.7.2, LA.1112.1.7.2, LA.910.6.1.2, LA.1112.6.1.2, LA.910.6.2.2, LA.1112.6.2.2, LA.910.4.2.1, LA.1112.4.2.1, LA.910.4.2.2, LA.1112.4.2.2, LA.910.4.2.3, LA.1112.4.2.3, LA.910.6.3.1, LA.1112.6.3.1, LA.910.1.7.4, LA.1112.1.7.4

Academic Benchmark: HOPE-PE, HOPE-Core, Health 2-Personal Health, Life Management Skills

Knowledge Objectives

1. Increase student's awareness of sun safe behaviors
2. understand the risks of overexposure to the sun and ways to protect oneself
3. understand the differences in sunscreens
4. encourage responsible decision making by students in relation to sun protection

Behavioral Objectives

1. Students can engage in a sun-safety awareness campaign involving peers, school staff and administration, community leaders, state legislators and the media.
2. Students can design and implement a promotional campaign demonstrating sun-safety awareness. using posters, phrases, and short video clips
3. Students can work with the middle school or high school journalism class and/or yearbook staff on a sun-safety page for the school yearbook



High School Sun Safety Educational Resource

Students will:

1. Be able to encourage students to reflect on their own behaviors in relation to sun protection.
2. Determine which sunscreens are most effective in blocking UV light.
3. Demonstrate an understanding of the risks of overexposure to the sun and ways to protect oneself through explaining and promoting sun safe
4. Information and behaviors to others.

Materials

1. Pre -Test
2. Information Handouts
3. Activities 1-4
4. AAD Information Resource Articles
5. Post -Test

Procedure

6. Distribute pre-tests
7. Distribute student information handout
8. Allow time for students to read through the material
9. Choose & complete a student activity
10. Distribute post-tests

Materials

Use of a computer connected to the Internet

Web Sites: (The web site will be a link to the Sun Sense Survey)



Pre/PostTest

Answer the following questions:

Using a _____ of SPF _____ should be routine.

Always carry a tube of _____.

Reapply _____ every _____ hours.

Stay in the _____ or wear a wide-brimmed _____.

Wear _____ and tightly-woven protective _____.

Sunscreen should be applied at least _____ minutes before going outside.

Try to avoid being in the sun between _____ am and _____ pm.

Broad brimmed hats should have a brim of at least _____ inches.

The higher the SPF in sunscreens, the _____ the protection.

Fresh snow can reflect _____ percent of UV rays.



Pre/ Post Test -Answer Key

Answer the following questions:

Using a sunscreen of SPF 30 should be routine.

Always carry a tube of sunscreen.

Reapply sunscreen every two hours.

Stay in the shade or wear a wide-brimmed hat.

Wear sunglasses and tightly-woven protective clothing.

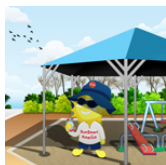
Sunscreen should be applied at least 20 minutes before going outside.

Try to avoid being in the sun between 10:00 am and 4:00 pm.

Broad brimmed hats should have a brim of at least 3 inches.

The higher the SPF in sunscreens, the greater the protection.

Fresh snow can reflect 80 % percent of UV rays.



Information Sheet

Skin cancer is a disease of the cells of the skin. Healthy cells that make up the body's tissues grow, divide and replace themselves in an orderly way. Sometimes normal cells lose their ability to limit and direct their growth. They divide too rapidly and grow without order. This process can result in skin cancer and other cancers. The best way to protect yourself against skin cancer is to practice healthy sun behaviors.

Spending too much time in the sun increases your risk for skin damage. Skin damage includes wrinkles, freckles, and skin cancer. A **tan** is not healthy and is a sign of skin damage, which can lead to skin cancer.

You should **never get a sunburn**. One to two blistering sunburns before the age of 18 doubles your risk of developing skin cancer.

Use these five important steps to be SunSmart

Slip on some sun protective clothing

Wear loose-fitting, close weave clothing that covers as much skin as possible during outside activities. School uniform or dress codes should include tops with elbow length sleeves, and if possible, collars and knee length or longer style shorts and skirts.

Slop on SPF 30+ sunscreen

Apply SPF 30+ broad spectrum, water resistant sunscreen 20 minutes before going outside to ensure maximum effectiveness. Reapply every two hours or more often if involved in physical or water activities. Sunscreen should never be the only method of sun protection.

Slap on a hat

To protect the neck, ears, temples, face and nose, wear a broad brimmed, legionnaire or bucket hat



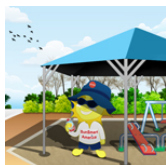
Broad Brimmed



Bucket



Legionnaire



- Broad brimmed hats should have a brim of at least 3 inches. The brim width for children under the age of 10 should be proportional to the size of the child's head and ensure that their face is well shaded.
- A legionnaire hat should have the front peak and the long, back flap meet at the sides to protect the side of the face, neck and ears.
- Bucket hats should have a deep crown and a brim of at least 2.5 inches (2 inches for young children).
- Baseball caps and visors offer little to no protection to the cheeks, ears and neck and are not recommended for sun protection.

Seek shade

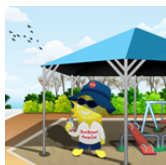
Stay out of the sun as much as possible between the hours of 10:00 a.m. and 4:00 p.m. Try to use shade whenever possible. UV radiation can reflect from surfaces such as water, sand and concrete, so it is important to wear a hat, appropriate clothing and sunscreen even while in the shade.

Slide on some sunglasses

Eyes can be damaged by exposure to UV radiation. Where practical, wear close-fitting, wrap around sunglasses that cover as much of the eye area as possible. Look for sunglasses that block 100 percent of UV rays and that also absorb most high-energy visible (HEV) radiation, or blue light. Remember to wear sunglasses even when you're in the shade. Although shade reduces your UV and HEV exposure to some degree, your eyes still will be exposed to UV rays reflected from buildings, roadways and other surfaces. Sunglasses are important especially in winter, because fresh snow can reflect 80 percent of UV rays, nearly doubling your overall exposure to solar UV radiation. If you ski or snowboard, choosing the right **ski goggles** is essential for adequate UV protection on the slopes. Even if your **contact lenses** block UV rays, you still need sunglasses. UV-blocking contacts shield only the part of your eye under the lens. UV rays still can damage your **conjunctiva** and other tissues not covered by the lens. Wearing sunglasses protects these delicate tissues and the skin around your eyes from UV damage. (ref All About Vision, Ultraviolet Radiation and Your Eyes, by Gary Heiting, OD)

Sunscreens

Sunscreens absorb, reflect and scatter ultraviolet (UV) radiation from sunlight. This UV radiation causes skin damage which may lead to skin cancer. It can take as little as 5-6 minutes for some people to sunburn and a single sunburn increased the chance of getting skin cancer. When correctly applied, a sunscreen forms a barrier between your skin and the sun. Sunscreens should be applied in an even thickness to clean, dry skin about 20 minutes before going into the sun. All American-made sunscreens carry a sun protection factor (SPF) number



ranging from two to 30 and higher. The SPF is based on how long unprotected skin takes to burn when exposed to artificial sunlight, the higher the number, the greater the protection. Sunscreens of SPF 30 or higher are recommended because sunscreens with higher SPF protect longer. Zinc and Titanium creams are the only chemicals that provide total UV block-out protection.

The sunscreen should be reapplied when you are sweating, swimming, or involved in other outside activities. Weather conditions, time of day, and time of year also influence the effectiveness of the sunscreen. Water resistant sunscreens should be used during outdoor swimming and activities causing perspiration. Non-chemical protection-shade, clothing, wide-brimmed hats, and sun-glasses also protect against sun damage. The UV index, developed by the National Weather Service and the EPA, should be used to help you plan outdoor activities in ways to prevent sun overexposure.

Adolescents and sun protection

Research published in 2005 found that:

Changing adolescents' sun protection behaviors remains a challenge, and the need for effective interventions targeting this group is a priority, particularly in warmer climates where emphasis on appropriate sun protection remains a year-round concern. However, there has been little prospective research on the effect of school-based sun protection interventions, particularly on adolescents, especially teens aged 15 to 18. High school science students in Palm Beach County, Florida, received a seven-lesson sun protection and early detection curriculum preceded by pretests and followed with post-tests 6 months later. The main outcome measures were student knowledge and sun protection practices, including adherence to sunscreen recommendations. Of 344 students completing the baseline surveys, 184 students completed the postintervention questionnaire. Overall, there were significant improvements from baseline to follow-up for many of the knowledge questions. Greatest change scores were seen in the children's ability to correctly define the five rules of early detection of skin cancer (27-60%, $p < 0.001$) with improved change scores by gender and race persisting after 6 months. No significant differences were found in reported use of sunscreen, hat wearing, or sunglasses, although there was a slight decrease in the reported use of always wearing sun protective clothing ($p = 0.03$). In conclusion, in this study, a skin cancer prevention and detection curriculum integrated into high school biology, resulted in knowledge gains maintained at least 6 months after classroom teaching. (**Geller, A. C., Shamban, J., O'Riordan, D. L., Slygh, C., Kinney, J. P.**, Rosenberg, S.; Department of Dermatology, Boston University School of Medicine, 720 Harrison Avenue, DOB 801A, Boston, MA 02118, USA; Pediatric Dermatology)



High School Sun Safety Educational Resource



Activity 1

Have each student go to: **www.melanomafoundation.com** and click on “Take the SunSense Survey – It may save your life”. Have each student print and complete their survey. Go over the survey with the class. Have the students hand-in their survey for credit.



Activity 2 - Sunscreens

Materials

Dylux Proof Paper

Dylux Proof Paper reacts to ultraviolet radiation which changes in color. It comes in two colors when developed in ultraviolet radiation: bright sky blue and gray. When exposed to intense UV sources the paper turns blue or gray (if you have the gray paper) in about 30 to 60 seconds. When returned to the interior, the color is fixed if the paper is exposed to low UV indoor lighting for about an hour. The paper may be stored for several weeks without fading.

Sunscreens of SPF 2, SPF 6, SPF 10, SPF 15, SPF 30 and SPF 50.

Distilled or tap water

Tanning oils, olive oil, zinc ointment and other emollients may also be used for comparison. Fabric squares, sunglasses, and anything else that should stop UV radiation can also be included.

Applicator sticks



Teacher notes

Sunblock papers may be distributed as strips or squares.

Application may be done by finger or for a more precise application, quantities of sunblock may be weighed and then applied using an applicator stick.

Be sure students keep sunblocks separate from each other and do not use the same applicator with more than one sunblock.

An application of tap or distilled water is suggested (a wet person burns faster than a dry person when exposed to UV radiation).

Have students collect and display data in a chart or table to show which sunscreen is most effective.

Procedure

1. Apply the SPF sunblocks to the paper, one at a time. Be sure to keep the sunblocks separate from each other
2. Application may be done by finger or for a more precise application, quantities of sunblock may be weighed and then applied using an applicator stick.
3. Expose the paper to a UV light source or sunlight. Exposure times and UV radiation intensity should be constant for all exposures. About 30 seconds should be sufficient.
4. An application of plain water may also be included (a wet person burns faster than a dry person when exposed to UV radiation). Dylux Proof Paper is difficult to wet so you will have to keep trying for a few moments.
5. After 30 seconds of exposure to bright sunlight, the paper will develop to a sky blue color. Use the contrast between the site of application and area of paper without sunscreen to determine which sunscreen blocked the most ultraviolet light.



Analysis

1. Display your data in a table or chart.
2. Which sunscreen is most effective?
3. Why should you limit sun exposure time?
4. What features would you look for in a sunscreen? Should it be water-based or water resistant? Greasy or creamy? Why?
5. What are three other ways, in addition to sunscreen application, you can protect yourself against sun damage and prevent skin cancer?
6. (This activity was adapted from: 'A Sunscreen Activity' by David McLean and C.J. (Kip) Anastasiou published in Catalyst, 1993, Vol. 36 (3): p. 21)



Activity 2 – Answer Key

1. Why should you limit sun exposure time?

To limit skin damage from overexposure to the sun.

2. What features would you look for in a sunscreen? Should it be water-based or water resistant? Greasy or creamy? Why?

It should be a broad spectrum sunscreen that filters both UVA and UVB radiation. Its SPF will depend on your skin color, length of sun exposure time, and time of day. A water resistant sunscreen should be used for outdoor swimming lessons and high energy outdoor activities. Consistency of a sunscreen depends on the type of activity of the individual. Water resistant sunscreens are less likely to wash off during swimming and heavy perspiration.

3. What are three other ways, in addition to sunscreen application, you can protect yourself against sun damage and prevent skin cancer?

Shade, protective clothing, wide brimmed hats, and sunglasses



Activity 3 – Spreading the Word

Explain to the class that the American Academy of Dermatology (AAD) has provided four articles from their on-line skin cancer information resource that will be used for this activity. Discuss the mission and purpose of the AAD and its interest in sun safety.

Pass out the four AAD information resource articles to your students. Explain that their assignment is to read the articles and extrapolate all of the pertinent information and write an article for their school newspaper. The article is to be an expository piece of writing on sun safety and is to include important points from each bulletin. Remind students that the article is to have an opening paragraph, three paragraphs in the body, and a conclusion. The best article should be submitted to the school paper for publication.

NOTE: The American Academy of Dermatology recently revised one of its key messages to the public regarding sun safety. After years of recommending that people apply a sun screen with a minimum of SPF of 15, the Academy's Board of Directors recently approved increasing the minimum recommendation to 30. (ref: American Academy of Dermatology- Dermatology World; VOL. 19, NO. 9; September 2009)



What is Skin Cancer?

Cancer develops when DNA, the molecule found in cells that encodes genetic information, becomes damaged and the body cannot repair the damage. These damaged cells begin to grow and divide uncontrollably. When this occurs in the skin, skin cancer develops. As the damaged cells multiply, they form a tumor. Since skin cancer generally develops in the epidermis, the outermost layers of skin, a tumor is usually clearly visible. This makes most skin cancers detectable in the early stages.

Types of Skin Cancer

Three types of skin cancer account for nearly 100% of all diagnosed cases. Each of these three cancers begins in a different type of cell within the skin, and each cancer is named for the type of cell in which it begins. Skin cancers are divided into one of two classes - nonmelanoma skin cancers and melanoma. Melanoma is the deadliest form of skin cancer.

The different types of skin cancer are:

Basal cell carcinoma (BCC)

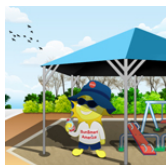
The most common cancer in humans, BCC develops in more than 1 million people every year in the United States alone. About 80% of all skin cancers are BCC, a cancer that develops in the basal cells - skin cells located in the lowest layer of the epidermis. BCC can take several forms. It can appear as a shiny translucent or pearly nodule, a sore that continuously heals and then re-opens, a pink slightly elevated growth, reddish irritated patches of skin, or a waxy scar. Most BCCs appear on skin with a history of exposure to the sun, such as the face, ears, scalp, and upper trunk. These tumors tend to grow slowly and can take years to reach ½ inch in size. While these tumors very rarely metastasize (cancer spreads to other parts of the body), dermatologists encourage early diagnosis and treatment to prevent extensive damage to surrounding tissue.

Squamous cell carcinoma (SCC)

About 16% of diagnosed skin cancers are SCC. This cancer begins in the squamous cells, which are found in the upper layer of the epidermis. About 200,000 cases are diagnosed every year. SCC tends to develop in fair-skinned middle-aged and elderly people who have had long-term sun exposure. It most often appears as a crusted or scaly area of skin with a red inflamed base that resembles a growing tumor, non-healing ulcer, or crusted-over patch of skin. While most commonly found on sun-exposed areas of the body, it can develop anywhere, including the inside of the mouth and the genitalia. SCC may arise from actinic keratoses, which are dry, scaly lesions that may be skin-colored, reddish-brown or yellowish-black. SCC requires early treatment to prevent metastasis (spreading).

Melanoma

Accounting for about 4% of all diagnosed skin cancers, melanoma begins in the melanocytes, cells within the epidermis that give skin its color. Melanoma has been coined “the most lethal form of skin cancer” because it can



rapidly spread to the lymph system and internal organs. In the United States alone, approximately one person dies from melanoma every hour. Older Caucasian men have the highest mortality rate. Dermatologists believe this is due to the fact that they are less likely to heed the early warning signs. With early detection and proper treatment, the cure rate for melanoma is about 95%. Once it spreads, the prognosis is poor. Melanoma most often develops in a pre-existing mole or looks like a new mole, which is why it is important for people to know what their moles look like and be able to detect **changes** to existing moles and spot new moles.

Other nonmelanoma skin cancers

All other skin cancers combined account for less than 1% of diagnosed cases. These are classified as non-melanoma skin cancers and include Merkel cell carcinoma, dermatofibrosarcoma protuberans, Paget's disease and cutaneous T-cell lymphoma.

Causes

Sun exposure is the leading cause of skin cancer. According to the American Cancer Society, "Many of the more than 1 million skin cancers diagnosed each year could be prevented with protection from the sun's rays."

Scientists now know that exposure to the sun's ultraviolet (UV) rays damages DNA in the skin. The body can usually repair this damage before gene mutations occur and cancer develops. When a person's body cannot repair the damaged DNA, which can occur with cumulative sun exposure, cancer develops.

In some cases, skin cancer is an inherited condition. Between 5% and 10% of melanomas develop in people with a family history of melanoma.

Who Gets Skin Cancer?

Skin cancer develops in people of all colors, from the palest to the darkest. However, skin cancer is most likely to occur in those who have fair skin, light-colored eyes, blonde or red hair, a tendency to burn or freckle when exposed to the sun, and a history of sun exposure. Anyone with a family history of skin cancer also has an increased risk of developing skin cancer. In dark-skinned individuals, melanoma most often develops on non-sun-exposed areas, such as the foot, underneath nails, and on the mucous membranes of the mouth, nasal passages, or genitals. Those with fair skin also can have melanoma develop in these areas.

Skin Cancer Rates Rising

While Americans now recognize that overexposure to the sun is unhealthy, the fact remains that most do not protect their skin from the sun's harmful rays. As a result, skin cancer is common in the United States. More than 1 million nonmelanoma skin cancers are diagnosed each year, and approximately one person dies from melanoma every hour.

If current trends continue, 1 in 5 Americans will develop skin cancer during their lifetime. Melanoma continues to rise at an alarming rate. In 1930, 1 in 5,000 Americans was likely to develop melanoma during their lifetime. By



2004, this ratio jumped to 1 in 65. Today, melanoma is the second most common cancer in women aged 20 to 29.

Prevention and Early Detection Key

Sun protection can significantly decrease a person's risk of developing skin cancer. Sun protection practices include staying out of the sun between 10 a.m. and 4 p.m. when the rays are strongest, applying a broad-spectrum (offers UVA and UVB protection) sunscreen with a Sun Protection Factor (SPF) of 15 or higher year-round to all exposed skin, and wearing a protective clothing, such as a wide-brimmed hat and sunglasses when outdoors.

Since skin cancer is so prevalent today, dermatologists also recommend that everyone learn how to recognize the signs of skin cancer, use this knowledge to perform regular examinations of their skin, and see a dermatologist annually (more frequently if at high risk) for an exam. Skin cancer is highly curable with early detection and proper treatment.



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What Skin Cancer Looks Like

The most common warning sign of skin cancer is a **change** to your skin. This change can take many forms, including:

Translucent pearl-shaped growth

Mole that has begun to grow, bleed, and/or itch

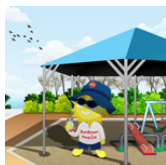
Mole with any ABCDE feature:

Asymmetrical. If lesion were folded in half, the two sides would not match.

Borders irregular.

Color varies.

Diameter greater than 6 mm (size of a pencil eraser). While melanomas are usually greater than 6 mm when diagnosed, they can be smaller.



Evolving. A mole or skin lesion that looks different from the rest or is changing in size, shape, or color.

Brown or black streak underneath a nail

Sore that repeatedly heals and reopens

Smooth, waxy lesion

Cluster of slow growing, shiny or scaly lesions that are pink or red

To help you recognize the many different forms that skin cancer can take, the links below take you to pages that show several photographs. If you notice a lesion on your skin that resembles any of examples shown on these pages, make an appointment to see a dermatologist. Don't delay. With early detection and proper treatment, the cure rate for skin cancer averages 95%.

Warning: Some of the photographs shown on the following pages depict advanced forms of skin cancer that some may find disturbing.

Visual Guides

Basal Cell Carcinoma: What it Looks Like

Melanoma: What it Looks Like

Merkel Cell Carcinoma: What it Looks Like

Squamous Cell Carcinoma: What it Looks Like



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Prevention

Most skin cancer can be prevented by practicing sun protection, according to numerous research studies.

Research also shows that not only does sun protection reduce one's risk of developing skin cancer; sun protection also may decrease the likelihood of recurrence.

Even if you have spent a lot of time in the sun or developed skin cancer, it's never too late to begin protecting your skin. The American Academy of Dermatology (Academy) recommends that everyone protect their skin by following these sun protection practices:



Sun Protection Practices

Avoid deliberate tanning. Lying in the sun may feel good, but the end result is premature aging (wrinkles, blotchiness, and sagging skin) as well as a 1 in 5 chance of developing skin cancer. Tanning beds and sunlamps are just as dangerous because they, too, emit enough UV radiation to cause premature aging and skin cancer. If you like the look of a tan, consider using a sunless self-tanning product. These products do not protect skin from the sun, so a sunscreen should be used.

Get vitamin D safely through a healthy diet that includes vitamin supplements. Don't seek the sun.

Generously apply sunscreen to all exposed skin every day. The sunscreen should have a Sun Protection Factor (SPF) of at least 15 and be broad-spectrum (provides protection from ultraviolet A (UVA) and ultraviolet B (UVB) rays).

Dermatologists worldwide agree that the Australians' use of the word "slop!" accurately describes how sunscreen should be used. Most people do not apply enough sunscreen to help protect against harmful ultraviolet (UV) radiation. One ounce, enough to fill a shot glass, is considered by the Academy to be the amount needed to cover the exposed areas of the body properly. So when applying sunscreen, remember to "slop!" it on.

Here are a few more tips:

Don't forget your ears, nose, neck, hands, and toes. Many skin cancers develop in these areas. Protect your lips, another high-risk area, with lip balm that offers sun protection with an SPF of 15 or higher.

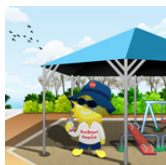
Sunscreen should not be used to prolong sun exposure. Some UV light gets through sunscreen.

Sunscreens should be applied to dry skin 15-30 minutes before going outdoors, and reapplied every two hours.

Be sure to reapply sunscreen after being in water or sweating.

Sunscreen does not make sunbathing safe.

Wear protective clothing, such as a long-sleeved shirt, pants, a wide-brimmed hat, and sunglasses, where possible. This is what Australians call the "slip!" and "slap!" of sun protection. When you will be out in the sun, be sure to slip on protective clothing, such as a shirt, and slap on a wide-brimmed hat.



High School Sun Safety Educational Resource

Here's why: Clothing protects your skin from the sun's harmful rays. The tighter the weave, the more sun protection provided. In fact, clothing plays such an important role in sun protection that clothing designed specifically to protect against the sun as well as laundry additives created to boost clothing's protective function are available. Your dermatologist may be able to provide you with more information about these products.

A wide-brimmed hat shades your face and neck from the sun's rays. Wide-brimmed means the brim circles the entire hat and shades both the face and neck.

Seek shade when appropriate. The sun's rays are strongest between 10 a.m. and 4 p.m.

Use extra caution near water, snow, and sand as they reflect the damaging rays of the sun. This can increase your risk chance of sunburn.

Check your birthday suit on your birthday. If you notice anything changing, growing, or bleeding on your skin, see a dermatologist. Skin cancer is very treatable when caught early.

More Good Reasons to Practice Sun Protection

Aside from skin cancer, the sun's UV rays also cause:

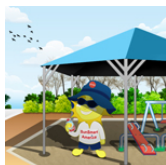
Premature aging: Signs of premature aging include wrinkles, mottled skin, and loss of skin's firmness.

Immunosuppression (weakening of the body's ability to protect itself from cancer and other diseases)

Cataracts and macular degeneration: Macular degeneration, for which there is no cure, is the leading cause of blindness in people aged 65 and older.



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Skin Examinations

Two types of skin examinations are used to detect skin cancer:

1) Skin self-exam and 2) Exam by a dermatologist or other physician.

Dermatologists encourage regular self-skin exams because research shows that this exam can lead to early detection of skin cancer, which can save your life. When detected early, most skin cancers can be successfully treated. The following explains what you should know about a skin self-exam.

Everyone Should Perform a Skin Self-Exam

Everyone, not only those with an increased risk of developing skin cancer, should perform regular skin self-exams. Examining your skin for suspicious moles and other lesions could save your life. No one is immune to skin cancer.

Enlist Your Spouse

If feasible, ask someone close to you for help when checking your skin. A study found that patients benefited when a partner was involved in their skin self-exams. Specifically, the patients who were assisted by a partner in performing skin self-exams were more likely to perform regular exams than those who relied solely on themselves for motivation. Having a partner also led to the patient having a more positive attitude about performing skin self-exams and greater confidence in the ability to perform this exam.

What You Need to Perform a Skin Self-Exam

The following can be helpful when performing a skin self-exam:

Full-length mirror

Handheld mirror

Well-lit room that offers privacy

Pen or pencil

Body Mole Map

(This page gives you a place to record where spots appear on your skin. Referring back to your record the next time you perform a skin self-exam can help you detect changes.)



How to Perform a Skin Self-Exam

An illustrated guide that shows how to examine your skin appears on the right. This guide also appears on the Body Mole Map.

It is important for you or your partner to examine your entire body as skin cancer can occur anywhere, not only on areas frequently exposed to the sun. Be sure to check your back, scalp, underarms, genitals, palms, soles, and skin between the toes and fingers. When examining your scalp, it may help to part the hair to check the entire scalp.

What to Look for During a Self-Exam

You should become familiar with your birthmarks, blemishes, and moles so you know what they look like and can spot changes. As you or your partner examines your skin, look for **changes** in the size, color, shape, or texture of a mark on your skin. Signs of skin cancer include:

Mole that is different from the rest, itches, bleeds, or is changing in any way — even if the mole is smaller than 6 millimeters (about the size of a pencil eraser)

Sore that never fully heals

Translucent growth with rolled edges

Brown or black streak underneath a nail

Cluster of slow-growing, shiny pink or red lesions

Waxy-feeling scar

Flat or slightly depressed lesion that feels hard to the touch

If You Find a Suspicious Lesion

If you or your partner finds a suspicious lesion, see a dermatologist. When making the appointment, be sure that the person making the appointment knows why you want to see the doctor. Skin cancer has a high cure rate when detected early.



High School Sun Safety Educational Resource

Related Links

To help you spot a suspicious lesion, the American Academy of Dermatology created the following visual guides:

Basal Cell Carcinoma: What it Looks Like

Melanoma: What it Looks Like (includes ABCDEs of Melanoma)

Merkel Cell Carcinoma: What it Looks Like

Squamous Cell Carcinoma: What it Looks Like

References:

American Academy of Dermatology, "**New Studies Support Dermatologists Recommendation: Self-Exams, Screenings Vital for Detecting Skin Cancer,**" News release issued May 5, 2008. Last accessed November 25, 2008.

Robinson JK, Turrisi R, Stapleton J. "Examination of mediating variables in a partner assistance intervention designed to increase performance of skin self-examination." J Am Acad Dermatol 2007; 56: 391-7.



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Activity 4 – How Can I Keep My Natural Skin Color?

Brainstorm **sunsilly** behaviors and list at least ten on the board, i.e. sunbathing at the pool during midday.

Give one student a ball or soft toy.

That student must complete the following statement: **I can keep my natural skin color by...** in relation to the first behavior listed on the board i.e.... **going to the pool in the late afternoon.**

The student then throws the ball to another student, who repeats the statement in relation to the second listed behavior on the board. Continue down the list.

This activity often generates much discussion about values and attitudes. Have the students write a short essay about their values and attitudes toward sun safety.

RDK Melanoma Foundation acknowledges that this resource has been contextualized and reproduced with permission from Cancer Council Victoria.'



Activity 5

Video can be found at :

http://www.sunsmart.com.au/news_and_media/media_campaigns

Show your students the Tattoo advertisement video.

Often advertisements appeal to emotions, such as desire, fear, love, pride, authority, patriotism and self-interest in order to sell products or change behavior.

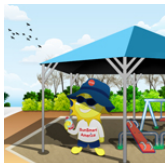
After looking at the Tattoo advertisement, have a discussion with your class about “What main emotion is being appealed to in the Tattoo advertisement? How is this done? Why?”

Have the students write an essay about their emotions about skin cancer and sun safety after seeing the advertisement.

Details regarding the use of this resource is outlined at:

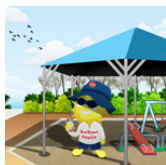
http://www.sunsmart.com.au/about_us/about_this_website/sunsmart_intellectual_property.html

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Topic 5 Tanning





SunSmart America™

Topic 5: Tanning

1996 Benchmark: SC.F.2.4.2, SC.G.2.4.6, LA.A.1.4.2, LA.A.2.4.1, LA.A.2.4.7, LA.A.2.4.8, LA.B.2.4.3, LA.C.3.4.5, LA.C.2.4.2, LA.C.3.4.4

Next Generation Health SSS: HE.912.B.1.1, HE.912.C.1.1, HE.912.C.1.7, HE.912.C.2.5, HE.912.C.2.6, HE.912.C.2.7, HE.912.P.1.1, PE.912.C.1.9, PE.912.L.1.6, PE.912.R.1.5, PE.912.M.1.35, SC.912.L.16.3, SC.912.L.17.15, SC.912.L.17.16, SC.912.L.17.20, LA.910.1.6.3, LA.1112.1.6.3, LA.910.1.6.8, LA.1112.1.6.8, LA.910.1.7.3, LA.1112.1.7.3, LA.910.1.7.5, LA.1112.1.7.5, LA.910.6.2.2, LA.1112.6.2.2, LA.910.6.2.2, LA.1112.6.2.2, LA.910.4.3.1, LA.1112.4.3.1, LA.910.5.2.2, LA.1112.5.2.2, LA.910.5.2.5, LA.1112.5.2.5

Academic Benchmark: HOPE-PE, HOPE-Core, Health 2-Personal Health, Life Management Skills

Knowledge Objectives

1. Students will learn the cumulative and progressive effects of tanning
2. discover the risks involved in the use of tanning salons
3. develop an awareness of personal susceptibility to skin damage

Behavioral Objectives

1. Students will identify and describe the methods used by advertisers to influence behavior with regard to tanning. The purpose of this activity is to increase personal awareness.
2. Students will report in writing their own personal habits with relation to tanning behaviors in journal reflection activities.

Students will

1. Explore advertisement techniques used by the tanning bed industry
2. Be able to reflect on their own behaviors in relation to tanning
3. Make skin cancer more relevant to young people, through the use of personal stories
4. Be able to apply their knowledge of sun protection to critique advertisements about tanning salons



Materials

1. Pre -Test
2. Information Handouts
3. Visual Handouts
4. Activities 1-8
5. Post -Test

Procedure

1. Distribute pre-tests
2. Distribute student information handout and visual handout and choose a student activity. Allow time for students to read through the material and answer questions.
3. Distribute post-tests.



Pre/Post -Test

Multiple Choice

- Should you try to get a tan?
a) never
b) sometimes
c) usually
d) always
- How often should you be sunburned anywhere on your body within a period of 12 months?
a) not at all
b) 1-2 times
c) 3-6 times
d) more than 6 times
- True or False: Photo aging is a term to describe changes in the skin that can be reversed.
- List 3 harmful effects of tanning beds
- Tanning beds emit forms of ultraviolet radiation known as _____ and _____.
- True or False: Indoor tanning is safer than outdoor tanning
- Tanning without burning can still cause _____.
- How would you describe your skin and natural hair color?
a) fair skin, light hair
b) fair skin, dark hair
c) light-olive skin, any hair color
d) medium-olive skin, any hair color
e) dark-olive skin, dark hair
f) dark skin, dark hair

Written questions:

- What are some of the advantages to being outside in the sun, either early in the day or late in the day?
- Identify how you can reduce your personal risk of being affected by UV radiation



Pre/Post –Test Answer Key

Multiple Choice

1. Should you try to get a tan?
a) **never** c) usually
b) sometimes d) always
2. How often should you be sunburned anywhere on your body within a period of 12 months?
a) **not at all** c) 3-6 times
b) 1-2 times d) more than 6 times
3. True or **False**: Photo aging is a term to describe changes in the skin that can be reversed.
4. List 3 harmful effects of tanning beds – **Photoaging; sunburn; skin cancer**
5. Tanning beds emit forms of ultraviolet radiation known as **UVA** and **UVB**.
6. True or **False**: Indoor tanning is safer than outdoor tanning
7. Tanning without burning can still cause **skin damage**.
8. How would you describe your skin and natural hair color?
g) fair skin, light hair
h) fair skin, dark hair
i) light-olive skin, any hair color
j) medium-olive skin, any hair color
k) dark-olive skin, dark hair
l) dark skin, dark hair



High School Sun Safety Educational Resource

Written questions

1. What are some of the advantages to being outside in the sun, either early in the day or late in the day?
It is better to reduce exposure to the sun between 10 am and 4 pm because staying inside or in the shade during these hours can reduce UV exposure by up to 60%. Reducing UV exposure reduces the risk of skin cancer.
2. Identify how you can reduce your personal risk of being affected by UV radiation:
An individual can reduce their personal risk of being affected by UV radiation by: limiting sun exposure during the mid-day hours; wearing sunscreen SPF 30+ and higher; wearing protective clothing with long sleeves and pants, sunglasses and wide-brimmed hats; Avoiding the use of tanning lamps. Tanning lamps emit UV radiation and also cause skin damage. There is no such thing as tanning safely.



Information Handout – Dangers of Tanning

Spending too much time in the sun increases your risk for skin damage. Skin damage includes wrinkles, freckles, and skin cancer. A **tan** is not healthy and is a sign of skin damage, which can lead to skin cancer.

You should **never get a sun burn**. One to two blistering sunburns before the age of 18 doubles your risk of developing skin cancer.

Skin and natural hair color usually determine how quickly you burn and how susceptible you are to skin cancer.

Type 1: Very fair skin color, always burns easily, never tans, red hair, freckles

Type 2: Fair skin, light eyes, burns easily, tans minimally

Type 3: Light skin, burns moderately, tans eventually

Type 4: Medium skin color, burns minimally, always tans

Type 5: Dark skin color, rarely burns, tans readily**

Type 6: Very dark skin color, never burns, becomes deeply pigmented**

*Those most susceptible to sunburn are very fair skin, red or blonde hair, rarely tan, burns easily

**Those least susceptible to sunburn are olive to dark complexion, dark brown/black hair, and tan easily.

Photoaging is a term used to describe irreversible changes in the skin. These changes result in the generalized wrinkling, sagging, scaling, and blotchiness of skin once thought to be characteristic of chronological aging. Through overexposure to UV radiation, the skin changes in structure at the microscopic and macroscopic level. At the microscopic level, the epidermis exhibits variable pigmentation due to melanosomes (products of melanocytes) being transferred to the upper layer skin cells. The epidermis also becomes thinner and the dermal papillae become flatter. Within the dermis, elastic fibers unravel and there are changes in the cellular activity of the skin. The result at the macroscopic level: the skin discolors unevenly, wrinkles, sags, and loses elasticity,



texture, and smoothness. Overexposure to UV radiation can also result in localized skin lesions including freckles, lentigos, skin cancers and precancers.

As a class, brainstorm reasons for being outside in the sun either early in the day or late in the day. Make sure students understand that there are less intense UV rays during those hours. Explain to them that UVA rays cause aging and UVB rays cause burning, and that both can cause skin cancer. Staying inside or in the shade during these hours can reduce UV exposure by up to 60%. Reducing UV exposure reduces the risk for skin cancer, freckles, blotchiness and wrinkles.

Sunburn

In the United States, sunburn can occur in as little as fifteen minutes on a fine June day.

It is the UV radiation in the sun that causes our skin to burn. UV radiation is invisible; it is not warm and can pass through clouds, so sunburn can occur on cool, cloudy days.

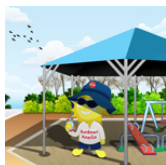
As soon as UV radiation hits our skin, the epidermis releases chemicals that cause the blood vessels to swell and leak fluids, causing inflammation, pain and redness – otherwise known as sunburn. This type of damage can occur in as little as fifteen minutes and will continue for twenty-four to seventy-two hours after exposure to the sun.

Tanning

A tan is much more than the skin just turning brown. Skin cells located in the epidermis produce a pigment called melanin that gives skin its natural color. When skin is exposed to UV radiation, melanin production is stimulated, causing the skin to darken.

Many people refer to a *healthy tan* – but even a light tan is a sign the skin has been exposed to too much sun. Tanning without burning may still cause DNA and skin damage leading to premature aging, and potentially skin cancer.

Fair-skinned people (a large portion of the United States population) have a less protective form of melanin than people with darker skins. When fair-skinned people spend time in the sun, cells called melanocytes produce melanin, which then stays in the top layer of skin for four or five days, sometimes giving a tanned appearance. The melanin produced by fair-skinned people is much less protective, meaning no amount of sun baking will result in a lasting tan – just sunburn and skin damage.



Tanning Beds

Many people think tanning beds are a “safe” way to tan. But all forms of UV radiation contribute to skin cancer (NRPB 2002), and a tanning bed tan is induced by UV radiation. In fact, tanning beds may emit much higher concentrations of UV radiation than the sun (Walter et al. 1990).

Tanning beds emit both UVA and UVB radiation, both known causes of skin cancer. The Richard David Kann Melanoma Foundation does not support UV tanning in tanning beds under any circumstance.

Tanning in Different Cultures

The desirability of a tan has varied dramatically over the years and from country to country. This information sheet provides a brief overview of tanning behaviors; you might like to find out more information.

United States

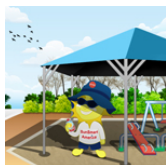


In the **1950s**, an ever-growing trend was to use baby oil as a method to tan more quickly. The first self-tanner came about in the same decade and was known as “Man-Tan,” and often led to undesirable orange skin.^[4] **Coppertone**, in **1953**, brought out the little blond girl and her cocker spaniel tugging on her bathing suit bottoms on the cover of their sunscreen bottles; this is still the same advertisement they use today on their bottles of sunscreen. In the latter part of the 1950s, silver metallic UV reflectors were common to enhance one’s tan. Their superstar status helped to promote tanned skin as desirable. In **1971**, **Mattel** introduced Malibu Barbie, which had tanned skin, sunglasses, and her very own bottle of sun tanning lotion. The same decade, specifically **1978**, gave rise to **tanning beds** and **sunscreen** with SPF 15. Today there are an estimated 50,000 outlets for tanning, whereas in the 1990s there were only around 10,000.^[citation needed] The tanning business is a five-billion dollar industry.^[citation needed]

United Kingdom



During medieval and Elizabeth times the only people who had tans were those from the working class. The upper classes had pale skin, indicating they did not have to labor in the fields



Greece and Rome



Women of these countries sometimes put their health at risk to make sure their skin was pale. They painted their faces with lead paints and chalk. A few centuries later women even used arsenic (a strong poison) to have pale skin.

Europe



In the 1960's, French fashion designer Coco Chanel is thought to be the first person to make a tan fashionable. Much earlier, after the industrial Revolution, when transport to holiday destinations became more available, the beginning of a change in attitudes began to take place. People could afford to take holidays and spend time in the sun (getting a tan) and the association with wealth changed the way society viewed a tan.

Asia



In many Asian countries a tan is still undesirable because the people that are most tanned are those that work in the fields. People who are wealthier do not spend time in the sun unprotected, making pale skin more desirable. There are still places today where women attempt to lighten their skin (the Japanese sometimes use powders made of crushed pearl).



Australia



This country still carries a reputation for sun worship. You only have to think of statements like “sun-bronzed Aussie” that are used frequently in the media and general discussion. This reputation has come at a price, with Australia recording the highest rate of skin cancer in the world. This is most unfortunate because the average Australian is light-skinned with fair hair. Therefore, most susceptible to damage from the sun’s rays.

RDK Melanoma Foundation acknowledges that this resource has been contextualized and reproduced with permission from Cancer Council Victoria.’



Activity 1

Create an imaginary line in the front of the classroom. Ask all those students who like to get suntans to stand all the way to the right side of the line; ask all those who do not like to get suntans to stand to the left side of the line.

Now tell students that you are going to classify them according to how tan they actually like to get.

Divide the line into five sections. Have students place themselves in the space that corresponds to how deep a tan they like to get. The right end will represent a very dark tan. The line then will progress to have spaces represent a dark tan, moderate tan, a light tan, and the left end will represent no tan.

Record the numbers of students at the various points on the line and have the class convert the numbers to percentages.

Have students write the reasons they placed themselves at certain positions on the imaginary sun line. After learning about skin cancers and photoaging, do they think that they will change their attitude about tanning or not worry about it until later.

Optional: Students may also survey students in other classes. They can analyze and graph their data to determine student body awareness of sun smart behaviors and calculate measures of central tendency and dispersion.



Activity 2

Make copies of the three articles attached to this lesson for your students: “Florida Proposed Ban On Tanning Beds For Teens”, “The World Health Organization recommends that no person under 18 should use a sunbed”, “Sunbeds, tanning and UV exposure”. Discuss the information as a class. Students will then use what they learn to complete the following activity.

Review the following points:

Indoor tanning can be as harmful as outdoor tanning, at least in terms of photoaging.

Tanning beds use bulbs that release UVA, and small amounts of UVB rays. While UVA rays do not cause burning, they penetrate very deeply into the skin and do cause wrinkling and premature aging of the skin.

UVA rays damage the retina of the eye and suppresses the immune system.

Indoor tanning beds cause DNA damage and, therefore, some scientists believe that these sun beds can cause cancer if there is excessive exposure.

Together as a class develop a questionnaire to discover information about tanning beds and salons.

Use the information that has been learned about sun safety and exposure to UV rays to develop the questions.

Have the students form small groups and together investigate local tanning salons.

Using the questionnaire, have them interview the manager.

Discover the type of bulbs that are used in the salon,

Learn how often a person typically stays under the light,

Discover whether or not people ever burn; do they use protective lotion before entering the tanning bed, etc.

Determine if the salon has written information about the beds. **If so**, have the students ask for copies of the brochures.



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In addition, if students want to gather more information they can surf the web using key words to find sources. A great way to obtain accurate information is to call upon local dermatologists to discover their thoughts and views on the safety of tanning salons.

Have the groups report their findings back to the class. Then, using the following steps, have the class decide whether or not the information that each group received from the salons is reliable.

1. From where did the information come?

Identify who or what organization gave you the information. Who wrote it or published it, and when. If it is oral, what are the qualifications of the person delivering the information.

2. Is it a primary source or a secondary source?

A primary source is information being delivered from a person who has experienced something first hand. A secondary source relates someone else's experience or knowledge.

3. If it is a secondary source, where did that source get its information?

4. Is the source an expert in the field?

What is the background of the person, his/her reputation; is he or she respected.

5. Is there a hidden purpose to what the source says?

Sometimes information is given for a reason other than the one that seems obvious: publicity, making a sale. This can distort the truth.

6. Is the information old? Does that matter?

The date of information matters if it is information that needs to be continually updated, such as type of light bulbs used in tanning salons.



Florida Proposed Ban On Tanning Beds For Teens

Posted by Jane Akre

Monday, March 30, 2009 10:06 AM EST



Kayla Collier was a beauty pageant contestant when she first started visiting tanning salons at the age of 15. She was concerned the bright lights on stage would make her look ghostly and a nice tan was what many contestants at Miss Florida Teen USA displayed.

But her mother noticed a scab on her back, which turned out to be skin cancer.

Now Miss Florida Teen USA, Collier, 18, is joining state lawmakers in speaking out in support of a proposal to ban tanning bed use for people under the age of 16 in Florida. She spoke to the legislature which is in session in Tallahassee.

"I know teenagers that go every day, every week, twice a day sometimes to tanning beds," she said. "I do believe that it did play a part in my skin cancer."

If the legislation passes in Florida, it would become the latest among 17 states including Hawaii considering a ban on indoor tanning by young teens. Her mother, Claire Collier, fully supports Kayla's campaign.

"Do you really realize that your daughter or son – after just a few times in the tanning bed – could have melanoma? I didn't" she says.

Under SB 546, teens 16 and 17 must provide written parental consent witnessed by a tanning operator before using any one of 7,100 tanning beds in Florida.

Needless to say, shop owners in the state fear an impact on their business and want the state legislature to mind its own business.



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“God made us to naturally tan. If you were on an island, you would tan to protect yourself from the sun’s harmful rays,” says Brandi Botts of Tan Lines Studio in Cape Coral **to First Coast News**.

But lawmakers cite studies that show too much tanning, especially in young people can harm the skin and lead to skin cancer.

Naturally, people don't like government intrusion in their lives. But experts are beginning to agree that the UV exposure from tanning beds is linked to an increase in the risk of melanoma by 75 percent – according to the Skin Cancer Foundation. The biggest risk is for those who first use a tanning bed before the age of 35.

The World Health Organization doesn't believe tanning beds are safe for young people and promotes banning their use. **The American Academy of Dermatology** also believes their use should be restricted to anyone under the age of 18.

Florida could join at least 29 states that have some sort **of restriction on tanning salon use** by minors, whether it restricts the age to 14 and above, or bans the use of tanning beds outright, as Texas and Vermont do for anyone under the age of 18.

One girl puts it best in a blog- she knows from the location of the skin cancer she got in her 20s that it could have only come from a tanning bed. #

Find this article at:

<http://www.injuryboard.com/national-news/florida-proposed-ban-on-tanning-beds-for-teens.aspx?googleid=259978>

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The World Health Organization recommends that no person under 18 should use a sunbed

17 MARCH 2005 | GENEVA -- Today, the World Health Organization (WHO) is highlighting that sunbed use poses a risk of skin cancer, and that no person under 18 years of age should use a sunbed. It is known that young people who get burnt from exposure to UV will have a greater risk of developing melanoma later in life, and recent studies demonstrate the direct link between the use of sunbeds and cancer.

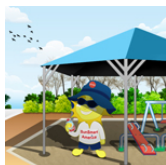
WHO highlights its recommendations as many people, especially young women in developed countries, prepare to get a tan in anticipation of summer.

Worldwide, WHO says, there are an estimated 132 000 cases of malignant melanoma (the most dangerous form of skin cancer) annually, and an estimated 66 000 deaths from malignant melanoma and other skin cancers. These figures continue to rise: in Norway and Sweden, the annual incidence rate for melanoma is estimated to have more than tripled in the last 45 years, while, in the United States, the rate has doubled in the last 30 years. Growth in the use of sunbeds, combined with the desire and fashion to have a tan, are considered to be the prime reasons behind this fast growth in skin cancers.

Worldwide, the incidence of melanoma varies more than 150-fold. The highest rates are found mainly in those nations where people are fairest-skinned and where the sun tanning culture is strongest: Australia, New Zealand, North America and northern Europe. One in three cancers worldwide is skin-related; in the United States, that figure is one in two. There are an estimated 1.1 million annual cases of skin cancer in the United States.

"There has been mounting concern over the past several years that people and in particular, teenagers are using sunbeds excessively to acquire tans which are seen as socially desirable. However, the consequence of this sunbed usage has been a precipitous rise in the number of skin cancer cases," said Dr Kerstin Leitner, WHO Assistant Director-General responsible for environmental health. "We are therefore calling attention to this fact and we would hope that this recommendation will inspire regulatory authorities to adopt stricter controls on the usage of sunbeds."

Some sunbeds have the capacity to emit levels of ultraviolet (UV) radiation many times stronger than the mid-day summer sun in most countries. At present, however, only a few countries have effective regulations on sunbeds or their use. Belgium, France and Sweden have legislation, limiting the maximum proportion of UV-B (the most dangerous component of UV radiation) in the UV output to 1.5% (a similar level of the carcinogenic UV that is emitted by the sun). In France the regulations require all UV radiation-emitting appliances to be declared to the health authority, minors under the age of 18 are banned from their use, trained personnel must supervise all



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commercial establishments and any claim of health benefit is forbidden. The State of California in the United States prohibits anyone under 18 from using sunbeds/tanning salons. Often, however, effective implementation of regulations remains a challenging issue. WHO encourages countries to formulate and reinforce laws in order to better control the use of sunbeds such as the ban of all unsupervised sunbeds operations.

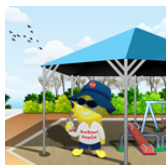
Some of the main consequences of excess UV exposure include skin cancers, eye damage and premature skin ageing. A study in Norway and Sweden, for example, found a significant increase in the risk of malignant melanoma among women who had regularly used sunbeds. Furthermore, excessive UV exposure can reduce the effectiveness of the immune system, possibly leading to a greater risk of infectious diseases.

Acute effects of UV radiation on the eye include cataracts, pterygium (a white colored growth over the cornea) and inflammations of the eye such as photokeratitis and photoconjunctivitis. This is why protective goggles are recommended when using a sunbed.

Only in very rare and specific cases, WHO counsels, should medically-supervised sunbed use be considered. Medical UV devices successfully treat certain skin conditions such as dermatitis and psoriasis. These treatments should only be conducted under qualified medical supervision in an approved medical clinic and not unsupervised either in commercial tanning premises or at home using a domestic sunbed.

WHO's recommendation on sunbed usage is part of its overall efforts to protect the health of those people who could be overexposed to UV radiation. WHO, along with its partners, the International Commission on Non-Ionizing Radiation Protection, the United Nations Environment Programme and the World Meteorological Organization, have elaborated the Global Solar UV Index, which is now used in many countries including Argentina, Australia, Czech Republic, Finland, France, Germany, Greece, Israel, Mexico, Norway, Poland, Portugal, Spain, Sweden and Switzerland, and has recently been adopted for general usage in the United States and Canada.

"In all of our actions, we are clear: avoid excess exposure to UV and, when you have to be in the sun, protect your skin. Malignant melanomas, other cancers and conditions are the consequence of not taking the proper precautions," added Dr Leitner.



Fact sheet N°287

March 2005

Sunbeds, tanning and UV exposure

The desire to acquire a tan for fashion or cosmetic purposes has led to a large increase in the use of artificial tanning sunbeds in, mostly, developed countries. Use of sunbeds for tanning continues to increase in popularity, especially among young women.

Sunbeds used in solariums, and sun tanning lamps, are artificial tanning devices that claim to offer an effective, quick and harmless alternative to natural sunlight. However, there is growing evidence that the ultraviolet (UV) radiation emitted by the lamps used in solariums may damage the skin and increase the risk of developing skin cancer.

Some 132 000 cases of malignant melanoma (the most fatal kind of skin cancer) and over two million cases of other skin cancers occur worldwide each year. One in every three cancers diagnosed worldwide is a skin cancer. Most skin cancers are attributable to over-exposure to natural UV radiation. A fact sheet indicating the adverse health consequences from natural (i.e., sun) UV exposure issued by the World Health Organization (WHO) can be found at the link to the right.

This fact sheet is the complement of the above, providing information on artificial sources of UV. Primary among these artificial sources is sunbeds, and this fact sheet looks at the health consequences of sunbed usage and how they can be managed. Information for this fact sheet comes from WHO sponsored meetings and workshops, recent scientific literature, reviews by WHO Member States and the recommendations of international NGOs.

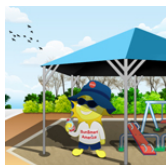
Health consequences

Skin cancers

Exposure to UV, either naturally from the sun or from artificial sources such as sunlamps, is a known risk factor for skin cancer. Short-wavelength UVB (280-315 nm) has been recognized for some time as carcinogenic in experimental animals, and there is increasing evidence that longer-wavelength UVA (315-400 nm) used in sunbeds, which penetrates more deeply into the skin, also contributes to the induction of cancer. A study conducted in Norway and Sweden showed a significant increase in the risk of malignant melanoma among women who had regularly used sunbeds.

Additional exposure to UV from sunbeds is likely to enhance the well-known detrimental consequences of excessive solar UV exposure. There is no evidence to suggest that UV exposure from any type of sunbed is less harmful than UV exposure from the sun. Pre-cancerous actinic keratoses and Bowen's disease have also been found in sunlight-protected but sunbed exposed skin in fair-skinned users after just two to three years of regular sunbed use.

Skin ageing, eye damage and other adverse health effects



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Any excessive exposure to UV, not just from sunbeds, can result in structural damage to human skin. In the short term this damage can be due to burning, fragility and scarring and in the longer-term as photoaging. Photoaging, caused by the breakdown of collagen in the skin by UV, manifests itself as wrinkling and loss of elasticity.

The effects of UV on the eye include cataracts, pterygium (a white colored growth over the cornea) and inflammation of the eye such as photokeratitis and photoconjunctivitis. Furthermore, excessive UV exposure can suppress the immune system, possibly leading to a greater risk of infectious diseases.

Some skin types are unsuitable for tanning

Based on their susceptibility to sunburn, skin types are classified into six different classes (I – VI). People with skin type I have the lightest skin and may not have even a light tan after repeated exposure to a sunbed. Instead, their skin generally suffers sunburn reactions. People with skin type I are more likely to use sunbeds than people with darker skin.

The ability of the consumer to recognize their skin type as not suitable for sunbed use is based on either self-diagnosis, or worst, a bad experience of sunburn. For this reason sunbed operator training is needed to ensure correct skin type diagnosis. While skin type II and higher can tan, skin damage can still occur following excessive exposure to UV.

Dangers associated with childhood UV exposure

Childhood exposure to UV and the number of times a child is burnt by UV, either from the sun or from sunbeds, are known to increase the risk of developing melanoma later in life. For this reason, particular attention is required to ensure children and adolescents do not use sunbeds. The United States Department of Health and Human Services has classified exposure to sunlamps or sunbeds as "known to be carcinogenic to humans" and states that the longer the exposure, the greater the risk, especially to people exposed before the age of 30 years.

About sunbeds

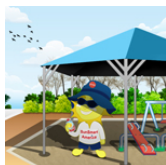
Sunbeds emit predominantly UVA and some UVB, both of which can damage the DNA in cells of the skin. However, in recent years, lamps of sunbeds have been manufactured that produce higher levels of UVB to mimic the solar spectrum and speed the tanning process. While UVB has well known carcinogenic properties and whose excessive exposure is known to lead to the development of skin cancers, recent scientific studies suggest that high exposures to the longer wavelength UVA could also have an impact on skin cancer occurrence.

As with sun exposure, recent studies indicate a relationship between the use of sunbeds and malignant melanoma as well as non-melanoma skin cancers such as squamous and basal cell carcinomas. Thus, the consequences of regular sunbed use may include disfigurement from removal of skin cancers, early death if the cancer is a malignant melanoma, as well as substantial costs to national health systems for screening, treating and monitoring skin cancer patients.

Health benefits

Aside from tanning, many people claim that use of sunbeds helps them to be more relaxed and have a feeling of wellbeing. It is difficult to quantify such claims.

While sunbed use may increase vitamin D synthesis, predominantly from the UVB component, for the majority of the population, incidental exposure to the sun, combined with normal dietary intake of vitamin D, provides



adequate vitamin D for a healthy body throughout the year. If people require more vitamin D than the sun can provide (for example, because of living in polar regions) this should be supplemented through diet rather than sunbed use.

Only in very rare and specific cases should the medically-supervised use of sunbeds be considered. Medical UV devices successfully treat certain skin conditions such as dermatitis and psoriasis. These treatments should only be conducted under qualified medical supervision in an approved medical clinic and not unsupervised either in commercial tanning premises or at home using a domestic sunbed.

There is a widespread false belief that a tan acquired using a sunbed will offer good skin protection against sunburn for a holiday in a sunny location. In reality, a tan acquired using a sunbed offers only limited protection against sunburn from solar UV. It has been estimated that a sunbed tan offers the same protective effect as using a sunscreen with a sun protection factor (SPF) of only 2-3.

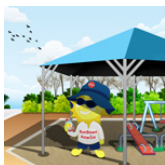
Strong case for effective regulations governing sunbed use

As long as sunbeds are available to the public, there is a need for guidelines or legislation to reduce the risks associated with their use. WHO encourages governments to formulate and enforce effective laws governing the use of sunbeds. In countries where voluntary industry codes of practice exist, the sunbed owners have generally not shown significant capacity to self regulate effectively.

Of highest regulatory priority should be the restriction of use by persons under 18 years as well as banning unsupervised trained personnel. WHO recommendations are consistent with those of the International Commission on Non-Ionizing Radiation Protection (ICNIRP) and the European Society for Skin Cancer Prevention (EUROSKIN).

The key reasons why regulations are necessary

- Increase in the number of unsupervised commercial sunbeds - Without trained staff and adequate health care advice, the potential for harm to the uninformed consumer is much greater. This, combined with competitive pricing strategies such as unlimited sessions within a specific time frame, increases the likelihood of skin damage.
- High intensity of UV output - Some machines have the capacity to emit very high levels of UV, many times stronger than the midday summer sun in most countries. In a largely unregulated industry where training of staff is not mandatory, this increases the health risks considerably.
- Exposure time and intervals between tanning sessions - Reasonable sunbed use includes keeping to recommended exposure times (which depends on the type of machine used) and having sufficiently long breaks between tanning sessions. Normally at least 48 hours are needed between tanning sessions for repair of UV-induced DNA damage in skin cells
- Eyewear - UV protective eyewear (such as goggles) must be worn during tanning sessions to protect the eyes.
- Effect of certain drugs and cosmetics - Some drugs, for example anti-depressants, antibiotics, psoralens, antifungals, and antidiabetics as well as some cosmetics make the skin more photosensitive and therefore decrease the time it takes for the skin to burn.
- The size of the skin area exposed - Modern 'clam-type' sunbeds and canopies can expose more skin area to UV than outdoor situations, therefore increasing the health risk. Here young people, , are more sensitive to UV-induced damage from this "all-over" tanning.



ICNIRP recommendations

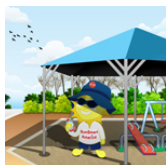
In its 2003 publication ICNIRP recommends against the use of UV-emitting appliances for tanning or other non-medical purposes. ICNIRP states that the following groups are at particularly high risk of incurring adverse health effects from UV, and therefore should be particularly counseled against the use of tanning appliances:

- People who have skin phototypes I or II;
- Children (i.e., less than 18 years of age);
- People who have large numbers of nevi (moles);
- Persons who tend to freckle;
- Individuals who have a history of frequent childhood sunburn;
- People who have pre-malignant or malignant skin lesions;
- People who have sun-damaged skin;
- Those who are wearing cosmetics. These may enhance their sensitivity to UV exposure; and
- Persons taking medications. In this case they should seek advice from their physician to determine if the medication will make them UV-sensitive.

Action of the World Health Organization

INTERSUN, the Global UV project, is a collaborative project between WHO, the United Nations Environment Programme, the World Meteorological Organization, the International Agency on Cancer Research and ICNIRP that aims to reduce the burden of disease resulting from exposure to UV radiation. The project assesses and quantifies health risks, and develops an appropriate response through guidelines, recommendations and information dissemination. Beyond its scientific objectives, INTERSUN provides guidance to national authorities and other agencies about effective sun awareness programmes. These address different audiences such as occupationally exposed people, tourists, school children and the general public.

In 2003 WHO published a brochure entitled "Artificial tanning beds: risks and guidance" providing advice to the public, operators of sunbed facilities and member states on how sunbeds could be managed to protect public health.



Further information

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Name _____

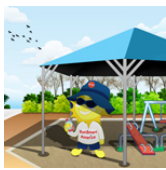
This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



Activity 4

Copy and distribute **Activity 4 Handout**. Read and discuss the story either within groups or with the class.

Ask students to write a sixty-second speech in which they try to convince their peers to be sunsmart. Personal stories can be powerfully persuasive.



Activity 4 – Handout



Brittany Lietz Patient Profile

17-year-old Brittany Lietz was ready for her prom. She had the perfect dress, the perfect date and what she thought was the perfect tan. When she selected her long, white dress, she convinced herself that a deep, dark tan would be the perfect accessory.

To get this tan, Brittany started indoor tanning regularly for prom and kept going after the event. Her mom, however, warned her against using tanning beds and repeatedly asked her to stop. Like a typical teenager, Brittany went against her mother's wishes and used tanning beds anyway - four times a week for three years. Reflecting back on that experience, Brittany says she was addicted to tanning. And Brittany believes her addiction led to her fight against the deadliest form of skin cancer, melanoma, just three years later.

"I never felt dark enough," she said.

Brittany continued tanning, and at the age of 20, her mom noticed a mole on Brittany's back and encouraged her to visit a dermatologist. But Brittany was convinced the mole wasn't a serious problem.

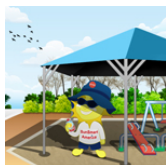
"I went tanning the week before my doctor's appointment," she said.

The dermatologist cut out the mole and sent it away for testing. The results showed Brittany had stage II melanoma. She took time off from college to undergo surgery and complete a 6-week recovery. The long surgery left her with a 7-inch scar. To find out if the cancer had spread, the surgeon also removed seven lymph nodes under her arm.

"I was in a lot of pain," she said. "My pictures after surgery are so graphic that some people have become physically ill looking at them."

Just a year after the surgery, Brittany competed for and won the title Miss Maryland 2006. Part of her motivation was to bring more awareness to skin cancer detection and prevention.

"Teenagers just don't listen to their parents. That's why it's our job as skin cancer survivors to step up," she said.



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Brittany has brought her passion for skin cancer awareness to a variety of audiences. She's encouraged her fellow Miss America contestants to stop tanning, testified before legislators in states considering bills to limit access to tanning salons by minors, and spoken to numerous groups, most commonly high school students.

"I tell the students that if indoor tanning is such a risk, why would they take it?" Brittany said.

Now 24 - four years after her diagnosis - Brittany says the experience of battling cancer at such a young age has impacted her view on life.

"Life happens and life has done a lot of different things for me," she said. "As bad as my melanoma was, I also have been very fortunate to serve as Miss Maryland, which gave me a forum to educate my peers about the risks of indoor tanning".

Brittany hopes to pursue a career in sonography - performing ultrasounds on patients. She's also completed a season as a Washington Redskins cheerleader. But Brittany's primary focus is on her health. She visits her dermatologist for regular skin exams and undergoes regular head CT scans and chest x-rays. Since her original surgery, Brittany has had more than 20 suspicious lesions removed.

"I don't want anyone to go through what I have. I keep reminding people that skin cancer can happen to you. You're not immune to this," she said. "This is such a preventable cancer. Wear a sunscreen of a sun protection factor (SPF) of at least 30 every day. Avoid tanning beds and get screened by a dermatologist regularly."

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Activity 5

These advertisements were obtained from the internet. Divide the class into small groups and assign one advertisement for each group. Have the students analyze the advertisements and answer the questions below and hand them in:

Questions:

What is the main message of the advertisement?

What emotions or attitudes are the advertisers trying to appeal to?

Does the information in the advertisement “match” with the other information you have learned about being SunSmart?

Does it make you feel that using this product would be safe?

What makes people want to get a tan?

Advertisement #1

Tanning equipment emits light that contains just about 40% less UVB light. Tanning beds provides for the control of exposure time as well as the ratio of UVB rays to UVA rays, allowing you to get to a ‘perfect balance’ between the two. Tanning beds can dramatically decrease your chances of getting burned since this type of tanning equipment was made to filter out majority of the UVB rays.

Some of the UV radiation from tanning beds is also beneficial for the body’s production of Vitamin D, an important factor in maintaining a constant level of calcium in the blood and in controlling its absorption.

Advertisement #2

The same UV light emitted by tanning beds is also being used in phototherapy – the medical process used to help treat conditions such as psoriasis. What’s more, the same light in higher intensities is now being used to treat indicators of seasonal affective disorder or SAD.

SAD is a health condition that is presently being treated with regular antidepressant medications like Prozac and Zoloft, but more and more health professionals are turning to exercise and light therapy which are seen to be more effective. Patients are made to either sit in front of high-intensity lightboxes or wear specially-designed



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lightvisors for a minimum of 30 minutes a day – similar to what tanners do when using tanning beds. The FDA does not allow tanning bed manufacturers to claim that their products can alleviate SAD, but a strong body of evidence supports the fact that exposure to bright light similar to that which is emitted by tanning beds helps the brain restrain the release of depressant hormones, making a person feel happier.

Advertisement # 3

Contrary to popular belief, self-esteem is directly related to health. Many tanners claim that getting a tan helps them feel better about their appearance and interact more confidently with other people. People with more upbeat dispositions generally have better bioprocesses and are able to lead healthier lives.

Advertisement # 4

Your tan will be deep, luscious, golden brown, and will last you three times as long as other tans. You will save time and money by not having to tan as often. With high-pressure tanning you will have a rich healthy looking tan in just one hour each month.

Advertisement # 5

Achieve the ultimate tan with (x) & get the darkest tan possible in a fraction of the time. If you want to look great & tan for this weekend or before your next trip make sure to check us out. Perfect for any event where you want to look your best and want a great looking tan fast including weddings, proms and more.



Activity 6

Where Do You Stand?

Label each corner of the room with the following statements **strongly agree, agree, disagree, strongly disagree** and the middle of the room with **unsure**.

Read out the first statement about sun protection.

Ask the students to move to the place in the room that best illustrates their opinion about each statement.

Ask individuals to explain their positions.

Repeat with each statement. Some suggestions are listed as starters – add more of your own.

At the end of the activity have the students write down their explanation for each of their positions to hand-in.

Getting a suntan is important to me.

A suntan makes you look thinner.

Friends think a suntan is a good idea.

A suntanned person looks healthier.

It is easier to enjoy summer once you get a suntan

A solarium tan is safer than a tan caused by ultraviolet (UV) radiation from the sun.

Refer to the background information to check responses if necessary.

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Activity 7

What Do The Others Think?

Ask small groups of students to develop a survey to learn about other students' attitudes to sun tanning. Students could interview others students in their grade.

Ask students to present their results in a creative way to the rest of the group (i.e. a role play or a chart with tables).

Brainstorm a list of the dangers of sun tanning and also ideas for sun protection.

Students should publicize their results and ideas in the school newsletter

They could also develop short fun sun protection messages for the daily bulletin or weekly school newsletter. Remind students that as their messages will be published they need to be accurate and appropriate for the intended audience.

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Activity 8

How Are You Influenced?

Students role-play, in pairs, one of the following roles (then swap and play the other).

Person A: Invite your friend to the beach, river or pool or where kids hang out, to work on their tan. Your friend is new to the area and you try to convince him/her that a tan is essential to be part of the group.

Person B: You are new to the area and want to meet more people your age. You have skin that burns easily and have doubts about accepting your friend's invitation.

As a class, discuss and record how students felt in each of the two roles. Have the student hand-in their answers to the discussion questions. Questions for discussion might include:

Were you able to resist your friend's invitation, and if so, how did you feel?

What tactics did your friend use to attempt to persuade you, and how did those tactics make you feel?

What are the reasons for and against accepting the invitation? Which reasons are most important? Why? Would those reasons always be the most important?

How did you feel while you were trying to persuade your friend to accept the invitation? What could you do to help your friend meet people without placing them in this position?

What strategies could be used by Person B to make friends without compromising their health?

Variation

Create and conduct role-plays like the one above, asking students to think of different scenarios related to sun exposure, for example, in relation to other sun tanning situations, using fake tanners, hat wearing and sunscreen use.

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SunSmart/Skin Cancer Education Resources

Richard David Kann Melanoma Foundation

2751 South Dixie Highway, Suite 2A

West Palm Beach, Fl. 33405

Telephone: 561-655-9655

Facsimile: 561-655-9650

<http://www.melanomafoundation.com>

Australia's SunSmart Program

Council of Victoria

1 Rathdowne Street

Carlton South, Victoria 3053

Australia

Telephone: 6103 9635 5000

<http://www.sunsmart.com.au>

AMC Cancer Research Center

1600 Pierce Street

Denver, CO 80214

303-233-6501

800-321-1557

<http://www.amc.org>



High School Sun Safety Educational Resource

American Academy of Dermatology

930 North Meacham Road

P.O. Box 4014

Schaumburg, IL 60173-4965

Telephone: 888-462-DERM (462-3376)

<http://www.aad.org>

American Cancer Society

1599 Clifton Road, NE

Atlanta, GA 30329-4251

Telephone: 800 ACS-2345 (227-2345)

621 Clearwater Park Rd

West Palm Beach, FL 33401

561-366-0013

<http://www.cancer.org>

Bottom of Form

California Department of Health Service

Skin Cancer Prevention Program

P.O. Box 942732 MS-662

Sacramento, CA 95814

Telephone: 916-322-2154

<http://www.CA5ADAY.com>



High School Sun Safety Educational Resource

Centers for Disease Control and Prevention

Division of Cancer Prevention and Control

4770 Buford Highway

Chamblee, GA 30341

Telephone: 1-888-842-6355, 770-488-4751

<http://cdc.gov/chooseyourcover/>

Melanoma Education Fund

7 Jones Street

Peabody, MA 01960

Telephone: 978-535-3080

e-mail: MEF@skincheck.com

<http://www.skincheck.com>

National Cancer Institute

Cancer Information Service

1-800-4-CANCER

<http://www.nci.nih.gov>

National Safety Council Environmental Health Center

1025 Connecticut Avenue, NW

Suite 1200

Washington, DC 20036

Telephone: 800-557-2366 ext. 2; 630- 285-1121

<http://www.nsc.org/ehc/sunsafer.htm>



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SHADE Foundation

<http://www.shadefoundation.org/>

Sun Safety Alliance

413 North Lee Street

Alexandria, VA 22314

Telephone: 703-837-4202

<http://www.sunsafetyalliance.org/>

The Skin Cancer Foundation

245 Fifth Avenue

Suite 1403

New York, NY 10016

Telephone: 212-725-5176

<http://www.skincancer.org>

U.S. Environmental Protection Agency

Sunwise School Program

1200 Pennsylvania Ave. (6205J)

Washington, DC 20460

Telephone: 202-272-0167

<http://epa.gov.sunwise>



Health Care Services Information

For skin cancer screenings and early detection services:

Make an appointment with a dermatologist. For a list of dermatologists in Palm Beach County, call the Richard David Kann Melanoma Foundation at 561-655-9655. For other locations, contact your local Medical Society or the American Academy of Dermatology for a list of dermatologists in your area.

If you do not have health insurance or have trouble getting an appointment, call the following resources in Palm Beach County or in the State of Florida:

Palm Beach County Health District 561-659-1270

Florida KidCare for Uninsured Children 1-888-540-KIDS

Your local office of the Department of Children and Families

Call your local hospital(s). Many community and university hospitals and clinics sponsor free skin cancer screenings each year.

The Quality Health Rights Program of the Palm Beach County Medical Society 561-433-3940.

In the State of Florida, there is a law called Direct Access that entitles HMO or EPO members to see a dermatologist without a referral from your plan or your primary care physician. For more information, call the Florida Society of Dermatology in Tallahassee at 850-531-8373.