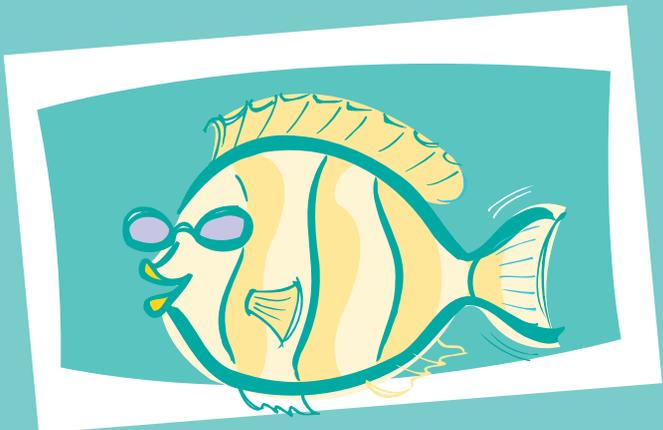
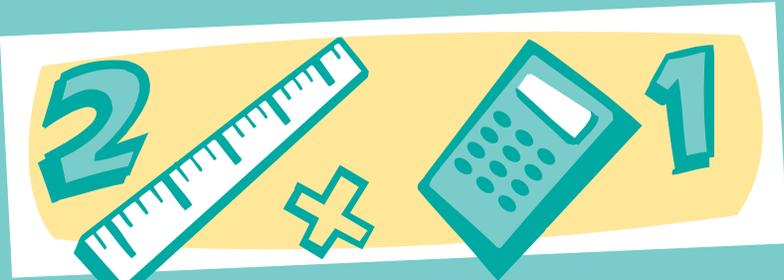
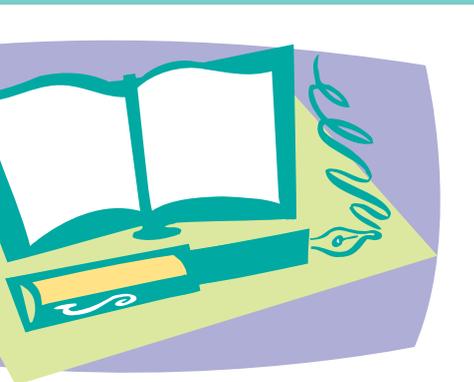
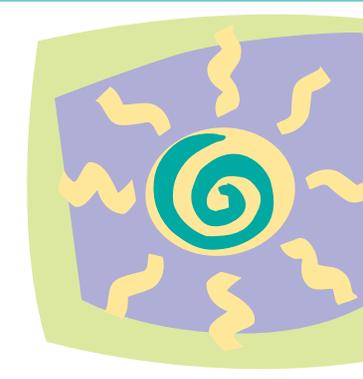
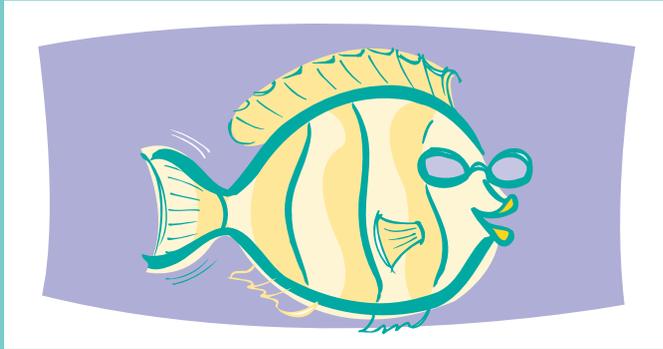
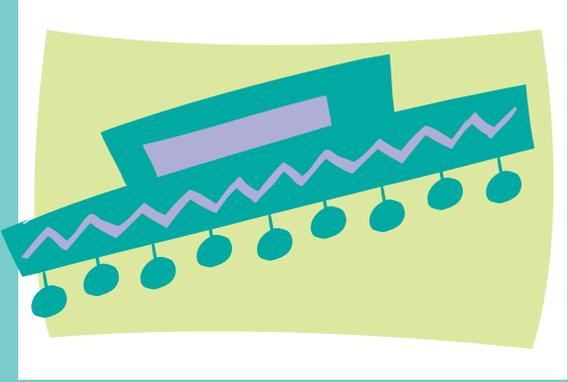


grades 3-5



SunWise[®]
a program that **radiates** good ideas
A Partnership Program of the U.S. Environmental Protection Agency
www.epa.gov/sunwise





Sun Scoop

Directions

Use a video camera, computer, pencil and paper, or any other recording device to develop a news story. Story angles could include the health effects of overexposure to the sun, sun protection, or how the UV Index works.

Gather the facts (who, what, when, where, why, and how) using resources such as the Internet, encyclopedias, or your local newspaper. Interview an expert. This could be a science teacher, nurse, or local weather forecaster. Write a lead and the rest of the story. As a guide, answer the three questions below. Be prepared to share your news story with your class.

Talk with the editor of your school or local paper about printing the news story. Ask your teacher or principal if you can read it over the PA system during morning announcements.

Vocabulary Words

Story Angle—The topic or approach to a news story.

Who, What, When, Where, Why, and How—Questions that form the basic building blocks of any news story. A story might answer some or all of these questions.

Lead—The most important part of the story. The lead is always the first paragraph and it explains some of the Who, What, When, Where, Why, and How questions.

Questions

- 1 What questions will you ask the expert? Justify your reasoning regarding how you chose those particular questions.
- 2 What is the most important part, or lead, of your story? Give three reasons why you chose that particular lead.
- 3 Construct an argument to support why you chose the facts you selected to include in your story.



Sun Scoop

Estimated Time

30–60 minutes

Supplies

Video camera, computer, or
any other recording device (optional)
Paper and pencils
Research materials (encyclopedias,
newspapers, or computers)

Learning Objective

The objective of this activity is to have students work collaboratively to conduct short research projects to understand that: 1) the sun is a star and appears larger and brighter than other stars because it's closer to Earth; 2) the sun is important to humans and other life on Earth; and 3) the sun can also be harmful to life on Earth, especially humans.

This activity uses research and journalism to raise awareness about the science and risk of the sun's harmful UV rays and about ways to be sun safe. Assess what students have learned by asking them to include the following in their story: at least three ways to be sun safe; the effects of ignoring these precautionary measures; and some background information about the sun and UV radiation.

Directions

Provide students time to research the sun and the ways it helps and harms life on Earth. If possible, arrange for a science teacher, nurse, or local weather forecaster to come to your classroom to serve as an “expert” for students to interview. Have the students respond to the questions below as a class and then write their stories individually or in groups.

Questions and Answers

- 1 What questions will you ask the expert? Justify your reasoning regarding how you chose those particular questions. *Students should list 3–5 questions and provide justification for each.*
- 2 What is the most important part, or lead, of your story? Give three reasons why you chose that particular lead. *Students should select one fact as the lead and give three reasons why they chose that particular lead.*
- 3 Construct an argument to support why you chose the facts you selected to include in your story. *Students should list the facts they will include in their story and construct an argument to support why each fact was chosen.*

Additional Resources

The National Elementary Schools Press Association.
www.nespa.ua.edu

The New York Times Newspaper in
Education Program.

www.nytimes.com/learning/teachers/NIE/



SunWise Word Scramble

Directions

Unscramble this list of words.

- nsu _____
- cksluobn _____
- nrsbun _____
- lmeo _____
- sgalusnses _____
- nlgosevelestirh _____
- tha _____
- niksreclac _____
- aebhc _____
- ratluloietvysra _____
- swlrknie _____
- neswisu _____
- coptert _____
- luberlma _____
- esdha _____
- znoeo _____
- ntirfelceo _____
- mmnaaleo _____
- ntvopeerin _____

Questions

- 1 What does UV stand for? Can you see or feel UV rays?

- 2 What forms a thin shield around the Earth and protects us from the sun's harmful UV rays?

- 3 At what time is the sun at its highest point in the sky?

- 4 During what hours should you limit your exposure to the sun?

- 5 What are some effects of too much exposure to the sun?



SunWise Word Scramble

Estimated Time

15–20 minutes

Directions

By unscrambling the SunWise words the students will be exposed to key vocabulary associated with sun safety. Have a sun safety discussion before you assign the task to start the students thinking about certain sun safety vocabulary.

Questions and Answers

- 1 What does UV stand for? Can you see or feel UV rays? *Ultraviolet. No.*
- 2 What forms a thin shield around the Earth and protects us from the sun's harmful UV rays? *The thin shield around the Earth is known as the ozone layer.*
- 3 At what time is the sun at its highest point in the sky? *Solar noon.*
- 4 During what hours should you limit your exposure to the sun? *You should limit your exposure to the sun between 10 a.m. and 4 p.m.*
- 5 What are some effects of too much exposure to the sun? *Some of the effects of too much exposure to the sun are wrinkles, skin cancer, and eye damage.*

Unscrambled SunWise Words

sun
sunblock
sunburn
mole
sunglasses
long sleeve shirt
hat
skin cancer
beach
ultraviolet rays
wrinkles
sunwise
protect
umbrella
shade
ozone
reflection
melanoma
prevention

Physical Education Variation

The teacher should write the 19 scrambled words from the Tool Kit activity in chalk on a concrete play surface without letting students see the words. Students line up about 50 yards away and take turns trying to decipher the first word. The first student runs to the first word. If s/he can decipher the word, s/he writes it next to the scrambled version. If s/he doesn't, s/he runs back and hands the chalk to the next student until all words have been revealed. Teachers might want to mention the words to students ahead of time when discussing sun safety with the class. Older students may choose to create their own word scramble. Divide students into groups. One group creates 15 scrambled sun safety words; another group must unscramble the words. Groups then trade off. The first group timed as the fastest wins. Larger classes might require 30 or more words. Additional words can be found throughout the SunWise Tool Kit.



SunWise Virtual Vacation

Directions

People all over the world enjoy the sun in very different ways. Some may enjoy the beach, while others may take hiking trips in the mountains. No matter where you go, it is important to be SunWise.

Plan a pretend class trip to anywhere in the world. Use the suggested websites on this page to “travel” to your chosen place. Make sure you pack everything you need to protect yourself against the sun’s harmful UV rays. Write a letter to your classmates and tell them about your trip and what you have learned. In your letter, answer the 10 questions below. Read your letter to the class.

Have fun on your trip! You’ll discover many things about different people, their countries, and the sun.

Some suggested vacation spots:

Galapagos

www.galapagos.org

Puerto Rico

www.seepuertorico.com

Spain

www.spain.info

India

www.incredibleindia.org

Kenya

www.porini.com/kenya.html

Australia

www.australia.com

Antarctica

www.expeditions.com/destinations/antarctica

Other resources to help you pick a place to visit:

www.geographia.com

<http://kids.nationalgeographic.com>

Resources to learn about the weather at your vacation spot and SunWise practices:

www.weather.com

www.intellicast.com

www.weatherbase.com

www.epa.gov/sunwise/kids/kids_actionsteps.html



SunWise Virtual Vacation

When writing your letter to the class, answer the following questions:

- 1 How did you protect your skin and eyes while on your vacation?
- 2 What did you pack for your trip?
- 3 What did you do on your trip?
- 4 What do people in the country (or state) that you visited do for recreation? Where do they vacation?
- 5 What kind of outdoor activities do they like?
- 6 What is the climate like?
- 7 How do the local people stay cool (or warm)?
- 8 How do people protect their skin and eyes?
- 9 What kind of clothes do people wear?
- 10 What types of houses do people live in?



SunWise Virtual Vacation

Estimated Time

45 minutes (students may work in preassigned groups of 3 or 4 students)

Supplies

Map of the world
Computers

Learning Objectives

This activity gives students the opportunity to learn about different cultures, develop Internet research skills, and think about their sun exposure during recreational activities (and associated risks). Assess the students by asking them to compose a letter to their classmates that includes the answers to the questions and tips for sun safety.

Directions

Divide the students into small groups. Discuss possible “vacation” spots they would like to visit. Have each group pick a location and use the suggested websites to research the answers to the questions. You may want to develop a list of possible sites and make sure there are no duplicate locations. Students will write a letter to their classmates to report on their findings, being sure to include the answers to the 10 questions.

Questions and Answers

Answers should reflect students’ research on their location.

- 1** How did you protect your skin and eyes while on your vacation? *Use sunscreen, wear sunglasses, wear a wide-brimmed hat, etc.*
- 2** What did you pack for your trip?
- 3** What did you do on your trip?
- 4** What do people in the country (or state) that you visited do for recreation? Where do they vacation?
- 5** What kind of outdoor activities do they like?
- 6** What is the climate like?
- 7** How do the local people stay cool/warm?
- 8** How do people protect their skin and eyes?
Answers should reflect students’ research on their location and include precautionary actions such as using sunscreen, wearing sunglasses, and limiting time in the midday sun.
- 9** What kinds of clothes do people wear?
- 10** What types of houses do people live in?

Physical Education and Social Studies Variation:

After choosing their vacation location, have students try or demonstrate the native sports and activities of that country. This activity can be coordinated with social studies lessons or an all-school cultural event. Try bocce ball, petanque, speedaway, rugby, badminton, croquet, or soccer, or make up your own versions of rugby, lacrosse, and games that will be new to participants and age appropriate. They can even dress in the country’s native clothing or discuss how citizens in these countries protect their skin. This event might also be used as an outreach vehicle to include parents or community members who have experience with activities native to other countries.



The Sun Shines Around the World

Directions

Use encyclopedias, magazines and periodicals (National Geographic, for example), books, and the Internet to research your assigned country and answer the questions below. Share your findings with your class.

Vocabulary Words

Custom—A habit or an established way of doing something.

Nomadic people, like the Bedouins of Jordan, wear clothing that covers almost all of their skin. This clothing is traditional, and also helps them stay protected from the sun.

Questions

- 1 What is the name of the country you researched?
- 2 What continent is the country in?
- 3 What types of houses do the people of this country live in? How do the houses help the people of this country protect themselves from the sun?
- 4 What kinds of clothes do the people of this country wear?
- 5 Describe one custom that people in this country practice to protect themselves from the sun.
- 6 What are three differences between your state or hometown and the country you researched?

In Latin America and Spain, many people take siestas or noontime breaks to stay out of the sun when its rays are most powerful.



The Sun Shines Around the World

Estimated Time

20–45 minutes

Supplies

Map of the world (for display)
Research materials (encyclopedias, travel or geography magazines, or computers)

Learning Objective

This activity teaches students about a variety of ways people all over the world protect themselves from the sun's harmful UV rays. Assess comprehension by having students describe ways individuals from the country investigated practice sun safety.

Directions

Assign each student or pair of students a country to research or have them choose their own. Instruct students to respond to the questions. Have students share their findings with the class.

Questions and Answers

Answers should match the country researched.

Additional Resources

www.geographia.com

Geographia offers a variety of information on housing, clothing, and customs of countries throughout the world.

<http://kids.nationalgeographic.com>



Sun Myths from the Internet

Directions

While exploring the Internet, read a story about the origin of the sun according to Japanese history. Also visit the SunWise website to learn about the Action Steps for Sun Protection.

Visit the website “*Windows to the Universe.*”

Follow the steps to find the story:

- Open the internet browser on your computer.
- Type this address into the Location Toolbar:
www.windows.ucar.edu
- When you are at a home page called “Windows to the Universe,” click on the “*Culture*” tab.
- Now click on “*Myth.*”
- Now click on “*Sun.*”
- At the top of the page you can choose a reading level.
- Finally, click “*Japanese: Amaterasu*” to read the story about the sun from Japanese culture.

Now visit the SunWise website:

- Type this address into the Location Toolbar:
www.epa.gov/sunwise/kids/kids_actionsteps.html
- Scroll down the page to read about the many ways to stay protected while in the sun.

Vocabulary Words

Myth—An invented story; a belief that is often false about a person, place or thing; a traditional or legendary story, especially one that involves gods or heroes and explains certain occurrences.



Sun Myths from the Internet

Estimated Time

30–45 minutes

Supplies

Computers

Learning Objective

While becoming familiar with the Internet, the students will learn about how different cultures perceive the origins and history of the sun. The students will also visit the SunWise website to gain further exposure to the World Wide Web while reading about the various steps they will take to be safe in the sun. Assess what they have learned by asking them to write their own story about the origin of the sun, making sure to incorporate the SunWise Action Steps.

Directions

- Visit the website “*Windows to the Universe*,” www.windows.ucar.edu. Follow the steps on the Student Page to find the story. Suggest a reading level according to their abilities.
- Now visit the SunWise website, www.epa.gov/sunwise/kids.html. Follow the link for the SunWise Action Steps.
- Have students write a story about the origin of the sun.



SunWise Fashion Show

Directions

Hold a fashion show with your classmates. Model clothes that are good examples of what to wear to protect against the sun's harmful ultraviolet (UV) rays in all seasons.

Choose spring and summer clothing such as knee-length shorts, wide-brimmed hats, long-sleeved or elbow-length shirts, and sunglasses. Don't forget the colorful zinc oxide. Choose fall and winter clothing such as long-sleeved shirts, long pants, light jackets or coats, hats, and sunglasses.

Decide who will be the fashion show's hosts. The hosts will explain to the audience what each model is wearing and point out the outfit's sun-safe features.

Another group of students will DJ the fashion show. They will play the music for each model's walk down the runway or stage.

Questions

- 1 Why should you wear protective clothing in the sun?
- 2 Can you get a damaging dose of sun in the fall and winter? Why or why not?

Don't forget that your lips absorb UV rays and are particularly cancer prone. Wear lip balm with SPF 30+ sunscreen when you go outside.



SunWise Fashion Show

Estimated Time

Preparation time at teacher's discretion
1 hour

Supplies

Summer clothes
Fall and winter clothes
Music/Radio
Runway or stage area
SunWise items such as sunglasses,
umbrella, wide-brimmed hats,
zinc oxide, SPF 30+ sunscreen, etc.

Learning Objective

The objective of this activity is to familiarize students with some of the clothing that protects against the sun's harmful rays. Assess the students' understanding by asking them what they wear during different seasons. Ask students what they will wear now that they know how to be SunWise.

Directions

Hold a fashion show. Students will model good examples of clothes to wear in each of the seasons which protect against the sun's harmful UV rays. The fashion show can be held indoors or outdoors, depending on the weather.

Discuss the different clothes that are worn throughout the year and other items to wear. Depending on the class size, have three students model clothes for each season. Spring and summer clothing could be knee-length shorts, wide-brimmed hats, long-sleeved or elbow-length shirts, and sunglasses. Fall and winter clothing can include long-sleeved shirts, long pants, light jackets or coats, hats, and sunglasses. Students can carry a bottle of SPF 30+ sunscreen and zinc oxide (for the nose).

Choose students to be the fashion show hosts. The hosts will explain to the audience what each model is wearing.

Another group of students will DJ the fashion show. They will play the music for each model's walk down the runway or stage.

Questions and Answers

- 1 Why should you wear protective clothing in the sun? *Suggested answer: to prevent skin cancer, wrinkled skin, sunburn, and eye damage.*
- 2 Can you get a damaging dose of sun in the fall and winter? *Yes. Why? The sun's rays are still strong in the fall and winter, and UV is reflected off snow and ice. UVA is consistently present all year.*



UV Frisbee® Fun

Directions

Before having UV Frisbee Fun, predict how much time it will take the UV Frisbee to change color once it is exposed to sunlight.

Cover the UV Frisbee as you carry it outside, and start timing as soon as you expose it to the sun.

Questions

- 1 How long did the UV Frisbee take to change color once it was exposed to sunlight? How close was your prediction?
- 2 What made the UV Frisbee change color?
- 3 Can UV light do the same thing to your skin?
- 4 What did you learn to do for yourself by covering the UV Frisbee?
- 5 What are two ways that you can protect yourself from the sun's harmful UV rays?





UV Frisbee® Fun

Estimated Time

30 minutes

Supplies

UV Frisbee

Stop watch

Additional non-UV Frisbees (optional)

Learning Objective

The objective of this activity is to demonstrate the effects of UV radiation while exercising. Assess the students' understanding of the effects of UV radiation by asking them to list some possible outcomes of overexposure to the sun's harmful UV rays.

Directions

Use the UV Frisbee included in the SunWise Tool Kit to show students the effects of UV radiation. For information about UV radiation and the health effects of sun overexposure, please review the *SunWisdom* section of the Tool Kit. Go over this information with the class prior to the activity.

Before you begin your UV Frisbee Fun, ask the students to predict the amount of time it will take the UV Frisbee to change color once it is exposed to outdoor light. Cover the UV Frisbee as you carry it outside and start timing as soon as you expose it to the sun. Once exposed to the sun, the Frisbee will begin changing color almost immediately.

Ask the students to remember their predictions and compare them to the actual time it took the UV Frisbee to change colors. Discuss the effects of UV radiation and the importance of being protected from the sun's harmful UV rays.

Questions and Answers

- 1 How long did the UV Frisbee take to change color once it was exposed to sunlight? How close was your prediction? *The UV Frisbee should change color almost immediately. Answers will vary.*
- 2 What made the UV Frisbee change color? *Exposure to the sun's UV rays.*
- 3 Can UV light do the same thing to your skin? *Yes.*
- 4 What did you learn to do for yourself by covering the UV Frisbee? *Protect my skin and eyes from the sun's harmful UV rays.*
- 5 What two ways can you protect yourself from the sun's harmful UV rays? *Answers will vary and may include using sunscreen SPF 30 or higher, wearing long-sleeved shirts, seeking shade, and wearing sunglasses.*

Now, search for a sun-safe spot on your playground and have some UV Frisbee Fun! If your class is large, use additional Frisbees.



Personal Skin Assessment

Risk Factor	Yes	No
Light or fair skin		
Blue, green, or hazel eye color		
Blonde or red hair		
Freckles when in the sun		
Burn when in the sun		
40 or more moles		
Family or personal history of skin cancer		
Living in the Sunbelt area of the United States where UV rays are very strong (Arizona for example)		
Living in high altitudes		
Two or more blistering sunburns		
Taking medications that increase the skin's photosensitivity (some antibiotics and antihistamines)		

Adapted from Project S.A.F.E.T.Y., *Risk and Risk Factors*, Elementary Safety Lesson Five.



Personal Skin Assessment

Estimated Time

30 minutes

Supplies

Markers or crayons
Magazines (optional)
Glue (optional)

Learning Objective

After completing this activity, students will understand the need to be careful about exposure to the sun's harmful UV rays. Students who possess several risk factors will develop a heightened sense of their own risk. To assess student comprehension of the risk and prevention message, form groups of three to make fliers, posters, or collages for the classroom or school that depict individuals practicing sun safety.

Directions

Teachers are cautioned to be sensitive to the privacy concerns of students during this activity. Also be aware that students may answer no to all the questions, thereby allowing for the misconception that they are not at risk for overexposure to UV radiation. Instruct students to evaluate their own risk factors, checking off yes or no in each column. Have students raise their hands in response to each question as you read it aloud. Using the fact sheets (located in the *SunWisdom* section of the Tool Kit) as your guide, discuss the prevention steps with the class. Stress the importance of protection from the sun's harmful UV rays, especially for individuals who have several risk factors. Remind students that everyone is equally at risk for eye damage.

The skin is the largest, most visible organ of the body and is the fastest growing part of the body. It makes up 16 percent of the body's weight.

Sun Safety Survey

Directions

Are you SunWise? Are your classmates? Is your family? Find out what you know about being SunWise.

Sun Safety Survey Questions

Circle an answer for each of the questions below.

Self

Do you think the sun can hurt your skin?

yes no

I think I look healthier with a tan.

true false

When I am outside in the sun during the summer, I wear sunscreen.

true false

Sun protection factor (SPF) indicates the level of protection a sunscreen provides from UVB. Which SPF number is the minimum I should use?

4 30 40 I don't know

I need to use the most sun protection when the UV Index is:

1 5 11+ I don't know

School

How sun-safe are our school grounds?

not sun-safe

somewhat sun-safe

sun-safe

100 percent sun-safe

What are the rules for using sunscreen and wearing hats in our school?

Home

How many people in your home have ever had a sunburn? How many times?

Do people in your home wear sunscreen, sunglasses, or a hat? If so, when?

After completing your individual sun safety survey, follow along as your class tallies up its responses. When you are finished, answer the questions below.

Questions

- 1 What percentage of the class believes the sun can hurt their skin?
- 2 What percentage of the class believes they look healthier with a tan?
- 3 Make a bar graph depicting the percentage of the class that chooses each sunscreen SPF. What was the most popular response? How many more people choose the most popular response over the least popular response?
- 4 What percentage of the class chose a UV Index level of 11+ as requiring the most sun protection?
- 5 How many of your classmates think your school grounds are at least "sun-safe?"
- 6 Read the example SunWise word problem, and then write your own.

My family of five went camping this summer. My brother and my father both got sunburned. Forty percent of my family was not SunWise.

My family of _____ went to _____ this summer. My _____ got sunburned. _____ of my family was not SunWise.

Sun Safety Survey

Estimated Time

20 minutes

Supplies

Pencil

Calculator (optional)

Graph paper (optional)

Learning Objective

The objective of this activity is to help students understand the variety of ways they can protect themselves from the sun's harmful UV rays. After completing this activity, students will understand that using sunscreen, hats, sunglasses, and the UV Index are examples of SunWise behavior. Assess whether the students understand they must protect themselves from the sun's harmful UV rays by asking them whether the activity taught them something new about being sun safe. Finally, ask your students what they will do differently now.

Directions

In preparation for this activity, create a simple chart on the chalkboard listing the Sun Safety Survey questions (including all possible answers) along the left vertical axis and numbers by five along the top horizontal axis. After the students answer the questions on their individual Sun Safety Survey, compile the data from the entire class. Appoint one student to be the reporter and a different student to be the recorder. The reporter should read each question aloud. The students should respond as a group by a show of hands. The recorder should record the responses, and with the help of the teacher, calculate totals for Sun Safety Survey questions. Now, instruct your class to make some statistical generalizations about their SunWise behavior.

Questions and Answers

- 1 What percentage of the class believes the sun can hurt their skin? *Answers will vary.*
- 2 What percentage of the class believes they look healthier with a tan? *Answers will vary. Ask if people look healthier with wrinkles. Explain that up to 90 percent of visible changes to the skin commonly thought to be caused by aging are actually caused by sun exposure.*
- 3 Make a bar graph depicting the percentage of the class that chooses each sunscreen SPF. What was the most popular response? How many more people choose the most popular response over the least popular response? *Answers will vary.*
- 4 What percentage of the class chose a UV Index level of 11+ as requiring the most sun protection? *Answers will vary.*
- 5 How many of your classmates think your school grounds are at least "sun-safe?" *Answers should include the total number of students with responses "sun-safe" and "100 percent sun-safe."*
- 6 Read the example SunWise word problem, and then write your own. *Answers will vary.*



SunWise Word Problems

Directions

Answer the following word problems about sun-safe products and behavior.

- 1 If you buy a dozen wide-brimmed hats for \$132.00, how much do you pay per hat?
- 2 If you stand on the corner and sell the hats you bought in question #1 for \$15 each to people at risk of being overexposed to the sun's UV rays, how much will you make in profit?
- 3 Sunscreen A comes in a 36 oz. bottle and sells for \$6.24. Sunscreen B comes in a 28 oz. bottle and costs \$6.08. Sunscreen C comes in a 42 oz. bottle and costs \$6.85. Which sunscreen is cheaper per ounce?
- 4 A new SunWise school is being built for grades 1–6. A school board regulation states that each first and second grade classroom can have no more than 20 students. Classrooms for the other grades (3–6) can have no more than 28. If the community where they're building the school has 220 SunWise students in the first and second grade, and 616 in the other four grades, how many rooms should the new building have?



SunWise Word Problems

Estimated Time

40–50 minutes

Learning Objective

This activity will reinforce the prevention message of sun safety. Assess whether students understand the importance of protecting themselves from harmful UV rays by asking them to make a list of all the SunWise products they can think of. Use items from the problems as a starting point.

Directions

Have the class solve the following word problems. (The variables in the problems below are not scientifically accurate.)

Did you know that more than one million Earths could fit inside the sun?

Questions and Answers

- 1 If you buy a dozen wide-brimmed hats for \$132.00, how much do you pay per hat? *\$11.00*
- 2 If you stand on the corner and sell the hats you bought in question #1 for \$15 each to people at risk of being overexposed to the sun’s UV rays, how much will you make in profit? *\$48.00*
- 3 Sunscreen A comes in a 36 oz. bottle and sells for \$6.24. Sunscreen B comes in a 28 oz. bottle and costs \$6.08. Sunscreen C comes in a 42 oz. bottle and costs \$6.85. Which sunscreen is cheaper per ounce? *Sunscreen C*
- 4 A new SunWise school is being built for grades 1–6. A school board regulation states that each first and second grade classroom can have no more than 20 students. Classrooms for the other grades (3–6) can have no more than 28. If the community where they’re building the school has 220 SunWise students in the first and second grade, and 616 in the other four grades, how many rooms should the new building have? *33 classrooms*



Measure Your Shadow

Directions

Using the sun as your light, you are going to trace your shadow. But first, on a piece of paper, make a data chart with two columns and three rows. On the top of your data chart label one column “time” and the other “measurement.” On the side of your data chart at the start of each row, write “first shadow,” “second shadow,” and “third shadow.”

Choose a partner and stand in the sun. With a piece of chalk, your partner will trace your shadow starting from your feet. Write your name inside your traced shadow and record the time and the length measurement of your shadow in your chart.

Later in the day, have your partner trace your shadow again. Remember to position your feet in the same spot and face in the same direction as before.

Repeat a third time. Remember to face the same direction as before.

Questions

- 1 What makes your shadow?
- 2 Do you always have a shadow?
- 3 Have you ever seen your shadow at night? How did that happen? Can you think of other ways you might see your shadow at night?
- 4 Is your shadow always the same size? If your shadow isn't always the same size, give your reasoning for your shadow being a different size.
- 5 Record the number of hours and minutes between your first, second, and third shadow measurement. Make a prediction about what will happen to the length of your shadow over this time period. (You will be checking your answer as you record your measurements!)
- 6 What is the difference between the measurements?
- 7 What is the shadow rule?





Measure Your Shadow

Supplies

Chalk (have a different color for each time the students trace their shadow)
Paper and pencil
School yard with dark cement or blacktop
A clear sunny day
Watch or clock
Yardstick/meter stick

Estimated Time

At least three 15-minute intervals during one day

Learning Objective

The objective of this activity is to have students understand the movements of the Earth over the course of a day and demonstrate why this movement causes a shadow. Have students collect evidence on how shadows change from morning to evening, and how they can tell by the length of their shadows what times of day they should seek protection from the sun's harmful UV rays. Ask the students to predict how their shadows will change during the day. Once the day is over, ask them to compare their prediction to the actual shape and size of their shadows. Assess what they have learned by asking them to explain the shadow rule.

Directions

Instruct the students to make a data chart on a piece of paper to record the time they traced the shadows and the size of the shadows. Also, each student should record his/her own height for comparison. The data chart will need two columns and three rows. The top of the data chart should be labeled "time" and "measurement." The side of the data chart should be labeled "first shadow," "second shadow," and "third shadow." If necessary, draw the data chart on the board to show how it should look.

You should take the students outside three times during the day (once around noon). Have students choose a partner. Instruct the students to trace their partner's shadow using a piece of chalk on the cement surface of the schoolyard. They should begin tracing the shadow from the feet. They should write their names inside their shadows. Students should use the yardstick to measure the length of the shadows each time they trace them. Students should record the measurement and time in their charts.

When everyone goes back outside later in the day, have each student stand on the feet of their own shadow and have their partner retrace their new shadow on top of the original. Again, they should record the measurement and time in their data charts.



Measure Your Shadow

Discussion

Discuss how shadows are formed. A shadow is a dark figure or image cast onto the ground by our bodies intercepting the light of the sun. Both the sun and the moon can create shadows. We have noticeable shadows throughout the day; however, our shadows are much shorter closer to noon when the sun is overhead. Explain to the students that when their shadows are long (during the early and late parts of the day) the sun is not as intense. When their shadows are short (during the middle part of the day) the sun is more intense, and they are at a greater risk from the sun's damaging UV rays. Also mention that visible light, not UV rays, causes shadows. UV rays are present even on cloudy days. Nevertheless, the shadow rule is a good indication of UV intensity. Tell the students the shadow rule, "Watch your shadow. Short shadow, seek shade!"

Questions and Answers

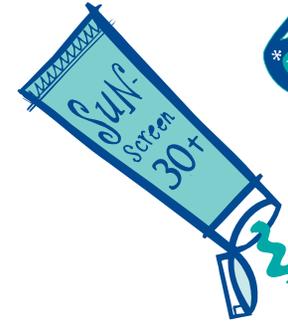
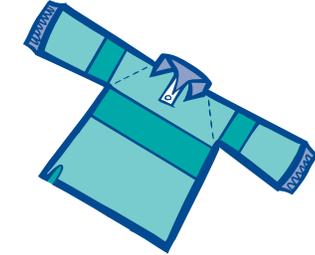
- 1 What makes your shadow? *The rays of the sun shining on one side of your body generate a shadow that is projected away from your body.*
- 2 Do you always have a measurable shadow? *Yes. When the sun is overhead at noon, the projection of the shadow is much shorter than it is during the rest of the day.*
- 3 Have you ever seen your shadow at night? How did that happen? Can you think of other ways you might see your shadow at night? *Yes. When there is a full moon, the light can create a shadow, but the moon does not emit UV rays. Other sources of light, such as a street lamp, can create a shadow, but they also do not emit UV rays.*
- 4 Is your shadow always the same size? If your shadow isn't always the same size, give your reasoning for your shadow being a different size. *No. Your shadow is long in the early morning and late afternoon; your shadow is short during midday. This is because of the Earth's movement over the course a day.*
- 5 Record the number of hours and minutes between your first, second, and third shadow measurement. Make a prediction about what will happen to the length of your shadow over this time period. *Students should count the hours and minutes on a watch or clock to find the number. They should predict that the length of their shadow will change throughout the day.*
- 6 What is the difference between your measurements? *Students should subtract to find the answer.*
- 7 What is the shadow rule? *"Short shadow, seek shade!"*



Speedy Sun Relay Race

Directions

One student in your group will be the “model.” The model’s job is to dress in sun-safe clothes as fast as possible with the help of the team. Across the field will be a pile of clothes. Each team member, besides the model, will take turns running to the pile, selecting one sun-safe item, and running it back to the model. The first team to have a completely SunWise model is the winner!



Don't forget that your lips absorb UV rays and are particularly cancer prone. Wear lip balm with SPF 30+ sunscreen when you go outside.



Speedy Sun Relay Race

Estimated Time

30 minutes

Supplies

A field or other open space with 20 yards of room
One set of the following SunWise and non-SunWise clothes and items for each team:

Long-sleeved shirt (preferably with collar)

Long pants (optional)

Hats (wide-brimmed, cowboy)

Sunglasses

Empty bottles of sunscreen, some with
SPFs of 30 and higher, some with lower SPFs

Umbrella (optional)

Various other articles of clothing that are
not sun safe, like tank tops, shorts, baseball caps,
visors, etc.

Note: Make sure that the clothes are large enough for each student to put on and take off easily.

Learning Objective

This activity will challenge students to think quickly about sun-safe behavior by selecting correct sun-safe clothes in a competitive environment. Students will learn that wearing SunWise clothes is another way to be safe in the sun, and they'll get some exercise, too! As an assessment, have the class examine the non-winning teams' clothes after the race and suggest corrections.

Directions

Organize the class into teams of five or more and line them up at the start of the racecourse. Place the piles of clothes at the other end of the racecourse.

Have each team select one student to be the SunWise model. This student will stay at the start point of the race, donning sun-safe clothes. The other team members should each take turns running to the pile of clothes, selecting one item, and running it back to the model to wear.

The first team to have a completely and appropriately dressed SunWise model, and that is able to explain why the model is SunWise, is the winner. The SunWise models should be wearing a protective hat, long-sleeved shirt, long pants (optional), and sunglasses, and be carrying a bottle of sunscreen of SPF 30 or higher.



Sun Science

Directions

The sun's light has an effect on everything. Try these experiments to see what the sun's effect will be over a week's time.

- Put a sheet of newspaper by the window in the direct sunlight. Put another piece in the shade.
- Place a whole piece of fruit, such as an apple, in the sun, and another in the shade.
- Put some solid objects with interesting shapes on a piece of construction paper. You can try spelling your name with plastic letters. Leave the paper in the sun for a week, then remove the objects.



Questions

- 1 How does the sun affect the newspaper over the course of a week?
- 2 How does the sunlight affect the fruit's decomposition?
- 3 What do you see on the construction paper after a week?





Sun Science

Estimated Time

Ten minutes to set up the experiments, one week for them to run, and 30 minutes for discussion.

Supplies

Newspaper

Construction paper

Paper or plastic letters or other uniquely shaped objects

Apple or other thick-skinned fruit

Learning Objective

This activity will make a mental and visual connection for students between the damaging effects that the sun has on the experimental objects, and what the sun's harmful UV rays can do to their own skin cells. The students will also have visual evidence of how being protected will guard against or prevent sun damage. Assess the students' comprehension by asking them to predict the effects of the sun on their skin, eyes, and other objects over a period of time. Students should show understanding of the differences of the sun's effects on organic versus inorganic matter.

Directions

Have the students place a sheet of newspaper in a sunny spot and another in the shade. Leave the paper for a week. Place an apple or other whole

piece of fruit in the sun as well. Have the students place some uniquely shaped solid objects on pieces of construction paper in the sun. They can use plastic letters to spell out their names. Leave the objects out for a week. After a week, view and discuss the results of these experiments with the class. Once the students have had the opportunity to view the sun's effect on various items, ask them to imagine how the sun affects their skin when they are exposed to its harmful rays without protection. Remind them that the fruit is made of cells just like they are.

Questions and Answers

- 1 How does the sun affect the newspaper over the course of a week? *The newspaper left in the sun is faded /yellowed. Assess whether students make the connection between the fading of the paper, and the sun's possible effects on their own skin.*
- 2 How does the light affect the fruit's decomposition? *The fruit in the sun decomposed faster than the fruit left in the shade. Assess whether the students comprehend that the sun's harmful UV rays can have some of the same unhealthy effects on their own skin cells.*
- 3 What do you see on the construction paper after a week? *The objects protected the portion of the paper they covered from fading. Discuss how clothing helps protect their skin from the sun.*

The Ozone and Me

Directions

Label the following on the illustration of the Earth and its atmosphere:

Earth

Sun

Earth's four major systems:

- 1 Geosphere—the solid portions of Earth
- 2 Hydrosphere—the liquid water components of Earth

3 Atmosphere—the gases surrounding Earth

4 Biosphere—the zone of life on Earth

Two parts of the atmosphere:

- 1 Stratosphere
- 2 Troposphere

Ozone layer

Sources of ozone depleting substances (ODS)

Many popular household products like air conditioners used to use chlorofluorocarbons (CFCs) and hydrochlorofluorocarbons (HCFCs). Both of these chemicals damage the Earth's protective ozone layer. Cars, trucks, power plants, and factories all emit air pollution that forms ground-level ozone or smog.





Questions

- 1 What is the stratospheric ozone layer and what does it do?
- 2 What causes the hole in the stratospheric ozone layer (ozone layer depletion)?
- 3 What human-made objects use CFCs and HCFCs?
- 4 Why are we concerned about ozone layer depletion?
- 5 What is being done to reduce the effects of stratospheric ozone layer depletion?
- 6 What is “bad” ozone? What causes it?
- 7 What happens when we are exposed to UV rays?
- 8 Create an illustrated tri-fold brochure explaining either 1) what you learned about the importance of the ozone layer; or 2) the possible causes of ozone depletion.

This activity is adapted from *Sun Smart*, published by the Anti-Cancer Council of Victoria.



The Ozone and Me

Estimated Time

30 minutes

Learning Objective

The objective of this activity is to teach students basic information about the ozone layer, the possible causes of its depletion, and how it is connected with their personal health and well-being. Students should understand that the Earth has four major systems that interact in multiple ways to affect the Earth's surface, materials, and processes. This interaction also affects humans and their existence on Earth. Assess whether the students understand the connection between the depletion of the ozone layer and the need to protect themselves from the harmful rays of the sun. Ask them if their behavior will change once they've completed the lesson and how.

Directions

Instruct the students to label the following in the illustration of the Earth and its atmosphere:

Earth

Sun

Earth's four major systems:

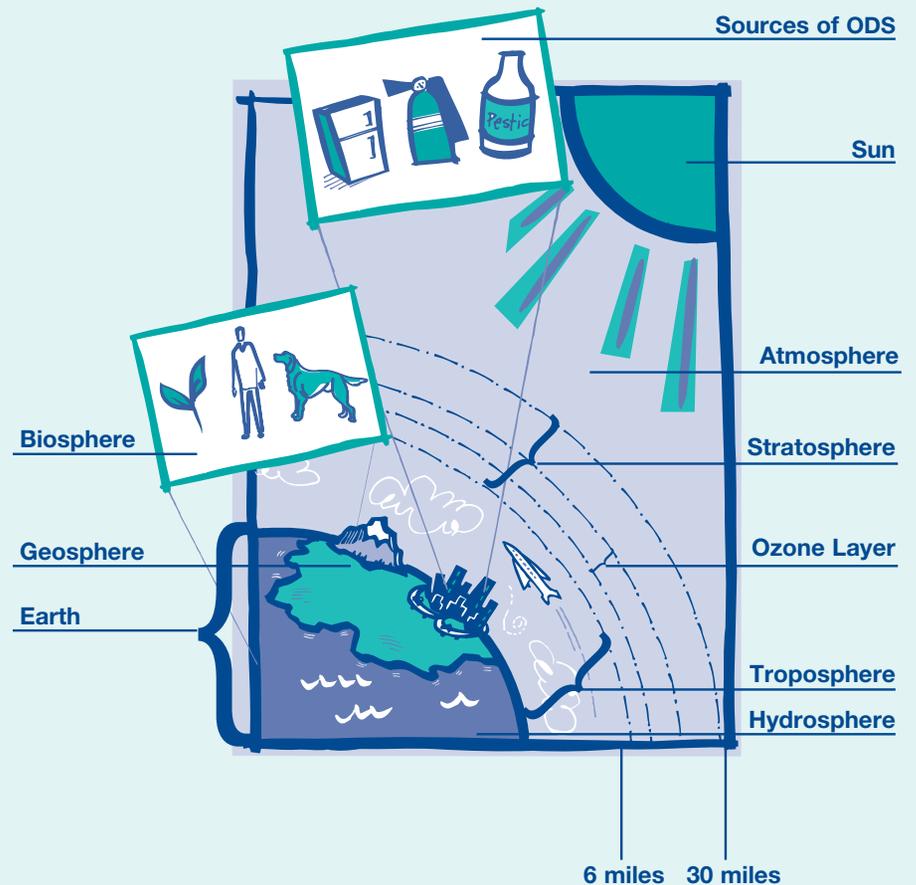
- 1 Geosphere—the solid portions of Earth
- 2 Hydrosphere—the liquid water components of Earth
- 3 Atmosphere—the gases surrounding Earth
- 4 Biosphere—the zone of life on Earth

Two parts of the atmosphere:

- 1 Stratosphere
- 2 Troposphere

Ozone layer

Sources of ozone depleting substances (ODS)





Discussion

Discuss each of the Earth's systems and how they interact. Then move to a more specific discussion of the atmosphere and explain the presence of ozone in the atmosphere and discuss why ozone is good up high and bad nearby, its effects, and what measures are being taken because of ozone layer depletion.

For more information on ozone, see the *SunWisdom* section of the Tool Kit.

Questions and Answers

- 1 What is the stratospheric ozone layer and what does it do? *A thin layer of naturally occurring gas in the stratosphere that protects life on Earth from the sun's harmful UV rays.*
- 2 What causes damage to the stratospheric ozone layer (ozone layer depletion)? *The use of chlorofluorocarbons (CFCs) and other chemical substances.*
- 3 What human-made objects use CFCs and HCFCs? *Air conditioners, refrigerators, fire extinguishers, aerosols, foams, and solvents.*
- 4 Why are we concerned about ozone layer depletion? *Ozone protects us from harmful UV rays. Without ozone, these rays can easily pass through the atmosphere and reach the Earth's surface. For each 1 percent drop in ozone levels (i.e., 1 percent increase in ozone layer depletion), scientists estimate about 1 percent more UVB will reach the Earth's surface.*
- 5 What is being done to reduce the effects of stratospheric ozone layer depletion? *Countries around the world have signed a treaty—The Montreal Protocol—promising to reduce and then eliminate use of ozone-depleting substances.*
- 6 What is “bad” ozone? What causes it? *Bad ozone is found in the troposphere and contributes to smog. High levels can make it difficult to breathe and cause eye irritation and headaches. Emissions from cars, some factories, gasoline vapors, and chemical solvents, in the presence of strong sunlight and hot weather, form bad ozone.*
- 7 What happens when we are exposed to UV rays? *Exposure to UV rays can cause sunburn, skin cancer, eye damage, immune system suppression, and premature aging of the skin.*
- 8 As a culminating activity, have students create an illustrated tri-fold brochure explaining either 1) what they learned about the importance of the ozone layer; or 2) the possible causes of ozone depletion. *Students should use what they have learned to create an illustrated brochure based on their understanding.*

For additional information, visit:
www.ucar.edu/learn/1.htm



UV Frisbee® Science

Directions

Observe the UV Frisbee as your teacher applies a variety of materials to the plastic covering it. Record your observations on the data chart below. Write down the color of the UV Frisbee after each material is applied to it. Use the data you have collected to answer the questions.

	Frisbee Color (before exposure)	Frisbee Color (after exposure)
material #1		
material #2		
material #3		



Questions

- 1 Did the UV Frisbee change color when exposed to normal room light? Why or why not?
- 2 What happened to the color of the UV Frisbee in the sunlight? After five minutes?
- 3 What effects did the different sunscreens have on the UV Frisbee?
- 4 What did you note about the part of the UV Frisbee that was covered with cotton cloth?

This activity is adapted from the Project LEARN module *Ozone In Our Atmosphere*.



UV Frisbee® Science

Estimated Time

30–40 minutes

Supplies

UV Frisbee

Sunscreen (a variety of protection levels including baby oil, SPF 30, and SPF 50)

2" x 2" swatches of cloth (a variety of materials including cotton, UV blocking fabric, and “tan-through” fabric)

Plastic wrap or hotel shower cap

Stop watch

Newspaper

Masking tape and marker

Learning Objective

The objective of this activity is to demonstrate the effects of UV radiation and the effectiveness of different ways to block UV radiation. After completing this activity, students should be able to describe at least three ways they can protect themselves against harmful UV radiation. After the lesson, ask students whether their behavior will change and how. (See the *SunWisdom* section of the Tool Kit for a list of sun safety tips.)

Directions

Use the UV Frisbee included in the SunWise Tool Kit to show students the effects of UV radiation and the effects of different materials on blocking out UV radiation. For more information about UV radiation, please review the *SunWisdom* section of the Tool Kit.

Students should watch you perform the experiment and record their observations on the data chart provided to them on the Student Page of this activity.

- Cover the UV Frisbee with a piece of clear plastic or hotel shower cap. Apply small circles of baby oil and sunscreen (each SPF level) to the plastic covering on the UV Frisbee. Use the masking tape and marker to identify each SPF level. Cover the UV Frisbee with the newspaper and take it outside. Uncover the UV Frisbee and begin timing. The unprotected area of the UV Frisbee will change color. The circle with SPF 0 baby oil will change color, but the circle with SPF 30 and above will not change color. Return to your classroom and remove the plastic with the sunscreen.
- Tape the different swatches of fabric to the UV Frisbee. Use the masking tape and marker to identify each fabric. Cover the UV Frisbee with the newspaper and take it outside. Uncover the UV Frisbee and begin timing. The unprotected area of the UV Frisbee will change color from



clear to purple. The area underneath the UV blocking fabric should not change color. Other fabrics will filter out a portion of UV depending on the thickness and tightness of the weave of the fabric. Return to your classroom and remove the fabric swatches.

- Supplemental activity: Perform a similar activity using sunglasses on the UV Frisbee.

Questions and Answers

- 1** Did the UV Frisbee change color when exposed to normal room light? Why or why not? *The UV Frisbee will not usually change color because there is very little UV radiation in indoor lighting.*
- 2** What happened to the color of the Frisbee in the sunlight? After five minutes? *The Frisbee changed from clear to purple.*
- 3** What effects did the different sunscreens have on the UV Frisbee? *Generally, results do not differ much for sunscreens with SPF 30 or higher. SPF 30 sunscreen blocks approximately 97% of the sun's UVB rays while SPF 50 blocks approximately 98%. If the sunscreen is broad-spectrum, then the UVA protection is proportional to the UVB protection. So, when coupled with the broad-spectrum claim, a higher SPF value shows higher protection against UVA.*

- 4** What did you note about the part of the UV Frisbee that was covered with cotton cloth? *Answers will vary depending on the thickness and tightness of the weave of the cloth.*

**Insects can see UV rays, but humans can't.
Flowers carry lovely UV-reflective patterns
on their petals to attract insects.**



Map a SunWise Town

Directions

You are a civil engineer, and your job is to design a new SunWise town.

Your SunWise town will need to have everything other towns need, such as a fire station, shopping mall, post office, gas station, school, and parks.

Draw a map of a town. You'll want to provide plenty of shade for the town's residents to help them avoid overexposure to the sun's harmful UV rays. Pay attention to areas like the town square and public swimming pool. How can challenging areas like these be made sun safe? Don't forget the trees! Remember to consider where the sun will be in the sky at various times of the day and mark your map with north, south, east, and west.

Also, mark all the locations where your town's residents can help themselves be SunWise. This includes stores where they can buy sunscreen, hats, sunglasses, and other sun safety necessities. Create a legend for your map.

Vocabulary Words

Civil Engineer—An engineer trained in the design and construction of public works.

Legend—The part of a map that explains the symbols used on the map.

Questions

- 1 Where are the most SunWise areas in your town?
- 2 What are the best places to be a SunWise shopper?



Map a SunWise Town

Estimated Time

40–50 minutes

Supplies

Colored pens and pencils

Ruler

Paper or poster board

Learning Objective

This activity allows students to evaluate sun protection on a larger scale. It will help students visualize the connection between their environment and sun-safe behavior. Students will need to understand the movement of the sun across the sky over the course of the day and consider that movement when they create their town.

Ask students to think about where they spend time outdoors and if those places are SunWise. Assess student comprehension by having the class write a paragraph comparing areas in their neighborhoods to

the same areas in the towns they've mapped. How are they different? How could their towns be made more sun safe?

Directions

Tell the class that they are civil engineers whose job is to design new SunWise towns. Their towns will need to have everything other towns need—a fire station, shopping mall, post office, gas station, school, and parks, for example.

The students will draw a map of their town. They should provide shade to help residents avoid overexposure to the sun's harmful UV rays. They will mark all the locations where residents can help themselves be SunWise. The students will then create legends for their maps.

Questions and Answers

- 1 Where are the most SunWise areas in your town?
Answers will vary.
- 2 What are the best places to be a SunWise shopper? *Answers will vary.*

Physical Education Variation:

Have students walk around and map their school to determine areas where additional shade would be beneficial in terms of trees and shade structures (requires paper, pen, and surface to write on). This activity can also be coordinated with other content areas (e.g., science and social studies for environmental impact and improvements

to the community). It can also be structured as a student service learning project where students could coordinate a fundraising activity to purchase trees and/or erect a shade structure. Groups can also split up, with each member responsible for identifying at least two areas that would benefit from shade.



Be a SunWise Traveler

Directions

You are planning a trip. Use maps, a world globe, and websites to research your assignment and answer the questions below. Share your findings with your class.

Vocabulary Word

Mean — The average value of a set of numbers. A mathematical value that is intermediate between other values.

Activities and Questions

- 1 Using a world map or globe, identify where you live.
- 2 Using the world map or globe, identify where you would like to visit. Why would you like to visit this location? What time of year would you like your visit to occur?
- 3 Using the UV Index maps located on the EPA SunWise website, www.epa.gov/uvindex, identify what the UV Index mean (average) is where you live at this time of the year.
- 4 Using the UV Index maps located on the World Health Organization website, www.who.int/uv/resources/link/indexlinks/en/, identify what the UV Index mean (average) is where you would like to visit and at the time of year your visit would occur.
- 5 What do you notice about your local UV Index in comparison to the UV Index at the location and time you want to visit?
- 6 Are there similarities and differences? Why?
- 7 What SunWise action steps should you take when visiting your destination?





Be a SunWise Traveler

Estimated Time

45–60 minutes (students may work individually or in small groups)

Supplies

Maps of the United States and the world
Computers
Action Steps for Sun Protection
(see *SunWisdom* section)

Learning Objective

This activity gives students the opportunity to learn about how people all over the world need to protect themselves from the sun's harmful UV rays. It will help students make connections and comparisons between their local environment and sun-safe behaviors they practice when visiting other parts of the world.

Background/Talking Points

People often travel to, or vacation in, locations with extreme UV intensity, especially in comparison to the UV intensity at that time of year in the traveler's city or town. Additionally, travelers may not realize how intense the sun is at that time of year and may not adequately prepare for the UV radiation that they are exposed to, resulting

in severe sunburns. Studies have shown that as much as 88 percent of sunburns in children occur during sunny vacations. A serious potential problem surfaces when you combine this information with the fact that sunburn is a risk factor for skin cancer. By raising awareness of the dangers specifically associated with travel/vacations to UV intense destinations, our goal is for children and their caregivers to receive no sunburns during travel/vacations.

In addition:

- UV rays are reflected by snow, sand, water, and pavement. Fresh snow may reflect up to 80 percent of the incident UV radiation. This is important at higher altitudes and latitudes. Sand and water also reflect up to 25 percent and 5 percent of UV radiation, respectively, and can increase UV exposure at the beach.
- The closer you get to the equator, the more intense the UV rays. This occurs because the sun is more directly overhead, causing a shorter distance for the sun's rays to travel through the atmosphere, and there is naturally less ozone in the stratosphere in the tropics.
- The higher in altitude you go, the more intense the UV rays become because there is less atmosphere for the UV to travel through.



Directions

Engage students by asking them if they have a place in mind that they would like to travel to someday. Or ask them if they have a friend or relative that lives far away from them (be cognizant of students that may have family in the military) that they might like to visit. Have students identify the place they would like to visit along with the time of year they would like to do this traveling. Students will identify the UV Index mean (average), both where they live and at the place they would like to visit, then make a connection or comparison of the two locations. They will then identify SunWise action steps they should take when visiting their choice of destinations. Instruct students to respond to the activities and questions individually or in pairs. Then, have them share their findings with the class.

Student Activities and Questions

Answers should reflect students' research on their location.

- 1 Using a world map or globe, identify where you live.
- 2 Using the world map or globe, identify where you would like to visit. Why would you like to visit this location? What time of year would you like your visit to occur?

- 3 Using the UV Index maps located on the EPA SunWise website, www.epa.gov/uvindex, identify what the UV Index mean (average) is where you live at this time of the year.
- 4 Using the UV Index maps located on the World Health Organization website, www.who.int/uv/resources/link/indexlinks/en/, identify what the UV Index mean (average) is where you would like to visit and at the time of year your visit would occur.
- 5 What do you notice about your local UV Index in comparison to the UV Index at the location and time you want to visit?
- 6 Are there similarities and differences? Why?
- 7 What SunWise action steps should you take when visiting your destination?

Resources to Learn More About Your Destination and SunWise Practices

www.weather.com/activities/health/skin

www.intellicast.com

www.weatherbase.com

www.epa.gov/sunwise/kids/kids_actionsteps.html

For full page maps, please see the UV Index maps located at www.epa.gov/uvindex and www.who.int/uv/resources/link/indexlinks/en/.

A SunWise Legend

Wise Heart Saves the Day¹

Once upon a time, a very long time ago, there lived a young Indian boy who was both smart and kind and who longed to make the world a better place for his people. His name was Wise Heart, and he belonged to the Cahto Indian Tribe that lived in what is now northern California. The world in which Wise Heart lived was cold and barren, with few plants or trees. During the day, his world was gloomy and grim, lit by only a faint, dim light that seemed to come from very far away. At night, his world was always cloaked in deep darkness, a darkness that was broken only by the campfire and the torches that the elders alone were allowed to carry.

Wise Heart knew that the world had not always been such a dark and gloomy place. Sometimes as his tribe huddled around the campfire at night, the elders told stories—ancient stories—of a time when a bright light they called the Sun had warmed the world during the day, while its distant relatives, the Moon and Stars, had filled the night. Wise Heart had also seen the ancient tribal cave paintings that showed a world filled with the bright light of the Sun and with towering trees and plants. Whenever Wise Heart or the other children asked the elders how the world had lost its Sun, Moon, and Stars, the elders would become quiet and warn the children not to ask such questions.

One night, while Wise Heart slept, he dreamed of the beautiful, Sun-filled world that he had seen in the cave paintings. There were blue skies, trees laden with delicious fruit, and smaller plants with fragrant flowers. Then, in his dream, he heard the sound of a fiercely shrieking wind, and the Sun suddenly seemed to be torn from the sky, leaving only a dim glow in its wake. Wise Heart woke from his dream troubled and unable to fall back asleep.

When the dim light of day returned, Wise Heart cautiously approached the oldest and most respected of the elders, a stooped old man named Running Water. The boy recounted his dream and asked the old man if he knew what had happened to the Sun so many years before. At first Running Water scolded the boy and warned him not to wonder about such things. Finally, however, seeing the boy's determination to know the truth, Running Water relented. He told the boy that many years before, an Evil Spirit had become jealous of the brilliance and warmth of the Sun and had stolen it from the sky and hidden it in a deep canyon on the far side of the world. The Evil Spirit had also stolen the Moon and Stars and hidden them away as well so that the humans would not have enough light to be able to search for and free the Sun from its captor. From that day on, Running Water explained, the world had been dimly lit. Bound with thick ropes to a giant boulder, the Sun could make only a few of its rays reach above the edge of the deep canyon.

All that day Wise Heart thought about Running Water's words. He watched his people as they struggled to survive by eating the few fish in the stream and few small plants on the hillsides. By the time darkness fell, Wise Heart had made a decision. He would journey across the mountains, to the far side of the world. He would find the deep canyon where the Sun, Moon, and Stars were being held by the Evil Spirit, and somehow, he would free them. That, he decided, was how he would help make the world better for his people.

Early the next evening, Wise Heart secretly set out for the distant mountains, carrying only a skin of water, some dried fish, and a sharp knife. As he traveled, he asked the kind spirits of his people to help him, and they did. Guided by a fierce and powerful eagle and thousands of fireflies, Wise Heart found his way through the steep, dark mountain range. A sure-footed

mountain goat led him to the edge of the deep canyon in which the Evil Spirit was guarding the Sun, Moon, and Stars. Just at that moment, a traveling family of field mice offered to chew through the ropes that bound the Sun, Moon, and Stars while Wise Heart distracted the Evil Spirit. Accepting their offer of help, Wise Heart climbed cautiously over the rim of the canyon and slowly began to climb down the steep cliff toward the canyon floor below. Just as he reached the bottom, the silence was suddenly pierced by the same sound of shrieking wind that he had heard in his dream. The Evil Spirit, red-faced and shaking with rage, stepped between Wise Heart and the Sun, Moon, and Stars and demanded to know why the boy had intruded in his canyon. Before Wise Heart could answer, the Evil Spirit noticed the boy's water skin and demanded that he be given some water to quench his thirst and to cool his sun-scorched body. In reply, Wise Heart said, "Powerful spirit, I am happy to give you all my water, but first let me add some special herbs that will quench your thirst and cool your sun-scorched body better than plain water." The Evil Spirit agreed, and after Wise Heart had added the herbs, which were really sleeping herbs, he drank the water greedily. Soon after, the Evil Spirit fell asleep.

Immediately, as if on cue, the family of mice began gnawing through the thick ropes that held the Sun, Moon, and Stars captive. When they had almost completed their task, the Evil Spirit, feeling the heat of the Sun's rays as it slowly began to ascend into the sky, awoke from his slumber. With a piercing shriek, the Evil Spirit rushed to recapture the Sun. Just before he could do so Wise Heart cut through the remaining fragments of rope with his knife. With the ends of the rope held

tightly in his hands, Wise Heart and the mice sailed into the sky. A short time later, as the Sun passed over Wise Heart's village, they all jumped safely into the soft boughs of the tallest fir trees. From there, Wise Heart looked up to see the first and most beautiful sunrise that he would ever see.

Wise Heart returned to his tribe as a hero. The people hailed him as the Sun Guard and thanked him for returning light and warmth to the day and light to the night. Almost immediately, the trees and plants began to grow larger, and the people danced and celebrated in the warmth and brightness of the Sun. After several hours, however, the people began to complain. They said, "It's too hot! I'm thirsty!" Others complained of feeling tired and of their skin feeling red and sore. Wise Heart was amazed that his gift that had at first caused so much joy was now causing so much pain and discomfort. He thought for a moment and then quickly led his tribe to the river's edge. There he told his people to drink deeply and to coat their skin with mud from the riverbank. He told them, "The mud will soothe your skin and protect it from the powerful rays of the Sun," and they found that he was right. Now Wise Heart was truly a hero. His tribe could now enjoy the Sun and all the beauty it gave to the world, without being hurt by its powerful rays. Even today, Wise Heart is a hero, for though he did not know it, he had developed the first sunscreen with an SPF of 45!

The legend is available with illustrations at the Children's Melanoma Prevention Foundation website, www.melanomaprevention.org.

¹ This story has been adapted from traditional tales by Jane Shanny and Mary Ellen Maguire-Eisen of the Children's Melanoma Prevention Foundation.



A SunWise Legend

Estimated Time

1 hour

Supplies

Large paper

Markers and/or crayons

Book-making supplies/Paper for drawing

Learning Objective

The students will learn that people from all over the world have different stories about the sun. Before the story is read, ask the students what they know about the power of the sun, both good and bad. Write their ideas on the board/paper. After reading the story assess what they have learned by asking them to write a story about the sun and why it is important to people around the world.

Directions

Read to your class “Wise Heart Saves the Day,” a legend about the origin of the sun inspired by the Native American Cahto Tribe of California (on the Student Page of this activity). Discuss with them the location of California in relation to where you are located. While doing this, explain to them that people from all over the world have different ideas and beliefs about the sun. Discuss what they remember from the story. Ask them why the sun is so important that people from all over the world tell stories about it (e.g., it makes plants grow, provides light).

After discussing the legend and the sun with your students, ask them to write their own legend about the sun. Have them illustrate their short stories to make books. Once students have finished their books, have some share their legends with the class. To help your students get started, ask them to consider the following questions:

- 1 During what period of time does your sun myth take place?
- 2 Where does your sun myth take place?
- 3 In your sun myth, who is the main character(s)?
- 4 What powers does your main character(s) have?
- 5 What effect or change has your character(s) made?



Keep an Eye on Sun Safety

Directions

UV radiation can cause damage to the eyes of both animals and humans. One example of eye damage is a cataract. A cataract is the clouding of the eye's lens, which makes it difficult to see. Sea lions and seals that live in a zoo may develop cataracts because of not enough shade in their enclosure or because of looking up at the sun during feeding and training with the zookeeper. In addition, the reflection from the water causes extra UV exposure for both the animals and the visitors at the zoo.

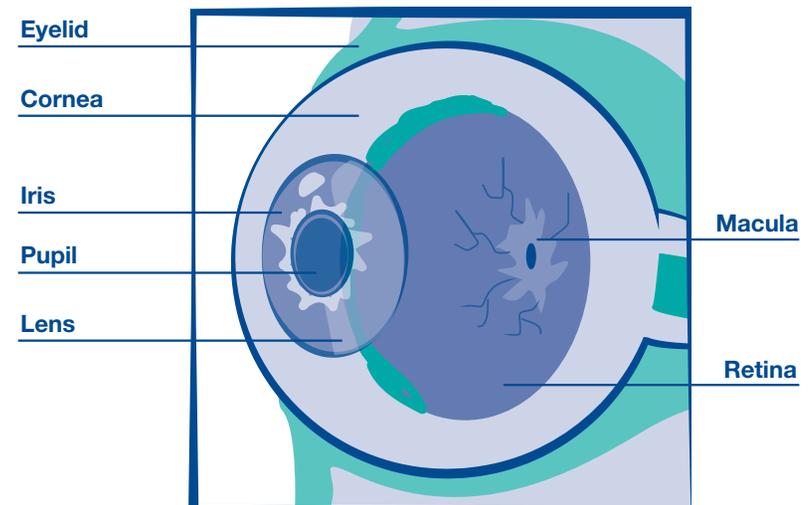
Design an outdoor zoo exhibit for seals and sea lions that helps protect their eyes and the zoo visitors' eyes from too much sun exposure. How should visitors dress for a sun-safe day at the zoo?

Many animals have natural adaptations that protect them from the sun. Find examples of these animal adaptations by visiting the SunWise website www.epa.gov/sunwise or the website of your local zoo. In your exhibit design, include signs that point visitors in the direction of these animals.

Vocabulary Words

Cataract—A clouding of the eye's lens that can blur vision

Lens—A transparent structure in the eye that helps focus light





Keep an Eye on Sun Safety

Estimated Time

30–45 minutes

Supplies

Paper

Pens or Pencils

Learning Objective

The aim of this activity is for students to learn the importance of protecting their eyes from overexposure to the sun's harmful UV rays. By understanding animal adaptations for sun protection and designing a sun-safe enclosure for zoo animals, students will draw connections to the ways they can protect themselves from overexposure to the sun. Assess if they have learned how to protect their eyes from UV radiation by facilitating a classroom evaluation of each group's exhibit design.

Directions

Assign groups to collaborate on the design of a sun-safe outdoor exhibit for seals and sea lions. Before the students begin, have a brief discussion on the damaging effects that UV radiation has on the eyes of both animals and humans (for additional background information on cataracts and UV-induced eye damage, refer to the "Prevent Eye Damage" fact sheet on the SunWise website). Use the following questions to guide a discussion:

- 1 Does the exhibit design provide enough shade for the animals?
- 2 Do the visitors have a shaded area where they can watch the animals?
- 3 How should visitors dress for a sun-safe day at the zoo?
- 4 Where can zoo visitors find other sun-safe animals?

Describe to the students how seals and sea lions in zoos can be prone to cataracts due to the following: 1) lack of shade in the enclosure; 2) reflection of UV rays from the water and from the light surfaces of the tank/enclosure; 3) looking up toward the sun during feeding and training with the zookeepers; and 4) living longer in captivity than in the wild (in addition to overexposure to UV radiation, cataracts can also develop from old age).

Ask students to brainstorm animals that have natural adaptations to protect themselves from the sun. The students may research animal adaptations on the SunWise website or on your local zoo's website, or you can guide them to examples of adaptations using the "Search for SunWise Animals" resource on the SunWise website. Explain to the students that humans can "adapt" too with simple sun safety habits. For eye protection, these habits include the following: avoiding overexposure to the sun; wearing a wide-brimmed hat and sunglasses with 99-100% UVA/UVB protection; seeking shade when the sun's UV rays are most intense between 10 a.m. and 4 p.m.; checking the UV Index; and using extra caution around reflective surfaces such as water, snow, and sand.



When the students have finished their exhibits, lead them in a discussion to evaluate each design. Relate the issue of eye protection to the students' environments. Ask the students where they might get the most UV exposure in their daily lives. Remind the students that sun safety is important for all outdoor activities, including recess at school, swimming, boating, biking, soccer, baseball, etc. Ask the students to think of ways they can better protect their eyes from too much sun exposure.

Additional Resources

Search for SunWise Animals, available on the SunWise website

(www.epa.gov/sunwise/doc/animals_zoo.pdf)

SunWise Animal Quiz, available on the SunWise website

(www.epa.gov/sunwise/doc/Animal_WhoAmI.pdf)

Prevent Eye Damage, available on the SunWise website

(www.epa.gov/sunwise/doc/eyedamage.pdf)

Activity Enrichment

- Connect this activity with the UV-sensitive Frisbee activity. Have the students bring their sunglasses to class and test their effectiveness using the Frisbee. Place the sunglasses on the inner surface of the Frisbee and then carry it outside. Once the Frisbee has changed color, carry it back indoors and remove the sunglasses. If there is a white area in the shape of the sunglasses, then the sunglasses are effective at blocking UV radiation.
- Have students brainstorm activities and occupations that may lead to a person's eyes being exposed to excessive UV radiation. Answers may include sports (baseball, skiing, swimming, surfing, etc.) and outdoor jobs (fishing, construction, landscaping, farming, etc.). Ask the students how they could protect their eyes during each activity.
- In addition to overexposure to UV radiation, risk of cataracts also increases with age. Ask the students if they know of anyone who has cataracts or other eye damage. Offer the students the opportunity to interview that person and report back to the class. Remind the students to ask their interviewee about previous sun exposure and sun protection habits.
- Have the students experience what it is like to have cataracts by taking an old pair of glasses and applying a light coat of non-toxic snow spray. Students can take turns wearing the glasses.
- Connect this activity with a visit to your local zoo or aquarium. Plan a sun-safe animal tour using the "Wild for Sun Protection" resource on the SunWise website.



Sunny Crossword

Supplemental

Directions

Answer the questions and fill in the crossword puzzle with the answers.

Across

- 1** The right type of these will block almost 100 percent of the UV radiation that can cause damage to your eyes.
- 4** Small, brownish spots on the skin that can increase in number with exposure to sunlight.
- 6** EPA school program that promotes sun safety.
- 8** A ____-brimmed hat will protect your face, neck, and ears.
- 9** The most serious form of skin cancer.
- 10** _____ are most at risk for overexposure to UV radiation because their young skin is thinner and more easily damaged.
- 12** UV is an acronym for _____.
- 13** If your _____ is shorter than you are when you're outside, it's time to seek shade.
- 15** Everyone is affected by UV radiation. Skin color doesn't exclude anyone from its effects, but if you have ____ skin you are at higher risk for skin cancer.

**Sunny Crossword** continued**Down**

- 1** Use this with at least SPF 30, and apply properly to protect against skin damage.
- 2** The time the sun is at its highest, which means its rays have less distance to travel through the atmosphere and the intensity is greatest.
- 3** Initials for sun protection factor.
- 5** Abbreviation for chlorofluorocarbon, one of the chemicals that destroys the fragile ozone layer.
- 7** The sun's rays are stronger at high altitudes and closer to the _____.
- 8** Overexposure to the sun can cause skin cancer, eye damage, and _____.
- 10** Eye damage that occurs when there is a loss of transparency in the lens, which clouds your vision.
- 11** It is UV _____, not the warmth or the brightness of the sun, that causes damage to our skin.
- 12** This type of radiation is not absorbed by the ozone layer and can cause a lot of damage to our bodies.
- 13** You can find protection from the sun's UV rays under the _____ of trees and umbrellas.
- 14** A gas found in two layers of the atmosphere with the same chemical structure; it is bad at ground level and good high above the Earth.



Sunny Crossword

STUDENT PAGE

The crossword puzzle grid is set against a light teal background. It consists of white squares for letters and teal squares for empty space. The grid is defined by the following numbered starting points:

- 1: Top row, first square.
- 2: Top row, second square.
- 3: Top row, eighth square.
- 4: Third row, fourth square.
- 5: Third row, sixth square.
- 6: Fourth row, first square.
- 7: Fourth row, sixth square.
- 8: Sixth row, eighth square.
- 9: Fifth row, third square.
- 10: Seventh row, sixth square.
- 11: Seventh row, eighth square.
- 12: Eighth row, third square.
- 13: Tenth row, first square.
- 14: Tenth row, fourth square.
- 15: Eleventh row, first square.



Sunny Crossword

Supplemental

Estimated Time

10–15 minutes

Learning Objective

This activity promotes the idea of protection from overexposure to the sun. Students will learn about the adverse health effects of UV radiation and how to avoid them.

Clues and Answers

Across

- 1** The right type of these will block almost 100 percent of the UV radiation that can cause damage to your eyes. (*Sunglasses*)
- 4** Small, brownish spots on the skin that can increase in number with exposure to sunlight. (*Freckles*)
- 6** EPA school program that promotes sun safety. (*SunWise*)
- 8** A ____-brimmed hat will protect your face, neck, and ears. (*Wide*)
- 9** The most serious form of skin cancer. (*Melanoma*)
- 10** _____ are most at risk for overexposure to UV radiation because their young skin is thinner and more easily damaged. (*Children*)
- 12** UV is an acronym for _____. (*Ultraviolet*)
- 13** If your _____ is shorter than you are when you're outside, it's time to seek shade. (*Shadow*)
- 15** Everyone is affected by UV radiation. Skin color doesn't exclude anyone from its effects, but if you have ____ skin you are at higher risk for skin cancer. (*Fair*)

**Sunny Crossword** continued**Down**

- 1** Use this with at least SPF 30, and apply properly to protect against skin damage. (*Sunscreen*)
- 2** The time the sun is at its highest, which means its rays have less distance to travel through the atmosphere and the intensity is greatest. (*Noon*)
- 3** Initials for sun protection factor. (*SPF*)
- 5** Abbreviation for chlorofluorocarbon, one of the chemicals that destroys the fragile ozone layer. (*CFC*)
- 7** The sun's rays are stronger at high altitudes and closer to the _____. (*Equator*)
- 8** Overexposure to the sun can cause skin cancer, eye damage, and _____. (*Wrinkles*)
- 10** Eye damage that occurs when there is a loss of transparency in the lens, which clouds your vision. (*Cataracts*)
- 11** It is UV _____, not the warmth or the brightness of the sun, that causes damage to our skin. (*Radiation*)
- 12** This type of radiation is not absorbed by the ozone layer and can cause a lot of damage to our bodies. (*UVA*)
- 13** You can find protection from the sun's UV rays under the _____ of trees and umbrellas. (*Shade*)
- 14** A gas found in two layers of the atmosphere with the same chemical structure; it is bad at ground level and good high above the Earth. (*Ozone*)



WordWise

Supplemental

Directions

Be WordWise! Look up each of the following words in the dictionary and write the definitions. Then create a sentence for each word. Make sure the reader can understand what the word means in the sentence. For example, if the word is “sunscreen,” a sentence like, “I bought sunscreen at the store” does not help the reader understand what sunscreen is. However, a sentence like, “I applied sunscreen on my skin before I went outside to play so that I wouldn’t get a sunburn” helps the reader know that sunscreen is some kind of protection from the sun that you put on your skin.

Sun

Solar

Epidermis

Ultraviolet Radiation

Suntan

Intensity

Atmosphere

Ozone

Ozone Layer

Pigment

Melanoma



WordWise

Supplemental

Estimated Time

45–50 minutes

Supplies

Dictionary

Directions

The students should define each of the words and then use them in a sentence that somehow expresses the meaning of the word.

Sun—A star of medium brightness, around which the Earth revolves. The sun provides the Earth with its light and heat from 93 million miles away.

Solar—Of or relating to the sun; caused or produced by the action of the sun’s light.

Epidermis—The outer layer of the skin of a vertebrate animal.

Ultraviolet Radiation—Radiation with a wavelength too small to be visible to the naked eye.

Suntan—Browning of the skin’s pigment, caused by damage from exposure to the sun’s UV rays.

Intensity—Strength, power, or energy.

Atmosphere—The whole mass of air and other gases surrounding the Earth.

Ozone—A gas that forms in the atmosphere when three atoms of oxygen are combined. It can be good or bad depending on its location.

Ozone Layer—A layer in the stratosphere, which is located 6–30 miles above the Earth’s surface. It protects people from the damaging effects of the sun’s rays by absorbing some UV radiation.

Pigment—Coloring material in the skin cells of plants and animals.

Melanoma—A usually malignant tumor containing dark pigment; a type of skin cancer.

Additional Activities

Using the words they defined, have students create

- A short story for a younger audience
- A four–eight frame comic strip