

Lesson 3.3: The Skin

Task	Page(s)	Learning Target
1	2	I can identify the structures and explain functions of the skin.
2	3	I can follow a procedure to collect evidence that describes that perspiration happens all the time.
3	4	I can plan a model for the skin using household materials.
4	5	I can follow a procedure in order to explain how perspiration affects body temperature using data evidence from a thermometer.
5	6-7	I can use text evidence to describe ways to protect against the sun.
6	8-10	I can create a campaign poster or video that urges people to protect themselves from the harmful effects of the sun.

Task 1 Learning Target: I can identify the structures and explain functions of the skin.

The skin is the largest organ

1. Structures

- A. Epidermis:
- B. Dermis:
- C. Fatty Layer:

**Draw a diagram of the skin and label parts

2. Functions

A. Protection- *What and how does the skin protect?*

B. Sensory Responses- nerves gather info about pressure, temperature, and _____

C. Formation of Vitamin D in the presence of _____ - helps your body absorb calcium

D. Elimination of Wastes: perspiration

E. Regulation of Body Temperature-

a. Perspiration:

b. Blood vessels constrict and dilate

What do blood vessels look like when they constrict? How does this affect body temperature?

What do blood vessels look like when they dilate? How does this affect body temperature?

3. Injuries and Repair

A. blood vessels that burst under skin and leak into surrounding tissue cause _____.

B. cuts and scrapes in skin repair by _____

Resource Links:

BrainPop: <https://www.brainpop.com/health/bodysystems/skin/>

Anatomy: <https://sites.google.com/a/ps207tigers.org/207sci/skin>

Task 2 Learning Target: I can follow a procedure to collect evidence that describes that perspiration happens all the time.

Possible Misconception:

Do we perspire when we are hot or cold?

Material:

plastic sandwich bag

Procedure:

1. Place a plastic bag over one hand.
2. Use the ZIP to close the bag at the wrist.
3. After a few minutes, observe any changes that happened inside the bag.

Answer the following questions:

1. What changes did you observe inside the bag after a few minutes?

2. Copy and complete the following summary:

**Perspiration not only serves to _____ the body,
but also to remove _____ from cellular _____.
Even though I was not hot during the activity, my body was still _____.
Our body and its cells are always working.
For example, the cells in our _____ are always working to _____.
Because our cells are always working, they are always going through the process of cellular
_____ and will release water waste in the form of _____.**

Task 3 Learning Target: I can plan a model for the skin using household materials.

Using household materials, plan and design a model that represents the skin (layers) in structure and function.

<u>Material</u>	<u>How does it represent structure?</u>	<u>How does it represent function?</u>

Task 4 Learning Target: I can follow a procedure in order to explain how perspiration affects body temperature using data evidence from a thermometer.

Materials:

- 2 thermometers
- piece of paper/folder
- 1 wet paper towel
- 1 dry paper towel

Safety Precautions: Handle thermometers with caution. If one breaks, DO NOT attempt to clean it.

Before completing the procedure, analyze the thermometer and answer the following questions in your notebook:

- A. What is the bulb of the thermometer?
- B. What does each tick mark/line represent?

Procedure:

1. Read and record the initial temperatures of both thermometers. ****Do not touch the bulbs of the thermometers.**
2. Wrap a wet paper towel around the bulb of one thermometer. Wrap a dry paper towel around the bulb of the other thermometer. Place both thermometers next to each other but do not let them touch. ****Be sure to hold the thermometers in place so that they cannot roll and/or fall.**
3. Using a piece of paper or folder, fan both of the thermometers for 2 or 3 minutes. ****Be sure to hold the thermometers in place so that they cannot fall. Remember not to touch the bulbs of the thermometers.**
4. Record the temperature shown on each thermometer.

C. Design a data table and record your data.

D. Draw a Scientific Conclusion: How does this activity relate to the role of skin and perspiration in regulating body temperature? ****Use data evidence to support your claim.**

- What did the dry paper towel represent? How did the dry paper towel affect the temperature? ***Use numbers as evidence.**
- What did the wet paper towel represent? How did the wet paper towel affect the temperature? ***Use numbers as evidence.**



Task 5 Learning Target: I can use text evidence to describe ways to protect against the sun.

To many people, summer means hanging out at the pool or the beach, soaking up rays in pursuit of a golden tan. But before you put on your bathing suit and head to the pool (or pay for a bed or booth in a [tanning salon](#)), there are a few things to think about when it comes to your skin and sun exposure.

How Tanning Happens

The sun's rays contain two types of ultraviolet radiation that reach your skin: UVA and UVB. UVB radiation burns the upper layers of skin (the epidermis), causing sunburns. UVA radiation is what makes people tan. UVA rays penetrate to the lower layers of the epidermis, where they trigger cells called **melanocytes** (pronounced: mel-an-oh-sites) to produce **melanin**. Melanin is the brown pigment that causes tanning. Melanin is the body's way of protecting skin from burning. Darker-skinned people tan more deeply than lighter-skinned people because their melanocytes produce more melanin. But just because a person doesn't burn does not mean that he or she is also protected against skin cancer and other problems.

Tanning Downsides

UVA rays may make you tan, but they can also cause serious damage. That's because UVA rays penetrate deeper into the skin than UVB rays. UVA rays can go all the way through the skin's protective epidermis to the dermis, where blood vessels and nerves are found. Because of this, UVA rays may damage a person's immune system, making it harder to fight off diseases and leading to illnesses like [melanoma](#), the most serious type of skin cancer. Melanoma can kill. If it's not found and treated, it can quickly spread from the skin to the body's other organs.

Skin cancer is epidemic in the United States, with more than 1 million new cases diagnosed every year. Although the numbers of new cases of many other types of cancer are falling or leveling off, the number of new melanoma cases is growing. In the past, melanoma mostly affected people in their fifties or older, but today dermatologists see patients in their twenties and even late teens with this type of cancer. Experts believe this is partly due to an increase in the use of tanning beds and sun lamps, which have high levels of UVA rays. Getting a sunburn or intense sun exposure may also increase a person's chances of developing this deadly cancer.

Cancer isn't the only problem associated with UV exposure. UVA damage is the main factor in premature skin aging. To get a good idea of how sunlight affects the skin, look at your parents' skin and see how different it is from yours. Much of that is due to sun exposure, not the age difference!

Sun Smarts

Staying out of the sun altogether may seem like the only logical answer. But who wants to live like a hermit? The key is to enjoy the sun sensibly, finding a balance between sun protection and those great summer activities like beach volleyball and swimming.

Sunscreens block or change the effect of the sun's harmful rays. They're one of your best defenses against sun damage because they protect you without interfering with your comfort and activity levels. The SPF number on a sunscreen shows the level of UVB protection it gives. **Sunscreens with a higher SPF number provide more defense against the sun's damaging UV rays.**

Here are some tips to enjoy the great outdoors while protecting your skin and eyes from sun damage:

- **Wear sunscreen with an SPF of at least 15 every day, even on cloudy days and when you don't plan on spending much time outdoors.** Wearing sunscreen every day is essential because as much as 80% of sun exposure is incidental — the type you get from walking your dog or eating lunch outside. If you don't want to wear a pure sunscreen, try a moisturizer with sunscreen in it, but make sure you put on enough.
- **Use a broad-spectrum sunscreen that blocks both UVA and UVB rays.** Ideally, it should also be hypoallergenic and noncomedogenic so it doesn't cause a rash or clog your pores.
- **Reapply sunscreen every 1½ to 2 hours.** If you're not sure you're putting on enough, switch to sunscreen with a higher SPF, like SPF 30. No matter what the SPF, the sun can break down the UVA ingredients in sunscreen. Even if you don't get a sunburn, UVA rays could still be doing unseen damage to your skin.
- **Take frequent breaks.** The sun's rays are strongest between 10:00 A.M. and 4:00 P.M. During those hours, take breaks to cool off indoors or in the shade for a while before heading out again.
- **Wear a hat with a brim and sunglasses that provide almost 100% protection against ultraviolet radiation.**

Other things to know when it comes to avoiding sun damage:

- You probably know that water is a major reflector of UV radiation — but so are sand, concrete, and even snow. Snow skiing and other winter activities carry significant risk of sunburn, so always apply sunblock before hitting the slopes.
- Certain medications, such as antibiotics used to treat acne, can increase your sun sensitivity (as well as your sensitivity to tanning beds). Ask your doctor whether your medications might have this effect and what you should do.
- Avoid tanning "accelerators" or tanning pills that claim to speed up the body's production of melanin or darken the skin. There's no proof that they work and they aren't approved by government agencies for tanning purposes.

Trauma-free Tans

Even when you're serious about protecting your skin, you may sometimes want the glow of a tan. Luckily, many products on the market — but *not* sun lamps or tanning beds — will let you tan safely and sun-free.

One safe way to go bronze is with sunless self-tanners. These "tans in a bottle" contain dihydroxyacetone (DHA), which gradually stains the dead cells in your skin's outer layer. The "tan" lasts until these skin cells slough off, so **exfoliating** or vigorously washing will make the color fade faster. Typically, self-tanners last from several days to a week.

You may have to try a few brands of self-tanner to find one that looks best with your skin tone. For a subtle, goof-proof glow, try moisturizers that contain a modest amount of fake tanner, letting you gradually build up a little color without blotches and staining — or the smell that some people dislike. All of these options are cheap, too, usually around \$10.

Ask a friend to help you apply self-tanner to spots you can't reach, like your back. And be sure to wash your hands as soon as you finish applying the tanner. Areas of your body that don't normally tan (like the palms of your hands or soles of the feet) just look dirty if you leave tanner on them.

With self-tanners, you get better results if you **exfoliate** your skin with a scrub brush or loofah before the tanner is applied. This evens your skin tone and removes dead skin cells.

If you use a sunless tanner, you'll need to wear plenty of sunscreen when you go outdoors to protect you from the sun's rays. Self-tanners don't generate melanin production, so they won't protect you against sunburn (and some scientists believe they might even make skin more susceptible to sun damage).

If you're thinking about using a sunless tanner, **it's a good idea to avoid airbrush or spray-on tans.** The FDA hasn't approved DHA for use internally or on mucous membranes (like the lips). Spray tans may have unknown health risks because people can breathe in the spray, or the tanner may end up on their lips or eye area.

Reviewed by: [Patrice Hyde, MD](#) Date reviewed: July 2012

Questions:

1. How do UVA and UVB rays compare?
2. What are the effects of UV exposure?
3. In the past, melanoma mostly affected people in their fifties or older. Why do dermatologists see patients in their twenties and even late teens with this type of cancer in current times?
4. How do self-tanners work?
5. Why is it recommended to avoid airbrush or spray-on tans?
6. Using context clues, define the following:
 - a. broad-spectrum sunscreen
 - b. hypoallergenic
 - c. noncomedogenic
 - d. exfoliate

Task 6 Learning Target: I can create a campaign poster or video that urges people to protect themselves from the harmful effects of the sun.

Sun Safety Campaign

Practice Smart Sun

Skin cancer is the most common form of all cancers in the U.S. Rates of new melanoma cases have tripled over the last 35 years. Yet many Americans behave as if it can't happen to them.

Fewer than one in three adults report using sunscreen frequently. According to a national surveys conducted by the federal Centers for Disease Control and Prevention, even fewer say they routinely seek shade, wear a hat or cover up with long sleeves.

Americans do not do enough to protect their skin from sun damage and prevent skin cancer. Because of drastically rising rates of skin cancer, we need to educate Americans on the importance of sun safety - and change their behavior.

It's critical that we bring sun safety to top of mind and reverse the escalating trend lines.

Our manifesto:

Sun Safety isn't just about sunscreen. Defenses against getting too much harmful ultraviolet radiation also include protective clothing, sunglasses, shade and timing.

Sunscreen ingredients matter. Sunscreens must offer true broad-spectrum protection from sunburn and other types of skin damage.

High-SPF claims are misleading. A label higher than SPF 50 can tempt people to stay in the sun too long.

Americans must be encouraged to check their skin regularly for new moles that are tender or growing and to see their dermatologist.

Other countries, notably Australia, have raised public consciousness about sun safety. They have made sun protection as routine as wearing a seat belt. It's time to do the same in the U.S.

<http://www.ewg.org/sunsafety/>

Your Goal: Create a campaign poster or video that urges people to protect themselves from the harmful effects of sun exposure.

1. Research your topic questions. **See research questions on the following page.
2. Discuss/share answers to research questions. Be sure to focus on areas that are confusing.
3. Before designing your campaign poster or video, consider the following:
 - A. Who is your audience? How will you connect with your audience?
 - B. What mood will your poster or video establish? How will you establish this mood?
 - C. What action do you want your audience to take? How will your poster or video urge people to take action?
4. Create your campaign poster or video.

	3	2	1
Creativity	The entire presentation reflects an exceptional degree of student creativity in idea and display.	The presentation reflects student creativity in idea and display.	Student creativity is limited.
Content	The poster/video clearly and effectively communicates a thorough purpose. All research questions are thoroughly answered with high-quality examples or pieces of data that support the campaign.	The poster/video communicates a purpose. Most research questions are thoroughly answered with high-quality examples or pieces of data that support the campaign.	It was difficult to figure out the purpose of the poster/video. Few research questions are thoroughly answered with high-quality examples or pieces of data that support the campaign.

Participation					
I often contributed good ideas that were relevant to the topic and task. I came to meetings prepared. I did my share of the work.	4	3	2	1	I seldom contributed good ideas. Sometimes I was talking off-task. I did not come to meetings prepared. I did not do my share of the work.
Working with Others					
I often compromised and cooperated. I did take initiative when needed and/or listened and respected the ideas of others.	4	3	2	1	I seldom compromised and cooperated. I did not take initiative when needed and/or did not listen and respect the ideas of others.
Product					
My part of the task is complete and accurate. My work was submitted on time.	4	3	2	1	I did not complete my part of the task. The information I presented was inaccurate and/or not done correctly. It was not completed on time.
Understanding Content					
I can speak about the topic and group work knowledgeably. I can sum-up the lesson.	4	3	2	1	I do not understand what I did in my group. I did not ask or answer questions. I cannot sum-up the lesson.

Topic 1: Sun Safety isn't just about sunscreen. Defenses against getting too much harmful ultraviolet radiation also include protective clothing, sunglasses, shade and timing.

- a. How can time of day affect the intensity of sun exposure?
- b. Other than sunscreen, what protective clothing and accessories would you recommend to consumers? (Things to consider: color of clothing, type of fabric, type of clothing and accessory) Why?
- c. How are clothes given a UPF rating?
- d. What brands offer UPF clothing? Which brand would you recommend and why?
Describe consumer reviews.
- e. Create an informational campaign poster or video that presents “looks” for both males and females that would serve to protect from the sun.

Topic 2: Sunscreen ingredients matter. Sunscreens must offer true broad-spectrum protection from sunburn and other types of skin damage.

- a. Why would you recommend broad-spectrum sunscreen over another types of sunscreen?
- b. How do mineral sunscreens compare to chemical sunscreens?
- c. Which chemical sunscreen ingredients are recommended? Why?
Which mineral sunscreen ingredients are recommended? Why?
- d. Which sunscreens would you recommend and why? (Select brands and SPF levels)
Describe consumer reviews.
- e. Create an informational campaign poster or video that promotes different types of sunscreen with important directions and tips.

Topic 3: High-SPF claims are misleading. A label higher than SPF 50 can tempt people to stay in the sun too long.

- a. What do SPF ratings mean?
- b. How do mineral sunscreens compare to chemical sunscreens?
- c. Which chemical sunscreen ingredients are recommended? Why?
Which mineral sunscreen ingredients are recommended? Why?
- d. Which sunscreens would you recommend and why? (Select brands and SPF levels)
Describe consumer reviews.
- e. Create an informational campaign poster or video that promotes different types of sunscreen with important directions and tips.

Topic 4: Americans must be encouraged to check their skin regularly for new moles that are tender or growing and to see their dermatologist.

- a. Explain how to detect skin cancer.
- b. Describe different types of skin cancer.
- c. Describe treatment options for skin cancer.
- d. Which local dermatologist would you recommend and why?
Describe online reviews.
- e. Create an informational campaign poster or video that describes the signs and types of skin cancer while promoting a local dermatologist.

