

Grade 4 Historical Lesson

Lesson: 10: Muscles and Skin: History

Objectives:

1. Students will discover the importance of sunscreen through an experiment comparing the color of UV beads.
2. Students will do an experiment using UV beads to compare the kind of sunscreen that was used in the past as compared to today as well as the degree of protection that we have today as compared to the past.
3. Students will learn the history of sunscreen, who created it, and what used to be used as sunscreen by listening the information and creating a time line.
4. Students will connect the information they know about sunscreen to Andrew Taylor Still, a doctor of osteopathy, who came up with the philosophy that all systems are interconnected drawing conclusion about how sunburn affects all body systems.
5. Students will draw conclusion about the importance of sunscreen to the integumentary system but more importantly how damage to one system influences all the systems of the body, again relating the information to A.T. Still's philosophy of medicine and health.

Materials:

- Students will need to bring in pictures of themselves, a family member, or a picture of a person in a magazine with sunburn.
- UV detection Beads
- Plastic Zip Lock bags
- Tape
- Sunscreen – variety of different SPF's
- Olive oil
- shortening
- Make a red pasty substance
- Dixie cups
- Markers

Background Information for teachers

Information on Andrew Taylor Still... <http://www.kcom.edu/newmuseum/atstill.htm>

Information on how to be safe in the sun...

www.fda.gov/opacom/lowlit/sunsafty.pdf

Vocabulary:

Integumentary System-

D.O.- doctor of osteopathy

Osteopathy- a medical practice based on the theory that diseases are due mainly to the loss of structural integrity which can be restored by manipulation

UV light-wavelengths shorter than visible light and longer than those of X rays

Engage: (15 minutes)

Ask students to bring in a picture of of themselves with a sunburn, a family member with sunburn, or someone from a magazine. Tell them to think about how they felt when they had a really bad sunburn.

Note to teacher: Be sure to have some pictures of your own in case students forget. Depending on how many students bring in a picture you may want only a few to share and post the rest of the pictures in the room.

Have the students share the worst sunburn experience they had.

Ask: What symptoms did you have because of the sunburn?

How did you feel? (tired, thirsty, hurt, sore, achy, couldn't move, nauseous, hospital experience)

Write one word answers on the board that describe how they felt or what happened. Create a list. (Save the list for later in the lesson)

Explore: (25 minutes)

Bring in a sunscreen bottle.

Ask: What is this? (Sunscreen) What do we use this for? (Protection from the sun)

How do you think people used to protect themselves from the sun, before sunscreen was invented?

(Clothing, hats)

Write the following three questions on the board and answer them at the end of the lesson.

1. Who invented sunscreen?
2. How long has using sunscreen or the idea of protecting the skin been around?
3. How have sunscreen ingredients changed?

Tell: Today we are going to do an experiment.

We want to find out if all sunscreens are as effective and how sunscreen ingredients have changed?

Tell: Some of this information you already know from previous lessons. However, we are going to put it to the test and also check out some other kinds of sunscreen.

2 things we will find out from our experiment...

1. Ask: What do we already know about different strengths of sunscreen?

Ask: What do we know about SPF 45 compared to SPF 15?

Hypothesis (Have the students come up with a hypothesis – Guide the students as needed.): Example: The higher the SPF the better protection we have from the sun.

2. Hypothesis: Ask: Did sunscreen many years ago protect people as well as sunscreen today?

Ask: Do you think people always had sunscreen?

Sunscreen did not provide as much protection as sunscreen today.

Tell: Today we are going to compare different kinds of sunscreen including sunscreen we use today and sunscreen that people used to use a long time ago.

Prep Before the lesson begins:

Step 1. Put Sunscreen, water, or one of the other substances listed below in the bottom of a Dixie cup.

Step 2. Label the Dixie cups. Number the cups in random order. Create a key for yourself with what kind of substance is in each Dixie cup.

(Suggested substances: SPF 40, SPF 30, SPF 10 or 5, olive oil, shortening, water, and homemade sunscreen remedy-red pasty substance.)

This lesson is done for a group of about 20 students resulting in 7 groups. Adjust accordingly. If you have a larger group more cups can be created with different degrees of SPF sunscreen in them.

Step 3: Each group would need to receive a numbered cup with a substance in it, a plastic bag with UV beads, and a permanent marker.

Step 4: Put students in groups of approximately 3 (assign roles – reporter, recorder, supply manager – Assigning roles to each student helps keep everyone on task.)

Have the students rub whatever substance is in their cup on the outside of their plastic bag. Be sure that the whole bag is covered well. Put the # of their cup on their bag as well as one group member's name with the permanent marker.

As a class take all the bags outside. Stay with the bags. Stop and bring the beads indoors, out of the sun, when you can see that the bags vary in color (about 5 minutes). The beads that get “sunburned” will turn the brightest color. This will be the group with water. As the SPF gets stronger the beads will not change color as much. The color will not be as bright.

Explain:

After the beads have changed color in the sun return to the classroom.

Have the reporter from each group bring up their group's bag and stand in front of the classroom.

As a large group identify the amount/degree of color that all the beads in each bag changed and have them collaboratively rearrange the students in front of the room in order from brightest color to least amount of color change.

Once the order looks logical, tape each bag up on the board in the correct order.

Based on what they see ask them to predict what kind of protection was used. Write the predictions under the taped bag on the board.

(Remind the students it could be sunscreen with different SPF strengths, a substance, or nothing at all.)

Example:

The brightest colored beads should be first. Ask: What kind of protection was used here? (nothing- water) Next have the “supply manager” from that particular group bring the cup up to the front and show the class what was in their cup. Now have them either confirm their prediction or change their predictions of what was used.

Continue with each bag.

When you get to the bags that were covered in oil or the homemade substance you may want to give the class the clue that you didn’t use a specific SPF on this bag but rather these two were what people used a long time ago for sunscreen. Predict.

Ask: What do you think people used for sunscreen? If we didn’t have sunscreen what do you think you would use to protect yourself from the sun?

Extend: (20 minutes)

Read the information below on the history of Sunscreen. (See Figure 1)

As you read have students write down the following information...

1. What did the Greeks use for sunscreen?
2. When was sunscreen created?
3. What did the first sunscreen look like?
4. Who invented sunscreen?

How long has sunscreen, or the idea of protecting the skin, been around?

How have sunscreen ingredients changed?

Discuss how sunscreen has changed and what that means for our health. (Less skin cancer etc...)

Connect/Expand to new concept: A.T. Still

Show students a picture of A.T. Still. (See Figure 2)

Ask: Does anyone know who this is? (pre-assess)

Read: <http://www.kcom.edu/load.asp?url=/newmuseum> (See Figure 3)

As a class sum up what they read in a couple sentences on the board. Write important facts on the board.

Reiterate what was learned and share some additional information:

Tell: A.T. Still created the profession of Osteopathy. He was a doctor who believed that if everything in the body was in the right place and order it was capable of healing itself. His philosophy was that you need to look at the whole person and treat the whole person not just the one thing that was causing the person problems. He believed all systems

were interconnected. For example, this means the circulatory system effects the respiratory system and the both those systems affect the urinary system, etc...

How does this idea relate to our skin?

Ask: What does our skin do? What are its functions we learned about earlier? (Protection-protects us from infection and protects us from dehydration, etc...)

When we get sunburned what happens to the body? (dehydrated)

How does dehydration affect other systems of the body?

Print out effects of dehydration on the body. (**See Figure 4**)

On the board or overhead make two columns. In the first column have students list what happens when you get dehydrated. Guide their thinking. If they can't think of many then write them in that column. In the second column have the students decide what body system is involved in each particular effect on the body. Discuss how getting badly sunburned can affect the whole body.

Example:

Column 1 – effects	Column 2 – body system effected
Nausea	Digestive system
Joint Pain	Skeletal System
Leg Cramps	Muscular System
Kidney Stones	Urinary System
Labored Breath	Respiratory System
Tingling in feet	Circulatory System

Compare to the list that was made at the beginning of the lesson of how they feel when they get sunburned.

A.T. Still believed that all systems were interrelated. Therefore when we burn our skin (introduce the integumentary system) what is going to happen to the other systems? (all systems are affected)

When finding the source of the problem many other problems would also be cured.

Therefore, protecting our skin protects us from having numerous other problems in our bodies.

If we get sunburn what do we need to do?

How do we care for sunburn? (Aloe, lotion, drink a lot of water, vitamins)

But most of all, what should we do? (Prevent sunburn – wear sunscreen, reapply sunscreen, don't stay in the sun too long, etc...)

Assessment:

Tell: During A.T. Still's time there wasn't sunscreen but surely he would have agreed with using it. Pretend you are A.T. Still. Write a short 1 page fiction story. Remember you are talking as if you are A.T. Still and you are trying to convince people to use sunscreen.

To include in your story...

- your profession
- what you created
- your belief in medicine
- why using sunscreen fits into your belief

-Hand in the short fictional story that the students write.

- Use optional enrichment activity as an assessment for understanding how to prevent sunburn and what to do if they get sunburn.

Optional Enrichment Activity:

Make a first aid poster to hang in the bathroom (inside a cupboard) Have the students write How to Prevent Sunburn and What to do if you have Sunburn. Under each category have them fill in what they know. Make it colorful and catchy.

Additional Web Resources

<http://www.causeof.org/dehydrate.htm#DehydrationEffectsPain>

Missouri Grade Level Expectations

Science:

Strand 7: Scientific Inquiry

1. Science understanding is developed through the use of science process skills, scientific knowledge, scientific investigation, reasoning, and critical thinking.
 - A. Scientific inquiry includes the ability of students to formulate a testable question and explanation, and to select appropriate investigative methods in order to obtain evidence relevant to the explanation.
 - c. Conduct a fair test to answer a question
 - B. Scientific inquiry relies upon gathering evidence from qualitative and quantitative observations.
 - a. make qualitative observations using the five senses
 - C. Evidence is used to formulate explanations
 - a. use quantitative and qualitative data as support for reasonable explanations
 - b. use data as support for observed patterns and relationships, and to make predictions to be tested
 - E. The nature of science relies upon communication of results and justification of explanations.
 - a. Communicate the procedures and results of investigations and explanations through: Oral presentations, drawings and maps, data tables,

graphs, writings

Strand 8 Impact of Science, Technology and Human Activity:

2. Historical and cultural perspectives of scientific explanations help to improve understanding of the nature of science and how science knowledge and technology evolve over time
 - A. People of different gender and ethnicity have contributed to scientific discoveries and the invention of technological innovations.
 - a. research biographical information about various scientist and inventors from different gender and ethnic backgrounds, and describe how their work contributed to science and technology

Figure 1:

History

The ancient Greeks used olive oil as a type of sunscreen. However, this was not very effective. Throughout the early twentieth century, H.A. Milton Blake, a South Australian chemist, as well as several other inventors attempted to create an effective sunscreen but failed.

It was not until 1944 that the first effective sunscreen was invented. At that time, World War II was in full swing and many soldiers were getting serious sunburn. A pharmacist called Benjamin Greene decided to create something that would save the soldiers from the sun's harmful rays. In his wife's oven, he created a sticky, red substance which he called "*red vet pet*". Greene tested it on his own bald head. It didn't work nearly as well as modern sunscreens, but it was a start. Greene then created a more user friendly sunscreen which he began selling to customers in and around Miami. He founded the Coppertone company and his sales boomed. The little protection his product offered had customers enthusiastic. People were no longer afraid of getting sunburn. In their eyes, the sun's harmful rays were conquered.

Sunscreen has come a long way since its initial conception. Modern products have much higher protection factors than Greene's sunscreen, and modern products can also be water- and sweat proof.

Source: <http://www.worldhistory.com/wiki/S/Sunscreen.htm>



Figure 3:

Andrew Taylor Still was born on August 6, 1828, in a log cabin in Lee County, Virginia. The third of nine children born to Abram and Martha Still, young Andrew led a typical frontier boy's life. His father was a Methodist circuit-riding preacher and a physician, whose work led the family to move several times between 1834 and 1841, to circuits in Tennessee and Missouri.

Andrew Still, by then married with two young children, followed his parents to Kansas in 1853. It was about this time that he decided to become a physician. It was common practice in those days for a would-be doctor to train by studying medical books and working with a practicing physician--in this case, his father. He may have received additional, formal training at a school in Kansas City, but no records remain to establish where and when this training took place

An epidemic of spinal meningitis swept through the area and killed three of his children. He had already lost his first wife, Mary Vaughan, to childbirth complications; a month after the epidemic, the daughter born to his second wife, Mary Elvira Turner, died of pneumonia. His inability to save his family, coupled with his grim experiences as a Civil War doctor, led Still to reject most of what he had learned about medicine and search for new and better methods.

Still's explorations were grounded in the study of anatomy. Having grown up as a hunter and farmer, he already had a basic understanding of the structural relationships of bones, muscles, and organs, knowledge which he now extended through the study of human skeletons. He became convinced that most diseases could be alleviated or cured without drugs. The key was to find and correct anatomical deviations that interfered with the free flow of blood and "nerve force" in the body.

From the beginning, Still met with considerable opposition to his new theories and techniques. Still slowly built up his reputation. Word spread about the doctor whose system of drugless, manipulative medicine--officially named "osteopathy" in 1885--was able to cure many apparently hopeless cases.

Finding he had more patients than he could handle, Still trained his children and a few others to assist him in his practice. Finally, there were enough people who wanted to learn his methods that he was persuaded to start a school. The American School of Osteopathy (ASO) was founded in Kirksville in 1892, in a two-room frame building. The first class of five women and sixteen men--including three of Still's children and one of his brothers--graduated in 1894. His medical school and practice became firmly established. He died on December 12, 1917.

Source: <http://www.kcom.edu/newmuseum/atstill.htm>

Figure 4:

Dehydration can lead to...

- Constipation (digestive system)
- Depression
- Heartburn (digestive system)
- Kidney Stones –urinary system
- Lymph Flow –lymphatic system
- Muscles –muscular system
- Pain, Localized Thirst -skeletal system
 - Description
 - Joint Pain
 - Low Back Pain
- Problems with Detoxification - urinary system

Severe Dehydration can lead to...

- loss of appetite (digestive system)
- nausea (digestive system)
- tingling in the arms and feet (circulatory system)
- labored breathing (respiratory system)
- dizziness (circulatory system)

Source: <http://www.causeof.org/dehydrate.htm#DehydrationEffectsPain>