

A Case of Skin Cancer

Part I: Sofia's mole

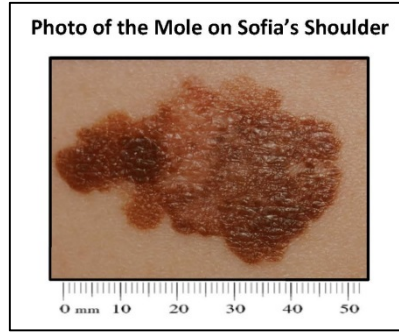
Sofia, Camilla, and Zoey were enjoying a sunny first day of summer at the beach. Camilla noticed a mole on Sofia's shoulder. She told Sofia that she should get the mole checked by a dermatologist (a skin doctor) to be sure it wasn't skin cancer. Sofia laughed because she was young and had dark skin. She thought that skin cancer only happened on the faces of older people with light skin who did not use sunscreen when they were in bright sun.



1. What do you know about skin cancer?

2. What additional information might help you decide whether Sofia's mole is skin cancer?

Your lab kit contains a photo of the mole on Sofia's shoulder and a **Skin Cancer Fact Sheet**. Use the **ABCDE's of Skin Cancer** designed to help people recognize the characteristics of moles that might be skin cancer.



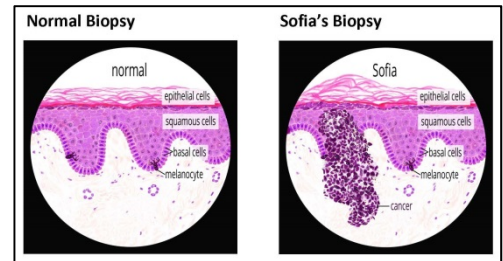
ABCDE's of Skin Cancer		
NORMAL	DESCRIPTION	CANCEROUS
	A symmetry - If you draw a line through the center of the mole the two halves of the melanoma won't match in size.	
	B order - the edges of an early melanoma tend to be irregular. The edges may be scalloped or notched.	
	C olor - Healthy moles have a uniform color. A variety of colors especially white and/or blue is a warning signal.	
	D iameter - Melanomas usually have a wider diameter than a pencil eraser but they may be smaller when first detected.	
	E volving - When a mole's traits such as color or size change, or any new symptoms occur, this points to danger.	

3. Do you think that Sofia should have her mole checked by a dermatologist? _____

Support your answer with at least three evidences from the **ABCDE's of Skin Cancer**.

- _____
- _____
- _____

Sofia decided to have the mole removed. The dermatologist who removed the mole sent a sample of the mole to a lab for a biopsy (a lab test to determine if a tissue is cancerous). Your lab kit contains photos of a normal skin biopsy and the skin biopsy from Sofia's mole.



4. Do you think Sofia has skin cancer? _____

If you answered "yes," identify which kind of skin cancer she has. Support your answer with information from the skin biopsy and the **Skin Cancer Fact Sheet**.

5. What should the doctor tell Sofia about this kind of skin cancer?

Part 2: Sofia Tells Her Story

Disaster Day! I just found out that I have melanoma. Melanoma is the most dangerous form of skin cancer. How could this possibly happen to me? I'm only 16. I thought skin cancer was for older people. I can't find the words to tell my best friends that I have melanoma.

1. List at least two questions that you would have about skin cancer if you found out that one of your friends had melanoma, a potentially deadly form of skin cancer.

- _____
- _____

Week Two I had my surgery and they removed the mole. They also removed a big chunk of skin around the mole so that they could check the lymph nodes near the mole to see if the melanoma cells had spread. Lymph nodes act as "filters" to trap germs and cancer cells to keep them from spreading throughout the body.

2. Why did the surgeon remove some of the skin around Sofia's mole?

Week 3 When I went for a follow-up visit I thought they would tell me that I was fine. Instead, the oncologist (the cancer doctor) told me that two of the lymph nodes around the mole contained melanoma cells. This means my melanoma has metastasized (spread to other parts of my body). I need another surgery so they can remove other lymph nodes and check them to see how far the cancer has spread. As soon as I recover from the lymph node removal, my oncologist wants me to start chemotherapy.

3. What does it mean when they say that cancer has metastasized?

Week 7 I just finished my first month of chemotherapy. I had to go to the cancer center three days a week for five weeks. Each time, they hooked me up to an IV for an hour and a half. The side effects of the chemotherapy made me feel really horrible. I can't help wondering if the melanoma is because I used indoor tanning beds and because I did not use sunscreen when I was outside.

4. List two things Sofia could have done to help prevent melanoma?

- _____
- _____

Six Months Later YAY!!! My chemo is done. But I can't be sure that the chemo killed all the cancer cells. Will I be one of the lucky ones who remains cancer free or will my melanoma reoccur in the future? Only time will tell.

5. What does a cancer reoccurrence mean?

Part 3: Sun Safety Research

The list below describes three things that some people say will work as well as using sunscreen to reduce exposure to UV radiation from the sun. **You will design and conduct an experiment to compare the effectiveness of ONE of these to the effectiveness of sunscreen.**

1. **Research Question:** Does (*circle the one you will be testing below*) work as well as or better than sunscreen for protecting your skin from harmful UV light that may cause skin cancer?
 - a) Going into the water (for example a swimming pool or lake)
 - b) Wearing long pants and long-sleeved shirts
 - c) Sitting in the shade of an umbrella

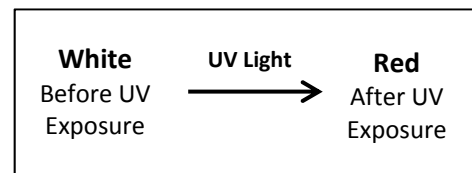
You have these items in your lab kit that you can use for your experiment:

- 15 UV color changing beads in a brown plastic bag
- 3 bowls for the beads, labeled “Negative Control Group,” “Positive Control Group,” and “Experimental Group”
- A cotton pad for applying sunscreen to the beads
- 3 sheets of black paper to cover the beads in the bowls until you expose them to light
- A package of sunscreen (you may pour the sunscreen onto the cotton pad and use it to wipe sunscreen onto some of the beads)
- A piece of white fabric to simulate long pants or a long-sleeved shirt
- A paper umbrella and a small piece of clay to support the umbrella

You can also use tap water for your experiment (to simulate swimming pool or lake water).

To model the effect of UV light on skin, you will use the special UV color changing beads that turn from white to pink to red when exposed to UV light.

These UV color changing beads appear white while indoors, but when you take them outside the ultraviolet-sensitive pigment will change to pink and then to red. You can even make a color scale from white to pink to red to measure low, medium, and high UV light intensity.



2. What is the **Hypothesis** that you will be testing in your experiment?

Experimental Group

What I Changed

Positive Control Group

The group where an effect is expected. For example, where a treatment is known to prevent sun damage.

Negative Control Group

The group where no effect is expected. For example, where no treatment to prevent sun damage is used.

3. How should the **Experimental Group** be treated?

4. How should the **Positive Control Group** be treated?

5. How should the **Negative Control Group** be treated?

6. For a fair comparison, list two ways that the two control groups and the experimental group should be the same.

- _____
- _____

9. What is the **Independent Variable** in your experiment?

10. What is the **Dependent Variable** in your experiment?

11. What are two **Controlled Variables** in your experiment?

12. Conduct your experiment (set it up and collect data). You will need to take your experiment outside, place it next to an open window, or use a UV lamp to expose the beads to UV light.

13. Make a data table below to summarize the results of your experiment.

Independent Variable <i>What I Changed</i>
Dependent Variable <i>What I observed</i>
Controlled Variables <i>What I kept the same</i>

14. Do the results of your experiment support or refute the hypothesis that you were testing?
Refer to your hypothesis in question 2. Provide evidence from your experiment.

15. Describe two changes that you might make to improve the design (set up and/or data collection) for your experiment.

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- ---

Part 4: Sofia's Story Continued - Preventing Melanoma

I hope my story will help people change the way they think about tanning. Camilla, Zoey, and I decided we should do something to make people aware of the dangers of tanning and the importance of sun safety.

I made a list of things people should know about skin cancer. Zoey said that my list was boring. She suggested that an infographic would be a more interesting way to get information across to our friends. Zoey explained that an infographic takes a large amount of information and condenses it into pictures and brief text so that viewers can quickly grasp information.

1. Your kit contains a sheet of pictures and captions for you to use to make an infographic. Cut along the lines to cut out the 10 pictures and 10 captions.
2. Match each of the 10 pictures with the appropriate caption.
3. Select the five most important pictures and captions that you would use to make your friends aware of things that they should do to avoid skin cancer.
4. Your kit also has a **Skin Cancer and Sun Safety** sheet. Use glue or tape to attach the five pictures and captions that you selected to the **Skin Cancer and Sun Safety** sheet to make a "Skin Cancer and Sun Safety" infographic.