<table>
<thead>
<tr>
<th>Week 8</th>
<th><strong>The Cell Cycle and Cancer</strong></th>
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<td><strong>Parent Information</strong></td>
<td>All cells go through a series of specific, predictable life stage which biologists call the cell cycle. These steps include growth, development, performing a specific function, and mitosis (cell division). Some cells proceed through the steps rapidly. For example, some bacteria complete the entire cycle in only 20 minutes. Other cells, like nerve cells may take years to complete the cycle, or never get to the final step. There are hundreds of genes which control each step in the cell cycle and a mutation in any one could result in problems for the cell, organ or organism. Most cancers are the result of the cell losing control over one or more steps in the cell cycle, usually leading to uncontrolled cell division (mitosis).</td>
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<td><strong>Benchmark</strong></td>
<td>SC.912.L.16.8 Explain the relationship between mutation, cell cycle, and uncontrolled cell growth potentially resulting in cancer.</td>
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<td><strong>Objective</strong></td>
<td>The student will be able to describe mutations, how they may influence the cell cycle and may result in cancers.</td>
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<td><strong>Duration</strong></td>
<td>1-2 hours</td>
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<td><strong>Materials</strong></td>
<td>Cancer Information slides (attached) Research Books or Internet Access</td>
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| **Procedures** | Use the attached slides and your research materials to answer the following discussion questions.  
1. Juan is a high school junior. Because his mother is of Mexican descent he has always been able to tan easily. A typical day for Juan is to wake up, shower & brush his teeth, go to school, and attend a two hour football or baseball practice. The girls just love coming to watch Juan throw the ball at practice. Juan knows this and constantly practices shirtless to show off for the ladies!  
   a) Is Juan at risk for skin cancer?  
   b) What are the behaviors that put him most at risk for skin cancer?  
   c) Is there anything Juan can do to prevent further harm or damage to his skin?  
2. Jessica is a high school senior. Fortunately she knows the damage the sun can cause, so every day she puts on makeup with an SPF of 8. Whenever she goes to the beach with her friends she stays in the sun a maximum of 2 hours to prevent her from getting sunburned.  
   a) Is Jessica at risk for skin cancer?  
   b) What are the behaviors that put her most at risk for skin cancer?  
   c) Is there anything Jessica can do to prevent further harm or damage to her skin?  

NOTE: There is data to suggest that severe sunburns in childhood may greatly increase risk of melanoma in later life, children, in particular, should be protected from the sun.
3. Cacee is another high school senior, one of Jessica’s best friends. Like Jessica she knows that the sun can cause skin cancer. To avoid unnecessary exposure to the sun Cacee lifeguards at an indoor pool. However, to compensate, she visits the tanning bed once a week (for only 20 minutes) because she knows tanning beds don’t emit UVB rays. To be extra safe while in the bed, she uses an oily sun tan lotion with an SPF of 2.

   a) Is Cacee at risk for skin cancer?

   b) What are the behaviors that put her most at risk for skin cancer?

   c) Is there anything Cacee can do to prevent further harm or damage to her skin?

### FCAT Practice

1. A group of scientists are studying a group of cells. They notice that the cells are not dividing, but their DNA has replicated. Which step of the cell cycle are these cells in?

   A. G1  
   B. S  
   C. G2  
   D. M  

   Answer: C

### Extra Help


[http://www.cancerquest.org/cancer-biology-animations.html?gclid=CJWsp4bY-K8CFQKcnQod0XdRTg](http://www.cancerquest.org/cancer-biology-animations.html?gclid=CJWsp4bY-K8CFQKcnQod0XdRTg)
9th Grade Science Summer Activity

Diagram of the Cell Cycle
What is Cancer?

- Changes to the DNA of a cell (mutations) lead to cellular damage.
- Mutations enable cancer cells to divide continuously, without the need for normal signals.
- In some cancers, the unchecked growth results in a mass, called a tumor.
- Cancerous cells may invade other parts of the body, interfering with normal body functions.

Skin Cancer Statistics

- **Statistics (7)**
  - According to the American Cancer Society, skin cancer is the most common cancer in the United States, with over 1 million cases diagnosed per year.
  - Over 10,000 deaths estimated yearly in the U.S.
  - Survival rates are very good when skin cancer is detected early.
    - 5 year survival rates:
      - Localized melanoma – 99%
      - Regional melanoma – 65%
      - Distant melanoma – 15%
Detection of Skin Cancer

- **ABCDE’s of Skin Cancer (3)**
  - These are the general characteristics used to identify skin growths of possible concern
  - A – asymmetry – one half doesn’t look like the other
  - B – border – irregular, ragged or blurred edges
  - C – color – a mixture of colors or marks that change color
  - D – diameter – a growth more than 6 millimeters across
  - E – evolution – changes in shape, size or color

Note that not every skin cancer will have all of the following characteristics. Medical advice should be sought for any suspicious area or when an existing mark has a change in appearance.

The Big Risk: Ultraviolet (UV) Radiation

- **Understanding UV Radiation**
  - The nuclear reactions that fuel the sun and other stars release an enormous amount of energy
  - This energy is emitted as radiation of several kinds, including visible light and the heat that warms the earth
  - UV light is a type of high energy (short wavelength) radiation that is produced by the sun
  - There are three types of UV radiation: UVA, UVB, UVC

**UV RADIATION (ALL TYPES) IS THE MAIN CAUSE OF SKIN CANCER**
**Prevention**

"Slip! Slop! Slap! Wrap!"

- **Slip** on a shirt,
- **Slop** on 15 SPF (or higher) sunscreen,
- **Slap** on a hat,
- **Wrap** on sunglasses

before any exposure to the sun.

*From ACS Skin Cancer Fact Sheet 2006*

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**Tanning Myths**

- **Myth:** Tanning beds are safer than the sun
- **Reality**
  - **NO!**
  - Most tanning bed lamps emit both UVA and UVB rays
  - A study from Dartmouth in 2002 showed tanning bed users had 2.5 times the risk of SCC and 1.5 times the risk for BCC. (19)
  - “Indoor tanning...is a dangerous practice leading to a vast array of adverse effects” (10)
Cancer Myths

- Myth: Darker skinned people don’t get skin cancer
- Reality
  - False!
  - They are at risk for skin cancer and most frequently at risk for melanoma
  - Frequent areas from cancer in darker skinned people are palms, soles, under nails, in the mouth, or on genitalia
  - NO ONE is 100% risk free from skin cancer