

STUDENT ELECTRONIC VERSION:

Living Earth: Week 5 Assignment → 5/4 - 5/11 Name: _____ pg.1

Past Big Ideas :

1. In the past weeks you have learned about how cells are triggered to differentiate to become specific cell types to support multifunctioning organisms.
2. Specific cells make up organs and you have also learned how those organ systems work to properly support all your body functions, maintaining homeostasis.

This Week's Big Ideas: Cell Cycle

This week you are going to learn about the life cycle of a cell. Within this life cycle is a time when cells are triggered to divide and make more of themselves. This process is called *Mitosis* (NOT Meiosis). This process is basically cloning, every cells' DNA replicates (now has 2 sets) and those chromosomes separate into 2 new cells. Sounds simple, but it is actually a highly regulated process. You will learn why cells need to replicate and the triggers that keep this process working correctly. You will also learn about what can happen if the triggers don't regulate the process correctly...cancer!

Assignments:

1. Please log into the HMH app via Clever in order to do the Textbook Assignment There are 2 sections to read this week.

First:

Unit 7: Lesson 1 –Mitosis and the Cell Cycle

Explore/Explain 1: Overview of the Cell Cycle

- Please Highlight and annotate as you read → this should help you answer questions correctly on the Reading Quiz
- Answer the questions within the text thoroughly
- When finished with this section go back to “assignments” and click “I’m Done” to submit

Second:

Unit 7: Lesson 1 –Mitosis and the Cell Cycle

Explore/Explain 2: Mitosis and Cytokinesis

- Please Highlight and annotate as you read → this should help you answer questions correctly on the Reading Quiz
- Answer the questions within the text thoroughly.
- You DO NOT NEED TO DO THE hands-on-activity of Modeling ☺
- When finished with this section go back to “assignments” and click “I’m Done” to submit.

2. Watch this quick video 1 “How the Cell Cycle Works” (3:00)

<https://www.youtube.com/watch?v=g7iAVCLZWuM>

3. Watch this quick video #2 on check points “Check Points in the Cell Cycle” (1:30)

<https://www.youtube.com/watch?v=DSeZZGxkYzo>

4. Take the Living Earth Week 5 Textbook Reading and videos 1 & 2 Quiz 1 (Copy and paste the following link into your browser.)

<https://forms.office.com/Pages/ResponsePage.aspx?id=bsSeXYwVl0uXor1txqc9lkzD7ovUBylluEOjUbcSsIJUMkFPNE9BRFRCSVY0NIJSN1hBMjFDWlpYQS4u>

What you have **read about** in the text book and **have heard** in the videos is the **normal cell cycle**. At times, this cycle does not function properly. Sometimes the checkpoints are over ridden (or blocked) by proteins and the proper checks are not made, this results in mutated cells (cells with damaged DNA) multiplying. There are a number of factors that contribute to this. Please watch these next two videos and read the information about the P53 gene.

5. Watch this **video #3** The Cell Cycle and Cancer (9:19)
<https://www.youtube.com/watch?v=QVCjdNxJreE&t=460s>

6. Watch this **video #4** How are Cancer cells different from Normal cells (3:50)
<https://www.youtube.com/watch?v=BmFEoCFDi-w>

Cancer and the p53 Gene

You have previously learned about genes and have also heard that mutated genes can lead to problems with the cell cycle, leading to cancer. There are many genes that control the regulation of the cell cycle. One very important gene is the **P53 gene**. Please read the following information about this and highlight important information as you are reading to help you on the quiz at the end.

“p53 protein has been voted molecule of the year”

The **p53** gene, found on chromosome 17 in humans, produces a protein called the **P53** or **tumor protein**. **This protein** regulates the cell cycle and so functions as a **tumor suppressor**. **(It suppresses or fights down problems that lead to tumor formation)**. It is very important for cells in multicellular organisms to **suppress tumors and cancer**. P53 has been described as "the guardian of the genome", referring to the facts that this protein carries out three major functions :

1. Slows or stops the cell cycle from advancing through the cell cycle if DNA is damaged
2. Helps in DNA repair
3. Triggers Apoptosis (cell death)

Defective p53 (due to mutation) could allow abnormal cells to proliferate(grow uncontrollably) resulting in cancer. If the p53 gene is damaged, tumor suppression is severely reduced. People who inherit only one functional copy of p53 will most likely develop tumors in early adulthood, a disease known as Li-Fraumeni syndrome. p53 can also be damaged in cells by mutagens (chemicals, radiation or viruses), increasing the likelihood that the cell will begin uncontrolled division. More than 50 percent of human tumors contain a mutation in or a deletion of the p53 gene.

Keep going!!

7. Take the Video 3 &4, p53 info **Quiz #2 1** **(Copy and paste the following link into your browser.)**
<https://forms.office.com/Pages/ResponsePage.aspx?id=bsSeXYwVI0uXor1txqc9IkzD7ovUBylluEOjUbcSiJUNINCOENYVVZVVeTCUIZQRDVHV1ROR05XTy4u>

Congratulations!! You have completed week #5!!