**The Cell Cycle – Independent Web-Based Lesson**

1. ***Go onto moodle and open the files in the folder* “The Cell Cycle – Independent Web-Based lesson”**

**Day 1: Stations 1 – 3**

**STATION 1:**

**Introduction to the Cell Cycle**

Go to [www.cellsalive.com/cell\_cycle.htm](http://www.cellsalive.com/cell_cycle.htm) and watch the animation. Choose Play the Animation. Read the description by clicking on the stages on the side complete the section below.

Interphase can be further divided into phases: G0, G1, S, and G2.

1. During which specific phase does DNA replication take place? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is the cell doing during G1 and G2? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. What is an example of a cell that stays in G0 permanently? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What is being checked during G1 Checkpoint? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What is being checked during G2 Checkpoint? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Cell Cycle Animation and Video**

1. Go to the website and click on Mitosis and Cytokinesis and watch the video

<http://highered.mheducation.com/sites/0072495855/student_view0/chapter2/animation__mitosis_and_cytokinesis.html>

1. Go to the website:

<http://www.cellsalive.com/mitosis.htm>

On this site you can watch the entire cell cycle uninterrupted and then look at specific stages of mitosis frozen in time by clicking on the name.

1. Complete the worksheet provided by stating what happens in each stage of mitosis beside the diagram in point form.

**Interphase**



1. **Prophase**

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1. **Metaphase**
2. **Anaphase**



1. **Telophase**





Cleavage Furrow

1. **Cytokinesis**

**STATION 2:**

**Open the file: Station 2 - Cell Cycle Smart board activity**

1. Complete the matching activity, and then record the terms and definition.

|  |  |
| --- | --- |
| **Term** | **Definition** |
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2. Complete the identifying activity, and then complete a sketch of each stage.

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| --- |
| **Interphase** |
|  |
| **Prophase** |
|  |
| **Metaphase** |
|  |
| **Anaphase** |
|  |
| **Telophase** |
|  |
| **Cytokinesis** |
|  |

**STATION 3:**

Teacher’s initial:

**Open the file: Station 3 Cell cycle picture sort**

1. Drag each of the pictures and order them on the circle in order starting from interphase.
2. Have the teacher check when complete.
3. Take a photo for review.

**Day 2: Complete the following questions using the links provided.**

***NOTE: If you are using a Tablet, you must use “Dolphin Browser” to access each webpage.***

* *Go to:* [*http://www.nobelprize.org/educational/medicine/2001/cellcycle.html*](http://www.nobelprize.org/educational/medicine/2001/cellcycle.html) *and play the game using your knowledge so far. Then number the following steps in the correct order:*

\_\_\_\_\_ cell growth \_\_\_\_\_ DNA duplication

\_\_\_\_\_ G1 checkpoint \_\_\_\_\_ mitosis (including chromosome separation and cell division)

\_\_\_\_\_ cell growth \_\_\_\_\_ G2 checkpoint

* *Go to:* [*http://www.pbslearningmedia.org/asset/lsps07\_int\_celldivision/*](http://www.pbslearningmedia.org/asset/lsps07_int_celldivision/) *and click through the steps of cell division. Read through the descriptions to make sure you understand the process. Once you have gone through the steps a few times, answer the following questions.*

1. The centrosome is a structure involved in chromosome separation, made up of two centrioles. What structures extend from the centrosome? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. After the DNA strands have been duplicated, what do they coil and bunch up into? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What happens to the nucleolus and the nuclear membrane during cell division? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Where do the chromosomes line up before they are separated? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What is the role of the microtubule spindles during cell division? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* *Go to:* [*http://www-tc.pbs.org/wgbh/nova/assets/swf/1/how-cells-divide/how-cells divide.swf*](http://www-tc.pbs.org/wgbh/nova/assets/swf/1/how-cells-divide/how-cells%20divide.swf) *and click through the steps, focusing only on the LEFT SIDE (mitosis). Read through the descriptions to make sure you understand the process. Answer the following.*

Identify the phase of mitosis (prophase, metaphase, anaphase, and telophase) in which the following events occur:

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Duplicated strands of DNA condense into chromosomes.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Nuclear membrane breaks down.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Centrioles finish migrating to opposite ends of the cell.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Chromosomes line up in the middle of the cell.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Chromosomes are separated into sister chromatids by spindle fibres.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Nuclear membrane forms around separated chromatids.

Once mitosis is complete, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ takes place during which the cell membrane pinches in and divides the cytoplasm and its contents into two identical daughter cells.

* *Go to:* [*http://www.glencoe.com/sites/common\_assets/advanced\_placement/mader10e/virtual\_labs\_2K8/labs/BL\_03/*](http://www.glencoe.com/sites/common_assets/advanced_placement/mader10e/virtual_labs_2K8/labs/BL_03/) *and follow steps 1 to 4 on the left of the screen to learn about the cell cycle and cancer.*

***When you have finished step 4, click on the “CHECK” button to label all the cells under the microscope. Count the number of cells in each of the phases and record them in the data table below. Repeat the process for the different tissue slides.***

Data Table: Normal and Cancerous Cells

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Interphase** | **Prophase** | **Metaphase** | **Anaphase** | **Telophase** | **% Cells Dividing** | **% Cells at Rest** |
| **Normal**  **Lung** |  |  |  |  |  |  |  |
| **Cancerous Lung** |  |  |  |  |  |  |  |
| **Normal Stomach** |  |  |  |  |  |  |  |
| **Cancerous Stomach** |  |  |  |  |  |  |  |
| **Normal Ovary** |  |  |  |  |  |  |  |
| **Cancerous Ovary** |  |  |  |  |  |  |  |

1. Based on your data and observations, what is the major difference between normal cells and cancer cells? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. When studying cell division in tissue samples, scientists often calculate a mitotic index, which is the ratio of dividing cells to the total number of cells in the sample. Which type of tissue would have a higher mitotic index, normal tissue or cancerous tissue? Explain.

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1. Different types of normal tissues in the human body have different mitotic indices. From the following list, which normal tissues would you expect to have the highest mitotic index: muscle, skin, kidney, or lung? Explain your answer.

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