Mitosis and Meiosis Webquest

Name: ________________________

https://sites.google.com/site/mrbonersskyviewwebsite/online-assignments/mitosis-meiosis-webquest

Science 9

Date: ___________ Period: _______

Objective: In this activity, you will use the following web pages to examine the processes of mitosis and meiosis. Both of these processes are important in homeostasis as well as human reproduction.

PART A: Cell Growth and Mitosis

Please go to the following webpage:
http://plaza.ufl.edu/alallen/pgl/modules/rio/stingarees/module/index.html

1. What is the role of the cell membrane in cell division? The main function of the cell membrane is to control what goes in and out of the cell. It is made of a double layer of lipids (fats) imbedded with odd-looking protein molecules.

2. What is the role of the nucleus in cell division? The role of the nucleus is to be the control center of the cell and it contains chromosomes made up of long strands of molecules called DNA.

3. What is the role of the centrioles in cell division? The role of the centrioles in cell division is they duplicate and they help to anchor the spindle fibers.

4. What is the role of the microtubules in cell division? Microtubules are miniature tubes that act as the skeleton of the cell, just like our skeleton holds us together.

Click on the tab, “Why Must Cells Divide?”

5. Why are cells limited in size? Cells are limited in size because the outside (the cell membrane) must transport the food and oxygen to the parts inside. As a cell gets bigger, the outside is unable to keep up with the inside, because the inside grows at faster rate than the outside.

6. Click on the animation. A cell with 2 cm sides has what surface area? What volume? A cell with a side of 2 cm will have a surface area of 24 cm² but a volume of 8 cm³.

7. What would be the surface to volume ratio? The ratio of surface area to volume is 24/8 = 3. (Surface to volume ratio = S/V)
8. A cell with a large volume will have a more difficult time doing what? A cell with a large volume cannot supply the inside with all the nutrients that a cell needs.

<table>
<thead>
<tr>
<th>Side</th>
<th>Volume</th>
<th>Surface Area</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 cm</td>
<td>27 cm³</td>
<td>54 cm²</td>
<td>2</td>
</tr>
<tr>
<td>5 cm</td>
<td>125 cm³</td>
<td>150 cm²</td>
<td>1.2</td>
</tr>
<tr>
<td>7 cm</td>
<td>343 cm³</td>
<td>294 cm²</td>
<td>0.857</td>
</tr>
</tbody>
</table>

Click on the tab, “What Does Mitosis Do?”

9. What are the 2 major functions of mitosis? The main functions of mitosis are growth and repair. Note that nerve cells and muscle cells do not undergo cell division once they are fully formed. But skin cells and bone cells will repair themselves.

Click on the tab, “Built-in Controls in Mitosis”

10. What are the 2 ways that cells “know” to stop dividing? Cells know to stop dividing when they are in contact with each other. This is called “contact inhibition.” The other way is that there are “go” and “no go” switches that are located along the path the cell takes.

Please go to the following webpage:
http://www.emc.maricopa.edu/faculty/farabee/BIOBK/BioBookmito.html

11. What ends the cell division process where one cell splits from the sister cell? Various answers here - cells are different and it depends on the type of cell. For some it is when they reach maturity. For others is when there is no more space.

12. What is the genetic relationship between the cells in mitosis? Are the same or different? In mitosis the cells are called daughter cells and these cells are identical (same).

13. Some cells divide rapidly. Some not at all after maturity. Examples Nerve and muscle cells do not divide once they are mature. Skin cells and bone cells are just some of the cells that can replace tissue until repair is done. Cancer cells are cells that do not divide properly.
14. How is binary fission a similar process? **Binary fission happens in prokaryotic (bacteria) cells. Mitosis happens with eukaryotic cells.**

15. Label the following steps of mitosis:

![Cell Cycle Diagram](image)

**PART B: Meiosis**

Please go to the following webpage: [http://www.lpscience.fatcow.com/jwanamaker/animations/meiosis.htm](http://www.lpscience.fatcow.com/jwanamaker/animations/meiosis.htm)

16. What is the purpose of meiosis? **Meiosis is used to form sex cells (sperm and egg cells).**

17. **Start the animation.** What is the first thing the chromosomes do? **The first things the chromosomes start to do is replicate, or make copies of themselves.**

18. Crossing over occurs in Prophase I. What is the significance? **This is the exchange of genetic information.**

19. When the cells divide again, what happens to the number of chromosomes? **The number of chromosomes end up being half the number of the original cell.**

**What are different methods of cell reproduction? SUMMARY**
a. Fission – binary – cell divides into two equal halves (bacteria)
b. Budding – outgrowths from the outer surface of an organism
c. Asexual – mitosis – produces two cells that are exact copies of the original
d. Sexual – meiosis - produces the sex cells and each cell has half the number of chromosomes