

Name: _____

Per. _____



Mitosis WebQuest & Virtual Lab

Objective: In this lesson you will discover how the cells divide through a process called mitosis. You will also learn how uncontrolled cell division leads to cancer.

Before beginning, use the Learning Scale below to rate your knowledge. Place a check in the before box.

Before Lesson	Learning Scale	After Lesson
	4 I can conduct a discussion describing process of mitosis, identify all of the phases of mitosis, and discuss how uncontrolled cell growth leads to cancer.	
	3 I can describe the process of mitosis, identify and explain the phases of mitosis, and explain how uncontrolled cell growth leads to cancer.	
	2 I can identify the phases of mitosis and how describe how uncontrolled cell growth leads to cancer.	
	1 With help, I can identify some of the phases of mitosis and somewhat explain how uncontrolled cell growth leads to cancer.	
	0 I cannot identify any phases of mitosis and do not understand how uncontrolled cell growth leads to cancer.	

Task 1: Introduction To Mitosis

Use the following link to watch the "Mitosis" video by the Amoeba Sisters. As you watch, answer the following questions.

<https://youtu.be/f-ldPgEFAHI>

1. What do healed injuries, fingernail growth, and growing up have in common? _____

2. Mitosis produces ONLY what type of cells? _____

3. Why is it important that during mitosis, your cells only make identical cells? _____

4. Do cells divide all the time? _____ What is cancer? _____

5. In what phase of cell division do cells spend the most of their time? _____

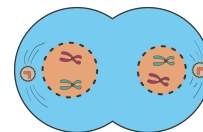
6. What 3 things do cells do during interphase? _____

7. What percentage of time do cells spend in Interphase? _____ What percent of time do they spend in mitosis? _____

8. What cell organelle holds your DNA and why is DNA important? _____

9. What two things are chromosomes made of? _____

10. How many chromosomes do our body cells contain? _____



11. In what phase do our cells make a copy of our chromosomes before mitosis starts? _____

12. What is a centromere? _____

13. What are chromatids? _____

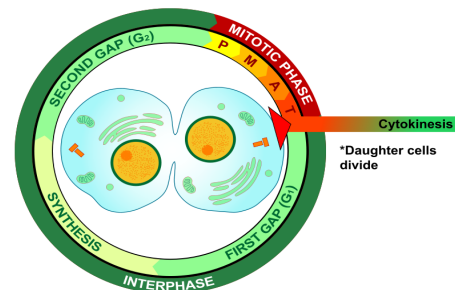
14. Write out the name of the phase that each letter of PMAT stands for.

P: _____

M: _____

A: _____

T: _____



Fill in the table below as you watch and learn about the different stages of mitosis.

Phase	Describe What Happens During This Phase	What Is One Way You Can Remember This Stage?
15. Prophase		
16. Metaphase		
17. Anaphase		
18. Telophase		
19. Cytokinesis		

20. What is cancer? _____

Task 2: In Depth Look At Mitotic Stages

Use the following link to complete the cell division interactive activity. While clicking through the activity, fill in the blanks to the following questions. <https://www.wisc-online.com/learn/natural-science/life-science/bio204/cell-division>

21. Through _____, _____ cells distribute genetic material to daughter nuclei. _____ divides the _____ and distributes organelles to the _____ newly formed _____ cells.

22. Each _____ strand was replicated earlier during the _____ of the _____ to form two _____ strands called _____. These chromatids are held together by _____

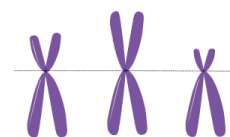
23. During prophase, the sister chromatids _____ and supercoil and become _____ for the first time during the cell cycle. The _____ begins to disintegrate. The _____ replicate and move away from each other due to microtubular action.

24. During metaphase the nuclear membrane has _____ disintegrated. The _____ reach the centromeres and align the sister _____ along the center of the cell.

25. During anaphase, the _____ move apart to free the sister chromatids so they can be pulled apart by the _____. Some spindle fibers shorten and length, _____ the dividing cell. Sister chromatids separate to _____ of the cell.

26. During telophase, nuclear membranes assemble around two _____ nuclei. Chromosomes _____ and the spindle _____

27. The daughter cells receive molecules and _____ within their cytoplasm. During cytokinesis, the _____ divides into _____ cells.



28. In the space table below. Draw what each phase of mitosis looks like. Be sure to draw the chromosomes, spindle fibers, and nuclear membrane in the appropriate phases.

Interphase	Prophase	Metaphase	Anaphase	Telophase	Cytokinesis

Task 3: Mitosis Matching

Use the following link to complete the Onion Root Tip activity from the Biology Project website. In this activity you will be shown cells from the tip on an onion root. You will classify each cell by clicking on what phase of mitosis it is in. At the end, you will count up your results and use that number to predict how much time a dividing cell spends in each phase. Base your calculation on a cell cycle of 24 hours. Place your data in the table below.

http://www.biology.arizona.edu/cell_bio/activities/cell_cycle/01.html

29.	Interphase	Prophase	Metaphase	Anaphase	Telophase	Total
Number Of Cells						
Percent Of Cells # cells ÷ 36						

30. What phase do cells spend the MOST time in? _____ The LEAST time in? _____

Task 4: Cancer & The Cell Cycle Virtual Lab

Click on the following link to complete the Cell Reproduction Virtual Lab on the McGraw Hill website. Follow the directions below to complete this activity. http://mhhe.com/biosci/genbio/virtual_labs/BL_23/BL_23.html

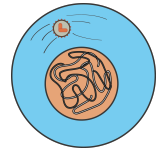
31. Click on the T.V. and watch the video. After telophase, what phase do the two new cells undergo? _____

32. Click on the "Information" tab in the lower right hand corner of the screen. Read about the three different types of cancers that are studied in this lab. What are the three types of cancer studied? _____

Click on the Microscope in the lab. Here you can use the tissue slides to look at normal and cancerous cells undergoing various phases of mitosis. You will label 5 cells in the boxes below them for each slide.

To label the cells

1. Click on the correct phase of mitosis in the Index Box on top of the screen
2. Click and drag the yellow label box above the image down to label the five cells in your current sample.
3. Click the Check Box to check your answers.
4. Collect your data for each tissue sample by recording the number cells in each phase in the table below.
 - To get the percentage of cells dividing, count the total number of cell actively undergoing mitosis. Divide that number by 20.
 - To get the percentage of cells not actively dividing, count the number of cells in interphase and divide that by 20.



33.	Interphase	Prophase	Metaphase	Anaphase	Telophase	% Of Cells Dividing	% Of Cells Not Actively Dividing
Normal Lung							
Cancerous Lung							
Normal Stomach							
Cancerous Stomach							
Normal Ovary							
Cancerous Ovary							

34. Based on your data, what are some differences between normal and cancer cells? How do their rates of cell division compare? _____

Task 5: Mini-Quiz (NO Internet Needed!)

Decide if each statement below is true or false. If it is true write "T" in the space provide. If it is false you must correct the statement, by writing a new word in to replace the underlined incorrect word in the space provided.

35. Cancer is a controlled cell division. _____
36. Cells spend 90% of their time in interphase. _____
37. The end result of mitosis is two identical daughter cells. _____
38. During metaphase, the cytoplasm is split to create two separate cells. _____
39. Centromeres are strands of replicated chromosomes. _____
40. During prophase the nuclear membrane around the nucleus begins to disintegrate. _____

Great Job! Don't forget to re-rate your learning on the scale on page 1 of this handout!