

Cell Reproduction: Mitosis and Meiosis WebQuest

Part I Mitosis:**Interactive Mitosis Tutorial**

<http://www.sci.sdsu.edu/multimedia/mitosis/>

1. What is mitosis?
2. Cells that are non-reproductive undergo mitosis. Which are the reproductive cells?
3. Mitosis occurs in eukaryotic cells. Describe a eukaryotic cell.

Click "For An Example." Then click on "What is Mitosis?"

You are now viewing a circle that represents a cell's life cycle. Move around the circle and describe what happens in each part of the cycle.

4. Describe what happens in the Interphase G1 phase.
5. Describe what happens in the Interphase S phase.
6. Describe what happens in the Interphase G2 phase.

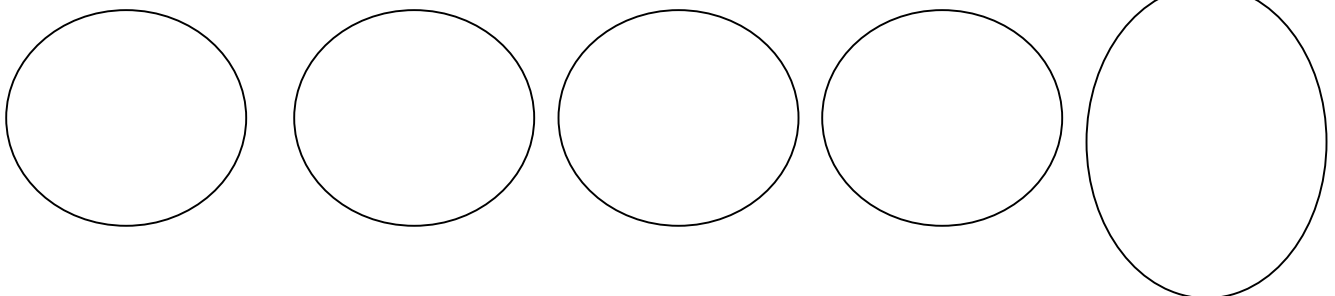
Next put the cursor over the 5 primary phases of mitosis and summarize what occurs in each phase.

7. Prophase
8. Prometaphase
9. Metaphase
10. Anaphase
11. Telophase

Click on Contents. Click on the Interactive Mitosis Animation. Adjust the speed to slow.

View the video and familiarize yourself with the movements of the chromosomes during each phase.

12. Do a simple sketch of each phase below and label each sketch with the name of the phase.



Click on Contents. Click on Plant Eukaryote Mitosis. View the movie.

13. How does plant cell mitosis differ from the mitosis of cells that lack a wall?

Mitosis Animation

<http://www.stolaf.edu/people/giannini/flashanimat/celldivision/crome3.swf>

On this site the phases of mitosis can be studied in more detail. Click the arrow to play the animation one step at a time.

Click once (G)

1. How many chromosomes are there?

Click once (S)

2. What happened to each chromosome?

Click once (G2)

3. What is happening to the chromosomes?
4. What do you think those grey rectangles represent?

Click once (Prophase)

5. Summarize what has happened.

Click once (Metaphase)

6. How are the chromosomes aligned (where are they in the cell?)?
7. What is attaching to the chromosome?
8. What do you hypothesize the purpose of these structures are?

Click once (Anaphase)

9. What is happening to each chromosome pair?

Click once and click again (Telophase and Cytokinesis)

10. Summarize what has happened to each chromosome pair in telophase.
11. Summarize what has happened during cytokinesis.

Onion Root Tip Activity

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

Study the pictures before continuing to the next page.

You will be viewing onion cells and determining which part of the cell cycle or mitosis they are in, when you have completed identifying the phases of each cell count the total number present in each column and enter the data below. Calculate the percentage of cells found in the specific phase by taking your number in the phase and dividing it by 36.

	Interphase	Prophase	Metaphase	Anaphase	Telophase	Total
Number of cells						36
Percent of cells						100%

Part II Meiosis:

Meiosis Tutorial

http://www.biology.arizona.edu/cell_bio/tutorials/meiosis/main.html

On the meiosis tutorial page click on "Reproduction" and answer the following questions or fill in the blanks.

Sexual Reproduction

1. New individuals are formed by a combination of two _____ cells. (_____)
2. What is fertilization?
3. What are the gametes in females? _____ In males? _____
4. Are the gametes haploid?
5. What does the ploid mean in terms of their chromosome number?
6. What is the new individual called?
7. How many chromosomes sets does the individual have?
8. What does diploid mean?
9. Summarize the process of meiosis.

Return to Meiosis Tutorial page. Click on Chromosomes in a Diploid Cell.

1. A diploid ($2n$) of human chromosomes consists of _____ chromosomes.
2. The haploid (n) number of human chromosomes consists of _____ chromosomes.
3. Autosomes are all the chromosomes except the sex chromosomes. You receive how many autosome chromosomes from each parent?
4. You receive one sex chromosome from each parent. A female would receive what combination of sex chromosomes? ____ A male would receive ____
5. Define haploid
6. Define diploid.
7. Most plants are made of _____ cells.
8. Eggs and sperm are _____

Meiosis Animation

<http://www.stolaf.edu/people/giannini/flashanimat/celldivision/meiosis.swf>

Click on the animation until you reach Telophase 1 Cytokinesis. REPEAT as many times as necessary to answer questions and summarize the first stage of meiosis.

1. At the start of this example how many chromosomes are in the cell?
2. What happens in the "S" phase to the chromosomes?
3. If a chromosome replicates but remains attached in the center does it count as one or two chromosomes?
4. What happens to the chromosomes at the end of prophase 1 that is different from mitosis?

Did you notice any trading of pieces between the red and blue chromosomes?

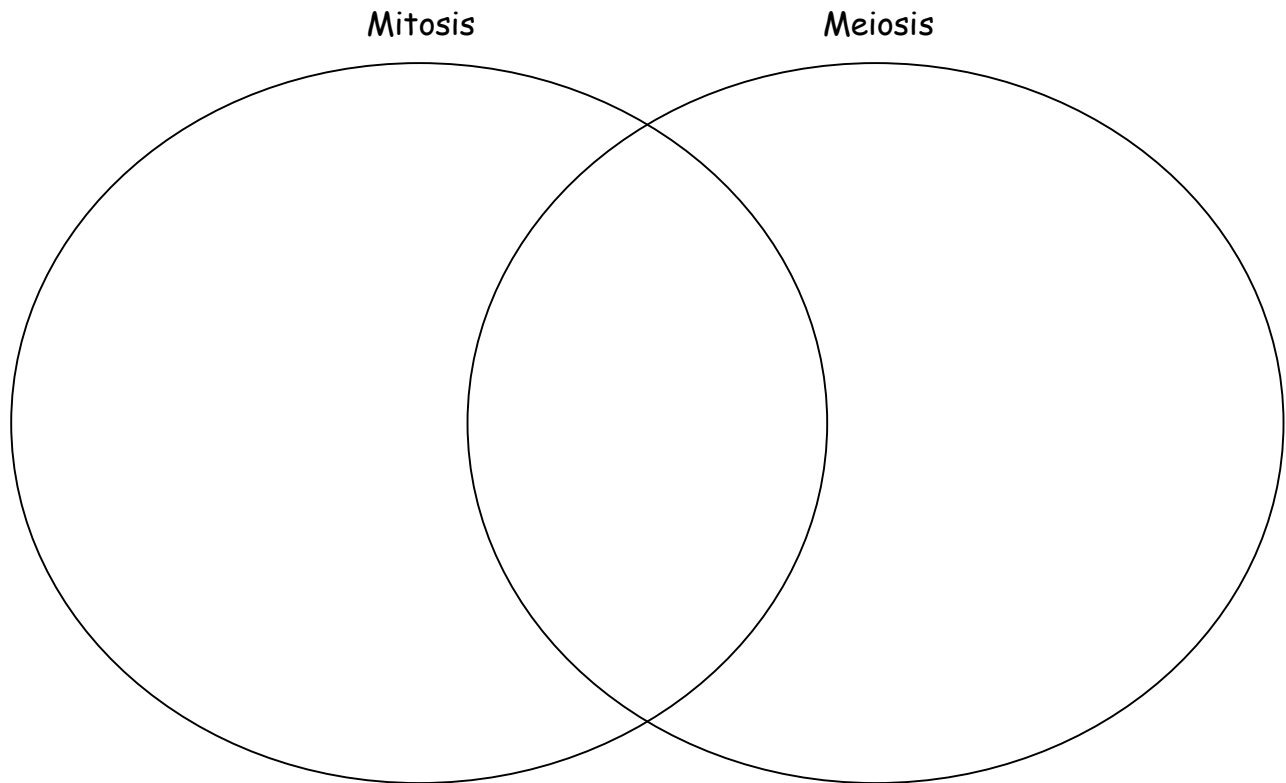
5. At which phase do the chromosomes separate?
6. At the end of telophase 1 and cytokinesis what do you end up with?
 - a. Number of cells =
 - b. Number of chromosomes in each cell =
7. Is each cell haploid or diploid?

Notice again that some trading of chromosome pieces has occurred; this is called crossing over and is responsible for genetic variation.

Continue to click on the animation until you reach the end of Meiosis 2. Repeat as many times as necessary to answer questions and summarize the second stage of meiosis.

1. How many cells are there in prophase 2?
2. If a chromosome has replicated and the two pieces are still attached at the center is that considered one chromosome or two?
3. How many chromosomes are in each cell in prophase 2?
4. What happens to the chromosomes in Anaphase 2?
5. What is the final product of this example of meiosis at Telophase 2 and cytokinesis?

Using ALL the previous sites and this additional site that helps to summarize meiosis (<http://www.accessexcellence.org/RC/VL/GG/meiosis.php>) compare and contrast mitosis and meiosis in the Venn Diagram.



Go back to http://www.biology.arizona.edu/cell_bio/tutorials/meiosis/main.html and click on Test yourself (10 problems). Quiz yourself and see how you do! Record your score here