Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Oreo Cookie Lab – Mitosis and Meiosis**

**Supplies:**

14 Oreo Cookies Paper Towels

Container of Sprinkles (rod shaped) Scissors

Icing Textbook

**Procedure:**

1. Have one person from your group obtain supplies for the Oreo Cookie Lab.
2. Open the green textbook to page 171 to view the diagram comparing Mitosis and Meiosis, use pages 141 & 174 to view the individual processes.
3. Every member of the group must wash their hands with soap and water. Set up your tray by lining it with Aluminum Foil.
4. Assign jobs to each member of the group:
   1. **Sprinkle Sorter**- In charge of picking out the necessary sprinkles.
   2. **Sprinkle Placer**- In charge of placing the sprinkles on the icing of the Oreo Cookies and spreading icing.
   3. **Director**- In charge of using the book to make sure the sprinkle placer is putting the sprinkles in the proper place.
   4. **Labeler and Organizer**- In charge of labeling the phases of Meiosis and that they are in proper order as well as making a legend for the sprinkle colors.
5. Start by gently twisting off one of the “outside” chocolate cookies from every Oreo cookie leaving only the “middle” or white icing and a chocolate cookie on the bottom.
6. Decide as a group what colors of sprinkles will represent the following parts of the cell during Meiosis:

* Chromosomes and Chromatids (2 colors)
* Meiotic Spindle (1 color)
* Nuclear Envelope (1 color)
* Centrioles (1 color)

1. Now you will be creating models for every phase of Mitosis and Meiosis included below (think about genetic recombination and crossing over):

* Interphase (use icing to write 2n on icing of 1 Oreo)
* Mitosis
  + Prophase (1 Oreo)
  + Metaphase (1 Oreo)
  + Anaphase (1 Oreo)
  + Telophase (1 Oreo and use 1 of the leftover “outsides” and spread icing in between the two cookies)
* Cytokinesis (2 Oreos – end product with two cookies write 2n on each cookie)
* Interphase (use icing to write 2n on icing of 1 Oreo)
* Meiosis
  + Prophase I (1 Oreo)
  + Metaphase I (1 Oreo)
  + Anaphase I (1 Oreo)
  + Telophase I (1 Oreo and use 1 of the leftover “outsides” and spread icing in between the two cookies)
  + Prophase II (2 Oreos)
  + Metaphase II (2 Oreos)
  + Anaphase II (2 Oreos)
  + Telophase II (2 Oreos and use 2 of the leftover “outsides” and spread icing between the two cookies)
* End Product- 4 Haploid Cells- Use two cookies and two leftover “outsides” and spread icing between them. Then use icing to write 1n on each cookie.

1. Make sure each model and phase is accurately represented, in order, and labeled. There should also be a key included that tells what each color represents.

Draw a labeled picture below of what your final products look like:

Draw a Venn diagram comparing/contrasting Mitosis and Meiosis.

**Oreo Cookie Lab Questions:**

1. Which stage is there two identical chromatids?
2. How many chromosomes are there in each cell when you are done?
3. What is the difference between haploid and diploid cells?
4. What is genetic recombination and crossing over? Please state how you demonstrated this in your models.
5. What are the benefits of Mitosis?
6. What are the benefits of Meiosis?
7. Which occurs more frequently in your body? Please explain your answer.
8. What are key differences between Meiosis I and Meiosis II?
9. What happens if one of your somatic cells undergoes unregulated cell division?
10. What regulatory steps are in place to control cell division?
11. Please match the descriptions below to the correct phase:
    1. The tetrads line up at cell’s midline
    2. Part of interphase - cell makes a copy of its nuclear DNA
    3. Homologous chromosomes synapse forming tetrads, nuclear envelope breaks down and meiotic spindle starts to develop
    4. Sister chromatids remain attached at their centromeres and homologous chromosomes separate and move to opposite poles
    5. Part of interphase - cells grow, carry out normal functions and replicate their organelles
    6. One of each pair of homologous chromosomes is at each pole and cytokinesis occurs
    7. Part of interphase - this is a time of additional growth for the cell
    8. Cytokinesis is occurring and there is a single chromosome at each pole
    9. Chromosomes line up along cell’s midline
    10. Chromosomes condense, but DNA is not replicated
    11. Sister chromatids separate and chromosomes move to opposite poles
    12. The fourth stage in the cell cycle and results in two identical daughter cells
12. Prophase I
13. Metaphase I
14. Anaphase I
15. Telophase I
16. Prophase II
17. Metaphase II
18. Anaphase II
19. Telophase II
20. Gap 1 (G1)
21. Synthesis
22. Gap 2 (G2)
23. Mitosis