Name: _____ Period:_____Date:_____

What's the Diff? - Binary Fission, Mitosis, and Meiosis

Background Information:

What Is Binary Fission?
The reproduction of prokaryotic cells (eubacteria and archaebacteria) is accomplished through binary fission. A bacterial cell that is ready to divide first copies its genetic material, circular DNA. The two newly copied DNA strands, each attached to the plasma membrane, move apart as the cell **elongates**. Once the two copies of genetic instructions are separated, the cell divides, laying down new cell wall and membrane between the two chromosomes. The two resulting **daughter cells** are identical to the parent cell. The time required to complete this process varies widely among bacteria.

What Is Mitosis and Cytokinesis?
Mitosis is division of a somatic cell's nucleus in eukaryotic organisms. **Somatic cells** are all cells of the body, other than the reproductive cells of sexually reproducing organisms—sperm and egg. There are four phases of mitosis: **Prophase, Metaphase, Anaphase and Telophase**. Although more complicated in it timing and execution, and involving more DNA, the basic result of mitosis is the same as that of binary fission—chromosomes are replicated, copies are moved to opposite ends of the parent cell, and then the parent cell divides, giving rise to two daughter cells that are identical to each other and to the parent cell. Mitosis is how single celled eukaryotic organisms reproduce, and how multi-cellular eukaryotes develop, grow, and repair. After mitosis **Cytokinesis** occurs splitting the cell into two cells each with their own nucleus.

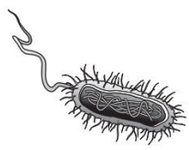
What is Meiosis?
Meiosis is the production of sperm and eggs in sexually reproducing individuals. The process of meiosis reduces the **chromosome** number by half, so that when a sperm fertilizes an egg, the resulting **zygote** has a full set of chromosomes. During meiosis there are two cell divisions of a **diploid** (2n) parent cell, resulting in four **haploid** (n) gametes.

Directions: Use context clues and your notes to define the BOLD words:

1. Elongate: _____
2. Daughter cells:_____
3. Somatic Cells:_____
4. Prophase:_____
5. Metaphase:_____
6. Anaphase:_____
7. Telophase:_____
8. Cytokinesis:_____
9. Chromosome:_____
10. Zygote:_____
11. Diploid:_____
12. Haploid:_____

Directions: Answer the following multiple choice questions.

13. Sexual reproduction in animals depends on the production of gametes. Which of these produces gametes in animals?
    a. Mitosis
    b. Fertilization
    c. Meiosis
    d. Binary Fission




14. Four different types of cells are shown to the right.
    Which characteristics is shared by all the cells?
    a. A mechanism for transforming sunlight
    b. Self-locomotion
    c. Membrane-bound organelles that transport substance
    d. Genetic Material composed of DNA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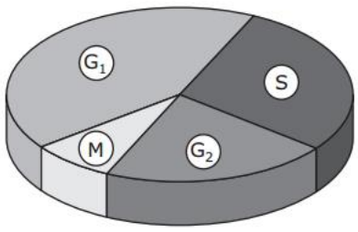
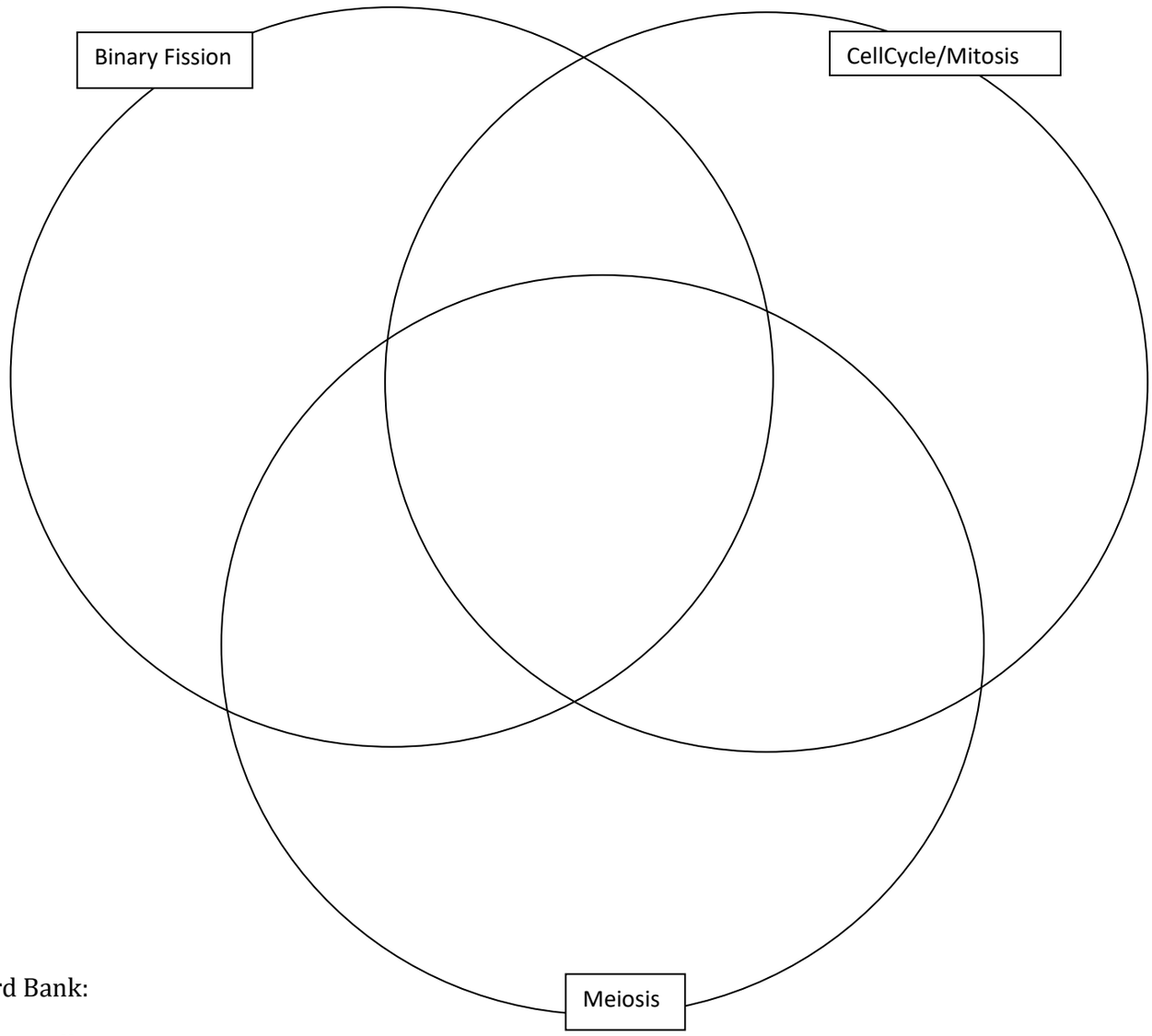
15. Checkpoints occur between the stages of the cell cycle. If a cell does not meet certain criteria at the end of the stage, it will not move to the next stage.



Which of these occurs just before the cell enters the G2 stage of the cell cycle?

a. The nuclear membrane disengages
b. DNA replicates
c. Centrioles form
d. The nucleus divides

Directions: Use the provided word bank to fill in the Venn diagram. Only use the **number** provided in the diagram. **Do NOT write the whole word**.



Word Bank:

1. Cell Division
2. Haploid Cells
3. Diploid Cells
4. Gametes
5. Somatic Cells
6. Eubacteria
7. DNA Replication
8. Cytokinesis
9. Linear DNA
10. Sperm
11. Muscle Cell
12. Division of Nucleus
13. One Cell Division
14. Two Cell Divisions
15. Crossing Over
16. Identical
17. Different
18. 2n
19. N
20. PMAT
21. PMAT 2
22. Liver cell
23. Chromosomes
24. Centrioles
25. Spindle Fibers
26. Archaebacteria
27. Egg