MITOSIS AND MEIOSIS
VOCABULARY LIST

Anaphase: The mitotic stage that follows metaphase; duplicated chromosomes separate at the centromere and migrate toward the mitotic centers.

Asters: Microtubules and fibers that radiate out from the centrioles.

Asexual Reproduction: Reproduction involving only one parent.

Blastula: A hollow ball of cells formed during the early stages of embryological development. Whitefish blastula cells are used to demonstrate animal mitosis.

Centromere: The part of a chromosome where the chromatids are joined together.

Centriole: In animal cells, a cytoplasmic organelle that organizes the mitotic spindle fibers during cell reproduction.

Chromatid: One of the two strands that make up chromosomes seen in prophase and metaphase that have duplicated their DNA during interphase. During anaphase, chromatids separate to form daughter chromosomes.

Chromatin: The coils of DNA and protein that condense to form chromosomes. Chromatin can be thought of as chromosomes with no distinct shape.

Chromosome: Distinct wormlike structures formed from chromatin during cell reproduction.

Crossing Over: An exchange of chromosomal material between homologous pairs that occurs during prophase one of meiosis.

Cytokinesis: Cytoplasmic division that follows division of the nucleus.

Diploid: Having two of each chromosome. Humans have 23 different chromosomes, yet in each body cell, these chromosomes occur in twos called homologous pairs. For this reason, each body cell possesses a diploid number of 46 chromosomes.

DNA Replication: The process of doubling the DNA that occurs before mitosis.

Germ Cells: The only cells that can undergo meiosis—found in the ovaries of females and the testes of males.

Haploid: The actual number of different types of chromosomes a cell possesses.

Homologous Pairs: In diploid cells, a pair of identical chromosomes is called an homologous pair.

Interphase: The phase of a cell’s life cycle between the reproductive stages of mitosis. DNA replication occurs during interphase. Most cells spend about 95% of their life cycles in interphase.

(Continued on Blackline Master 2)

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**Mitosis and Meiosis**

**Vocabulary List**

(Continued from Blackline Master 1)

**Meiosis:** The process that germ cells undergo by which the number of diploid chromosomes is reduced by half. Sperm and egg cells are created by meiosis.

**Metaphase:** The stage of mitosis where duplicated chromosomes line up along the center of the mitotic spindle.

**Microtubules:** Tiny tubes that make up most of a cell's "cytoskeleton." Spindle fibers are made up of microtubules.

**Mitosis:** The duplication and division of the chromosomes and nucleus during cell reproduction.

**Mitotic Centers:** The centers of mitotic activity of a cell--toward which separated chromosomes migrate.

**Oogenesis:** The meiotic process that results in the formation of eggs in a female.

**Ova:** Another word for eggs.

**Ovum:** One egg.

**Polyploid:** Having more than a diploid number of chromosomes.

**Prophase:** The first stage of mitosis when chromosomes form from chromatin and the nuclear membrane is absorbed into the cell.

**Reduction Division:** Cell division such as occurs in meiosis that results in the production of cells with half the number of chromosomes found in the original parent cells; cell reproduction without DNA replication.

**Sexual Reproduction:** Reproduction requiring two parents.

**Somatic Cells:** Body cells. Cells other than germ cells.

**Spermatogenesis:** The meiotic process that results in the formation of sperm cells in males.

**Spindle Fibers:** Microtubules visible during cell division that are involved in separating the chromosomes into two separate, yet identical groups.

**Synapsis:** The pairing of homologous chromosomes during meiosis. Synapsis does not occur during mitosis.

**Telophase:** The last stage of mitosis when the chromosomes return to the form called chromatin and the nuclear membrane reforms. Telophase usually happens simultaneously with cytokinesis.
MITOSIS AND MEIOSIS

THE STAGES OF MITOSIS

- Early Prophase: thickened chromosomes
- Late Prophase: chromatids visible
- Metaphase: centromeres align independently

MITOSIS

- Anaphase: chromatids move apart as separate chromosomes
- Telophase: chromosomes group in nuclear region
- Two Cells
MITOSIS AND MEIOSIS

THE STAGES OF MEIOSIS

EARLY through LATE PROPHASE-1

thickened chromosomes
homologous chromosomes form pairs (synapsis)
chromatids visible

MEIOSIS

METAPHASE-1
centromeres align in pairs on spindle

ANAPHASE-1
centromeres do not divide

TELOPHASE-1
chromosomes with chromatids group in the nuclear region

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MITOSIS AND MEIOSIS

THE STAGES OF MEIOSIS

PROPHASE 2
no prior DNA replication, hence no new chromatids are formed

METAPHASE 2
centromeres are arranged on new spindles

MEIOSIS

ANAPHASE 2
sister chromatids separate and move to poles of cells

TELOPHASE 2
four new haploid cells result from this stage
MITOSIS AND MEIOSIS
CROSSWORD PUZZLE

Down
1. Only _______cells can undergo meiosis.
2. When a cell first starts to undergo mitosis, it loses its nuclear membrane and chromosomes are formed from chromatin. This stage of mitosis is called _________.
3. Chromosomes move rapidly toward the mitotic centers during _________.
4. Sperm and egg cells result from a special type of cell division called _________.
5. DNA undergoes a process called _________ when it is duplicated.
6. When a cell is not undergoing the process of mitosis, it is in a stage called _________.
7. If an organism possesses just four different kinds of chromosomes and yet its cells have a total of eight chromosomes, eight would be its ________ number of chromosomes.
8. For the organism described above in the previous question, its _________ number of chromosomes is four.

Across
4. Duplicated chromosomes are arranged in the middle of the spindle during _________.
9. The stage of mitosis that happens at the same time the cytoplasm divides is called _________.
10. Eggs are also called _________.
11. The arrangement of microtubules that become visible during mitosis and that separate the chromosomes into equal groups is called the _________.
12. Telophase is the final stage of _________.

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MITOSIS AND MEIOSIS
INTERACTIVE VIDEO QUIZ

Directions: Fill in the blank with the correct answer or circle True or False.

Part 1  Mitosis

1. The state of mitosis seen here is called ________________.

2. Chromatin shortens and thickens to form these distinct structures called______________.

3. DNA is replicated during the stage between cell divisions called ________________.

4. True or False: The division of the cytoplasm following mitosis is called cytokinesis.

5. The first stage of mitosis, the stage when the nuclear membrane begins to be reabsorbed into the cell, is called ________________.

Part 2  Meiosis

1. As a result of meiosis, sex cells are formed that have _______ the number of chromosomes of body cells.

2. True or False: Pairs of identical chromosomes are also called homologous chromosomes.

3. True or False: Normal body cells are diploid because they possess one of each different chromosomes.

4. True or False: During meiosis, the DNA is replicated twice.

5. True or False: In plant and animal cells, meiosis occurs only in germ cells.

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