

Name _____

Hour _____

Date _____

Demonstrating Cell Cycle/Mitosis with Pipe Cleaners Group Activity

Objective: In groups, students will demonstrate the events of the cell cycle/mitosis for a eukaryotic organism that has 4 chromosomes in their body (somatic) cells using pipe cleaners to represent chromosomes.

Materials: 2 – large blue pipe cleaners
2 – large red pipe cleaners
2 – small blue pipe cleaners
2 – small red pipe cleaners
4 – tiny yellow pipe cleaners

Key:

Blue pipe cleaner = paternal chromosome (chromatid) inherited from father
Red pipe cleaner = maternal chromosome (chromatid) inherited from mother
Yellow pipe cleaner = centriole (only found in animal cells)

CELL CYCLE/MITOSIS SUMMARY:

INTERPHASE “between cell division” NON-DIVIDING CELL

- G₁ (growth 1 stage) – Cell grows in size; organelles begin to double in number
- S (synthesis stage) – DNA replication occurs; each chromosome contains 2 sister chromatids; chromosome # stays the same
- G₂ (growth 2 stage) – Cell continues to grow; synthesis of proteins; chromatin begins condensing into visible chromosomes

MITOSIS CELL DIVISION

- **PROPHASE** “prior to or earlier than”
 - Chromosomes are duplicated
 - Centrosomes (1 centrosome = 2 centrioles at right angles to each other) begin moving apart
 - Nuclear membrane disintegrates
 - Nucleolus disappears
 - Chromatin condenses into visible chromosomes
 - Spindle apparatus begins to form between the poles of the cell
- **METAPHASE** “later than”
 - Chromosomes each consisting of two sister chromatids attach to the spindle apparatus and align along the equator of the cell
 - Centrosomes are at opposite poles of the cell
- **ANAPHASE** “upward or backward”
 - Daughter chromosomes (each consisting of one chromatid) are moving toward opposite poles of the cell

- **TELOPHASE “end”**
 - Chromosomes (chromatids) reach poles of cell
 - Nuclear membrane re-forms
 - Nucleolus reappears
 - Chromosomes will become indistinct chromatin

CYTOKINESIS

- One cell divides into two; division of cytoplasm
- In plant cells, cell plate (development of a new cell wall) forms dividing the daughter cells
- In animal cells, cleavage furrow forms at equator of cell and pinches inward until cell divides in two

EVALUATION CRITERIA:

Be able to define/identify/explain/demonstrate/present/answer the following items:

- ✓ Cell division
- ✓ Somatic cell
- ✓ # chromosomes in a human somatic cell
- ✓ Nucleus
- ✓ Nucleolus
- ✓ Nuclear membrane
- ✓ Cytoplasm
- ✓ Maternal and paternal chromosomes
- ✓ Chromatin
- ✓ Chromosome
- ✓ Chromatid
- ✓ Sister chromatids
- ✓ Centriole
- ✓ Centromere
- ✓ Centrosome
- ✓ Spindle fibers/apparatus
- ✓ Events of interphase, prophase, metaphase, anaphase, telophase, and cytokinesis What happens?
- ✓ # chromosomes/#chromatids at each phase of the cell cycle; especially before and after cell division
- ✓ # cells formed from cell division; are they the same or different?
- ✓ Why is cell division/ mitosis important?

Instructor Comments:

Score _____