Cell Division & Genetics

Why do Cells Divide? For \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Mitosis
	1. Organisms grow by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of cells
		1. In multicellular organisms some of these cells perform functions different from other cells.
		2. The process of a cell becoming different is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
		3. Under normal conditions once an animal cell becomes specialized it can no longer form an entire organism, however plant cells are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and any cell can form an entire plant.
	2. Cell Division vs. Nuclear Division
		1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: The actual division of the cell into two new cells.
		2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: The division of the nucleus of the cell into two new nuclei.
		3. Note: Sometimes cells go through mitosis without going through cytokinesis.
	3. How do Cells Divide?
		1. **Cell cycle** - sequence of phases in the life cycle of the cell
		2. Cell cycle has two parts:
			1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (interphase)
			2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
				1. mitosis (nuclear division)
				2. cytokinesis (cytoplasm division)
		3. Phases of the Cell Cycle
			1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
				1. Occurs between divisions
				2. Longest part of cycle
				3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

G1 or \_\_\_\_\_\_\_\_\_\_\_\_

The cell just finished dividing so in Gap 1 the cell is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from mitosis

S or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ stage

\_\_\_\_\_\_\_\_\_\_\_ replicates

G 2 or \_\_\_\_\_\_\_\_\_

This is preparation for mitosis

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are replicated.

More growth occurs.

* + - 1. Prophase
				1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ condense
				2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ form
				3. The nuclear envelope \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
			2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
				1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are pulled to center of cell
				2. \_\_\_\_\_\_\_\_\_\_\_\_\_ along “metaphase plate”
			3. Anaphase
				1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ divide
				2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pull one set of chromosomes to each pole
				3. Precise alignment is critical to division
			4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
				1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ forms around chromosomes
				2. Chromosomes uncoil
				3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

animals - \_\_\_\_\_\_\_\_\_\_\_\_\_ of plasma membrane

plants- \_\_\_\_\_\_\_\_\_\_\_\_ and the cell plate forms (future cell wall and cell membrane)

1. Meiosis
	1. What is Meiosis?
		1. A division of the \_\_\_\_\_\_\_\_\_\_\_\_\_ that reduces chromosome number by half.
		2. Important in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		3. Involves combining the \_\_\_\_\_\_\_\_\_\_\_\_\_ information of one parent with that of the other parent to produce a genetically distinct individual
	2. Terminology
		1. \_\_\_\_\_\_\_\_\_\_\_ - two sets of chromosomes (2n), in humans 23 pairs or \_\_\_\_\_ total
		2. \_\_\_\_\_\_\_\_\_\_\_ - one set of chromosomes (n) - gametes or sex cells, in humans \_\_\_\_\_ chromosomes
		3. Chromosome Pairing
			1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ = each chromosome in pair are \_\_\_\_\_\_\_\_\_\_\_\_\_ to the other (carry genes for same trait)
			2. only \_\_\_\_\_\_\_\_\_\_\_\_\_ differs - sex chromosomes X or Y
			3. XX = female; XY = male
		4. Phases of Meiosis
			1. A \_\_\_\_\_\_\_\_\_\_\_ cell replicates its chromosomes
			2. \_\_\_\_\_\_ stages of meiosis
				1. Meiosis I and Meiosis II
				2. Only 1 replication
			3. Terms
				1. \_\_\_\_\_\_\_\_\_\_\_\_ - pairing of homologous chromosomes forming a \_\_\_\_\_\_\_\_\_\_\_.
				2. \_\_\_\_\_\_\_\_\_\_\_\_ - chromatids of tetrad exchange parts
			4. Meiosis I
				1. Prophase I

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ condense

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ chromosomes pair w/ each other

Each pair contains \_\_\_\_\_\_\_ sister chromatids – tetrad

* + - * 1. Metaphase I

Tetrads or homologous chromosomes move to \_\_\_\_\_\_\_\_\_\_ of cell

* + - * 1. Anaphase I

Homologous chromosomes \_\_\_\_\_\_\_\_\_\_ to opposite poles

* + - * 1. Telophase I

Daughter nuclei formed

These are \_\_\_\_\_\_\_\_\_\_ (1n)

* + - 1. Meiosis II
				1. Daughter cells undergo a second division; much like \_\_\_\_\_\_\_\_\_\_\_\_
				2. NO ADDITIONAL REPLICATION OCCURS
				3. Prophase II

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ form again

* + - * 1. Metaphase II

Sister chromatids move to the \_\_\_\_\_\_\_\_\_\_

* + - * 1. Anaphase II

Centromeres split

Individual chromosomes are \_\_\_\_\_\_\_\_\_\_ to poles

* + - * 1. Telophase II & Cytokinesis

\_\_\_\_\_\_\_\_ haploid daughter cells results from one original diploid cell

* + - 1. Review of Mitosis & Meiosis
				1. Both are forms of \_\_\_\_\_\_\_\_\_\_\_ division
				2. Both involve \_\_\_\_\_\_\_\_\_\_\_\_\_
				3. Both involve \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the nucleus, and nucleolus, nuclear membrane
				4. Both involve formation of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
			2. Differences
				1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ produces daughter cells that have \_\_\_\_\_\_ the number of chromosomes as the parent. Go from 2n to 1n.
				2. \_\_\_\_\_\_\_\_\_\_ produced by meiosis are \_\_\_\_ genetically \_\_\_\_\_\_\_\_\_\_\_\_ to one another.
				3. In \_\_\_\_\_\_\_\_\_\_ cell division takes place \_\_\_\_\_\_\_\_\_\_\_ but replication occurs only \_\_\_\_\_\_\_\_\_\_.
			3. Value of Variation
				1. \_\_\_\_\_\_\_\_\_\_\_ - differences between members of a population.
				2. Meiosis results in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of chromosomes in gametes.
				3. Causes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that over time can be stronger for survival.