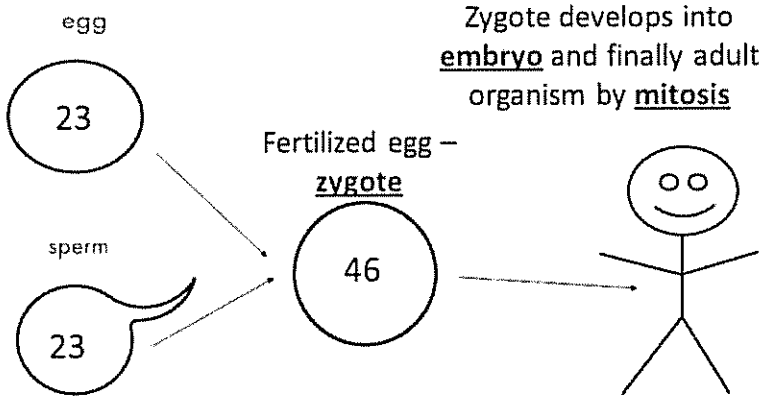
Name_____

Unit 5 (Ch. 9 & 10.1) Cellular Reproduction Notes – Meiosis

Chromosomes and Chromosome Number

Human body cells (somatic cells) have _____ chromosomes. Each parent contributes _____ chromosomes in their _____ or sex cell. Therefore, body cells having 2 copies of each chromosome (2n) are called _____. Sex cells or gametes having only 1 copy of each chromosome (n) are called _____.

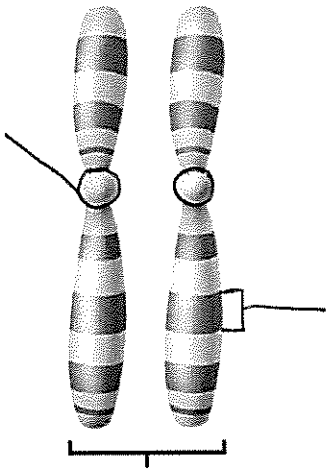


Fertilization – process by which an egg and sperm unite

Zygote – fertilized egg

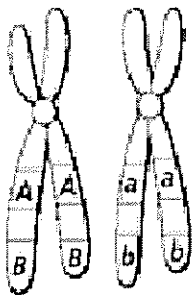
Embryo – organism in early stage of development

_____ = pair of chromosomes (1 chromosome from each parent) having genes for the same traits.



A pair of homologous chromosomes

- Same _____
- Same _____ position
- Carry genes that control the _____ inherited traits

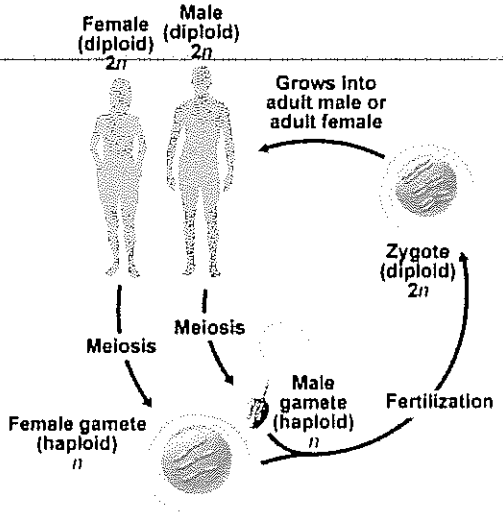


Homologous chromosomes

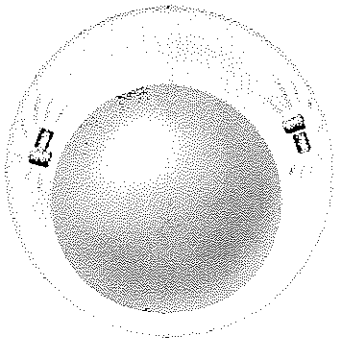
_____ = functional unit of DNA that controls inherited trait expression that is passed on from one generation to another.

Meiosis = _____ division, occurring only in _____ cells (gametes), in which 1 diploid (2n) cell produces _____ that are not genetically identical.

- The sexual life cycle in organisms Involves meiosis.
- Meiosis produces _____.
- When gametes combine during _____ the chromosome number is restored.
- Meiosis occurs in _____ divisions called _____ and _____.



Interphase

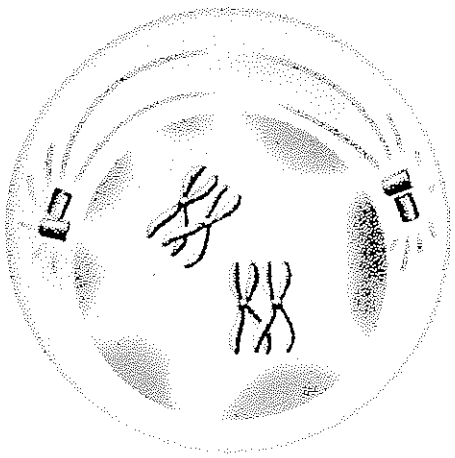


- DNA is in relaxed (string) form called _____.
- Chromosomes are not visible yet.

- G_1 (Growth 1) - _____.
- S (Synthesis) - _____.
- G_2 (Growth 2) - _____.

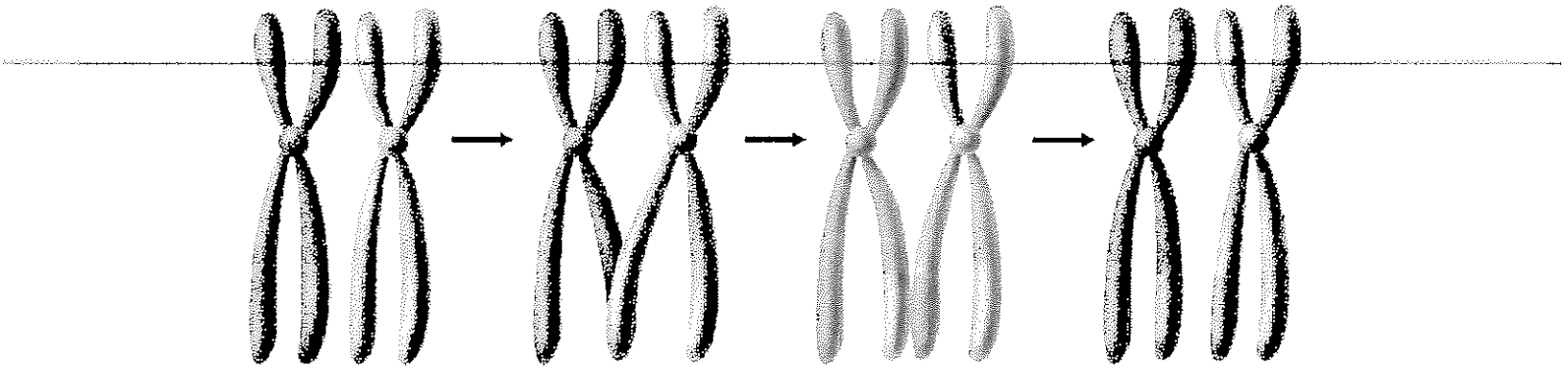
<u>Meiosis I (1st Cell Division: 1 cell → 2 cells)</u>

Prophase I

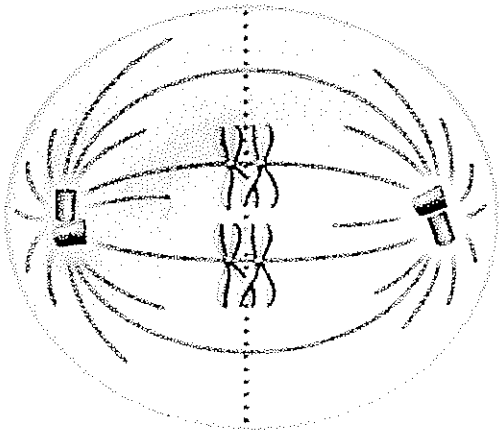


- Centrioles (in pairs) move toward poles
- Spindle apparatus (fibers) begins to form
- Nuclear envelope (nucleus) breaks down
- Chromatin condenses into visible _____.
- _____ pair up (synapsis)
- _____ between nonsister chromatids of homologous chromosomes occurs and leads to _____.
- How many chromosomes total in this cell? _____

Crossing over between nonsister chromatids of homologous chromosomes during Prophase I of Meiosis

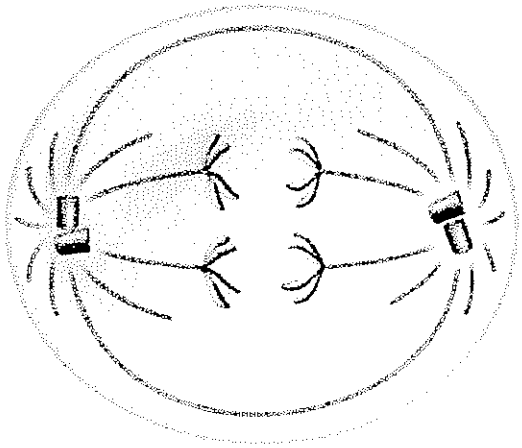


Metaphase I



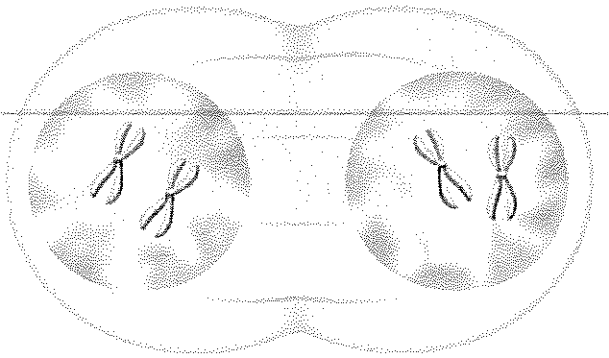
- Centrioles (in pairs) are at opposite poles of cell
- Spindle fibers attach to centromeres of chromosomes
- _____ pairs line up side-by-side at the equator (see picture)
- Homologous chromosome pairs line up randomly by _____, which leads to more genetic variety in the gametes or sex cells.

Anaphase I



- _____ separate toward opposite poles of the cell so that each new cell will have _____ set of chromosomes.

Telophase I



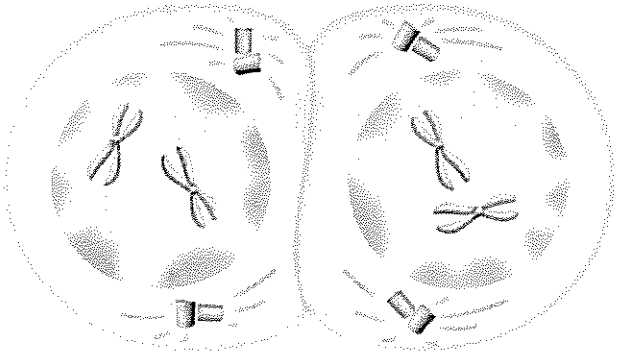
- _____ reform at each pole of the cell
- Spindle apparatus breaks down
- Centrioles double in number

Cytokinesis occurs and splits the cell into _____ cells each with the _____ number of chromosomes. Chromosome number is reduced by _____ in each cell.

How many chromosomes are in each cell now? _____

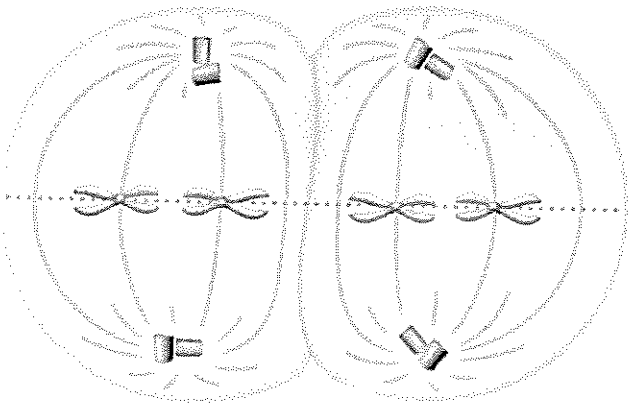
Meiosis II (2nd Cell Division: 2 cells → 4 cells) SAME AS MITOSIS!

Prophase II



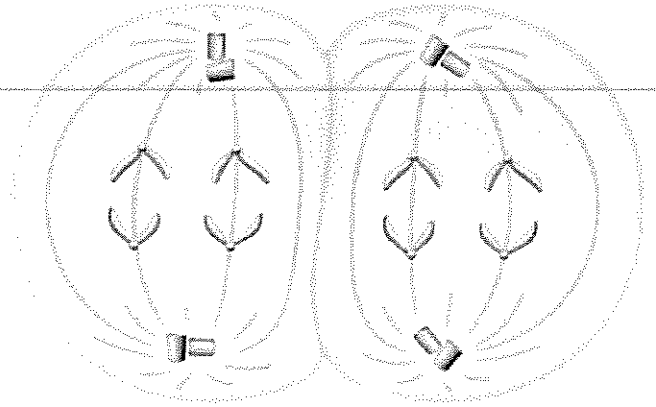
- _____ (in pairs) begin moving apart to opposite poles of cells
- Nuclear membrane breaks down and the nucleus and nucleolus disappear
- _____ begins to form again

Metaphase II



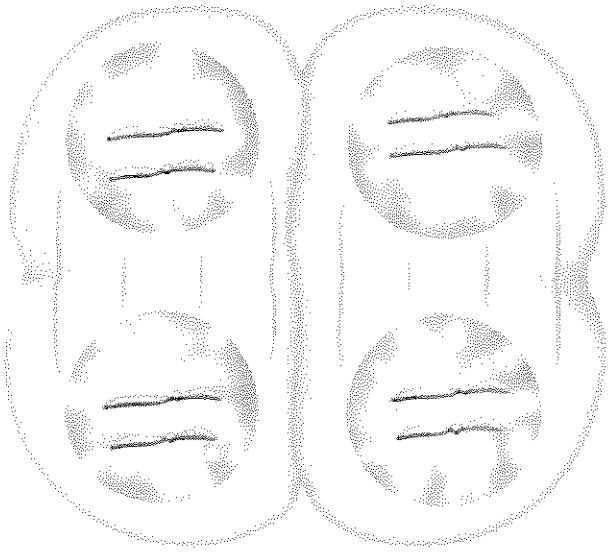
- Centrioles (in pairs) are at opposite poles of cells
- Spindle fibers attach to centromeres of chromosomes
- Chromosomes line up in a _____ along the center or equator of the cells

Anaphase II



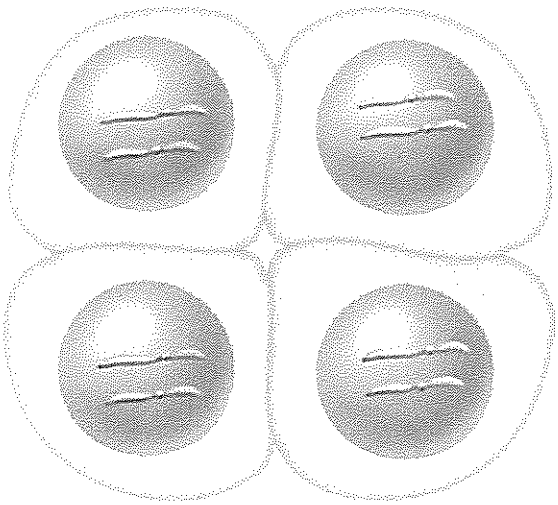
- _____ separate and move toward opposite poles of the cells

Telophase II



- Nuclei reform around chromosomes on both sides of cells
- Spindle apparatus breaks down

Cytokinesis



- Two cells divide into _____ cells
- Each gamete or sex cell is _____
- These four cells have the _____ chromosome number.

How many chromosomes are in each one of these gametes or sex cells after meiosis?

_____

Determine if the event listed is Mitosis, Meiosis, or Both. Place check(s) in the appropriate column.

Event	Mitosis	Meiosis
Interphase happens before		
Creates body cells (somatic cells)		
Creates sex cells		
Forms daughter cells that are haploid (n) with one set of chromosomes		
Forms daughter cells that are diploid (2n) with two sets of chromosomes		
Creates identical daughter cells		
Creates unique or different daughter cells		
Involves the movement of chromosomes in cell		
Cell division		
1 division (cell cycle)		
2 divisions		
Forms 4 daughter cells per cycle		
Forms 2 daughter cells per cycle		
DNA replication must occur before (S of Interphase) to maintain chromosome number		
Crossing over between homologous chromosomes		
Homologous chromosomes pair (synapsis) and line up side-by-side		
Associated with sexual reproduction		
Homologous chromosomes separate during Anaphase I		

Compare and contrast mitosis and meiosis (4 similarities and 4 differences).

Mitosis	Compare/Same	Meiosis
•	•	•
•	•	•
•	•	•
•	•	•