

# Cell Reproduction

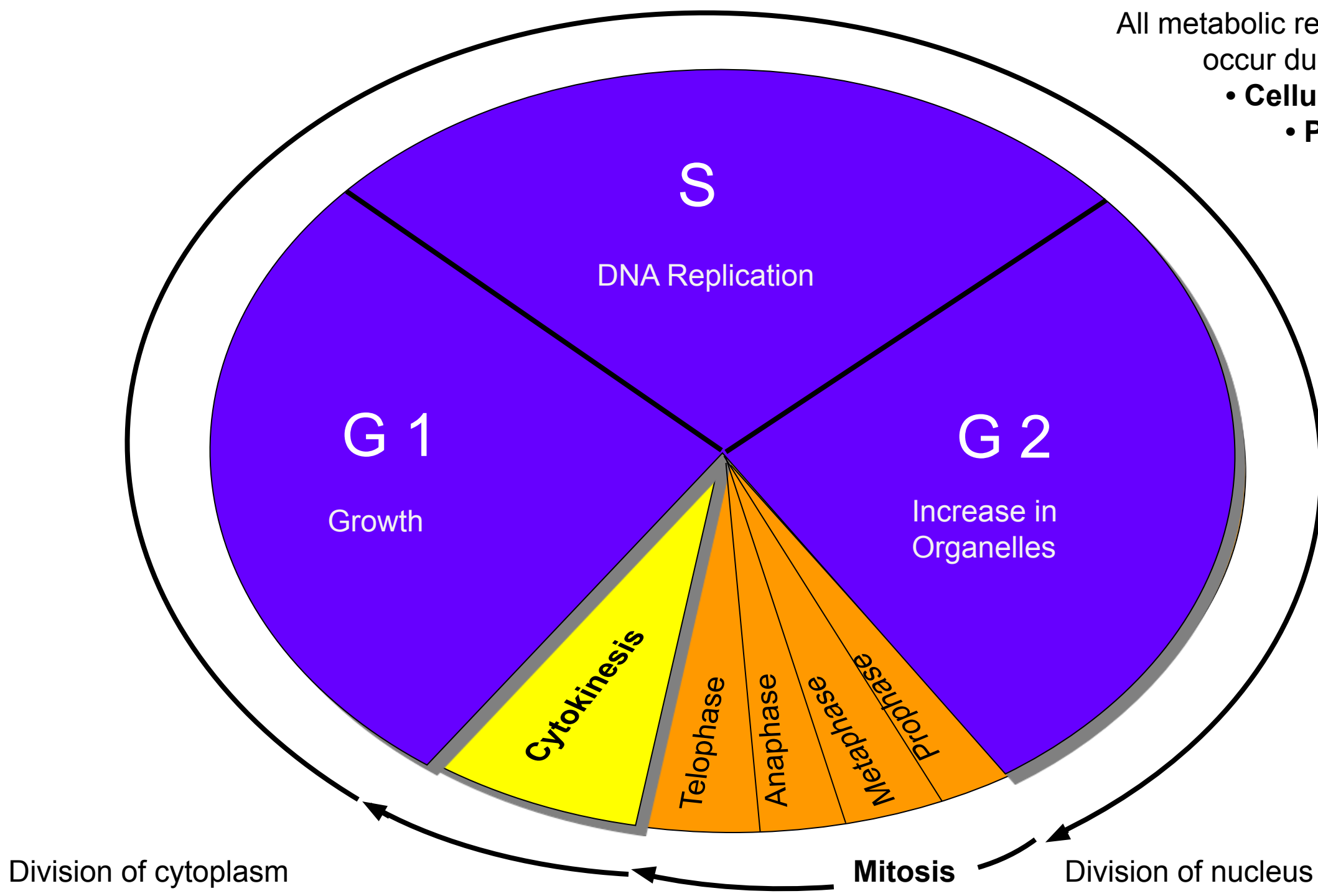
Unit 3

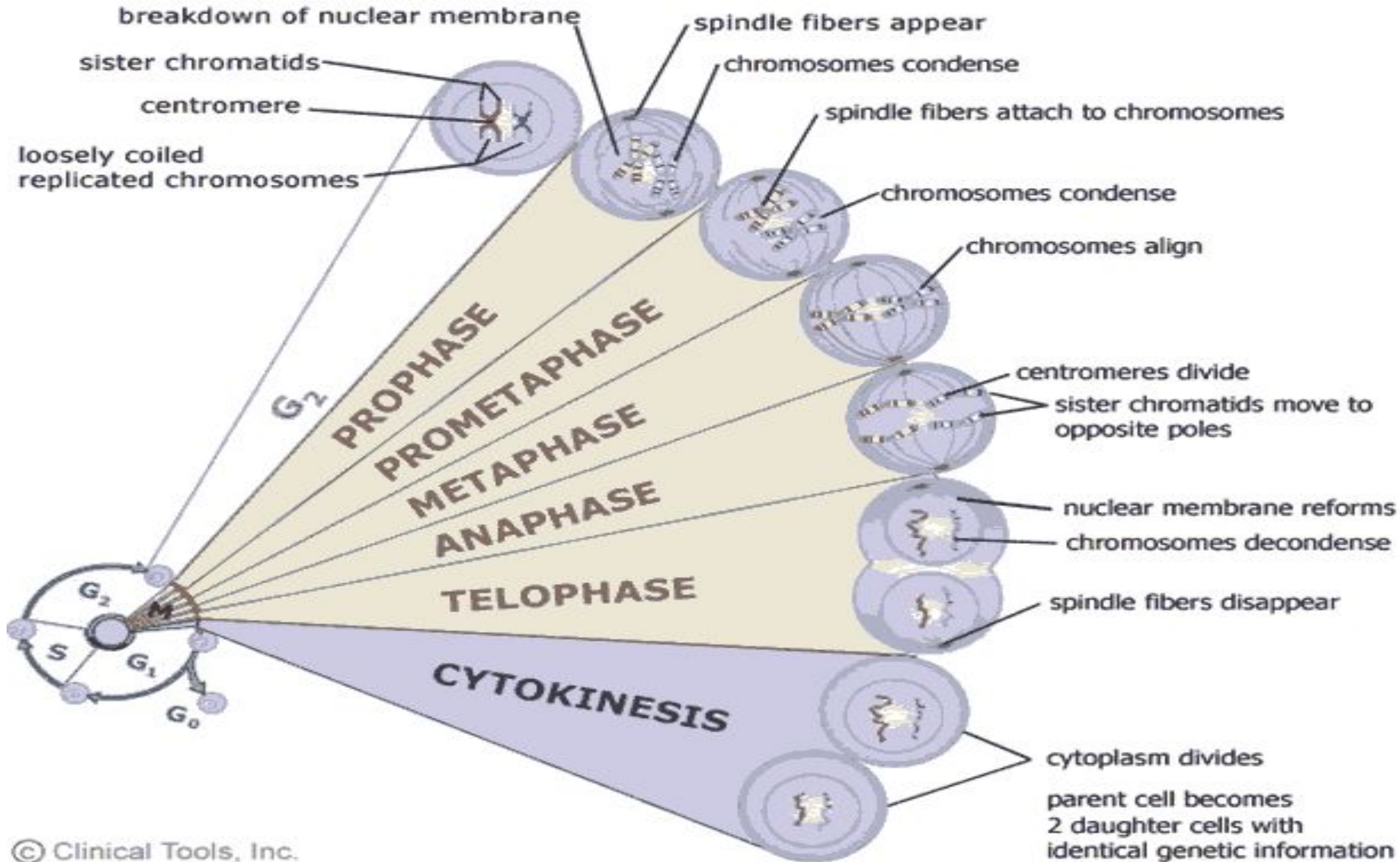
# Vocabulary

- **Allele**- Different forms of a gene
- **Asexual reproduction**- A reproductive process that involves only one parent and produces offspring that are identical to the parent.
- **Binary fission**- A form of asexual reproduction in prokaryotes by which one cell divides into two cells of the same size
- **Cell cycle**- Series of events that cells go through as they grow and divide
- **Cell plate**- The precursor of a new plant cell wall that forms during cell division and divides a cell into two
- **Cleavage furrow**- The area of the cell membrane that pinches in and eventually separates the dividing cell
- **Crossing over**- Exchange of genetic material between homologous chromosomes during prophase I of meiosis
- **Cytokinesis**- Division of the cytoplasm during cell division
- **Diploid**- A cell having two complete sets of chromosomes
- **Gamete**- sex cell
- **Haploid**- A cell having only one complete set of chromosomes.
- **Homologous**- Term used to refer to chromosomes that each have a corresponding chromosome from the opposite-sex parent. Same genes, maybe different alleles
- **Independent assortment**- The arrangement of individual hereditary factors, when two or more characteristics are inherited, during gamete production that gives different traits an equal opportunity of occurring together.
- **Interphase**- Cell grows, performs its normal functions, and prepares for division; consists of G1, S, and G2 phases
- **Meiosis**- A type of cell division that results in four daughter cells each with half the number of chromosomes of the parent cell, as in the production of gametes and plant spores.
- **Mitosis**- Cell division in which the nucleus divides into nuclei containing the same number of chromosomes
- **Segregation**- Separation of alleles during gamete formation
- **Sexual reproduction**- Type of reproduction in which cells from two parents unite to form the first cell of a new organism
- **Spore**- A walled, single- to many-celled, reproductive body of an organism, capable of giving rise to a new individual either directly or indirectly. (germ cell, seed, etc)

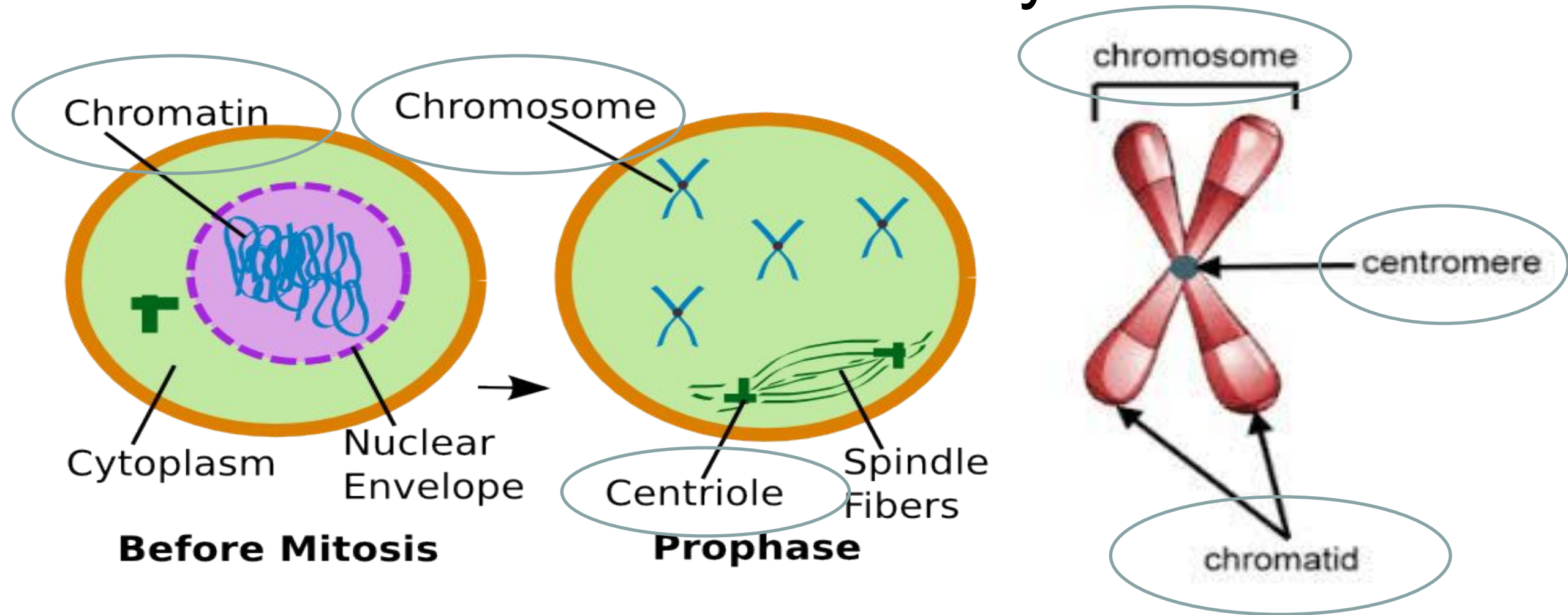
All metabolic reactions of a cell  
occur during **Interphase**

- **Cellular Respiration**
- **Photosynthesis**
- **Transcription**
- **Translation**

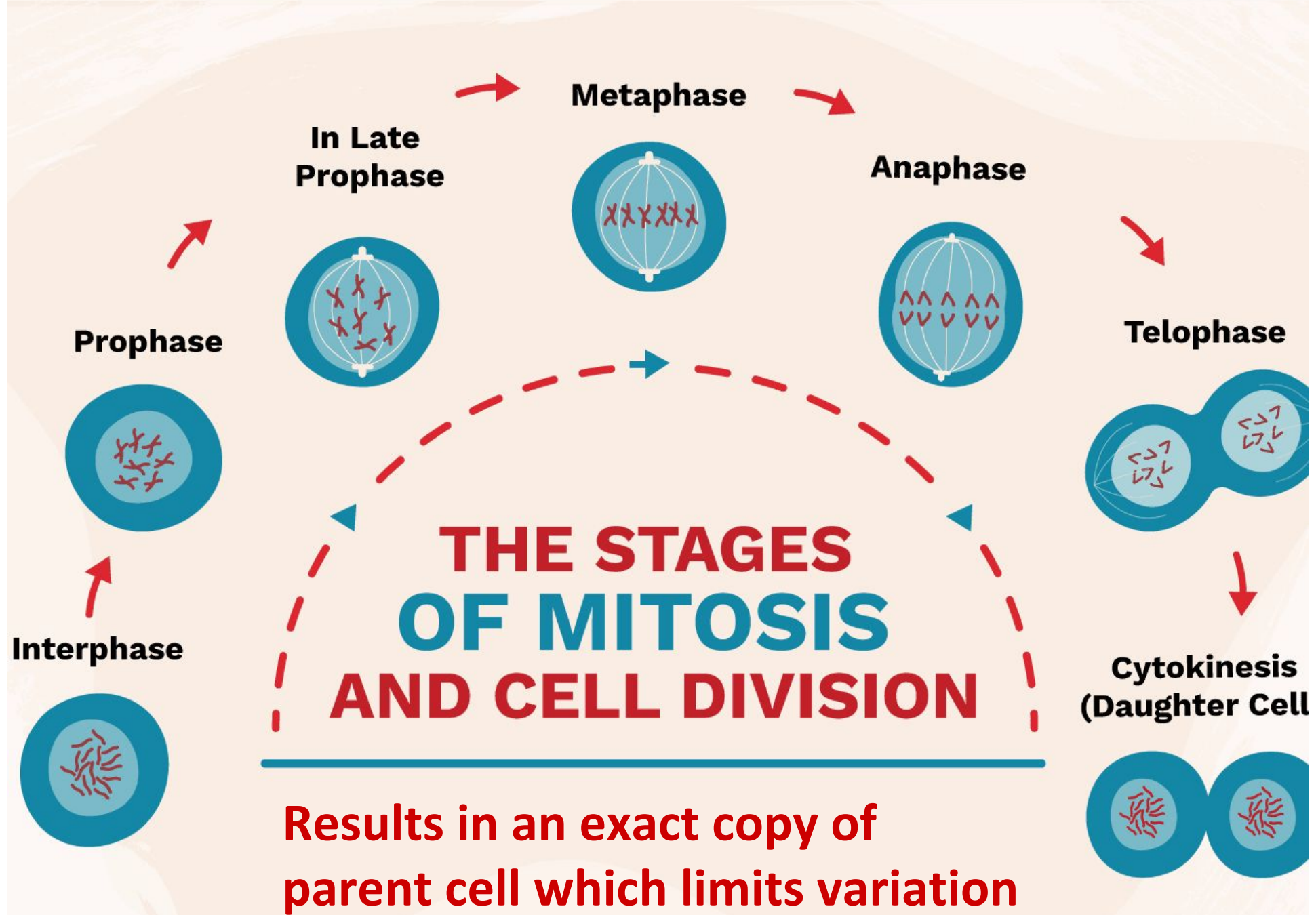




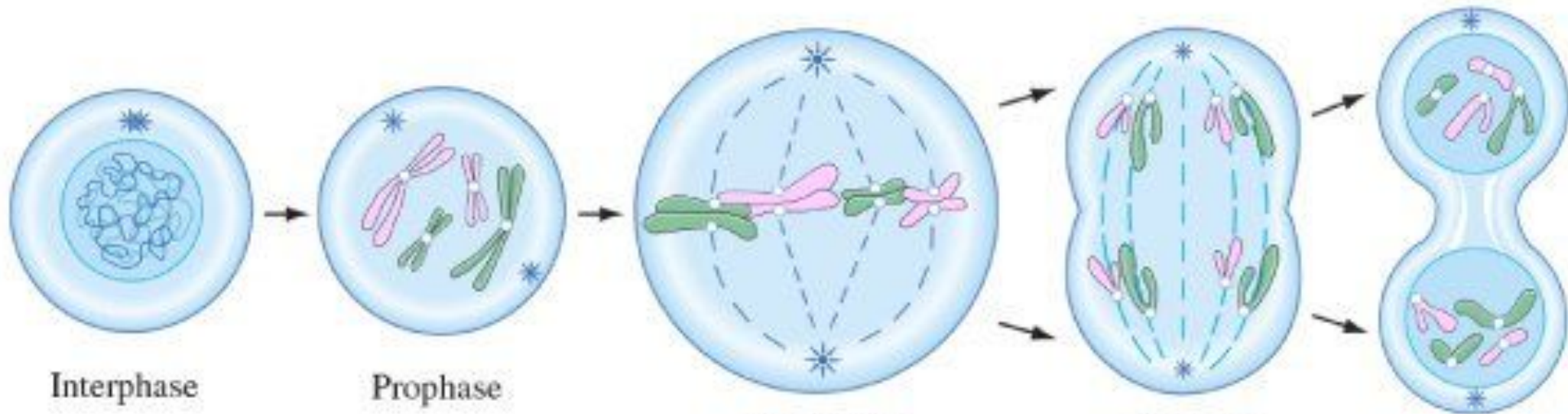
# More Vocabulary







# Mitosis



Interphase

Prophase

Metaphase

Anaphase

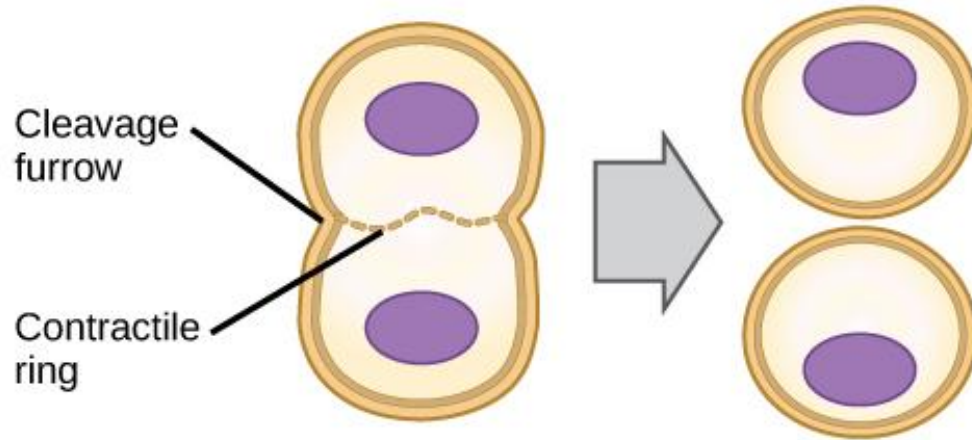
Telophase

- Chromatin condenses to chromosomes
- Nuclear envelope deteriorates
- Centrioles begin to move to opposite poles of the cell
- Spindle fibers move chromosomes to align at the equator (metaphase plate) of the cell
- Sister chromatids separate at centromere and begin moving along spindle fibers to opposite poles of the cell.
- Chromosomes unravel
- Nuclear envelope reforms
- Cytokinesis begins

What types of cells do you think go through mitosis the quickest?  
(Hint: think of cells that would replicate the most often)

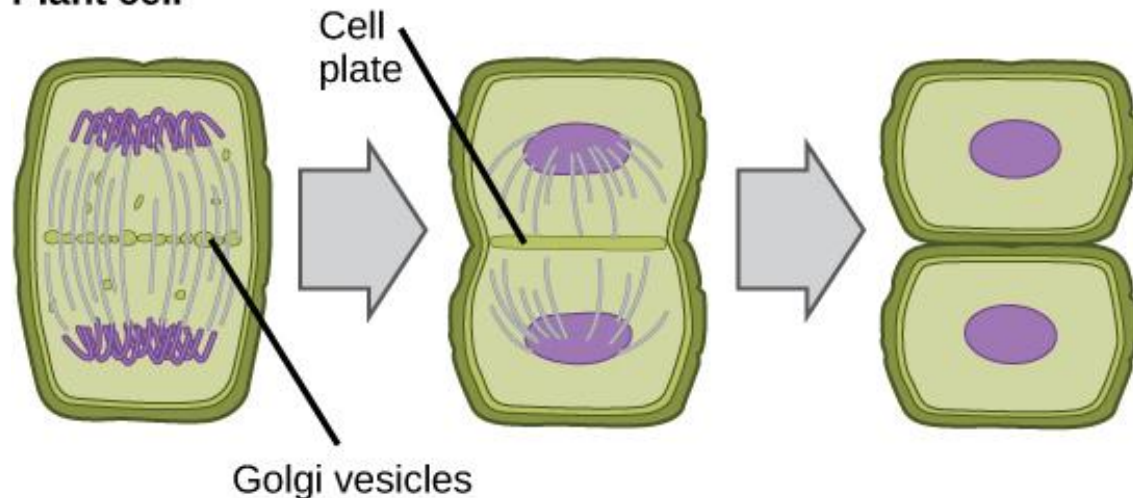
# Plant vs. Animal

Animal cell



- Animal cells pinch together to form a cleavage furrow during cytokinesis.
- Plant cells form a cell plate that becomes the new cell wall between the new nuclei to make two identical cells during cytokinesis.

Plant cell





# Purposes and Consequences

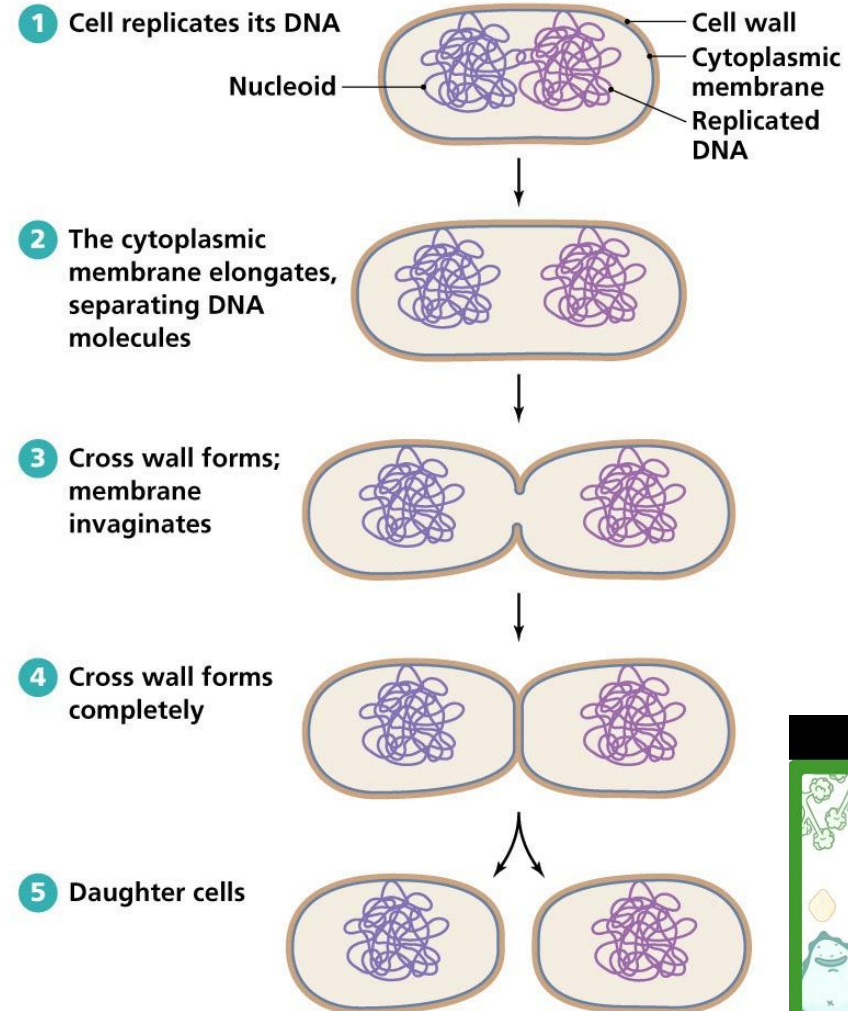
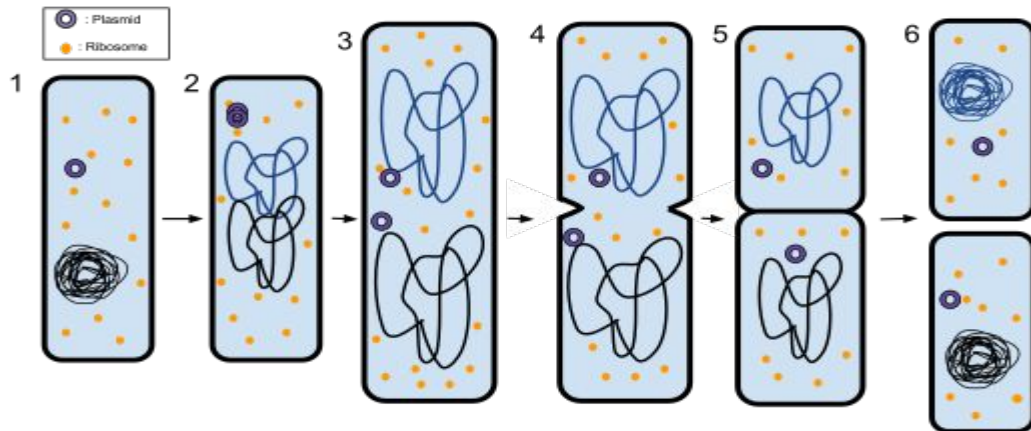
- Produces 2 genetically identical nuclei in **identical daughter cells** for the purposes of:
  - Growth
  - Tissue repair
  - Asexual reproduction



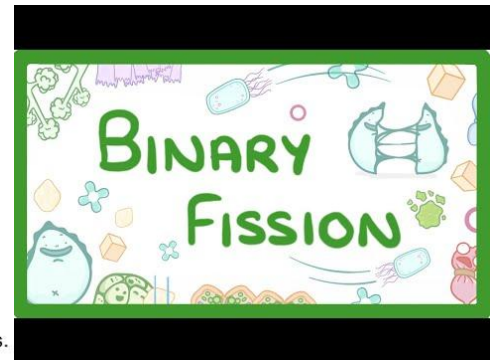
# Asexual Reproduction in Prokaryotes

YOU DO NOT NEED TO BE ABLE TO EXPLAIN EACH STEP

- Reproduce through **binary fission**- cells made are **identical**
- **Much faster than mitosis** because there is no nucleus to divide

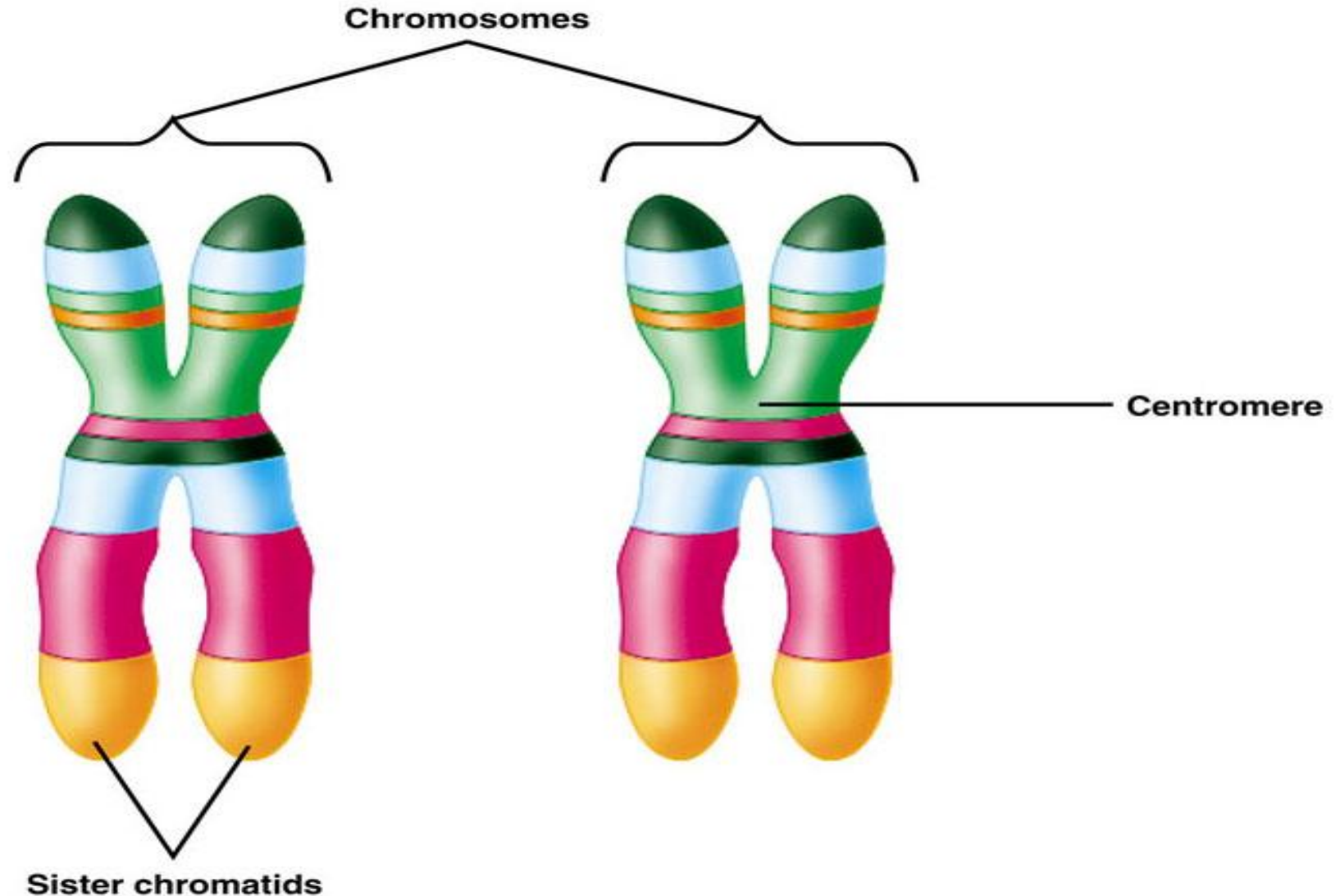


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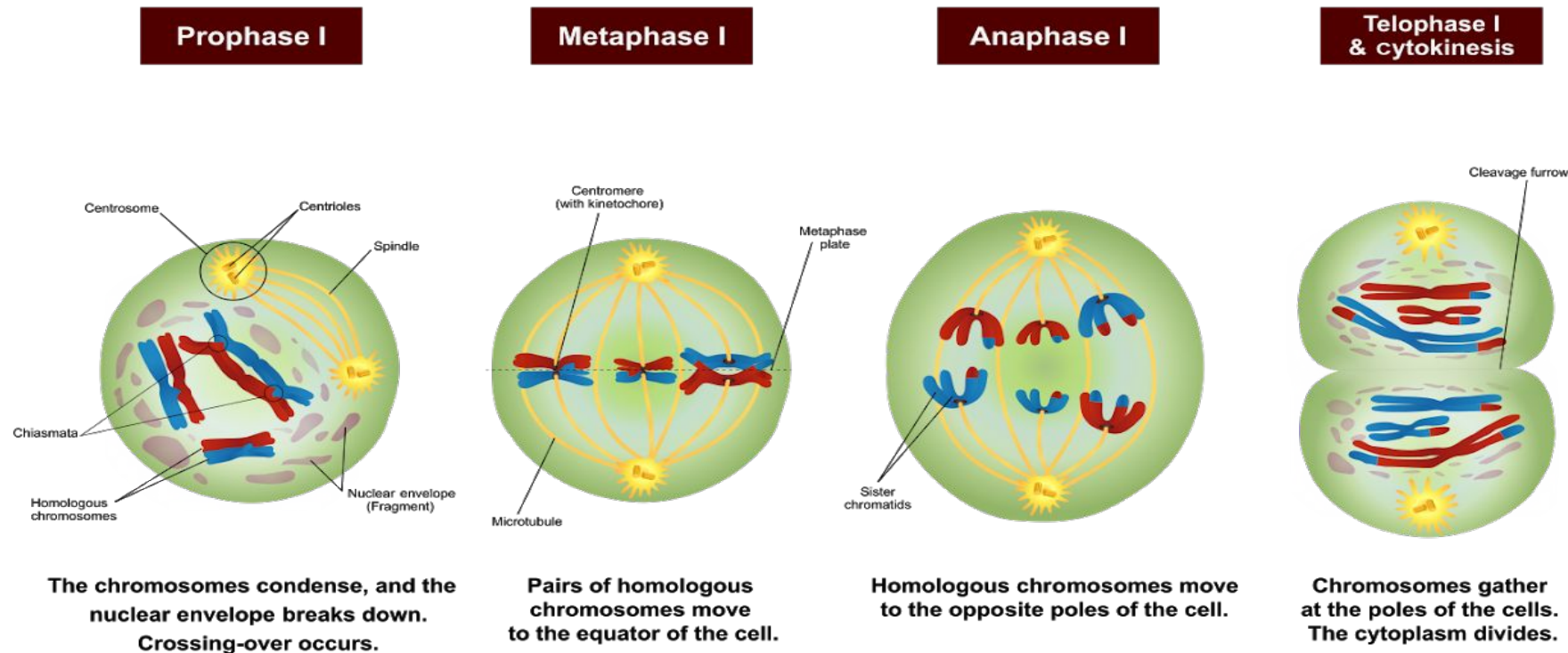
# Homologous Chromosomes

- You get one set of chromosomes from each parent.
- You have two copies of each chromosome.
- Each pair (one from the mother and one from the father) has the same genes, but may have different forms of the gene (alleles)



# Steps of Meiosis- formation of gametes or sex cells

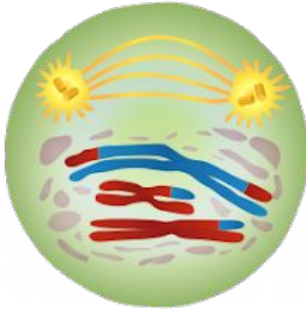
- There are two divisions, meiosis I & meiosis II
- Meiosis I (start with a diploid cell)
- Results in 2 genetically different, haploid daughter cells





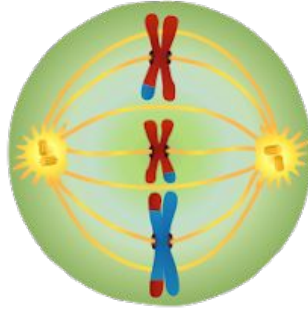
- Meiosis II results in 4 genetically different haploid daughter cells.

**Prophase II**



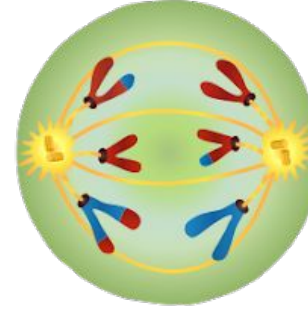
A new spindle forms around the chromosomes.

**Metaphase II**



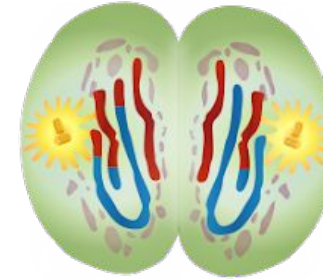
Metaphase II chromosomes line up at the equator.

**Anaphase II**

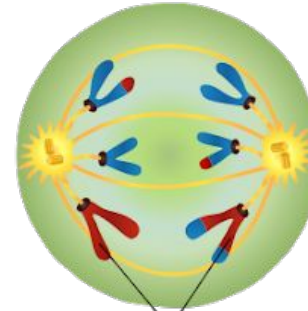
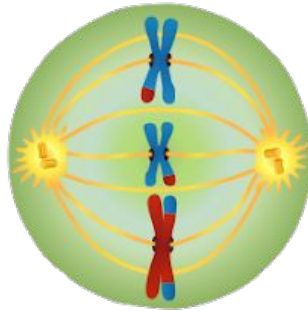


Centromeres divide. Chromatids move to the opposite poles of the cells.

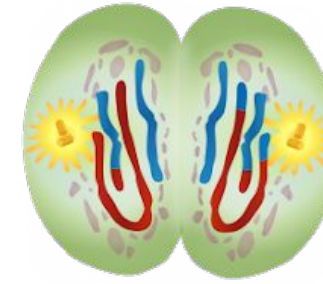
**Telophase II & cytokinesis**



A nuclear envelope forms around each set of chromosomes. The cytoplasm divides.



Sister chromatids separate

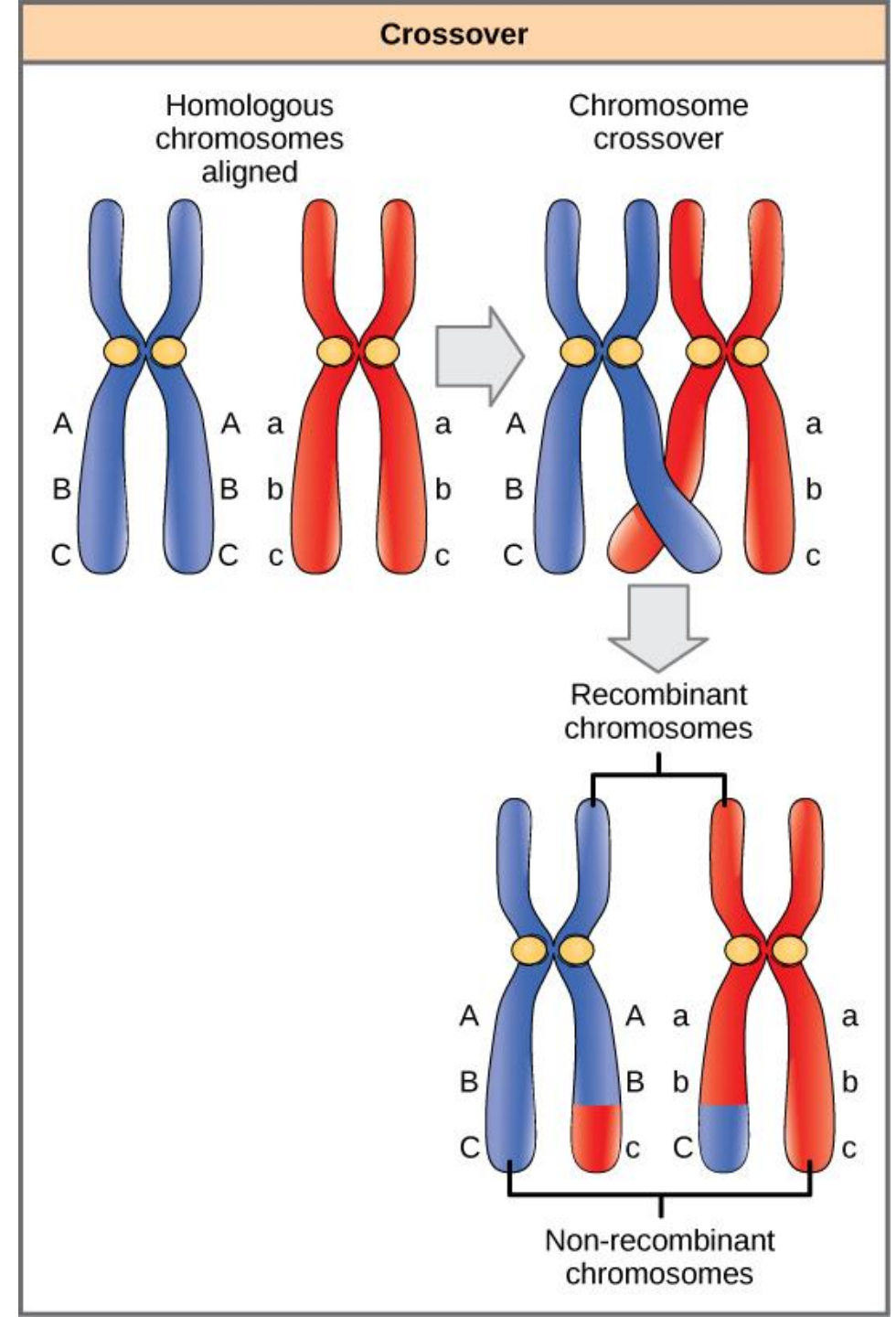


# Sources of Variation in Meiosis

- Crossing over- parts of homologous chromosomes switch during Prophase I. As a result, there is a switching of alleles and a different combination on each chromatid/ chromosome.
- Independent/ Random Assortment- how homologous chromosomes arrange is random and has no effect on how other pairs arrange. The arrangement of the mother and fathers chromosomes on each side leads to different combinations of chromosomes.

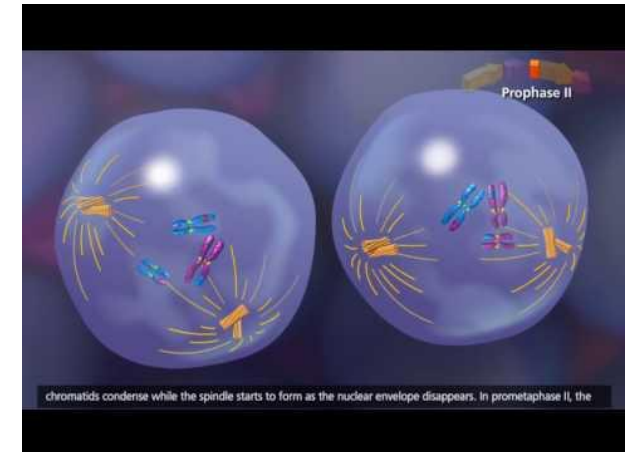
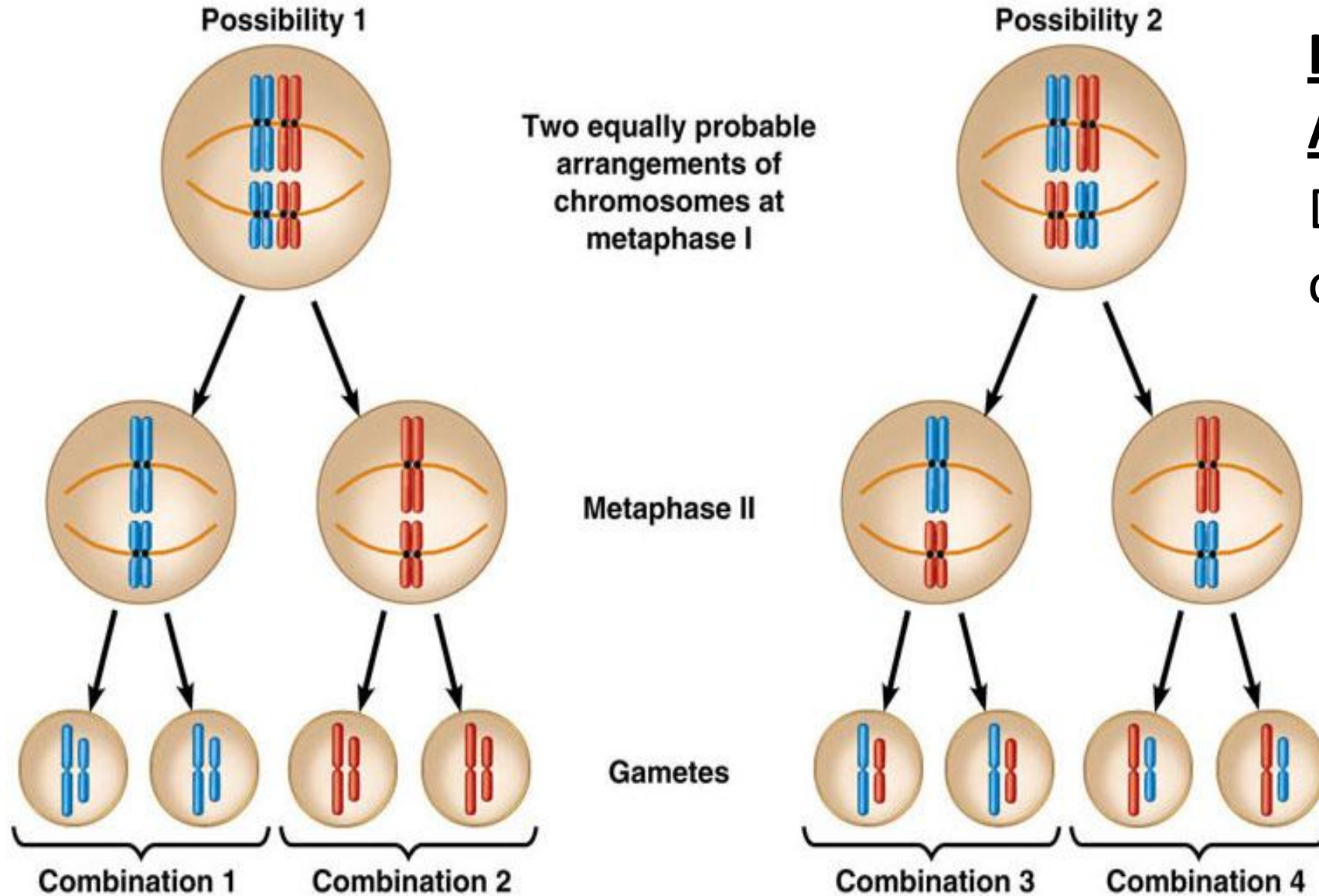
# Crossing over

Different combinations of alleles (forms of a gene)



# Independent / Random Assortment

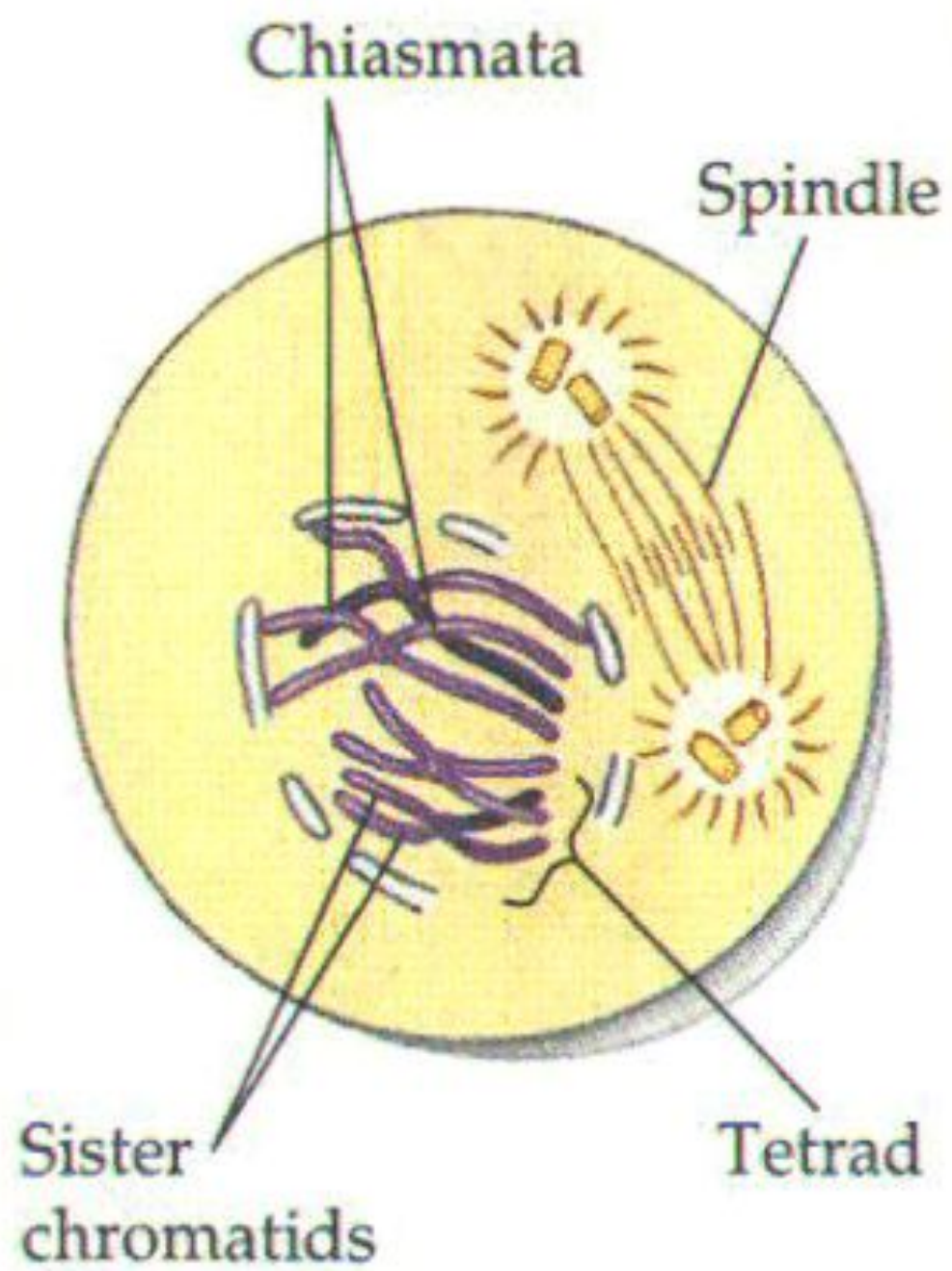
Different combinations of chromosomes

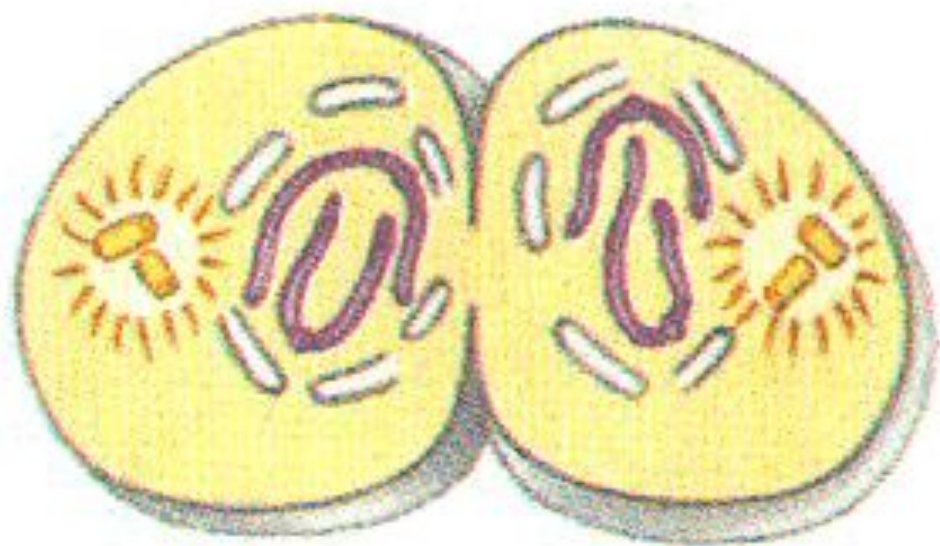




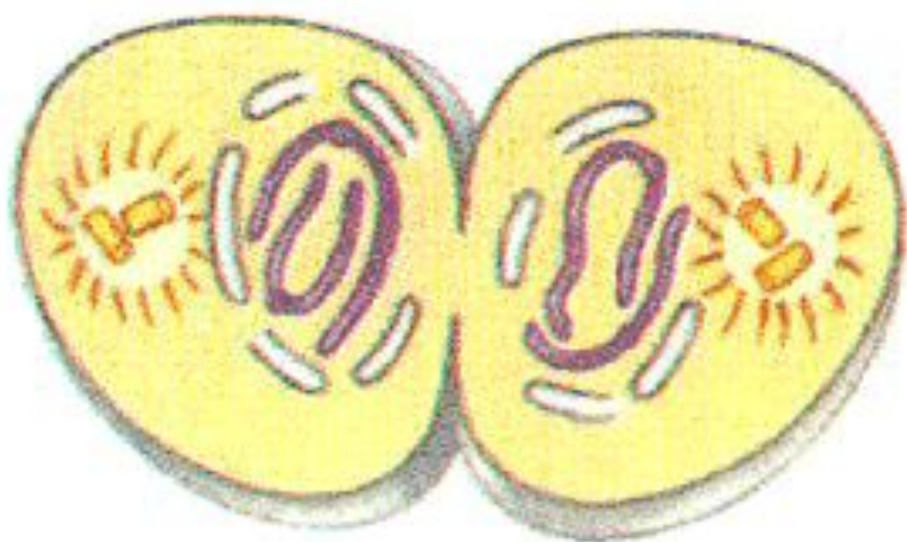
Name That Phase



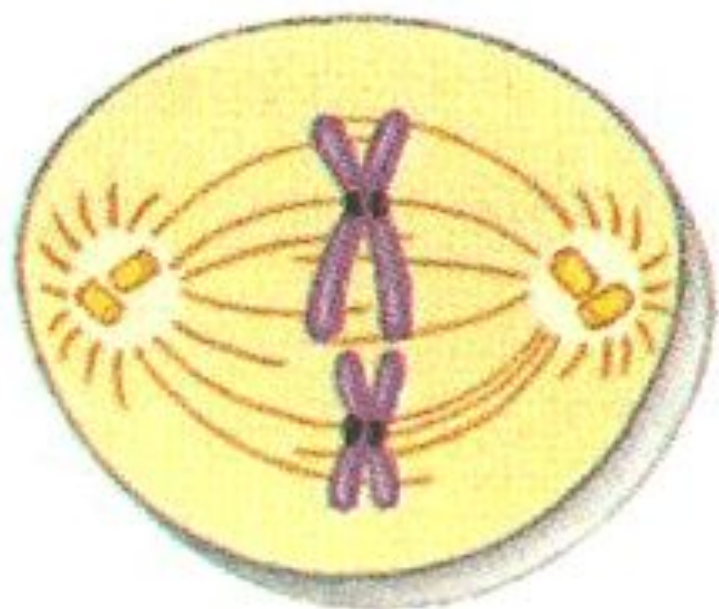
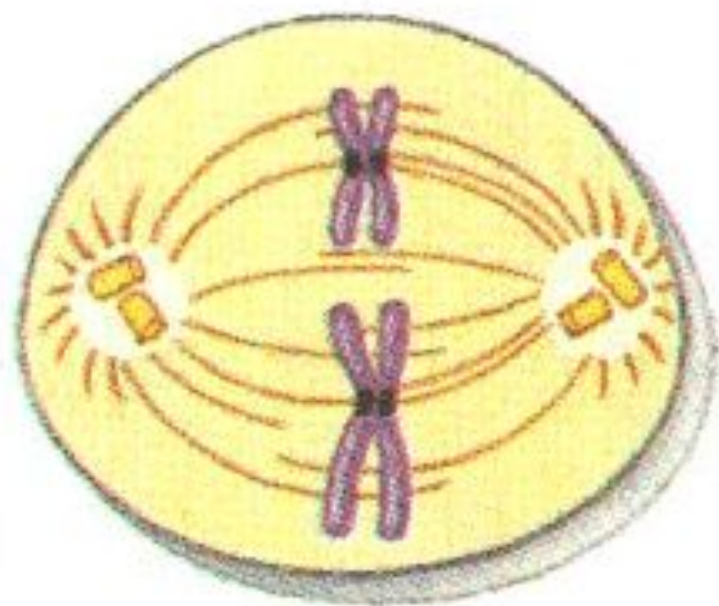




Haploid daughter cells

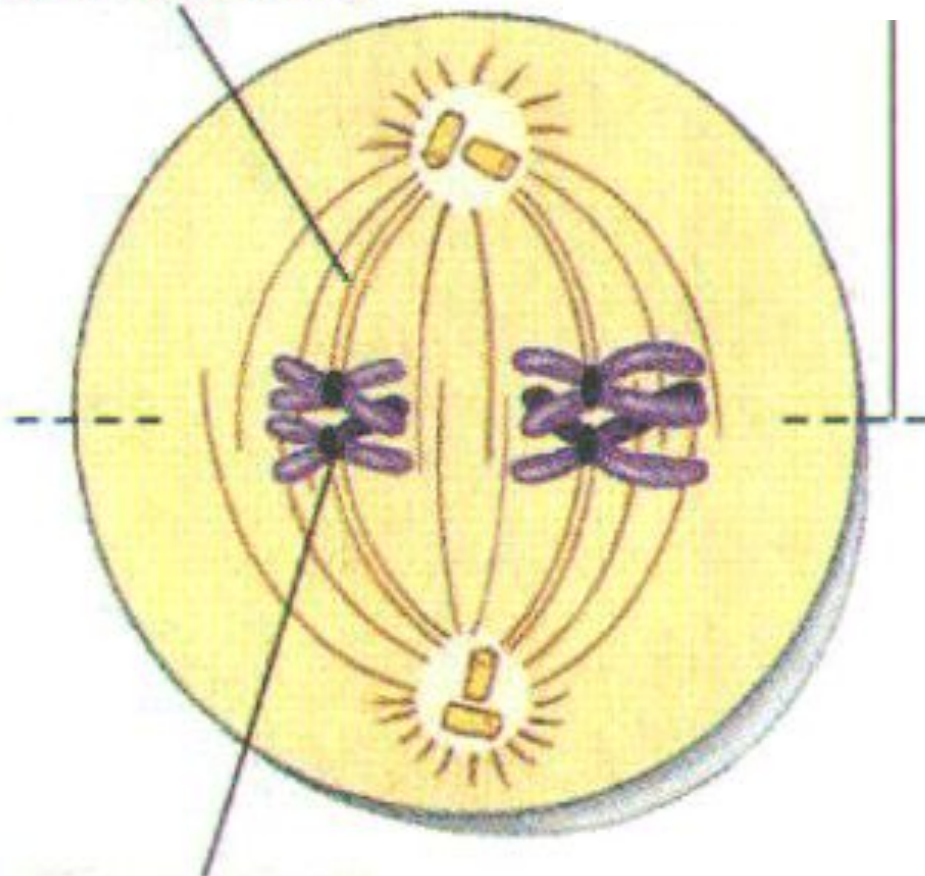






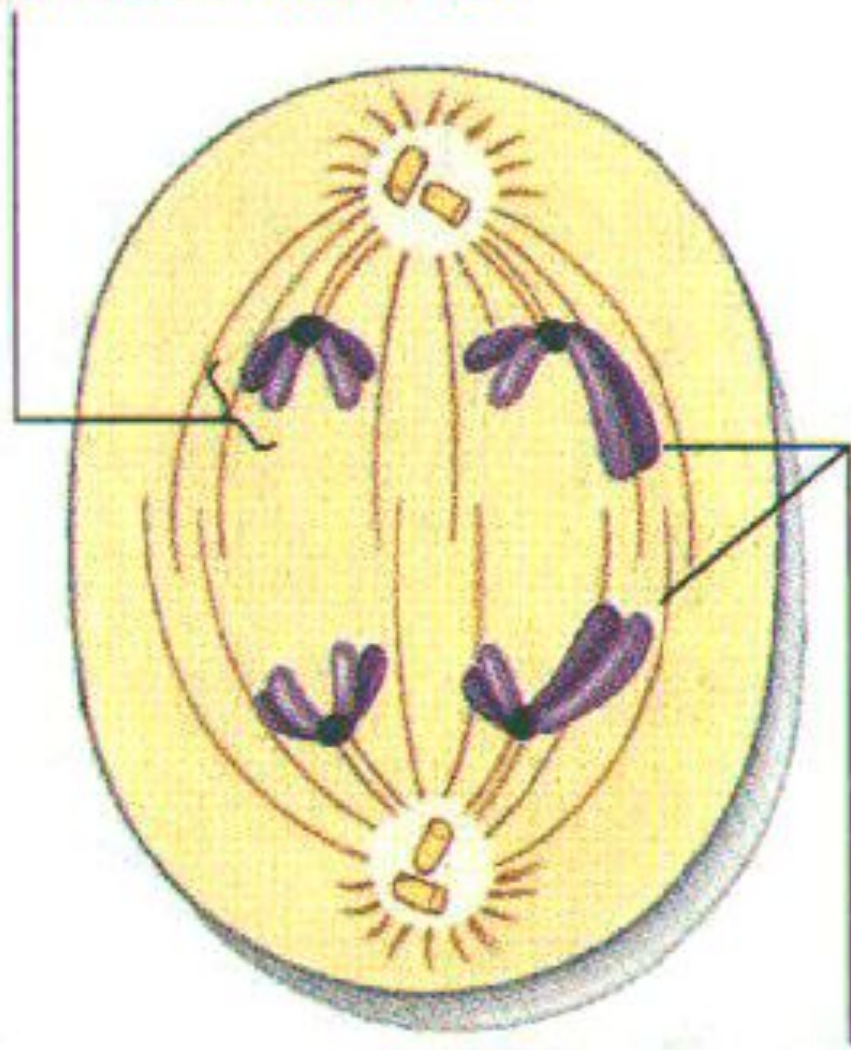


Microtubules  
attached to  
kinetochore



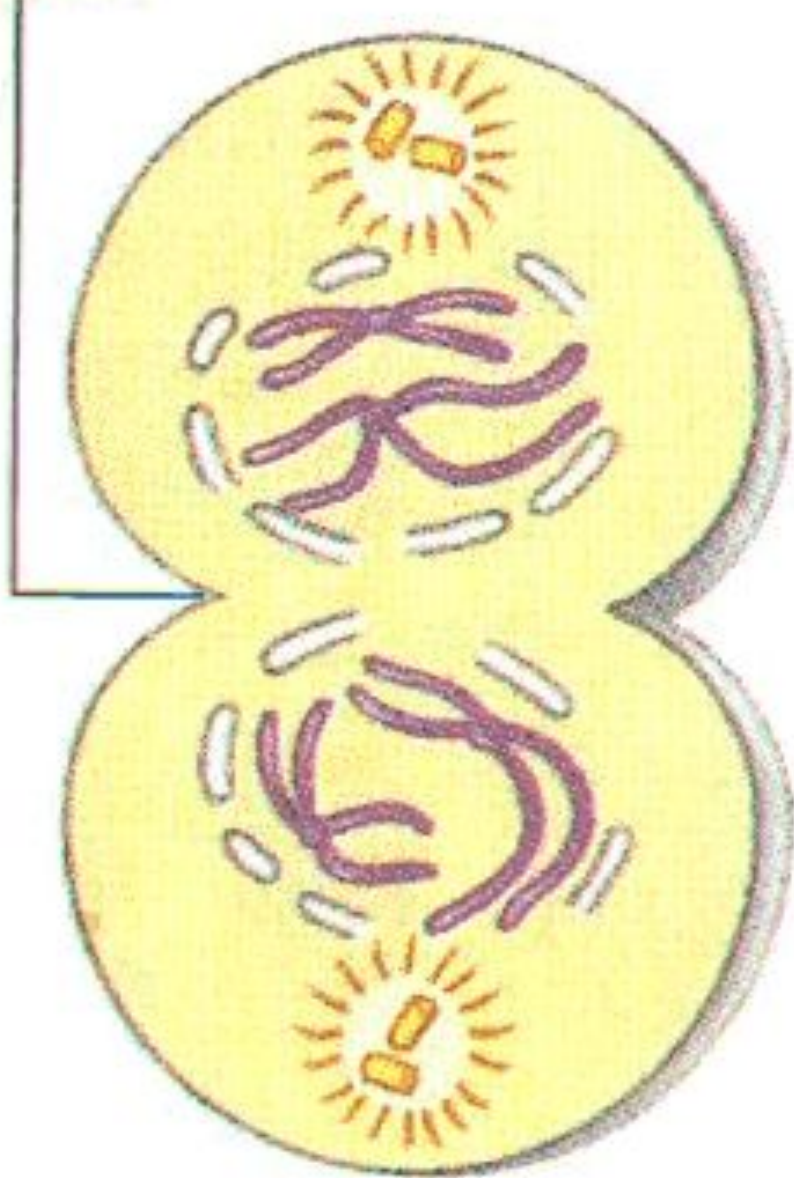
Centromere  
(with kinetochore)

Sister chromatids  
remain attached



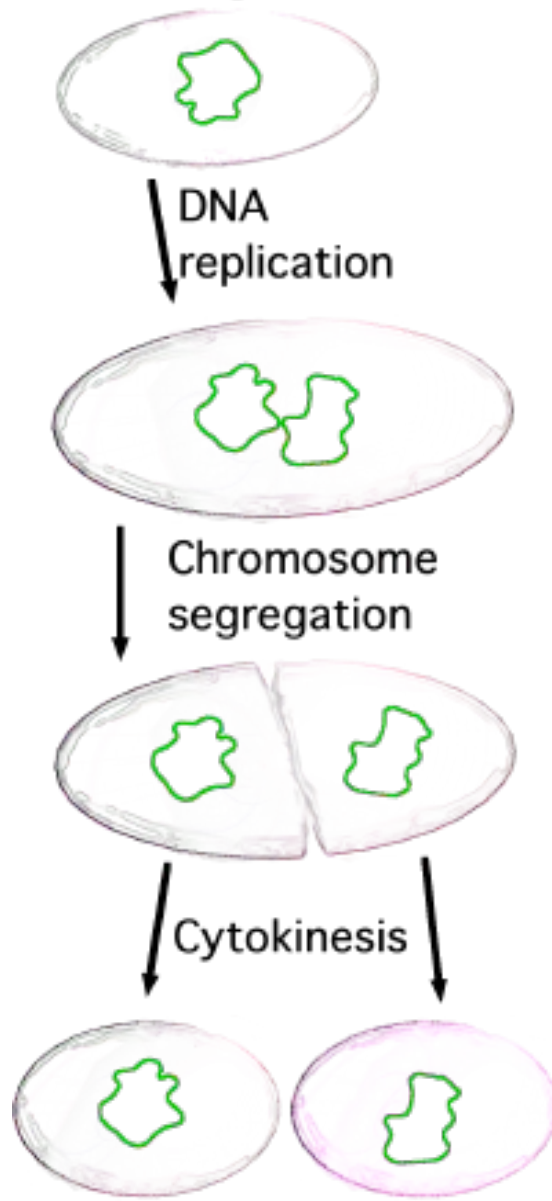


Cleavage  
furrow

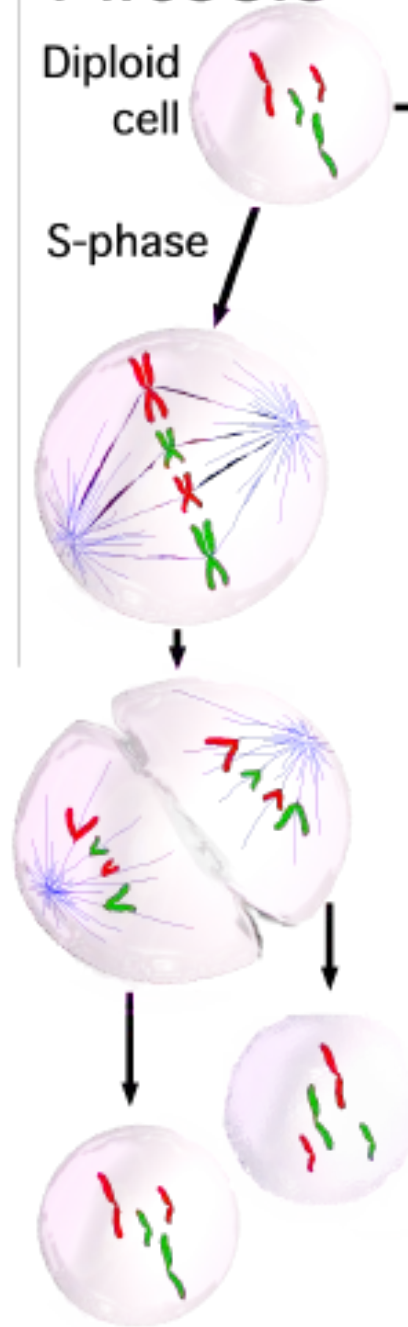


	Mitosis	Meiosis
Interphase	Once	Once
Number of Divisions	1	2
Purpose	-Asexual reproduction -Growth -Tissue repair	-Sexual reproduction
Number of Daughter Cells	2 diploid; Genetically identical to parent cell	4 haploid; Genetically different than parent cell

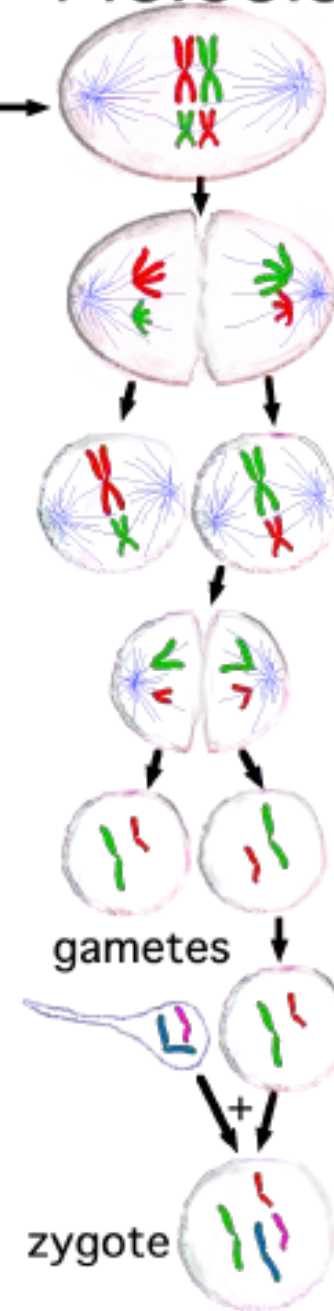
## Binary fission



## Mitosis



## Meiosis



[CLICK HERE FOR LINK THAT EXPLAINS THE DIFFERENCES BETWEEN BINARY FISSION & MITOSIS](#)