

# Genetic Processes

**GP 2** *We are learning to investigate & demonstrate and understanding of genetic processes that occur through meiosis*

***I can...***

- explain the concepts of DNA, genes, chromosomes, alleles, **mitosis**, & meiosis

- explain how DNA, genes, chromosomes, alleles, **mitosis**, & meiosis account for the transmission of hereditary

- Why is mitosis necessary?



# INTERPHASE

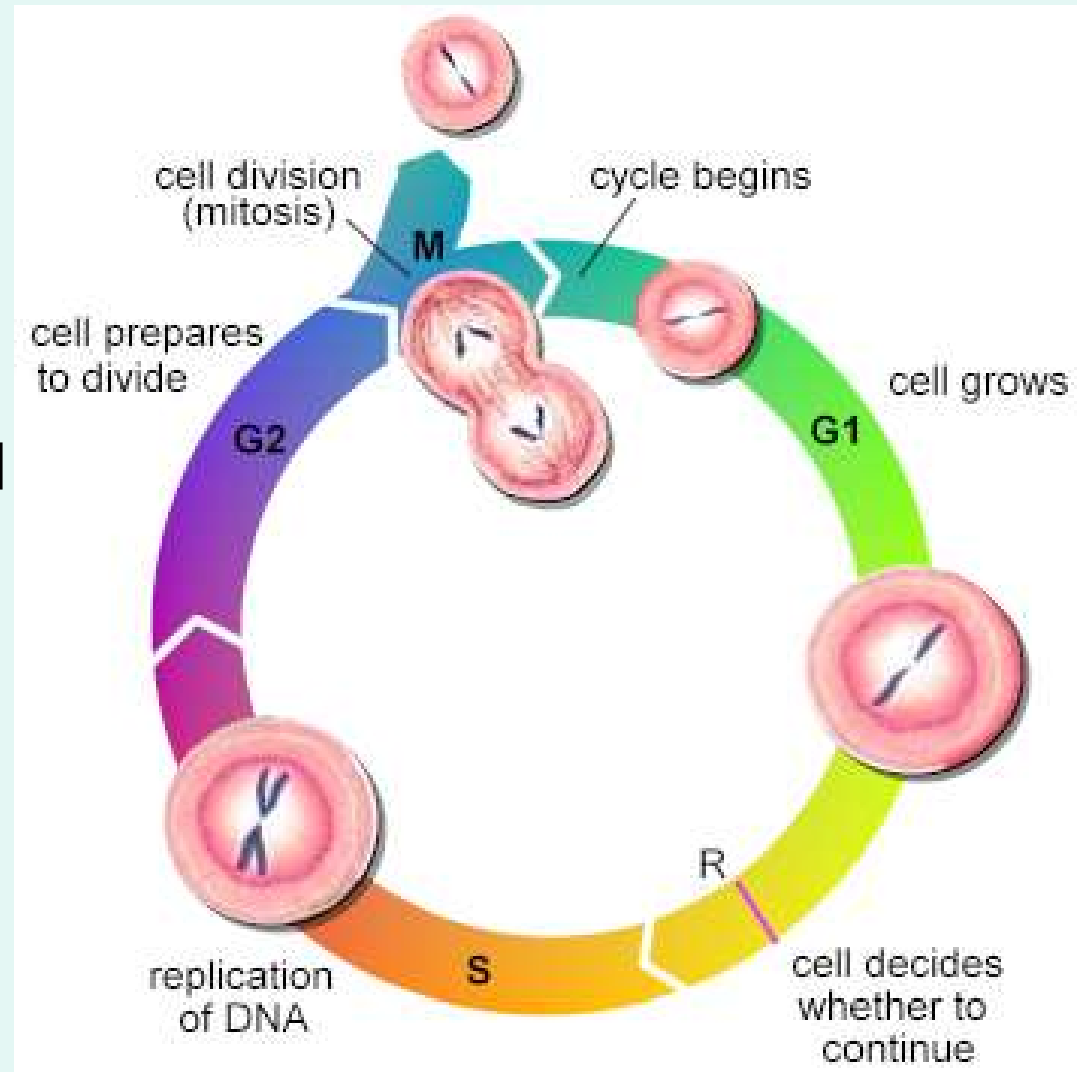
## G1 Stage- (Gap1)

*(also known as interphase)*

The cell grows rapidly and has high metabolic activity

*Cell chooses- Stay in G1 or*

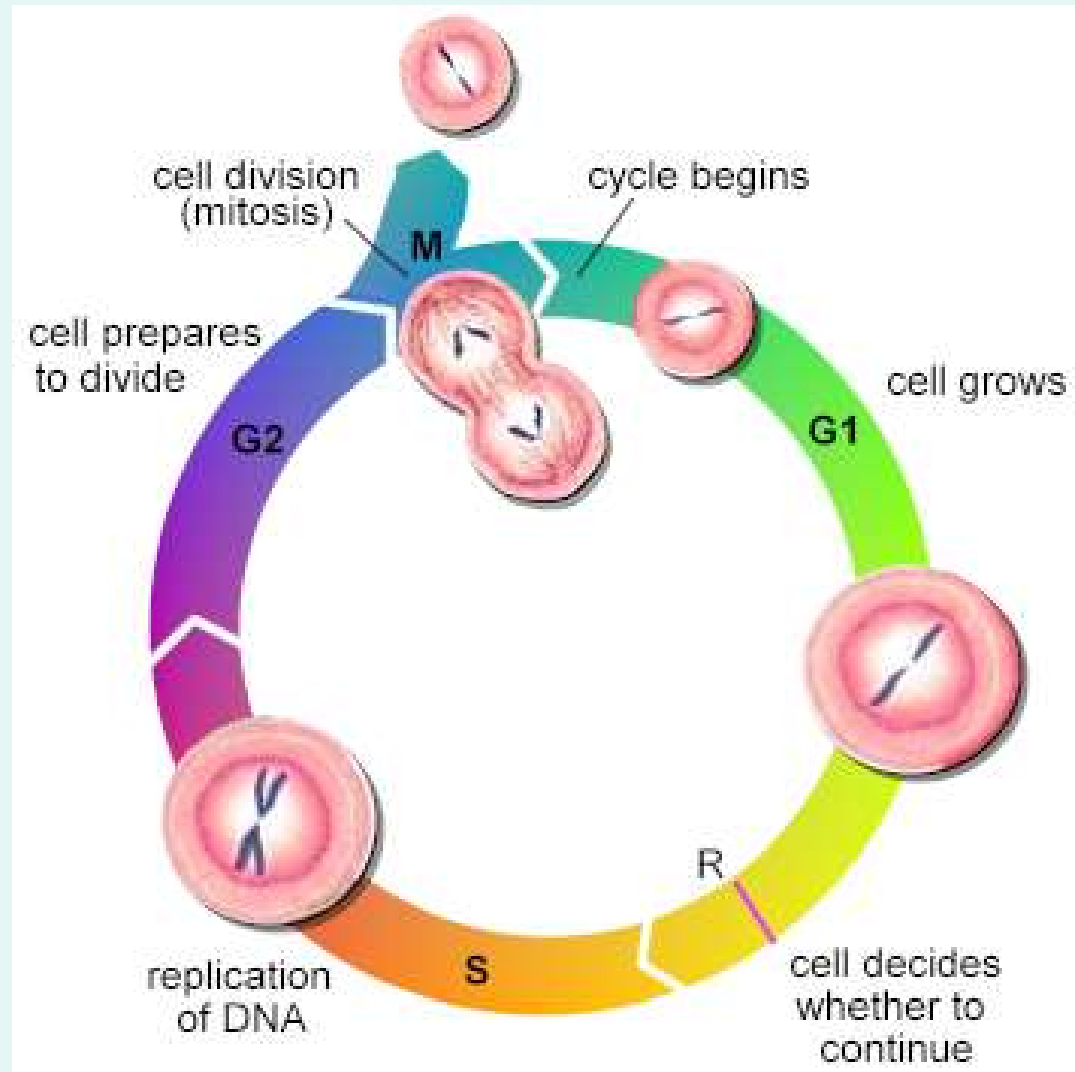
*continues on to divide*



# INTERPHASE

## S1 phase (synthesis)

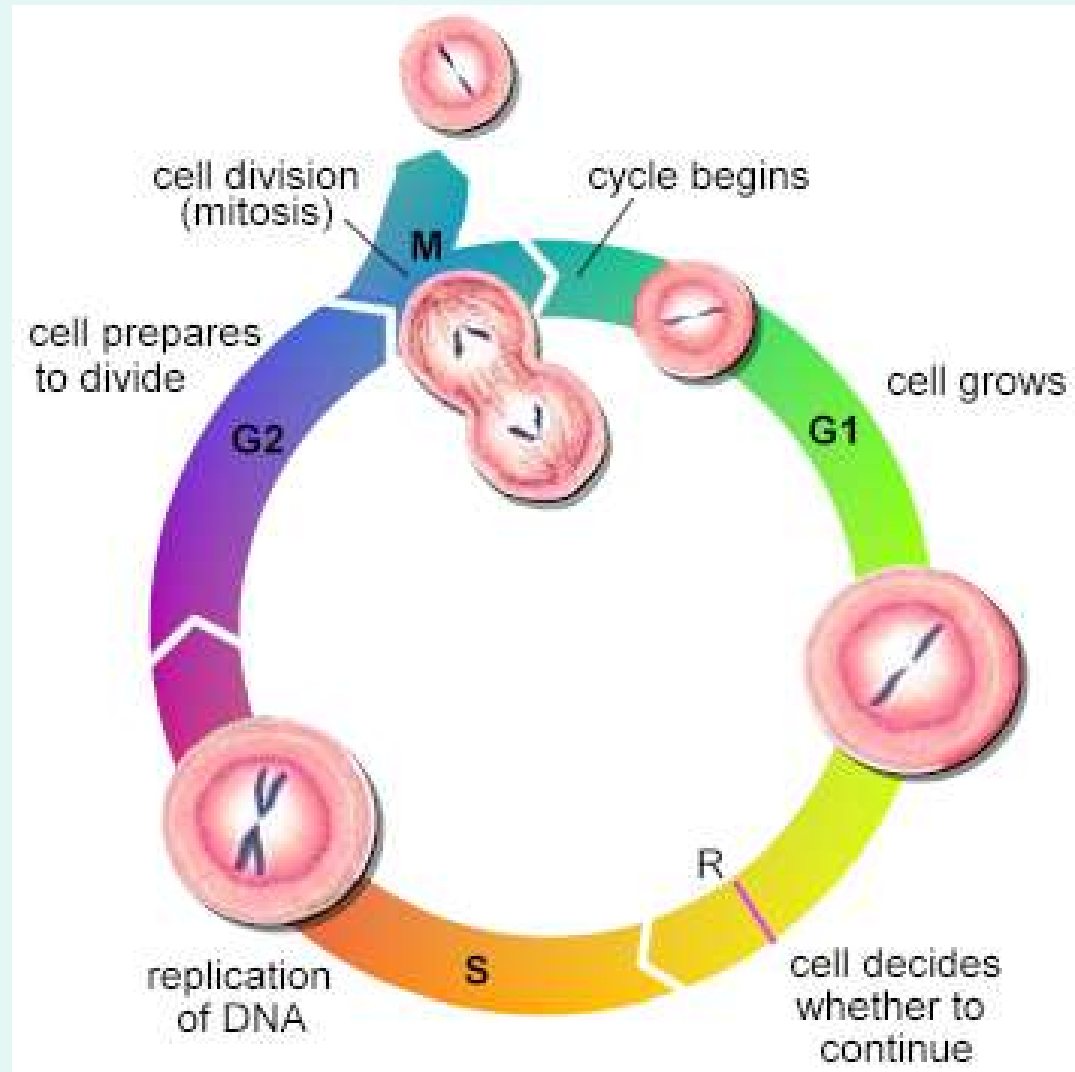
- DNA is replicated
- Centrioles begin to replicate



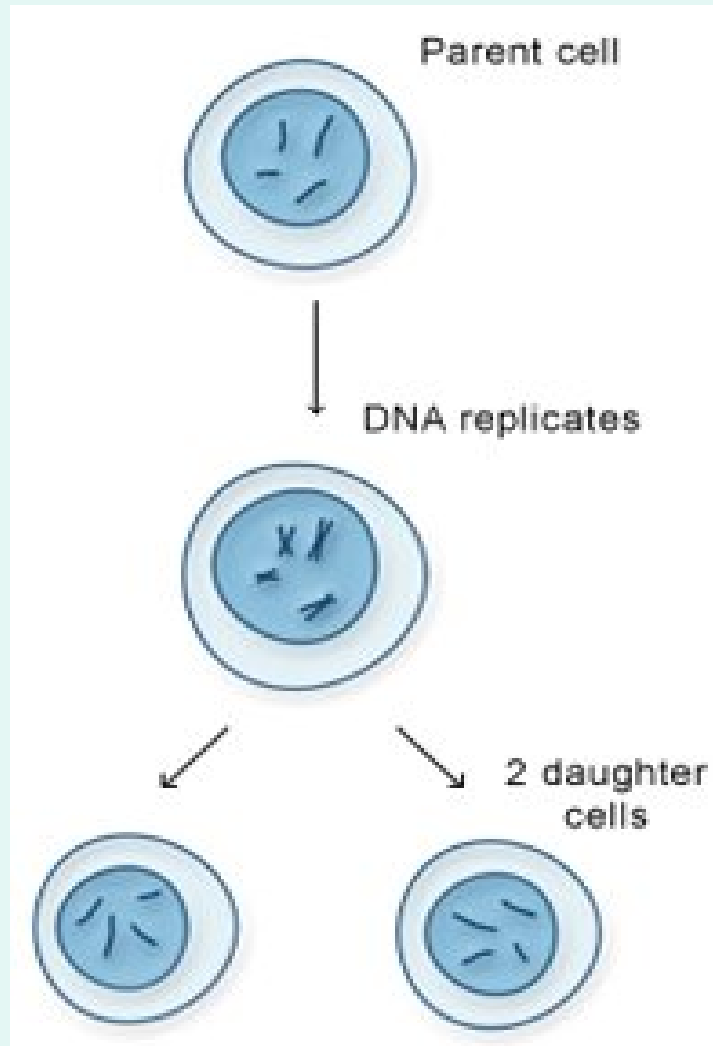
# INTERPHASE

**G2- Cells prepare to divide.**

-Centrioles are duplicated  
*(leads to mitosis & cytokinesis)*



# Mitosis

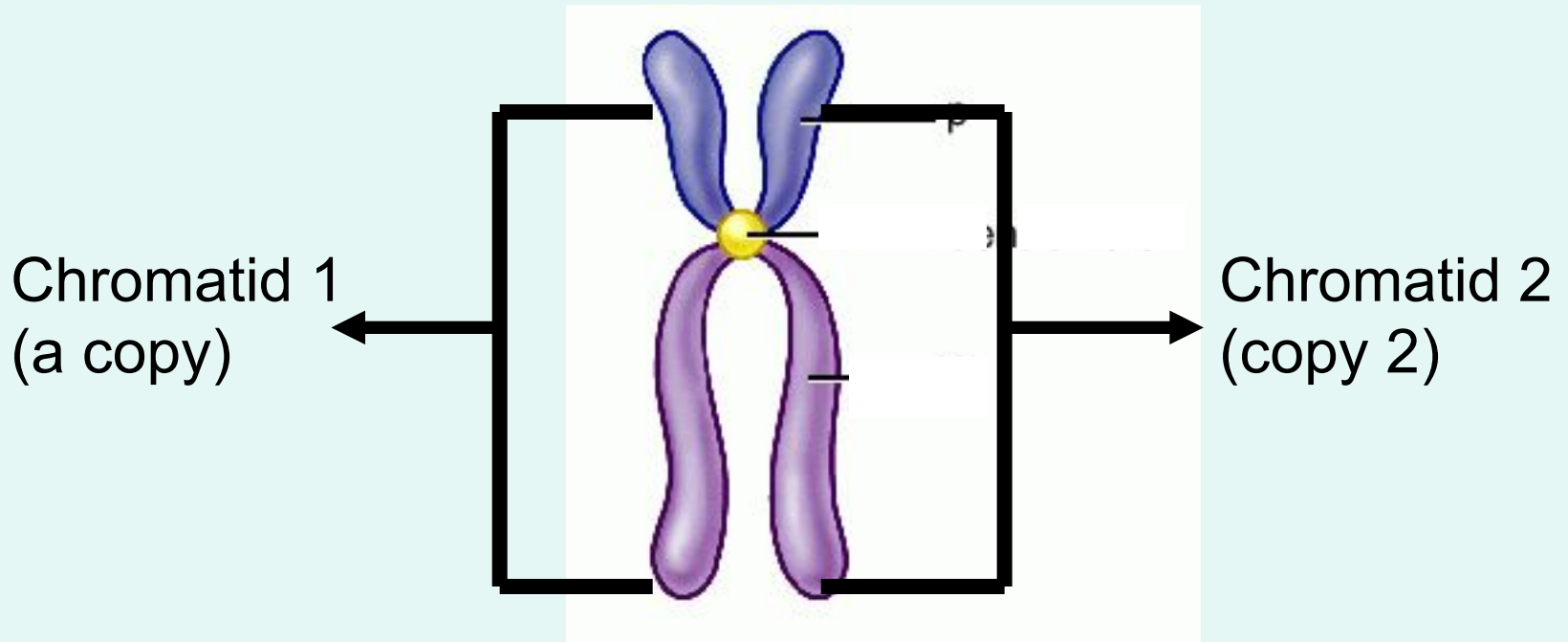


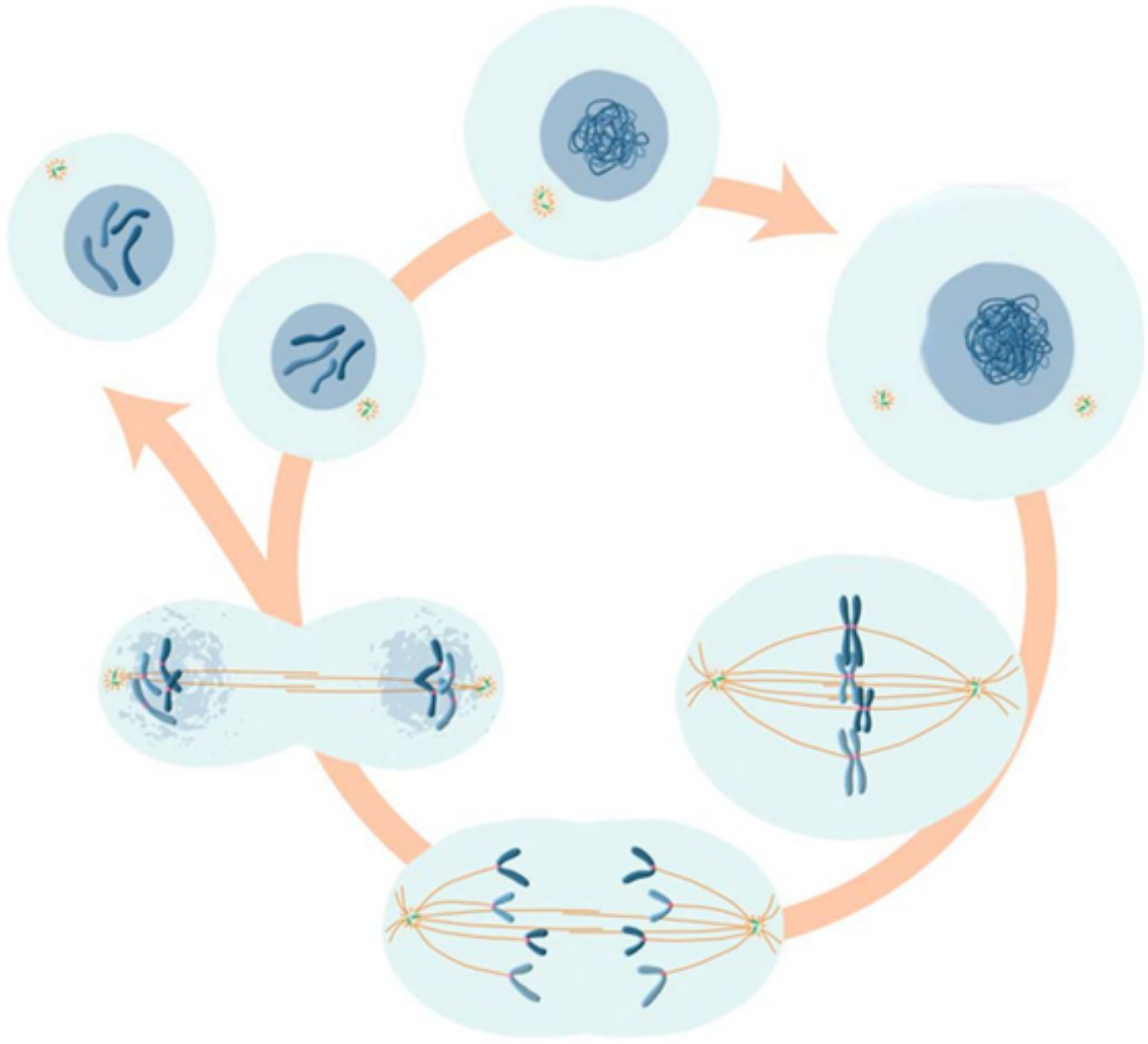
# Mitosis

- cell division resulting in 2 **identical** daughter cells
- each cell has the same **number & type** of chromosomes as the parent
- most somatic (body) cells undergo mitosis (muscle, skin, liver, ...)
- mitosis is needed for growth or repair



- each chromosomes contains **sister chromatids** (genetic copies of each other held together by a centromere)

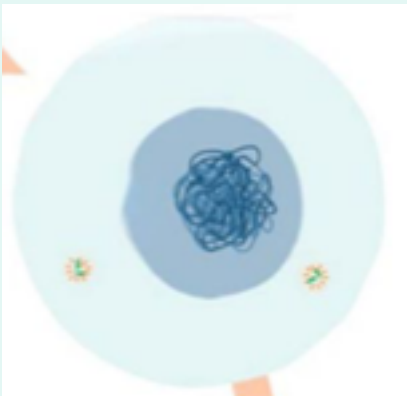




# The Phases of Mitosis

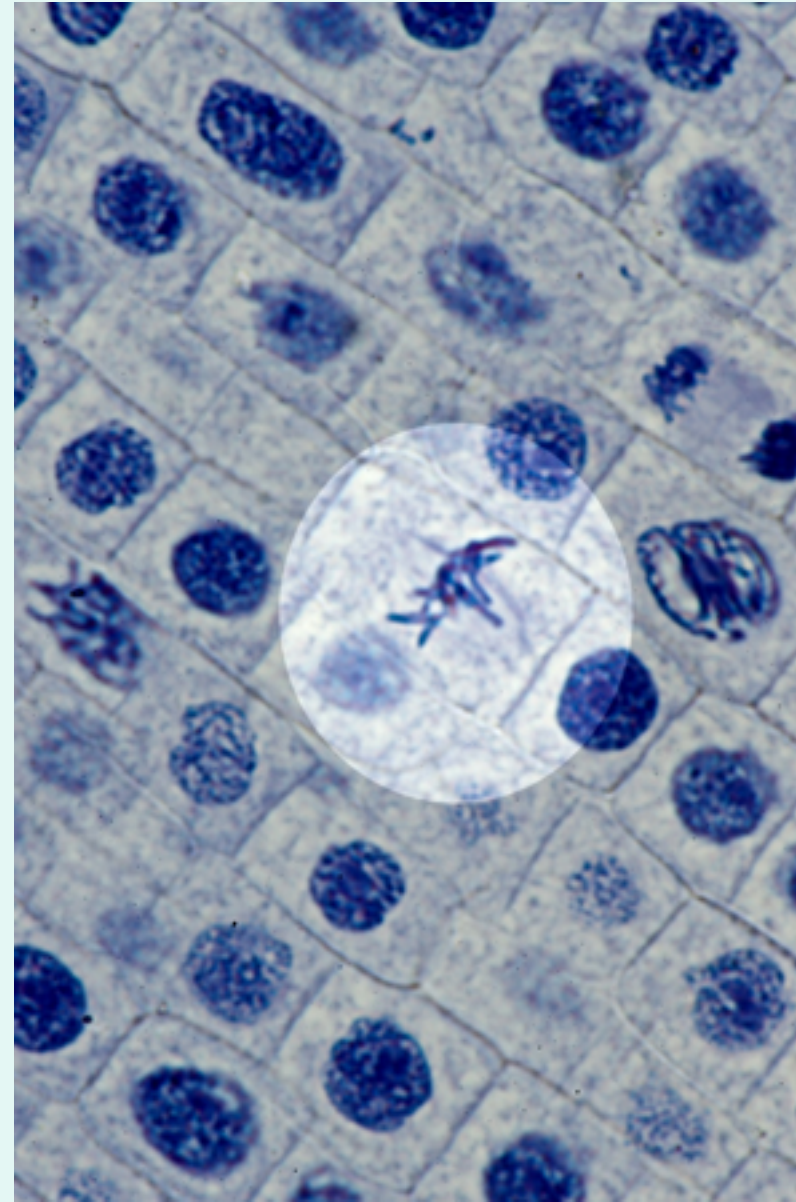
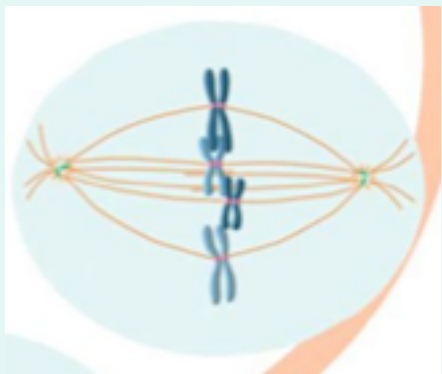
## 1. Prophase

- DNA bundles to form visible chromosomes
- nuclear mb disappears
- centrioles migrate to poles & spindle fibres form between



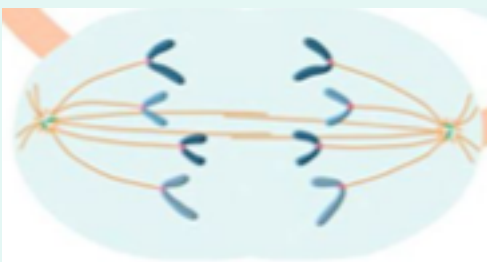
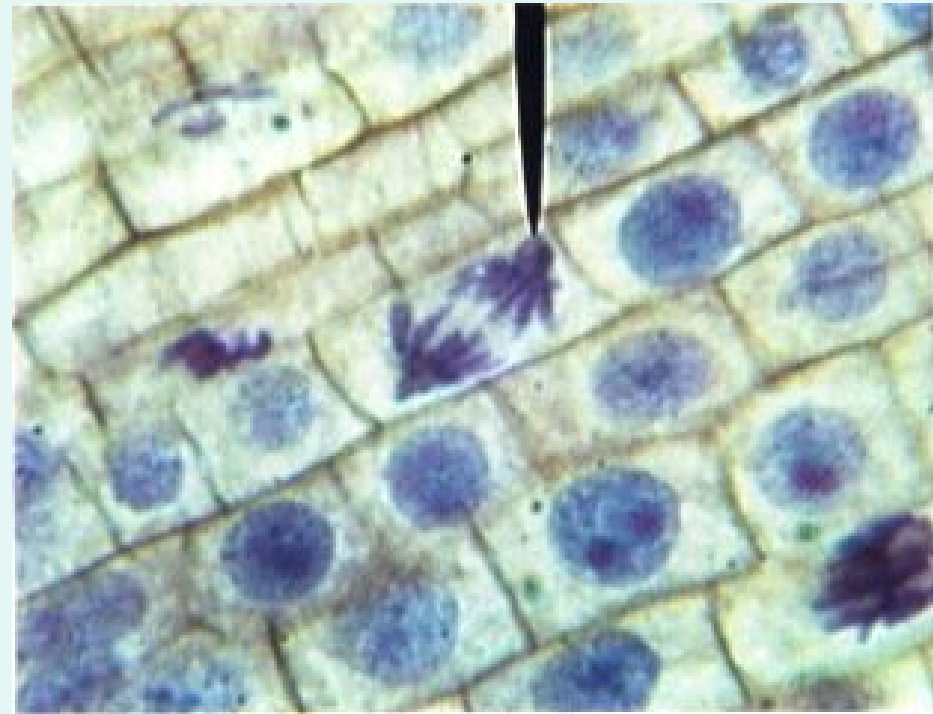
## 2. Metaphase

- spindle fibres attach to centromere of chromosome
- chromosomes move to equator of cell



### 3. Anaphase

- centromeres split & pull sister chromatids to opposite poles of the cell.

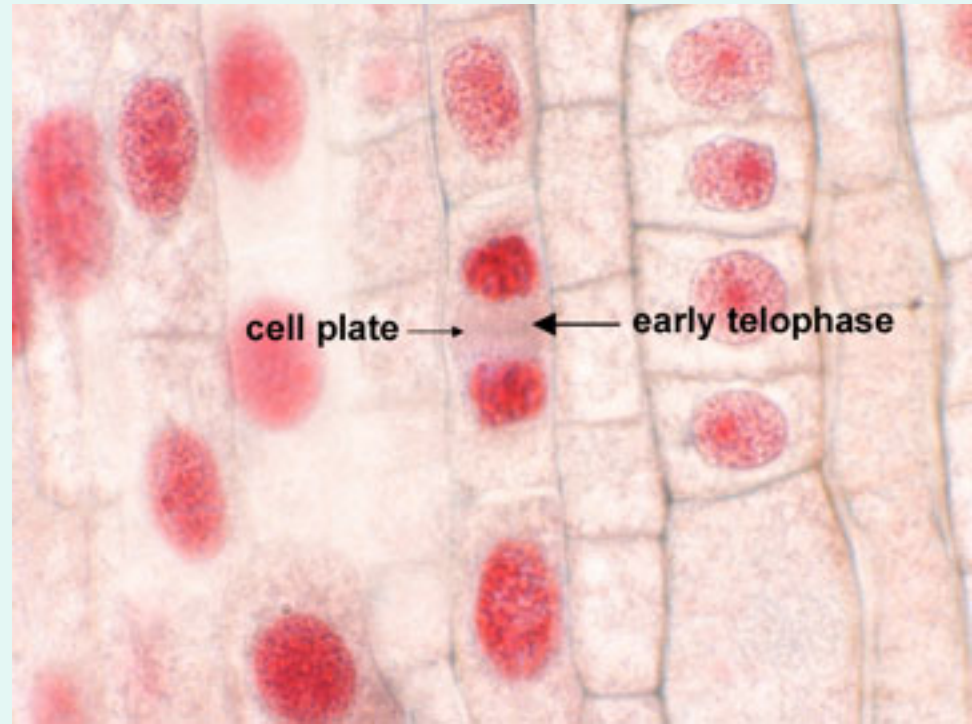






## 4. **Telophase**

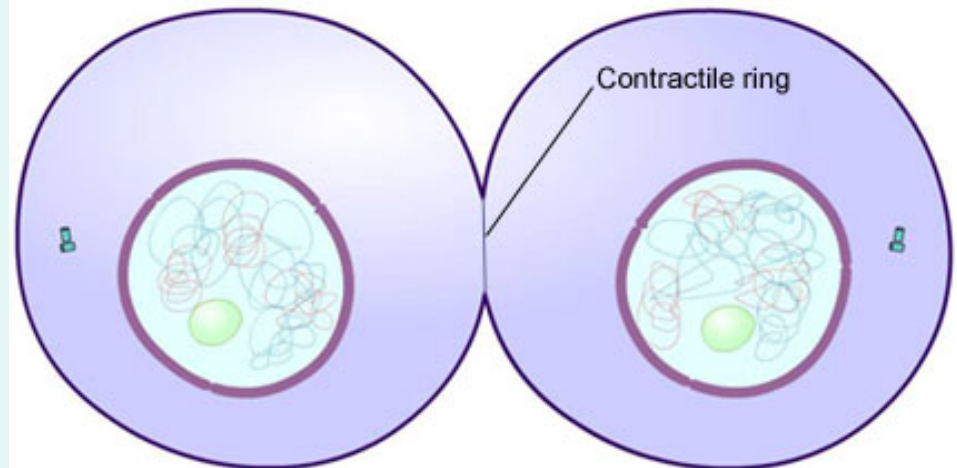
- chromosomes begin to unwind
- cells divide as the cell cycle moves back into G1 stage



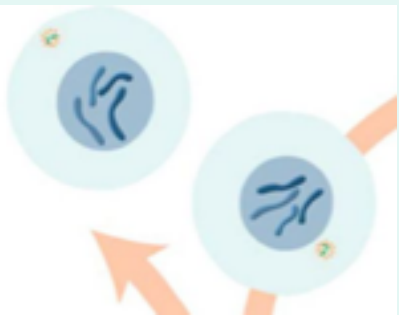
## cytokinesis

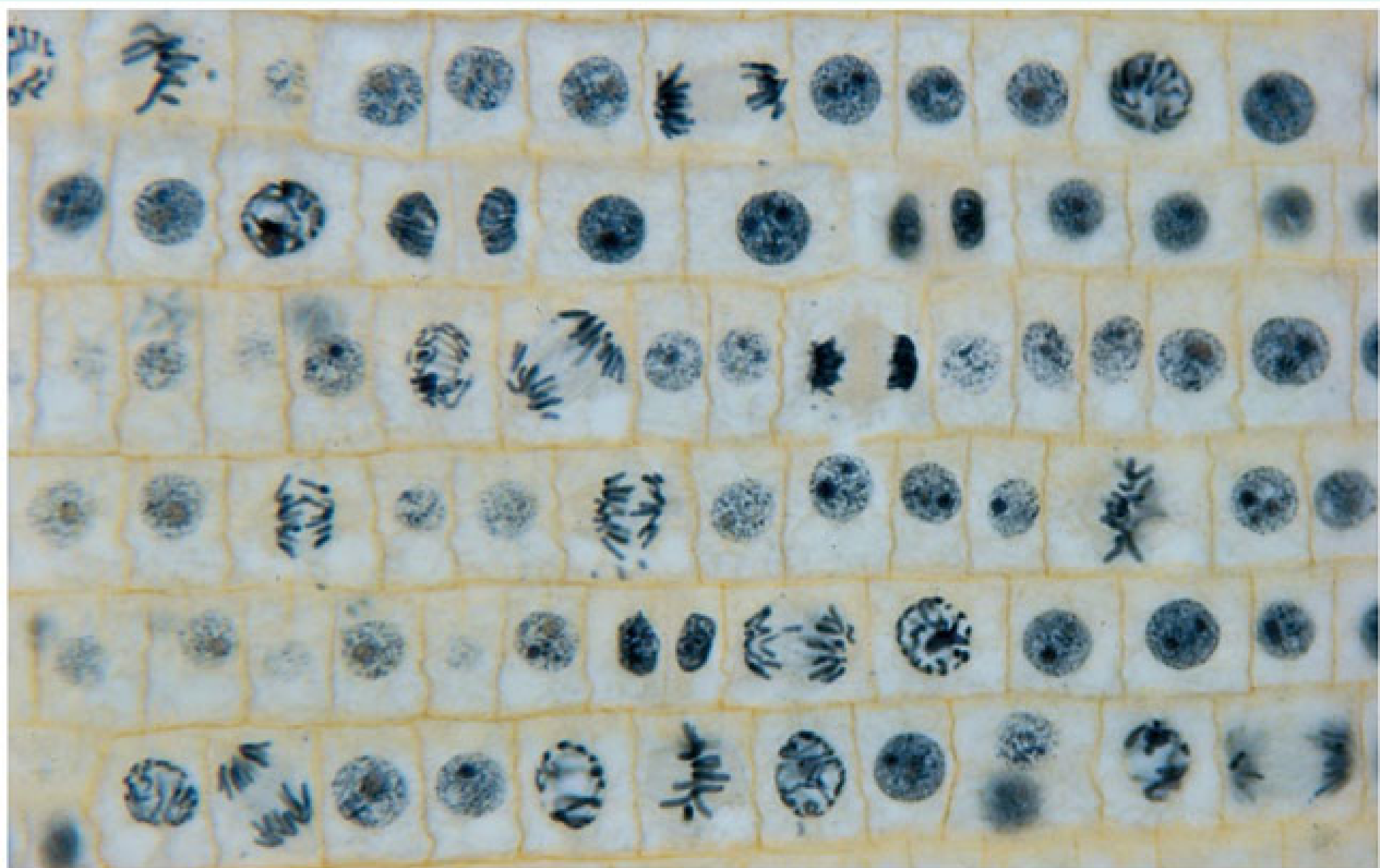
- cytoplasm divides and 2 daughter cells are formed
- nuclear mb forms around each new set of chromosomes
- cell plate forms

Figure B-17: Mitosis, Cytokinesis



Cytokinesis refers to the pinching of the cell into two new daughter cells, which is accomplished by a narrowing contractile ring.







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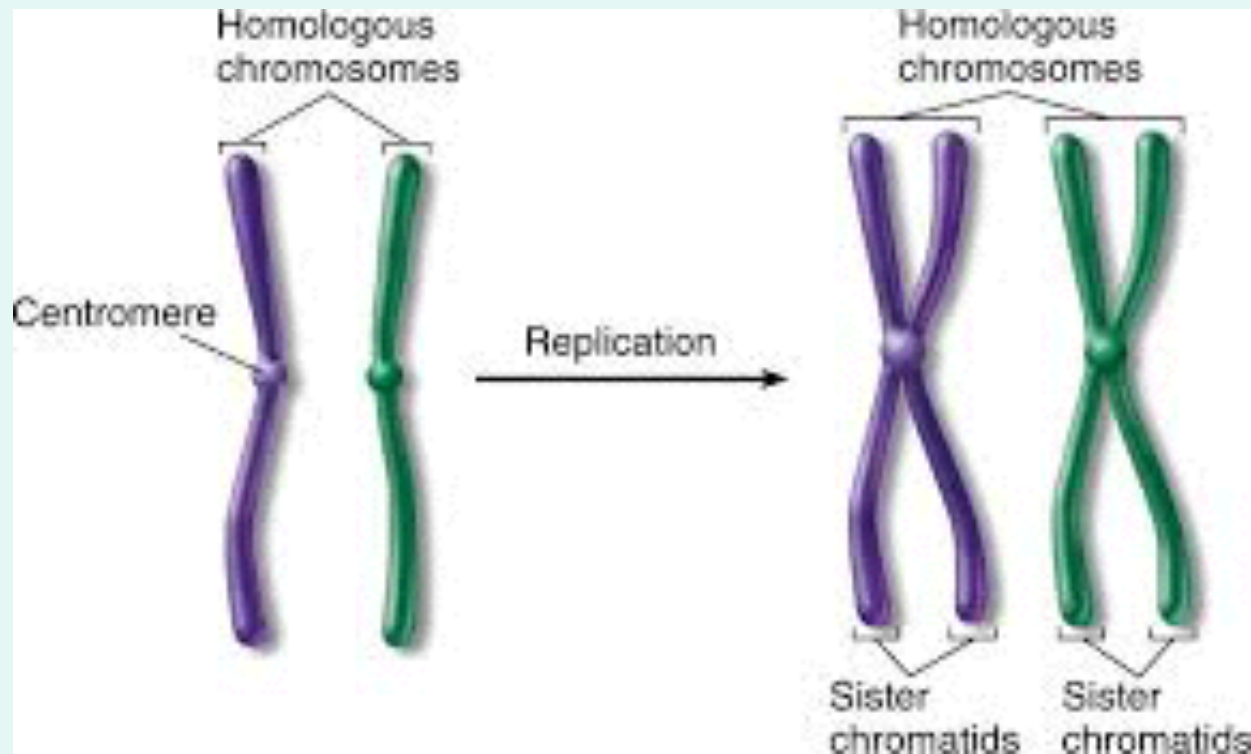
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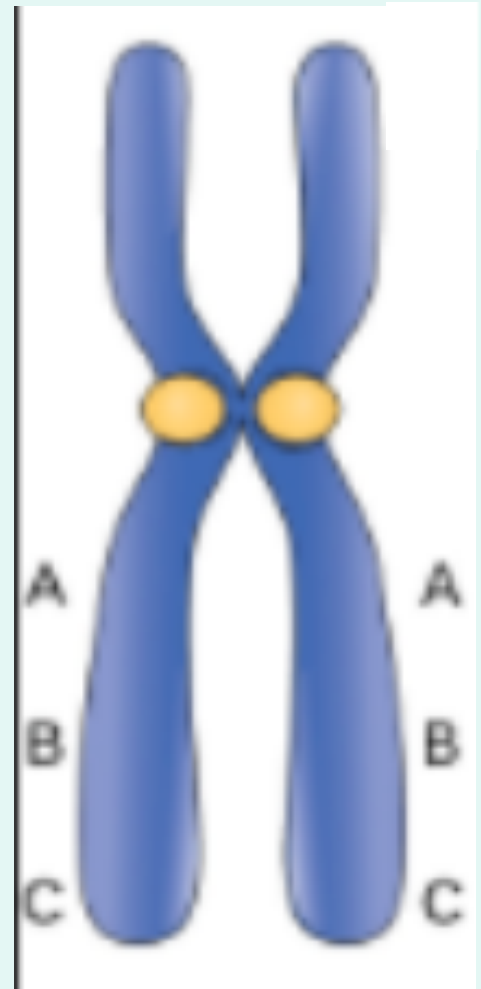
# Chromosomes

*How do homologous chromosomes compare to Sister Chromatids?*



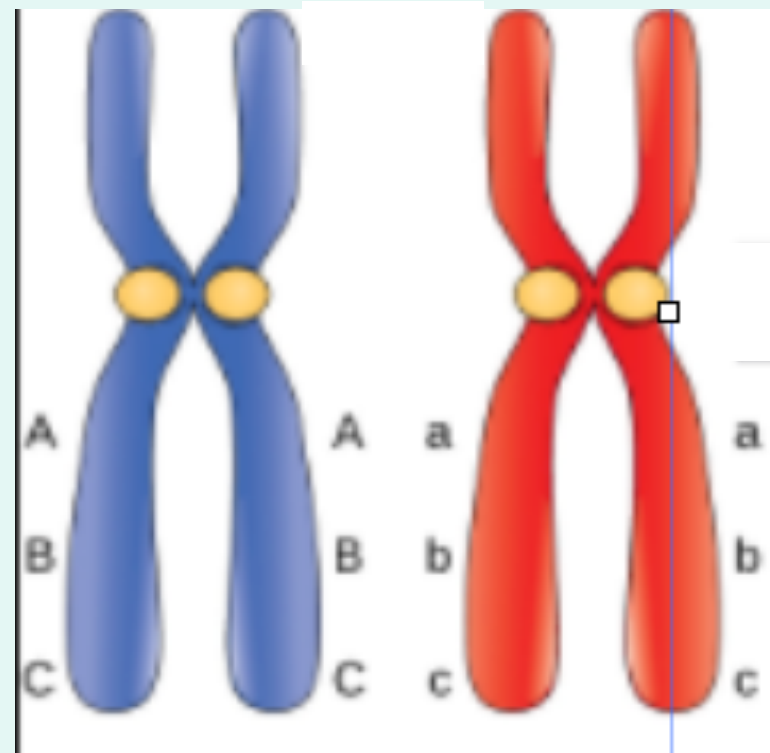
## Sister Chromatids

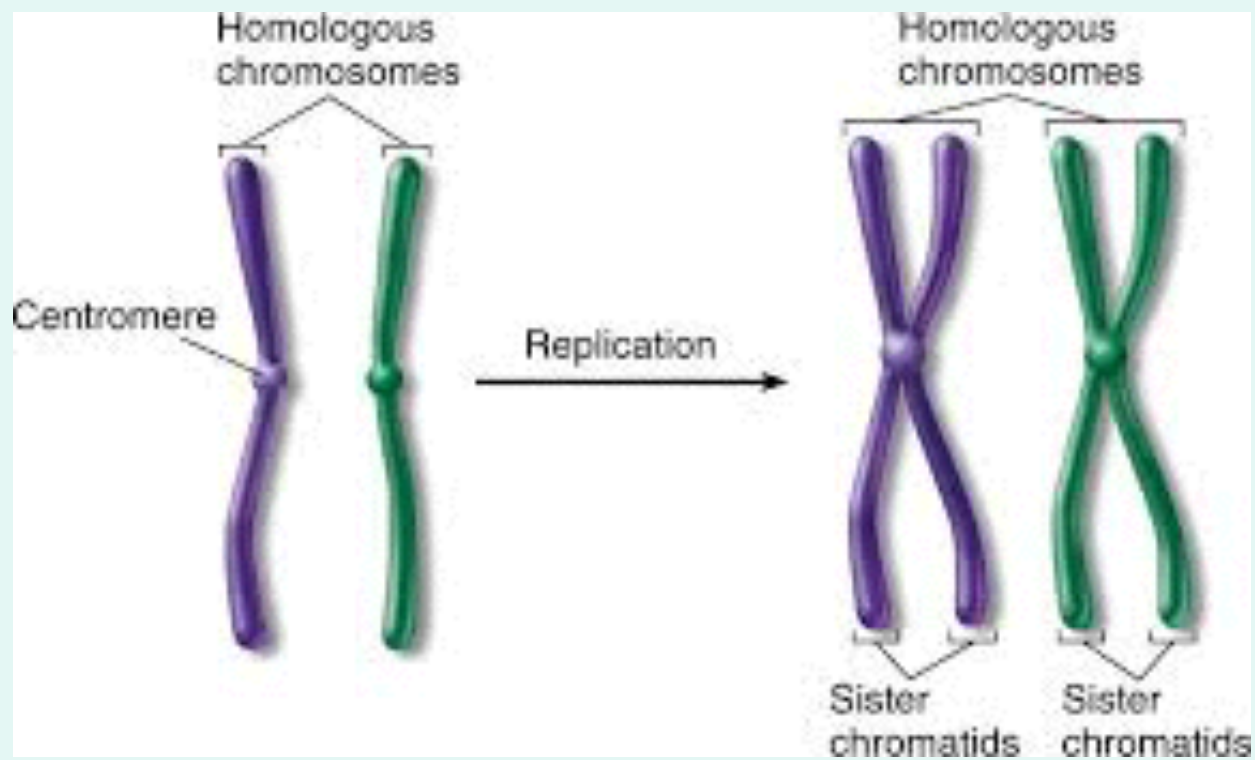
- formed in Prophase
- genetically identical chromosomes
- held together by a centromere
- separate during **Mitosis** (& **Meiosis II**)



## Homologous Chromatids

- contain the same sequence of genes
- same size, same shape
- same centromere location
- 1 originally came from mom;  
1 originally came from dad
- separate during **meiosis I**





**Autosomes**

