

# Chapter 2

**Genetic Material** → **Deoxyribonucleic Acid  
(DNA)**

**DNA** → **Genes** → **Chromosomes**

**Mitosis**: Production of 2 cells, each with the identical number of chromosomes as the parental cell.

**Meiosis**: Reduces the amount of genetic material and the number of chromosomes by 1/2.

# Terms

- **Chromatin**
- **Sister-Chromatid**
- **Homologous Chromosomes**
- **Diploid Number ( $2n$ )**
- **Haploid Number ( $n$ )**
- **Karyotype**

# Mitosis

## **PROPHASE:**

**Migration of 2 pairs of centrioles**

**Break down of nuclear envelope**

**Chromatin ----> Chromosomes**

## **PROMETAPHASE:**

**Period of chromosome movement**

## **METAPHASE:**

**Chromosomes at equatorial plate**

**Spindle fibers**

## **ANAPHASE:**

**Separation of sister-chromatid**

**Chromatid = Daughter chromosome**

## **TELOPHASE:**

**Opposite of Prophase**

**Cleavage furrowing in animal cells <sub>3</sub>**

**Cell Plate in plant cells**

# MEIOSIS

- Produces haploid (n) gametes or spores.
  - Synapsis (pairing) of homologous chromosomes.
  - Crossing-over between homologous chromosomes.
  - **BIVALENT** = synapsed structure and produces **TETRADS** (4 chromatids)
- 
- 

**1<sup>st</sup> Division = Reductional Division -- number of centromeres, each representing one chromosome, is reduced by 1/2.**

**Tetrads separate to produce 2 dyads.**

**2<sup>nd</sup> Division = Equational Division -- number of centromeres remains equal following this division.**

**Each dyad separates to produce 2 monads**

# **Prophase I -- Substages**

## **1. Leptonema--**

**--Chromatin Condensation**

**--Homology Search -- Gross Pairing of Homologues**

## **2. Zygonema--**

**--Synaptonemal Complex Formation**

**--Bivalents = Paired Structures**

**--# of Bivalents = haploid number**

## **3. Pachynema--**

**--Synapsis & Crossing-over**

**--Structure of tetrad is obvious**

## **4. Diplonema--**

**--Chiasma evident**

## **5. Diakinesis--**

**--Chromosome pull apart BUT nonsister chromatids remain loosely associated via chiasmata.**

**--nucleolus and nuclear envelope breakdown.**