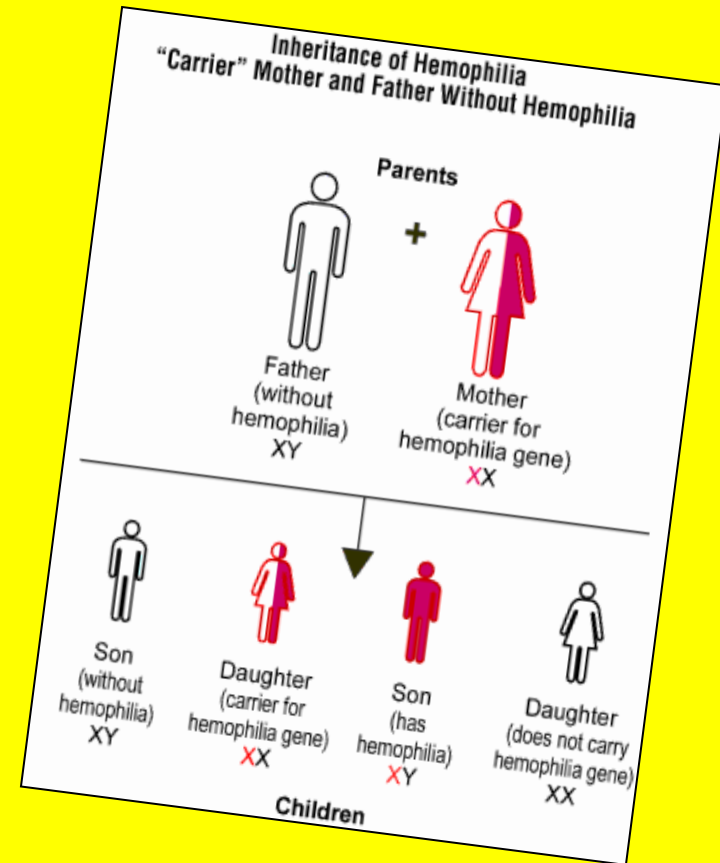
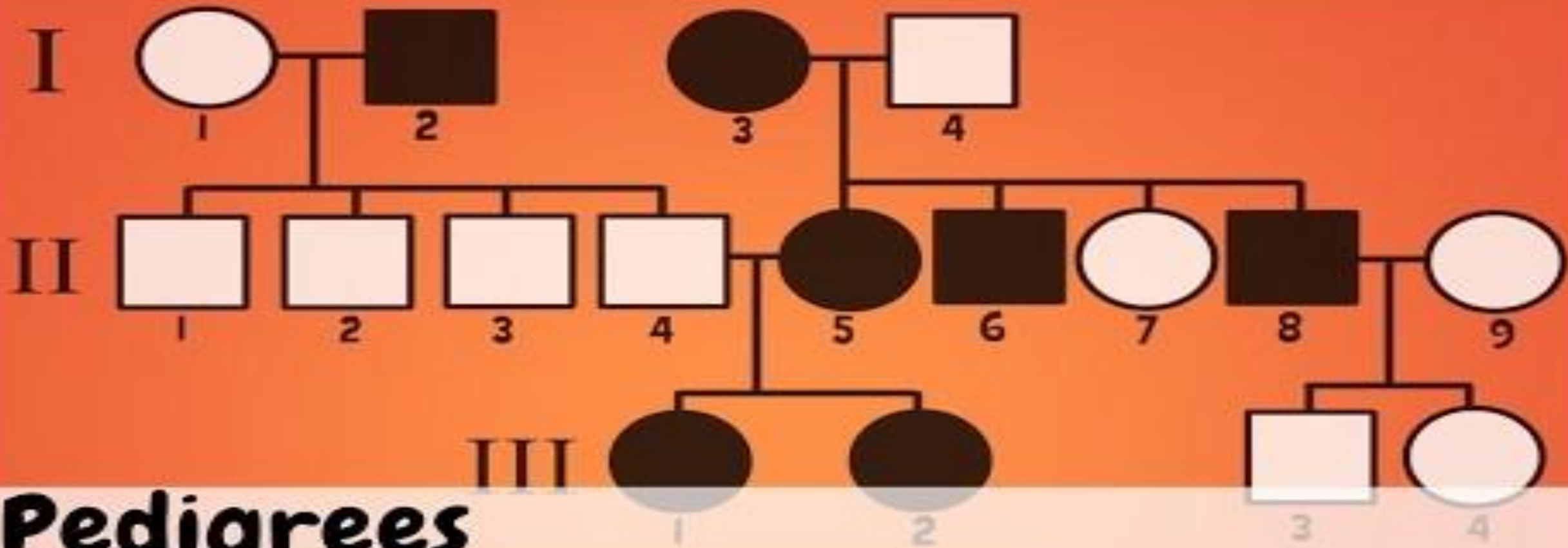


Pedigrees





Pedigrees

with the Amoeba Sisters

What is a pedigree?

Pedigrees: a chart that shows how a certain trait is passed from generation to generation.

- Shows family relationships, including marriages and births.
- Pedigrees can show us the genotypes of family members.

What are they used for?

- Pedigrees are commonly used in families to find out the probability of a child having a disorder in a particular family.
- In the practice of breeding animals pedigree charts are used to plan animal breeding in order to enhance desirable traits.



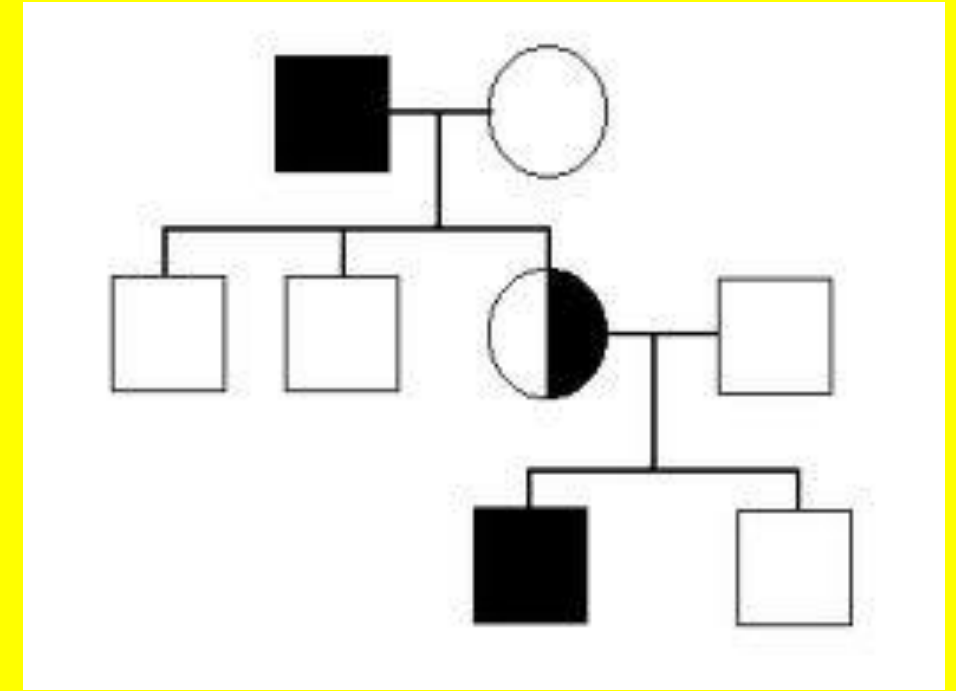
When can we use pedigrees?

Pedigrees work best to demonstrate **simple dominance inheritance.**

- Not all genes can be traced through a pedigree because some genes are polygenic.

Pedigree Symbols

- Females: ○
- Males: □
- Vertical lines: parent/child relationship
- Horizontal lines: marriage
- Shaded shape: infected family member
- Unshaded shape: not infected family member
- Half-shaded shape: carrier of the gene



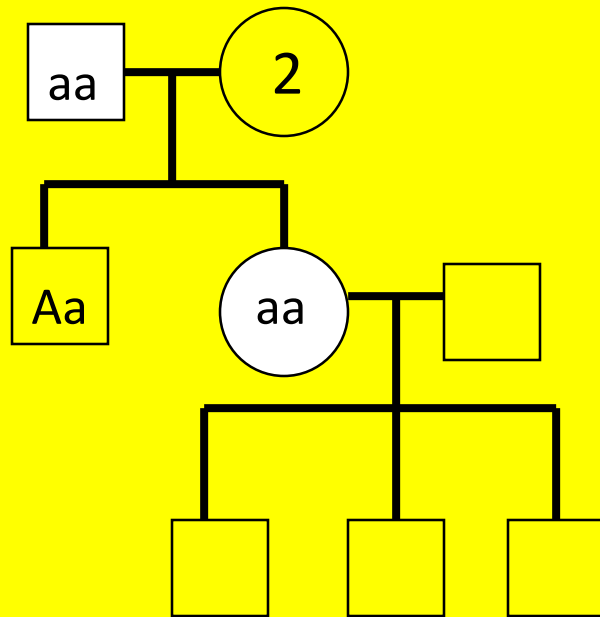
Determining Genes on a Pedigree

You can determine the genes of family members on the pedigree in a few easy steps....

1. Fill in the genotypes of the infected people first.
2. Do a punnett square to find out the missing genotypes.

Example #1

Albinism is caused by a recessive allele (a). The following pedigree shows 3 generations.



Is individual #2 homozygous or heterozygous for normal skin color?

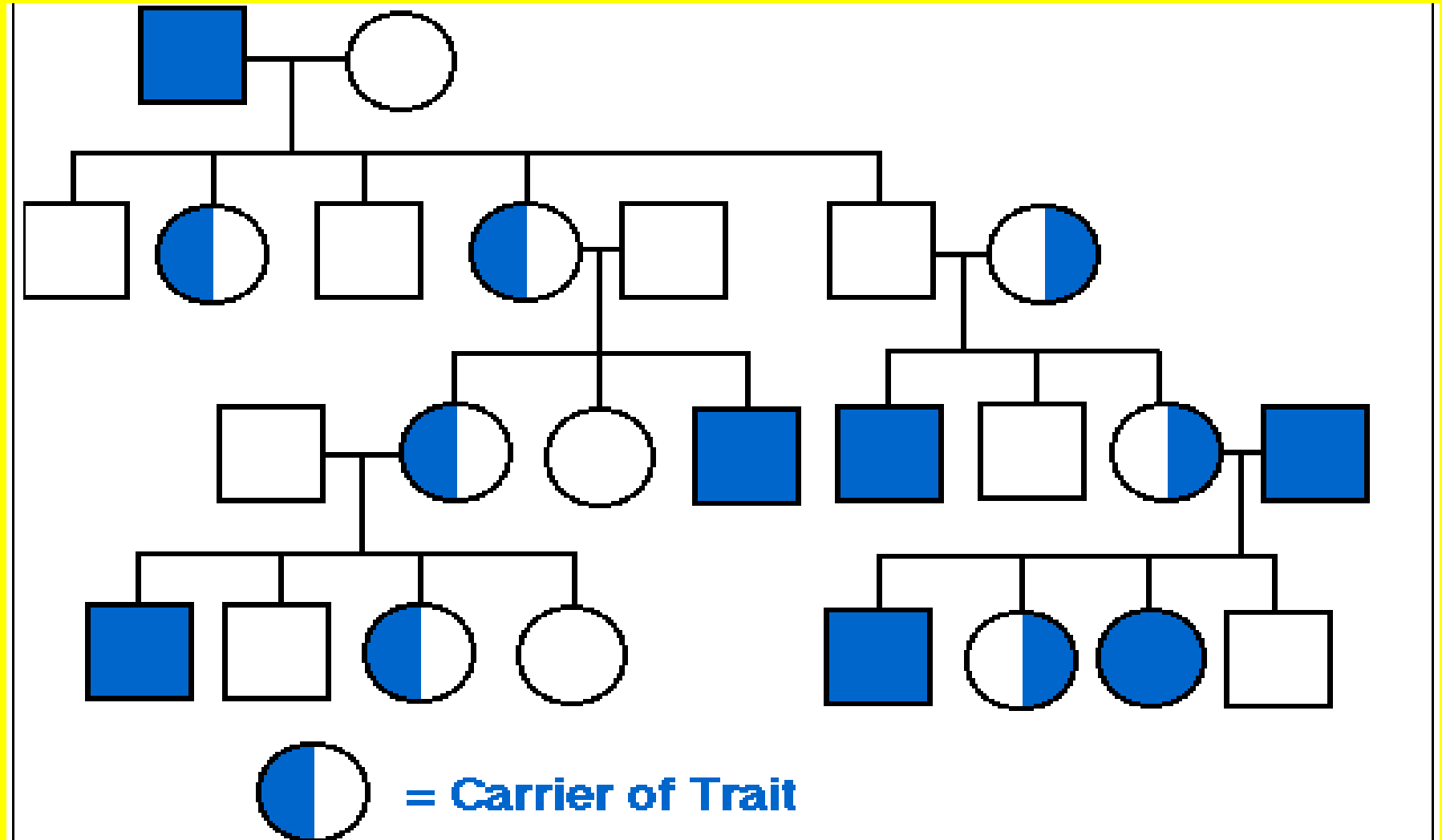
Heterozygous!

Why?

Because individual 2 had to have given their child a copy of the recessive allele

Example #2

- What type of inheritance is being shown? (Solid blue means you have the disorder)



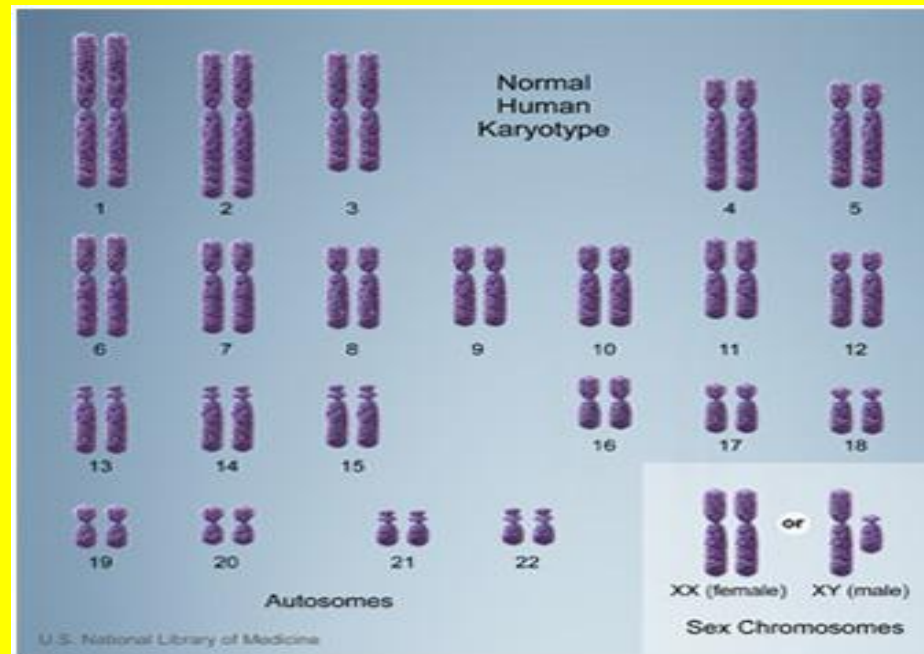
Genetic Disorders

- Disorders passed down to offspring by parents
 - Could be issue with a single gene or entire chromosome
 - In order to be passed down error must be present in the gametes
 - IE: If you lose an arm in an accident, will your children be born without arms?
 - **NO!** Unless the gene/chromosome issue is in the sperm or egg it won't be passed down



Chromosomes

- Humans have 46 chromosomes (23 pairs)
- Pairs 1-22 are autosomes
- Pair 23 are sex chromosomes (determine gender)
 - XX = Female
 - XY = Male

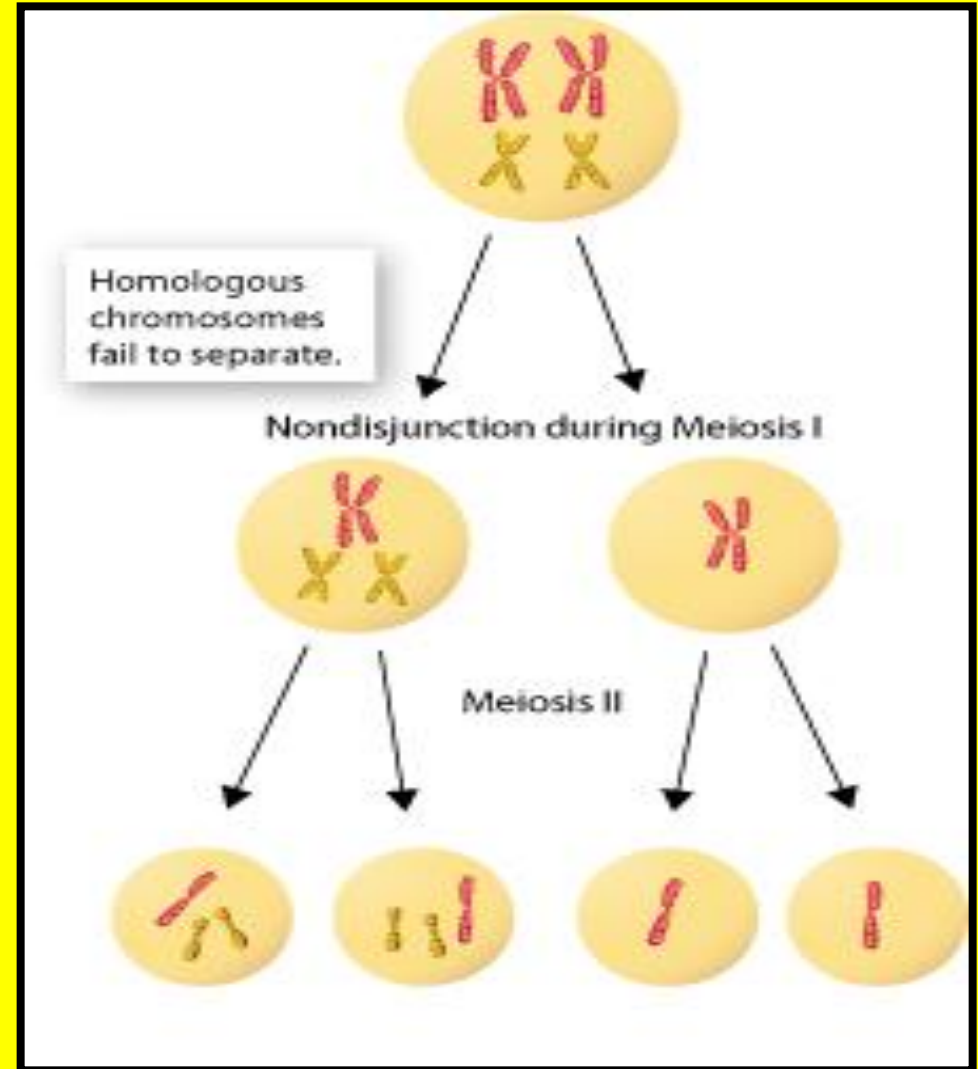


Karyotype

(picture of actual chromosomes paired up)

Nondisjunction

- The most common error happens in meiosis, where chromosomes fail to separate correctly = ***nondisjunction***



Down Syndrome

Down syndrome: **Trisomy 21**

- chromosomes fail to separate and an individual ends up with **3 copies of that gene, called trisomy.**



Using Karyotypes to Identify Disorders

Karyotypes can be used to identify certain genetic disorders.

Normal Karyotype

