

Topic:

Beyond Mendel Outline of Topics

- I) \_\_\_\_\_
- II) \_\_\_\_\_
- III) \_\_\_\_\_
- IV) \_\_\_\_\_
- V) \_\_\_\_\_
- VI) \_\_\_\_\_
- VII) \_\_\_\_\_
- VIII) \_\_\_\_\_

### I. Mutations

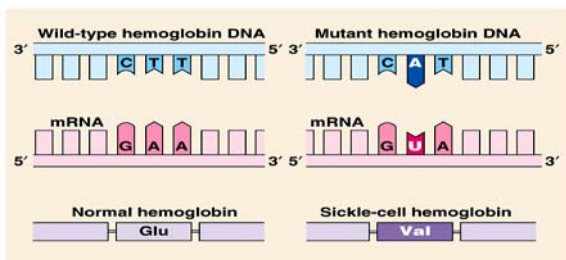
Definition:

A \_\_\_\_\_ in the genetic material (\_\_\_\_ or \_\_\_\_ ) of a cell  
- \_\_\_\_\_: If it occurs in \_\_\_\_\_ cells, it \_\_\_\_\_ be \_\_\_\_\_ to next generation  
- \_\_\_\_\_: If it occurs in \_\_\_\_\_, it \_\_\_\_\_ be passed on to next generation

### 2 Types of Mutations in Genes

Point Mutation

1. \_\_\_\_\_ mutation  
Affects \_\_\_\_\_  
(One nucleotide is \_\_\_\_\_ by another)



\_\_\_\_\_ types of point mutations  
a) \_\_\_\_\_ mutations: code for a different \_\_\_\_\_ (ex. sickle-cell hemoglobin)  
- left diagram  
b) \_\_\_\_\_ mutations: code for the \_\_\_\_\_ amino acid  
c) \_\_\_\_\_ mutations: code for a \_\_\_\_\_.

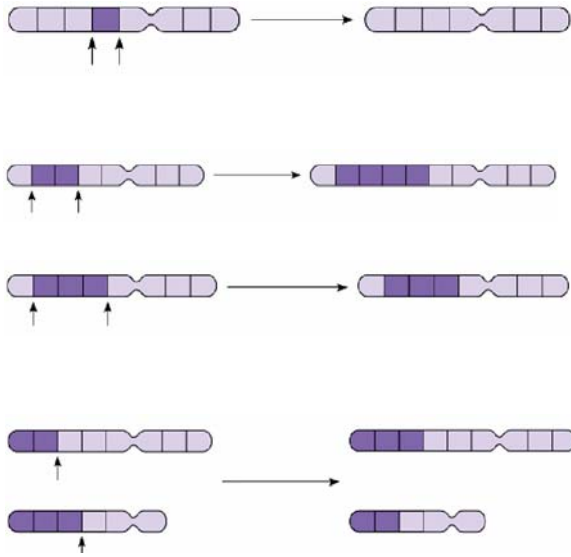
Frameshift Mutation

2. \_\_\_\_\_ mutation: An \_\_\_\_\_ or \_\_\_\_\_ that shifts the triplet code \_\_\_\_\_ frame

a) Example of Insertion:  
TACGCATGGAATACC  
New sequence?

b) Example of a deletion:  
THE FAT CAT ATE THE RAT

### Mutations in Chromosomes



New sequence?

1. \_\_\_\_\_: A \_\_\_\_\_ of the chromosome is \_\_\_\_\_ (not just \_\_\_\_\_ nucleotide)
2. \_\_\_\_\_: A segment of the chromosome is \_\_\_\_\_
3. \_\_\_\_\_: A segment within a chromosome is \_\_\_\_\_.
4. \_\_\_\_\_: A segment from one chromosome \_\_\_\_\_ to another \_\_\_\_\_ chromosome

### II. Linked Genes

If genes are "linked", this means they are \_\_\_\_\_ on the \_\_\_\_\_.

The linked genes are most likely \_\_\_\_\_ and will \_\_\_\_\_ undergo Mendel's Law of \_\_\_\_\_, unless \_\_\_\_\_ over \_\_\_\_\_ the linked genes

### III. Gene Mapping

Genes that are \_\_\_\_\_ together on the same chromosome are \_\_\_\_\_ likely to cross over, therefore, \_\_\_\_\_.

Genes that are \_\_\_\_\_ apart on the same chromosome are \_\_\_\_\_ likely to cross over and segregate

Genes that are on \_\_\_\_\_ chromosomes will \_\_\_\_\_ independently

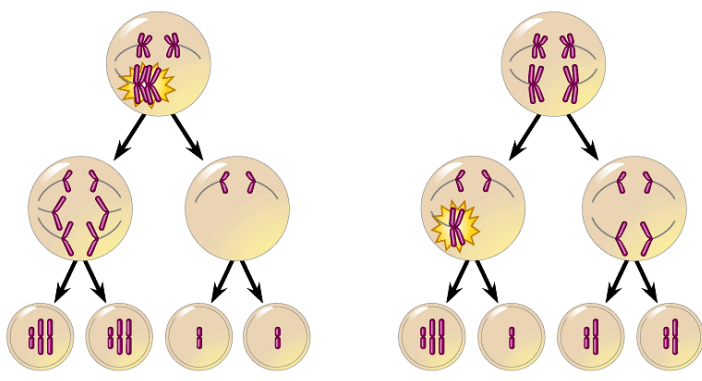
### IV. Sex-Linkage or (X-linked)

How are X chromosomes different from the Y chromosome?

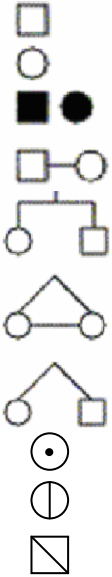
Explain how a gene can exist on the X chromosome without existing on the Y chromosome.

When a gene is found on the \_\_\_ chromosome, it is considered \_\_\_-\_\_\_\_\_.

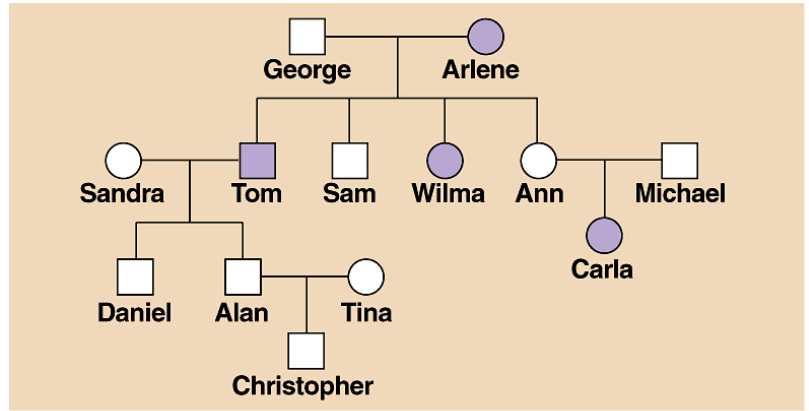
When genes are sex-linked, we include the X and Y as part of their genotype. For example, the allele for red eye in fruit flies is not "R" but is written as \_\_\_\_\_.

<p>How would you write the allele for white eye in fruit flies?</p>					
<p>You work in a fruit fly lab and you cross a heterozygote red-eye female with a red-eye male. Predict the F1 offspring using a punnett square. What is the phenotypic ratio?</p>	<div style="text-align: center;"> <table border="1" style="width: 100px; height: 100px; margin: auto;"> <tr> <td style="width: 50px; height: 50px;"></td> <td style="width: 50px; height: 50px;"></td> </tr> <tr> <td style="width: 50px; height: 50px;"></td> <td style="width: 50px; height: 50px;"></td> </tr> </table> </div> <p>Phenotypic Ratio:</p>				
<p>V. Polygenic Traits</p>	<p>Definition: Traits controlled by _____ or _____</p> <p>Examples: _____, _____</p>				
<p>VI. Non-disjunction Disorders</p>	<p>Definition: When members of homologous chromosomes fail to _____ during _____ - or - when _____ fail to _____ during _____.</p> <p>Examples: _____ Syndrome, _____ Syndrome, _____ Syndrome</p> <div style="text-align: center;">  </div>				
<p>VII. Prenatal Diagnosis Using Karyotypes</p> <p>In your own words, explain the 2 ways karyotypes can be created to diagnose diseases in a fetus</p>	<ol style="list-style-type: none"> <li>1. Amniocentesis</li> <li>2. Chorionic Villus Sampling (CVS)</li> </ol>				
<p>VIII. Pedigree</p>	<p>A pedigree is a _____ of the _____ of family over several _____</p>				

Create a Legend



Interpreting a Pedigree Chart



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If A =  
a =

Determine if the pedigree chart shows an autosomal or X-linked disease.

- a. If most of the \_\_\_\_\_ in the pedigree are affected the disorder is \_\_\_\_\_.
- b. If it is a 50/50 ratio between \_\_\_\_ and \_\_\_\_\_ the disorder is \_\_\_\_\_.

Determine whether the disorder is dominant or recessive.

- a. If the disorder is \_\_\_\_\_, \_\_\_\_ of the \_\_\_\_\_ have the \_\_\_\_\_.
- b. If the disorder is \_\_\_\_\_, \_\_\_\_\_ parent has to have the disorder because they can be \_\_\_\_\_.