**DNA Mutations Guided Notes**

**What are Mutations?**

Mutations are heritable changes in genetic information.

**What Causes Mutations?**

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: certain substances or conditions that can create a greater rate of mutation.

Some examples include:

* Viruses
* High temperatures
* ­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (UV rays)
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (mustard gas, DDT, Agent-Orange)

**Types of Mutations**

All mutations fall into \_\_\_\_\_ basic categories:

1. \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ produce changes in a single gene.
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ produce changes in whole chromosomes.

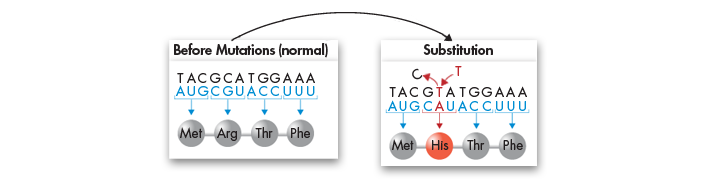
**Gene Mutations**

\_\_\_\_\_\_\_\_\_\_\_\_\_ mutations involve changes in one or a few nucleotides. This is because they occur at a single point in the DNA sequence. They generally occur \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

If a gene in one cell is altered, the alteration can be passed on to every cell that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_.

**Types of Gene Mutations**

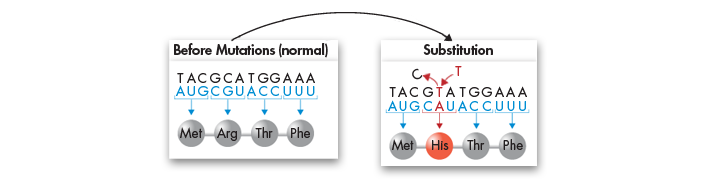
Point mutations are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



**Gene Mutations - Substitution**

In a substitution, \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ is changed to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_.

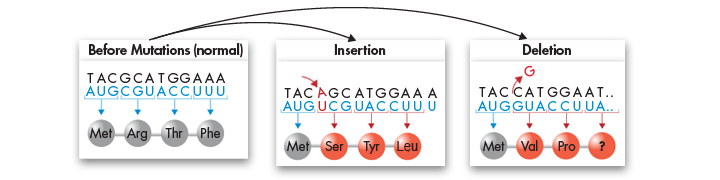
Substitutions usually affect no more than a \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_, and sometimes they have \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_ at all.



**Gene Mutations – Frameshift: Insertions and Deletions**

Insertions and deletions are point mutations in which \_\_\_\_\_\_ \_\_\_\_\_\_\_ is \_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_ from the DNA sequence.

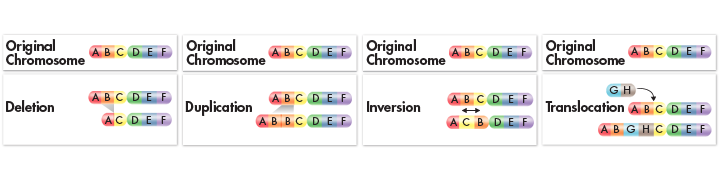
If a nucleotide is added or deleted, the bases are still read in groups of three, but now \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_ in every codon that follows the mutation.

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**Chromosomal Mutations**

Chromosomal mutations involve changes in the \_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_ of chromosomes.

These mutations can change the \_\_\_\_\_\_\_\_\_\_\_\_ of genes on chromosomes and can even change the \_\_\_\_\_\_\_\_\_\_ of copies of some genes.

There are four types of chromosomal mutations: \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_, and \_\_\_\_\_\_\_\_\_\_\_\_.

**Chromosomal Mutations - Deletion**

Deletion involves the loss of \_\_\_\_ or \_\_\_\_\_\_\_ of a \_\_\_\_\_\_\_\_\_\_\_\_.

**Chromosomal Mutations - Duplication**

Duplication produces an \_\_\_\_\_\_\_ \_\_\_\_\_\_\_ of all or part of a \_\_\_\_\_\_\_\_\_\_\_\_.

**Chromosomal Mutations - Inversion**

Inversion \_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_ of parts of a \_\_\_\_\_\_\_\_\_\_\_\_.

**Chromosomal Mutations - Translocation**

Translocation occurs when part of one chromosome \_\_\_\_\_\_\_\_\_\_\_\_ off and \_\_\_\_\_\_\_\_\_\_\_\_ to another.

**How Do Mutations Affect Genes?**

The effects of mutations on genes \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_. Some have \_\_\_\_\_\_ or \_\_\_ effect; and some produce \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variations. Some negatively disrupt gene function.

Mutations often produce \_\_\_\_\_\_\_\_\_\_\_ with \_\_\_\_\_ or \_\_\_\_\_\_\_\_ functions that can be useful to organisms in different or changing environments.

**Effects of Mutations**

-Genetic material can be altered by \_\_\_\_\_\_\_\_\_\_\_ events or by \_\_\_\_\_\_\_\_\_\_\_\_ means.

-The resulting mutations \_\_\_\_\_ or \_\_\_\_\_ \_\_\_\_\_\_ affect an organism.

-Many mutations are produced by \_\_\_\_\_\_ in genetic processes. For example, some \_\_\_\_\_\_\_\_ mutations are caused by errors during DNA replication.

-The cellular machinery that \_\_\_\_\_\_\_\_\_\_\_ DNA inserts an incorrect base roughly \_\_\_\_\_ in every \_\_\_ \_\_\_\_\_\_\_ bases.

-Small \_\_\_\_\_\_\_\_\_\_\_\_\_ in genes can gradually \_\_\_\_\_\_\_\_\_\_\_\_\_ over time.