**VARIATIONS IN POPULATIONS**

The 4 ways variation is brought about within a gene pool include:

1. Mutations
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Crossing over during meiosis
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Mutations** are changes in DNA or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. These chances are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Gene mutations change the sequences of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (ATCG). Bases are read in groups of 3 called \_\_\_\_\_\_\_\_\_\_\_\_\_.

This is an example of normal codons:

* **the sun was hot but the old man did not get his hat**

This is what can happen when mutations occur:

* **Hes unw ash otb utt heo ldm nad idn otg eth ish at**

The code has now changed.

Environmental causes of mutations can result from exposure to: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Mutations can be **good** and **bad**. Fill in the table below:

|  |  |
| --- | --- |
| Good (beneficial) mutations | Bad (detrimental) mutations |
|  |  |

**Adaptations** are changes in a species over a period of time which can help the organism to survive. Adaptations occur over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ due to mutations. There are 3 types of adaptations:

1. **Structural – Physical features of the organism**
2. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_– How the organism acts**
3. **Physiological – How the internal systems of the body respond to stimulus**

Complete the table below:

|  |  |  |
| --- | --- | --- |
| Structural | Behavioural | Physiological |
|  |  |  |

**Natural selection** is the evolution of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ due to beneficial \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ being passed to future generations. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ factors can play an important role in natural selection.

**Genetic variation** describes the differences in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a population. An example is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Genetic variation allows natural selection to occur!**

The environmental factors that act on the population is called the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.** These pressures may be **biotic** (\_\_\_\_\_\_\_\_\_\_\_\_\_) or **abiotic** (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_). The species that are not \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ affected by the pressure are able to breed and pass on their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ traits.

The **peppered moth** is a great example of organisms undergoing natural selection. Draw a picture which shows the evolution that occurred during the industrial revolution:

Some selective agents act by \_\_\_\_\_\_\_\_\_\_\_ individuals who are seen to be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. For example: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Others, like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ discovered by Charles Darwin act differently. Draw a picture to show sexual selection in birds:

**Natural selection** leads to a change in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a population.

Variations in a population \_\_\_\_\_\_\_\_\_\_\_\_\_\_ **biodiversity** that is required for organisms to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ecological change.

**Evolution** occurs when a new species is formed as a result of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Some examples of evolution include: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Speciation** is when one species \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ into 2 or more separate species. An example is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Speciation is responsible for the high biodiversity in the world.

**Biodiversity** is the \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ species in the world.

The 3 main factors that cause speciation are:

1. Variation
2. Isolation
3. Selection

**Biodiversity** impacts **evolution** as the biodiversity of an area affects the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and survival of the species.

Evidence that evolution has occurred include: