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## Variation: Meaning of Variation and Examples of Genetic Variation (For CBSE, ICSE, IAS, NET, NRA 2022)

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### Meaning of Variation

- It can be defined as any difference between the cells, individual organisms, or groups of organisms of any species.
- This difference is being caused either by genetic differences (genotypic variation) or by the effect of environmental factors on the expression of the genetic potentials (phenotypic variation) .
- They can be further classified as continuous or quantitative.
  - Smoothly grading between two extremes.
  - With many individuals at the center.
  - Variation of height among human population.
- Discontinuous or qualitative.
  - Well-defined classes.
  - Variation of blood groups in humans.
- These variations may be shown in.
  - Mode of reproduction
  - Physical appearance
  - Metabolism
  - Fertility
  - Learning and mental ability
  - Another obvious or measurable characters

### Examples of Genetic Variation

- Eye colour
- Blood type
- Camouflage in animals
- Leaf modification in plants

### Polymorphic Variation

- The separation of higher organisms into males and females.
- An occurrence of several forms of a butterfly of the same species.
- Each of the species is colored to blend with a different vegetation.

### Importance of Variation

- It allows some individuals within a population to adapt to the changing environment.
- More phenotypic variation is enabled by a more genetic variation within a population.
- It plays an important role in survival of different species.
- They enable human beings to improve the races of important plants and animals.
- It further provides variation amongst individuals for natural selection to act upon.

### Sources of Variation

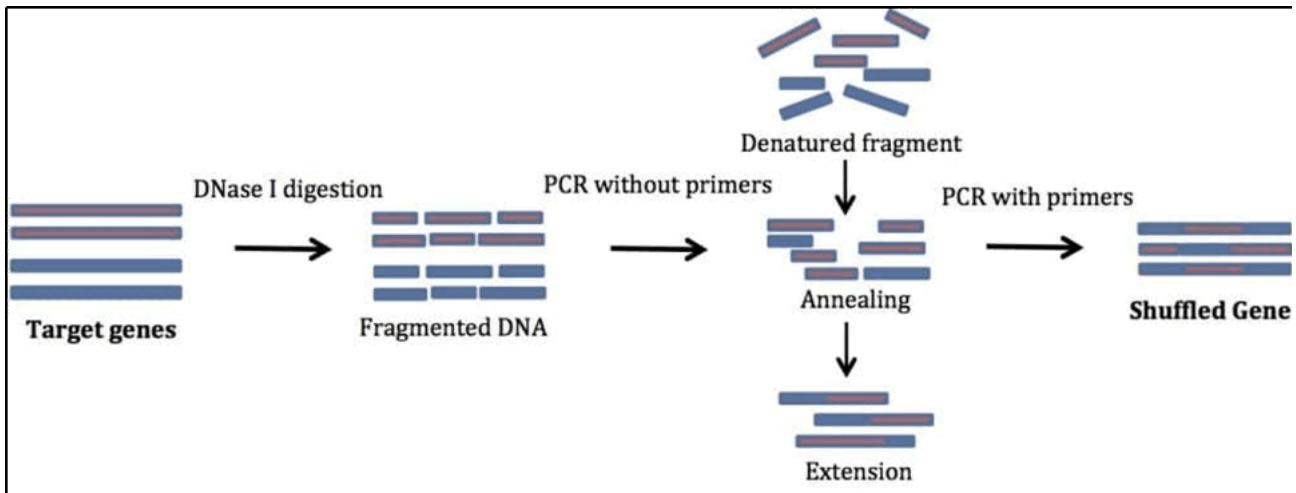
#### Mutation

It creates new variation by changing parts of the genetic code.

#### Gene Shuffling (Recombination)

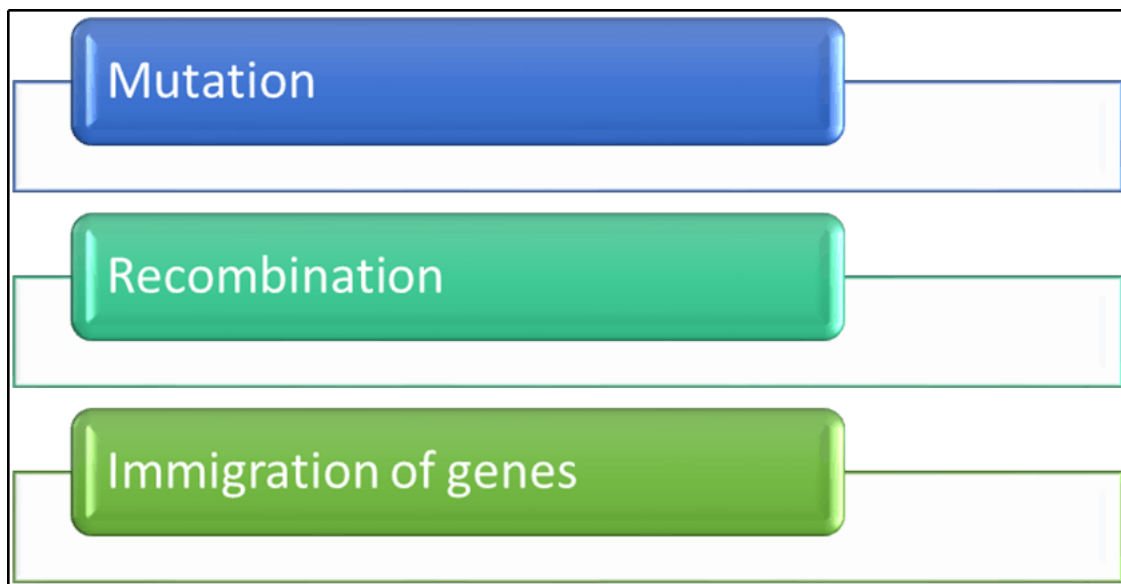
- It creates new variation by the reshuffling of genes during sexual reproduction.

- Chromosome segregation
- Crossing-over



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### Three Sources of Variation



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## Quality Variation

The law of variation defines the difference between an ideal and an actual situation.

### Variation or variability:

- A change in data
- Expected outcomes
- Slight changes in production quality

## FAQs

Q 1. What are the examples of variations?

Answer:

Examples of variations are eye color, blood type, camouflage in animals, and leaf modification in plants.

Q 2. What is the importance of Variation?

Answer:

Following are the importance of Variation:

- i) It allows some individuals within a population to adapt to the changing environment.
- ii) More phenotypic variation is enabled by a more genetic variation within a population.
- iii) It plays an important role in survival of different species.
- iv) They enable human beings to improve the races of important plants and animals.
- v) It further provides variation amongst individuals for natural selection to act upon.

Q 3. What is quality variation?

Answer:

- The law of variation defines the difference between an ideal and an actual situation.
- Variation or variability:
  - A change in data
  - Expected outcomes
  - Slight changes in production quality

Q 4. Define Gene Shuffling.

Answer:

- Gene Shuffling creates new variation by the reshuffling of genes during sexual reproduction.
- Chromosome segregation
- Crossing-over

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