

Topic 1.3: How can natural and artificial selection influence changes in populations?

- DNA _____ produce genetic diversity within a population.
- _____ favours traits that make an organism better suited to its environment.
- _____ can lead to the formation of new species.
- Environmental factors can cause _____.
- _____ select desired characteristics in organisms to be passed on to the next generation.

Concept 1: DNA _____ produce genetic diversity within a population.

- Variety exists within the same species because of _____.
 - _____ are a source of genetic variation.
 - _____: a permanent change in the genetic material of an organism
 - They can occur during _____.
 - Some _____ can be harmful and can cause a cell to die, malfunction, or multiply uncontrollably.
 - Some _____ can be beneficial, while others have _____
1. What is a mutation? Are all mutations harmful? Explain.
 2. Explain why mutations are the starting point for genetic variation.

Concept 2: _____ favours traits that make an organism better suited to its environment.

Some _____ may provide a selective advantage in changing conditions.

Selective advantage: a _____ advantage that improves an organism's chance of survival, usually in a changing environment

- _____: the process by which characteristics of a population change over many generations as organisms with heritable traits survive and reproduce, passing their traits to offspring

- There must be _____ within a species for _____ to occur.
- _____ : structural or behavioural feature or physiological process that
- improves the organism's chance of _____ in its environment to reproduce
- Organisms that have an advantageous mutation may _____ better in a changing environment.

An _____ factor selects for certain characteristics in some individuals and against other characteristics.

Over time, the _____ changes because individuals with favourable characteristics _____ and reproduce.

The environment exerts _____ pressures that result from predators, parasites, and competition for _____.

Natural selection is _____.

A trait that may be a _____ to an individual at one time may be advantageous to its survival later.

_____ for this trait will be passed on to the next generation to the offspring.

1. Why does genetic variation make it possible for changes in populations to occur through natural selection? Explain your answer.
2. Using the example shown in Figure 1.23, make a graphic organizer to show the steps by which natural selection favours a population of plants to grow in a shady environment.

Concept 3: _____ can lead to the formation of new species.

Individuals of the same species can _____ to produce fertile offspring.

Sometimes members of a population _____ so much that they are no longer able to produce fertile offspring with members of the original population.

This leads to _____, where new species are formed.

- _____ barriers can isolate a population, resulting in new species that are unable to _____.

- Examples of _____ barriers include a _____, a lava flow, and an _____.
 - _____: the diversification of a common ancestral species into a variety of differently adapted species
 - Finches on the _____ have different beak shapes due to their diverse diets.
 - Tortoises on the _____ are all different due to mutations, _____, and _____.
 - _____: occurs when a species _____ from Earth
 - _____ result in a decline in the number of species.
1. What is adaptive radiation?
 2. Explain why it would have been possible for an ancestral finch species, having arrived on one of the Galapagos Islands, to have diversified and evolved into other species over time.
 3. How is extinction related to selective pressure?

Concept 4: _____ factors can cause mutations.

_____ are important to natural selection and speciation.

Mutations provide genetic _____.

_____ : a substance or event that increases the rate of mutation

_____ cause physical changes in the DNA (i.e., _____ and _____).

_____ can chemically react with DNA (i.e., _____ and _____).

_____ : a substance or agent that causes cancer

Some mutagens are _____

Examples include _____, _____.

Wearing sunscreen, a hat, and sunglasses can reduce the exposure to _____

1. What is a mutagen?
2. Explain how mutagens and the production of proteins are related.

Concept 5: _____ select desired characteristics in organisms to be passed on to the next generation.

- _____: selective pressure exerted by humans on populations in order to improve or modify desirable traits
- Humans breed cows that produce more milk, chickens that produce large numbers of eggs, and pigs with large muscles for meat.
- Humans breed crops to _____, _____, and _____
- Through selective breeding, the wild mustard plant is used to produce six other plants.

Some _____ animals have health problems (i.e., English bulldogs have respiratory problems and German shepherds have hip problems).

_____ plants lack genetic diversity because they are all similar.

_____ : repeated planting of the same varieties of a species over large expanses of land

1. What is artificial selection?
2. What are some benefits and risks associated with artificial selection of agricultural crops?

Topic 1.3 Summary: How can _____ and _____ selection influence changes in populations?

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