

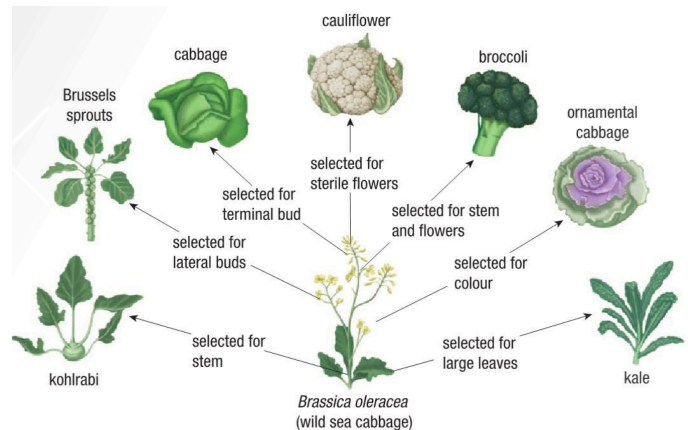
7.1 Biological Change Over Time

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- A **scientific theory** is much more than an educated guess or hypothesis.
 - an _____ model that accounts for a large body of evidence
 - considered _____ and open for revision as new evidence is gathered
 - used to make accurate and precise predictions
 - E.g. Theory of Evolution
 - Biologists are convinced that entire species _____ over time.
 - E.g. Snowshoe hares have evolved to turn white in the winter (camouflage) and have wider feet to move through the snow
- Evidence that supports the theory of evolution is based on:
 - _____ of ancient life forms
 - genetic analysis
 - _____ anatomy
 - distribution of living things on Earth
- How do these changes come about?
 - _____!
 - A mutation is a change in the genetic information alters _____, which in turn alter _____ formation
 - has an immediate and direct effect on individuals (except neutral mutations)
 - has the potential to influence _____ generations if it is inherited (passed down)
- **Three types of mutations**
 - Harmful Mutations
 - _____ the reproductive success of an individual
 - does not accumulate over time in a population
 - E.g. Mutation Causing Huntington's
 - E.g. Mutation Causing Cystic Fibrosis
 - Neutral Mutations
 - does not result in any selective advantage or disadvantage
 - change in the DNA has no _____ effect
 - most _____
 - Helpful Mutations
 - results in a phenotype that is _____ by natural selection
 - Increases the _____ success of an organism
 - accumulates over time in a population
 - E.g. Bacterial _____ (beneficial for bacteria)
 - Individual bacteria with a random mutation that gives them antibiotic resistance _____ and reproduce _____ on their resistant gene to future generations.

Selective Breeding

- **Artificial selection:** Breeding where parents of the next generation are chosen based on _____ traits
 - Used to produce new breeds or varieties of plants and animals
 - Artificial because it occurs in _____
 - E.g. Wild _____ has been artificially selected for specific desired traits producing a wide array of common vegetables.



- **The science of breeding:**
 - Each time a breeder attempts to develop a new breed they are testing a hypothesis and following a common set of procedures.
 - **Hypothesis:** Breeding selected individuals with certain favoured traits will result in the favoured traits becoming _____ and more pronounced.
 - **Independent Variable:** selected _____ population
 - **Dependent Variable:** _____ of favoured trait in the population
 - When selective breeding is successful, the resulting offspring with the desired traits may be mass-produced by _____.
 - This could result in a population with _____ genetic diversity.

The Power of Scientific Breeding

- Production of individuals that have traits far beyond the natural variability seen in the original population
 - (E.g. Wolf → _____)
- _____ genetic diversity within the population
 - Increased _____ to disease
- Other traits inherited with favoured traits may be linked to _____ alleles
 - E.g. Large breeds of dogs, including great danes, are at an increased risk of hip _____ (loosening of hip joint).

Artificial Selection: Limitations

- _____ attempts at artificial selection are successful
- Breeders cannot breed for traits that do not already _____ within the population
 - E.g. no mutation exists causing roses to be blue, so breeders cannot choose this trait to breed (unless they were to genetically modify the rose first!)
- sometimes favourable mutations are inherited along with unfavourable ones