Introduction to Evolution

What evolution is not.

- A fact.
- It is not just concerned with the origin of humans.
- It is not something that happened in the past (still happening).
- It is not something that happens to individuals.
- It is not a random process.
- It is not the same as natural selection

What evolution is.

- It is the idea that new species develop from earlier species.
- It is something that happens to populations.
- It has developed from many observations of life.
- There is no evidence against evolution, but evidence for evolution can be viewed in different ways.

The Idea of Evolution

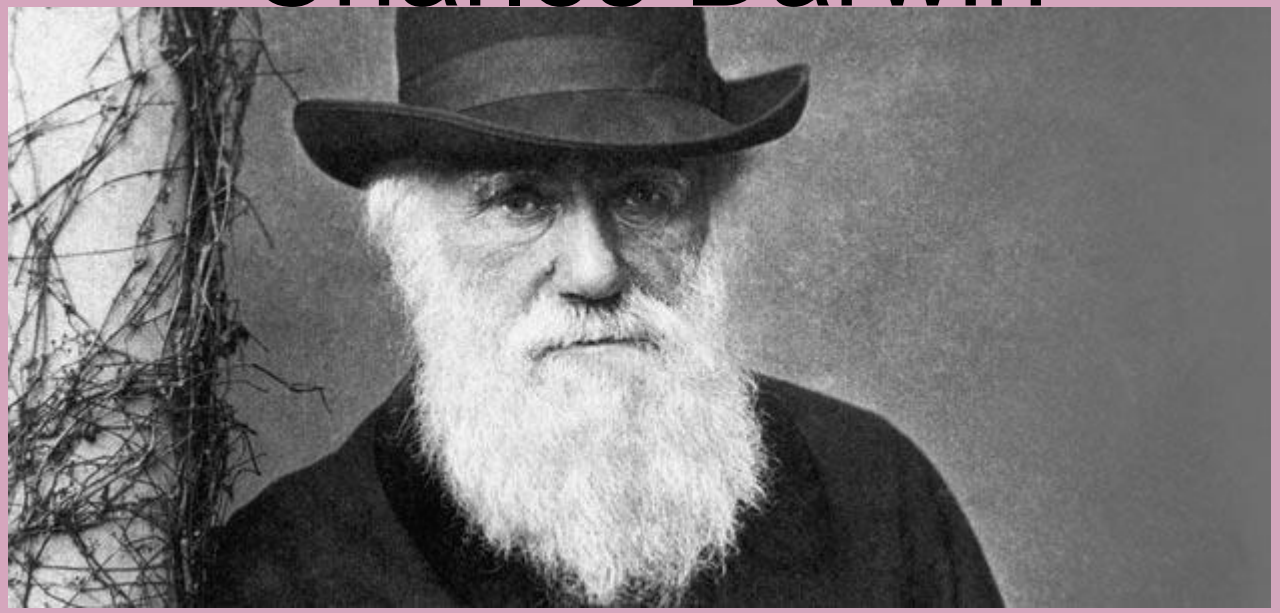
- In eighteenth century Europe most scientists believed that all **species** were permanent and **unchanging**.
- By the 1800's scientists began to study **strata** (rock layers) which housed a number of different fossils
  - By studying fossils found in strata, Georges Cuvier gave convincing evidence that some organisms in the past **differed** greatly from any living species and that some had gone **extinct**.

Jean Baptiste Lamarck

- In 1809, Jean Baptiste Lamarck proposed that over the lifetime of an individual, **physical features** increase because of use OR decrease because of misuse.

- Lamarck's idea stresses that an **individual** can **change** based on experiences and pass acquired traits on to offspring

Charles Darwin



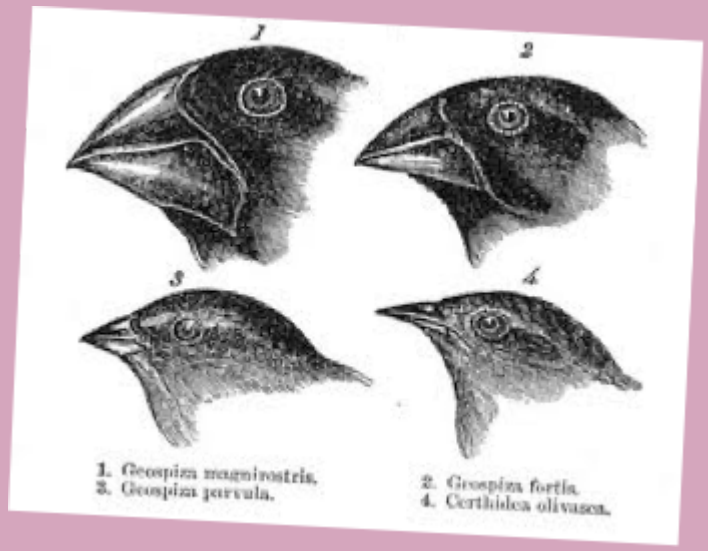
- English Naturalist
- Darwin set out aboard the H.M.S Beagle on a trip that took him around the world.
- While on the Beagle he collected natural objects from each place he visited.

Finches

- While Darwin was on the **Galapagos Islands** he observed many different species of animals, but the finches caught his attention.

- Darwin collected specimens of **13** different types of finches.

- Each type of finch had a beak best **adapted** to a certain kind of **food**.

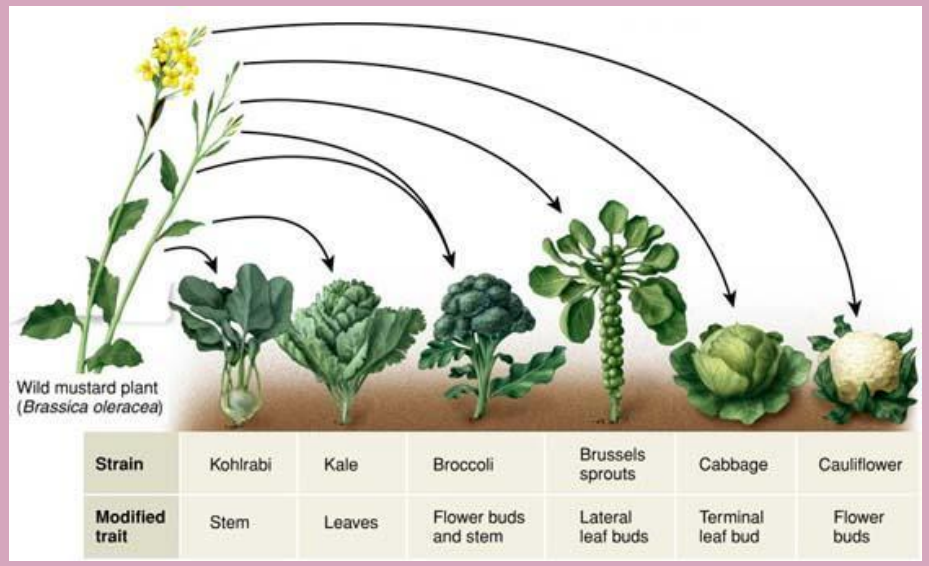


Darwin's Conclusion

- Darwin concluded that all 13 species had **descended** from one in South America that had **migrated** to the islands.
- The descendent finches changed (were modified) over time as groups **survived** by eating different foods.
- Darwin called this **evolution**.
- Evolution is **descent with modification** or change over time

Artificial Selection

- Artificial Selection is the human practice of **<u>breeding</u>** plants and animals that have desired **<u>traits</u>**.
  - Example: breeders pick animals with the **<u>best</u>** traits to be parents of a new generation



Strain	Kohlrabi	Kale	Broccoli	Brussels sprouts	Cabbage	Cauliflower
Modified trait	Stem	Leaves	Flower buds and stem	Lateral leaf buds	Terminal leaf bud	Flower buds

Natural Selection

- Process by which individuals that are better adapted to their environment **<u>survive</u>** and **<u>reproduce</u>** more successfully than well adapted individuals do.
  - Explains the cause of evolution.

The steps of natural selection

1) **Overproduction**: organisms produce more offspring than can survive.
2) **Variation**: characteristics will differ within a population
3) **Selection**: having a particular trait can make individuals more or less likely to survive
   - Some individuals leave more offspring than others
4) **Adaptation**: overtime, traits of those who survive become more common

Big Ideas

- Habitats present **challenges**/opportunities to survive and reproduce

- Species evolve because of "**selection**" of individuals that survive challenges or make use of opportunities

- Populations and species evolve (not individuals)