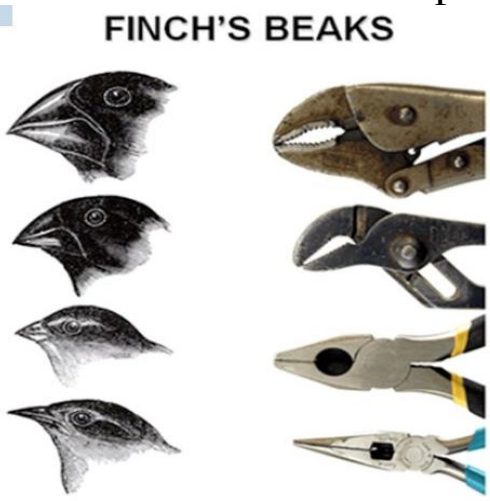
Chapter Seven: The Evolution of Living Things
Section 2: How Does Evolution Happen?

1831: Charles Darwin graduated from college

- Earned a degree in theology but was most interested in plants and animals
- He joined an exploration team on a ship called the *Beagle*
- Served as a naturalist: a scientist who studies nature
- Made observations that helped him form a theory about how evolution happens

Along the way, Darwin noticed that finches from the Galápagos Islands were a little different from the finches in Ecuador.

- The beak of each finch is adapted to the way the bird gets food.
- He hypothesized many different ideas gathering and analyzing evidence from the islands and other people.



The image shows the changes of beak shape in the Galapagos finch to suit the different food sources available on different islands in the archipelago. Natural selection has caused one species to evolve into different, distinct species.

Traits: specific characteristics that can be passed from parent to offspring through genes

Selective breeding: the process in which humans select which plants or animals to reproduce based on certain desired traits

- Ex. Bred horses that are fast or strong
- Ex. Bred crops that produce large fruit or grow in specific climates

Thomas Malthus: noted that humans reproduce rapidly and that food supplies may not support unlimited population growth

Darwin realized that populations of all species are limited by starvation, disease, competition, and predation.

- Only a limited number of individuals survive to reproduce.

Darwin believed that the Earth was much older than anyone had imagined.

- Many geologists didn't think the Earth was old enough to allow for slow changes
    - Before scientists dated the Earth at 4.6 billion

Darwin proposed the theory that evolution happens through a process that he called natural selection.

Natural Selection: the process by which individuals that are better adapted to their environment survive and reproduce more successfully than less well adapted individuals do

- 4 parts
    - overproduction – too many offspring produced
    - inherited variation – offspring have own traits and are similar to parents (not identical)
    - struggle to survive – some offspring may die while others survive
    - successful reproduction – those offspring that survive will have more offspring that survives

Today, scientists have found most of the evidence that Darwin lacked.

- They know that variation happens because of differences in genes.
- Changes in genes may happen whenever organisms produce offspring.