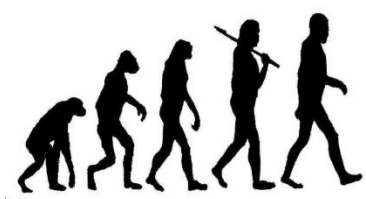
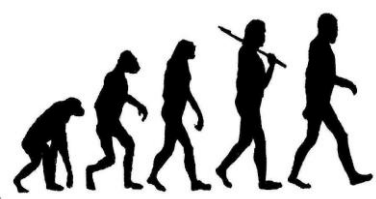


# Theories of Evolution

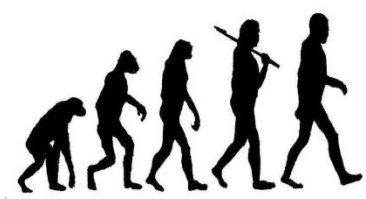
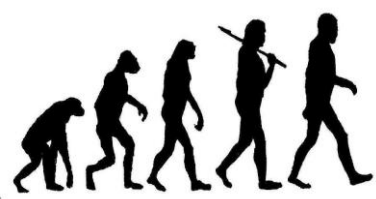
**Honors Biology**  
**Facilitator: Mr. Lee**  
**Room 320**



## Objectives:

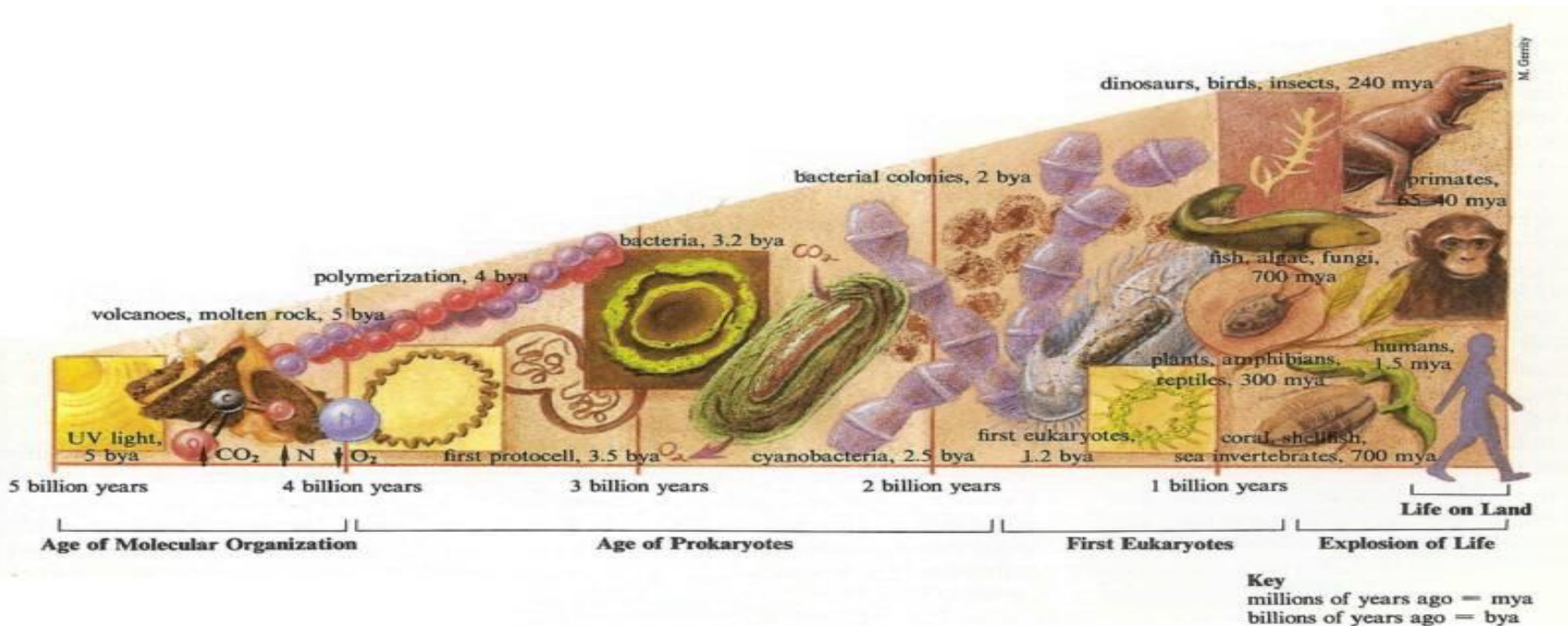
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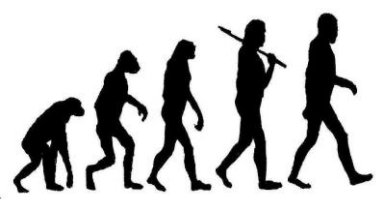
- ▶ **Define Evolution**
- ▶ **Explain Lamarck's theory of evolution**
- ▶ **Explain Darwin's two major theories**



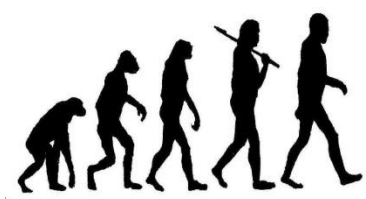
# Introduction

- ▶ Evolution is the orderly succession of changes
- ▶ Biological evolution is the change of populations of organisms over time



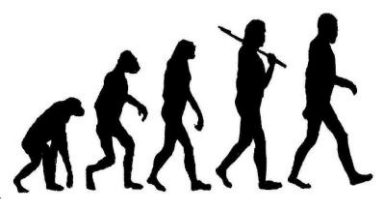


# Lamarck's Explanation

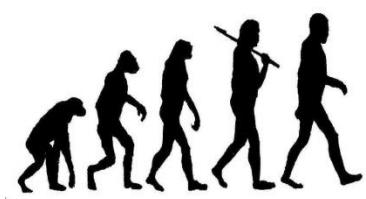


- ▶ He was a French scientist (1744-1829)
- ▶ He was one of the first to propose a unifying hypothesis of species modification:
  - ▶ Living species descended from a common ancestor
  - ▶ Acquired traits were passed on to offspring:
    - ▶ Traits not inherited by genes
    - ▶ If an organism stretched its neck, it would get a longer neck, and its offspring would too
    - ▶ If an organisms didn't use it's tail, its offspring would have a smaller tail
- ▶ How was Lamarck was wrong?

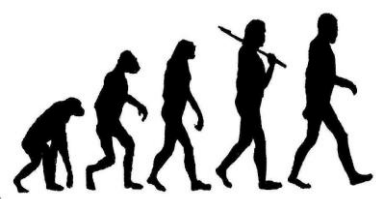




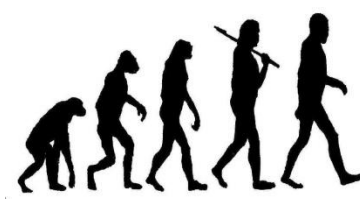
# Modern Evolutionary Thought



- ▶ **Charles Darwin (1809-1882) and Alfred Wallace (1823-1913) independently proposed that species were modified by natural selection**
  - ▶ **Natural selection- organisms best suited for their environment reproduce more successfully than other organisms**
  - ▶ **Over generations, organisms with favorable traits increase in a population**

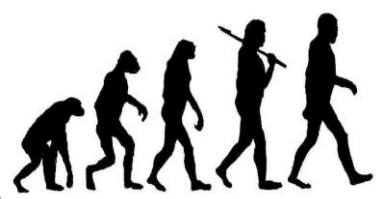


# Charles Darwin

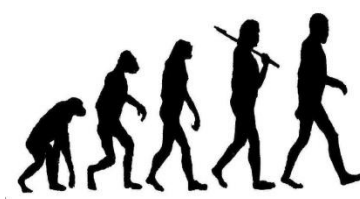


- ▶ Went on a five year voyage on H.M.S. *Beagle* (1831-1836)
- ▶ He was the ship's naturalist
- ▶ On the voyage, Darwin read *Principles of Geology* (Charles Lyell)
  - ▶ This book emphasized the age of the Earth
  - ▶ Uniformitarianism- geological structure of the Earth resulted from observable processes
  - ▶ Darwin reasoned that if geography changed over millions of years, organisms would have to adapt to these changes

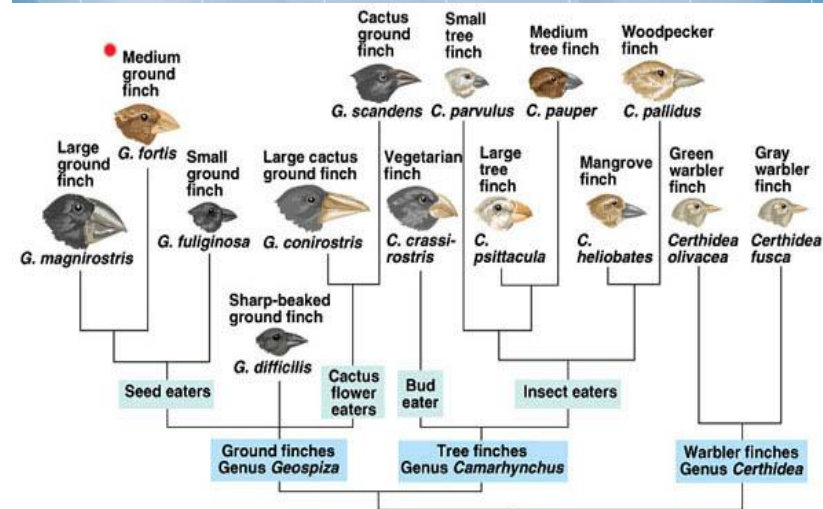




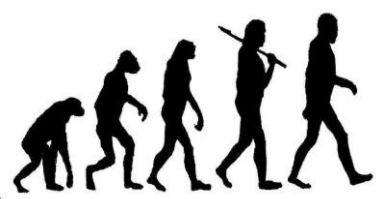
# Galapagos Islands



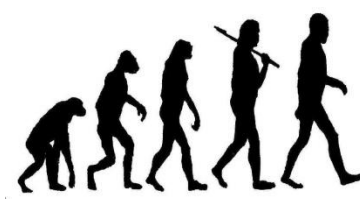
- ▶ These are islands about 1000 km to the west of South America
- ▶ These islands have very different environments from each other
- ▶ Darwin collected 13 different but similar birds (finches)
- ▶ Darwin studied his data for years back in England



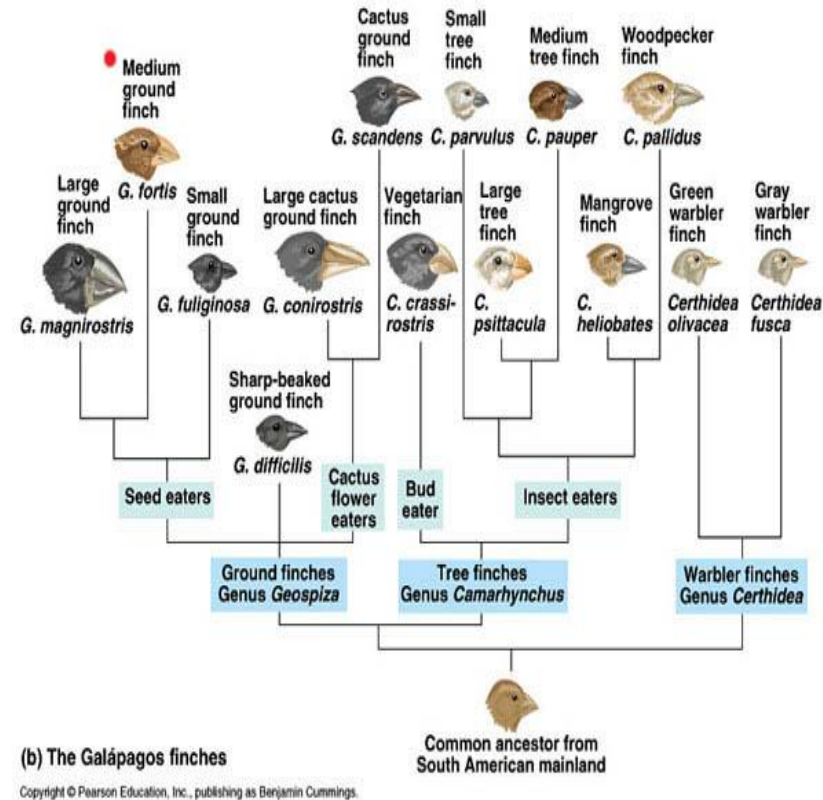
(b) The Galápagos finches

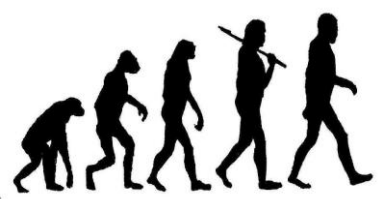


# Galapagos Islands...

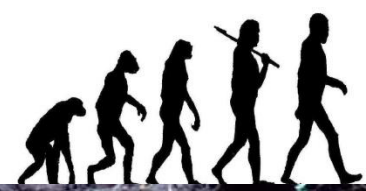


- ▶ He hypothesized:
  - ▶ That all the birds were descendent from one species
  - ▶ The finches had adapted to their local environments
  - ▶ Over millions of years large differences could accumulate between species



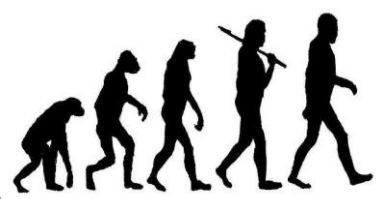


# Galapagos Islands...

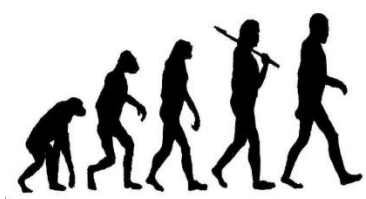


- ▶ He also found different tortoises
- ▶ There were different ones found on different islands
- ▶ Some of the shells and necks were different

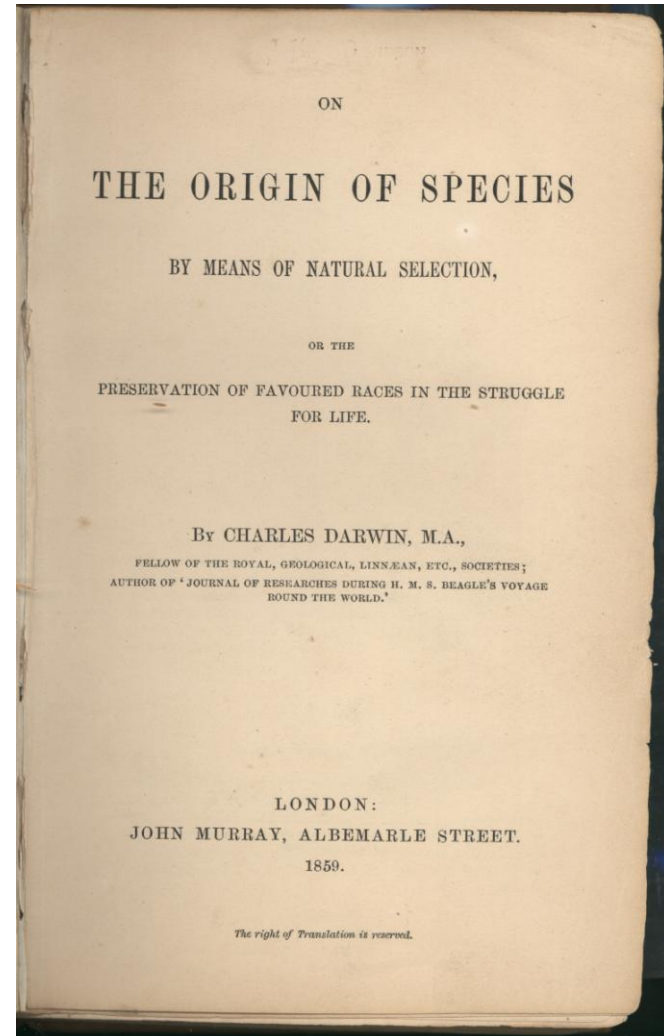




# The Origin of Species



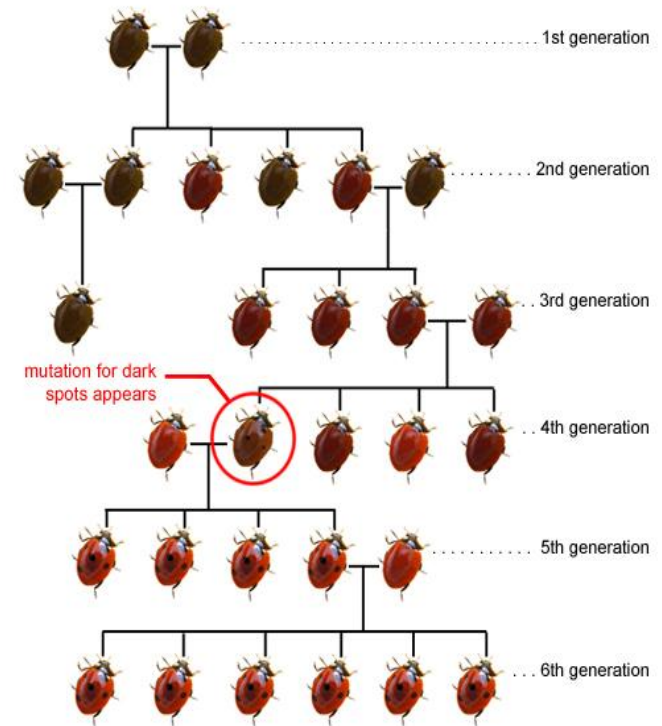
- ▶ Darwin publishes *The Origin of Species*: Full title is *On the Origin of Species by Means of Natural Selection*
- ▶ Why did Darwin wait until 1858 to publish his book?



# Darwin's Theories

## ▶ Descent with Modification:

- ▶ Newer forms appearing in the fossil record are actually the modified descendants of older species
- ▶ All living things descended from one or a few remote common ancestors



1



2



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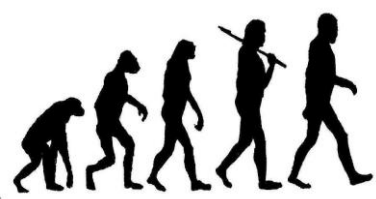


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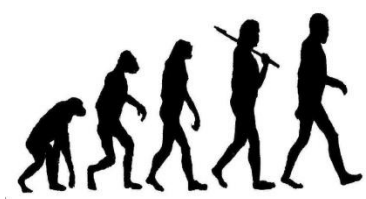


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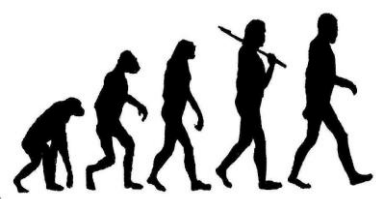
# Darwin's Theories...



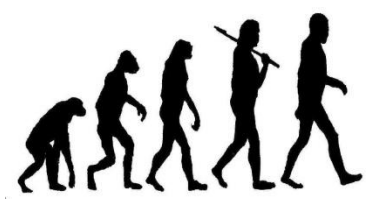
- ▶ **Modification by Natural Selection:**
  - ▶ **“Survival of the fittest” (not his term)**
  - ▶ **Fitness refers to the organisms that is best suited for its environment**
  - ▶ **Adaptive advantage is a favorable trait**
  - ▶ **This explains how evolution occurs**



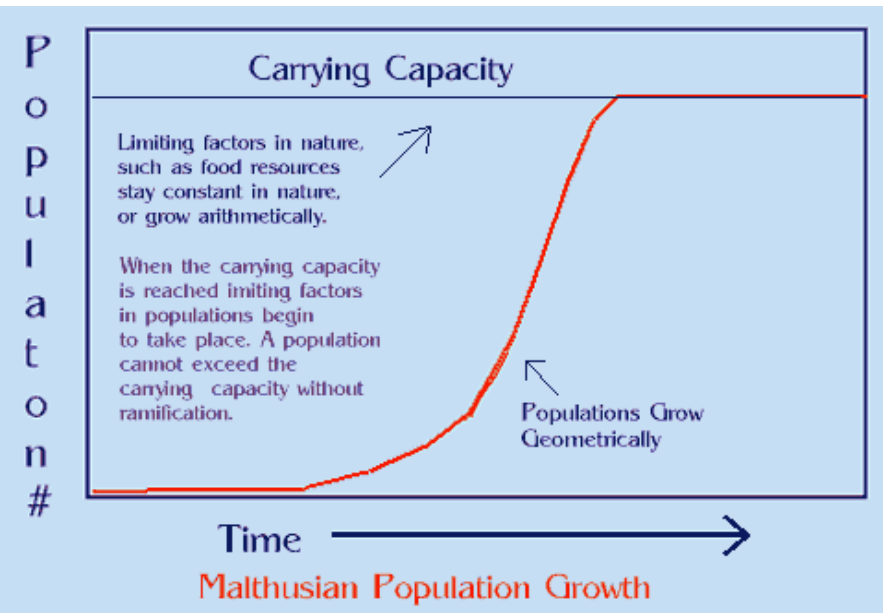
Natural Selection on Elephants

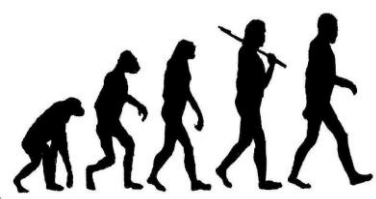


# Darwin's Theories...

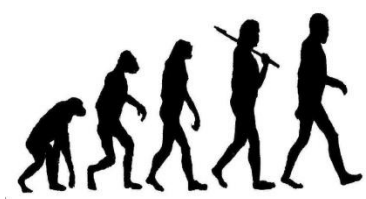


- ▶ Darwin was influenced by publications from Thomas Malthus:
  - ▶ Growth of human populations was limited by adverse conditions
  - ▶ These constraints can effect populations in nature

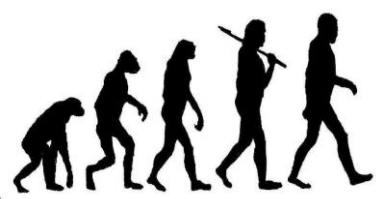




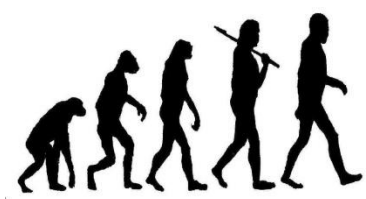
# Review



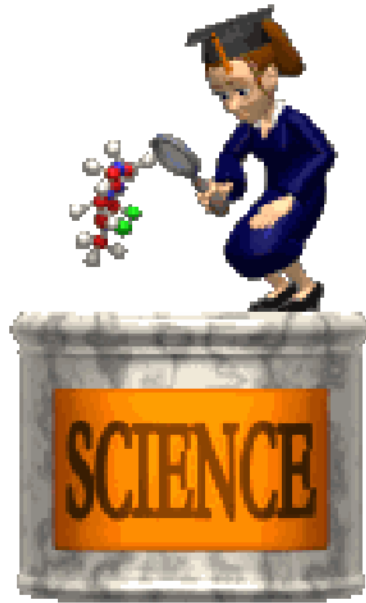
- ▶ **Define Evolution:**
  - ▶ **Biological evolution is the change of populations of organisms over time**
- ▶ **Explain Lamarck's theory of evolution:**
  - ▶ **Living species descended from a common ancestor**
  - ▶ **Acquired traits were passed on to offspring:**
    - ▶ **Traits not inherited by genes (he was wrong)**



## Review...



- ▶ **Explain Darwin's two major theories**
- ▶ **Descent with Modification:**
  - ▶ **Newer forms appearing in the fossil record are actually the modified descendants of older species**
  - ▶ **All living things descended from one or a few remote common ancestors**
- ▶ **Modification by Natural Selection:**
  - ▶ **The more fit an organism is to its environment the more likely it is to survive and pass on its traits to the next generation**



Learn Long  
Live Long

