

# Theories and Ideas

Intro to change in organisms  
GT BIO



## What is a theory?

- What is a theory?
- Theory = the most probable explanation for a large set of data based on the best available evidence
  - Theories are used to make predictions about new data



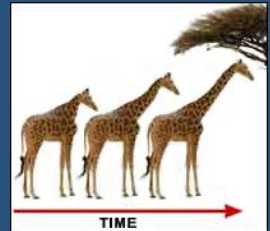
## LaMarck's Theory

- Jean Baptiste LaMarck: 1800's
  - One Of First Scientists To Understand That **Change Occurs Over Time**
  - Believed in the inheritance of acquired characteristics
    - Examples: giraffe necks and crab claws
  - Said acquired changes were passed to offspring



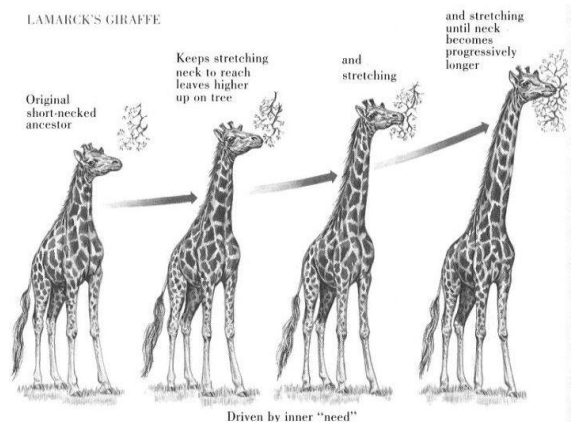
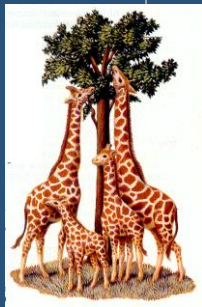
## Lamarck's Theory of Evolution

- Idea called **Law of Use and Disuse**
- If a body part was used, it got stronger
- If body part NOT used, it deteriorated



## Lamarck's Theory of Evolution

- More examples:
- Pierced ears
- Blacksmiths & Their Sons (muscular arms)
- Giraffe's Necks Longer from stretching)



## Lamarck's Theory of Evolution

- **Inheritance Of Acquired Traits**
  - Traits Acquired During Ones Lifetime Would Be Passed To Offspring



Clipped ears of dogs could be passed to offspring!

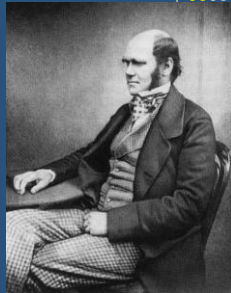
## Lamarck's Mistakes

- Was he correct??
  - NO!
- Traits are passed down from one generation to the next by **genes**, not by an individual's life experiences or activities
- Lamarck Did NOT Know how traits were **inherited (Traits are passed through genes)**
- **Genes Are NOT Changed By Activities In Life**
- Change Through Mutation Occurs Before An Organism Is Born

## Voyage of the Beagle

### Charles Darwin

- Born Feb. 12, 1809
- Joined Crew of HMS Beagle, 1831
- Naturalist
- 5 Year Voyage around world
- Avid Collector of Flora & Fauna
- Astounded By Variety of Life

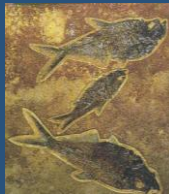


## Voyage of the Beagle

During His Travels, Darwin Made Numerous Observations And Collected Evidence That Led Him To Propose A **Revolutionary Hypothesis** About The Way Life Changes Over Time

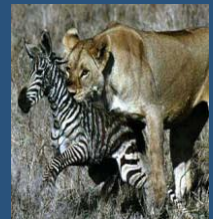
## Darwin's Observations

- **Left unchecked, the number of organisms of each species will increase exponentially, generation to generation**
- In nature, **populations tend to remain stable in size**
  - BUT, this is not usually the case because....
- **Environmental resources are limited**
  - Therefore, number of organisms will not increase exponentially



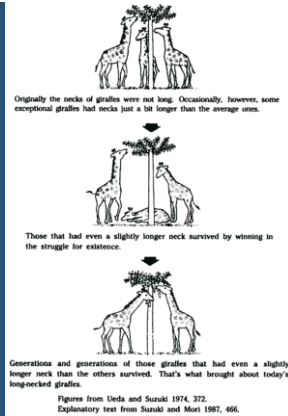
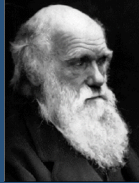
## Darwin's Conclusion – SURVIVAL OF THE FITTEST

- Production of more individuals than can be supported by the environment leads to a **struggle for existence among individuals**
- Only a fraction of offspring survive each generation



## Darwin's Theory – applied to the giraffes

- His theory was based on Survival of the fittest or natural selection
  - Natural selection said the giraffes with short necks had less food to eat
  - Why?
  - What happened?

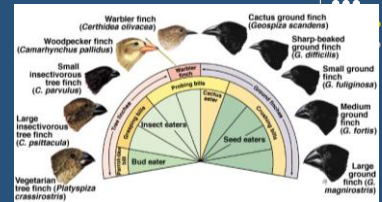


## Definition

- **Evolution** is the slow, gradual **change** in a population of organisms **over time**



## Where do we see this change?



- The **unequal ability of individuals to survive and reproduce** leads to a gradual change in a population, with favorable characteristics accumulating over generations (**natural selection**)
- **New species evolve**

## Natural Selection

- How does Selection occur?
  - Selection can occur from several factors:
    - Resource limitation
    - Predation
    - Industry (Environment)
    - Social influence (Society)

## Let's Read!

- Let's look at a classic example of natural selection
  - Peppered moths!

