

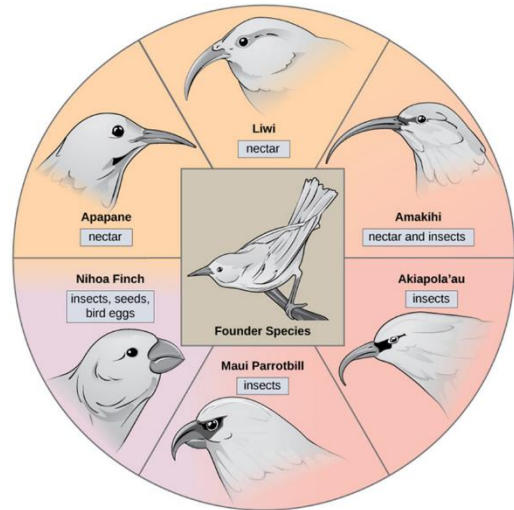
# Speciation

## Speciation

- The development of a \_\_\_\_\_

## Niche: How to make a living

- All organisms need to obtain the necessities of life from their \_\_\_\_\_
- Niche: Combination of an organisms \_\_\_\_\_ and its \_\_\_\_\_ within that habitat
  - How the organism obtains food
  - Are they a predator/prey
  - Where they live
  - What they do within their habitat (where they live)



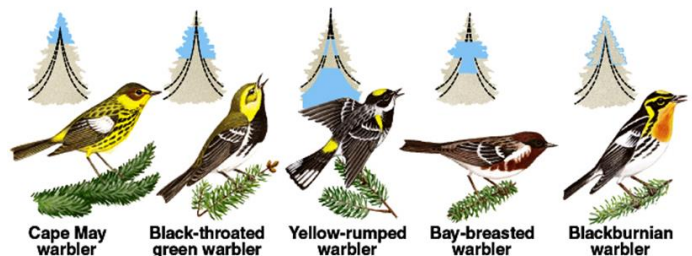
## Organisms occupying the same niche?

- If two species occupy the same NICHE in the same location at the same time, they will \_\_\_\_\_ with each other for
  - \_\_\_\_\_
  - \_\_\_\_\_

## Consequences of Having the Same Niche?

- One of the species will \_\_\_\_\_
  - Why?
  - No two species can occupy the same niche in the same location for \_\_\_\_\_ of time.
- One species will be more \_\_\_\_\_ than the other.
- It will survive, reproduce and drive the less efficient species to \_\_\_\_\_

## Niche partitioning among five species of coexisting warblers



## Occupying a Different Niche?

- The two species will \_\_\_\_\_ compete with one another
- \_\_\_\_\_ = less chance of extinction
- Any species that occupies an unoccupied niche will have less competition and a better chance of \_\_\_\_\_

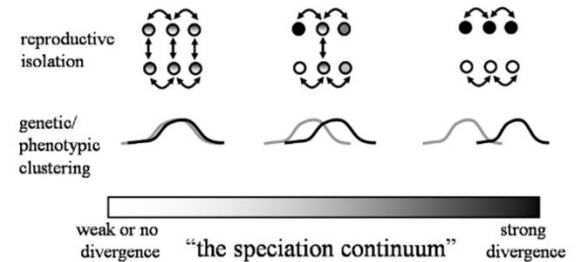
## The process of Speciation

- Review: Species: a group of organisms that can breed with one another and produce fertile offspring in a natural environment
- Same species? If yes, then same gene pool.

- Scientists that have learned that new species usually form only when populations are \_\_\_\_\_ due to environmental change/influence

### Reproductive Isolation

- \_\_\_\_\_ of 2 populations must become separated for them to become new species.
- Reproductive Isolation
  - When members of two populations \_\_\_\_\_ and produce fertile offspring
    - They are separated far enough that they don't mate or reproduce with one another
    - They end up having different \_\_\_\_\_
    - Reproductive Isolation can develop in a variety of ways
  - Behavioural isolation
  - Geographic isolation
  - Temporal isolation



### Behavioural Isolation

- Occurs when 2 populations are capable of interbreeding but have differences in \_\_\_\_\_ rituals or other reproductive strategies involving \_\_\_\_\_
- Ex
  - Eastern Meadowlark vs Western Meadowlark
    - Overlap habitats however do not interbreed due to different \_\_\_\_\_

### Geographic Isolation

- Two populations are separated by \_\_\_\_\_ such as rivers, mountains or oceans.
  - Barrier \_\_\_\_\_ population
    - Two gene pools form
    - \_\_\_\_\_ works independently on each group
    - Geographic barriers do not guarantee speciation
  - It will only occur if the populations are \_\_\_\_\_

### Temporal Isolation

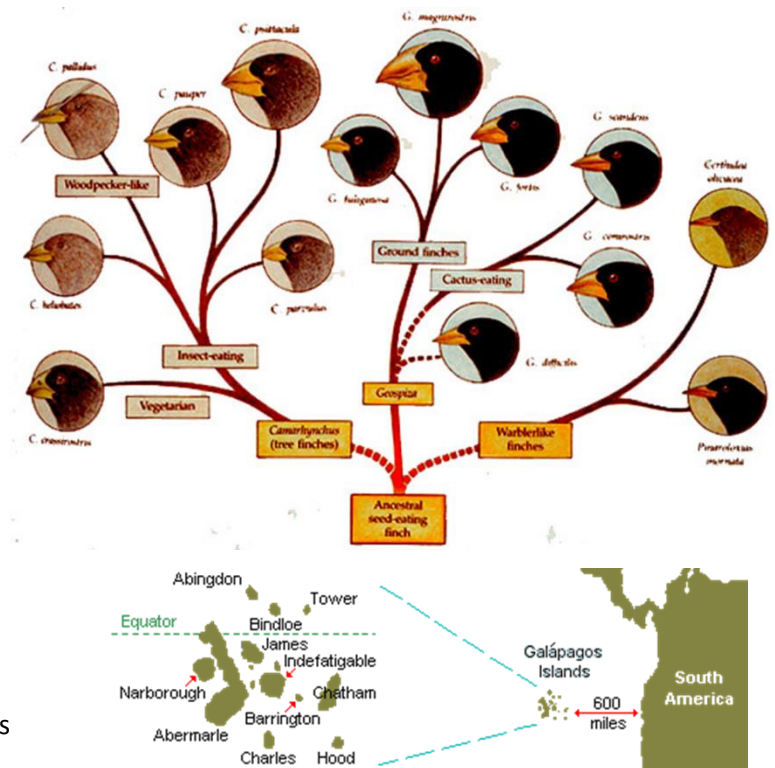
- Two or more species \_\_\_\_\_ at different times
  - Ex
    - 3 similar orchid species all live in the same rainforest
      - Only release pollen on a single day
      - They all release on different days therefore cannot pollinate one another
    - INDIVIDUALS ONLY BREED WITH THOSE THAT ARE \_\_\_\_\_

### What happens after Reproductive Isolation?

- \_\_\_\_\_ usually increases the differences between the separated populations
- In time, the populations may become more \_\_\_\_\_ to their environment.
- Their gene pools gradually become more dissimilar through variations due to \_\_\_\_\_
- If this persists for long periods of time they will become a \_\_\_\_\_

### Darwin's Finches

- Galapagos Islands
- Darwin's Finches: An Example of Speciation
- \_\_\_\_\_ bird species
  - Evolved from a \_\_\_\_\_ ancestral species
  - Found on \_\_\_\_\_ Islands
  - Each species has body structures and behaviours that allow it to live in a different \_\_\_\_\_
- Each species feeds \_\_\_\_\_
  - Some Finches Eat
    - Small seeds
    - Large tough seeds
    - Ticks
    - Small insect like animals

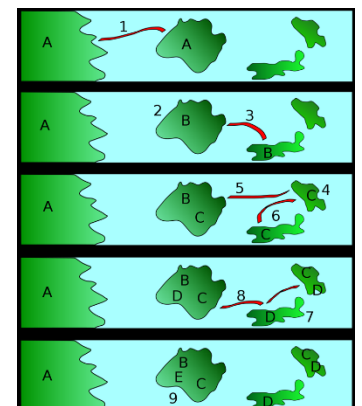


### Steps to Speciation

- Separation of \_\_\_\_\_ (Founder populations)
- Changes in the \_\_\_\_\_
- \_\_\_\_\_

### Summary of Darwin's Finches

- Ancestors of the finches lived on the \_\_\_\_\_ continent
  - Somehow they found their way to the Galapagos Islands
  - They managed to survive and \_\_\_\_\_
- Some birds from the first island crossed to another island.
  - Finches do not like to fly over open water
  - The populations were \_\_\_\_\_ from each other
    - Gene pools were prevented from mixing



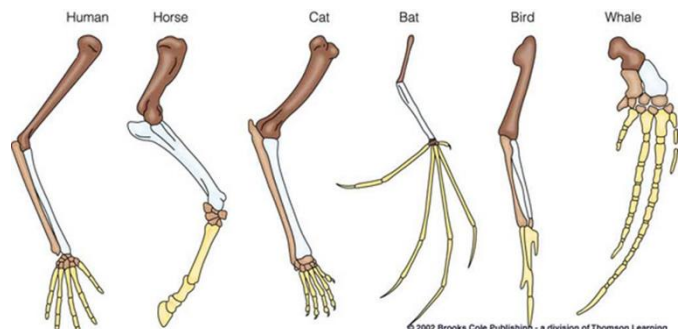
- Over time, the populations on each island became \_\_\_\_\_ to their environment
  - \_\_\_\_\_
- Imagine if a few birds from the first island crossed to the second island
  - Finches would prefer to mate with birds that look like \_\_\_\_\_
  - They will not mate with each other = reproductive isolation
- The Gene Pools of the two populations \_\_\_\_\_ mix
- They have become \_\_\_\_\_
- What will happen if the two populations somehow meet on the same Island?
  - Coexistence
    - Only if the two species occupy \_\_\_\_\_ niches
    - If their niches are too similar then:
  - Extinction
    - If the niches are similar, one species will \_\_\_\_\_ the other
  - Further Evolution
  - If one species has enough genetic variation, the competition may cause it to further evolve
    - A \_\_\_\_\_ may result
      - Ex
        - If the species \_\_\_\_\_ (over time), it will be able to eat a food that is not being competed for

### Evidence Indicates

- 14 species of finches all evolved from a \_\_\_\_\_ ancestor
- \_\_\_\_\_ occurred over and over again on the different islands
- \_\_\_\_\_
  - The process in which one species gives rise to many species
    - Darwin's Finches
- Adaptive Radiation → Divergent Evolution
- Adaptive Radiation often leads to \_\_\_\_\_
  - Darwin's Finches
  - What's happening
  - A number of different species \_\_\_\_\_ from a common ancestor
  - During adaptive radiation, organisms evolve a variety of characteristics
  - This allows them to \_\_\_\_\_ in different niches

### Proof of Common Ancestor

- \_\_\_\_\_ - similar body parts of related organisms evolved to perform different tasks.
- Example: Bat wing, human forelimb and cat forelimb



### Adaptive Radiation in Different Organisms

- Often produces different species that are similar in appearance and behaviour
- This is known as \_\_\_\_\_
  - It is the phenomena in which adaptive radiation among different organisms produce species that are similar in appearance and behaviour
    - Produces \_\_\_\_\_ structures
    - Example
      - Insect wing and bird wing

### Analogous Structures

- They serve the same function in different species but they have different origins
  - \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_
- Bat wings are made of skin stretched between elongated finger bones.
- Bird wings are made of skin, muscles and arm bones
- Butterfly wings are made of a thin membrane with an elaborate network of support

