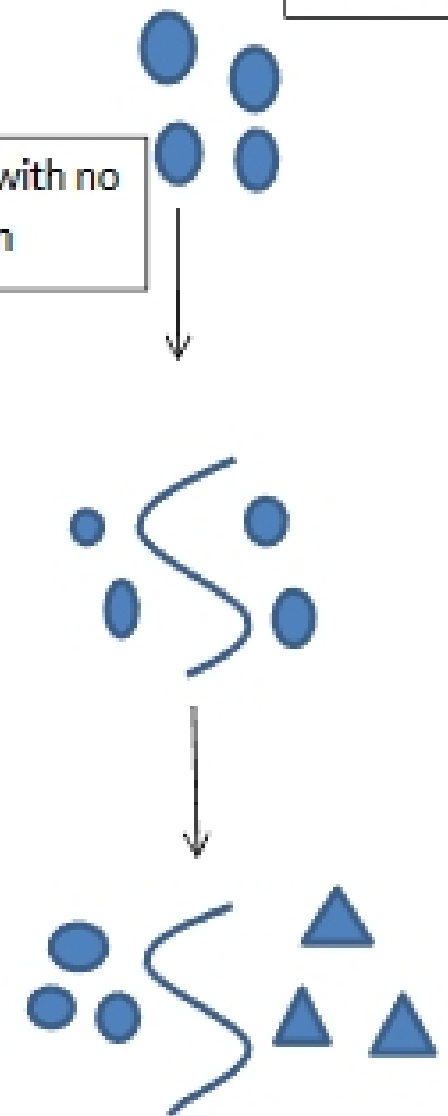


### Allopatric Speciation

- Fairly common
- Dependent on geographic location
- Started with 1 population then split by river (See picture)
  - Genetic divergence occurs
  - Over time, speciation occurs

Population with no geo isolation



### Sympatric Speciation

- No geographic isolation
- Organisms occur together
  - Gene flow, mating, little genetic divergence
- Something happens
  - Take gene flow to a 0
  - Increase in likelihood of genetic divergence
  - Could be through mutation
    - Causes immediate isolation
    - Example: snail morphology
      - Mutation causes snail's shell to be coiled in the opposite direction
      - Male and female parts no longer match up
- 1-gene mutation
  - **Mechanical Isolation**
  - Can also occur through changes in breeding behaviors/locations
  - Behavioral isolation, ecological isolation
    - Permanently isolates populations which increases genetic divergence which leads to speciation
  - Example: Fruit Flies
    - Breed with specific behaviors and places
    - Breed on Hawthorn tree but something cause some flies to breed on an apple tree. Now there is genetic divergence because they breed in different places.
  - Example: Anoles
    - Get to islands on driftwood
    - One started on the tree and then there was a lot of competition so some moved to the ground and only bred there
- **Gradualism**- slow rate of speciation
  - Intermediate forms before full speciation
- **Punctuated Equilibrium**
  - Rapid speciation
  - Short bursts of evolutionary change
  - Often mutation
- **Extinction**

- o Species loss- there are more extinct species than currently living species
- o Gradually
  - Changes in habitats (anthropogenic or drought/famine)
- o As species are lost, niches open up for other organisms to move into due to decreased competition
  - Could lead to genetic divergence
- o Catastrophe- hurricanes, asteroids
  - Example: Sumatra
    - Deforestation
  - Example: Chicxulub Crater
    - Asteroids collide with Earth
    - "Cretaceous calamity"
    - New organisms move into the niches

## CHAPTER 23

### Systematics

- Method of classifying/naming
- Organisms within an evolutionary framework
- Goals
  - o Inventory of all living things
  - o Universal system for naming (taxonomy)
  - o Determine evolutionary relationships between organisms

### Carolus Linnaeus

- "Systema Naturae"
- Derived binomial nomenclature
  - o Genus, species (*Homo sapiens*)
- In Latin= universal language for describing organisms
- Hierarchical Nomenclature
  - o Kingdom, Phylum, Class, Order, Family, Genus, Species
  - o Used to organize/group organisms
  - o Based on structural similarities/differences

### Carl Woese

- Added Domain (above Kingdom)
- 3 Domains
  - o Bacteria, Archaea, Eukarya
  - o Bacteria and Archaea lack a membrane bound nucleus (prokaryotes)
  - o Eukarya have a membrane bound nucleus

