

Evolutionary Concepts

Animal Behavior Group 1

Instructions

- Each group will research one of the following vocabulary words or evolutionary concepts
- Students will need teach the definitions and explain the vocabulary word or concept to their classmates
 - There needs to be at least one picture of the idea. Students will need to explain what the picture is and how it relates to their assigned topics
 - Each group's presentation should have at least two slides fully explaining idea
 - Oral presentations should be 5 minutes (+/- 30 seconds). All group members must speak at least once in a loud and clear voice. At least one group member should be prepared to answer questions
 - You may include youtube videos in your presentations (1-5 minutes) that will not count toward your five minute presentation
 - You may include questions for classmates or class discussion topics in your powerpoint

Instructions

- Students will have one class period to work on project and should divide up work to edit ppt on Google Drive
- - No group member should be without an assigned task during the class period.
 - Researching information , writing script for presentation, finding pictures, brainstorming class discussion questions, watching youtube videos, et

Instruction

- Each Animal Behavior Class has ppt on Google Drive
- Students will have one class period to work on project and should divide up work to edit ppt on Google Drive
- Project is due by 9 PM tonight. I will download ppt to my computer for presentation (my computer's presentation mode does not like Google Drive ppt, will not work)

Miss Charlene is beautiful -3-
-so true, I agree :D

Phylogenetics/ Cladogram

Root Word

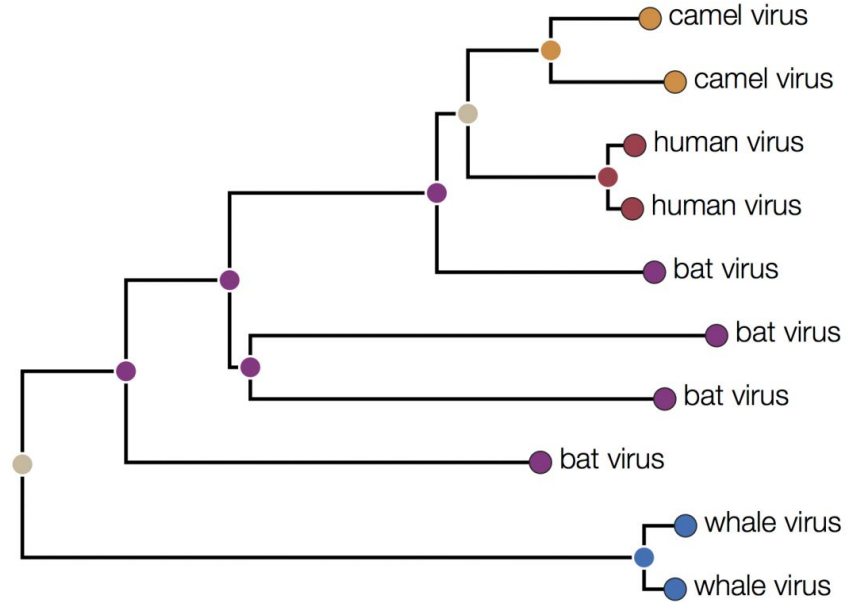
- Phylo = tribe
- Genetic = origin

Definition:

- The study of evolution and relationships between organisms

Phylogenetics

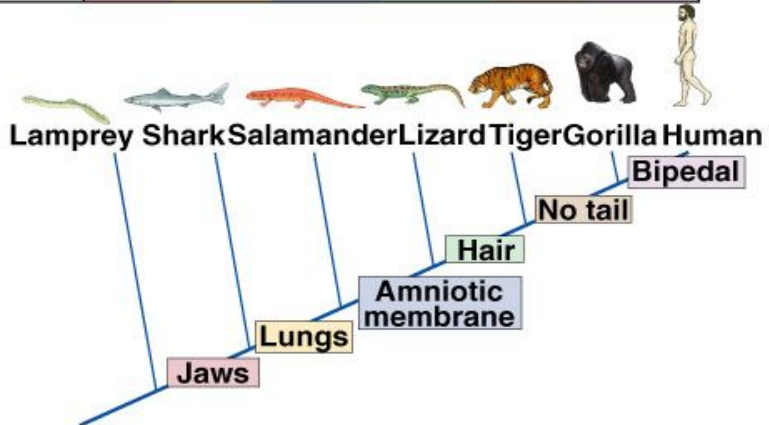
- Share the same common ancestor



Phylogenetics

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Traits: Organism	Jaws	Lungs	Amniotic membrane	Hair	No tail	Bipedal
Lamprey	0	0	0	0	0	0
Shark	1	0	0	0	0	0
Salamander	1	1	0	0	0	0
Lizard	1	1	1	0	0	0
Tiger	1	1	1	1	0	0
Gorilla	1	1	1	1	1	0
Human	1	1	1	1	1	1

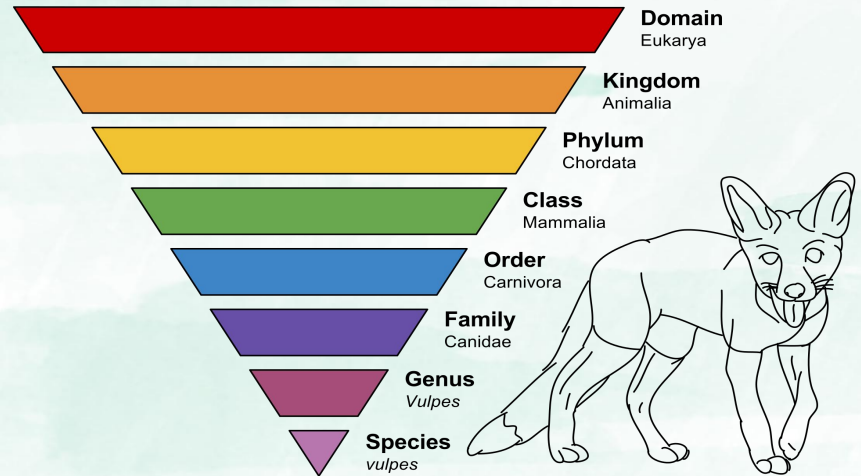


Phylogeny

Phylogeny is the history of all the organisms on Earth. It shows the evolutionary relationships

➔ Means that It shows the evolution of all the species and how they are related to one another

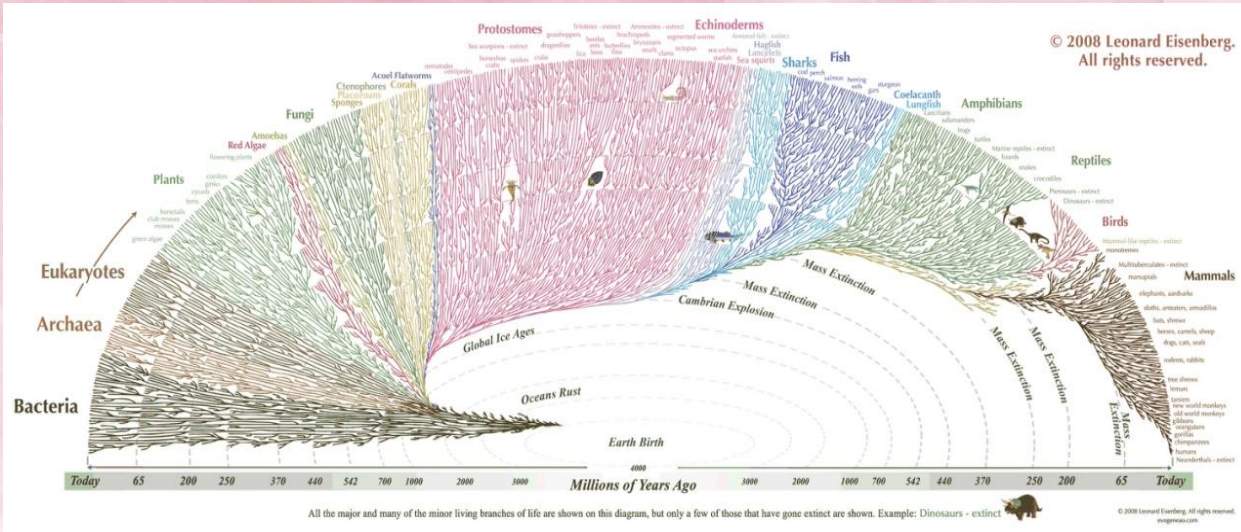
There are millions species in this world, so the scientists have classified all the living things on Earth by the Taxonomy system.



Red fox (*Vulpes vulpes*)

Phylogeny

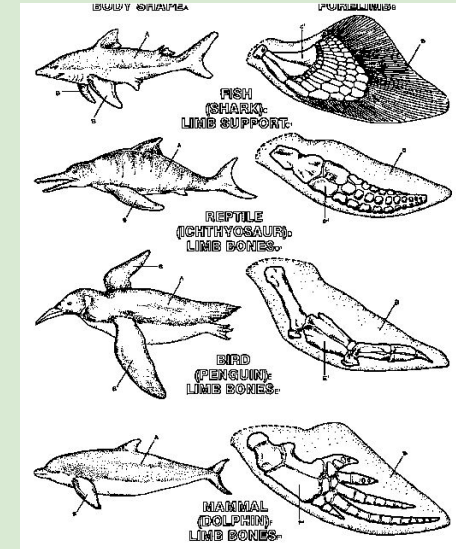
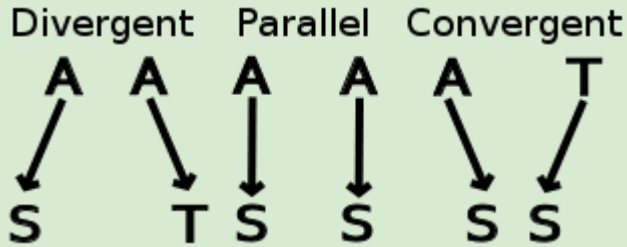
The Taxonomy becomes the “Phylogenetic tree or the tree of life” which is the diagram that represent the phylogeny



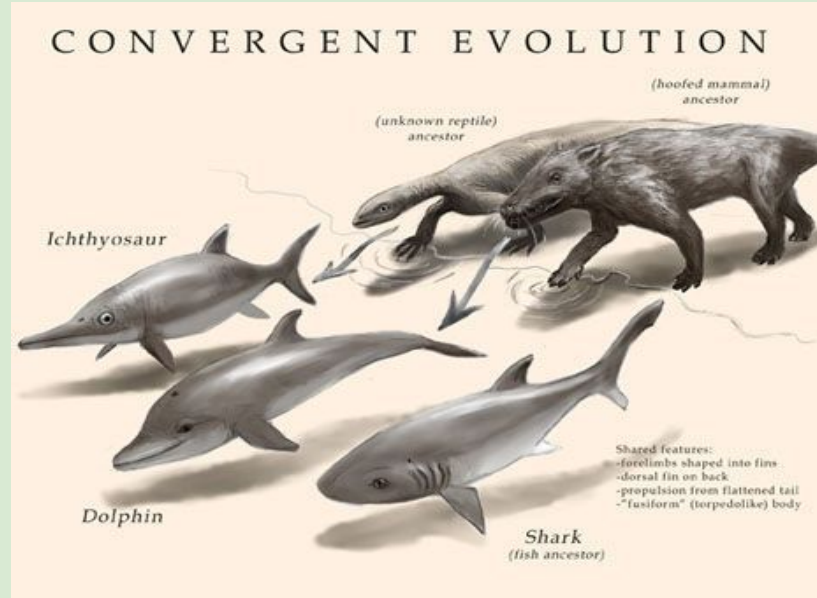
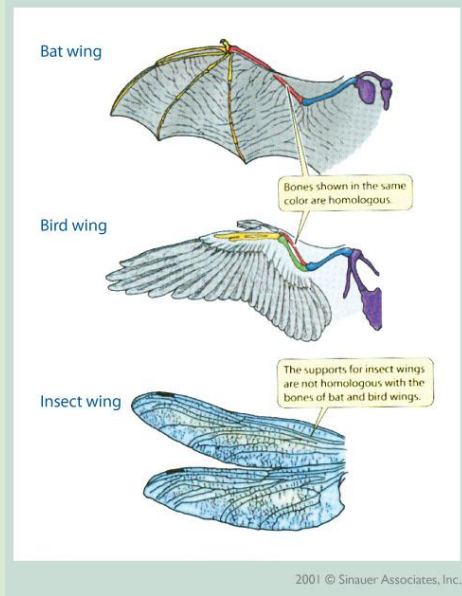
**THE CLOSER THEY
ARE THE MORE THEY
SIMILAR.**

Convergent Evolution

- Convergent Evolution are unrelated organisms who live in a similar environment and/or have similar roles in a habitat evolving similar traits as a result of that.
- A process in which refers to the evolution of organisms that have the same structure or functions which happen in the organisms that are not related to each other.
- They independently acquire similar traits as a result.



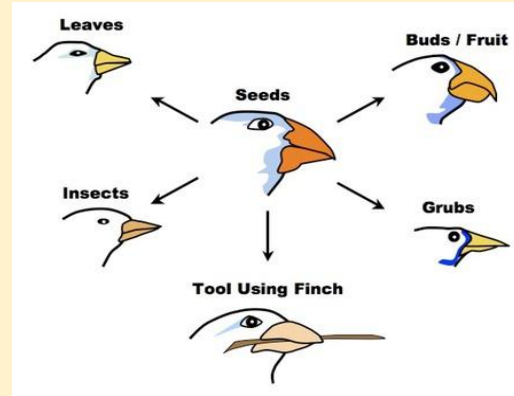
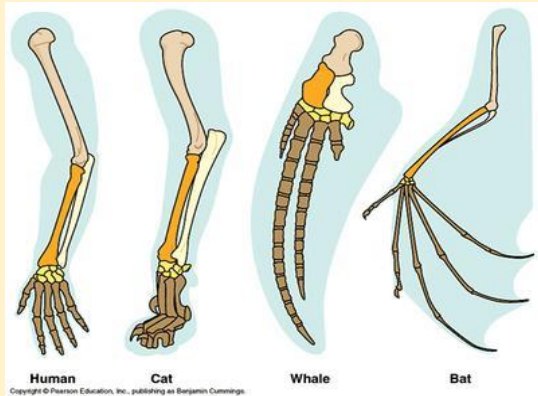
Convergent Evolution



- Examples: The animals that have wings such as birds, insects, and bats; they shared similar function even though they are not the same species. They are all have a ability to fly.

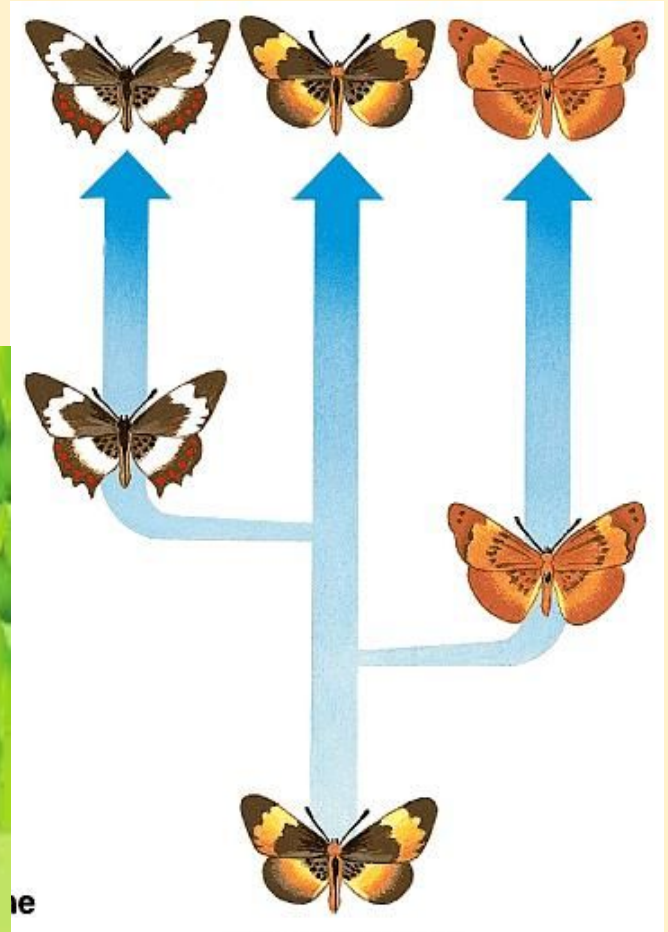
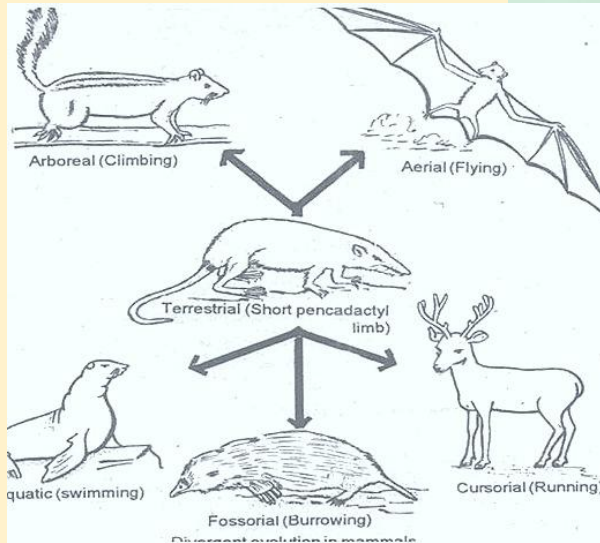
Divergent Evolution

- Divergent evolution is the process that members of a species become more and more different into species that each fit different parts of the environment.
- Animals that go through divergent evolution for a number of reasons such as Predators or their absence, changes in the environment, and the time at which certain animals are most active.



Divergent Evolution

- Example: In the past, Galapagos Islands has one types of bird and it and develop to have some different traits such as beak of the birds.



Reproductive Isolation

Is the ability of a species to breed successfully with related species due to geographical, behavioral, physical, or genetic barriers or differences.

They live in the same area but for some reason they do not mate

There are 2 categories of Reproductive isolation

- 1) Prezygotic- before they are fertilized (prevent the egg from being fertilized)
- 2) Postzygotic -after they are fertilized and they created the zygote

Reproductive Isolation



Lion and Tiger mate together to form Liger

Reproductive Isolation



Zebra and Horse
mate together to
form mule

Reproductive Isolation

<https://www.youtube.com/watch?v=2bPX0f120nc>

<https://www.youtube.com/watch?v=vmgKC2IJjOI>

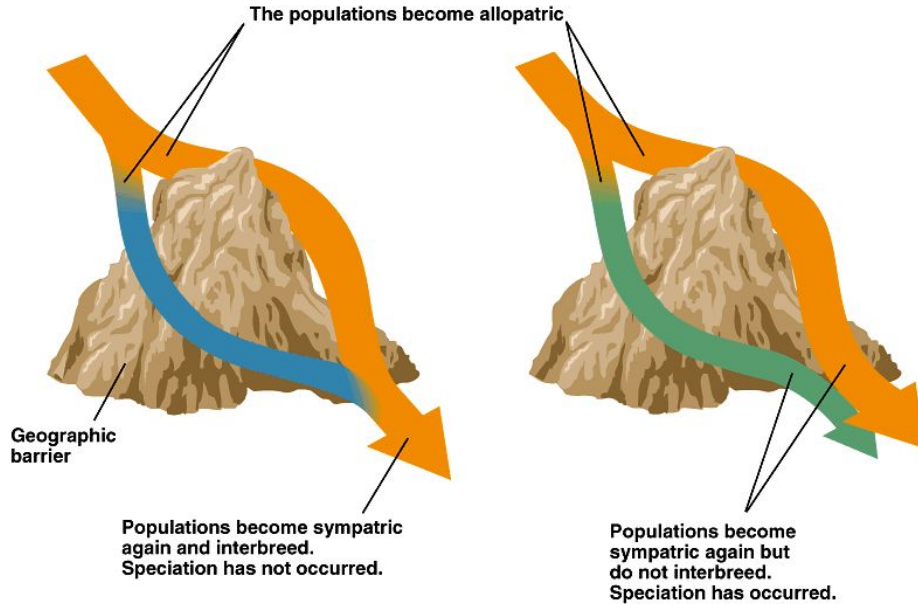
Geographic Isolation

Geographic Isolation is the group of living organism that get separate by physical barrier to stop it from mating.

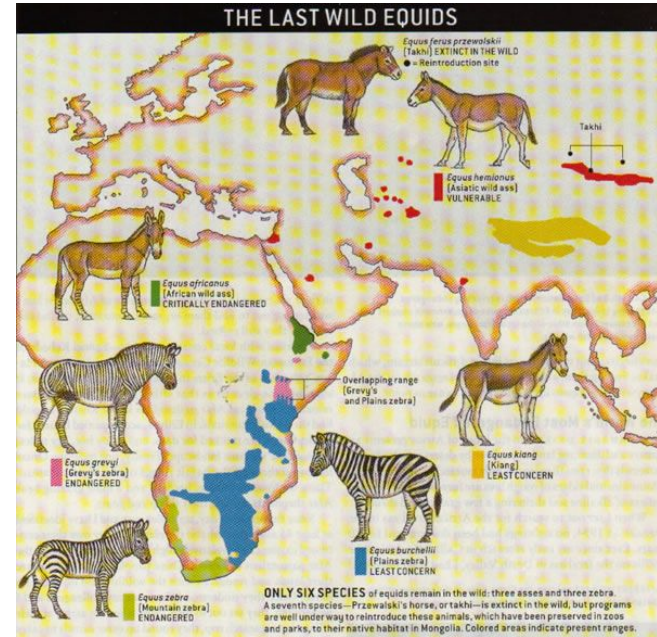
Example

- isolate by distance
- isolation after an event(earthquake, forest fire, land separate)
- isolation by barrier(river, mountain, oceans)

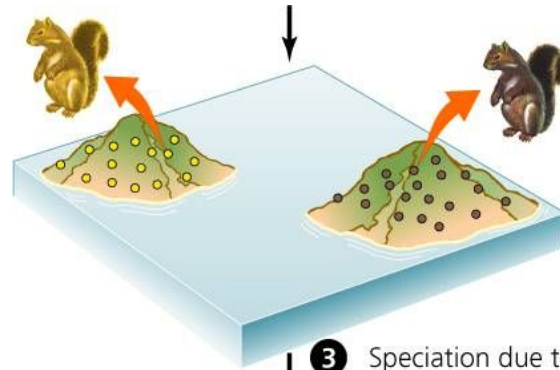
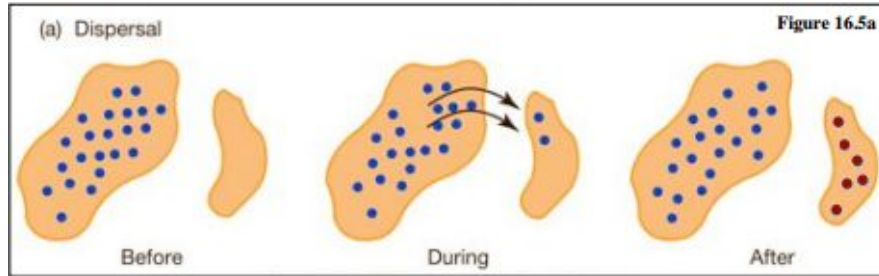
Geographic Isolation



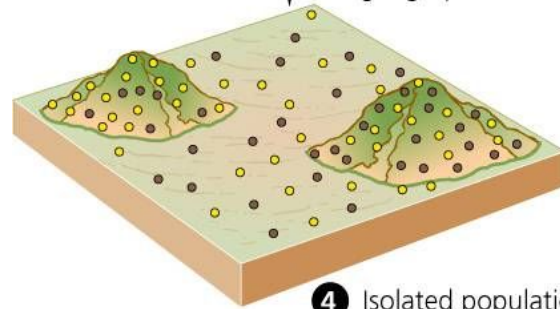
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Geographic Isolation



3 Speciation due to long-term geographical isolation

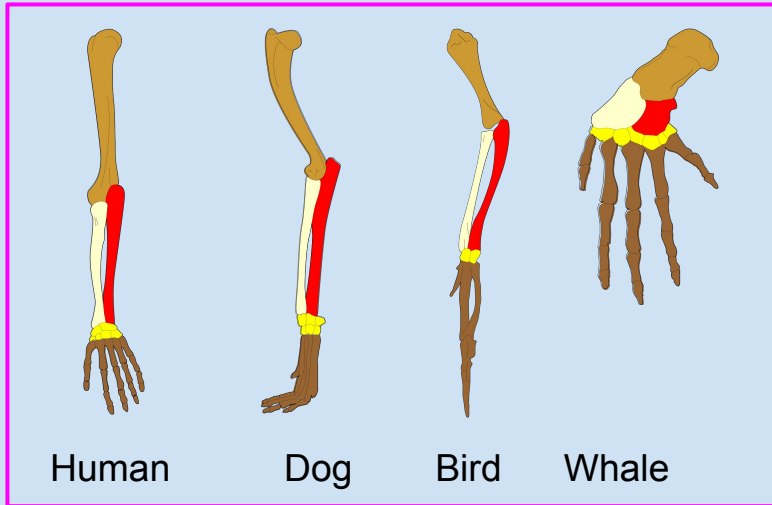


4 Isolated populations come together; two populations can no longer interbreed and are now two species

Analogous Structure

Meaning: Different species in which their same body parts have the **same function** but are different in structure.

- Also called “**Convergent Relationship**”



<u>Similarities</u>	<u>Differences</u>
-Function	- Origin
-Body	- Structure

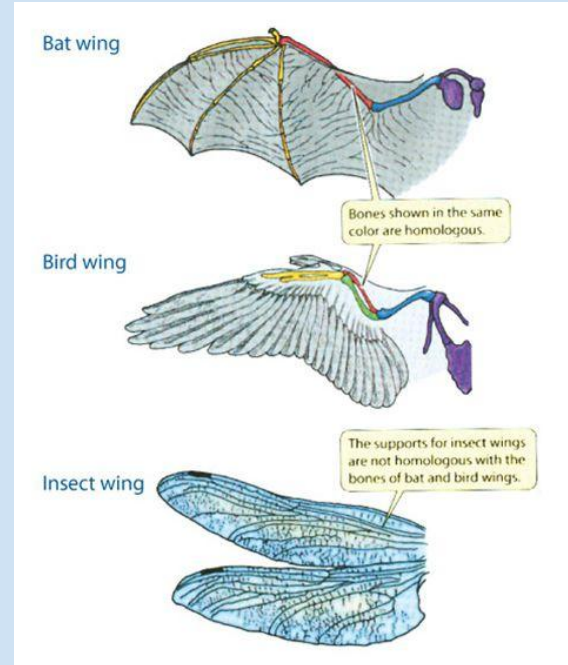
Analogous Structure

Examples:

→ Torpedo shapes of a penguin, shark and dolphin.

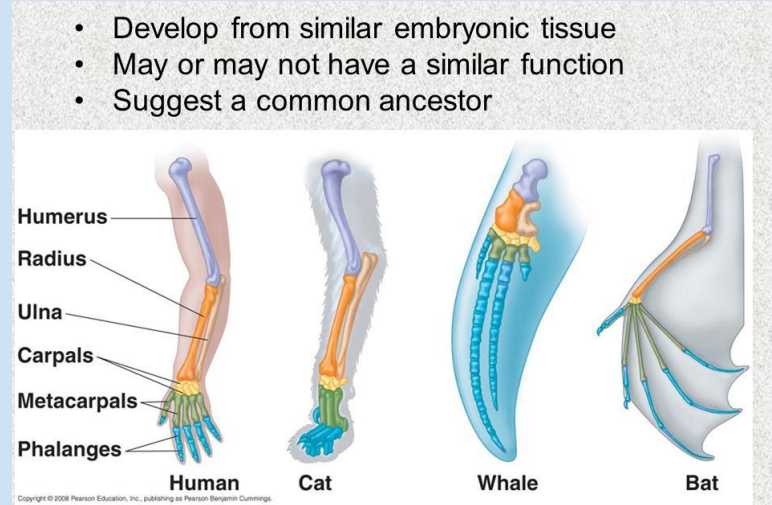


→ Insect and bird wings are similar in function, but not in structure.



Homologous Structure

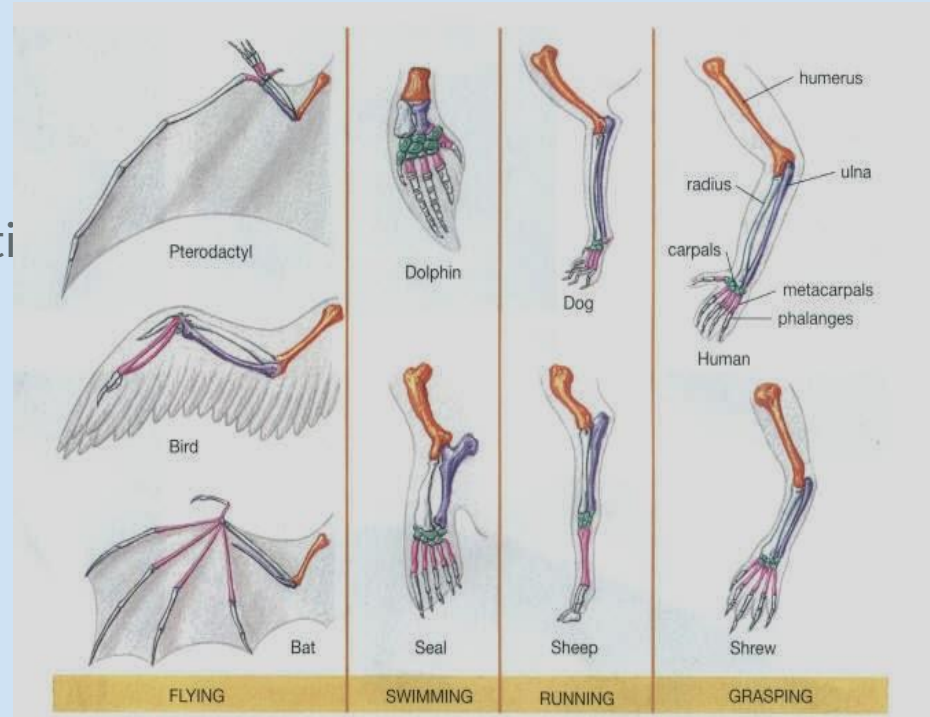
- Homologous structure is a body part of certain organisms that has **similar structure** to other species' body part.
 - Shows that different species of organisms have evolved overtime from a common ancestor.
 - Although the structure is similar, **the function may or may not be the same.**



Homologous Structure

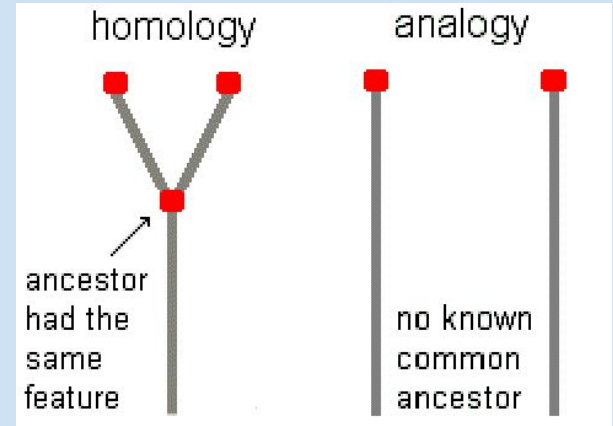
Examples:

- Human, bird and bat all have four limbs. These “four limbs” characteristic was evolved from the common ancestor.
 - Similar structure body parts.
 - But may or may not differ in function.



Difference between ANA and HOMO

	<u>Analogous Structure</u>	<u>Homologous Structure</u>
Common Ancestor	No	Yes
Similar Structure	No	Yes
Similar Function	Yes	No

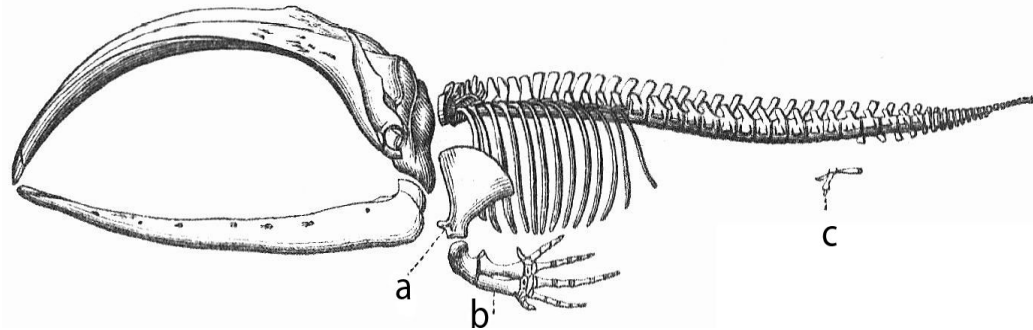


Vestigial Structure

- The organs in the organism body that once used to be needed and useful. Since the **evolution**, the organism are no longer need that organ.

Example:

Whale developed from **4 legs** land animal.



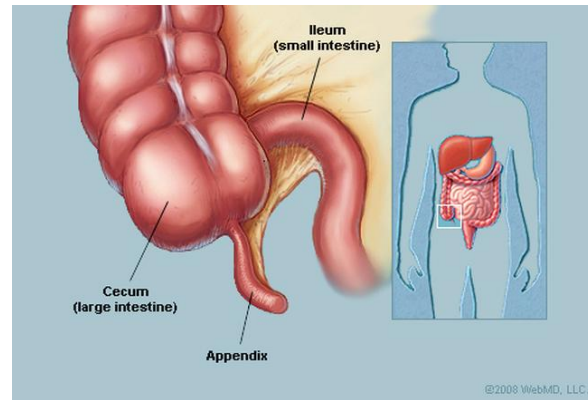
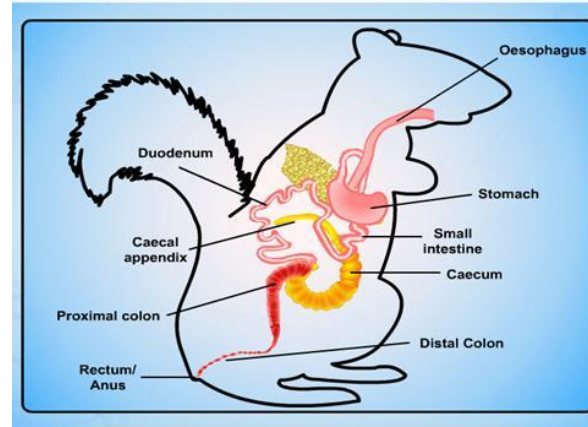
Whale don't need the hind legs anymore. (Letter C)

Vestigial Structure

Example:

Appendix

- From **plant-eating** ancestors
- For digesting leaves by storing bacteria
- Can cause Appendicitis



WHAT IS COEVOLUTION?

COEVOLUTION OCCURS WHEN AT LEAST **2 SPECIES** **INFLUENCE** OR HAVE IMPACT ON **EACH OTHER IN THEIR** **EVOLUTION**

- > WILL GAIN ADVANTAGES FROM EACH OTHER
- > ADAPT TO THE RELATIONSHIP

TYPES OF COEVOLUTION

> MUTUALISTIC COEVOLUTION

> BOTH SPECIES **BENEFIT** FROM EACH OTHER

> COMPETITIVE COEVOLUTION

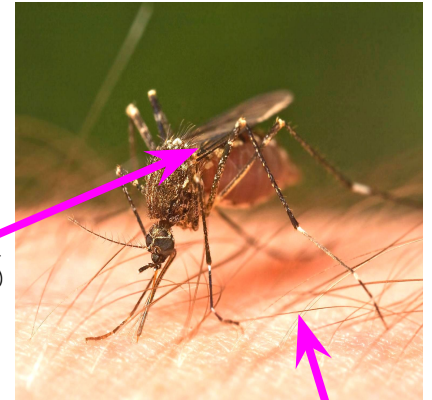
> **NEGATIVE** EFFECT ON EACH OTHER

Coevolution



FLOWER PRODUCES NECTAR FOR THE BEES TO BE FEED ON

BEES PICK UP POLLEN FROM ANOTHER FLOWER



MOSQUITOES AS PARASITES BENEFIT ALL

HOST DOES NOT GET ANY BENEFITS

Coevolution: MORE Examples!

Garter snakes and Newt

- **Newt** produces toxin enough to kill 100 humans
- **Snakes** can resist
- >> **Lower** amount of toxins → **get eaten**
- >> **Higher** amount of toxins → **be able to survive**

Angraecoid orchids and African moths

- **the moths** → depend on the flowers nectar
- **the flowers** → depend on the moth

Old world swallowtail and fringed rue

- This is **antagonistic coevolution**
- old world swallowtail
→ live on **the fringed rue**
→ developed resistance to plant-eating insects from **the rue**

Acacia ant and bullhorn acacia tree

The acacia ant → protect the bullhorn acacia tree

Yucca Moth and the yucca plant

The yucca plant → pollinated by *Tegeticula maculata*
(>>a species of yucca moth)

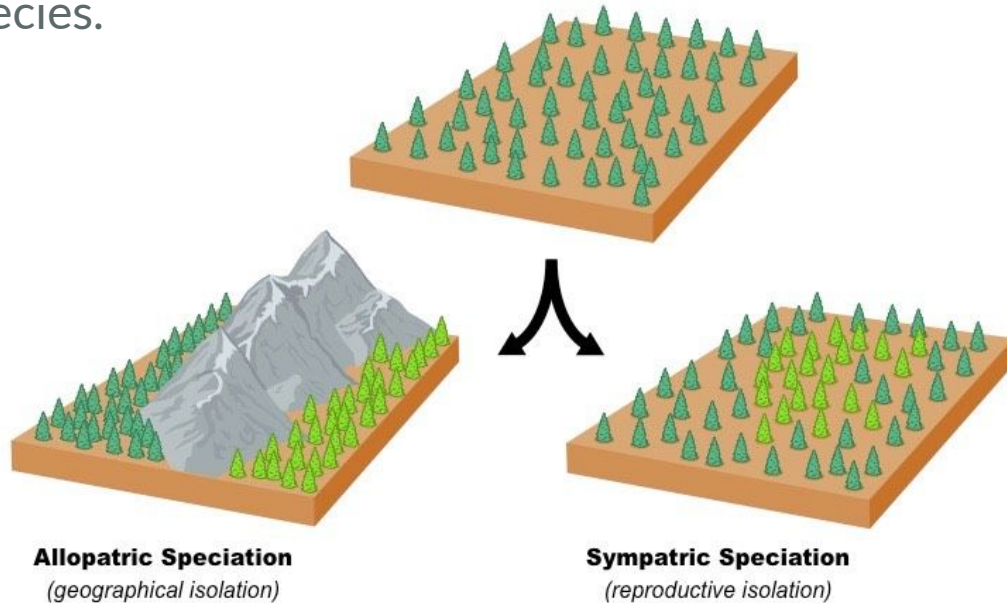


What is speciation?

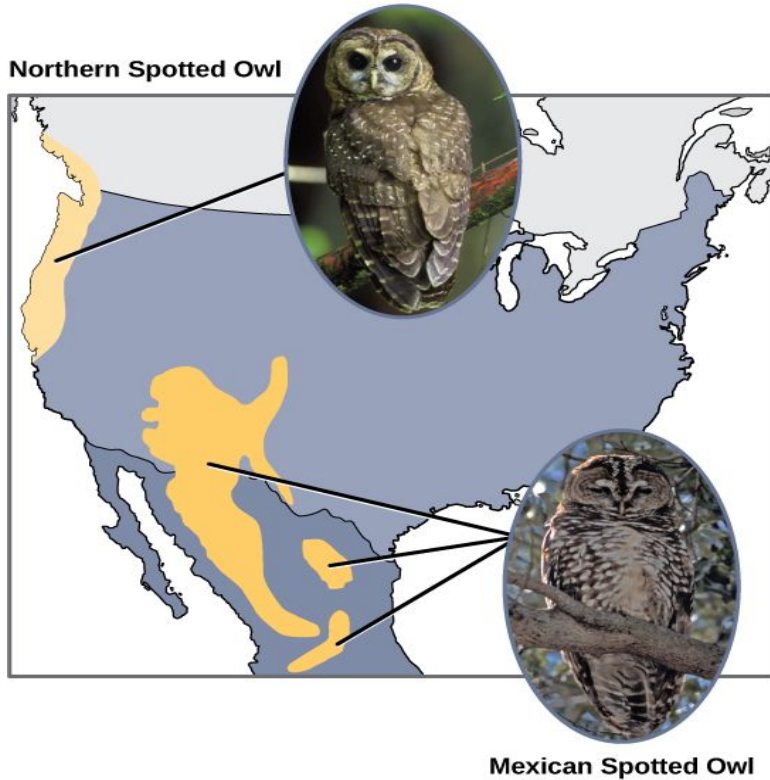


Modes of Speciation

- **Allopatric Speciation** = Isolation which occurs physically from the geographical gap between two species that were once were at the same place.
- **Sympatric Speciation** = A population forms a new species within the same area as the present species.



Example for Allopatric Speciation:



- Both of these are birds (duhhh), BUT they are categorised into 2 subspecies from the original.
- The northern spotted owl has partially distinct phenotypic and behavioral difference from their beloved relative in the south.
- These differences occurs due to the differences in; distant, environmental factors, also it is less likely for these two to meet up and mate...maybe **Owly** once in a year. (LOL, Get it? No? Fine...)



Example for Sympatric speciation:



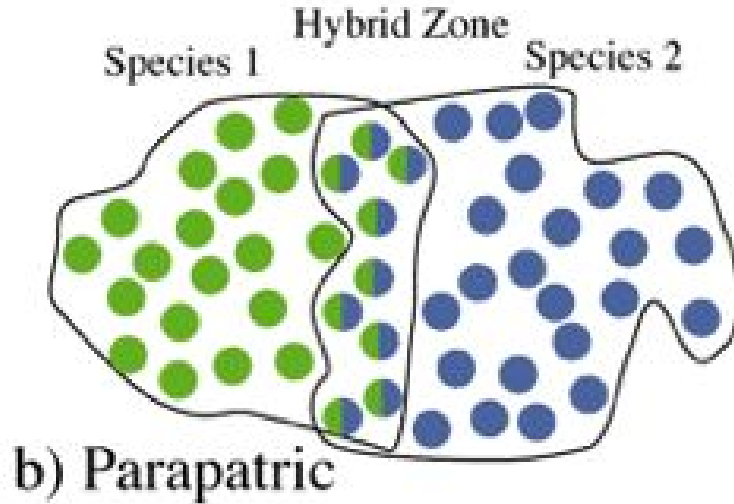
- Geographically overlapping population such as
 - Chromosomal changes
 - nonrandom mating
 - reduce in gene flow



Modes of speciation

- **Parapatric Speciation** = Population is mildly isolated, but populations are able to mate with the geographical neighbors, causing hybrids between two species.
- **Peripatric Speciation** = Is similar to Allopatric speciation, but only includes small population getting isolated in a new niche/area.

Example for Parapatric Speciation:



- So when one species mates with neighboring species....
- Ex: If one side is a species of unicyles and the other side are corns? You get this...



Hybrid at it's best

Example for Peripatric Speciation:



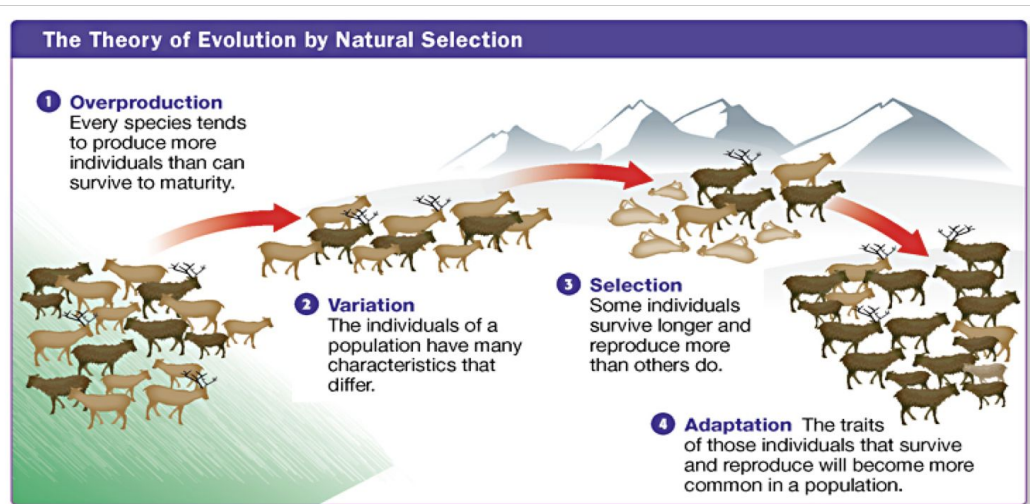
- Look at this poor thing sitting there all alone...yeah this is Peripatric Speciation alright.
- When one organism is separated and placed in a new area.
 - (He seems **peripatrified**...LOL)

Natural Selection

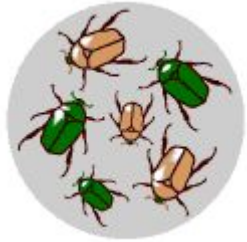
WHAT IS NATURAL SELECTION?

-NATURAL SELECTION IS WHEN ORGANISMS ADAPT TO THE ENVIRONMENT TO SURVIVE, SELECTING THE BEST GENES TO KEEP REPRODUCING.

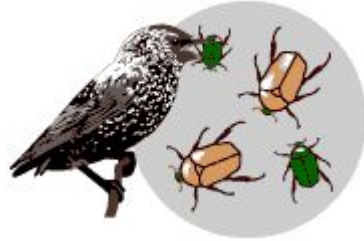
OVERVIEW



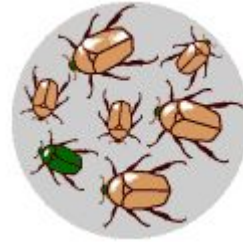
Natural Selection



THERE ARE MANY TRAITS
-BROWN AND GREEN BEETLES



ABILITY TO REPRODUCE
-THE GREEN AND BROWN BEETLES WILL KEEP REPRODUCING, HOWEVER BIRDS KEEPS ON EATING THE GREEN BEETLES CAUSING THE GREEN TO HAVE LESS POPULATION THAN THE BROWN ONES.



HEREDITY
THE TRAITS OF THE BROWN BEETLE WILL BE PASSED TO THE NEXT GENERATION WHILE GREEN TRAITS ARE DISAPPEARING.



IN THE END, THE GREEN BEETLES WILL EVENTUALLY DISAPPEAR AND THE ONLY POPULATION LEFT WOULD BE THE BROWN. "FITTEST ONES WILL SURVIVE" THE BEST TRAITS WILL BE PASSED ON.

LASTLY...



WHAT IF I TOLD YOU

**NATURAL SELECTION, MUTATION, GENETIC DRIFT,
GENE FLOW, SPECIATION, AND CHANGE IN GENE
FREQUENCY HAS NOTHING TO DO WITH EVOLUTION**