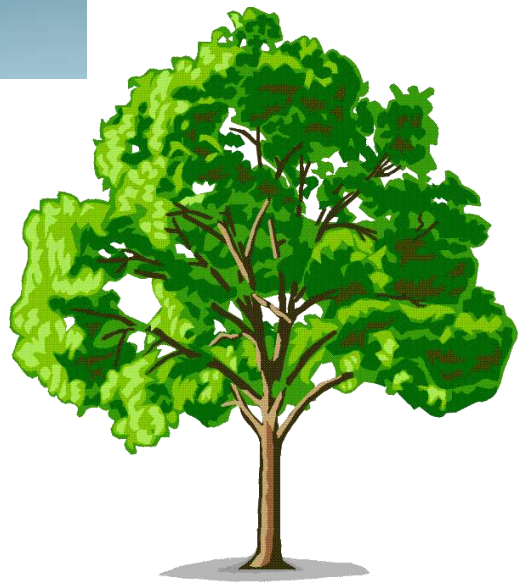
EVIDENCE OF EVOLUTION

Graphic Organizer

Molecular Biology

- the study of DNA and gene sequences.



- The more similar two organisms DNA sequences are, the more closely related they are to one another.

- What do you think the DNA relationship is between a tree, a frog, and a fish? Why?

Molecular Biology Activity

HUMAN:	Gly	Lys	Val	Asp	Val	Asp	Glu	Val	Gly	Gly	Glu	Lys	Leu	His	Val	Arg	Leu
GORILLA:	Gly	Lys	Val	Asp	Val	Asp	Glu	Val	Gly	Gly	Glu	Lys	Leu	His	Val	Leu	Leu
HORSE:	Asp	Lys	Val	Asp	Glu	Glu	Glu	Val	Gly	Gly	Glu	Lys	Leu	His	Val	Arg	Leu

1. On your graphic organizer, circle the amino acids that are not the same among the three organisms.
2. Count the number of non-matching amino acids.

Answer these questions on your graphic organizer:

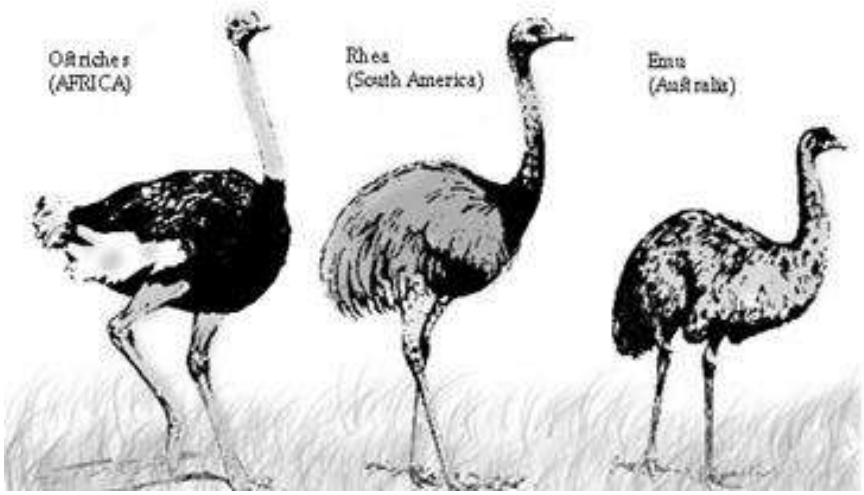
1. Which animal has more amino acids in common with a human: the horse or the gorilla?
2. Which two organisms are the most closely related (based on the amino acid sequence)?
3. Which two organisms do you think evolved from the most recent common ancestor?
4. What do DNA and amino acid sequences reveal about the relatedness of two organisms?

BIOGEOGRAPHY IS THE STUDY OF WHERE ORGANISMS LIVE NOW AND WHERE THEY AND THEIR ANCESTORS LIVED IN THE PAST.

Biogeography

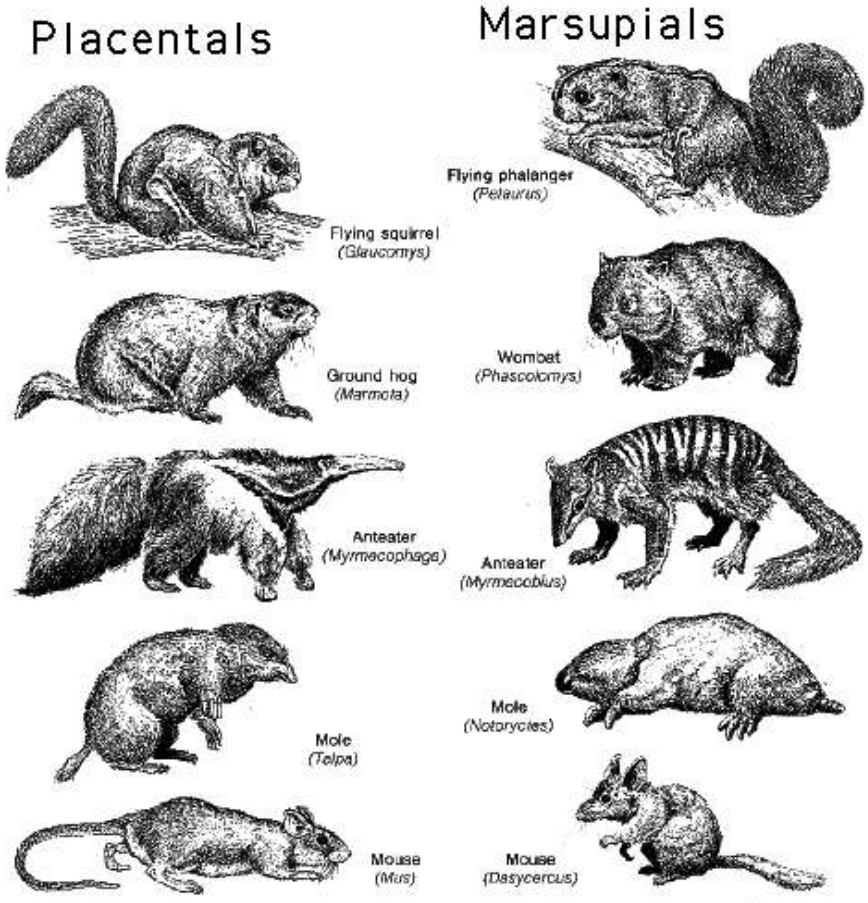
Convergent Evolution: Very distantly related species develop <u>similarities</u> in <u>similar</u> environments

Example: Ostriches, Rheas, and Emus, Different species of birds found in different locations around the planet. They are all large, flightless birds – similar characteristics that fit their similar environments.



Biogeography

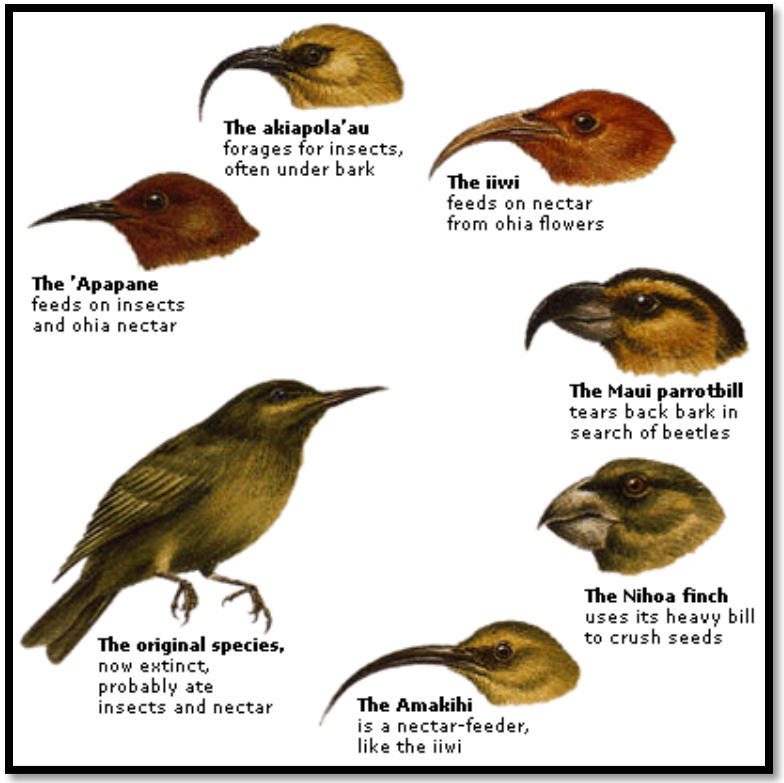
- Convergent evolution Examples continued..



Biogeography

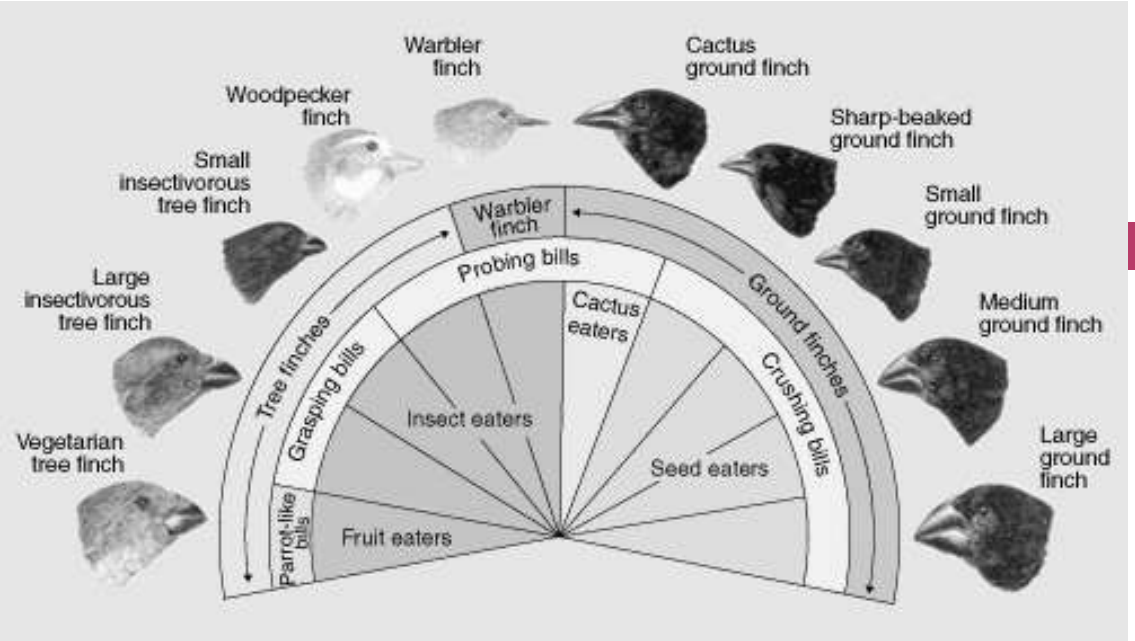
Divergent Evolution/Adaptive Radiation: Closely related species become <u>different</u> due to living in <u>different</u> environments

Example: Finches



Galapagos Finches

Activity



Galapagos Islands (not really…I just made them up…)

Island 1 is covered in with many fruit trees.

Island 2 has cacti.

Island 3 has many insects; most of the insects live deep

Island 4 has trees that produce large, seeds with tough, thick exteriors

Galapagos Finches Follow-Up Questions

1. What species of finches would be found on:
   - Island 1:
   - Island 2:
   - Island 3:
   - Island 4:
2. Why is it possible to find unique organisms with strikingly similar characteristics in various locations around the world?

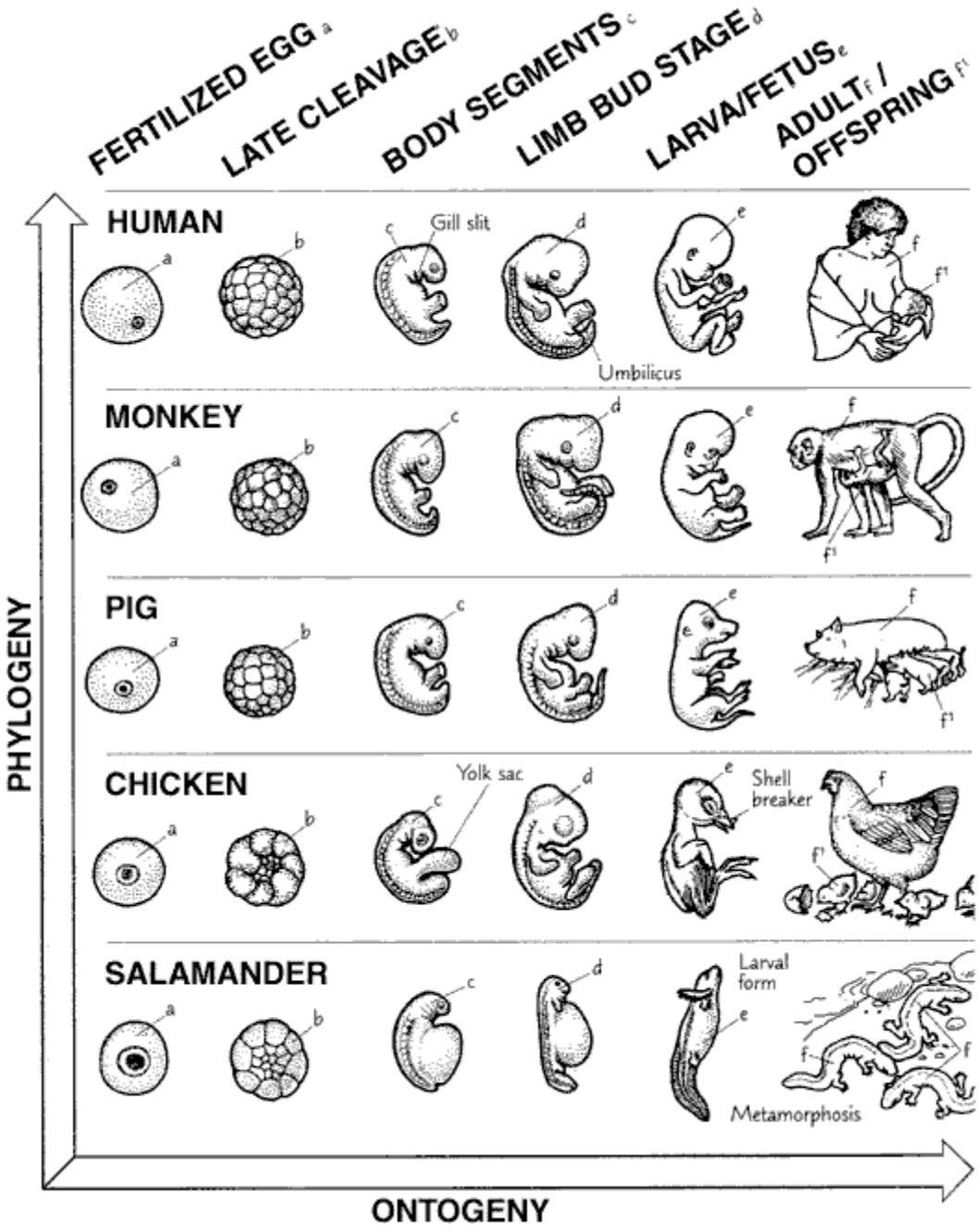
Biogeography

Coevolution:s two species evolve in response to changes in each other over a period of time

Example: Flowers and their pollinators

Comparative Embryology

- All vertebrate embryos follow a common developmental path due to their common ancestry.
- As embryos develop, the differences that will distinguish the embryos as adults become more and more apparent.
- The more closely related two organisms are to a common ancestor, the more similar their developmental patterns will be.



Fossils (Don't forget about fossils!!!)

- Fossils provide concrete evidence about organisms that lived on the planet in the past!
- Check out the Rock Layer Model

1. Which rock layer is the oldest?
2. Which rock layer is the newest?
3. Which species is the oldest?
4. Which species is the youngest?
5. Which species evolved first – species A or species D? How do you know?
6. What do you think the intermediate form of this animal might have looked like in the Lamarckian time era? The Darwinian time era?
7. What is the law that provides information on the age of fossils based on the rock layer in which they are found in? What are the two methods used to determine the age of a fossil?
8. What term would be used to describe fossil D, which can be found in all areas of the world in the Foxian rock layer?

COMPARATIVE ANATOMY:

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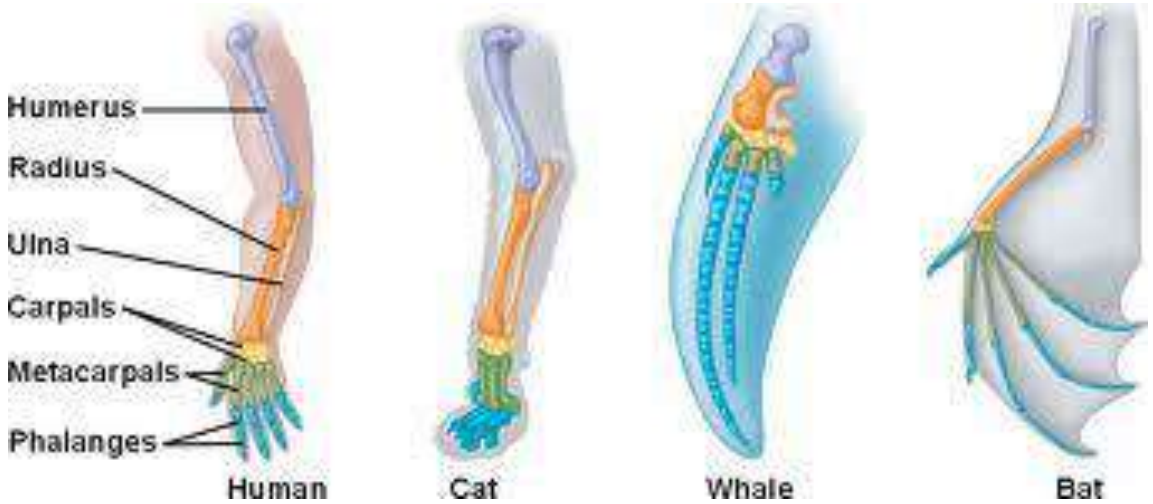
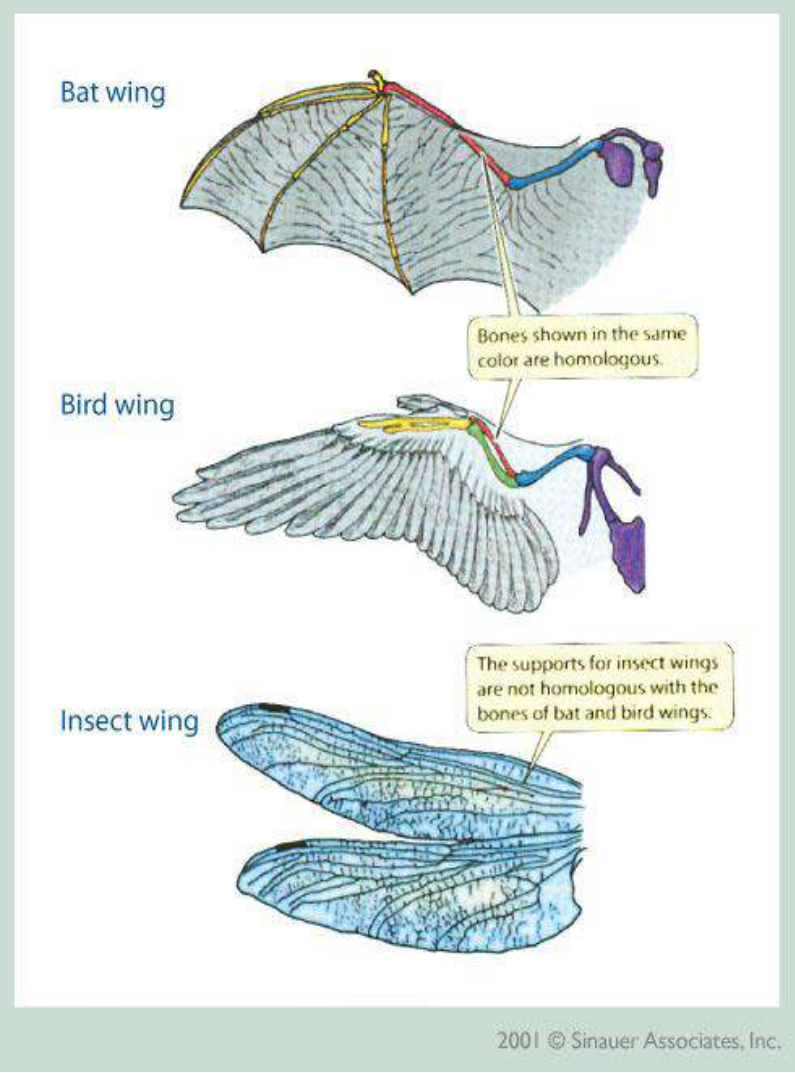
- *Study and comparison of body structures*
- Homologous Structures:
  - Structures that are shared by related species and have been inherited by a common ancestor, have a common structure, not necessarily common function



Comparative Anatomy

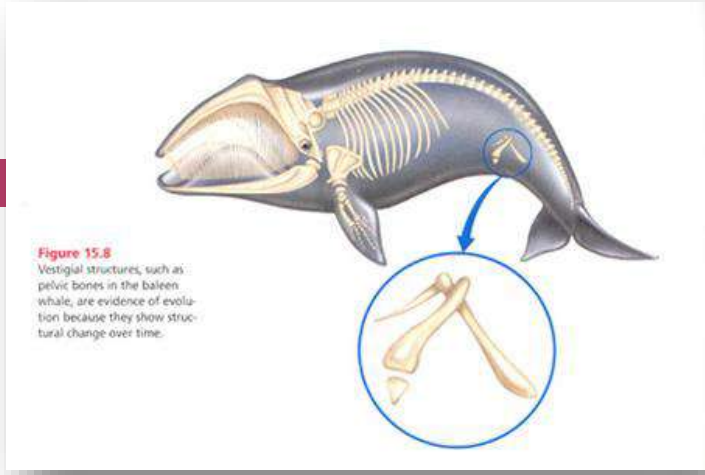
- **<u>Analogous Structures</u>:** Body parts that share a **common function,** but not a common structure.

- *For example, bats, birds, and insects can all fly, but insects do not have the same bone structure as a bat or a bird.*

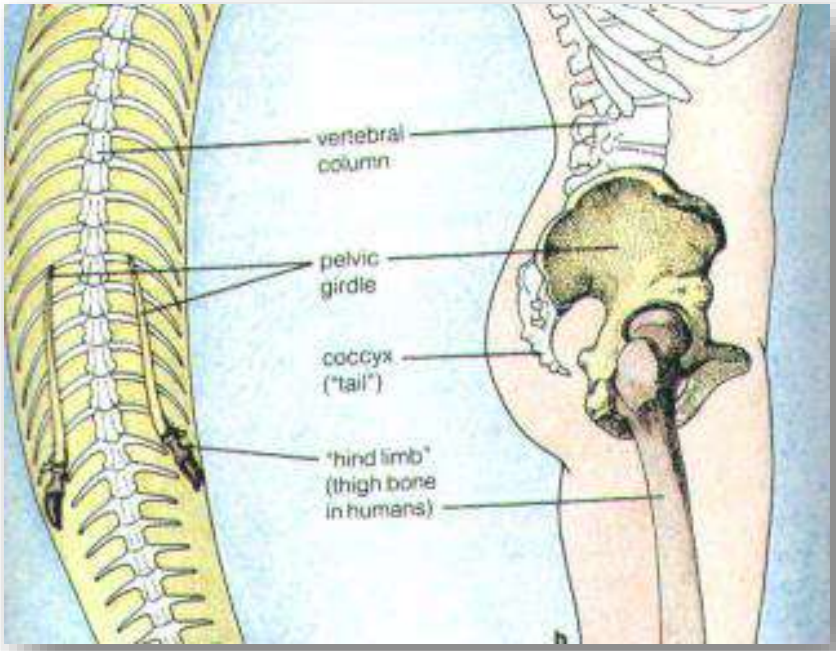


Comparative Anatomy

- Vestigial Structures: Structures inherited from ancestors but have lost much or all of their original function.

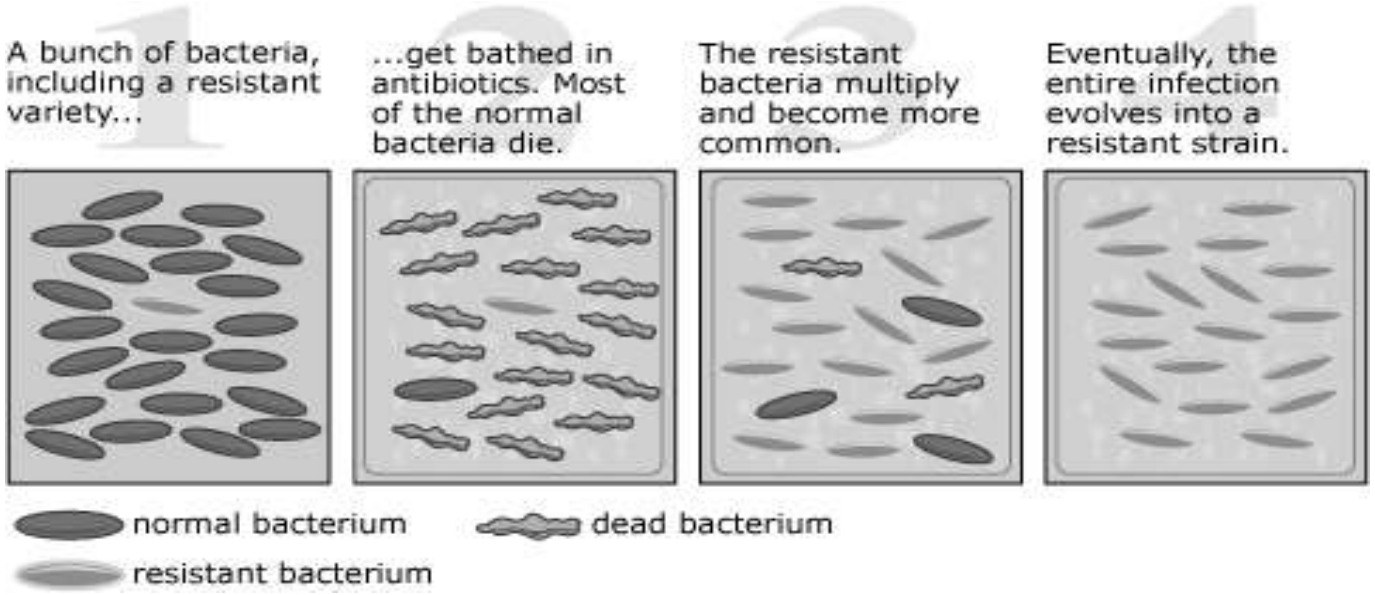


- Examples: Human tailbone (coccyx), ear muscles, body hair, whale pelvis, snake hind limbs



Antibiotic Resistance

- Antibiotic resistance is a form of drug resistance in which bacteria are able to survive exposure to antibiotics.
- Read and look at diagrams of antibiotic resistance



HOMEWORK: EVIDENCE FOR EVOLUTION WORKSHEET