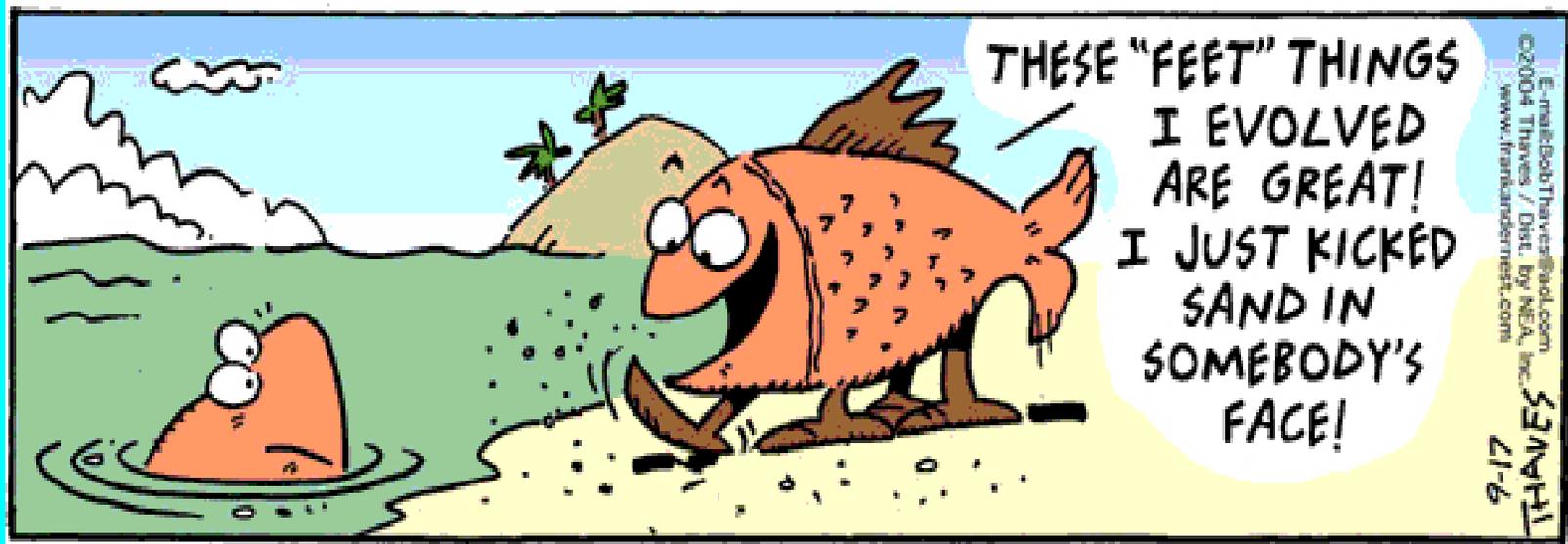


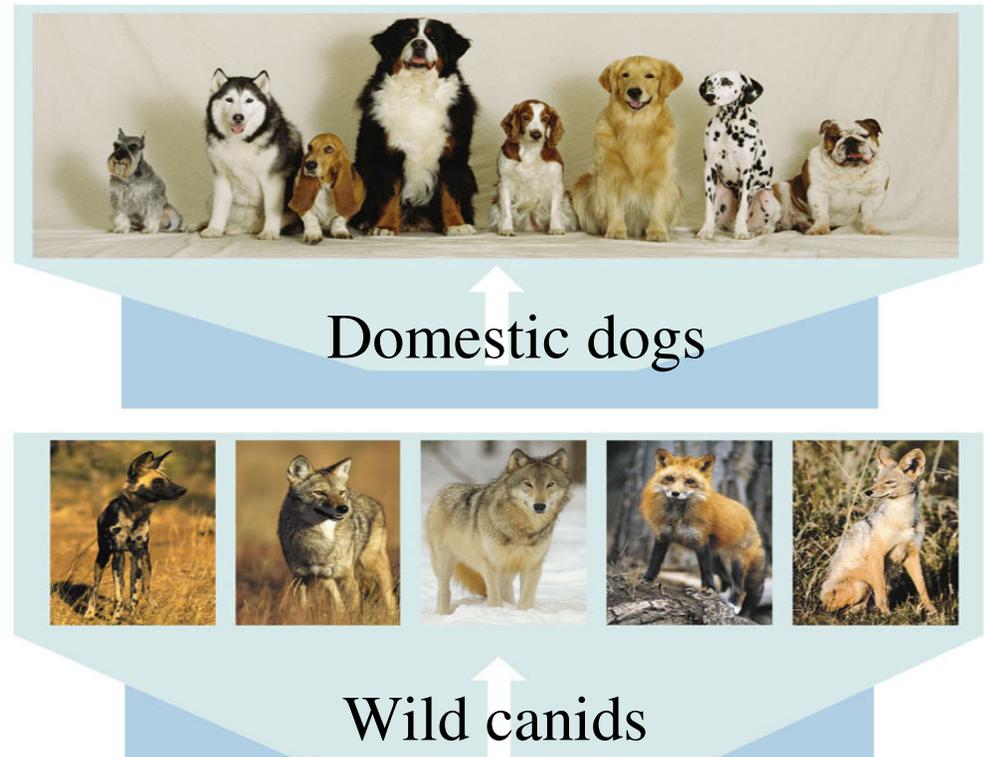
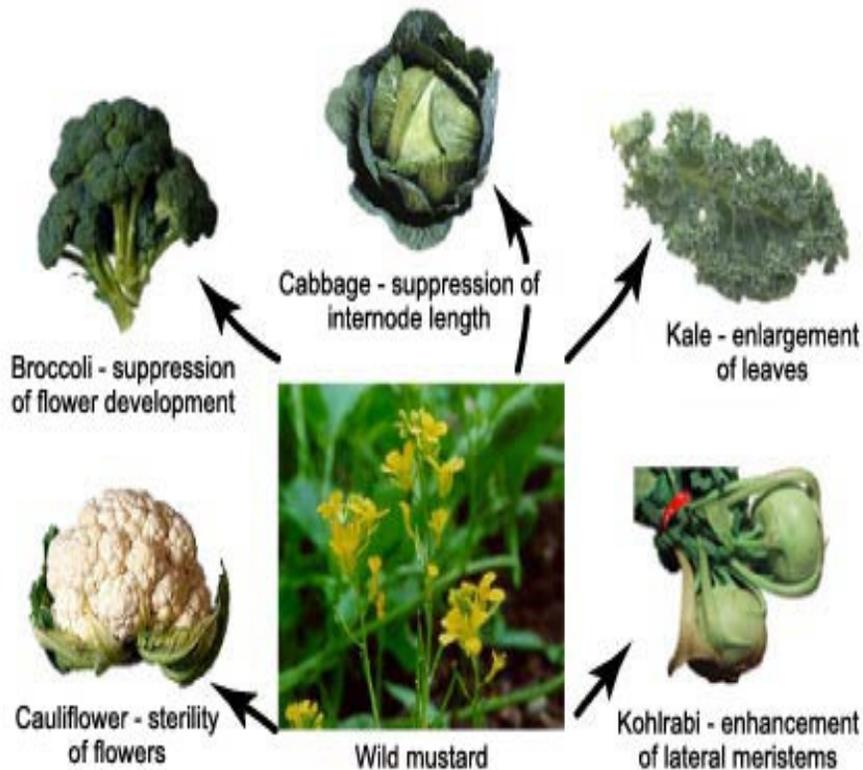
EVOLUTION



I. Inherited Variation and Artificial Selection

A. Artificial Selection- People select the best traits for the species. (ex. fast horse).

B. In artificial selection nature provides the variation and humans select those variations that they find useful.



II. Evolution by Natural Selection



- A. Struggle for existence- millions of species compete for food, space and other life necessities
- B. **Survival of the fittest**
 - 1. **Fitness**-is the likelihood that an individual will **survive** and **reproduce** *and/or* the number of offspring an individual produces over its lifetime.



2. **Adaptive trait** *or* **adaptation** increases an individual's fitness.

C. Over time natural selection results in change in the inherited characteristics of a population.

These changes increase a species fitness
in it's environment



D. DARWIN'S- Principle of Descent with Modification

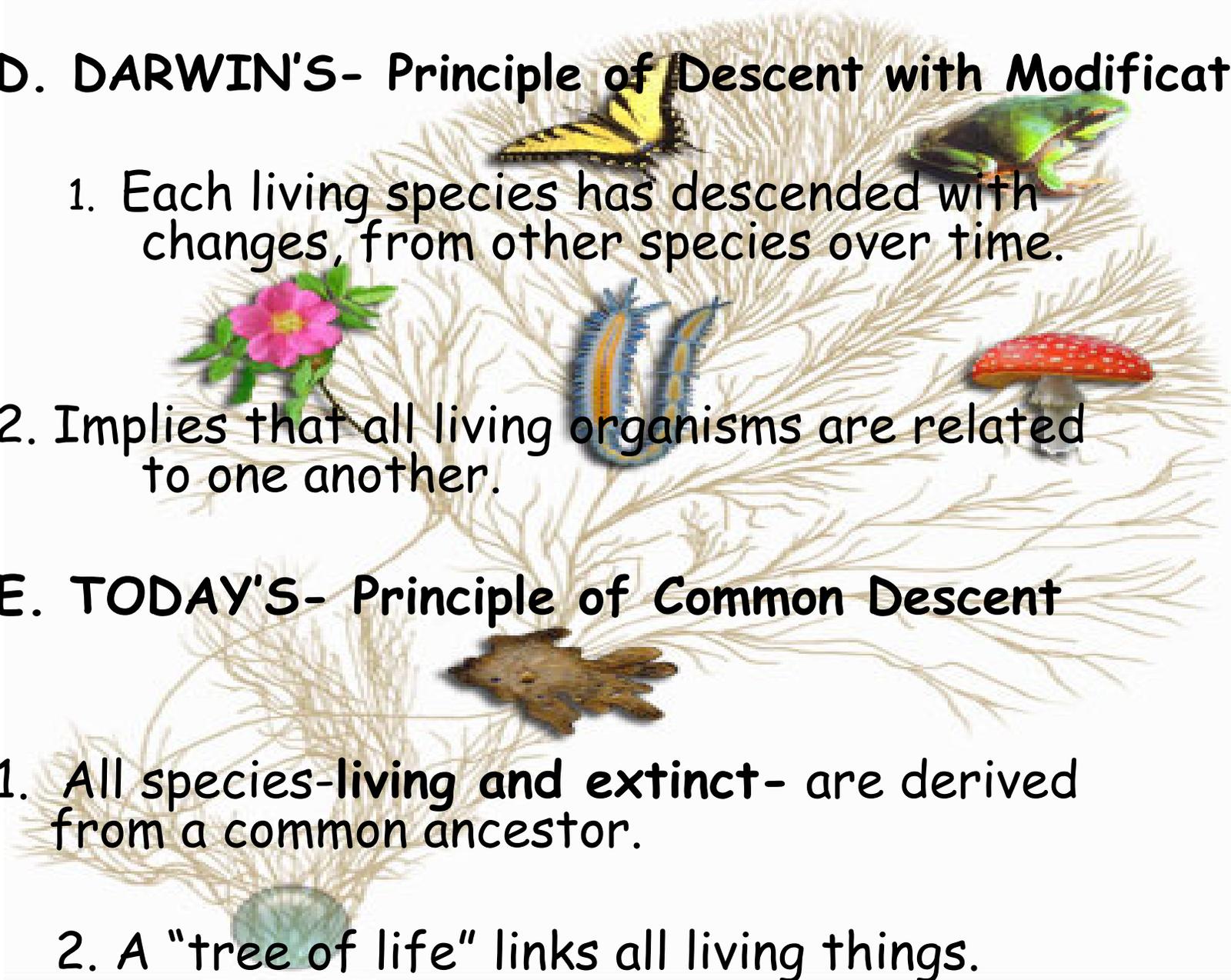
1. Each living species has descended with changes, from other species over time.

2. Implies that all living organisms are related to one another.

E. TODAY'S- Principle of Common Descent

1. All species-living and extinct- are derived from a common ancestor.

2. A "tree of life" links all living things.

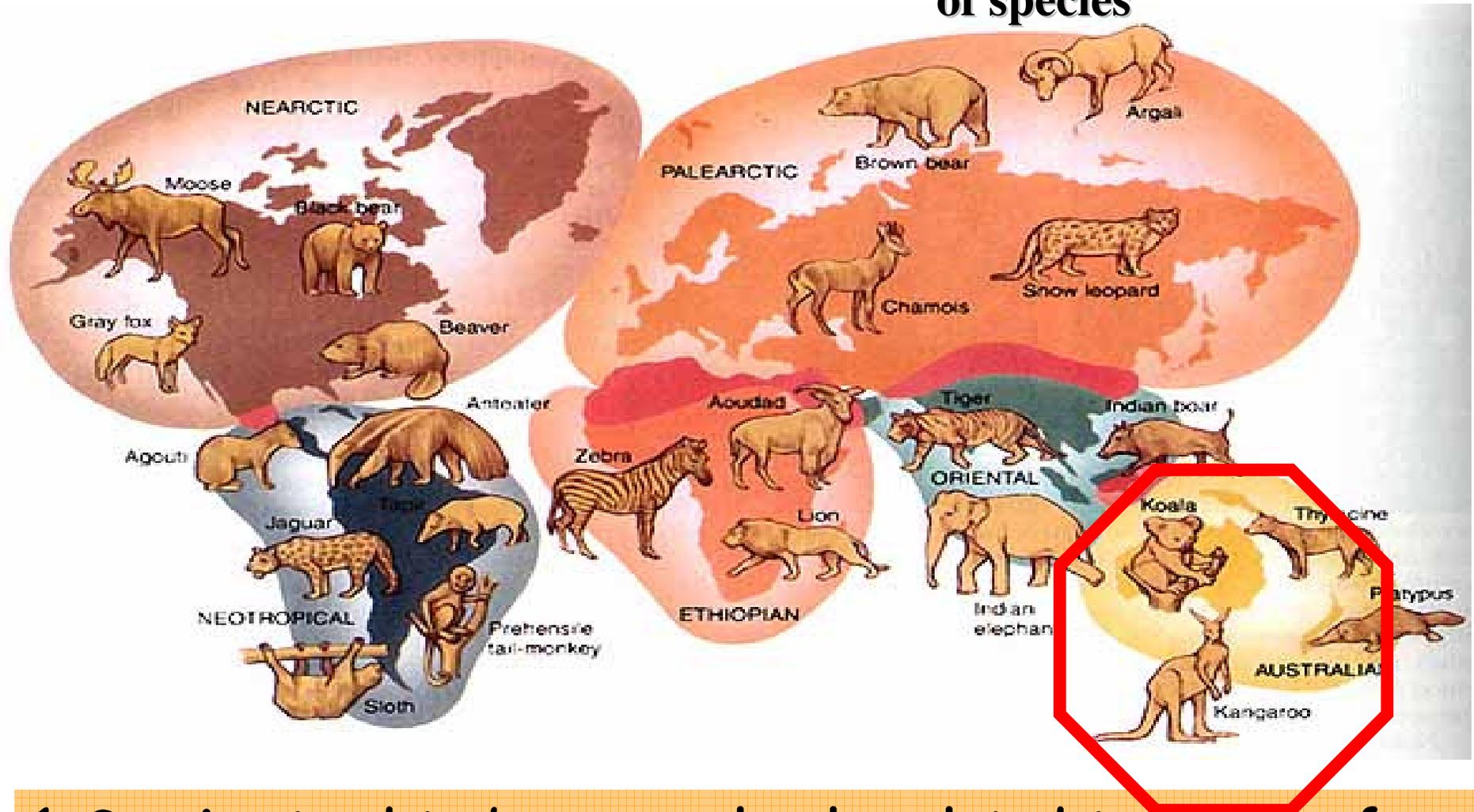


III. Evidence of evolution by natural selection

A. Fossil record-millions of years



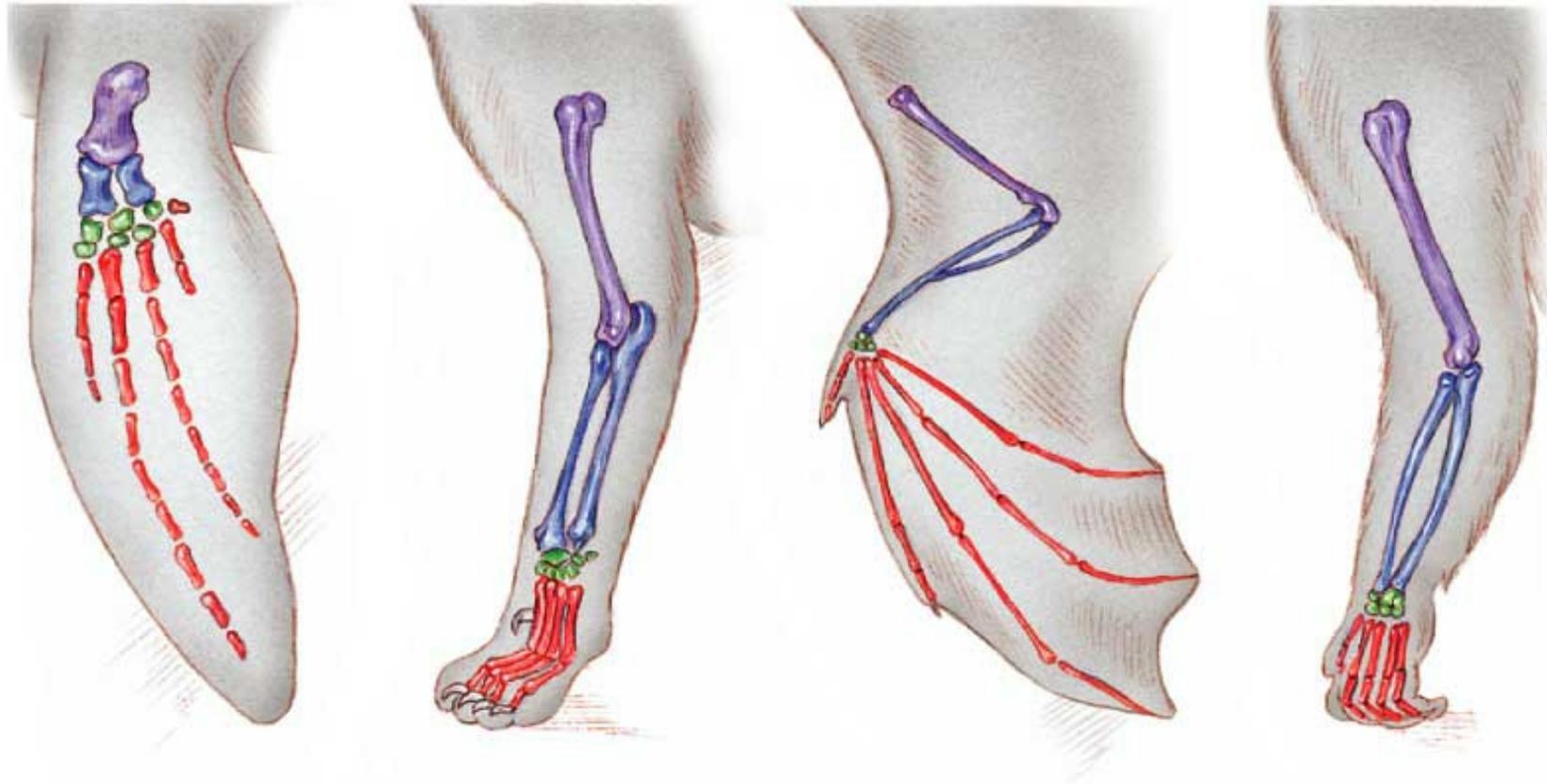
B. Geographic distribution = The geographic distribution of species



1. Species tend to be more closely related to species from the same area than to species from areas far away.

C. Comparative Anatomy

1. Homologous Body Structures - Structures in organisms that have a similar structure but serve a different function. This suggests they have a common ancestor (form from same embryonic tissues).



WHALE

CAT

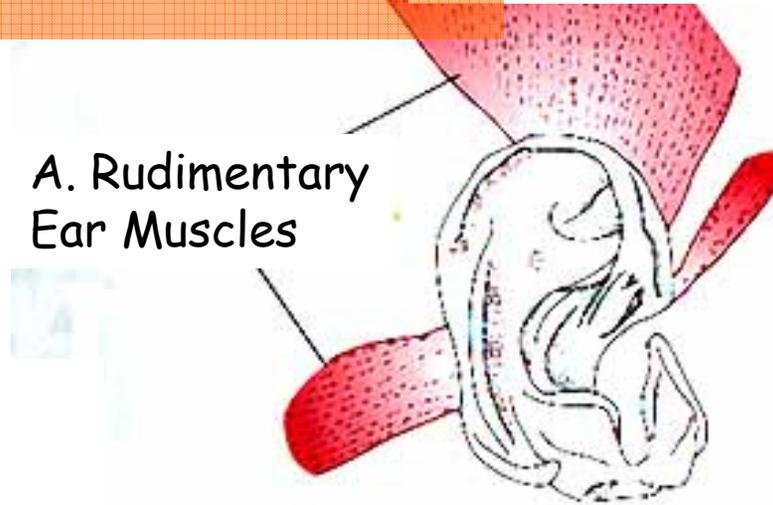
BAT

GORILLA

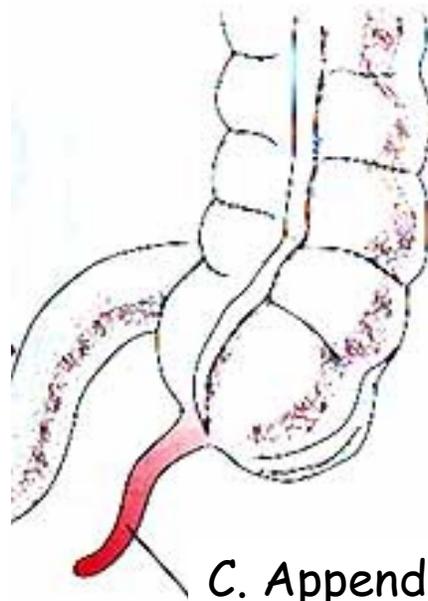
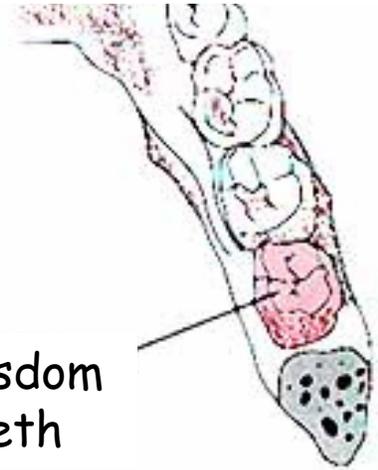
2. Vestigial Structures -

Structures that have little or no known function.

A. Rudimentary Ear Muscles



B. Wisdom Teeth



C. Appendix

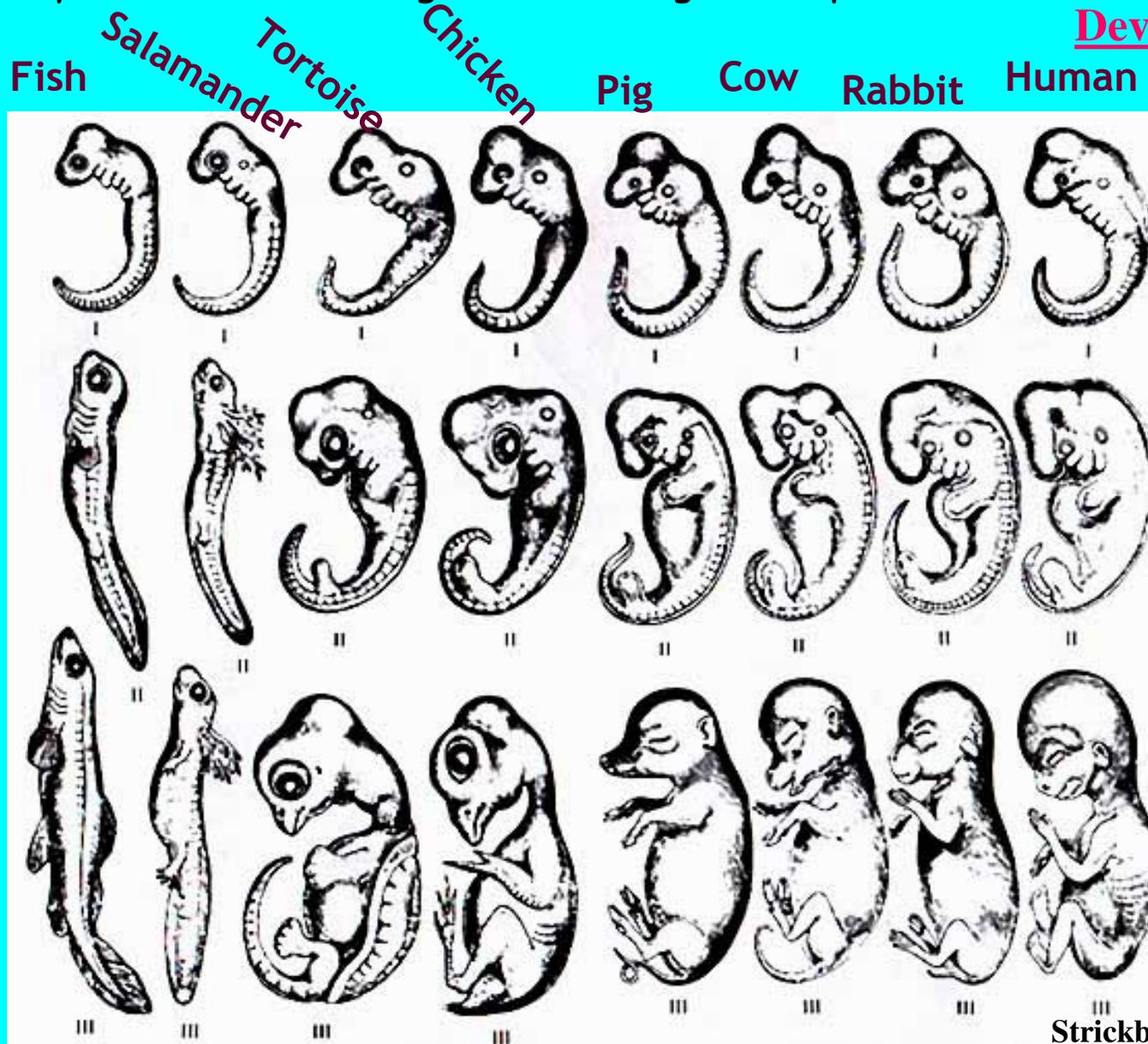


D. Coccyx

D. COMPARITIVE EMBRYOLOGY

similarity of embryos of different organisms during development

Stage of Development



Early

Later

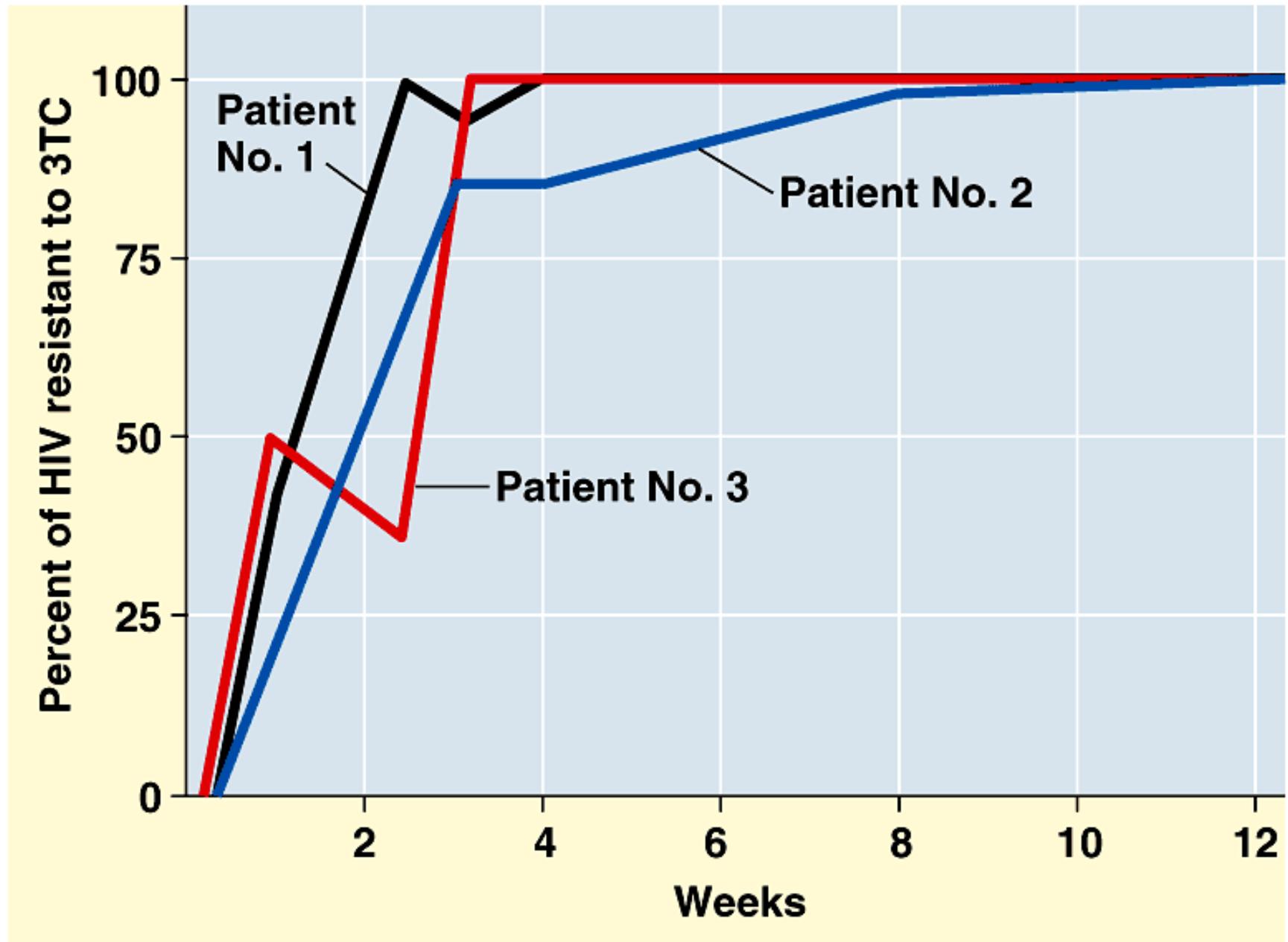
Strickberger, 1996

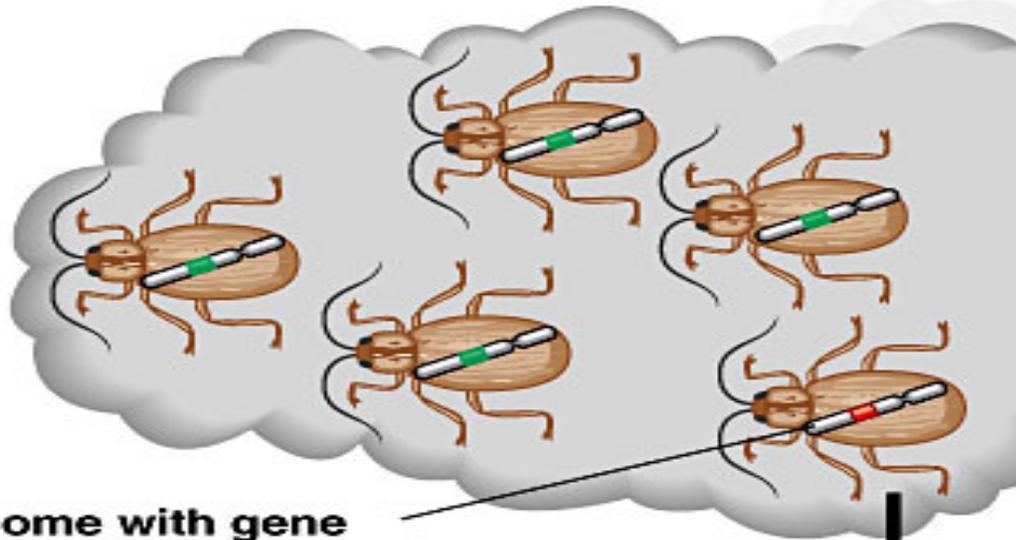
1. Embryo's of **less closely related** species would **look different earlier**- whereas embryo's of **more closely related** species **look similar** for more stages of development.
2. Infers that they shared a **common ancestor**

IV. Additional evidence of evolution

- A. Comparitive DNA- more nucleotide sequences that are the same the more recent the common ancestor.
- B. Antibiotic resistance in bacteria
- C. Herbicide resistance of weeds
- D. HIV resistance to anti- retroviral medications

Figure 22.13 Evolution of drug resistance in HIV





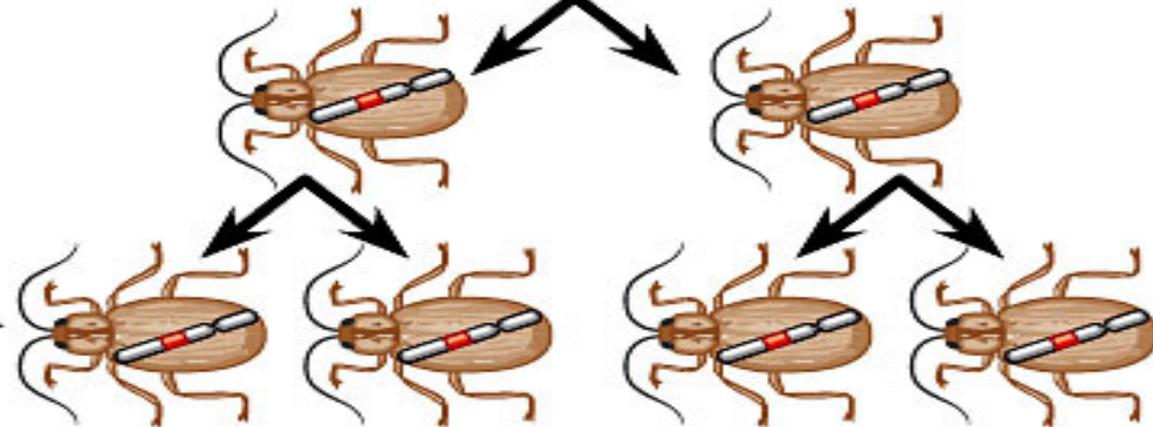
Insecticide application

Chromosome with gene conferring resistance to insecticide



Survivor

Additional applications of the same insecticide will be less effective, and the frequency of resistant insects in the population will grow



V. Points to remember about Natural Selection

- A. Populations evolve, but individuals do not.
- B. Natural selection only works on inheritable variations, not acquired traits (knowledge).

