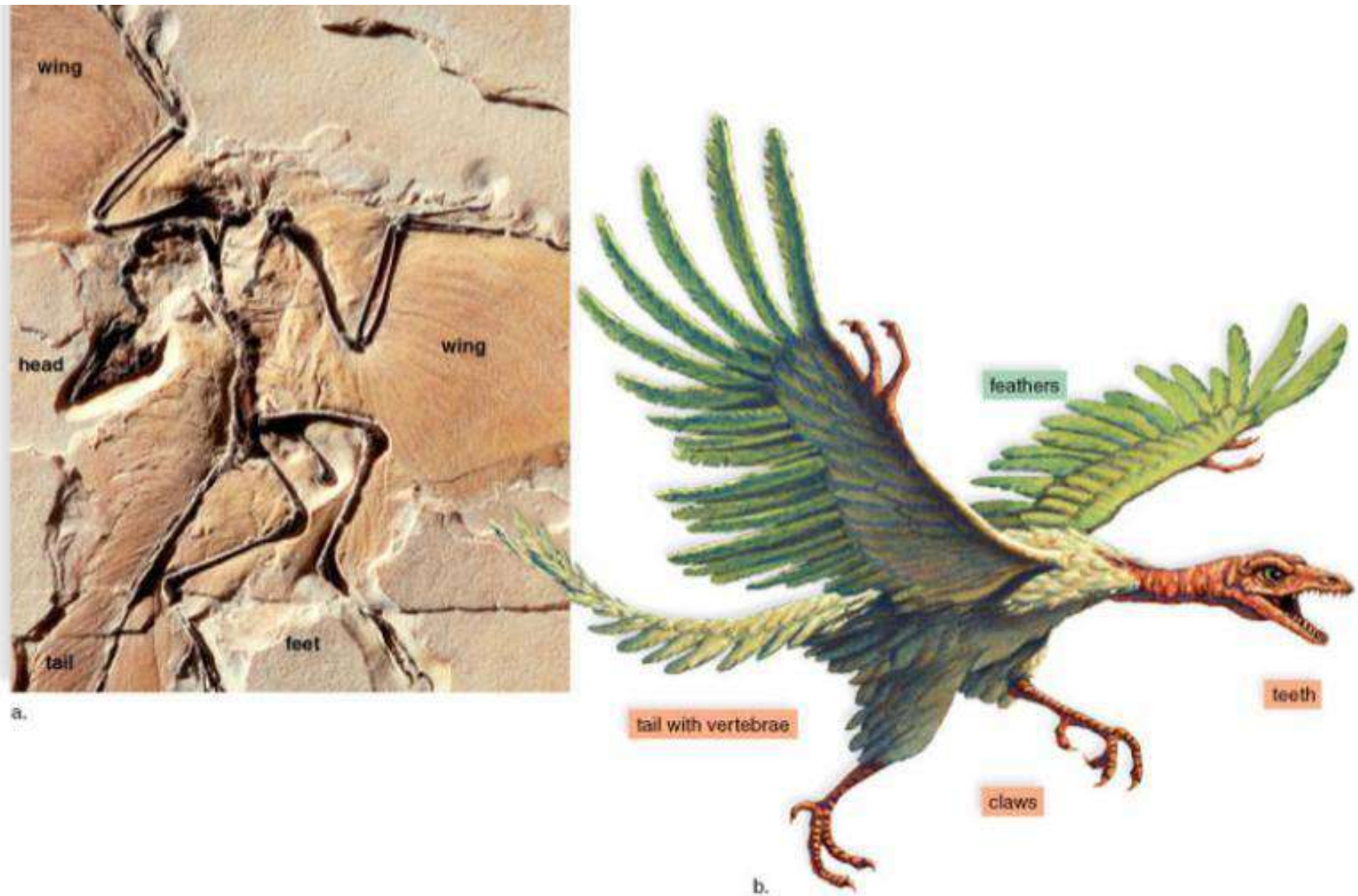
Evidence of Evolution

The theory of evolution is supported by many scientists from many fields and many cultural backgrounds. Evidence can be found in

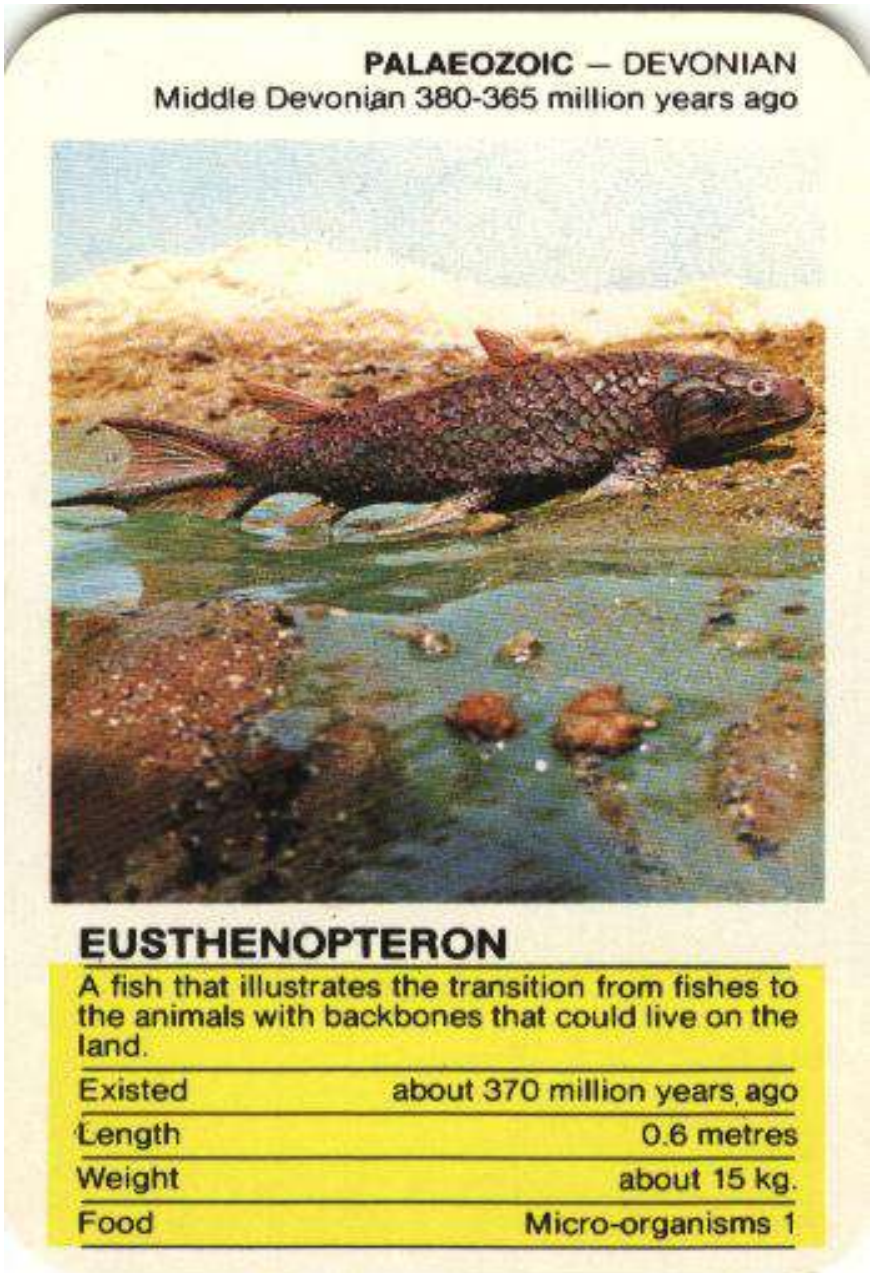
1. The Fossil Record
2. Biogeography
3. Anatomy
4. Embryology
5. Biochemistry

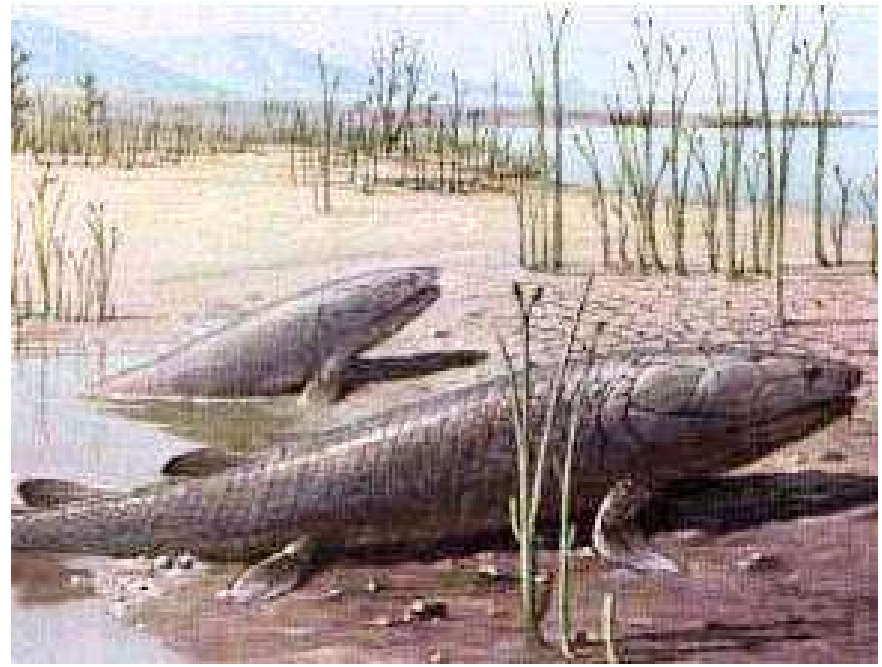
FOSSIL EVIDENCE

Fossil Record traces the history of life
Shows transitional fossils ….Archaeopteryx



Eustheoteron



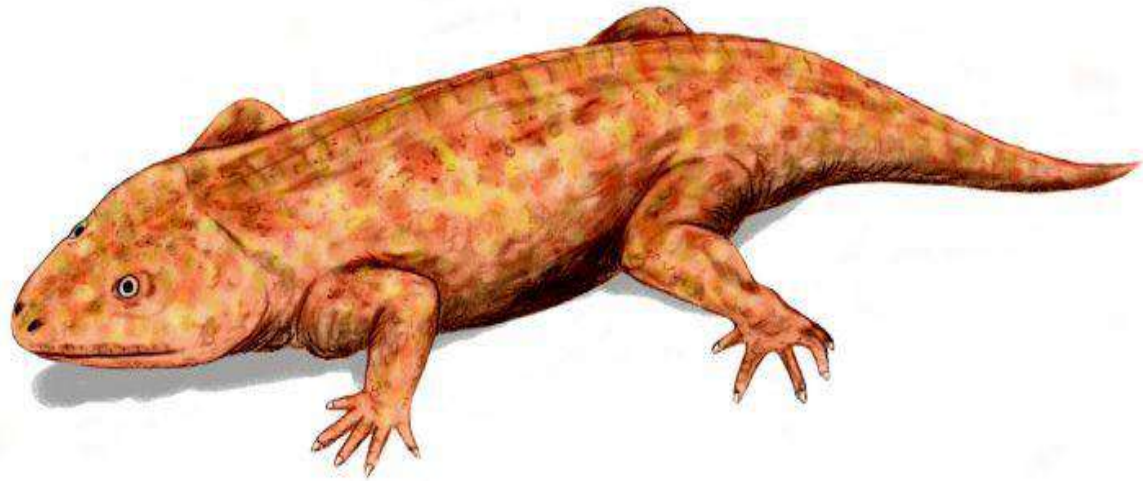


[Animal Armageddon:]

[Eustheopteron]

Seymouria

Amphibian or reptile?



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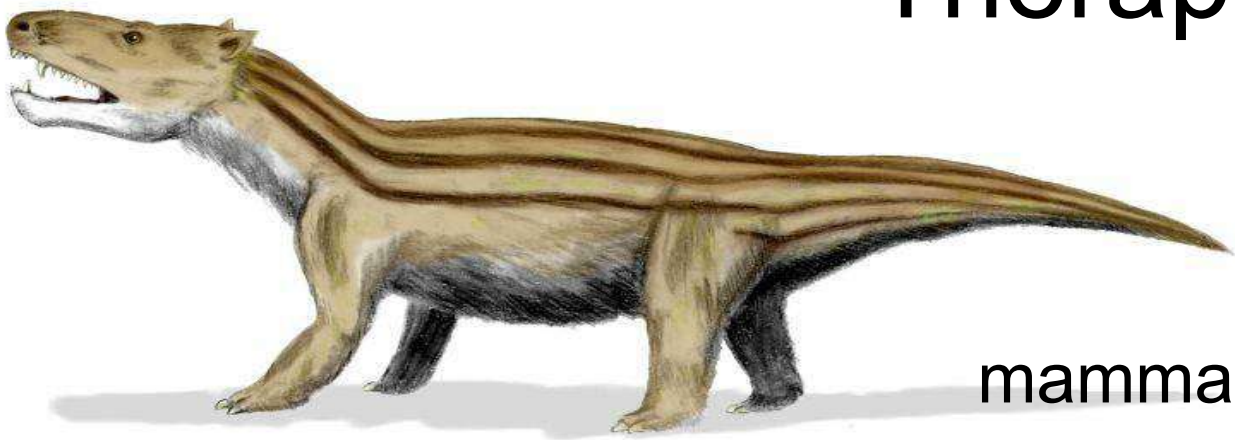
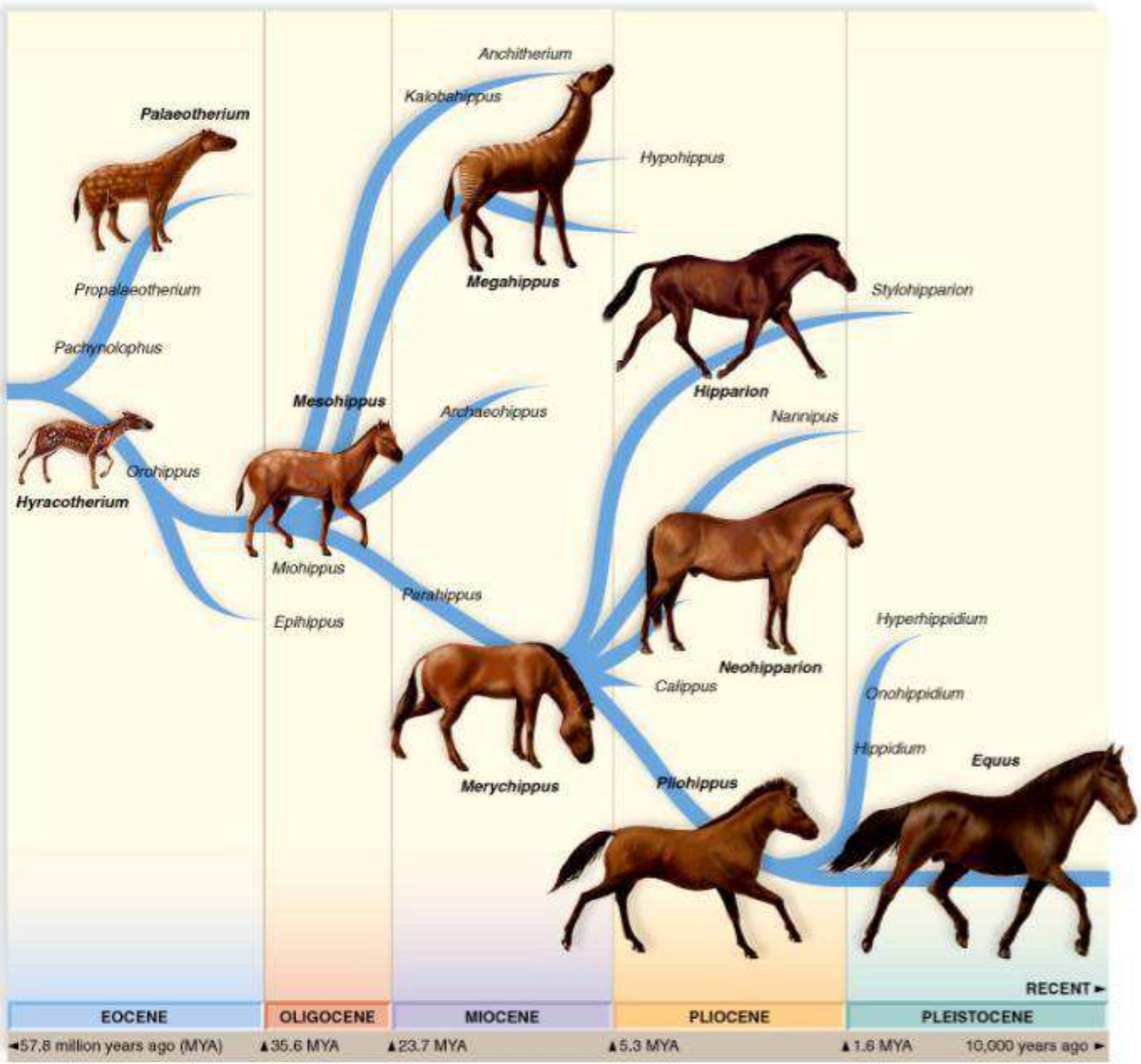


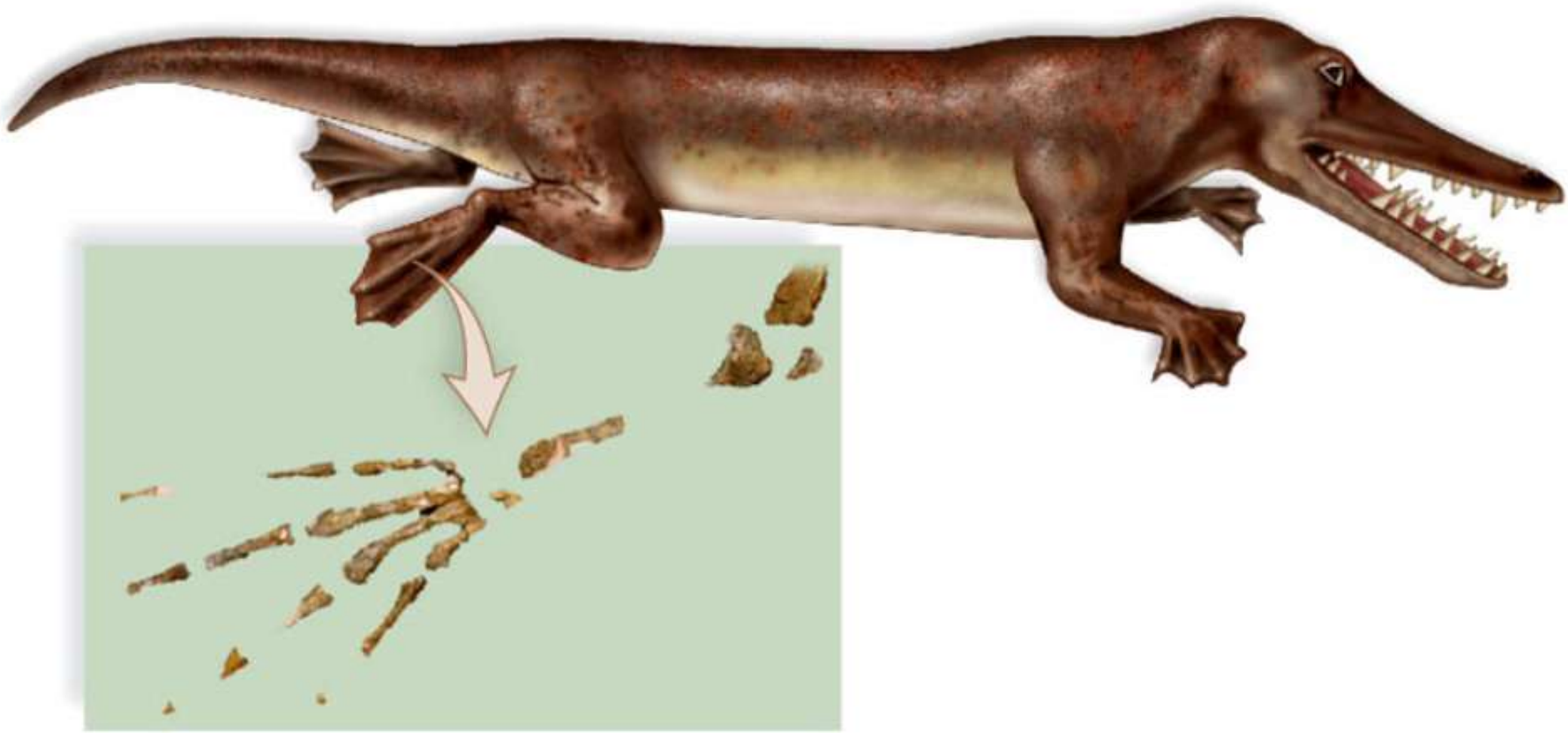
mammal or reptile?

FOSSIL RECORD – HISTORY OF THE HORSE



Ancestor of Modern Whales

Ambulocetus had hind limb



BIOGEOGRAPHICAL EVIDENCE

- Distribution of plants and animals
- No rabbits in S. America
- Explains the abundance of finch species
- Marsupials found in Australia

Tasmanian wolf, *Thylacinus*, an extinct nocturnal carnivore of deserts and plains

Kangaroo, *Macropus*, an herbivore of plains and forests

Sugar glider, *Petaurus*, a tree dweller

Coarse-haired wombat, *Vombatus*, nocturnal and living in burrows

Australian native cat, *Dasyurus*, a carnivore of forests

Tasmanian devil, *Sarcophilus*, a carnivore of forests

Figure 17.14a

Tasmanian wolf, *Thylacinus,* an extinct nocturnal carnivore of deserts and plains

Figure 17.14b

Kangaroo, *Macropus*, an herbivore of plains and forests

Figure 17.14c

Sugar glider, *Petaurus*, a tree dweller

Figure 17.14d

Coarse-haired wombat, *Vombatus*, nocturnal and living in burrows

Figure 17.14e

Australian native cat, *Dasyurus*, a carnivore of forests

Figure 17.14f

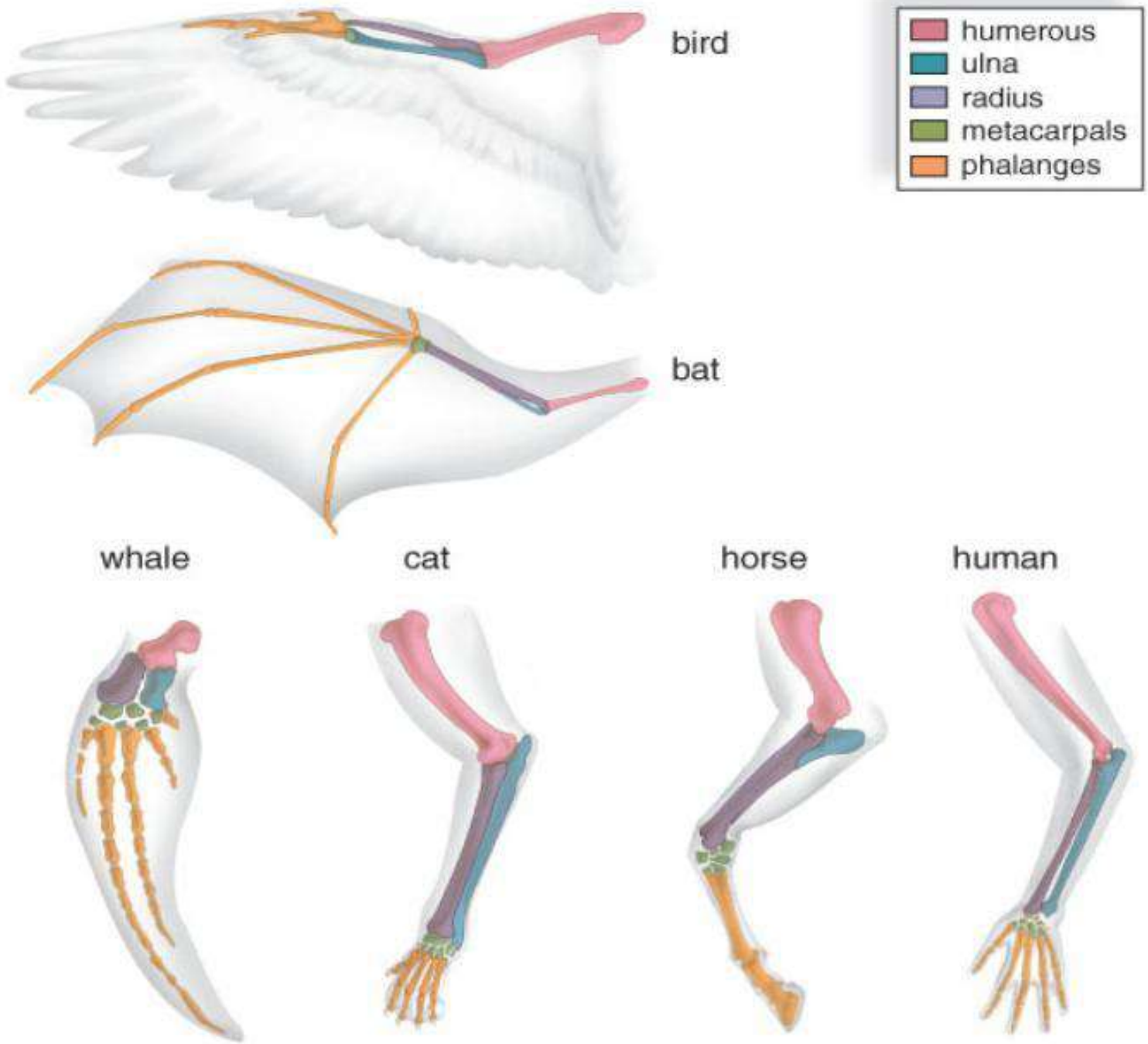
Tasmanian devil, *Sarcophilus*, a carnivore of forests

ANATOMICAL EVIDENCE

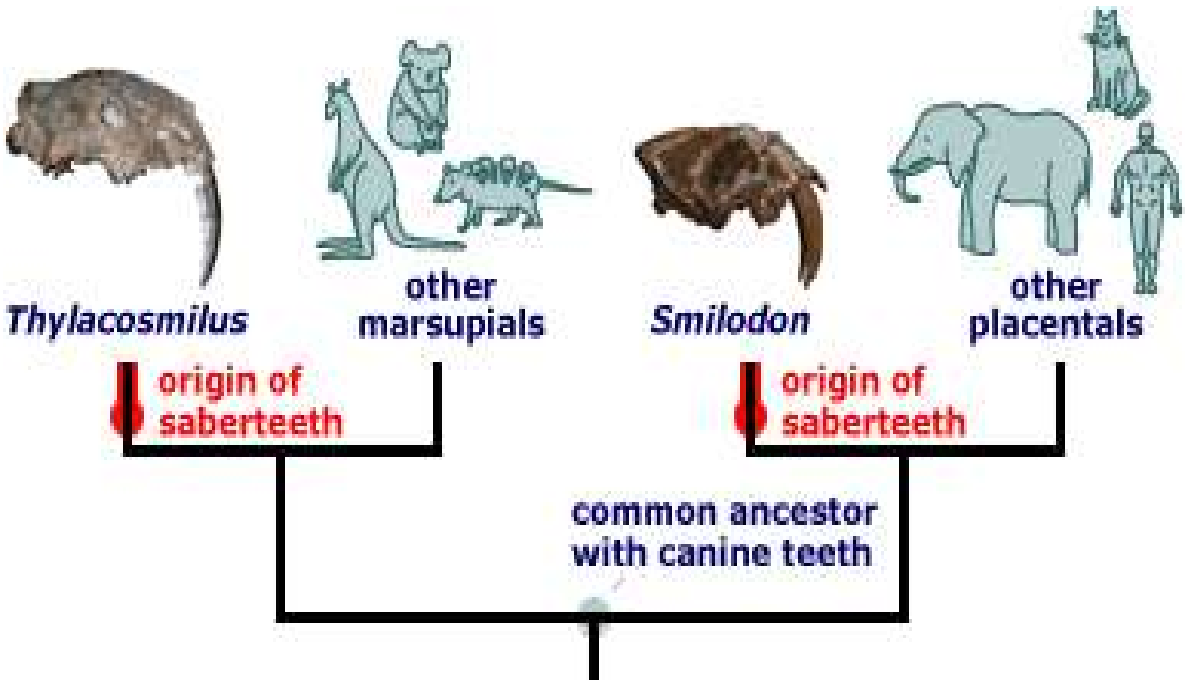
1. Organisms have anatomical similarities

a) Homologous structures

– similar structures inherited from a common ancestor (ex. Arm bones)

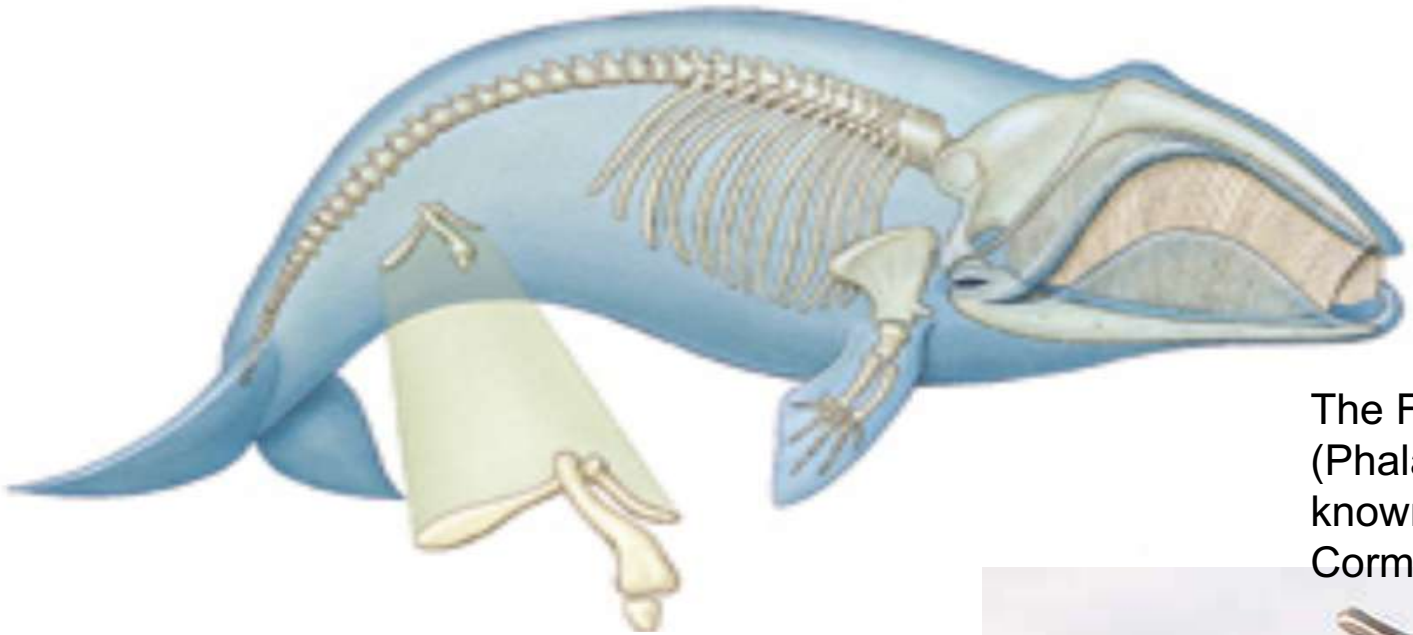


Analogous structures – inherited from unique ancestors, resemble each other because they serve the same function (ex fins on sharks, fins on dolphins)



[See how analogies evolve]

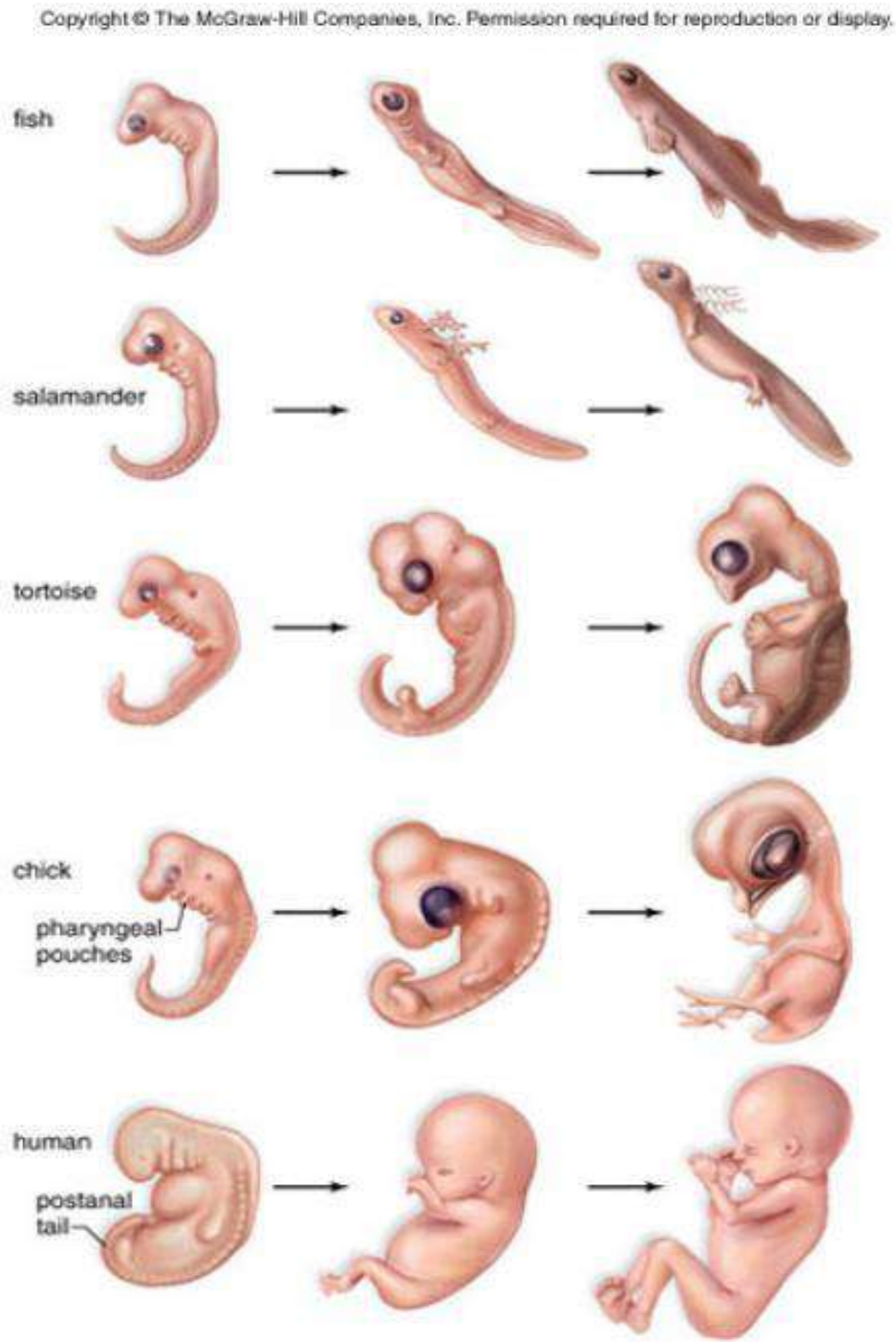
Vestigial structures – remains of a structure that was once functional (human tailbone)

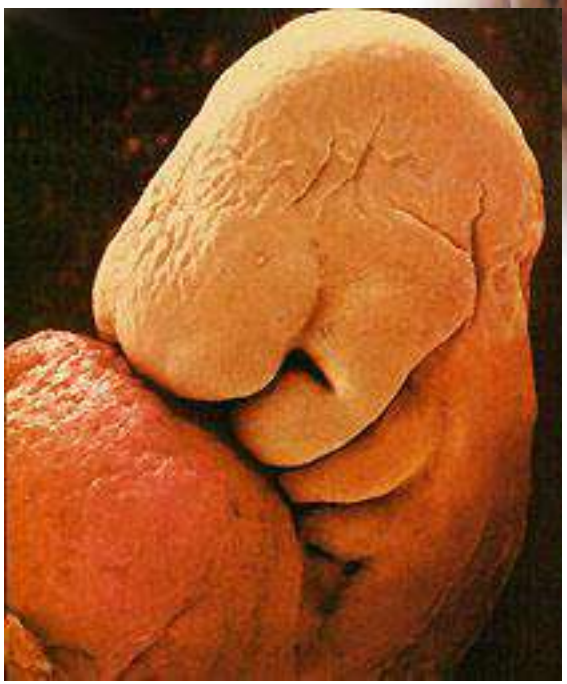


The Flightless Cormorant (Phalacrocorax harrisi), also known as the Galapagos Cormorant,

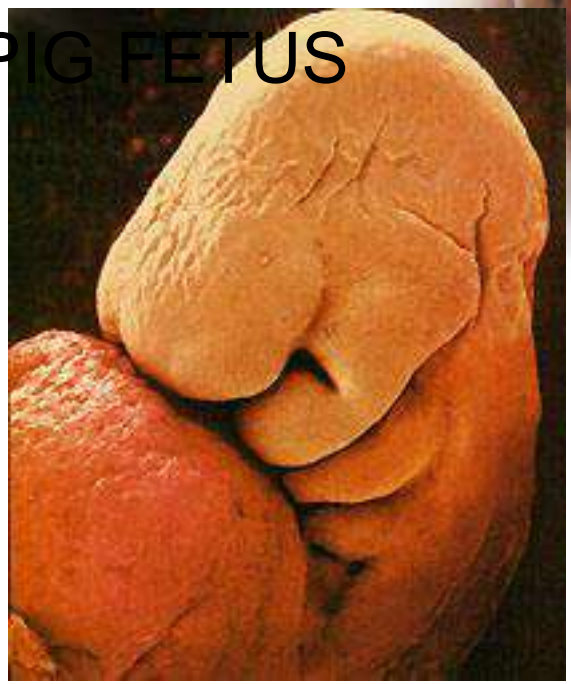
Adult Ozark Blind Cave Salamander (Eurycea spelaea). Notice the smaller, degenerating eyes, the eye lids that are beginning to grow over them, and the reduced pigment.

Embryological development – all vertebrates have the same basic pattern of development





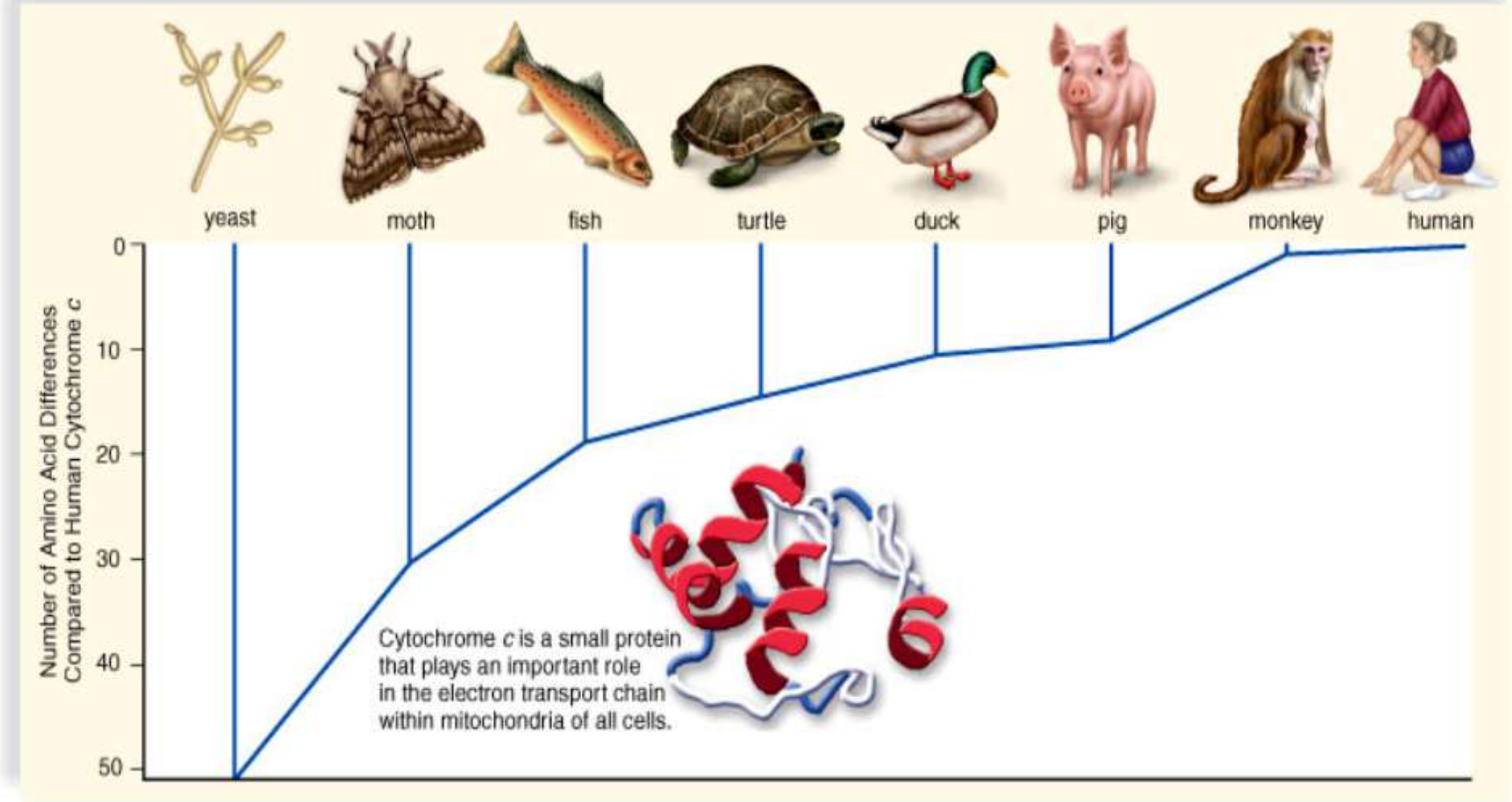
Which is the human embryo?



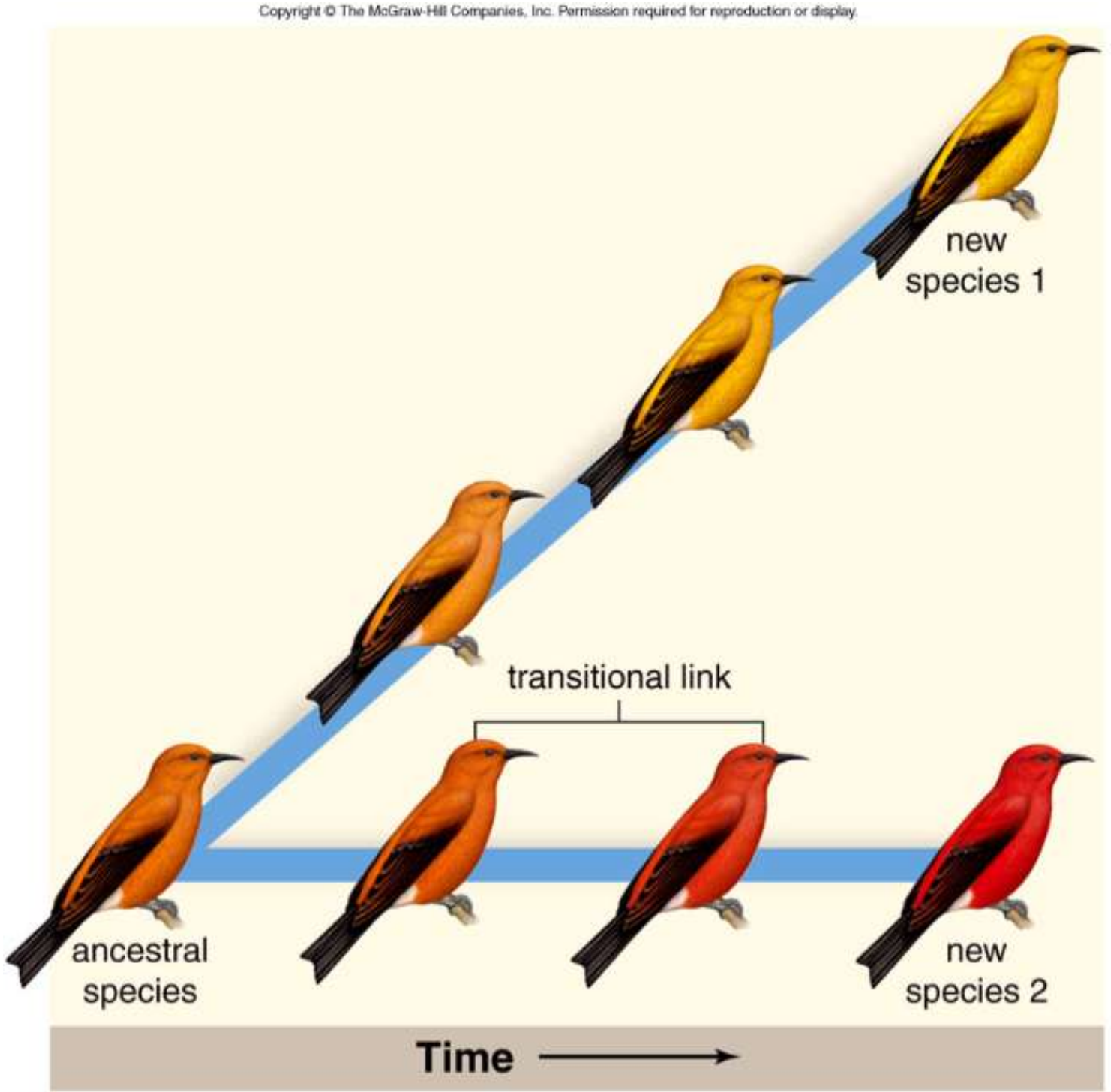
Answer: All of them except the one above, which is a pig.

BIOCHEMICAL EVIDENCE

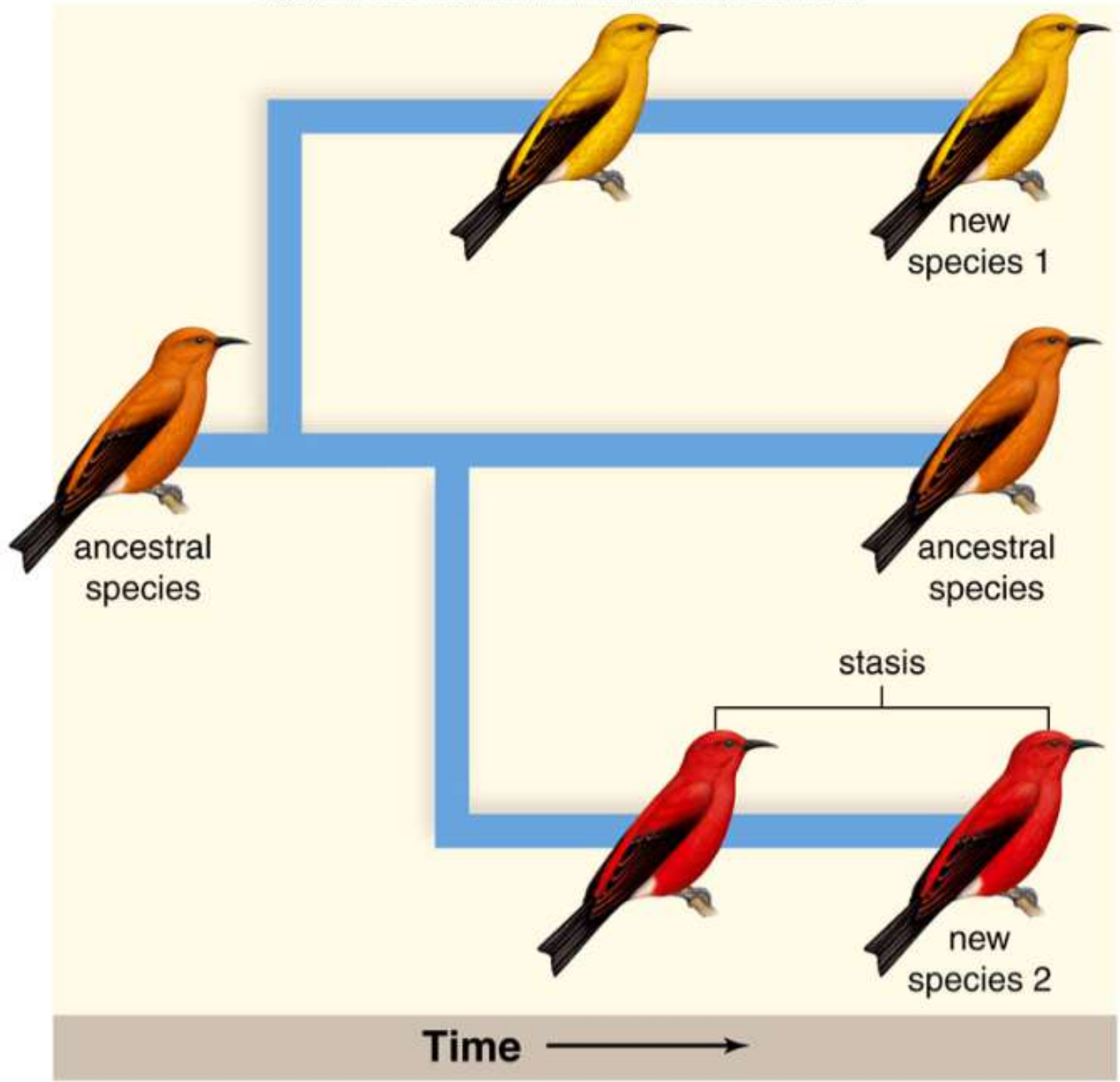
DNA, Amino Acids, Cytochrome C are similar in related organisms



Pace of Evolution – Phyletic Gradualism



Pace of Evolution – Punctuated Equilibrium



Theory of Evolution

Known as the

"**UNIFYING THEORY OF BIOLOGY**"

- Explain the diversity of living things on this planet
- Explains the fossil record
- Explains biochemistry and anatomy

**Don't forget that THEORIES are used by science to EXPLAIN phenomenon

Chapter 17 - Overview

1. What scientific observations and research influenced Darwin?

2. List the steps involved in natural selection. How does a population change over time? What environmental factors push these changes?

3. Summarize the various kinds of evidence for evolution (i.e., that all living organisms descended from a common ancestor)

4. In terms of evolution, what does "fitness" mean?

5. In science, an important part of a theory is that it is falsifiable.

What observations could refute the hypothesis that an adaptation evolved by natural selection?

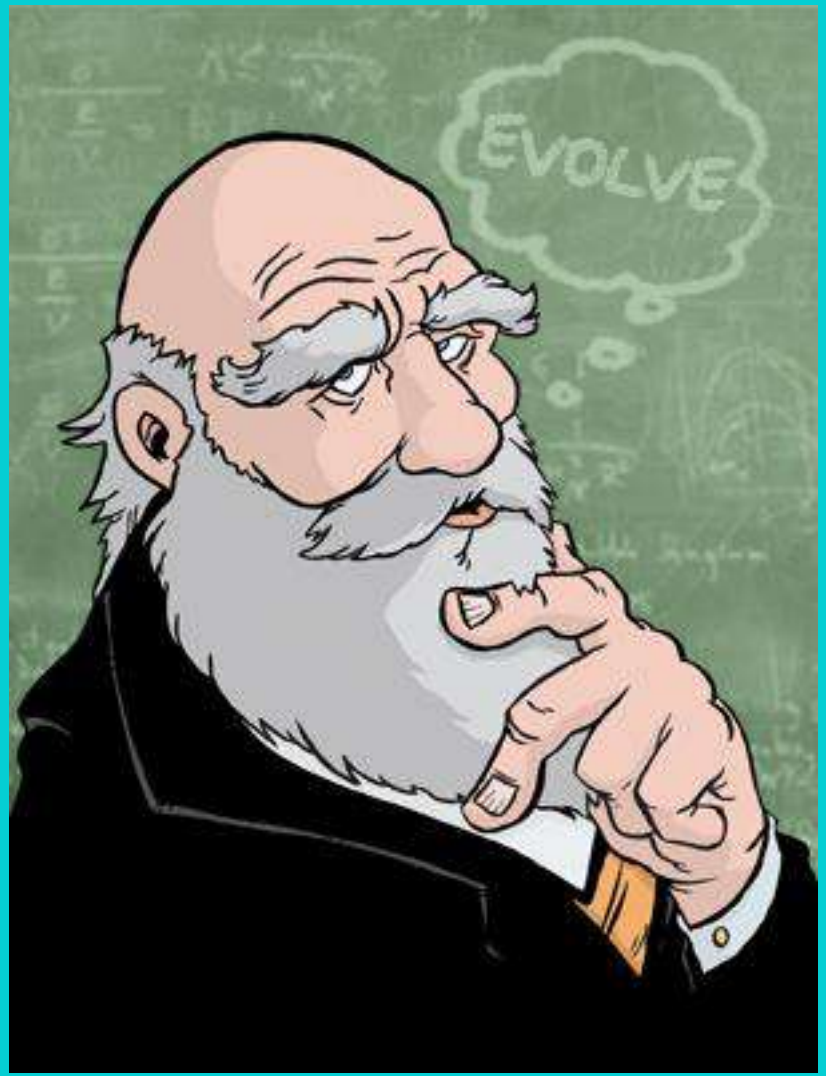
What observations could refute the theory of evolution?

6. A scientific theory stands or falls according to how well it is supported by the facts, not according to who believes it. Do you think higher education students should be encouraged to *believe* evolution?

7. Should creationism or intelligent design be taught as an alternative to evolution? (See Project Steve)

Darwin Awards?

http://www.darwinawards.com/



Named in honor of Charles Darwin, the father of evolution, the Darwin Awards commemorate those who improve our gene pool by removing themselves from it.