

Lecture 6: Evolution and the Fossil Record      Reading: Chapter 7

I. Evolution of the Georgia Bulldog, UGA

A. Speciation in Action, dog evolution

When was the first dog found with a human (Archaeological findings)?

What animal was the first to be domesticated by humans? Why do you think?

Did the dog evolve through artificial selection? Premise:

OR, did the dog evolve through natural selection? Premise:

B. Three types of Natural Selection

i. Directional selection

Wolf-to-Woof/snoodle example

ii. Stabilizing selection

All dogs would look like a wolf example

iii. Disruptive (diversifying) selection

Two kinds of dogs: the Danes and the Chihuahuas

Brief review of the three kinds of selection with little mice

What do you think? Did dogs evolve by natural selection via one of these types of selection?

Do you think that artificial selection is a type of natural selection? Why or why not?

C. In evolution, we would like to know the ancestor; in this case, who is the ancestor of dogs? Jackals? Wolves? Foxes? (I probably gave it away already!) How would we know, what would we have to do to find out?

i. Kingdom, Phylum, Class, Order, Family, Genus Species of dog and wolf

ii. The phylogeny of close relatives of dogs, how to read it and what it means

Phylogeny means:

D. Evidence for Evolution, what scientists look for to determine phylogenies.

i. Homology, morphology (dog example) and genes (dog example)

ii. Embryonic Development

iii. Vestigial organs (do wolves have an appendix? dogs?)

Another example from mammalian hairy whales

E. What is the Biological Species Concept and are dogs and wolves true separate species?

i. Biological species concept and important questions related to it.

ii. Speciation event (cladogenesis)

F. How could we possibly get new species? Speciation mechanisms

One example: Allopatric Speciation with genetic isolation

Another: hybridization

G. Evolutionary Trends. What are they? What is the evolutionary trend in dogs?

What is the paleobiogeography of dogs/wolves? How many dogs types exist today?

E. Is evolution perfect? Let's take a look at bulldog evolution

What did humans select for in bulldogs?

What is UGA (the dog) selected for?

What are UGA's (the dog) ailments? Why?

Do Great Danes share similar problems? Yorkies?

If these dogs were let into the wild, what do you predict their "evolutionary fitness" would be?

II. Modes of Speciation in the fossil record: Example, Horse Evolution

i. Gradual evolution (Gradualism, Darwinian evolution)

ii. Punctuated Equilibrium (Punctuated Equilibria, Punctuated Evolution)

iii. What evolutionary trend is seen in horses? (refer to p. 174 in text)

Teeth Toes Size

iv. Is horse evolution gradual or punctuated?

v. Can we get a three-toed, very small horse again?

Dollo's Law (p. 174 in text)