

BIOL 100.01 – Fall 2006

Dr. Hardy

Final Unit topic outlines

Note: Use this PLUS the previous two exam topic outlines. The final is 50 points from the Final Unit, and 25 points cumulative (i.e., the previous two units)

Topic 15 – Population Genetics

I. Populations

A. Population defined

B. Population genetics

1. Gene pool, allele frequencies, genotypic frequencies, phenotypic frequencies, diploid, dominant, recessive

2. Role of sexual reproduction in reshuffling allele combinations

3. Calculation of allele frequencies.

$$1 = p+q$$

-Use of Punnett square

4. Calculation of genotypic frequencies

$$1 = p^2 + 2pg + q^2$$

-Use of Punnett square

5. Calculation of phenotypic frequencies

6. Hardy-Weinberg Equilibrium

II. Deviations from Hardy-Weinberg Equilibrium

3 main causes

A. Natural selection

B. Genetic drift

C. Gene flow

Topic 16 – Evolution

I. Evolution

A. A natural law

B. Defined

C. Minimum unit of

D. Microevolution vs. macroevolution

II. Evolutionary theory

A. Descent with modification

B. History of “descent with modification” concept

C. Natural selection

D. Natural selection not the only force of evolution

- III. Species & speciation
 - A. Species defined
 - 1. Biological species concept
 - 2. Reproductive barriers
 - a. pre-zygotic
 - b. post-zygotic
 - B. Some modes of speciation
 - 1. Geographical speciation
 - 2. Ecological speciation

Topic 17 – Resistance: Evolution and Speciation in the Public Health

- I. Antibiotic resistance
 - A. Antibiotics
 - B. Penicillin & *Staphylococcus*
 - C. Methicillin & *Staphylococcus*
 - D. Tetracycline, erythromycin & *Staphylococcus*
 - E. Vancomycin & *Staphylococcus*
 - F. Linezolid & *Staphylococcus*
 - G. Mechanism of evolution of antibiotic resistance
 - H. Prevention of antibiotic resistance
 - I. Overuse of antibiotics or similar chemicals?

Topic 18 – Origins of Order Cetacea

- I. Cetaceans are mammals
 - A. Phylogeny of extant lineages
 - B. Shared mammalian characteristics
- II. The order Cetacea
 - A. Toothed whales
 - B. Baleen whales
- III. Evolutionary origins of Cetacea
 - A. Evidence
 - 1. Phylogenetic evidence
 - 2. Terrestrial to aquatic
 - 3. Front limbs to flippers
 - 4. Reduction to loss of hind legs
 - 5. Nostril migration (“nasal drift”)

Topic 19 – Origins of Order Cetacea

- I. Primate Heritage
 - A. First primates were arboreal
 - B. 3 major groups
 - C. Apes: Gibbons
 - D. Apes: Orangutans

- E. Apes: Gorillas
- F. Apes: Chimps
- G. Apes: Humans
- II. Hominid Evolution
 - A. family Hominidae
 - B. The human branch
 - C. Evolution of upright posture & bipedalism
 - D. Larger brains & the genus *Homo*
 - E. Origins of the “wise man”