BIOL 1012 PAL
Midterm 1 Review

By: Andrew (:

Which of the following defines Macroevolution? (Hint: There's 2)

a) Evolutionary Change Below Species Level

b) Evolutionary Change Above Species Level

c) Origin of Species or Mass Extinction Events

d) Change in genetic composition of a population from generation to generation

What branch of biology focuses on naming and classifying species into groups?

Which of the following species names is formatted correctly?

a) Canis Lupus

b) *C. lupus*

c) *canis lupus*

d) C. lupus

e) *C. Lupus*

f) *Canis lupus*

True or False: Evolution is goal oriented?

What are the 3 main types of selection? Briefly define each one

(THERE ARE ALSO 3 MODES OF SELECTION BUT THEY WILL BE ASKED ABOUT LATER IN THIS POWERPOINT)

Match the old white guy to his accomplishments

- Aristotle
- Carolus Linnaeus
- Jean Baptiste de Lamarck
- George Cuvier
- Charles Darwin
- Gregor Mendel

- Discovered genes as the basis for heritability
- Father of evolutionary theory, believed in inheritance of acquired traits and the law of use and disuse
- Father of modern taxonomy, first to group species into categories based on similarity, developed binomial nomenclature
- Figured species had heritable traits, developed the hypothesis of decent with modification, first to propose natural selection as the mechanism for evolution
- Classified organisms on a scale of increasing complexity, believed species were perfect and permanent
- Father of paleontology, looked at strata to find fossils, believed earth was too young for evolution to occur, believed older species were more divergent from current species.

What are the requirements for natural selection to occur?

Match the definition to the term

Homologous Traits	Product of convergent evolution. Similar features in distantly related groups, not caused by common ancestors.
Analogous Traits	Remnants of features that were important in ancestral species.
Vestigial traits	Similar features and structures in species not distantly related that appear due to a common ancestor. Can be genetic, anatomical, or developmental.

What are the 3 main things that the fossil record can tell us?

What 3 mechanisms cause change in allele frequency? Briefly describe each.

What is a population?
What is a gene pool?

What are the criteria of Hardy Weinberg Equilibrium (HWE)?

What are the equations associated with HWE?

(ONE OF THE CRITERIA IS THAT ALLELE AND GENOTYPE FREQUENCIES REMAIN CONSTANT, BUT THERE ARE 5 CRITERIA THAT MAKE THIS POSSIBLE, WHAT ARE THEY?)

True or False: Natural selection acts on genotypes

Match the modes of selection to their description

Directional Selection	Favours phenotypes of both extremes
Disruptive Selection	Favours phenotypes towards one extreme
Stabilizing Selection	Favours phenotypes that are intermediate

Which of the facts about genetic drift are true?

A) SIGNIFICANT IN LARGER POPULATIONS

B) CAN CAUSE FREQUENCIES TO CHANGE AT RANDOM

C) CREATES GENETIC VARIATION

D) CAN CAUSE FIXATION IN HARMFUL ALLELES

E) IS NOT AT ALL RELATED TO THE FOUNDER EFFECT AND BOTTLENECK EFFECT

F) EFFECTS SINGLE POPULATIONS

What is the founder effect?
What is the bottleneck effect?

What is the effect of gene flow? How does it work?

Define Speciation. What 2 concepts are bridged by Speciation?

Which of the following is not a species concept? Are there other species concepts not shown in this list?

MORPHOLOGICAL

BIOLOGICAL

PHYLOGENETIC

ECOLOGICAL

OH WAIT…THESE ARE ALL SPECIES CONCEPTS!

What are the limitations of the Morphological species concept?

How about Biological?

Phylogenetic?

Which of the following types of speciation requires a physical, geological barrier to form within a population?

Allopatric Speciation

Sympatric Speciation

What is reproductive isolation? What are the different types of barriers associated with it?

What is it called when an organism has an extra set(s) of chromosomes, but they are all from the same species?

What if they were from different species?

Match the hybrid zone outcome to it's meaning

Reinforcement

- Hybrid zone and 2 divergent species persist as is. Species don't diverge more or less, and hybrid zone remains constant. (Usually a temporary outcome)

Fusion

- 2 Divergent species re-converge to one species again and hybrid zone dissipates as a result

Stability

- 2 Divergent species diverge further and further until hybrid zone dissipates as a result

Phylogenetic trees, different types, their parts, and how to read them

Which of the definitions defines a monophyletic group?

A) AN ANCESTRAL SPECIES AND SOME BUT NOT ALL DESCENDANTS

B) AN ANCESTRAL SPECIES AND ALL OF ITS DESCENDANTS

C) DESCENDANTS FROM MULTIPLE DIFFERENT ANCESTRAL LINEAGES

Define the rule of parsimony? How is it applied?

What is the difference between maximum parsimony and maximum likelihood?

Which of the following are reasons that phylogenies are hard to predict?

A) HUGE DIFFERENCES MAKE ORGANISMS HARD TO COMPARE

B) VERY SMALL SIMPLE ORGANISMS ARE HARD TO DIFFERENTIATE DUE TO FEW FEATURES

C) LACK OF FOSSIL RECORD

D) CONVERGENT EVOLUTION

E) ALL OF THE ABOVE

What is horizontal gene transfer? What can cause it?

History of life in a nutshell

Earth formed 4.6 billion years ago

Seas formed like ½ or ¾ billion years later

Not much oxygen present in the atmosphere

- Abiotic synthesis of small organic molecules (chemical reactions make small molecules like nitrogen bases and stuff)
- Molecules join making macromolecules (remember last term…sugars and fatty acids making fats and polysaccharides…)
- Packaging of molecules into protocells (basically a drop of water or some other liquid that had its own special chemistry happening within that differed from that of the environment it was found in)
- Origin of self replicating molecules and systems (DNA replications, transcription, mitosis, etc.)
- Stromatolites (oldest fossils currently found, from 3.5 billion years)
- Only prokaryotes seen until about 1 ½ billion years after

Good luck everybody! You've got this! Email me with questions but I may not have time to answer because on Thursday I have 2 midterms and a lab (*:

(That isn't a twinkle it's a frozen tear)