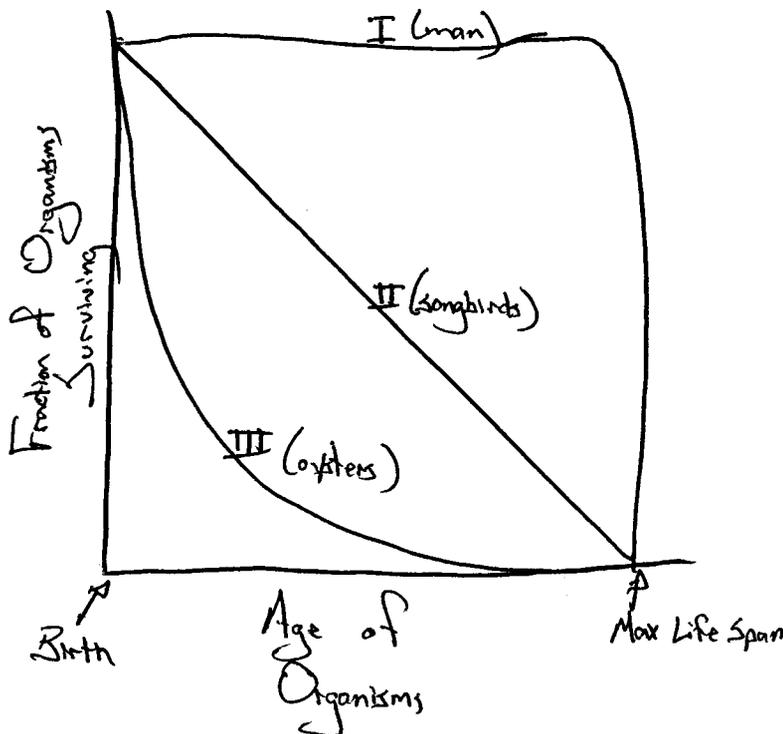


Review for Midterm 3

- Adaptive radiation – burst of species from a single lineage (genetic divergence)
- Allopatric speciation – geographical isolation caused by **physical barriers**
- Parapatric speciation – no barrier exists, but a **buffer zone of hybrids** exists
- Sympatric speciation – **both species** reside within the **same geographical region**
- Pre-zygotic isolation
 - Temporal isolation – reproduction occurring at different times (seasonal) (spring/summer mating)
 - Behavioral isolation – courtship rituals differ from one species to another (frogs croaking/crickets chirping)
 - Mechanical isolation – physically different and pollination or copulation is not possible (big dog/small dog)
 - Ecological isolation – microenvironment requirements differ so they cannot live near enough to interbreed (desert/rainforest mating)
 - Gamete mortality – the gametes cannot survive to cause zygote formation
- Post-zygotic isolation – after fertilization occurs there is a problem that prevents successful production of offspring
- Reproductive isolation – methods by which interspecific mating is prevented
- Species – organisms that can mate and produce fertile offspring
- Lamarck – Theory of acquired traits
 - *Fluida* was the substance housed in our nerves that moved to the area where change was needed and caused the body part to change
- Lyell – Theory of uniformity
 - Darwin read his book just before he left for the voyage on the Beagle
- Malthus – Principle of population
 - He thought that unless the population was controlled that all life would cease
- Darwin – sailed for 5 years on the Beagle (boat Darwin was on)
 - Found great diversity in the world
 - Darwin's finches – each species varied by their beaks and feet
- Wallace – traveled like Darwin, found great diversity, forced Darwin to publish
- Natural selection – difference in survival rates among individuals of a given population that differ from one another in one or more heritable traits
 - populations have the ability to make more offspring under favorable conditions resources are limited and this will restrict unlimited population growth
 - results in a modification of traits within a line of descent
- Artificial selection – selectively breeding
- Fossils – Latin word that means “dug up”/evidence of past life
 - Fossilization is a rare process
 - Most species weren't preserved
- Microevolution – small scale changes in allele frequencies brought about by : mutations, natural selection, gene flow, genetic drift
- Macroevolution – large-scale patterns, trends and rates of change

- Taylor and Wergner – first theorized about a possible different configuration of the earth
- Anatomical structures – show similar function but dissimilar in embryonic origin
- Homologous structures – related by embryonic origin, but different in embryonic origin
- Convergent evolution – two species coming together to form a new one
 - lineages that are not related evolve in similar directions
- Divergent evolution – one species branching off into two different species
 - a change in forms from a common ancestor
- Morphological traits – visible appearance or form of an individual or population
- Physiological traits – functional characteristics of an individual or population
- Gene pool – the total number of genes within a population shared by individuals in a population
- Gene flow – emigration and immigration bring in or move genes to new locations
- Genetic drift – random (chance) change in allele frequencies due to chance
- Bottlenecks – think of a neck of a bottle and everything gets narrowed to a small area
- Founder effect – special kind of a bottleneck where a new population is started in a new location by a few founders
- Inbreeding – breed with relatives
- Phenotype – visual effect on genes (what you see)
- Genotype – actual genes you have which cause the phenotype
- Mutation – a change in the DNA that codes for a particular trait. They cause changes in structure, function or behavior
- Biological fitness – a genetically determined tendency to leave behind more reproducing offspring than do competing individuals (survival of the fittest)
- Directional selection – movement due to natural selection that moves phenotypes in a given population in a certain direction
- Disruptive selection – extremes are favored over intermediate forms (keep extremes and get rid of norms)
- Stabilizing selection – intermediate forms are favored and extremes are selected against (getting rid of the extremes)
- Industrial melanism - -a form of directional selection where light colored moths were selected against due to pollution. The plants that once protected them (light colored trees) were increasingly covered with soot and thus looked dark. Darkly colored moths survived and thrived because they could hide from predators on the dark trees.
- Pesticide resistance – when you destroy some species with a pesticide and the remaining ones survive and are resistant to the pesticides
- Antibiotic resistance – antibiotics killed MOST bacteria, but some bacteria had the ability to live
- Linnaeus – devised the currently accepted naming system for organism (binomial nomenclature)
- Taxonomy – the science of classification/sorting things into categories

- Kingdom, Phylum, Class, Order, Family, Genes, Species (more inclusive → less inclusive)
- Population dispersal
 - Clumped – like humans
 - Uniform – very evenly spaced (desert bushes spread out evenly)
 - Random – no pattern
- Exponential growth follows a J-shaped curve
- Logistical growth – follows an S-shaped curve
- Graph of Population Growth (see graph)
 - A – exponential growth region
 - B – population that has exceeded the carrying capacity of the environment
 - C – population that is dying out possibly due to over population
 - D – stable population in equilibrium with the environment
 - E – carrying capacity of the environment
- Doubling Time – time it takes for a population to double
- Density dependent – disease, stress, pollution, parasites
- Density independent – weather, natural disasters, seasonal cycles
- US population – 305 million / 4.7% of world population 21% goods/services, 25% minerals/fossil fuels/trash
- India population – 16% of world population 17% goods/services, 37% minerals/fossil fuels/trash
- World population – 6.7 billion ^{↑ 1.1 billion}
- Pangea – the super continent where everything was connected as one land mass
- Biogeography – the study of the distribution of organisms on Earth and the factors controlling the distribution of animal distribution
 - Physical barriers
 - Climatic barriers
 - Biological barriers – absence of appropriate food, competition from other species, predators or disease
- Survival curves – Type I, II, III



Fertility rate – average # of children/women during her reproductive years

Baby Boom – 1950's
– average # of kids = 6.5

Molecular Clock –

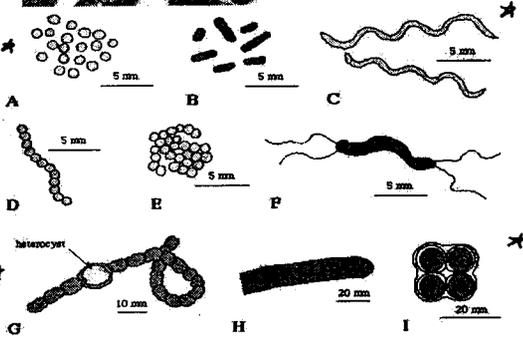
Δ DNA sequence
to tell us how related they are

The Six Kingdoms

Archaeobacteria



Eubacteria



Protista



Quiz questions:

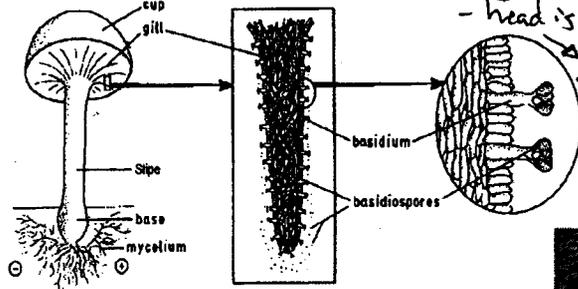
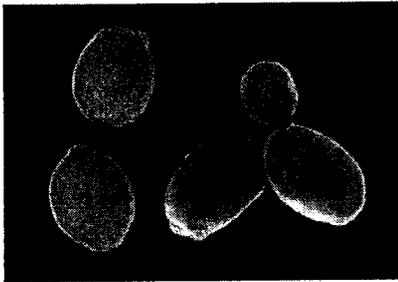
* Spicules - give sponge shape / protection

* Tapeworm - (GI tract)

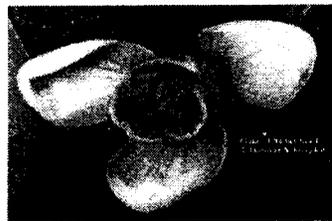
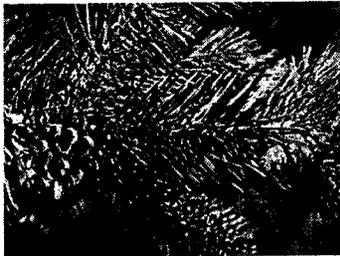
- segments called proglottids

- head is small, body gets progressively larger

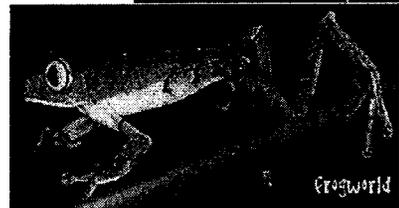
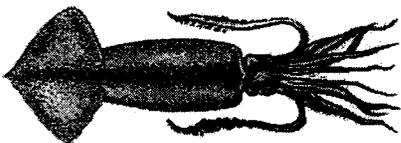
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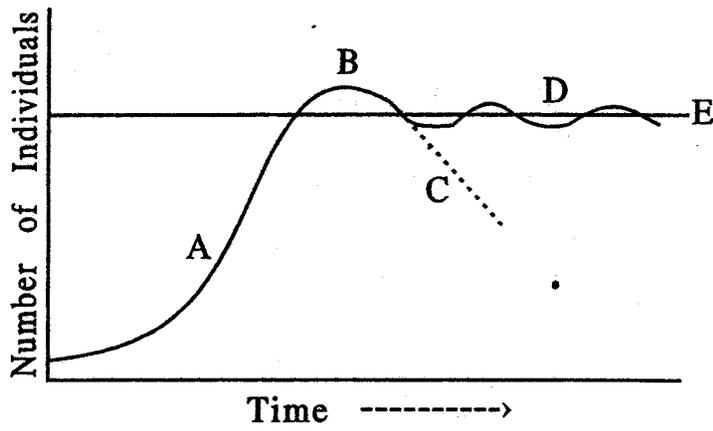


Plantae

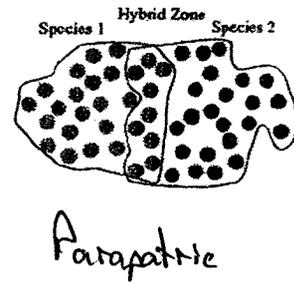
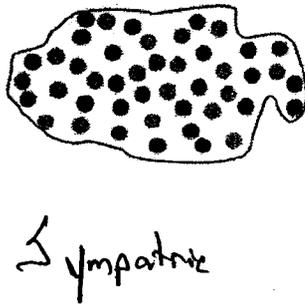
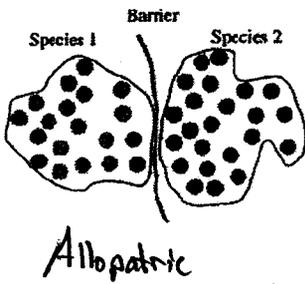


Animalia





KNOW A, B, C, D, E
WELL!



Review for Midterm 3

1. Be sure you know the following people and their contributions:
Linnaeus – devised the currently accepted naming system for organisms
Darwin – first to explain evolution by natural selection
2. Industrial melanism is a form of directional selection where light colored moths were selected against due to pollution. The plants that once protected them (light colored lichens or light colored trees) were increasingly covered with soot and thus looked dark. Darkly colored moths survived and thrived because they could hide from predators on the dark trees.
3. Be sure to know the difference between homologous – they have similar embryonic origin (they may not look alike) and analogous – they have similar form or function, BUT DO NOT HAVE SIMILAR EMBRYONIC ORIGIN.
4. Always know that the ENVIRONMENT always determines who is best suited to survive and produce the most offspring.
5. You must briefly read the first page of the lab called biogeography. Know what biogeography is!
6. Know what p^2 , $2pq$ and q^2 each represent in the Hardy Weinberg formula.
7. Be able to compute Hardy Weinberg type I and III problems and know which is which
8. Population density is the number of a certain type of organism per unit area.
9. Biotic potential is the maximum rate of reproduction of an organism under IDEAL circumstances.
10. Know that genetic drift is caused by CHANCE.
11. Be able to do a couple of Hardy Weinberg problems
12. Know the difference between divergent and convergent evolution.
13. Know the order: Kingdom, Phylum, Class, Order, Family, Genus and species
14. Remember that the species name is always in LOWER CASE and both genus and species are usually *Italicized*.
15. Be sure you can draw the three kinds of mortality curves (Type I, II and III)
16. Sympatric, parapatric and allopatric speciation – 2 questions – KNOW THE DIAGRAMS and the words
17. Carrying capacity is the size of population the environment will support
18. Read about Darwin's finches – know how they are different.
19. What for of life (which kingdom) probably is the most primitive?
20. Adaptive radiation is a rapid change or diversification of many species from one parent species
21. Be able to define or know the definition of microevolution and macroevolution
22. What is biological fitness
23. Darwin's ideal of natural selection helps us understand antibiotic resistance – know how!
24. What are plate tectonics?
25. Know the difference between natural and artificial selection.
26. Disruptive and stabilizing selection are very different – HOW?
27. Be able to compute G and r and G after one time period has elapsed ($G + N$)
28. Baby boom?
29. Why is the human population so large now? (not just we have sex a lot)
30. Know the graph about population changes over time ^{back}
31. Know population distribution diagrams and examples
32. World population? US population? ^{6.7 billion} _{3.05 billion}
33. India vs USA ^{4.7 billion} _{1.2 billion}
34. Malthus theory ^{pop}
35. Pangea
36. Factors that cause changes in a population

– GET NEW #'S

Study Guide for Midterm #3

adaptive radiation ✓

allele ✓

allopatric speciation ✓

analogous organs ✓

antibiotic resistance ✓

artificial selection ✓

biogeography ✓

biological fitness ✓

convergent evolution ✓

Darwin ✓

Darwin's finches ✓

directional selection ✓

disruptive selection ✓

divergent evolution ✓

evolution (several questions) ✓

fossils ✓

gene flow ✓

gene pool ✓

genetic drift ✓

genotype ✓

Hardy-Weinberg Equation ($p+q=1$) ✓

Hardy-Weinberg Equations ($p^2+2pq+q^2=1$) ✓

heterozygous ✓

homologous organs ✓

homozygous dominant ✓

homozygous recessive ✓

inbreeding ✓

industrial melanism ✓

Lamarck ✓

levels of biological organization ✓

Lyle ✓

macroevolution ✓

Malthus ✓

microevolution ✓

molecular clocks ✓

mutations ✓

natural selection ✓

Pangea ✓

parapatric speciation ✓

pesticide resistance ✓

phenotype ✓

physical traits ✓

physiological traits ✓

plate tectonics ✓

population bottleneck ✓

population founder effect ✓

post-zygotic isolation ✓

pre-zygotic isolation ✓

reproductive isolation ✓

selective breeding ✓

species ✓

stabilizing selection ✓

sympatric speciation ✓

Taylor and Wegner ✓

Wallace ✓

Linnaeus ✓

taxonomy ✓

Kingdom ✓

Phylum ✓

Class ✓

Order ✓

Family ✓

Genus ✓

species ✓

calculation of G and r ✓

population dispersal ✓

(random, clumped, uniform)

survival curves (types I, II and III) ✓

exponential growth ✓

logistical growth ✓

differences between US/India ✓

there may well be other terms on the test, but this is a great start

PLEASE BE SURE YOU HAVE READ ALL OF THE TEXT WELL!!!