Life Is Ultimate Art Study Guide: Quiz 7 For Biol 101

Principles of Biology (Liberty University)

STUDY GUIDE: QUIZ 7

	Quiz Preparation Tasks:	Your Answers and Notes
13	**Life Is Ultimate Art**	
13.1	**Life and Its Diversity: Ultimate Art or Ultimate Accident?**	
	Life as Ultimate Art	
	The sentence, "O you, who look on this our machine, do not be sad that with others you are fated to die, but rejoice that our Creator has endowed us with such an excellent instrument as the intellect" was first spoken by what great scientist/philosopher?	Leonardo da Vinci
	Life as Ultimate Accident	
	What great observation did Charles Darwin make from nature as a result of his reading and voyage around the world?	Populations of organisms were comprised of individuals who, although of the same species, had generous amounts of variation for most individual traits studied. (reproductive potential)
	List some organisms observed by Charles Darwin while reading and voyaging the world.	marine invertebrates, plankton, fossilized seashells and mammalian remains, the anthropology of the natives on Tierra del Fuego, the finches and tortoises of the Galapagos Islands (see Figure 13.3a), and the mockingbirds of Chile and the associated islands.
	Charles Darwin's view of the species was that populations of a species continually experienced new _____ and continually became more _____.	New ways of handling common biological problems / diverst
	Charles Darwin believed that whole new species originated as a result of populations of the same species reproducing in two distinct, separate _____ and responding to those _____ in different ways.	species / environments
	Complete the following sentence describing how Darwin interpreted his observations of nature: Individuals within populations _____ with each other for limited _____; some of these individuals will _____ better than others.	Compete / resources / survive
	List 7 features of Enlightenment thinking.	1. Human reason is the primary source of authority. 2. Traditions are to be questioned in light of human reason. 3. Science and the experimental methods flourish. 4. Strong spirit of individualism 5. Strong desire to accumulate and systematize knowledge 6. Natural causation is sought for every effect. 7. Society progresses toward utopia if individuals are free to follow reason.
	The term _____ represents a predictive theory of how a species might change with time, whereas the term _____ assumes that nature can create whole new structures and organisms.	Microevolution / macroevolution
13.2	**Can Life Originate without Artistry?**	
	Evolution's First Goal: The Smallest Cell	
	Compare *Mycoplasma genitalium*'s physical size with that of *E. coli*.	Mycoplasma genitalium 0.4um E. coli. 2.0-3.0um
	Compare *Mycoplasma genitalium*'s genome size (number of genes) with that of *E. coli*.	Mycoplasma genitalium 580,000 E. coli. 4,600,000
	How was *Mycoplasma genitalium* discovered and what sorts of infection does it cause in humans?	Mycoplasma genitalium was first discovered in 1981 in the inflamed urethras of two male patients. Various genital tract and lung infections in both men and women. Also found in the tissues of patients with rheumatoid arthritis, chronic fatigue, and Gulf War syndromes
	Evolution's Starting Materials: Small Geochemicals	
	Some have speculated that the origin of life occurred at geothermal vents. What is the problem with the amino acids formed near these vents?	Produces l and d form and d forms are useless
	Evolution's Highest Hurdle: Creating and Storing Information	
	Some scholars have viewed RNA as the original site of information storage in the primitive cell. One advantage of this view is that RNA can both store _____ and	information

	can act catalytically like a(n) _____.	
	Could RNA have been the original site of information storage in the primitive cell? List some difficulties with this possibility.	,little if any catalytic activity is possible in an RNA polymer until it approaches the size of 100 nucleotides in length.
	One problem associated with evolving a system in which RNA bases code for _____ acids is that the correct bonding of amino acids to tRNAs requires _____ catalysis—mature proteins are needed to begin making the first proteins.	Amino / specific
	Evolution's Final Challenge: Spatial Ordering of Biological Activity	
	State Francis Crick's theory of directed panspermia.	that life was seeded on this planet as a small variety of cellular forms by a civilization of life-forms apparently superior to us.
13.3	**Can Life's Diversity Increase without Artistry?**	
	The Gap to Be Bridged: Invention of Novel Complex Structures	
	Describe 1 popular evolutionary model for the origin of flight in vertebrates. Fliers must have evolved from non-fliers that _____ and then glided down from _____.	Climbed / trees
	List the names of some component structures of a primary flight feather.	Barbule, barb, shaft
	Given its precise shape, what is the role of the barbule in the primary flight feather?	is a fine, double-layer meshwork of thousands of crisscrossing barbules. These are systematically and repeatedly attached to each other by uniformly structured hooklets that grab onto inversely shaped ridges on adjacent barbules
	How does preening behavior enable a bird to continue to fly successfully?	the bird's bill during preening behavior. This involves the use of oily secretions from the uropygial gland, which also contains bacterial waste products that antagonize the growth of other microbes that destroy feather microstructures.
	During the formation of a feather, a tube-like _____ appears as a result of early induction events within the dermal layer of the wing surface.	follicle
	What is a basic evolutionary advance needed to convert a down-like feather into a primary flight feather? The feather's _____ must be _____ and reshaped to help support the bird's weight.	Rachis / lengthened
	Bridging the Gap I: Random Mutations in Primitive Feather Keratinocytes	
	What are some new mutations needed to generate appropriate structures for flight feathers? (A mutation that matches barbule _____ to the space _____ feather barbs.)	Formations / between
	Bridging the Gap II: Natural Selection in Primitive Feather Keratinocytes	
	Distinguish the roles of mutation and natural selection in developing a better organism. Mutation _____ the genes, and natural selection _____ the genes.	may be lost to the future of the species if it arises in an individual whose slightly weak variations in other / has no way of operating on
	Natural selection is an "expensive" process. Explain what this means in terms of the lives of the members of the population in which the selection is occurring.	For the mutation to succeed those without it must die
	In what sort of environmental situation is natural selection particularly limited in its effectiveness in preserving new favorable mutations?	small population scattered over a wide area
	Define the phrase "selection pressure."	selection pressure any force within the environment that reduces the reproductive potential of one variety of individuals in a species over another variety.
	"Natural selection is cybernetically blind." It does not _____ the structural hierarchies it is required to construct.	"see ahead" or comprehend
	Evaluation of the Naturalistic Hypothesis	
	Natural selection is unable to "see" a new useful biological function while protecting a different existing function. Is this a fair statement evaluating the naturalistic hypothesis? If not, what is a better one?	Conjectured Feather Evolution. Seemingly modest structural "advances" in feathers require corresponding advances in developmental pathways and the genetic

		information that supports them. Random mutation is saddled with the responsibility of generating the new information and its inter-relation to existing information.
13.5	**What Is the Product and Value of Evolution?**	
	Mutations Harmful, Neutral, and Helpful	
	How does the design theorist arrive at the conclusion that most mutations occurring today are harmful? What does he or she assume to be true of the living thing in which the mutations are occurring?	Any change made to something elegantly designed will deteriorate that design
	The naturalist also comes to the conclusion that most mutations occurring today are harmful because the naturalist and the theist both assume that by now, the living thing is a collection of highly inter-related, well "crafted" systems. So, most mutations occurring today would not contribute to the process of _____.	evolution
	List 3 broad classes of mutations, each of which affects the evolutionary process differently.	Harmful, Neutral, Good
	Which class of mutations accumulate silently in the DNA, having no obvious effect on one's ability to reproduce?	Neutral
	How would a design theorist define a beneficial mutation?	a beneficial mutation would improve on the quality of the organism's design
	What is a Darwinist's definition of a beneficial mutation?	Any mutation that enables its bearer to leave more competitive offspring will qualify.
	What Does Nature Select?	
	What does stabilizing selection do among individuals of a population?	This kind of selection eliminates individuals with extreme traits or phenotypes from the population
	Which sort of selection can eliminate rare individuals whose sexuality is intermediate between male and female?	disruptive selection
	Directional selection moves a population phenotypically in a new _____.	direction
	Which sort of selection has been used to generate a small increase in the number of bristles on the thorax of flies?	Directional selection
	What problem arises when you desire to see if directional selection could move a population of primitive organisms toward long-term change?	The problem is that there are no simple, primitive organisms available to test the idea on
	What problem arises when you desire to see if directional selection could move a population of modern, internally-integrated organisms toward long-term change? (A seemingly good change in one direction, _____.)	for one trait means a bad change somewhere else in the form or function of the organism
	Adding in Revealed Truth	
	In the early pages of the Genesis record, how might the first of three stages of life history best be described? (Note the three vertical red arrows in Figure 13.63.)	"Very Good" Un-improvable by randomnprocess. "Rest" Creation exists in finshed form "Curse" Creation in bonage to decay
	Of the three stages of life history implied in the early pages of the Genesis record, which one appears least likely to involve any biological change in populations with time?	Third Cursed
	How might the third stage of life history implied in the early pages of the Genesis record best be described?	Earth is cursed because of man's sin
	What phrase does Romans 8 use to describe modern living organisms?	"is in bondage to decay."