Jonathan Quang 10/7/14  
Biology - Mrs.Prabhu

Homework #6

Part I:  
1. When there was enough water vapor for lighting storms to occur, the energy from the sparks cause a reaction among the molecules thought to be present in Earth's early atmosphere. This eventually created organic molecules. These molecules may have gathered around on particles of clay. Eventually, RNA was made, and some of that RNA was self replicating. Local proteins and lipids around that particle may have formed a vesicle if they were disturbed properly (such as by tidal waves). If that vesicle could replicate itself, than it would have been the first protocell.  
2. When all organisms were single celled, the first organisms were prokaryotes. The earliest cells were anaerobic and used prebiotic chemical reactions to produce organic molecules. Eventually, some cells evolved photosynthesis. This process requires a source of hydrogen. The early sources were dissolved hydrogen sulfide gas, which when it ran low, bacteria evolved the ability to use water. Using water, more oxygen ( and consequently ozone) was introduced into the atmosphere. Due to the increases in oxygen, some cells evolved ways to detoxify oxygen and even use it. Once predator cells came into place, there were some cells that the predator could not digest. Some of those cells lived within the predator, and the two developed a symbiotic relationship. Eventually, those two cells evolved to become a cell and mitochondria or chloroplasts.   
3.The earliest multicellular organisms evolved from the fact that bigger cells had an increased advantage for predators. However a large cell could only be supported by having a slow metabolism or by becoming multicellular. Multicellular organisms were harder to be swallowed and could anchor themselves to one place. This eventually led to the development of multicellular organisms, such as algae.   
4.Increased animal diversity in the ocean eventually led to evolution geared towards improved mobility and senses. The evolution of efficient movement led to greater sensory capabilities, and more complex nervous systems. Skeletons were eventually formed. Exoskeletons improved mobility by providing a surface for muscle to attach to, provided support, and provided protection. Endoskeletons were also formed fish, which would eventually become the dominant predator.  
5. Numerous adaptations occurred from the transition from life in the sea to life on land. Plants had to evolve water-resistant coatings to maintain water, roots had to be evolved to mine water and minerals, vascular tissues had to be evolved to transport water, and cell walls had to become thicker to allow for the stems to stand erect. Plants evolved to have their egg cell to be contained in the parent plant and the sperm to be encased in drought-resistant pollen. Animal life transitioning to land life started with lobefins. These were fish that had stout, fleshy fins to crawl on the bottom of shallow, quiet water and a pouch of the digestive tract that could be filled with air. These fish walked across land to access more ponds and streams. Fish that could stay out of the water longer eventually became amphibians. Air was absorbed through sacs and skin that had to be kept warm. Reptiles evolved because their eggs were waterproof and shelled, scaly water-resistant skin allowed dry regions to be inhabited, and the lungs improved. Reptiles were cold-blooded, which was disadvantageous compared to warm-blooded animals. Birds and mammals would rise from reptiles.

Part II:  
1. anaerobic, photosynthesize, poisonous, cellular, energy  
2.RNA, enzymes, ribozymes  
3.eukaryotic, endosymbiotic, DNA, ribosomes  
4.swimming, wet, pollen  
5. conifers, wind, flowers, insects, efficient  
6.arthropods, exoskeletons, drying  
7. reptiles, egg, skin, lungs

Part III:

1.cilia  
2.nuclear pore complex  
3.pili  
4.plasmids  
5.plastid  
  
Part IV:  
1.phospholipids, proteins, phospholipid, protein  
2. cytoskeleton, microfilaments, intermediate filaments, microtubules, microtubules, microtubules, microfilaments, intermediate filaments.  
3.ribosomes, endoplasmic reticulum, nucleoulus, Golgi apparatus, cell wall, messenger RNA  
4. rough ER, vesicles, Golgi apparatus, carbohydrate, plasma membrane  
5.mitchodria, chloroplasts, cell wall, nucleoid, cilia, cytoplasm  
6.mitochondria, chloroplasts, double, ATP, size  
7. cell walls, nucleoid, plasmids, sex pili