**UCS BIOLOGY STUDY GUIDE FOR 1ST SEMESTER MIDTERM EXAM 2019-20**

Write your answers on a separate sheet if you need more space.

**Population Dynamics**

1. What are the factors that affect the birth rate of a population?
2. What are the factors that affect the death rate of a population?
3. Explain the relationship of birth rates and death rates on the three sections of the graph.



1. What are some factors that cause a species to go extinct? What role do humans play in these factors?
2. Explain how the wolf and moose on Isle Royal have historically interacted with each other. Sketch a basic graph of what this relationship looks like.
3. Sketch a graph of what a population would look like if a population was not limited by resources.
4. Sketch a graph of what a population would look like if a population was not limited by resources.

**Natural Selection**

 **\*\*\*Do not underestimate natural selection, this unit has the most questions on the exam. Most of the problems can be answered based on our model developed in class and/or graph interpretation. \*\*\***

1. Use your model sheet to write out the Natural Selection theory that we developed in class of how species change over time.
2. What is the importance of the following in the theory you wrote above?
	1. Advantageous Traits:
	2. Overproduction:
	3. A Struggle to Survive:
	4. Genetic Variation:
3. Using the theory you wrote above, write a narrative of why the finches’ beaks on the Galapagos Islands changed after the drought. **\*\*\*The importance of this question is not to memorize the narrative, but to be able to apply our Natural Selection Model to other examples of species changing over time\*\*\***
4. What determines if a new variation found in a population will stay in the population over time?

**Chemical Reactions**

1. What are some inputs and outputs in our bodies?
2. Why do our bodies rearrange inputs into outputs?
3. A student burns a piece of paper. Explain how matter and energy change during this chemical reaction.
4. What are the three main molecules found in the food we eat?
5. Fill the chart out below.

|  |  |  |  |
| --- | --- | --- | --- |
| Molecule | Elements that Compose it | Subunit (monomer) | Picture |
| Carbohydrate |  |  |  |
| Lipid |  |  |  |
| Protein |  |  |  |

1. Explain which of the molecules in the table above store the most energy. Explain your answer.
2. How is energy release from food that we eat?
3. Draw an energy diagram for the follow (label products and reactants on the diagram):
	1. A chemical reaction in which energy is released.
	2. A chemical reaction in which energy is absorbed.
4. What unit is used to measure energy in food?
5. What would it mean if a food burns more intently than another?
6. Explain what bromothymol blue (BTB) is and how it is used in an experiment.

**Cellular Respiration**

1. Write the chemical equation for cellular respiration.

1. What is the role of the mitochondria in a cell?
2. What are the energy transformations that take place within an organism from the food they eat to the movement in their muscles?
3. Explain how burning ethanol (combustion reaction) is similar to the process of cellular respiration.

1. What is the first food molecule that is used as fuel in the process of cellular respiration?

1. Draw an energy diagram for the chemical reaction of ATP 🡪 ADP.
2. Draw an energy diagram for the chemical reaction of ADP 🡪 ATP.

**Biosynthesis**

1. What are some examples of biosynthesis in your body?
2. Explain how both plants and animals obtain their mass as they grow.
3. What happens to a person’s mass when they lose weight?

**Photosynthesis**

1. Write the chemical equation for photosynthesis.
2. Do plants only perform photosynthesis, only cellular respiration, or both? Explain your answer.
3. Describe the relationship between photosynthesis and cellular respiration.
4. Be able to follow the flow of energy from the sun through a series of energy transformations through various organisms in an ecosystem.