BIOL 1114 Exam #1 (Preview) February 8, 2016

Use a #2 pencil to fill in the information on your NCS answer sheet. Put your **O-Key Account Username** in the boxes indicated **for LAST NAME** and darken the appropriate circles. **Write your Name (Last, First)** and "**Star**" **in the space above the boxes containing your O-Key Account Username**. Darken the **(S)** in the **last column of the name circles**. Enter the number **1611** and **darken the corresponding circles** in the **first 4 columns** of the **"Student ID."** Failure to perform this correctly will incur a **-10pt handling fee**. Read all questions and answers ***carefully*** before choosing the **single BEST response** for each question. Feel free to ask the instructor for clarification.

In a recent study of the connection between coffee consumption and cancer, the National Cancer Institute concluded that regular coffee drinkers are less likely to die from heart disease, diabetes, influenza, pneumonia and suicide than non-coffee drinkers,. These researchers followed the lives of 90,317 middle-aged adults in the U.S. between 1998 and 2009. By 2009, 8,700 of those people had died. The lowest death rates occurred among individuals who had consumed four to five cups of coffee per day, whether it was regular or decaffeinated. The coffee drinker and non-coffee drinker groups in the study were matched only for age and lack of prior disease histories.

The researchers noted that use of decaffeinated coffee made no difference in the results. Ironically the study did not conclude that coffee consumption was protective against any form of cancer development.

A married couple and their young child are separated from their tour group while visiting the Grand Canyon. As day turned to night, the temperature decreased drastically, and they took refuge in a small cave. The ambient temperature eventually dropped to 4°C, but fortunately they were able to start a fire that warmed the air to 15°C and the cave floor to 28°C. The entire family is feeling well and have normal body temperatures (37°C or 98.6°F).At one point in the night, the fire went out and all three people began to shiver. The child is approximately half of the size of her parents.

Early the next morning the child and her parents search for a trail out of the canyon. During this very cold morning, the child finds a rattlesnake and a kangaroo rat at the entrance of a cave. The snake attempts to strike at the rat but moves very slowly. In contrast, the kangaroo rat is quite agile and can easily avoid the snake.

Zoologist José Garcia visited the Natural Park "The Gardens of Eden" (a wildlife refuge in the Amazonian Rainforest). He saw a group of male and female deer gathered in a small open area. The males were moving their tails, behavior never known by the scientific community. So Dr. Garcia pondered "Why do the males display that behavior?" Dr. Garcia thought that males exhibited such behavior because the females were present. Dr. Garcia thought if the females were not present, then the males would not display that behavior.

Diuretics are drugs that often are prescribed to treat hypertension (high blood pressure). One side-effect of diuretics is an increased volume of urine and frequency of urination. A diuretic taken by mouth would most likely be distributed in your stomach and pass through your stomach lining to enter your bloodstream.

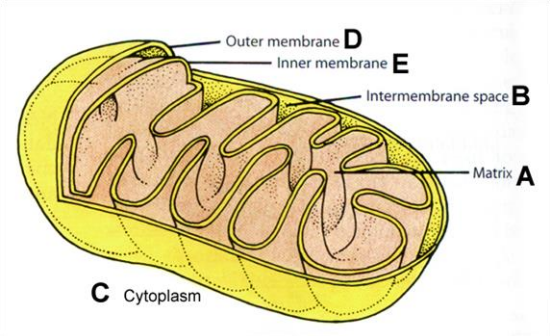
Dr. Matteo Minghetti is a new professor at Oklahoma State. Dr. Minghetti studies fundamental biological processes such as intake and breakdown of toxins by assembling membranes out of rainbow trout intestinal cells. He keeps these artificial membranes alive in well-aerated, air-tight flasks in solution containing necessary chemicals required by the cells in the refrigerator (4°C).

To test whether the cells are alive, Dr. Minghetti measures the amount of oxygen in the air-tight flask.

Dr. Minghetti forgets to place one of the air-tight flasks back in the refrigerator (4°C) and leaves it on the counter at room temperature (20°C). Dr. Minghetti uses the membrane to divide a flask into two compartments. He fills one compartment with 10 ml of sea water (35 parts sodium to 1000 parts water), and the other compartment with 10 ml of distilled water (0 parts sodium to 1000 parts water).

Dr. Minghetti is contracted by a pharmaceutical company to test the effects of a new drug. Upon subjecting his trout cells to this drug, Dr. Minghetti observes that although a few ATP were produced, there was a huge decrease in ATP produced by the cells, and there was no striking change in the amount of oxygen in the flasks.

Imagine the NASA research project of the year 2100 found a planet on a distant galaxy with life. This planet harbors organisms characterized by cube-shaped bodies of different sizes (1 cm, 3 cm, and 6 cm on a side). Scientists found the conditions on that planet to be similar to those on Earth and therefore are curious about how the surface-area-to-volume (SA/V) ratios of these organisms are related to the environmental conditions.



ETC inhibitor: http://static-content.springer.com/image/art%3A10.1186%2F1471-2202-7-29/MediaObjects/12868_2005_Article_234_Fig5_HTML.jpg
Source: http://bmcneurosci.biomedcentral.com/articles/10.1186/1471-2202-7-29

Prof. E. Lectron has been performing research on the process of cellular respiration for several years. She has been conducting experiments in the footsteps of Sir Hans Krebs and Peter Mitchell, and examining the steps by adding inhibitors or changing the concentration of the reactants (inputs) at various steps.

In her first experiment, she adds what she thinks may be an inhibitor and records an increase in the concentration of H^+ in the intermembrane space. In her second experiment, she prevents NADH from binding with the first electron carrier in the ETC. Finally, in her third experiment, she increases the temperature surrounding the cells that are undergoing cellular respiration.

Commented [FD1]: This was 1st, 3rd, 4th !!!

Tegu are lizards that have recently been reported to generate a large amount of heat during the reproductive season.

Tegu: http://reptilis.net/wordpress/wp-content/uploads/2016/01/Tegus.jpg
Source: http://reptilis.net/2016/01/22/tegus-get-hot-and-bothered-during-the-breeding-season/

Scientists determined that ducks sitting on ice during the winter lose only 5% of their body heat through their feet, despite direct contact between their feet and the ice (0° C or 32° F). Although the feet of the ducks standing on ice were only a few degrees warmer than the ice, their feet were much colder than the bodies of the ducks.
Ducks: http://duckshow.com/wp-content/uploads/2014/02/65601274_65601273.jpg
Source: http://duckshow.com/2014/02/more-olympic-tributes-with-ducks-of-course.html