

BIOL 1114 Fall 2015 Exam 4 Web Preview Material

The following material will appear on the upcoming exam. Use this preview to familiarize yourself with the material, and guide you in studying. Be sure to look up the definitions of any words you do not know. You are free to discuss this material or ask questions about it.

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**” or “**NoStar**” in the space above the boxes containing your **O-Key Account Username**. Darken the (S) or (N) in the **last column of the name circles**. Enter the number **1534** 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.

On the Great Salt Plains (GSP) of Oklahoma on a day with an afternoon high temperature of 102 °F (39 °C), Dr. Henley only had to urinate slightly once in 8 hours despite drinking 1½ gallons of water over the course of the day. Although he felt uncomfortable, his body temperature remained normal (37 °C).

You have a pet lizard, which is poikilothermic. You come home and notice that the heat lamp in the lizard’s cage has broken and the cage has been much cooler than normal all day.

A friend is learning to brew beer, which involves yeast undergoing anaerobic fermentation to produce alcohol. Your friend has the brewing liquid in an open container in a dark closet and is having trouble getting high alcohol content. Yeast are round or ovoid shaped eukaryotic cells with a diameter of about 10 µm. Round bacteria are usually less than 1 µm in diameter.

Mining operations are crushing and dumping pieces of stone near a pristine lake.

In a newly discovered alga, some genes are homozygous and some genes are heterozygous.

While many people are obese, leptin injection helps only a few of these people. When those people received leptin injections, they stopped overeating and lost weight. For the vast majority of obese people, the treatment doesn't work.

Individuals who have a genetic mutation leading to excess thyroxin production tend to overheat easily.

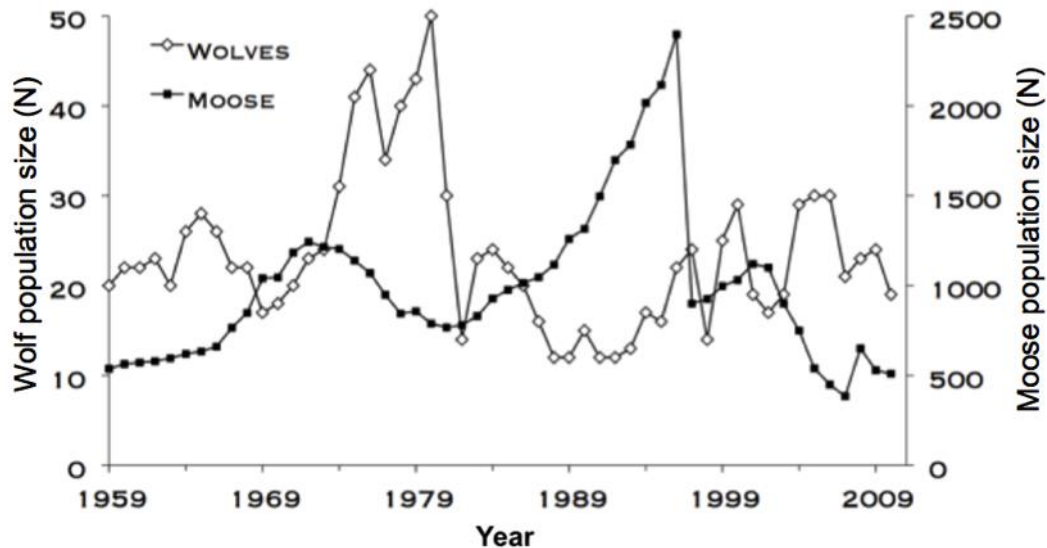
Fluffy is a severely overweight mouse. The scientists breed Fluffy with mice that they know are heterozygous for the O gene (responsible for leptin production) or the D gene (responsible for the leptin receptor production), and homozygous normal for the other gene (see below), with the following results based on over 100 young for each pairing:

Fluffy’s Mate (genotype)	Offspring
Mouse 5 (Oo DD)	50% overweight
Mouse 6 (OO Dd)	50% overweight

As you recall, leptin is composed of 167 amino acids yet the O gene is found on Chromosome 7 from base pair 128,241,202 to base pair 128,257,629 and the D gene on chromosome 1 from base pair 65,420,652 to base pair 65,637,493. It is clear that much of the DNA that controls leptin production must not be involved in coding for amino acids.

Fluffy becomes very thirsty and the concentration of salts in his cells rises to 0.4%.

Isle Royale is a remote wilderness island located in the cold waters of Lake Superior, Michigan. A research project documenting moose/wolf interactions has been ongoing since the 1950's. Predator-prey populations have increased and declined over the decades.



During the winter of 1996, lack of food and an outbreak of ticks (parasites) reduced moose numbers. Bull moose often get into antler-shoving matches to attract mates. Those with larger and more symmetrical antlers usually win the match and will mate more often. Moose have long legs for walking in snowdrifts and ponds, split hooves that act as snowshoes, a large snout for sniffing out predators, huge antlers, and finding mates.

The founding population of wolves on Isle Royale most likely came from Minnesota. In the early 1980's, many wolves died due to the introduction of a parvo-virus from an infected dog that visited the island. Wolf researchers could have started a program of vaccinating the remaining wolves against this virus. Wolves form packs, which consist of a single dominant breeding pair, the Alpha male and female, plus their offspring. The offspring include non-breeding adults and immature wolves.

The damselfish, *Acanthochromis polyacanthus*, is monogamous.

Hemophilia is an X-linked recessive human trait that, until fairly recently, resulted in death by the teen years, because it results in a failure of the blood to clot. Hemophilia A results from a deficiency of Clotting Factor VIII, which is produced by a gene found on the X chromosome. Several mutations have been found to result in hemophilia A, e.g. in 1985, Gitschier et al. found a change in codon 2228 from GCT to ACT.

A crime lab finds a degraded biological sample and identifies a short DNA sequence of AACGCCAG.

Hibernating species often possess leptin-secreting fat cells that result in winter warmth (thermogenesis) during the hibernation period. You know that chemiosmotic ATP production decreases rapidly as the availability of oxygen decreases. However the rate of the Krebs cycle also decreases with this lack of oxygen.