

## Preview Material for Exam 1 ~ Summer 2010

Remember: Use a #2 pencil to fill in the following information on your NCS answer sheet:

- Put your **OKEY ID** in the boxes indicated for LAST NAME and darken within the corresponding circles.
  - Write your **name** (Last, First) in the space above the boxes containing your OKEY ID.
  - Enter the number **1021** and darken within the corresponding circles in the first 3 columns of the "Student ID".
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Mary places her pet gerbil in a glass jar and closes the lid on it while she is cleaning the gerbil's cage. This jar is one which she borrowed from her dad's laboratory and has gas sensor probes within the lid. To ensure the gerbil doesn't suffocate, she allows the sensors to collect data on the air inside the jar.

Mary places the closed jar with the gerbil inside in front of a window which allows the sunlight to penetrate the glass. Within a few minutes, the air inside the jar is 5 degrees C warmer (but not warm enough to harm the animal).

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You begin an internship at an animal research facility (which never harms their animals!). You care for two rabbits, Abbie and Ben, pictured below. During your internship, the rabbits are exposed to different room temperatures and you are asked to monitor their metabolism, collect urine samples, and clean their cages.

Abbie



Ben



In 2004 the herbal dietary substance known as Ephedra was banned from sale in the US following the deaths of some of the users. The supplement was known to be a weight loss aid because it increases metabolism and helps to burn stored fat by decreasing the efficiency of cellular respiration. But, after the product was widely used in the US for some time, the FDA (Food and Drug Administration) provided data that the drug greatly increased stress on the cardiovascular system which sometimes lead to stroke or heart attack in otherwise healthy people.

In an experiment conducted by the FDA, hospital charts of patients who took ephedra were collected. Researchers recorded the amount of ephedra in the bloodstream and the corresponding patients' heart rate and blood pressure.

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The following two solutions were made with water and contain electrolytes in the proportions listed below. The dotted line represents a semi-permeable membrane separating the two solutions.

Total Volume = 50 mL 10% sodium 15% chloride 5% potassium	Total Volume = 50 mL 5% sodium 10% chloride 15% potassium
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A population of salamanders lives in a freshwater pond which is near some salty marshes. It is well known among scientists that the skin of salamanders is permeable to water and oxygen and their cells are isotonic to their environment. A young, 1-inch salamander and an older, 4-inch salamander are basking in the warm morning sun.

Calcium is commonly present in some fruits, including apples, which helps keep them fresh. Often though, farmers do not know the correct conditions which can enhance the uptake of calcium by their apple trees. Even if calcium is in the soil or in the tree itself, sometimes the calcium is not taken in by the fruit which leads to “bitter pit”, a condition in which the apple has bruise-like spots and/or depressions which are accompanied by hard and corky fruit. In perfect laboratory conditions, only 2 out of every 100 apples have bitter pit.

A group of apple farmers in California organized a study to evaluate the rate of bitter pit in their apples grown under various conditions. Nearby apple tree farms were included in the study and each farm experienced the same temperatures and water availability, but each had one treatment factor which was changed about the soil compared to the previous year. That factor along with the rate of bitter pit was recorded during the next harvest.

	Farm 1	Farm 2	Farm 3	Farm 4	Farm 5	Farm 6
	Low soil pH (below 6.0)	High magnesium in soil	High potassium in the soil	High nitrogen in the soil	Winter pruning	Summer pruning
Rate of bitter pit per 100 apples	25.6	8.2	10.1	9.5	15.3	6.0