Preview material BIOL 1114 Exam 1 Fall 2003

In March of this year, Dr. Hamilton acquired 16 hatchling (2-3 days old) chickens (*Gallus gallus* is the species). The chicks were housed in an unheated building inside a wooden brooder box (5 feet by 3 feet) equipped with two heat lamps, unlimited food, and a water source. Thirteen of the chickens were a Standard size variety that weigh about 6.5 to 8.5 lbs. (2.9 to 3.9 kg) at maturity; 3 were Bantam variety that weigh about 1.4 to 2.0 lbs (-0.64 to 0.91 kg) at maturity. Ambient temperature inside the building during this time ranged from 25 - 47°F (-3.9 to 8.3°C) at night to 38-70°F (3.3 to 21.1°C) during the day. At the end of March the chicks were beginning to grow their adult feathers (plumage) and were placed in an outside coop. Two heat lamps were placed inside the coop. Ambient temperatures during April ranged from 40 - 63°F (4.4 - 17.2°C) at night and 50 - 86°F (10 - 30°C) during the day. The heat lamps aided the chicks' ability to regulate their body temperature during cold weather. As the chicks grew larger and developed adult plumage they spent less time near the heat lamps. By the middle of May the heat lamps were removed from the coop and the chickens were allowed to roam in the yard all day long in search of food (free-range). The comb (fleshy crest on the head) and wattles (fleshy folds hanging from the neck or throat) of a chicken function as its cooling system. Chickens do not sweat like humans. The chicken cools itself by circulating its blood throughout its comb and wattles.

During July, Stillwater had many days in which the ambient temperature was 100°F/37.7°C or above. Dr. Hamilton watered down the shady area around the coop each morning and by late afternoon the chickens would either lie with their undersides pressed against the wet ground or stand in the shade with their wings lifted off their bodies. The chickens were also observed to pant during the hottest part of the day.

Dr. Hamilton is worried about a new strain of influenza, bantaflu, striking chickens in the Stillwater area. Someone suggests that it is transmitted in the chickens' feces. To test this, the Stillwater Infected Chicken Control Board – Rural Division (SICCBRD) collects feces from infected **Bantam** chickens and places them in a cage with healthy **Bantam** chickens.

Researchers at the USDA Poultry Research Laboratory at Mississippi State University generated the following data concerning the effect of initial brooding temperature on body weight, feed conversion, and mortality in chickens.

Brooding Temperature °F/°C			Body Weight (lbs) at end of 3 weeks	Feed Conversion Rate	Percent mortality
Week 1	Week 2	Week 3			
95/35.0	90/32.2	85/29.4	1.76	1.35	2.29
90/32.2	85/29.4	80/26.7	1.75	1.37	3.12
85/29.4	80/26.7	75/23.9	1.66	1.39	3.02
80/26.7	75/23.9	70/21.1	1.5	1.42	4.79

The researchers housed (brooded) 4 groups of newly hatched chicks (100 male chicks per group/ 2 groups for each temperature series) at starting temperatures of 95°, 90°, 85°, and 80°F. Brooding temperatures were dropped 5°F each week until the birds were three weeks of age. Temperatures for all groups then were set and held constant at 70°F for the remainder of the experiment. Feed conversion is a measure of the productivity of an animal and is defined as the ratio of feed to weight gained. The lower the feed conversion, the more efficient an animal is.

The standard commercial method for raising chickens is to house them in coops and provide commercial chicken food. A scientist wanted to test the hypothesis that eggs produced by free-range chickens contained more omega 3 fatty acids (an essential nutrient for humans) than eggs produced by chickens raised in the standard commercial manner.

Mr. Madman and his family frequently visit the Oregon beach in the summer. The Madman family has a large pet slug (a kind of snail without a shell) that they found in a damp place in their yard in eastern Oklahoma. They bring the slug with them wherever they go. One thing the family loves to do is go to the rocky areas and poke around the ocean tide pools. They often find algae, crabs, sea urchins, small fish, starfish and ocean snails in these pools. The first year they went to the beach, his son collected live specimens from these pools and placed them into a bucket containing fresh water (from a lake) rather than salt water (from the tide pool).

The mayapple plant (*Podophyllum peltatum*) that grows in North America produces the chemical podophyllotoxin. This chemical is very toxic for humans and other animals when given intravenously because it inhibits cell division. It is used as an external cream to treat genital warts.