Preview EXAM 19 September 2005

The following material will appear on the exam. We provide the materials so that you will have time to read and become familiar with it before the test. You are free to discuss the material among yourselves or with an instructor.

Land planarians are flatworms that live in warm, dark, and moist places, such as under rocks, low branches of shrubs and wood lying on the ground. **They are poikilotherms**. Although land planarians will eat roundworms (nematodes) and slugs (snails that do not have a shell), some scientists claim that these carnivores prefer to eat earthworms.

After careful observations, Dr. Worm suggests that land planarians really prefer earthworms. She takes 10 large glass aquaria and in each she places 5 slugs, 5 roundworms, and 5 earthworms. She puts 1 starved land planarian in each and watches to see what food the planarian chooses first.

Dr. Worm hypothesizes that planarians choose earthworms because they contain the most water. She raises three groups of earthworms under different conditions so that worms in group 1 contain a lot of water, worms in group 2 contain a moderate amount of water, and worms in group 3 contain a small amount of water. She offers each of 10 land planarian 3 worms, one from each group. Then she records which earthworm each planarian eats first. She analyzes the data she collects with a graph

Dr. Worm wants to know whether the length of wild land planarians is associated with availability of earthworms. She searches in the woods for planarians and measures each one she finds. She also estimates the abundance of earthworms in the various places where she has observed the planarians.

When land planarians detect prey, they produce a slimy material in which their prey become tangled.

Dr. Worm raised many slugs for her land planarian diet studies. A friend stopped by one day and wanted to taste the slugs. He thought salt might enhance their flavor so he sprinkled salt on a few.

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Llewelyn Party Guy returning from a picnic threw ice and ice water from a styrofoam cooler under a bush. A population of roly-polys (**poikilotherms**) that lived under the bush started running but then slowed down, curled up and became motionless as they encountered the ice.

A bird (**homeotherm)** saw the roly-polys lying there after the ice and water landed under the bush. It walked under the bush to eat the roly-polys.

The next day Llewelyn checked the spot where he threw out the ice and water. He noticed lots of roly-polys in the shade under the bush. He was not sure what they were and placed them in a small glass jar and screwed the lid on tight. He was going to take them to his biology instructor but forgot all about them. Three days later when he looked at the jar, all the roly-polys were dead.

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High temperatures and low rainfall characterize much of Australia, yet there is a whole range of mammals, among other life forms, inhabiting this continent. For example, the rodent genus, *Notomys*, contains about 10 different species of Australian hopping mice. They have large hind feet and well developed legs on which they can hop out of harm's way. Hopping mice inhabit some of the harshest (limited rainfall and scorching temperatures during the day) areas of Australia. Mammals such as these survive because they have adaptations that allow them to live in the hot, dry conditions.

One characteristic commonly found in animals that inhabit arid regions like Australia is an increased ability to obtain the majority of their water from metabolism of food such as seeds.

A human and an Australian hopping mouse are both on a ship that shipwrecks on a small tropical island. The island has plenty of nutritious food but **no fresh water**. The human dies in a few days, while the hopping mouse keeps on hopping.

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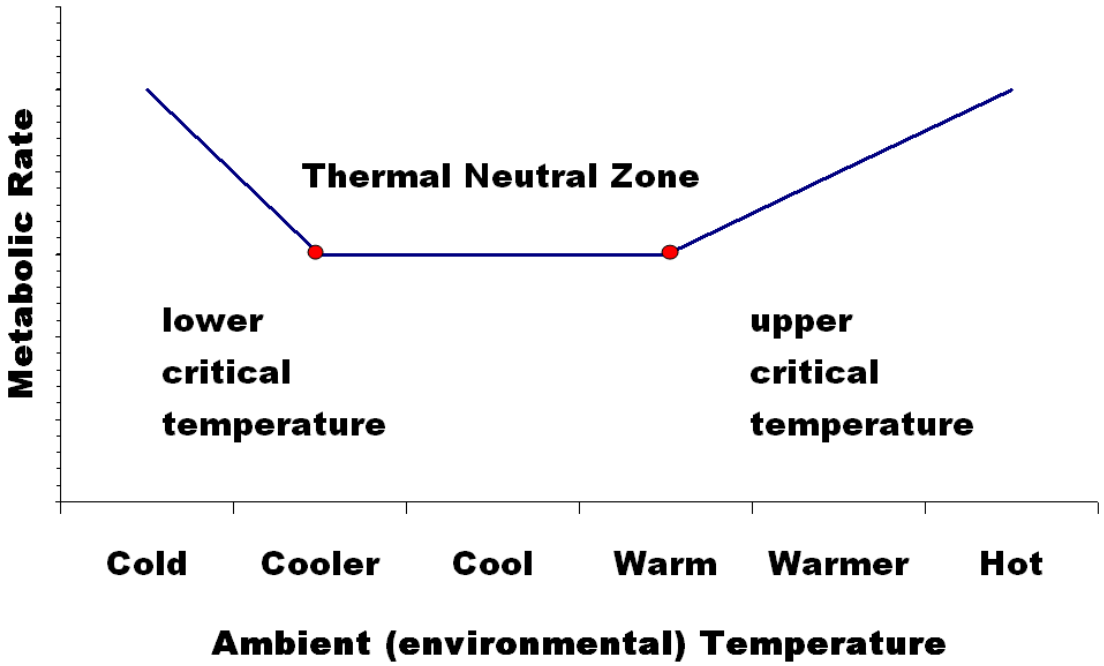

Let's say that the graph represents the Thermal Neutral Zone of a Swift Fox (*Vulpes velox,* weight about 2 kg, which is between the Bat-eared Fox and the Arctic Fox in body shape and length of extremities). It lives in grasslands in Alberta, Canada. Swift Foxes are very different than Flying Foxes, which are very large bats (1kg, 1.4m wingspans) in the genus *Pteropus.* Flying Foxes live in hot, tropical climates. Their wings comprise 80% of their body surface and are naked (no fur).

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Four students were asked to design a controlled experiment to determine the effect that the pH of water had on Rotenone's ability to kill fish. Their experimental designs are shown in the tables below.

Design A

Tank number	Number of Fish/tank	Amount of Rotenone (ppm)	Water pH	Water temp (°C)
1	10	5	3	20
2	10	5	7	20
3	10	5	12	20
4	10	0	3	20
5	10	0	7	20
6	10	0	12	20

Design B

Tank number	Number of Fish/tank	Amount of Rotenone (ppm)	Water pH	Water temp (°C)
1	10	5	3	10
2	10	5	7	20
3	10	5	12	30
4	10	0	3	10
5	10	0	7	20
6	10	0	12	30

Design C

Tank number	Number of Fish/tank	Amount of Rotenone (ppm)	Water pH	Water temp (°C)
1	10	5	3	20
2	10	5	7	20
3	10	5	12	20
4	5	0	3	20
5	5	0	7	20
6	5	0	12	30

Design D

Tank number	Number of Fish/tank	Amount of Rotenone (ppm)	Water pH	Water temp (°C)
1	10	5	7	20
2	10	5	7	20
3	10	5	7	20
4	10	0	3	20
5	10	0	7	20
6	10	0	12	20

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Frogs hatch into a larval stage called tadpoles that then develop into adult frogs. The tadpoles, which are smaller than the adult frogs, live only in water while the adult frogs are also terrestrial. At all developmental steps the frogs are **poikilotherms.**

Dr. Fun Gal discovered a new compound, F that seems to inhibit the growth of a pathogenic (disease-causing) species of fungi. She proposes to test it as a new fungicide. In one of her experiments, she dispensed 10 milliliters (ml) of a suspension of fungi into each of 20 tubes. She then added varying amounts of the compound F, ranging from 0 to 10 milliliters, to the tubes (see table below). The amount of dissolved oxygen in each tube was measured immediately after adding compound F. All of the tubes were placed in a room at 37 °C for one hour and the amount of **dissolved oxygen** in each tube was measured again.

Compound F (amount added in ml)	Number of tubes	Average Dissolved Oxygen Concentration (mg per liter)	
		Initially	After 1 hour
0	5	7	3
1	5	7	6
5	5	7	7
10	5	7	7

Willow trees living in the tundra are only a few inches tall.