Review sheet for nervous system (motor output) - conservation biology

WARNING: I have tried to be complete, but I may have missed something. You are responsible for *all* the material discussed in class. This is only a guide.

1) Nervous system - motor output

What is a skeleton, and why do we need one?

What are joints?

Why do muscles usually occur in opposing groups?

What is the structure of a muscle?

What are muscle fibers? Myofibrils?

What makes up myofibrils?

What are actin and myosin?

What happens when an action potential arrives in a muscle fiber?

What is the role of Ca^{++}? What does the sarcoplasmic reticulum do?

What does tropomyosin do?

What happens when a myosin binding site is uncovered?

What is the role of ATP?

Which step in muscle movement requires energey (i.e., ATP)?

What do the myosin heads do?

What is rigor mortis, and how can it be explained in terms of myosin and actin?

How many times per second can this cycle repeat?

How are muscles controlled? What controls the number of muscle fibers that are activated?

What is tetanus (not the disease!)?

What are fast fibers? Slow fibers?

2) Nervous system - integration

What is white matter? Gray matter?

What are ventricles? Meninges? What is the composition of the meninges?

What are the parts of the PNS? What are spinal nerves? Cranial nerves?

What is the autonomic nervous system? The somatic nervous system?

What is a reflex? What is a sensory neuron? Motor neuron?

How does a sensory signal reach the brain?

Know all the pathways of of sensory information going to the brain. Make sure you know what the thalamus does in all of this.

What role is played by the sensory cortex?

What about the optic nerve?

Taste receptors? Auditory nerve? Smell receptors?

Make sure you know how all of these reach the appropriate part of the brain (make sure you know what the appropriate part of the brain is).

What happens to all of these signals once they reach the cerebral cortex?

What is the structure of the human cerebrum? What do we do there?

Where are the nerve cell bodies?

What is the corpus callosum?

What do the various lobes of the cerebrum do? Why is the frontal lobe so important?

What is the motor cortex?

What is the role of the cerebellum both in movement and in processing sensory input?

Why can the cerebellum modify and coordinate movements on the fly?

What is the medulla? The pons? Hypothalamus? What do they do?

What is the limbic system? The reticular formation?

Why is the corpus callosum so important? What can happen if this is severed?

Be familiar with the example in the notes.

What are the differences between the right and left brain? What is the effect of culture on all of this?

How does reading work?

What are immediate memories? Short term memories? Long term memories? How do they differ?

What is the role of the hippocampus in memory formation?

3) Plant anatomy/physiology

What do roots do? What do shoots do? What are the parts of a shoot?

What parts of the plant are supported by shoots?

What kinds of buds are there and what do they do?

How can roots and shoots be modified? (e.g, carrots, potatoes, tendrils, spines, etc.)

What is xylem? Phloem? What are the three tissue types in plants, and where are they found?

What are annuals? Biennials? Perennials? How old can some plants get?

What is meristem? Where is it found? What is apical meristem? What is primary growth?

What is secondary growth? What is the role of meristem in secondary growth?

What is vascular cambium? Cork cambium?

How does a "tree" get thicker? What is the role of xylem? Phloem? What is cork?

What are you looking at when you look at a cross section of a tree trunk?

What is heartwood? Sapwood? What is bark? How do tree rings form?

4) Population ecology

What is ecology? What different aspects of ecology do biologists usually look at? How are these different?

What is a population? What is population density?

How can we estimate the size of a population (hint: we usually can't count every individual)?

What four factors cause changes to the size of a population?

What are dispersal patterns? Know the definitions of clumped, uniform & random.

How can a population grow?

What could happen if a population grew without limits? What kind of growth model is this?

What kind of a curve do we get with this kind of growth model?

Most important - why is this growth model totally unrealistic?

What is a (slightly) more realistic growth model?

What is the role of *K* in this model? What is *K*?

What is the name of this model? What kind of curve do we get?

What factors can affect *K*? What is the role of food, territory, weather, etc. in determining *K*?

Understand the Isle Royale moose-wolf example

Understand the lynx - hare example.

Why do the numbers of lynx and hare keep going up and down?

What are two possible explanations of this phenomenon?

What are life tables? Survivorship curves? What is the difference between types I, II, & III?

What is *K* - selection? *r* - selection? Why are humans generally considered to be *K* - selected and roaches *r* -selected?

What is the main reason for the human population explosion? What is our current population size? Where might we be in 2050? What is a possible *K* for humans on the planet?

What is the problem with this? What impact does this have on our ecological resources?

In addition to population growth, understand the role of excessive consumption.

What is meant by our ecological footprint? What would happen if every human consumed resources at the same rate that we do in the U.S.? Is this even possible?

What is doubling time? What country has the highest doubling time?

What are growth pyramids? What do they look like for a growing population? For one in decline? For a stable population?

Why is China's population still growing despite a 1 child / family policy that was instituted in 1979 (though not strictly enforced until later)?

5) Community ecology

What is species richness? Species diversity? How are they different? How do they contribute to Biodiversity?

What is interspecific competition? How does the Barnacle example demonstrate competition?

What is principle of competitive exclusion?

What is intraspecific competition? Why is this important in agriculture?

What is a niche?

How does predation affect a community? Why might predation be a "good" thing (know the sea otter - kelp example).

What other kinds of symbiotic relationships are there? Make sure you understand parasitism, commensalism and mutualism. Know some examples of each.

What is disturbance? What happens as a result of disturbance? What is succession?

What are trophic levels? Why can't we support that many "top" carnivores? What are detritivores? Why is it more efficient to eat vegetables/fruits/grains rather than meat?

What are chemical cycles? (Just know what they are - we really didn't discuss these).

6) Biomes

What is the biosphere? What are biomes? What is the distribution of life on earth?

What are the major factors affecting aquatic biomes?

What are some of the most productive biomes on the planet?

Know the major terrestrial biomes as explained in class (e.g., savannas, deserts, chaparral, etc.).

What characterizes each biome? What kind of animals might you find in each?

7) Conservation biology

What is conservation biology? Why would we want to conserve?

What are economic reasons for conserving? What are spiritual reasons for conserving? Ecological reasons?

Make sure you know examples in each category (e.g., examples of food and medicine for economic, etc.).

Why do we need to be aware of social issues when we try to conserve something?

What might different societies think about the same animal (e.g., snakes or dogs)?

Why does this impact conservation efforts?

What can be done to change people's minds?

What is habitat destruction?

How does urbanization contribute?

What is deforestation? Why is this a particular problem in the tropics? How much rainforest are we loosing every year?

What is desertification? What causes it?

How are wetlands being lost?

What is overexploitation?

What happened to the cod? Mediterranean forests?

What is the problem with poaching?

Be familiar with some animals that are particularly affected or have gone extinct.

What problems do introduced species cause?

How/why are species introduced?

What can be done about introduced species?

Again, know some of the examples we discussed in class.

What environmental factors are there that affect the environment? (We only talked about a very few of the more important ones).

What kinds of pollution are there?

What is the problem with ozone? Acid rain? Carbon dioxide? Pesticides?

What is the fundamental driving force behind most of the above problems? Are there any solutions?

Understand that proposed solutions become political very quickly (it should be obvious why).

How can we help conserve a species?

Why does understanding the life history of the animal/plant help?

What role does legislation play?

What about controlling predators?

Can we manage wild areas?

What is the role of zoos? Reserves?

Finally, understand the example of the Nairobi National Park as described in class. Make sure you understand both the benefits of the park and problems this park is having.