

**EVPP 111 Lecture
Exam #1 Study Guide
Spring 2004**

Human population issues

- What are some of the environmental problems/issues that are caused/exacerbated by the rapid increase in human population?
- To what is the exponential increase in human population over the past couple of centuries attributed?
- What are the current trends in human population growth?
- What is growth rate and on what four factors is it based?
- What is zero population growth?
- What is the natural rate of increase?
- What is the total fertility rate?
- What is the replacement fertility rate?
- What is meant by the age structure of a population?
- What is meant by a population pyramid?
- How is a population pyramid constructed (what information does it contain)?
- What does a population pyramid for an expanding population look like?
- What does a population pyramid for a declining population look like?
- What does a population pyramid for a stable population look like?
- What is the significance of the proportion of a population that is in the pre-reproductive or reproductive years?
- What factors affect the total fertility rate?
- What are the three general categories of factors that affect growth rate?
- What are some cultural factors that affect population growth?
- What role do infant mortality rates play in the TFR?
- What role does the importance of children in the labor force play in the TFR?
- What role does the average age at marriage play in the TFR?
- What role do educational and employment opportunities for women play in TFR?
- What role do family planning policies play in TFR?
- How is total fertility rate affected by culture and cultural traditions?
- How is the total fertility rate affected by the social and economic status of women?
- What effect does the availability of educational opportunities to women have on total fertility rate?
- What effect does the availability of family planning services have on total fertility rate?
- Describe the discrepancy between individual resource demands in developing vs. developed nations.
- What is meant by the term "nonrenewable" resources?
- What is meant by the term "renewable" resources?
- What is urbanization?
- What are the effects of human overpopulation on nonrenewable resources?

- What are the effects of human population on renewable resources?
- What is "people overpopulation"?
- What is "consumption overpopulation"?
- In the simple model of human impacts on the environment that was presented, what are the three factors most important in determining environment impact?
- How does the geographical distribution of people affect the impact of population growth?
- What is the "demographic transition"?
- What are the four stages of the demographic transition?
- What are the characteristics of the pre-industrial stage of the demographic transition?
- What are the characteristics of the transitional stage of the demographic transition?
- What are the characteristics of the industrial stage of the demographic transition?
- What are the characteristics of the post-industrial stage of the demographic transition?

Communities

- What is a population?
- what is a community?
- how does a community differ from a population?
- what are the four main properties of a community?
- explain what is meant by the "diversity" of a community and why it is important
- what are the two components of community diversity?
- explain what is meant by "species richness" of a community
- explain what is meant by "relative abundance of different species" in a community
- explain what is meant by the "prevalent form of vegetation" of a community and why it is important
- explain what is meant by the "stability" of a community and why it is important
- explain what is meant by the "trophic structure" of a community and why it is important
- how could a community appear to have relatively little diversity even though it has a large number of individuals and many different species?
- What are the different types of interspecific interactions?
- Who benefits, who is harmed, who is unaffected in competition, parasitism, mutualism, commensalism?
- what is competition and what role does a limiting resources play in it?
- What is interspecific versus intraspecific competition?
- under what circumstances does interspecific competition occur?
- What are the possible outcomes of competition?

- what concept forms the basis of the competitive exclusion principle?
- Describe the Gause experiment.
- What is stated in the competitive exclusion principle?
- what is a niche?
- What are some of the factors that can be used to describe a niche?
- Describe the competitive exclusion principle experiment with the barnacles.
- distinguish between the term "niche" and "habitat"
- what are the two types of niches discussed in class and how are they different?
- what is the relationship between a population's niche and the competitive exclusion principle?
- can two species that are so similar that they compete for the same limiting resource coexist?
- What is meant by local extinction?
- What is resource partitioning and an example?
- What is character displacement and an example?
- what is predation?
- what is a predator?
- what is a prey?
- can animals and plants be involved in predator-prey interactions?
- What is herbivory?
- why do organisms evolve mechanisms to defend against predation?
- what is coevolution?
- What are anti-predator defense mechanisms?
- what are the two categories of defenses plants have evolved against herbivores?
- What are examples of mechanical defenses of plants?
- What are examples of chemical defenses of plants?
- what are the major types of defensive mechanisms that animals have evolved to protect against predation?
- What are examples of mechanical defenses of animals?
- What are examples of chemical defenses of animals?
- what is camouflage?
- What is cryptic coloration?
- What is aposematic coloration?
- What is deceptive coloration?
- what is mimicry?
- what are the two types of mimicry?
- describe the difference between the two types of mimicry
- what are predator-prey interactions?
- What is a functional response?
- what are some of the reasons that predators rarely drive their prey to extinction in the wild?

- how can predator-prey relationships help maintain community diversity?
- what is a keystone species?
- what can happen to community diversity when a keystone species is removed?
- What examples of keystone species were discussed in class and what happened to the diversity of the community in their presence versus in the absence?
- what is the definition of a symbiotic relationship?
- what are the three main types of symbiotic relationships?
- what is parasitism?
- how is parasitism similar to/different from predator-prey relationships?
- what is commensalism?
- why is it thought that few cases of absolute commensalism exist?
- what is mutualism?
- What examples of parasitism, mutualism, commensalism were discussed?
- What is the parasite and what is the host in a parasitic relationship?
- what is a disturbance in an ecological sense?
- What kind of effect can a disturbance have on a community?
- What are some examples of disturbances?
- what is ecological succession?
- what are the two types of ecological succession?
- define primary succession
- what are the characteristics of primary succession?
- What factors affect primary succession?
- define secondary succession
- what factors affect secondary succession?
- what are the characteristics of secondary succession?
- What is a climax community?
- What is a pioneer community?
- What are the characteristics of a pioneer community?
- what characteristics does a climax community exhibit as compared to a successional community?
- Describe primary aquatic succession

Ecosystems: Energy flow and material cycling

- what is an ecosystem?
- In what ways do ecosystems differ and in what characteristics do they share?
- what are the two fundamental processes of ecosystems?
- what is energy flow?
- what is material cycling?
- why is the transfer of energy in an ecosystem referred to as energy flow instead of energy cycling?

- What is the ultimate source of energy in ecosystems?
- What is the global energy budget?
- What happens to incoming energy from the sun (reflected, absorbed, etc.)?
- What role do energy transformations play in sustaining life?
- In what form does energy enter the earth system?
- In what form does energy leave the earth system?
- What determines the routes of energy flow and chemical cycling in ecosystems?
- what is a trophic structure?
- what is the significance of the trophic structure relative to energy flow and chemical cycling in an ecosystem?
- what is a food chain?
- what are producers (autotrophs) and what role do they play in ecosystems?
- What are examples of producers?
- what type of organism is the main producer in terrestrial ecosystems?
- what are consumers (heterotrophs) and what role do they play in ecosystems?
- What are examples of consumers?
- describe the relationships between producers and primary, secondary, tertiary and quaternary consumers?
- what are detritivores and are they considered producers or consumers?
- what is detritus?
- What are decomposers?
- where do producers get their energy?
- where do consumers get their energy?
- what is decomposition, who carries it out and what is its importance in an ecosystem?
- What are trophic levels?
- what is a food chain?
- what is a food web?
- what is the relationship between food chains and a food web?
- what is the relationship between trophic structures and food webs?
- what is biomass?
- what is primary productivity?
- What is gross primary productivity?
- What is net primary productivity?
- Specifically, how does primary productivity vary among ecosystems?
- What are the major limits to productivity in terrestrial ecosystems?
- What are the major limits to productivity in aquatic ecosystems?
- What is secondary productivity?
- what is a pyramid of energy?
- What is pyramid of biomass?

- What is a pyramid of numbers?
- what is the basic trend of energy flow in ecosystems from one trophic level to the next higher trophic level?
- what is the basic trend in number of organisms in ecosystems from one trophic level to the next higher trophic level?
- what is the basic trend in amount of biomass in ecosystems from one trophic level to the next higher trophic level?
- energy can't be created or destroyed so what happens to the energy that doesn't make it from one trophic level to the next higher trophic level?
- how does the amount of energy available to top-level consumers compare with the amount of energy available to lower-level consumers?
- why are most food chains limited to 3 -5 levels?
- What is the general rule of thumb for the percentage of energy ingested at one trophic level that is available to the next trophic level?
- explain the statement "meat is a luxury for humans" in terms of an energy pyramid and the availability of energy at different trophic levels in a food chain
- how does matter cycle through ecosystems?
- What are biogeochemical cycles?
- What are the four reservoirs of the earth system through which matter cycles?
- What are the two main determinants of cycling time through biogeochemical cycle?
- What are the three main categories of biogeochemical cycles?
- What are examples of gaseous biogeochemical cycles?
- What are examples of sedimentary biogeochemical cycles?

Labs that are "fair game" for this lecture exam:

- 6 billion humans
- Population pyramids
- Simulated mark-recapture
- Tigers: survival & extinction
- Predator-prey interactions: bean simulation
- Predator-prey interactions: Populus
- Sustainable island