The midterm and final will include short answer, medium answer/calculations, and essay questions.

- Be thoroughly familiar with all lecture material (Hays Cummins 2 lectures, Chris Myers 1 lecture, Donna McCallum 1 lecture).
- Be sure to read and comprehend all class readings. HINT: Read Abstracts, Intro and Conclusions, plus understand any tables/figures specifically talked about in class.
- Readings from Week 3, when Dr. Russel lectured on Birds (The millennium ecosystem assessment, From birds to butterflies), are not on the exam!
- Earth-Sun Relationships—Be able to use a calculator to calculate sun angles (altitude and zenith angles). Be able to calculate sun angles using shadow lengths. Have a general understanding of earth-sun relationships, seasons and the earth’s heat budget—what do you mean by heat budget?
- Population Lab—Understand how to sample, estimate and compare populations.
- General Stats—Understand basic measures of central tendency, variation and t-tests. Be able to calculate a mean, range, etc. Know what a t-test is and how a t-test is used (think population lab, but we may ask you to interpret a statistical result in an ecological context). Know how to interpret a p value or standard deviation. When might a range or median be more appropriate than just a mean value? Formulas will be provided for any complex calculations that might be required on the exam.
- Can you work the Kepler’s Third Law Problems?
- Be able to speak to some of the natural processes (geological, geophysical, biological) at work in Collins Run.

Be prepared to understand concepts.

Example Questions from Reader Articles/Lectures

Apply Louis Agassiz’s view of “seeing the familiar” to your walk to Collin’s Run.

Be able to speak to two basic geologic principles outlined in Measuring Time that are key to understanding the RELATIVE AGE of rocks and fossils. What are some index fossils with which you are familiar?

Describe the greenhouse effect and some greenhouse gases. Be able to compare past climatic conditions (Cretaceous-Pleistocene) with the present (Holocene). Be able to explain Figure 3, in terms of effects on solar insolation.

What types of patterns exist concerning how biodiversity is distributed across the earth? Discuss a few of the possible causes of these patterns. Be able to interpret a graph of a given spatial pattern. Why might it be important to understand global patterns of diversity, and what things limit our knowledge of these patterns?
What types of information did Charles Darwin use to support each of his 4 logical arguments that led him to the conclusion that evolution does occur through natural selection? Why were pigeons such an ideal organism for his studies?

Does Gould adequately support his thesis that “The western world has yet to make its peace with Darwin and the implications of evolutionary …the greatest impediment to this reconciliation (is) – our unwillingness to accept continuity between ourselves and nature, our ardent search for a criterion to assert our uniqueness.”? Why or why not?

What is the current understanding of heterogeneity’s influence on biodiversity? At what spatial scales is heterogeneity important? Give an example to illustrate each scale. Do you agree that heterogeneity could be used as a key to “restoring and sustaining biodiversity in temperate agricultural systems”? Support your answer.

Describe how the size and location of habitat fragments can affect the survival of a species, using a specific organism as an example. (perhaps the blue-breasted fairy wren…? Or not!)

How do the concepts of connectivity differ between the disciplines of population and landscape ecology? What do you think are the most promising methods of measuring migratory connectivity, and / or which are least promising? Support your choices.

Some terminology to be familiar with:

• Astrobiology
• Frequency distribution
  o Normal
  o Skewed
  o Bimodal
• Characteristics of good sampling

NS 1 Second Half 2005 Review Questions
Week 12
• What are the effects of herbivores on grasslands? What variables might make that difficult to predict?
• Describe a generic grassland in terms of topography, climate, and disturbance.
• What characteristics of grasses made them poised to spread around the globe after the climate cooled at the Eocene-Oligocene transition?

Week 13
• What is taxonomy? How have the major groups of earth’s organisms been grouped over the last few centuries? Why have the groupings changed?
• What is an $n$-dimensional ecological niche? How could it help to explain coexistence of organisms that use the same or similar resources? Silvertown suggested that there might be two reasons we don’t have
information about plant niches: 1) the concept of a niche is not valid, or 2) we don’t know enough about how plants use resources to understand what their niches include. Which do you think is the more likely reason, and why?

• What sorts of organism live in the soils? Are they a good thing for the soil? Why or why not?

Week 15

• How would you describe the “banking” system of education? Do you agree with Friere’s argument that this type of education can be and/or is used as a form of oppression? What would he suggest to replace the banking system?

• What are the benefits of children’s participation in learning about and acting on environmental problems? If you were to devise a program to teach children about an environmental problem in your town, based on this article, what types of learning/activities would you involve them in?

Week 16

• How are tropical rainforests structurally more complex than the temperate deciduous forests found in Ohio? Could this complexity in structure be related to the high species diversity of rainforests? Why or why not? What structures found in a rainforest are not typically found in temperate deciduous forests?

• How does Lawton et. al.’s study of lowland deforestation help to explain the “lifting cloud base hypothesis”?