**Activity Title: Ecosystem Productivity and Resource Acquisition**

**Course: BIO 221—Ecology and Field Biology**

**Semester planned for implementation: Spring 2012**

**Instructor: Matthew Wund**

**Brief description of the activity or hypothesis:**

Students were required to devise and test hypotheses about the relationship between ecosystem productivity and traits associated with resource acquisition. Students commonly compared taxa that inhabit both highly productive biomes (e.g., rainforests) and much less productive biomes (e.g., deserts). The goal was to determine if characteristics such as home range size, diet, or body size differed depending upon the resource availability in an organism’s environment. Once the students designed and executed their query, they were responsible for graphically and/or statistically analyzing their results, and presenting their findings to the class in a short powerpoint presentation.

**How does this activity facilitate student inquiry?:**

Having already become familiar with the ADW and Quaardvark in a previous activity, students were prepared to devise their own specific hypotheses, query and analytical strategies. Aside from stating the general hypothesis that ecosystem productivity should relate to some organismal traits, I required students to design and implement their own study.

**Terms or concepts important to the activity:**

Relative productivity of biomes, how the traits in the ADW database might relate to productivity

**Instructions for completing the query and report:**

**Overview**

Ecosystems such as rainforests, grasslands and deserts, differ in **productivity.** Productivity is the rate of photosynthesis (e.g., g/m2/year), which is the primary way that new biomass is created on the planet. For the animals living in a particular ecosystem, productivity relates directly to resource availability; as such, one might expect that animals in productive ecosystems face different resource acquisition challenges than their relatives in less productive ecosystems.

**Goal 1**

Considering the information available on the Animal Diversity Web, generate a testable hypothesis about the relationship between ecosystem productivity and resource acquisition by animals.

**Goal 2**

Design a Quaardvark query and analytical plan to test your hypothesis. Important considerations include:

* What taxa will you include, and why?
  + Will they be endothermic? Ectothermic? Both?
* What will be your metric of resource acquisition?
  + Will this metric need to be standardized in some way?
* What ecosystems will you include?
* What data will you report?
* What type of graphical and statistical analyses will you perform?
* How will you manipulate your data to most efficiently and effectively perform these analyses?

**Goal 3**

Once you have come up with a solid hypothesis and plan to test it, execute your study. Then prepare a brief (5 minute) Powerpoint presentation to share what you have learned with the class.

**Analyses on downloadable data, if relevant:**

Analytical approaches varied depending upon the nature of the query, but typically involved analysis of variance (e.g., comparing home range sizes or metabolic rates among biomes).

**Graphical analyses of results, if relevant:**

Whether using statistics or not, all students produced graphs to illustrate either the differences in some trait between biomes, or the relationships between two or more traits, and how those relationships differed among biomes.

**Assignment requirements:**

* Develop a specific hypothesis
* Design a query, taking into consideration all of the points listed under “Goal 2” above
* Execute the query
* Download and analyze the data
* Draw conclusions
* Present the study to the class with a brief Powerpoint presentation

**How is student work assessed?:**

Student work was assessed throughout the activity as I circulated among the groups and discussed their progress. They were formally assessed via their presentation

**What existing or potential data sources are available to supplement this activity?**

N/A – we relied solely on the data in the ADW.