**AP Biology: Ecology Unit Project**

**Field Study - Describe and Evaluate A Local Ecosystem**

In this project you will engage in real field work. You will observe and collect data to describe an ecosystem in detail. You’ll keep an hourly raw data notebook log for your data collection (10 hours expected minimum; record all observations, research, diagrams, etc). You’ll create a Google Slides presentation as a final test grade addressing each of the following tasks with in-depth details concerning terms and concepts from the Ecology Unit of your textbook (Ch 52-56).

**Task #1: Identify and describe your chosen ecosystem.**

* Give a basic description - For example your backyard, local park, or nearby pond.
  + What type of *Biome* is it a part of?
  + Identify as many separate *populations* of living things in the *community* as you can. It must include at least three animal *species* and three plant *species*. Provide pictures. Do some research to determine the names of the species and some of their characteristics.
  + Describe the *abiotic factors* that impact the environment

**Task #2: Describe how this ecosystem took shape.**

* Based on your observations can you suggest how your ecosystem came to be as it is today?
  + Use ideas of *succession* to describe where your ecosystem is in the process?
  + What evidence is there to support your claims? Types of species? Environmental history?
  + What if anything do you suspect will happen in the future? Why?

**Task #3: Pick six easily identifiable populations within your ecosystem (three plants and three animals) and describe the *demographics*.**

* Estimate the Population Size. Describe your method of data collection and show your data. Do you suspect this population size may be changing? Why? Form a hypothesis to suggest what *limiting factors* are influencing the growth of these populations. Are these density dependent factors or density independent factors?
  + How could you determine the extent of the change in the population size? (you will check this at the end of the project)
* What *patterns of dispersion* do you observe? Form a hypothesis to explain these observed patterns.
* Are your populations *R-selected* or *K-selected*? How do you know?
* Do your populations exhibit a *type I, II, or III survivorship curve*? Give evidence?

**Task #4: Describe any clearly identifiable *niches* that are being filled in the ecosystem and discuss specific *species interactions*.**

* Pick six easily identifiable populations within your ecosystem (three plants and three animals) and describe their *niches*. What habitat and role do they fill? What resources do they use and/or provide?
* What interactions between species can be observed in the community? Find and document examples.
* Can you observe any apparent evidence of *resource partitioning* within your ecosystem? Describe and document (pictures).
* Can any species be identified as a *keystone species*? If so what is the keystone species and how does it fill this role?
* Are there any obvious *invasive species*? If so how did they get there and what impact are they having? Show evidence.
* Do you see any evidence of *co-evolution*? If so, describe and document.
* Can you find examples of either *cryptic coloration* or *aposematic coloration* in your ecosystem? If so describe and document (take pictures).
* Can you find examples of *mimicry* in your ecosystem? If so describe and document (take pictures).

**Task #5: Develop a food chain for your ecosystem.**

* Identify the *producers*, *primary consumers*, *secondary consumers*, *tertiary consumers*, and *decomposers* in your ecosystem
* Create a graphic representation of the *flow of energy* through your system. See if you can compile any data to show a corresponding *pyramid of numbers*.
* Can you find any evidence of *biological magnification* in your ecosystem? If so, try to describe and document.

**Task #6: Illustrate two of the biogeochemical cycles.**

* Using specific organisms from your ecosystem. Make sure to explain what role each organism plays in the cycle.

**Task #7: How have humans impacted your ecosystem.**

* Identify and give evidence of two specific examples of human impact on your ecosystem.
* Discuss how these impacts are changing the ecosystem and what the long term effects may be.
* Suggest ways to reduce this impact.

**Final reflection:** Write a final reflection. Consider the following questions.

* What did you learn about conducting field work?
* How do you now understand the interconnection between the living and physical worlds?
* How do you now understand the interconnection between living things?
* What questions do you have about sustainability?
* How do you look at the living world differently?
* Are you inspired to make different choices to affect your impact on the environment? Such as?