

Human/Natural Systems Interactions: A Framework

A critical thinking tool for developing ecological literacy throughout the curriculum compares cultures and their relationship to the natural world

by Barbara Jackson

In this era of relentless consumption of non-renewable resources, there is a tremendous need for the teaching of ecological concepts, in as many ways and places as possible. Society is at risk from these future consumers and decision makers who have little direct experience with the natural world and who often lack opportunities to make direct connections between their studies and their impact on ecosystems. Without creating accurate yet gloomy scenarios on the state of planetary health that often engender a feeling of hopelessness and powerlessness in the individual, it is possible to provide information that helps fill in the missing pieces. Hopefully, those little pieces can help build a larger picture that looks at the interrelationships between man and planetary systems.

In formal educational settings, ecology and ecological literacy, if taught at all, are generally the domain of the science teacher. In such places, there is a need to provide more opportunities for kids to be exposed to what was once common knowledge of the living world. Infusion of small pieces is a valuable approach when one considers that the process of becoming ecologically literate is much more than a unit in science class. Ecological literacy is a way of seeing the world and the interactions between people and the living systems as interconnected. It comes from developing a body of basic knowledge from first hand experience and from reflection

upon useful information gained through exposure to varied media.

There is the risk of offering small, disconnected pieces, yet in fact such an approach provides the opportunity to scatter many small seeds of connectedness into the still open mind of the adolescent. By planting seeds, the kids are being given information that hopefully they will find useful in the future as they look deeper at the world around them.

The Human/Natural Systems Interactions matrix below was most recently used as a wrap-up exercise after reading two books in class,

The Giver, a tale of a future time in a society devoid of memory by Lois Lowry and *Two Old Women* by Velma Wallis, which is a tale of survival of two elderly Aleut women, abandoned by their band in a time of starvation during a hard winter. For the student, the focus of the exercise is to make a comparison between the future society as found in *The Giver*, the indigenous culture in *Two Old Women* and the life they live as typical North Americans. The matrix also lends itself to a comparison between a historic time period, the present and the future time and also can be used to compare what is known about different cultures and their world views.

The matrix exercise evolved from two complementary musings. In *The Co-Evolution Quarterly* in a 1981-82 article on bio-regionalism and watersheds, the editors asked:

1. *What soil series are you standing on?*
2. *When was the last time a fire burned your area?*
3. *Name five native edible plants in your region and their seasons of availability.*
4. *From what direction do winter storms generally come in your region?*

Cultural Universals outline

- I. Recreation
 - A. Games and sports
 - B. Use of leisure time
- II. Arts and Esthetic Values
 - A. Art
 - B. Music
 - C. Drama, dance, literature
- III. Economics
 - A. Technology
 - B. Division of labor
 - C. Trade and money
 - D. Transportation
- IV. Food, Clothing, Shelter
 - A. Food (methods of production and domesticated animals)
 - B. Clothing and adornment
 - C. Shelter and dwellings
- V. Political Organization
 - A. Government
 - B. Law enforcement
 - C. War and peace
- VI. Family and Kin
 - A. Marriage and type of family groupings
 - B. Child training and rites of passage
- VII. Attitude Towards the Unknown
 - A. Religious beliefs
 - B. Religious practices
 - C. Death rituals
- VIII. Communications
 - A. Language
 - B. Number systems

5. *Where does your garbage go?*
6. *How long is the growing season where you live?*
7. *Name five grasses in your area. Are any of them native?*
8. *Name five resident and five migratory birds in your area.*
9. *What species have become extinct in your area?*
10. *What are the major plant associations in your region?*

When first exposed to those questions, I was intrigued, But, after answering the questions to my own satisfaction, I forgot about them until I saw them again in the David Orr's book *Ecological Literacy*.

At the time I was reading *Ecological Literacy*, my daughter's 7th grade social studies teacher used "Cultural Universals" for the class study of ancient civilizations. Cultural Universals is an outline format to help students look at the commonalities underlying cultures, in the areas such as art, religion, trade, and government. The Cultural Universals outline helps students recognize that while we may look different and speak different languages and call our gods different names, there are common activities to all cultures. With this frame of reference, attempts at understanding humanity throughout the ages can become more than a recitation of facts.

Furthermore, outlining cultural universals is a great way to practice going from the general to the specific as the skills of outlining are developed.

The Human-Natural Systems Interaction matrix evolved as an extension of the *Co-Evolution* questions and the Cultural Universals outline. As a matrix it can be used to look at how human nature has both changed and stayed the same for many generations.

The matrix is a critical thinking tool to help students develop a frame of reference for making comparisons between cultures. It also helps students delve deeper into the author's message, rather than simply asking them to prepare a rehash of the storyline and a list the characters. The matrix provides the opportunity to reflect upon what we know of the natural world and our relationship to that world.

References

Co-Evolution Quarterly, 32 (Winter 1981-2).

Lipetzky, Jerry, *Dig 2*, Interaction Publishers, Lakeside, CA, 1982.

Orr, David W. *Ecological Literacy*, State University of New York Press, Albany, 1992.

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Human/Natural Systems Interactions Matrix

System	TIME			ADDITIONAL SYSTEMS (use with grid at left)
	Back Then	Now	In the Future	
Biological Name 5 animals and their habitat and use to you				Human What does your family believe? Who is responsible for food, children, behavior, etc.? Responsibility What are you responsible for? Beliefs What would people fight for? Risk their lives for? Money How do you get it? What can it be used for? How easy is it to obtain? Communication how do people know what is going on? Change What changes and how often? Resources Who controls the natural resources? How is a "fair share" determined? Technology What is it? How is it used? Power Who is in charge? Household Who lives together? What is a family? Stories What are the stories you hear? Fun & Games What is fun? How do people entertain each other? Is there time? Survival What do you need for survival? Can you carry all you need? Time How is time kept track of? How is it measured? Essentials What can't you live without? Distance How far away is it? How do you get there? What is close by? Consequences What are the rules? What if they are broken?
Water Where do you get it? Where does it go?				Analysis Tools Who are your teachers? How do you know the answer? What is intuition? Medicine What is done to treat a broken leg or the flu? Mathematics How many fish, trees, clams in your neighborhood? How do you learn about numbers? Heat Where does it come from? Who makes it? Food Where does it come from? Who grows it? Lights Where does it come from? Who/what makes it? Transportation How do you get there? How far have you traveled in this period?
Weather Look at the weather before school and in the evening. What are your tools for predicting?				
Art & Literature What clues do they provide to the thinking of the time? Give an example.				
Geographical Describe land ownership in your neighborhood. Where is north?				
Geological What kind of soil is beneath your feet? How do you use it?				
Political What do you do if you don't like your neighbors?				