6.61.2.5

Essential Earth Learning Concepts for Teachers and Students

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Contents

Glossary:

Bioregion	A unique but integral geographical subsystem of Earth, most often a watershed, that provides a contextual container for life, one whose living boundaries are permeable and exist for the purpose of identity not separation.
Carrying Capacity	The ability of a bioregion or the planet to sustain given populations and their associated consumption and waste production.
Co-evolution	When two or more entities adapt to each other in a given place over long periods of time; requires the acquisition of local knowledge of what works and what does not work

Ecological footprint A representation of the amount of land, ocean, energy, and natural materials necessary to feed human activities and assimilate their waste for any given population.

Linear Progress The misconception that it is possible and necessary for humans to achieve unlimited material growth and accumulation of material wealth; linear progress is a consumptive practice, which ignores that we live on one materially finite planet who's ecosystems are being altered, drastically diminishing their capacity to support life.

Social re-education The long-term process of creating a paradigmatic shift in values and worldviews

Systems Thinking A holistic approach or method that allows one to see all life as an interconnected whole - a living web of relationships and nested systems; systems thinking prefers transdisciplinary synthesis and mapping over reductionist fragmentation of knowledge and analytical dissection.

Summary:
This article provides 10 essential concepts that may assist in dispelling the ultimate myth: that human are somehow separate from nature. The presentation of these concepts is designed to elicit in the reader a state of mindfulness or a heightened awareness that can be practiced regularly and can inform daily actions and lead to a more sustainable world.

The human story, the story of life on Earth and within the known Universe, is still being written. This story, which began about 13.7 billion years, forms an unbroken chain of events that gives humans and the rest of the living beings on this planet an extraordinarily long and rich shared history; one with many periods of drastic change, feedback, adaptation, and creativity. All Life, as we now know it, is the result of this ongoing "learning" process.

Although this work is aimed at teachers and students, it is vital to recognize that we all are learners, even Earth (hence the title); and, that this learning process might very well lead to a next step in humanity's evolution – an evolving global consciousness that all life - both human and other-than-human - past, present, and future is interconnected.

It is not enough to teach a man a specialty. Through it he may become a kind of useful machine but not a harmoniously developed personality. It is essential that the student acquire an understanding of and a lively feeling for values.

--- Einstein

1.0 Introduction

If a fundamental change does not occur, future human generations will inherit an Earth with a diminished capacity to support life. Such an opening statement is a reasonable conclusion based on the present lack of concern about "sustainability," and is a logical result of a "business as usual" attitude that perpetuates social and educational values which encourage hyper-consumption. The problem and contradiction in this scenario are obvious to those who question the West's uninhibited linear notion of social and economic progress and understand the finite limits of Earth. Modern education, however, continues to perpetuate this concept of linear progress. The growing presence of environmental education has been a good first step to arouse awareness about the protections necessary to ensure the long-term existence of Earth's life support systems. However, environmental education is often marginalized by discipline and ideology in today's world and so many students never come in contact with the ideas in these courses. In order to achieve sustainability, ecological concern must become all-pervasive in the education of current and future generations. They must learn how to prosper and thrive along *with* Earth, not *in spite of* her.

The challenge is to achieve and create an educational process that will enable current and future generations to reinvent their future, achieve true ecological sustainability, and thrive in the face of seemingly insurmountable challenges that they will surely confront. It is unfortunate that in the current period of specialization, students and people in general learn more about less (i.e. specialization that leads to reductionism). There is a need for a more broadly spread awareness (learning less about more!) in order to make sense of the whole world and to assure that sound, collective decisions that face humanity will be made in a sustainable manner.

Earth Learning implies that, in a very real sense, Earth itself is engaged in a learning (read adaptive) process, evolving and changing for over 4.5 billion years; *a continual albeit slow teasing out of what does and does not work*. It is trial, error and learning on a grand scale. This moment in time is challenging humans to be mindfully present in this Earth/Life process. Therefore, Earth Learning also means that humanity must re-engage in a co-evolutionary relationship with Earth in order to discover *how* to live on this planet (and within our local ecosystems) in harmony with each other and with the rest of the biosphere. The re-conceptualizing of our relationship with Earth and her community of Life (the subject of this article) is necessary for humans to begin to access the greater understanding accumulated from this continual and emerging learning process.

2.0 Essential Concepts

Below, the most important and vital concepts for Earth learning are considered. These concepts are derived from the author's experiences and from the various sources referenced in this article that collectively support an emerging movement of social re-education to achieve present and

future ecological sustainability. It is sincerely hoped that these concepts find their way into every possible classroom, religious school, scouting group, environmental center, museum program, appropriate workshop and conference. Such an educational effort that results in an awareness and formation of a benign global Earth ethic may very well be the most important step in human evolution.

2.1 There Is No Environment

To most people the word "environment" implies some object somewhere else. Yet, there is no environment separate from humanity. What is done to Earth is done to fellow humans and to the community of life that is Earth. For example, take molecules of air. Not only do humans share them with most other life forms on this planet, but they have shared them with many of the life forms in the past, including such figures as Jesus, Mohammed and Buddha. More importantly, they will share them with all those in the future. Indeed, respiration is impossible for humanity without the collaboration of a host of microbes within the body that work in partnership to transform air and food into the energy that sustains life.

The interconnectedness and interdependence of Earth's life web, a concept most eloquently explained by so many past and contemporary thinkers, depends on a complex diversity of species to function as a healthy community. As indicated above, the human body itself is a complex ecosystem. Many of its functions, such as breathing and digesting, are assisted and performed by organisms that humans simply could not live without. Human outer skin often acts less like a barrier and more like a sponge. Many historical and contemporary scientific studies demonstrate that the mind reaches far outside the brain; simple scientific experiments (i.e. dogs who know human companions are coming, while they are still many miles apart or people who receive phone calls from a loved one and sense who it is even before they answer) have been performed to demonstrate this. In a similar way, a tree is not separate from the soil that feeds its roots, the water that flows everywhere inside and out, and the air it breathes. In living systems boundaries exist for purposes of identity, not separation. As John Dewey so succinctly pointed out so many years ago, a living organism does not live in an environment, but by means of and as Capra might add, in connection and harmony with that environment. Such thoughts are currently echoed in the literature dealing with holistic and ecological interpretations of the world and education. (See Articles 6.61.4.1 and 6.61.4.3 in this Theme) Are the sun and light two separate entities, or are they one? The same question can be raised about mind and body. They are certainly not the same, but are they separate entities or are they one? Reductionist science and Western ways of thinking fail to clarify. Modern scientists classify and categorize, dissect and analyze, and produce more and more information. But more information (a product) can also serve to flood and dilute the understanding of the whole. Fortunately, hermeneutics and systems thinking (both processes) counter these limitations in the achievement of greater understanding.

2.2 Earth Is Alive.

For centuries humans have believed that Earth was an object, a rock floating in space, with living beings on its surface. Now, many believe that Earth is a living, breathing, self-sustaining and self-educating organism. James Lovelock's Gaia theory suggests that all of the cumulative activity in Earth's biosphere - every cycle (water, rock, carbon, etc.) and life process sustain the planet's atmosphere and regulate its temperatures to keep it just right for life to continue much as

the human body does. This appears certain because although the sun has gotten progressively hotter over time, the Earth has maintained a fairly even range of temperatures. It has been discovered that Earth's microbes and indeed all the rest of the solar powered organisms that breathe and photosynthesize, live and die to keep the atmosphere (Earth's thermostat) regulated within a given range.

According to current science, Earth is 4.5 billion years old. It is still changing and evolving with greater complexity and diversity in its life forms. It takes a diverse ecosystem to be resilient enough to withstand natural disturbances, much the same way it takes a strong immune system to protect humans from disease. Complexity and diversity mean that Earth is not putting all it eggs in one basket. However, many assert that human impact on the natural world and the resulting loss of biological diversity are drastically diminishing Earth's capacity to sustain life. The global extinction we are currently facing, the main causes of which are anthropogenic (global habitat destruction, global toxic contamination, and global warming), means that we are permanently loosing unique life forms at higher rates than during any of the previous five mass extinctions that have occurred on this planet combined. This phenomenon, which would be reduced and eliminated in the sustainable future envisioned in this and other articles in this EOLSS Theme, threatens the life-sustaining capacity of Earth.

2.3 Evolution Is Not A Theory.

The Universe began at a given point some 13.7 billion years ago or so. How it began is unknown. However, it is known that the Universe has been expanding and increasing in complexity ever since. Earth continues to evolve within the context of this expanding Universe. Life has evolved here as an integral part of the planet. It has created itself from itself; beginning with simple, single-celled organisms and maturing into an explosion of beautifully complex and diverse multi-cellular creatures. Humanity shares an inherent and inherited genetic memory, passed down from these first life forms; we share 99% of our human DNA with other primates. The elements --hydrogen, helium, oxygen, carbon—a one time creation of the Universe, are the living materials on which all life is based. Yet, some humans feel threatened by the concept of evolution, and they fear the spreading of its acceptance for various reasons. They fail to notice two crucial things. The first is that the evolution of life is quite the miracle, with any one of a billion things that could have gone wrong along the way. Every great extinction phase over the last 4.5 billion years of Earth history has been a portal where only a reduced percentage of the species then in existence passed through. And yet in the present there is a plethora of magnificent creatures on the Earth. The second crucial issue is that evolution presents a far more powerful, deliberate, and awe-inspiring set of events than any one-time, instant creation. In deed, the process of the Universe's unfolding over 13.7 billion years, as seen from the current viewpoint, provides humanity (and the entire life community!) with a fascinating shared history.

Teaching evolution as an integral part of Earth Literacy is a vital way of communicating that humanity is inextricably connected to Earth. Early humans lived by this knowledge. In a sense, they were enchanted by Earth and lived as an integral part of it. The recent, current norm of living, at least from the Westernized/industrial perspective, traditionally treats Earth as an infinite resource for the sole benefit of humanity and considers humans separate from nature. This development has allowed humanity to step outside of local ecosystems to affect the planet globally as one super organism, a geophysical force. Many articles in this Theme elaborate on

this force in relation to humanity's growing ecological footprint on Earth. (See for example, Articles 6.61.1.2, 6.61.1.3, 6.61.2.3 and 6.61.5.6 in this Theme) It is time to re-inhabit (re-conceptualize our relationship to) local ecosystems. By ignoring or rejecting evolution, many humans are basically saying that they do not belong on Earth. They, in effect, have rejected their rich and vibrant inheritance and their rightful place in the community of life.

2.4 Earth Is Learning and Teaching.

The evolutionary process is based upon trial and error, balance and chaos, creation and destruction, life-death-rebirth. Earth is inherently learning as it evolves, improving itself through greater complexity and diversity, keeping what works and discarding what does not. Mindfully re-engaging in the Earth Learning process means that humans can learn to do the same as part of our daily lives. By paying close attention, humans may recognize that Earth is constantly teaching; its living systems offer humanity a time-tested model for ecological sustainability.

According to many of the most brilliant minds concerned about the present state of the world, including Fritjof Capra and Thomas Berry, many ecological principles are directly relevant to human sustainability. Living systems at all scales: (a) constantly communicate and share resources; (b) are dependent on cycles of matter and energy that create no net waste; (c) are driven by solar energy (photosynthesis); (d) collaborate rather than compete for energy and resources; (e) strive for diversity that leads to resilience; and (f) offer a dynamic balance where no one value is maximized, but all become optimal. In other words, Earth teaches us by example to communicate and share resources, to create no net waste, to embrace solar and other renewable energies, to protect diversity, and to strive for balance based on collective basic needs rather than on anthropocentric individualism. Unfortunately, modern education and culture continues to perpetuate exploitative, anthropocentric attitudes towards Earth and its inhabitants. (See Articles 6.61.2.3, 6.61.4.3, 6.61.5.1, and 6.61.5.7 in this Theme)

2.5 Earth Is Slow, Culture Is Fast

The current moment in Earth's history may mark the end of the present Cenozoic Era, 65 million years of extraordinarily creative evolutionary process. A primary reason for this situation is the anthropogenic destruction of habitats and the resultant disappearance of life forms that inhabited them. Never before has the planet experienced such high rates of species extinction. And humanity is largely responsible. Humans are the only species to develop the capability to change and dominate its environment on such a large-scale, rather than adapt to it.

Adaptation is the key to the evolutionary process. Slow change is good for life. This is what Earth has been doing since its inception. Rapid change does not give humanity, any other species, or even the living Earth, time to adapt. It is time to slow down and rejoin the life community in the evolutionary process, and begin to adapt human lifestyles, so that they align with the planet's natural rhythms and the life support systems that sustain the biosphere. This does not mean that quality of life must be sacrificed. On the contrary, meaningful and sustainable livelihoods, simple and satisfying lifestyles, healthful nourishment for body and mind, caring and sustainable communities, and healthy and life-enhancing interactions with nature are all essential both sustainability and to quality of life. The race toward unfettered economic growth throughout the world driven by the forces of ever-increasing consumption (See

Article 6.61.5.7 in this Theme) is plagued by symptoms of work-related stress, declining health, stagnant levels of popular happiness, among many others. Indeed, quality of life may improve considerably if the frenetic pace of modern life slowed down and allowed more time to reflect on what is truly important and to relate to the less tangible enjoyments of life.

2.6 Earth Is Primary, Humans Are Derivative

All beings, including humans, are ultimately dependent on Earth and its life support systems. No amount of technology can replace these living systems. Humans are incapable of living on Mars, or the Moon, or any other planet unless they carry Earth's life support functions with them. . Humans are products of Earth and yet they race to undermine the integrity of the living systems that sustain all life. Many have recognized that a system that undermines its own subsystems or the larger system, of which it is a part, is unsustainable. This understanding of systems is vital for a transition to sustainability and to a sustainable future.

At the core of the vast number of unsustainable patterns is the assumption that humans are the chosen species and should inherit Earth's bounty at the expense of all other species. This is, at best, an arrogant assumption that has developed over the last 10,000 years of Western civilization (a relatively short amount of time in geological terms). Humans can adopt an Earth-centered mindset that generates empathy for and is inclusive of the other-than-human. This includes recognizing the inherent rights of all sentient beings to share in Earth community and their intrinsic value as members of that community. Human social, legal, and political institutions should reflect this. (See Article 6.61.2.3 in this theme) This may take all the courage and ingenuity that can be mustered by present and future generations.

By adopting an Earth-centered mindset, humanity can begin to strengthen its connection, both spiritual and physical, to life. Gandhi taught that the only way to reconcile power is through service. Such a concept might be applied in serving and protecting Earth's life support systems, instead of their present exploitation and destruction. It is possible to reverse the current chemical/industrial poisoning of humanity and Earth's ecosystems. Such a turn of events would result in cleaner air, healthier food and water, and the recognition of humanity as a species in collaboration, not in competition, with other species. Human understanding of their place in nature is an essential thought for the transition to a more sustainable future. This idea is presented very soundly in articles in this EOLSS theme, especially article 6.61.1.3.

2.7 Sustainability Requires Living In Place.

Humans are historically defined by their geography. Traditional cultures are often more sustainable because they have developed along with their places (read local ecosystems). Modern progress and globalization, however, have caused large-scale human displacement. Mass immigration and mobility often contribute to an inherent disconnect between humans and their places. Our places (bioregions) provide a context for us to live our lives purposefully and within the limits set by Earth. Modern schools further reinforce this disconnect through their emphasis on fragmented data that is taught without context and relevancy, generating the practice of skills that are not connected to the purpose and intent of living in harmony with life in our places.

By learning to "live in place," humans can reclaim their connections with the land and life support systems that sustain. Many have suggested that it is now time to design, to organize, and to structure communities, neighborhoods, and bioregions to be increasingly self-sufficient and mutually supportive. Such individuals as Thomas Berry, Wes Jackson, Michael Vincent McGinnis, David Orr, Helena Norberg-Hodge, Kirkpatrick Sale, Frank Traina, and many others are leading the call for humanity to return to their places (urban, suburban, and rural) deliberately and in a sustainable manner. This means promoting local food systems and sustainable agricultural practices so fresh and local food will be readily available without the need for chemical preservatives, radiation, or unnecessary long-distance transport. It also means developing distributive, human-scale enterprises and innovations that will create meaningful and sustainable work as well as clean energy based on renewable resources. Such things should not be seen as "alternatives"; they must be an integral part of the solutions that form the antidote to an otherwise unsustainable contemporary way of life. To live deliberately, as Henry Thoreau suggested, can be reinterpreted to mean that we need to create regions and cities that function within the limits defined by the life support systems of Earth and her local ecosystems.

2.8 Earth Is A Recycling Planet.

Earth is a recycling planet, powered by the energy of the sun that supports a complex and interconnected life web. Pathological consumption and waste patterns that deplete living resources, transform them into substances that cannot be readily assimilated by natural processes, and begin to unravel the Life Support Systems of the planet, are no longer reasonable, tolerable, or necessary. Many communities have exceeded their regions carrying capacity and are taking from other regions and their inhabitants, and from future generations. Not only is it necessary to stop taking, but it is possible to start giving back. Now more than ever in history, humans appear to have real power: the power to restrain themselves from harming others and Earth, the power to begin to heal themselves and Earth through the creation of simple, sustainable, and meaningful lifestyles, livelihoods, and practices. Alternatives to the modern consuming lifestyle, like community gardens, food partnerships, communal retirement housing, co-housing, and bartering systems, are appearing more frequently throughout the world.

The principle of the 5 R's: "Respect, Rethink, Reduce, Reuse, and Recycle" cannot be overstressed or underestimated. These principles imply respect for the entire community of life in terms of space and complementary support to grow and prosper; a rethinking of the built environment that has resulted from the modern lifestyle of industrial work and growth; a concerted reduction and a more equitable division of the consumption of necessary elements as well as the unnecessary things which clutter and put pressure on Earth; the reuse and recycling of all things in order to reduce anthropogenic pressures on renewable and non-renewable resources. Ecosystems waste nothing; everything is necessary and is food for something else. It is certainly possible to learn how to duplicate such systems. In fact, human-built wetlands have been designed to filter out human waste, plants are used to clean up brownfields, and buildings have been created that produce their own energy, capture their own water, and feed their inhabitants. The time has come to gather these wisdoms, the things that really work well within Earth and its bioregions, and apply them in all communities and in all human lifestyles, livelihoods, and business practices.

2.9 There Are No Second Chances.

There is no other planet that we know of that harbors life like Earth. Such life is considered by many to be inherently sacred and holding intrinsic value. Moreover, Earth is a one-time endowment and as such is subject to irreversible damage to her life support systems. Once life on Earth is diminished beyond a certain threshold it may no longer sustain humanity. Humans have intensified certain ecological global processes such as desertification, climate change, loss of biodiversity to such an extent that the quality and capacity of the very functions that sustain life are threatened. It may take tens of thousands of years for decimated ecosystems to recover or for climate to stabilize after the influences of green house gases. There is no possibility of a miraculous reappearance once a species, including humans is extinct.

As far as we know, humans are the first and only species to leave Earth, look back at it, and see it as one whole. The experience has initiated an evolution in consciousness and a new worldview that acknowledges humanity's role to celebrate, protect, and serve Life on Earth; not to diminish or dominate its life support systems and unravel its intricate community of life.

2.10 Humanity Must Be the Change

Each and every person has the ability to make a difference. With every action, with every dollar spent, one is casting a vote for or against Earth's life support systems. Consciously or not, each vote supports an institution, profession, program, and/or activity that will either diminish or enhance Earth. Neutrality and accommodation support the dominant ideology--the status quo which currently supports unlimited economic growth and development in a finite world. The kind of consciousness-raising that Paulo Freire sought in each individual is now required for the collective consciousness of all humanity in order to achieve a sustainable future.

The opportunities to positively transform society and transition towards sustainability are bound only by the human imagination, which can be a limitless source. As Gandhi suggests, humans must be the change they want to become. Individual actions matter; cumulatively they may make all the difference in the world. Positive change will occur when enough individuals embrace a sustainable, ethical worldview which will bring about a change in the institutions that govern human societies.

3.0 Conclusion

Earth learning on a global scale will take considerable time, but the time to begin is now in order to challenge the current ecological crisis facing humanity. The excessive termination of species through loss of habitat, along with all the other negative ecological effects perpetuated by humanity, must be directly confronted. A social learning process needs to recognize and expose the cultural contradiction in the idea of unlimited growth in a limited world. Such recognition begins with educational systems at every level, as described in so many articles in this Theme. It must permeate all institutions that guide and direct human behavior in the present and future. By applying the Earth learning concepts presented in this article, humanity begins the process of creating the awareness, empathy, understanding and ultimately wisdom that will shape and create a different, more sustainable vision for the continuation of life on Earth.

Earth, in all its grandeur and beauty, is one reality--a singular expression of an irreversible, but vulnerable, life process. However, humanity's ecological footprint is rapidly exhausting the planet's ability to sustain life. This situation can be modified and turned around quite easily through changes in human behavior-- by using ecological systems as models, by stepping back into local ecosystems (bioregions), by reducing waste and curbing consumption, and by realizing that humanity has a fortunate opportunity to learn how to embrace sustainability on a global scale.

Earth learning becomes an unconditional act of love – love of family, community, flora, fauna, culture, and life - all life. Such love is vital and integral to the kind of substantive change that is needed. Gandhi spoke of such love in this way:

> The law of love will work, just as the law of gravitation will work, whether we accept it or not…a man who applies the law of love with scientific precision can work great wonders…The men who discovered this law of love were greater scientists than any of our modern scientists...The more I work at this law, the more I feel the delight in life, the delight in the scheme of the Universe. It gives me a peace and a meaning of the mysteries of nature that I have no power to describe.

Such love of place, both natural and built, may yet result in the delight and splendor in life and in the Universe needed to ensure the preservation of Earth, our ultimate life support system…

If you feel you want to personally commit to making a difference in your bioregion, explore the readings listed in the bibliography, visit www.earth-learning.org for more resources and links, and take personal and local actions that serve life.

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Mario Yanez has an M.A. in Latin American and Caribbean Studies with a concentration in Environmental Studies from Florida International University where his main research was on Cienaga de Zapata, Cuba. He is a Ph.D. candidate in Environmental Anthropology, also at FIU, where he will examine the interaction of human and natural systems in his home bioregion: The Greater Everglades. He is a core member of the Earth Ethics Institute at Miami Dade College.

The author is founder of Earth Learning, a learning community that attracts, inspires, creates, and sustains people, ventures, projects, activities dedicated to Earth Literacy and Bioregional Sustainability (more at www.earth-learning.org). He is a Senior Fellow at the Environmental Leadership Program, a diverse national network of visionary, action-oriented emerging leaders.

He teaches undergraduate ecology & environmental science as well as Earth literacy. He has been an informal science educator since 2002 where he led an after school program for 4th and 5th graders, established a community native plant nursery, as well as ran various environmental education programs for adults. During the year, he leads workshops and field immersions on Becoming Native to Our Bioregion. In his teaching, he values combining lively discussion with plenty of hands-on field experiences.

When he is not working, he enjoys making time with his family and friends, organic farming, gardening with native plants, being in Nature, working towards attaining a simple and sustainable lifestyle, and striving to understand what it means become "Human".

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