



Curriculum Units by Fellows of the Yale-New Haven Teachers Institute  
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## **The Impacts of Human Activities on Biodiversity in New Haven County**

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As the population increases and the demand for goods increases, there may be a growing conflict between further economic development and the maintenance of unspoiled ecosystems large enough to sustain viable wildlife populations. Pollution cause by manufacturing or urbanization can change the make up of life present in an ecosystem. Toxic discharges can inversely impact the living organisms in an ecosystem by killing them, weakening them, or affecting their ability to carry out essential biological functions.

Increasingly, humans modify ecosystems as a result of population growth, technology, and consumption. Human destruction of habitats through direct harvesting, pollution, atmospheric changes, and other factors are threatening current global stability, and if not addressed, ecosystems will be irreversibly affected. Finally, many other human activities could cause the transformation of our environment.

I would like my students to understand the impact that humans have on biodiversity and how this in turn impacts the quality of their lives. Although humans are usually blamed for deterioration of natural ecosystems, I would like my students to learn to investigate the threats that human activity poses to biodiversity and to be able to point out what are the activities and their specific impact on ecosystems. I also would like them to become familiar with resources available for investigation and format of presentation. This unit not only will prepare the students in the area of scientific knowledge but it will also help them develop oral and written presentation strategies critical for higher education success.

I am interested in teaching a unit within the science department for students enrolled in a science issues course that is usually taken by students who are in the tenth and eleventh grade. The topics chosen for discussion in this unit will address *Performance Standard 3.4* -- Students will recognize the interdependence of living organisms . In addition, I would like to guide students in an exploration that will enable them to comprehend that living organisms have the capacity to produce populations of infinite size, but environments and resources are finite . This fundamental tension has profound effects on the interactions between organisms. Furthermore, I aim to help them recognize and comprehend the significance of the fact that human beings live within the world's ecosystems .

In addition to providing my students the opportunities to increase their knowledge about biodiversity I would like to help them develop a keen sense of observation. Scientific inquiry in the form of observation does promote higher thinking processes that encourage hypotheses development. I hope to engage my students in

a variety of activities that will enable them to observe the natural environment and to learn more about the urban setting where they live. Through natural history readings we will learn how this City's development has impacted both, plants and animals. The readings will permit us to gather information about animals and plants that previously exist in this area and what we find today.

In order to provide scaffolding in my students' conceptual development I want to make the focus of assessment through writing. Students will have to develop the necessary vocabulary to present historical findings, describe observations and explain hypothetical thinking that arises from their readings and experiences. Therefore, I will be working with students in developing a nature journal with both visual representations and descriptive writing.

This unit is intended for students who are enrolled in a science class at a basic level. These students commonly are interested in meeting the minimum requirements in science and therefore their interest in science is limited. My aim is to facilitate a process of inquiry that will allow them to enjoy nature and to see their urban surroundings as viable samples of biodiversity. That in fact they become aware of the many creatures that share our urban space with us and become conscious consumers of resources and goods that nature provides us.

Non-fiction reading and writing in science is a challenge for those who are not really interested in the topics require. Yet, for these students and their peers it is a requirement for graduation to become effective readers and writers of non-fiction. In order to help these students develop their skills in non-fiction inquiry and reporting I want to give them the opportunity to choose a focus or topic that interests them or that raises questions for them. Harvey (1998), in her book *Non-fiction Matters* explains that "the best nonfiction writing emerges from topics the writer knows, cares and wonders about and wants to pursue them."

## Why ecology?

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I am interested in learning more about ecology as a scientific and scholarly discipline specially, in regards to scientific methodology. This should help expose my students to scientific exploration that will enhance their learning and effective implementation of scientific inquiry. Not only the experimentation but to develop scientific thought processes. These processes should be demonstrated through their increased writing and reporting ability. Although this is an ambitious curriculum Ecology seems to be the discipline that can enhance their learning about science going at it from a variety of standpoints.

Ecology is the scientific study of the relationship between plants and animals and their environment. Understanding this relationships between living and non-living things can help us find ways to protect and preserve the environment. Young people who are at a time in their life in which they are making many decisions about who they are can benefit from learning how our actions as a specie has impacted ecosystems. I want my students to excel as individuals who are well informed citizens that make decisions based on accurate knowledge as opposed to emotions or politics.

Recently I visited the Peabody Museum of Natural History in New Haven and I realized that extinction as a popular concept has only been around for about 300 years. To think that people who lived before that time never thought of the possibility that an animal or plant could disappear seem incredible. Nowadays we know

that many species have become extinct leaving a void beyond repair. Although we do not know the final impact of all human activity on the environment it is our responsibility to be aware of how our activities can be disturbing to the global ecology of our planet having serious repercussions in the future. Thus, my aim is to help students gain the knowledge necessary to think and express themselves in regard to this topic.

## Unit Outline

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### I. New Haven natural history

- The Hill
- Fair Haven
- The Center of town
- Edgewood

### II. Human activity and the environment

- Demands for food – Harvesting
- Urbanization
- Population growth
- Pollution

### III. Living organisms and biodiversity

- Unspoiled ecosystems
- Biodiversity
- Interactions between organisms

### IV. Scientific observation

- Resources for investigation
- Building scientific knowledge

## V. Oral and written presentation

- Oral presentations
- Journaling
- Drawing and images
- Essay writing

## New Haven's Natural History

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European settlers arrived to New Haven on 1638 and found that the area was populated by the Quinnipiacks, a group of Native American people. This group of people harvested seafood, grew maize, and hunted for food and fur. The new settlers bought some land from the Quinnipiack and started a new community which focus was to establish a commercial empire utilizing the harbor.

New Haven has many neighborhoods many of which have a natural boundary that allows for fragmentation and its inhabitants are very much aware of the different neighborhoods. I intend to help students recognize the similarities and differences in the neighborhoods' habitats through the observation of the flora in each of four purposely chosen neighborhoods.

### **The Hill**

The entire southwest quarter of the city of New Haven was originally cut off from downtown by the West Creek. The Hill, located between the railroad station to the east and the docks to the south. One area of the Hill is one called Church Street South; this area is only blocks away from City Hall. The Hill is a peninsula that includes City Point, which was known for its numerous oyster plants.

The state instituted plans to construct I-95 right through Bay View Park. A park that was located in the south side of the Hill. Thus, the highway runs very close to the neighborhood. As former habitants of the Hill tell the highway isolated from the neighborhood some of the playground areas (to go fishing or oystering) that they use to frequent as recently as in the 50's.

### **Fair Haven**

Around 1640 farmers took possession of this portion of land. The area was called Farnes or East Farnes it

consisted of scattered farms. The river settlement came later.

For almost 200 years Fair Haven developed independently. Although it was two miles from the downtown green to the Quinnipiac River, the neighborhood development was separate of the original nine squares. Finally by 1870, Fair Haven became a part of the New Haven city due to improved transportation.

Right from the beginning, the European settlers of Fair Haven mimic the Native Americans in the digging and consumption of oysters. Piles of oyster shells were a common sight around the harbor. Anyone could walk into the harbor flats at low tide and pick all the oysters he could; during this time oysters were easily available. The oyster became Fair Haven's most precious resource.

The Dragon as is still commonly known by "Fairhaveners" became a small village dedicated to the oyster business. The Quinnipiac River continues to be a natural boundary that requires bridges to connect to other parts of the city.

Another natural boundary is the Mill River; nature has not been able to stop the building of houses and the many immigrants that have made this peninsula their home. The other industry that was and still is prevalent in the neighborhood is shipbuilding. Shipyards were located on both sides of the Quinnipiac. In the beginning the "Sharpies", a small boat build to fish for oysters was the most popular.

One important detail is the extinction of the native oysters and the need the fisherman had to import oysters to cultivate.

### **The Center of town**

A government had been established by 1640 and the settlement, originally called Quinnipiac, was renamed Newhaven. In accordance with old English custom, the town plan was based on a grid of nine squares, the central square, now the Green, was designated as a public common. In 1641 New Haven was a community of approximately 800 European settlers. By the time the Revolutionary War began, New Haven had evolved from a colonial village into a growing town of about 3,500.

## **Human Activity and the Environment**

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Demands for food, urbanization and industrialization have changed the landscape of our planet. The increased population of the world and the need for livable space has put a lot of stress on biodiversity. My students are going to be looking at such activities as agents of change in the habitats that existent in our urban environment. One ecological concept that I would like to share with my students is that of "fitness" not in the sense of health or aerobic capacity but the ability that certain representative of a species have to cope with changes in the environment.

Human activity can in fact impact land use on a small scale or create such bigger problems as habitat fragmentation, pollution and /or climate change. These changes can introduce a chain of changes in coping strategies therefore altering patterns in the environment and making it more difficult to explain phenomena in nature. Yet, scientific activity has lead to feasible explanations of possible results to human activity. Although

scientists have been able to track changes and successfully predict certain reactions many questions remain unanswered, which make environmental problems very serious at times. I want my students to view their activities as choices they make that may adversely impact the environment. Thus, they must learn to discern how daily activities or bigger decisions on resources management impact our lives today and future generations. As consumers of services they should be able to seek information in regards to pesticides, herbicides or any other products they may consume that is detrimental to them or to the environment.

The truth is that as any other organism in our biota we the humans are also competing for resources. Although competition for resources is part of the game of diversity, it is important to point out that we have an advantage over other organisms. Or do we? Many human activities are not necessary thought through and choices are taken or decisions are made for the sake of progress without considering all possible consequences. It behooves any human being to know how human activity is changing biodiversity and how those changes are going to impact the quality of life of not just other organisms but our own lives.

Urbanization is a need that humans have in terms of providing housing for an increasing world population. Yet, planning must take into account issues such as fragmentation or disruption of habitats. We also have to take into consideration how our garbage and other waste may disrupt the habitat of others. Perhaps considerations must be taken for long-term impact as opposed to only short-term consequences. All of this requires consumers who have respect for scientific findings and who can understand the vocabulary and the concepts entail in ecological research. We do not necessarily have to understand methodology but we must be informed consumers of its findings and recommendations.

## **Living Organism and Biodiversity**

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Plants absorb the energy from the sun and it flows through a food chain process that assures the transfer of energy throughout the planet. What an amazing process, so complex and simple at the same time. Lets talk about the layers and how does that support life on Earth. Although different organisms constitute each layer and some energy is dissipated in decay some is added by absorption from the air and some is stored in soils and other sources. Nevertheless it is a sustained circuit in which change can affect more than one species.

Ecologists have discovered a relationship between the diversity and number of species in different places and that of latitude, climate, biological productivity, habitat heterogeneity, habitat complexity, disturbance and the sizes and distances of the islands (Schluter & Riclefs, ?). The more scientist study patterns on biodiversity the more they see the possibility of mechanisms that regulate diversity. Yet, the relationships delineated by the dynamic interactions within the food web show that the number of feeding links per species is somewhat independent of diversity; suggesting that the food web is conserved. Populations are those organisms of the same species which live in the same area and communities are the different species that interact with one another in a given habitat.

Other factors we must take into consideration for diversity is the abiotic environment, which includes the conditions that can determine where a species lives and reproduces. These conditions are such that are not other organisms but that influence animal behavior such as temperature and rainfall. Energy flow, relationships and abiotic conditions are all important to know so that we are aware on what may impact an organism's life and its survival as a species. We must all know that extinction of one species may mean the

reduction of fitness in another species. Or that fragmentation cause by urbanization may decrease the fitness of one animal increasing the fitness of another that can become a pest. We all live a planet where systems both biotic and abiotic have relationships and impact each other. In other words the biological and physical factors that sustain the organisms are both important. Thus, balance is important in an ecosystem to maintain an energy or nutrient cycle without disturbances or fluctuations that may threaten the life of the organisms within the system.

Changes in the components of the Earth's biodiversity may cause concerns for ethical and aesthetic reasons, but we must keep in mind that they can also cause changes that can alter ecosystem properties and the goods and services they provide to humanity (Hooper, 2004). The balance in the environment is not only important for plants and animals but it is essential for our own survival as we are consumers of products for nutrition and other resources we need.

## Scientific Observation

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Ecologists, naturalists and many others scientist and artists have taken the time to admire nature and to document its intricacies. To an untrained eye nature may be a lot of plants without distinguishing characteristics. Yet, thanks to the trained eyes of many in the past we can document the changes and development of habitats. Many plants were originally study for medicinal purposes, which lead to a number of collections of plants that not only described their physical appearance but they also described their possible use.

Plant geographers, naturalists and botanists, such as Carl Ludwig Willdenow, Friederich Heinrich Alexander Humboldt and Aime Bonpland became interested in finding the explanation to the variety or biodiversity among plants (Smith 1996). This interest captured their desire to travel and compare the differences and similarities among plants in different regions of the world.

Observation allow for better understanding of plants survival and reproduction. Plants and animals use chemical substances for defense, recognition and even courtship. Colors and shapes are other characteristics that seem to influence how organisms develop. For example, among birds in some species the females only mate with males, which are more colorful and larger in size and form. Without careful observation it would be very difficult to know all the details that nowadays we have about nature.

Induction is how science tries to find and explain patterns that help us understand how things work in nature. It has helped to reveal to scientist or ecologists the existent relationships in nature, which sustain biodiversity in certain areas. Sometimes is as simple as the description of the morphology of organisms and counting its frequency or number. But it can also help to describe relation ships that clearly explain how an organism provides the protection or nutrition that allows for the other to survive.

I want my students to learn to describe morphology and relationships both utilizing drawings and written descriptions. This method of recording data has been called a nature journal and I hope to help them improve their ability to use language and text to explain what they have acquired as knowledge. I want them to be effective communicators of their thought processes by providing them with a structured opportunity express what they see and experience with nature. Hopefully these observations will lead them to questions that will

require further observations and seeking information that will help them pose further questions and so on. This process is aimed at increasing their scientific inquiry skills and interest.

Building scientific knowledge is a complex task for a teacher, first I or any other teacher trying to help students must realize that science teaching is not necessarily just knowledge transfer. Teaching concepts in science effectively requires the teacher to shift their views of their role and of the processes needed to acquire knowledge in this field. The teacher must provide activities in which knowledge is generated through making sense or understanding the content and by helping the students to develop their own meaning from experiences (Loucks-Horsley, 1998). Students must engage in a learning experience that allows for them to make meaning out of questions, investigation, collecting and organizing data, making predictions and all of it for the sake of understanding the new concepts and to deepen their understanding of already learned ones.

## Oral and Written Presentation

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Oral and written presentations are a representation in which individuals organize their thinking. As students progress in their academic development the requirements for organization become more challenging. If we must help students in the process of writing we should help them find the way they can organize their thoughts on a topic. One may model their own processes of mental organization and how is that transformed into notes, outlines, visual cues, and many other ways to organize information.

The critical point I want to make here is that organization is the key to good writing but to achieve it one must find that style of organization that fits them as individuals. Some students may need major organizational tools while others need only visual cues. As a teacher we must help students find the way that best fit them without compromising the quality of their final product – a piece of writing.

This unit is intended to help students develop their ability to write about scientific topics. In order to do so we must start by providing students with a series of rich events that will motivate them to share what they have experienced. At first students may be hesitant due to lack of the appropriate vocabulary or apprehension about the process of writing. Nonfiction reading and writing has presented a challenging dilemma in education. Students have the notion that non-fiction is a complex text that is difficult to understand and to reproduce in our own words.

The first thing I need to do is engage students in the learning process so that the challenge becomes an exciting process of inquiry that they not only enjoy but also allows for them to learn new concepts. I want students to engage in oral presentations that are short such as an advertisement about a weed. They would have to do the research about the plant make a drawing, take a photo or video and they must describe the habitat in which we can find it. Oral presentations help students build knowledge and start with the inquiry process. Meanwhile they must keep a journal on the plant or plants in the immediate surroundings of the school. Entries in the journal can be drawings or descriptions. This would be the first week of the class in which I will help them during class to develop confidence in their ability to create a nature journal by actually going out side and helping them record what they see.

The second week they will have the opportunity to see other habitats such as the Quinnipiac River banks. They will be able to record their findings and present to the class orally in terms of their chosen plant. This



exercise will help them with developing an eye for the morphology of their chosen plant and it will also help them record the frequency in which the plant appears in different habitats. My hope is that their journals could serve as possible publishable materials. I want to think that they in fact could help the readers of their journals to learn something new about their plant. Meanwhile they must find facts about their chosen plant and include them in their journal.

The students will be learning and using more than one technique for presentation. All these different layers or strategies to go about developing their writing should allow them to create a collection of information that will help them write position papers on environmental issues that we may encounter in our inquiry in the city. In addition, I want them to describe their take on some environmental issues but taking into consideration the new knowledge they may acquire in our study of city habitats.

## Lessons

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### The First lesson

This lesson will provide students with vocabulary and strategies necessary to complete and understand the purpose of the field journal. We will read a chapter on ecology and some of the terminology utilized in this area.

Goal: To help students to comprehend what is ecology?

Objective:

Students will be able to explain what is studied in the field of ecology

Students will be able to explain what a is bio-blitz

Students will be able to describe what is a field or a nature journal

Presentation: Teacher will explain the purpose of the unit and the importance to developing nonfiction writing skills. The teacher will model some organizational skills needed to create a data bank of observations and information research. An example of information is taking a leaf from the field and drawing it labeling its parts, documenting color, texture, and where it was found. Also one may add a personal connection, something that comes to mind when one encounters this plant.

Practice: Students will be provided with several stations of information on ecology, a station to build their field journal, a station for a personal writing piece on their take on nature. While they are engaged at the stations the students will mimic the organizational skills introduced by the teacher and will commenced to build their data bank.

Conclusion: Students with the teacher will go outside and chose a square of the backyard to conduct a bio-blitz and describe what life they can find in their particular square. They will record the data utilizing some of the strategies already introduced.

Homework: Students will choose a plant that they may find in their school or home backyard for study. They

must have a drawing, name and a brief description of the plant.

Explanation: in this lesson students will be exposed to new vocabulary and strategies for observation and data gathering. This should address the need to increase and strengthen students' scientific inquiry skills and understanding. In addition, nature journaling will be introduced as a means of a field journal. The aim of this activity is to develop the students' awareness of the world that surrounds them. They will be asked to record observations, perceptions and predictions (possible explanations on habitat relationships). The learning about ecology will increase my students' awareness on how organisms' relationships support biodiversity. My intention is to introduce to them how human actions can increase or decrease biodiversity and the importance of biodiversity to sustain life as we know it.

## **The second lesson**

Objective

Students will be able to write good descriptions of their surroundings

Students will be able to draw some elements in nature

Presentation: Teacher will read a description previously written of a place in nature that the students have not visited. Together with the group teacher will create a description of the classroom; prompting students to construct sentences.

Practice: Students will take a look at their bio-blitz done in the previous class and add any desired details they may recall they missed (three minutes). Following, with a partner, students will ask a series of questions that will enable to visualize each other bio-blitz better. Students will share with the rest of the class.

Conclusion: Students will work on a drawing of all or some of the elements of their bio-blitz.

Homework: Make a detailed drawing of the plant students are studying individually.

Explanation: The students will have a choice of ways to record their observations. They can utilize prose, poetry, drawings, photographs, tape recordings. They should also include information gathered from other sources to enhance their observations. Finally, they must include a connection to environmental impact of human activity of the area they observe. I hope to help them compare and learn from each other journaling strategies to increase their ability to communicate their observations and perceptions and to make connections that are based on sound scientific principles. Journal writing should enhance the students' ability to do: scientific observation, creative and technical writing, layout and presentation of ideas, perception and analysis, reflection, questioning, and synthesis (Leslie & Roth, 2000).

## **The third lesson**

Objective:

Students will be able to describe morphological and functional characteristics of the plants living in the square they have been observing.

Presentation: Teacher will read samples of descriptions of the flora encounter in New Haven, including visual representations and any other examples of descriptive data collection.

Practice: Students will be able to work on the data they have been collecting for homework. They need to describe their chosen plant to a partner and submit their drawings and information to share with others. In pairs they will create a poster about each other plant to exhibit in the classroom.

Conclusion: Students will describe the process to learn to write about nature and they will share any questions they have and everyone else is responsible to help answer the question.

Homework: Student gathers information about the plant they are studying in terms of functional characteristics, such as reproduction, nutrition etc.

Explanation: This lesson will focus on individual projects that are very specific to help deepen the understanding of the students on research, both the inquiry process and developing a background of information that supports their observations. As my students complete their projects and journals other lessons will address their specific needs skills and understanding.

## **Historical and Theoretical Pedagogical Framework**

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Current federal legislation known as "No Child Left Behind education act (NCLB)" all instructional services provided to children must be of excellent quality. Well-trained professionals must teach children challenging curricula. The Guiding Principles of No Child Left Behind are the following. 1) Accountability for results - all states must implement statewide accountability systems that will set academic standards in every subject and identify strengths and weaknesses in the educational system. 2) Focus on what works - the federal government will invest in educational practices that have proven effective in increasing student performance and expect local educational and state agencies to do the same. 3) Reduce bureaucracy and increase flexibility- state and local officials will have the flexibility to find local solutions for local problems; principals and administrators will spend less time dealing with federal red tape, and more on student achievement; and parents and guardians are empowered to make sure that their children received the best education. They will be informed about the quality of their child's education and school, and can take action based on a school's performance (NCLB, 2002).

### **The National Science Standards**

The standards for content in science are critical in designing and implementing this curriculum. Students should develop the abilities of doing science by exposure to experiences that enhance their opportunities and engagement in the active construction of ideas and explanations. Inquiry-based science teaching will provide me with the opportunity to develop my student's abilities and understanding of science. In addition, my students should do science in ways that are developmentally appropriate according to their capabilities. In order to accomplish this I have taken into consideration the science content standards. The standards for content in science were issued by the National Academy of Science seven areas of instruction are identified as important science as inquiry, physical science, life science, earth and space science, science and technology, science in personal and social perspectives, and history and nature of science. This unit will focus on the first standard - science as inquiry and will briefly attempt to address standards C and F-- life science and science in personal and social perspectives.

Science as inquiry based requires that students plan and conduct simple investigations. In addition, it should allow students to employ simple equipment and tools to gather data and extend the senses. Furthermore students must be given the opportunity to use data to construct a reasonable explanation. Finally they must be able to communicate their investigations and explanations to others.

I am also going to include information that will allow my students to explore life science. As a result of the activities my students should develop an understanding of some of the following concepts: ecology, fragmentation, food chain, and biodiversity among others. According to the National Academy of Science, students should have a chance to increase their understanding of the characteristics of objects and materials that they encounter daily. They content that through the observation, manipulation, and classification of common objects, children reflect on the similarities and differences of the objects. As a result, their initial sketches and single-word descriptions lead to increasingly more detailed drawings and richer verbal descriptions. By observing the habitat in the city students may begin to understand that phenomena can be observed, measured, and controlled in various ways.

I will also address life science and as a result my students should develop an understanding of properties of earth life organisms, ecology and biodiversity, and changes in the environment. In the beginning, they should be encouraged to observe closely the animals and plants in their environment, note their characteristics, distinguish one from another and develop their own explanations of how things become the way they are. As students become more familiar with their surroundings, they can be guided to observe changes, including cyclic changes, such as life cycle of animals and plants; predictable trends, such as growth and decay, and less consistent changes, such as weather and human activity impact on nature.

### **The Standards for Effective Pedagogy**

The Center for Research in Education, Diversity, and Excellence (CREDE) researchers have provided the educational community with a consensus for practice that is comprehensive and therefore allows for flexibility in its implementation. The array of techniques that are available to teachers can be overwhelming due to its complexity; CREDE has streamlined the possibilities. Standard-based instruction would be incomplete if we only looked at student performance standards without considering the importance of pedagogical standards. Since 1999 I have used and promoted the use of the Five Standards for Effective Pedagogy (5STEP) issued by CREDE. These standards are issued as a result of the work done by educational researchers associated with CREDE. Teachers have used these standards across time and program boundaries. Separately these standards may be useful but as a unit composed of five important dimensions in teaching they are indispensable if we are to help every child reach their potential. Specifically, the standards are joint productive activity, language across the curriculum, contextualization, challenging activities, and instructional conversations (IC).

Stoll Dalton (1998), as well as many other practitioners and researchers propose that pedagogy in fact occupies a central place in accomplishing all students learning. In addition, many contend that pedagogy that is supported by a strong learning theory can in fact enhance the teachers' abilities to reach every student. "The standards for effective pedagogy are based on the socio-cultural theory, a theory of development that is ideally suited to the study of education. It provides a flexible, inclusive integrative lingua franca for social science's plethora of mini-theories and hypothesis, preserving the close fit between disciplinary theories and inquiries but uniting them into an overarching intellectual architecture (Tharp & Gallimore in, Estrada, Stoll Dalton, Tharp, Yamauchi, Page 9, 2000)."

# Bibliography

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## Readings for teachers

Atwater, Edward, ed. (1887). *History of the City of New Haven*. New York: H. W. Munsell and Co. A classic historical account, of particular use in studying biographies of nineteenth century important individuals in New Haven.

Brown, E. M. (1976). *New Haven: A Guide to Architecture and Urban Design*. New Haven and London: Yale University Press. A valuable resource to any unit studying New Haven, with good photographs of city landmarks and historical as well as architectural insights.

Harvey, S. (1998). *Nonfiction matters: Reading writing, and research in grades 3-8*. Steinhouse Publishers: York, Maine. A great resource for teachers looking for ideas on how to teach students how to use nonfiction text and how to improve their reading and writing in nonfiction.

Leslie, C.W., & Roth, C. E. (2000). *Keeping a nature journal: Discover a whole new way of seeing the world around you*. Storey Publishing: North Adams, MA. A great resource for learning how to record information from the field visually and written. It is also a good resource on some nature information.

Lingelbach, J. & Purcell, L. (2000). *Hands-on nature: Information and activities for exploring the environment with children*. Vermont Institute of Natural Science: Woodstock, VT. This is an edited book with pictures and drawings that helps teachers with ideas for hands-on projects. Good valuable information on many organisms.

Loucks-Horsley, S., Hewson, P. W., Love, N., & Stiles, K. E. (1998). *Designing professional development for teachers of science and mathematics*. Thousand Oaks, CA: Corwin Press, Inc. This book is targeting teachers' skill development yet is a good resources for teachers to get ideas on how to develop inquiry-based knowledge.

Osterweis, Rollin G. (1953). *Three Centuries of New Haven, 1638-1938*. New Haven and London: Yale University Press. Essential to anyone with a desire to study New Haven history, especially in industrial development; also, immigrant and cultural history.

International Reading Association (2002). *Second language literacy: A position statement of the International reading association*. Describes the position that the association has in respect to literacy instruction for second language learners.

Kerrod, R. (2002). *How science works: Discover the secrets of science with exciting, accessible experiments*. Dorling Kindersley Ltd.: New York. An excellent background book with scientific information, historical connections and sample experiments that will help any adult enhance children's understanding of science. In addition, the pictures and information are up to date and it looks very attractive.

Science Made Simple Educational Magazine [www.sciencemadesimple.com](http://www.sciencemadesimple.com) This is a website that is very good for teachers to find answers to simple questions and also full units can be view. The units take a specific question and build a unit using scaffolds that build the understanding of the scientific concept behind it.

Thompson, C. L. & Zeuli, J. S. (1999). *The frame and the tapestry: Standard-based reform and professional development*. In *Teaching as the learning profession: Handbook of policy and practice*. L. Darling-Hamond & G. Sykes, Editors. Jossey-Bass Inc.: San Francisco. This is an excellent book for best pedagogical and staff development practice.

York, P. *Experiment cards*. Dorling Kindersley Ltd.: London. This is a book of illustrated and step by step direction for quick and easy

experiments.

## **Reading List for Students**

Beals, Carleton. (1953). *Our Yankee Heritage: The Making of Greater New Haven*. New Haven: Bradley and Scoville, Inc. A good read, making use of fiction and the dialogue among characters to make New Haven's story come alive. Suitable for students who are good readers.

Durkin, Marguerite, ed. *A Guide to New Haven's Neighborhoods*. New Haven: The Office of Community Relations, Yale University, 1978. A handy informative glimpse into New Haven's neighborhoods. Especially helpful are the 1970 census map, list of service agencies and various tables and charts giving neighborhood statistics.

## **Other Resources**

Zehnpfennig, G. *Ecology for young people: A teacher's guide to stimulating topics for research projects and classroom discussion*.

Sneed Collard, Action for Nature and Carl Dennis Buell. *Acting for Nature: What Young People Around the World Are Doing to Protect the Environment*.

Kevin Hillstrom and Laurie Hillstrom (Editors). *Biography Today: Profiles of People of Interest to Young Readers (World Leaders Series, Vol 1: Environmental Leaders)*.

Adrienne Olmstead. *My Nature Journal: A Personal Nature Guide for Young People*.

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