METROPOLITAN UNIVERSITY
GRADUATE SCHOOL OF ENVIRONMENTAL AFFAIRS
SAN JUAN, PUERTO RICO

# EDUCATIONAL LESSON: STREAM AND WETLAND

Partial requirement for obtaining the Master Degree of Arts in
Environmental Studies in Environmental Education

By
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**DEDICATORY**

*This work is dedicated to all the YMCA Camp Chingachgook Outdoor Educators that work day by day offering the best education any child can receive.*

*"Thanks YMCA Camp Chingachgook for been my playground all these years"*

## ACKNOWLWDGEMENTS

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## ABSTRACT

This research is established to find new and dynamics ways to teach the course of Streams and Wetlands at the YMCA Camp Chingachgook, New York. During the study we indentify the main constrains of the Center for the internship toward the education, the ecological characteristics of the stream and wetlands ecosystems and designing a lesson plan for the course of streams and wetlands for environmental interpretation.

The Purpose of this study was to enrich the Environmental Education Program at Camp Chingachgook in 2009 by development of an extra-curriculum guide for the outdoor educators in the area Streams and Wetlands. For the develop of this new tool we use the analysis of the New York State Educational Curriculum, the North American Association of Environmental Education Non-Formal Educational Standards and the main constrain of the principal environmental organization in the United State (e.g., WET Project, Wild Project, EPA, FWS Service and more).

# EDUCATIONAL LESSON: STREAM AND WETLAND

## CHAPTER I

## INTRODUCTION

### BACKGROUND:

The YMCA Camp Chingachgook has been serving kids, families and schools for approximately 95 years. Since the 1913, its mission has been to educate and to emphasize the values of respect, responsibility, honesty and caring. These values have been the foundation of the Outdoor and Environmental Education programs of the Camp Chingachgook.

These Outdoor and Environmental Education programs serve approx about 12,000 individuals, schools, and families who seek to develop their leadership skills, and improve their knowledge in environmental courses. These courses and trainings are offered by people who come from different parts of the United State and also outside of the nation. Also, the staff that works at Camp Chingachgook has different educational background from High School Diploma to Graduated School Degrees. This ethnic and academic diversity gives to the center a different and dynamic approach to the courses that are taught (García, 2003).

Furthermore, Camp Chingachgook allows environmental educators to develop their own lessons without having to be assessed by the Director of the center before being taught. This allows the courses offered to be more flexible but on the other hand jeopardized the integrity of quality of the lesson taught (Gutiérrez, Benayas, Pozo, 1999). The excellence of the courses it had been deteriorated by the lack of knowledge that educators had about the curriculum (Simmons, 1990) of New York and which are the theoretical frameworks established by the major environmental organizations such as the NAAEE, UNESCO, and others.

In addition to that, for a long time, educators have become used to redundancy in the lessons taught regardless of the grade or the subject (Garcia, 2003). These lessons are often full of subjective information and not based in scientific data (Hungerford, Peyton, Wilke, 1980; Shatz, 1996; Garcia, 2003). This behavior has been more commonly observed in the ecology courses, especially the course of Streams and Wetlands.

Of course, Camp Chingachgook for the past few months has been improving the quality of the course using the following methodology:

1. The coordinator of environmental education reviews and has supervised with more frequency the classes than the educators teach.
2. Have offered more frequent training for certain classes: Lake Studies, adaptations and others.
3. The OE coordinator is giving more background information about the classes to be taught.
4. Educators have been more willing to seek other sources of information.
5. Camp Chingachgook has been improving their lesson plans and outdoor education guidelines.
6. Request to the Metropolitan University of Puerto Rico to made a Streams and Wetlands Lesson Plan.

All these changes and improvements have been realized with the goal to fulfill the goal of the environmental education that is to foster clear awareness of, to provide every person with opportunities to acquire the knowledge, values, attitudes, commitments and skills needed to protect and improve the environment; to create new patterns of behavior of individuals, groups

and society as a whole toward the environment" (Tbilisi Conference: mentioned by Peyton, 1980).

**Justification**

As a center for Outdoor and Environmental Education we need to solve the problems that arise when we establish the free will during the process of teaching environmental courses (Garcia, 2003). The independence of teaching cannot be excuse to sacrifice the quality of the courses that have been offered (Hungerford, 1987; Simmons, 1990) here until now in Camp Chingachgook. For this reason it was necessary to develop a guide with clear objectives, lessons divided by grade and detailed descriptions of the national and international standards for environmental education.

For that reason Camp Chingachgook requested to the Metropolitan University to develop an extra-curriculum guide for outdoor educators in the area of Stream and Wetlands. This is the highest demanded environmental course at Camp Chingachgook.

The stream and wetlands course has been provided to all sectors of education from preschool to adults. During the spring of 2008, about 1190 students took this course during their visit to the center. The 64% of the student who took the course of stream and wetlands that spring was attending $5^{th}$ and $6^{th}$ grade of elementary schools (Camp Chingachgook, 2008).

For the high demand of the course of stream and wetlands in the environmental center we decided to develop a **Streams and Wetlands: Environmental Educational Activities Guide**. This guide not only includes examples of activities that can be taught but also included lessons

based on the academic standards of the New York State, national and international organization that establish the guidelines of the non formal environmental education.

**Goals and Objectives**

Goal:

To enrich the Environmental Education Program at Camp Chingachgook by the development of a Lesson Guide for the Stream and Wetland course.

The objectives are:

1. Identify the main constraints of the Center for the internship toward the education program at camp Chingachgook.
2. Identify the ecological characters of the stream and wetlands ecosystems.
3. Design a Lesson Plan for the curse of Streams and Wetlands for environmental interpretation.

## Chapter II

**Theoretical framework:**

### What is Environmental learning or Environmental Education?

The ultimate aim of education is to shape the human behavior. The societies throughout the world establish educational systems in order to develop citizens who will behave in desirable ways (Hungerford, Volk, 1990). Now, these groups are oriented toward the development of values that translated, ultimately into action to solve the problems that are occurring in our planet today (Hungerford, 1977). To solve this problem education is again re-introduced as alternative to sculpt the behavior of human with his environment (Palmer, 1998). This educational technique will be known as Environmental Education (EE).

The Environmental Education refers to programs or process where we are trying to help participants to develop: (1) improved knowledge about the "natural" environment; and (2) an understanding of how human and non-human elements of that world are interrelated (Shatz, 1996).

The Belgrade Chapter in 1976 states that the goal of EE is to develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations, and commitment to work individually and collectively toward solutions of current problems and the preventions of new ones.

The objectives of environmental education (EE) as defined by the 1978 Tbilisi Intergovernmental Conference on Environmental Education are as follows:

- Awareness- to help groups and individuals acquire an awareness and sensitivity to the total environment and its allied problems [and/or issues]
- Sensitivity – to help social groups and individuals gain a variety of experiences in, and acquire a basic understanding of, the environment and its associated problems [and/or issues]
- Attitudes – to help groups and individuals acquire a set of values and feelings of concerns for the environment and motivation for actively participating in environmental improvement and protection.
- Skills- to help social groups and individuals acquire skills for indentifying and solving environmental problems [and/or issues]
- Participation- to provide social groups and individuals with the opportunity to be actively involved at all levels in working toward resolution of environmental problems [and/ or issues]

By using these objectives, we might define environmentally responsible citizens as ones who have (1) an awareness and sensitivity to the total environment and its allied problems, (2) a basic understanding of the environment and its allied problems, (3) feelings of concern for the environment and motivation for actively participating in environmental improvement and protection, (4) skills for indentifying and solving environmental problems, and (5) active involvement at all levels in working toward resolution of environmental problems (Hungerford, 1990).

Similarly, The North American Association Environmental Education (NAAEE) in 1996 states that environmental education is rooted in the belief that humans can live compatibly with nature and act equitably toward each other. Another fundamental belief is that people can make

informed decisions that consider future generations. Environmental education aims for a democratic society in which effective, environmentally literate citizens participate with creativity and responsibility.

Environmental Education is crucial if our planet is to survive the rapid advancement to technology, consumerism, and the push for urbanization (Ford, 1986; Rees, 2003). Environmental Education provides the knowledge and skills that individuals need to protect and improve the environment for all livings things (Cantu, Desjean-Perrota & Mosel, 2008).

To accomplish that goal, teachers and educators must be aware of the factors that shape their personal understanding of the environment and those of their student. A critical analysis of their personal belief and the influence of the social context of those beliefs is an important step in environmental education (Cantu, Dejean-Perrota & Moseley, 2008; Robertson, 1993; Walls, 1992). According to the NAAEE Guidelines (1996) "educators must processes the understanding, skills and attitudes associated with the environmental literacy" and "environmental literacy hinges on understanding the processes and systems that comprise the environment, including, human systems and their influence". The underlying assumption of the NAAEE Guidelines (1996) is that teacher and educators have a working knowledge of environmental literacy and a clear understanding of how this knowledge affects environmentally sounds behaviors (Cantu, Dejean-Perrota & Moseley, 2008).

Adding to this, evidence is begging to accumulate establishing that traditional schooling's focus on individual, isolated activity, on symbols correctly manipulated but divorce from experience, and on de-contextualized skills may be partly responsible for our school's difficulty in teaching process of thinking and knowledge construction (Knapp, 1992a.). In the book Education Goes

Outdoor establish children (and the adults they will become) need the emotional experience of feeling the out-of-doors (Johns, Liske, Evans, 1986). This includes using all the senses: taste, smell, touch, sight, and hearing – in a total operation to absorb the various moods of the out-of-doors.

In these form activities that use the processes of observing, classifying, describing, measuring, inferring, and predicting build skills that will continue to be important throughout life (Johns, Liske, Evans, 1986). Research indicates that students retain more knowledge through using thinking processes than studying factual information or even broad conceptual material (Johns, Liske, Evans, 1986; Ford, 1986; Knapp, 1992a.; Simmons, 1995). An inquiry approach along with student involvement in highly affective setting provides an extremely motivating and stimulating curriculum.

**Why the education should go outside?**

Go outside and play! What an easy thing to say to a child these days, or no? In a typical week, only 6 percent of children, ages nine to thirteen play outside on their own (Louv, 2007; National Sporting Goods Association, 2007). The children now prefer to be more time in front of the computer, television or any electronic game instead of going outside to climb trees and play hide and seek (Nie & Erbring, 2000; Kraunt, Lundmark, Patterson, Kiesler, Mukopadhyay & Scherlis, 1998). The author of the book: "The last child in the wood" Richard Louv in 2005, stipulates that society and modern culture has developed fearful children to experience directly with nature.

These disorders contrary to other disorders do not have any prescription medicine. It just requires that the family, school and society reinstated this individual to its natural environment (Wood & Pennock, 2008). In essence, the education of a child should not be restricted to the classroom, it has to go outside.

Traditional education leads to children and young people having general concepts on natural systems. But this knowledge is not constructive if it is not complemented by direct experience with the natural resources. Kanpp in 1992a established that learning is a process of knowledge, not of absorbing and recording pieces of separated information. Kahn in 1978 said that "schooling is much like learning to ride a bicycle, by reading about it, diagramming it on the blackboard, dissecting the bicycle – but never actually riding it". If the kids and youth do not experience the natural process in the field is like the process of learning to ride a bicycle but never having the chance to really riding it.

This traditional process of learning not only increases Nature Deficit Disorder, but also decreases the process of knowledge that students are receiving (Wood, Pennock, 2008). Right now, society is trying to emphasis a new technique of learning. These techniques include classes in the outdoor incorporating the concepts learned in the formal classroom but instead of inside the school this lessons are developed outside (Simmons, 1996).

When education happens outside the classroom it is known as outdoor education (OE). Ford, 1986 defined "Outdoor education is the education in, about, and or, the out of doors". Also, the outdoor education applies to a wide variety of learning experiences that takes place outside the classroom, and to the skills, appreciation, and attitudes needed to obtain maximum satisfaction from the outdoors (Johs, Liske & Evans, 1986). Outdoor education can occur in outdoor settings, from a school yard in industrial neighborhood to a remote wilderness setting, in swamps, meadows, forest, shores, lakes, prairies, deserts, estuaries, and all the biomes (Ford, 1986).

The outdoor education or OE that subset of environmental learning that involves direct exposure to physical and biological phenomena in the field – addresses not only 'the facts' about the

interactions between people and nature, but also, about the imperative of caring for the environment (Palmer, 1998).

These bring to us the purpose of outdoor education that is related to implementing the cognitive, psycho-motor, and affective domains of learning for the sake of the ecosystems itself (Ford, 1986). In this way youth are encouraged to develop a curiosity about the world, to look at things with open mind, to avoid making decisions as much evidence as possible has been collected, and to make decisions based on the evidence found in the field (Clerkes, Haras, 1997). In this case we educated the society about the environment not only using concepts also with experience of been part of the process (Simmons, 1996).

Knapp (1992b.) said that outdoor education is one way to improve teaching and learning through direct experiences but direct experience is not enough. If such experience are to be meaningful and applied to life situations, teacher and educators must help students to learn carefully planned and guided reflection sessions. It is important for educators to make outdoor education an integral part of the curriculum, not a negotiable frill base on the affluence of a school district.

Due to the need inferred by both the literature and personal experience in environmental education, a paradigm is proposed which would permit curriculum developers and others to specifically plan for training in environmental action as an integral and substantial component in this field (Hungerford, 1977). The North American Association Environmental Education (NAAEE) established that environmental literacy depends on the level of preparation of the teacher or educator who is giving the course. They state that the educator has to prepare lesson plans according to the grade, the needs of the student, the subject to be taught and the knowledge that their students have (NAAEE, 1996).

**Can outdoors Education Centers help to meet the need of environmental education?**

Centers for Outdoor Education (OE) are a type of facilities and extra-curricular spaces equipped with the infrastructure and resources to develop environmental education activities outside schools (Gutiérrez, Benayas, Pozo, 1999). These initiatives extra-academic (non-formal) is regularly targeted by teaching methodologies not directives, flexible, playful, and participatory; similarly placed in direct contact with the visitors as children, teenagers or adults with primary processes of the world around us (Guitiérrez, Benayas, Pozo, 1999; Cooper, 1999; Shatz, 1996)

In general terms, speaking of outdoor education center we can highlight the following important features (Guitiérrez, Benayas, Pozo, 1999; Cooper, 1999; Minnesota State Dept. of Natural Resources, 1992):

1. They are a heterogeneous group of spaces and facilities located in extra-curricular activities in some cases in natural areas of high ecological interest, in other cases are in areas of high environmental risk, and many other urban centers or nuclei full of rural, agricultural or industrial.
2. They are endowed with a diverse range of facilities that offer the possibility of hosting a part-time or complete, visitor can stay in one or several days to develop optional activities, and they can use the classroom for the developing of workshop or simply visits within a few hours and outside of the facilities available.
3. Have an explicit educational project, whose aims and objectives are routed to develop attitudes of environmentalists and ecological distribution of content related to natural and artificial environments.
4. They have a wide range of materials and resources for the development of educational tasks and learning pathways.

Under the generic name of outdoor education center are integrates an amalgam of such facilities as classrooms for nature, farms, schools, learning field and experimentation school ecology centers, sea classroom, urban classrooms, and nature centers. All these initiatives are focused on environmental conservation and development of environmental education programs.

The outdoor education center can be use for instructional use of natural and built laboratories beyond the school to expand and enrich learning-developed (Knapp, 1992b). Considering that this type of residential environmental education centers includes facilities devoted to teaching K-post-secondary students (Minnesota State Dept. of Natural Resources, 1992). Establish a real tool for students to reinforce the concepts taught in the classroom as well as to have the opportunity of having direct contact with nature (Knapp, 1992b; Shatz, 1996).

Quite commonly the outdoor/environmental Education Center incorporate cooperative teaching and learning strategies and objectives in achieving awareness and appreciation of natural systems and knowledge of ecological principles and concepts (Knapp, 1986).The ecological principles and concepts are taught through activities such as waking in trails, playing simulation games (e.g., predator and prey role playing), or creating soil by combining parts (Knapp, 1986).

Also, these environmental centers offer an incredible variety of options for all ages, groups, and schools (Shatz, 1996). For this reason the center have to create a curriculum with lesson for all grades and all type of clients (Gutierrez, Benayas, Pozo, 1999). The educators need a good match between educational objectives, student's developmental levels and learning styles, educator instructional methods, and available facilities and resources (Richardson, Simmons, 1996).

Certainly, the outdoor educators have to create a safe place for learning, a community of learners. Such setting promotes appreciation, exploration, and discovery, and provides an intellectually open, stimulating, and exciting environment. In such an environment, students pursue their own ideas individually and in groups (Richardson, Simmons, 1996).

Environmental educators also have to maintain a broad range of comprehensive ethics education because their job is to provide general knowledge not to convince students of he/she believe (Desjean-Perrota, Mosely, Cantu, 2008).

The NAAEE states in 1997 that environmental education materials use for the center or the educator should:

- Foster awareness of the natural and built environment, an understanding of environmental concepts, conditions, and issues, and an awareness of the feelings, values, attitudes, and perceptions at the heart of environmental issues, as appropriate for different developmental levels.
- Rely on instructional techniques that create an effective learning environment. The material should be appropriate; learning should be based on learner interest and on the learner's ability to construct knowledge to gain conceptual understanding.
- Should build lifelong skills that enable learners to address environmental issues.
- Should promote civic responsibility, encouraging learners to use their knowledge, personal skills, and assessments of environmental problems and issues as a basis for environmental problem solving and action.
- EE materials should be well designed and easy to use.

Stapp and Cox in 1974 establish that there is no single teaching model that all students will respond favorably toward under all circumstances…It is important for an educator to asses his/her personal skills and the situation and blend teaching models in effort to achieve the best learning environment.

The effectiveness of the environmental education program will depend on the multidisciplinary instruction but with a strong science component. If the center and the school follow the guidelines set for the environmental education there learners will grows from awareness and understanding to concern and action (National Science Teacher Association, 1999).

If the schools and the outdoor centers work together and follow the guidelines for overcoming the news challenges of the 21st century we will success to accomplish our goals to develop a citizenry that is "knowledgeable concerning the biophysical environment and its associated problems"(Simmons,1991).

## Chapter III

## Methodology

I. We establish informal conversations with the employees of the YMCA Camp Chingachgook to collect data to determined the needs:

   a. Director of the Program

   b. Coordinator of the Outdoor Education Program

   c. Outdoor Educators

II. In the preparation of the Guide we consider the following fields:

   a. The acquisition of information to prepare the Guide for environmental educator in the Stream and Wetlands Curse.

      i. The data collect for the realization of the guide we are going to take it from environmental organizations with experience in the same framework as the Center for Environmental Education Camp Chingachgook:

         1. The Outdoor Educator Educational Guide from Camp Chingachgook
         2. WET Project
         3. Wild Project
         4. Frost Valley YMCA Camp
         5. EPA
         6. I. C.A.R.E. Environmental Guide

ii. For developing the lesson Plans we are going to use the concept of **I CARE**; (I) Interrelationships, (C) Cycles, (A) Awareness, (R) Resources, (E) Energy.

iii. For verifying the data acquired for the realization of the guide we use the standards set by the state of New York in Science and Mathematics classes as well as standards set by the NAAEE

III. Evaluating the Guide:

a. The Guide for Outdoor Educator of Stream and Wetland curse is going to be introduced during the training period of spring 2009.

i. In the training we going to teach:

1. How to use the guide?
2. What elements they need to develop a high quality standard lesson for the curse of Stream and Wetland?

ii. How they can evaluate the progress of the classes?

IV. Validation:

a. The validation of the lessons is going to validate by elite:

i. The Director of the Outdoor Education Program at YMCA Camp Chingachgook

ii. The Coordinator of the retreat and Weekend Program at the YMCA Camp Chingachgook

iii. The Mentor of the School of Environmental Education in the Metropolitan University

## CHAPTER IV

### Outline for the Outdoor Education Lesson Plan for the Streams and Wetlands Course

I. Introduction:

a. In this section we are going to introduce the main theme of the guide, the lesson plan for the course of Streams and Wetlands. In the first part we are going to introduce the definitions of environmental education, outdoor education and the role of these programs in the community and schools.

b. The objectives will be discussed in this section.

c. Will be introduced the main concept of the Guide that is, I CARE; (I) Interrelationships, (C) Cycles, (A) Awareness, (R) Resources, (E) Energy flow.

II. Lesson Plan Characteristics:

a. Age: In this section will determine the age sector.

b. Also, will describe the New York States Science, Mathematics and Technology Standards apply to our guide.

c. The guidelines for excellence in use of material will be discussed in this part. The discussion will be according to the materials are being use in the lesson plan.

III. Lesson Plan:

a. General Introduction of the theme: Stream and Wetland

b. Lesson Plan:

**1.** I CARE letter – The I CARE concept will be break up into 5 main lesson plans.

**a)** Abstract – A brief description of the lesson.

**b)** Objectives- What the kids or student will accomplish through the activity.

**c)** Skills- Which subjects are used in the lesson plan?

**d)** Standards- What Standards of the New York Education Department are use in this section of the guide.

**1.** Activities:

**1.** General Background Information: The first part of the lesson will have a brief background information about the letter to be discussed or taught (e.g., definitions, examples, and general information related to I CARE concept)

**2.** Introduction of the Activity: The Activity will be introducing as Activity **X**.

**a.** Title and reference, if this activity was take it from another source.

**b.** Purpose: Why we are doing this activity. In some activities will be include a background information about the activity to be made.

**c.** Location: Where should we make the activity?

**d.** Age: Which age group fit better to this activity? The educator can be capable to fit the activity to different group ages.

**e.** Time: How much time the activity takes? Remember this will depend of the dynamic of the group.

**f.** Materials: The educator is responsible to collect and have all the materials before the lesson.

**g.** Procedure: The Instructions that kids or the educator have to follow to make the activity.

**h.** Debrief: the activity will include several question to ask to student or a dynamic to make an assessment process of the activity.

**3.** Bridge: All the activities will be connecting by a bridge. This segment will explain what the educator has to do before each activity.

The Lesson will include approximately 3 activities. This will cover approximately one hour and forty-five minutes. Mostly of the classes are two hours or one and a half hour. The educator will determine for how long he or she will proceed with the activities.

IV. Appendix

V. Other information for the Outdoor Educator

**i.** More activities: This section will include other activities that the educator can exchange from the original version. The educator can also make a new lesson plan using the different activities either from the I CARE lesson plan or from Appendix educational activities.

ii. How to make an Assessment of Your Class? What You Need to develop one? – In this section will be discussed which questions the educator have to make himself before, during and after any lesson.

iii. The NAAEE Guidelines for excellence in their lesson plan through k-12.

1. In this section will briefly introduce the guidelines that educator should follow when educators are making their lesson. These guides will be divided by groups of age k-4, 5-8$^{th}$ and 9$^{th}$ and 12 grades.

iv. Other bibliography or internet source for Outdoor Educators.

v. In this section will be include a list of books that are available in the ERC, Camp Chingachgook library.

VI. Reference

## PROPERTIES OF THE GUIDE

General Characteristics:

1. The Guide have 6 lesson plans and 27 environmental activities
2. The Lessons are divided by the letters of the I.C.A.R.E. concept:
    a. (I) Interrelationships
    b. (C) Cycles
    c. (A) Awareness
    d. (R) Resources
    e. (E) Energy
3. Each lesson:
    a. Is independent and can be modified
    b. Include 3 activities
    c. Is Approximately one hour forty-five minutes long
4. The Guide provides:
    a. Extra-curricular activities to modified the exciting lessons
    b. Guidelines for educators to develop the curse
5. Theoretical Framework :
    a. Louv (2006), Nature Deficit Disorder
    b. Palmer (2008), education IN the environment
    c. Ford (1986), The outdoor education is the education in, about, and or, the out of doors

    d. NAAEE (1996), The environmental literacy depends on the level of preparation of the educator who is giving the course

2. The Guide is a Non-Formal Educational Guide
3. Interdisciplinary
4. Aligned to the NY Educational Standards and the Guidelines for Excellence of the NAAEE (North American Association of Environmental Education)
5. Based on Educational Constructive Aims
6. The Guide Provides:
    a. Different alternative to teach the class, by using scientific concepts, constructive activities, games and teambuilding activities
    b. The tools to approach the students with their natural environment establishing a instant relationship of awareness and caring for the natural world
    c. Tools for educators that have not an ecology, biology or education background
    d. Alternatives for developing the stream and wetlands course

# Project

# Streams and Wetlands:

# Environmental Education Activities

YMCA CAMP CHINGACHGOOK ON LAKE GEORGE

# Streams and Wetlands:

# Environmental Education Activities

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This publication is possible thanks to the agreement of collaboration for the establishment of the Center of Boarding School of the Masters in Arts in Environmental Studies of the School of Environmental Affairs (EAA) of the Metropolitan University (UMET) in collaboration with the YMCA Camp Chingachgook.

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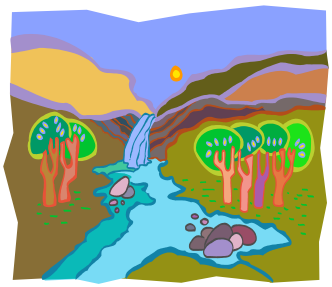


**Streams and Wetlands:**

**Environmental Education Activities**

**Introduction:**

The aim of education is to generate citizens responsible for the environment and the decision they make about it (Hungerford, 1990; Palmer, 1998). To accomplish this goal students have to learn about the natural process that occur inside the ecosystems, how humans impact these places and how we can improve and save our natural resources for future generations (D. Hammerman, 1973;Palmer,1998; Cooper, 1999).

Environmental Education has to be oriented toward the development of values that translated, ultimately into action to solve the problems that are occurring in our planet (Hungerford, 1977). To promote this type of behavior, Environmental Education is trying to help participants to develop: (1) improved knowledge about the "natural" environment; and (2) an understanding of how human and non-human elements of that world are interrelated (Curt, 1996; Palmer, 1998; García, 2003).

Environmental literacy has to transcend books and schools' walls. Environmental Education has to emerge from the school to the outdoors (R. Hammerman &W. Hammerman, 1973). If we want to change the perception of our kids and students about their natural world, we have to

connect them with the real world (Louv, 2006). Increasing the knowledge about nature and the appreciation the students have about the environment. In this way the knowledge that kids learn is not insulated and will be connected with the natural world.

Remember, kids are developing themselves in fast paces society where text messaging, internet and PSP are taking the kids' free time (Wood & Pennock, 2006; Louv, 2006). As educators, it is our job and responsibility to connect kids and communities with the environment, promoting the connection with their surroundings. It is our job and responsibility connects kids and communities with the environment, educating them and to make them feel the connected to their surroundings. As an outdoor center we have to work together with schools and communities to make kids and students felt more confident about being outside.

Outdoors center like YMCA Camp Chingachgook, provide communities and schools with the chance to enhance the process of learning about nature and increase the opportunity of being outside in direct contact with nature. To accomplish this, the lessons imparted by the educators at Camp Chingachgook have to be more diverse, with more connectivity with the subjects' taught in schools, and more neutral (D. Hammerman & W. Hammerman, 1968; Hungerford, 1987; González & Caballos, 1994, Woodhouse, Knapp & Clifford, 2000).

**Our Scenario:**

At YMCA Camp Chingachgook we have been taught excellent quality lesson for many years, but this society has change to meet the modern world's needs. Make kids and students more aware about the importance of our natural resources and why we need them. For this reason we decided to change and improve the Course of the Streams and Wetlands. Making a new lesson

plan that includes more information about the streams and wetlands ecosystem, how the educators can be more prepared, and what standards need to be taught.

We decided to improve the streams and wetlands class first because it is the highest nature class taught at camp Chingachgook. This class was taken by 64% percent of the students that visit YMCA Camp Chingachgook in the spring of 2007. Fifth grades account for the majority of students taking this course.

**The objectives of the Guide for Environmental Educator for the course of streams and wetlands are:**

1. To become a real tool for educators at the Environmental Education Center at the YMCA Camp Chingachgook.
2. To increase the knowledge of Issues and information among the students and educators in the area of streams and wetlands.
3. To increase the level of environmental sensitivity especially in issues involving the ecosystem of the streams and wetlands.
4. To increase the educator's skills to make new lesson plans using the standards inside the streams and wetland guide.

This guide is based on the I CARE concept of the YMCA. I CARE is being developed in different lesson plan to teach the kids about the different process that happen in the environment. These concepts promote the Hands On and the scientific learning processes of the natural resources.

I CARE Means:

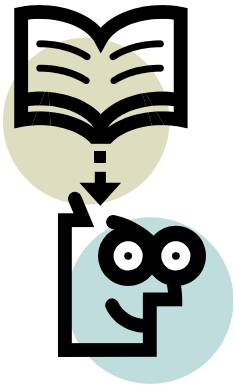
I – Interrelationships

C – Cycles

A- Awareness

R- Resources

E- Energy Flow



## Lesson Plans Characteristics

**Grades:** Variable

**New York Educational Department Science, Mathematics and Technology Standards used in the Stream and Wetland Lesson Plan:**

**Standard I:** Students will use mathematical analysis, scientific inquiry, and engineers design, as appropriate, to pose questions, seeks answers and develops solutions.

1. The Central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.
2. Beyond the use of reasoning and consensus, scientific inquiry involves the testing of proposed explanations involving the use of conventional techniques and produces and usually requiring considerable ingenuity.
3. Critical thinking skills are used in the solution of mathematical problems.

**Standard IV:** Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

A. Physical Setting

1. The earth and celestial phenomena can be described by principles or relative motion and perspective.
2. Many of the phenomena that we observe on Earth involve interaction among components of air, water, and land.

3. Matter is made up of particles whose properties determine the observable characteristics of matter and its reactivity.
4. Energy exists in many forms, and when these forms change in motion.

B. The Living Environment

1. Living things are both similar to and different from each other and non livings things.
2. Individual organism change over time.
3. Organisms maintain a dynamic equilibrium that sustains life.
4. Plants and animals depend on each other and their physical environment.

**Standard VI:** Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.

1. Through systems thinking, people can recognize the commonalities that exist among all systems and how parts of a system interrelate and combine to perform specific functions.
2. Models are simplified representation of objects, structures or systems use analysis explanations, interpretation, or design.
3. The grouping of magnitudes of size, time, frequency, and pressures or other units of measurement into a series of relative order provides a useful way to deal with the immense range and the changes in scale that affect the behavior and design of systems.
4. Identifying patterns of change is necessary for making predictions about future behavior and conditions.

5. In order to arrive at the best solution that meets criteria within constraints, it is often necessary to make trade-offs.

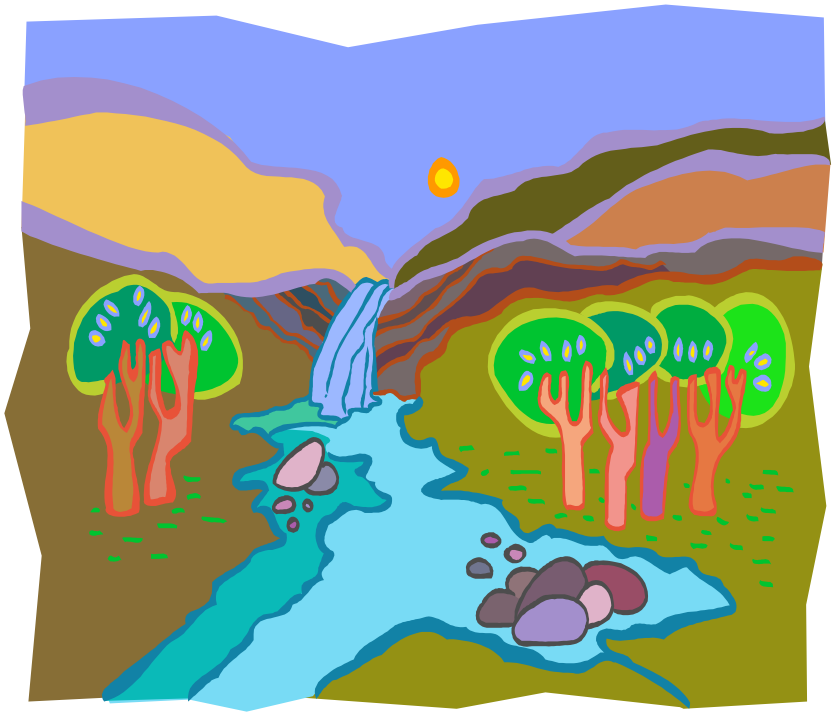
**Standard VII:** Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions.

1. Solving interdisciplinary problems involves a variety of skills and strategies, including effective work habits; gathering and processing information; generating and analyzing ideas; realizing ideas; making connections among the common themes of mathematics, science, and technology; and presenting results.

**The guidelines for excellence in use of materials will look at the following points:**

1. **Depth:** Students will develop the terminology involve in the Stream and Wetland Course. They will also determine the conditions, problems, interactions related to these ecosystems.
2. **Emphasis to action:** The lesson plan is organized in the I CARE concept. This concept will help to promote the civic action through the learning and experience process. This will establish a direct bridge between scientific knowledge and the civic responsibility.
3. **Emphasis on the use of Skills:** During the activities students are responsible of collecting the data, analyze and conclude on it. Student are responsible to finds the answer and the possible solutions to the problems that the educator set up for them.
4. **Instructional Soundness:** Students are going to use different skills during the lesson. These educational strategies encourage the practice of art, communication skills, teambuilding, math, theater, and others.

5. **Utility:** The lesson plan is for the use of all Outdoor Educator. Educators can decide if they want to change or modified the lesson plans. The lesson plans include General Background information, Standards, Instruction and Materials, Debrief Question and possible Extension for the classes that makes the lesson plan more easy to use.



# Streams and Wetlands:

# Environmental Education Activities

Freshwater wetlands

(Johnson & Smith, 2006)

## General Information:

Freshwater wetlands are found in low-lying areas and also at higher elevation. Wetlands provide a mix of conditions favorable to New York variety of plants and animals. More than 40 different kinds of wetlands are recognized in the state, ranging from beds of submerged aquatic plants, such as wild celery rooted in the bottom of the Niagara River, to towering hemlock swamps in the Adirondacks. New York's wetlands also include forested and shrub swamps, marshes, wet meadows and peatlands. Some wetlands, such as the Montezuma Marshes between Syracuse and Rochester are enormous extending over many square miles. Some wetlands have standing water or water-soaked soils year-round while others are often dry for portion of the year.

New York has about 2.5 million acres of freshwater wetlands, covering about 9 percent of the state's landscape. About 75 percent of the state's wetlands are in the Ontario Lake Plain, the St. Lawrence River Valley, and the Adirondacks. About one sixth are characterized by sedges, rushes, grasses, and other herbaceous plants.

Scientists estimate that about half of New York's original freshwater wetlands no longer exist. Most of them lost to draining and filling for agriculture and other development. While some wetlands types are still declining, others are actually increasing due to beaver activity, farm abandonment, and the restoration programs. Wetland protection laws, acquisition programs, and a growing public awareness of the value of the wetland have contributed to more security for wetland today. Nevertheless, they continue to be jeopardized by development, pollution, and invasive species.

*BLUE PLANET*
*Who live here?*
*Who depends on me?*

***Interrelationships:***

Plants and animals live in communities that meet their special needs and are connected through a "weblife".

***Standards:***

I.1, I.2, IV.A.1, IV.A.3, IV.A.4, IV.B.5, IV.B.6, VI.1, VI.2

***Skills****:*

Science, Language arts,


***Abstract:***

In this activity the students will determine the Interrelationship exiting between plants, animals, and non living organism inside the stream and wetlands ecosystem.


***Objectives:***

**The students will:**

- Determine different types of weblifes inside the wetland.
- Determine different types of weblifes inside the stream.
- Collect and observe different organisms in the stream.
- Connect in a weblife the organisms found in the stream.

**Background information:**

**How do plants and animals live with and how affect each other?** (***Ecology for every Kid- Easy Activities that make Learning Fun***, 1996)

When a group of organisms of the same species share the same area, they form a **population.** The term population also refers to the total

count of individuals within such as group. For example, the population of Riesel, Texas, is 846, which means that 846 people live in the town.

When different populations of species live together in the same area, they form a **community.** These organisms usually interact and depend on each other for existence.

Living things cannot live by themselves. In natural communities, each species is important to the survival of the community. The location and role or job for which a species is well suited within its community is called a **niche.** A niche includes the species' habitat, what it eats, its activities, and its interaction with other living things.

Some niches involve many organisms. For example, a squirrel's niche could start with the squirrel's nest in a tree. The squirrel eats nuts, birds' eggs, and other organisms, and it eaten by owls and other animals. Its waste droppings fertilize the soil, encouraging plant growth, and some of the nuts buried by squirrel grow into new trees. These are some of the activities that make up the squirrel's niche within its forest community.

**Lesson:**

After you gather your educational group, take them to the ERC. Use the trip to introduce the theme of the class, communities. For example, you can ask them: How would you describe your home? What things you need to survive? At this point, you can start to relate their conversation with the class.

When you arrive at the ERC (Environmental Resources Classroom) organize the group around the mid table, this way they can be able to see the activity better and it is the best way to have a nice discussion about it the class.

***As an alternative you can bring a box with the jars already containing the worms and use the picnic table as a resource.***

**Activity I:**

**Movers** (*Ecology for every kid- easy activities that make learning Science Fun,* 1996)

The staff or educator will have to prepare the activity before the group shows up, one or two day's priors to the class.

**Objectives:** To determine an earthworm's niche.

**Location:** ERC or outside by one of the picnic tables.

**Age:** 10-15

**Materials:**

- 2 cups (500ml) dark-colored soil.
- Large bowl
- Tap water
- Spoon
- Quart (liter) wide-mouthed jar
- 1 cup (250 ml) light-colored sand
- 1 teaspoon (15ml) oats
- 10 to 12 earthworms (from a bait shop or dig for your own)
- Dark colored construction paper
- Rubber band

**Procedure:**

**Before the class:**

1. Pour the soil into the bowl.
2. Slowly add water while stirring, until the soil is slightly moist.
3. Pour half of the moistened soil into the jar.
4. Pour the sand over the soil.
5. Add the remaining moistered soil.
6. Sprinkle the oats over the soil.
7. Put worms in the jar.
8. Wrap the paper around tha jar and secure it with the rubberband. Place in a cool area.

9. Observe the jar for a couple days.
10. When the jar is ready you can show to the kids the jar with the worms.

**During the class:**

1. Take the kids to the location
2. Keep the jar with the worms inside a box
3. Ask the kids:
    a. Where are the worms?
    b. Where do worms live?
    c. Who could live there? Write the answer in OE white board.
    d. Elaborate a diagram that included the worms, plants and soil in the white board and how the habitat of the worm is organized.
    e. How can they live together?
    f. How do plants and worms benefit from each other?
4. Introduce the concept of population
5. Take the jar and show it to the kids.
6. Ask the kids to describe what they see.
7. If you can, take one of the worms outside and show it to the kids.
8. Discuss with the kids the relationship between differents population.

***Bridge:*** Walk the kids out from the ERC. On the way out ask them if they can name any animal that can live around the building. Ask them if they can describe the animal's habitats they just mentioned. Walk down stairs and stop in the basketball field or the Center Green to introduce the next Activity.

When you get to your location ask them about what things they need inside their habitat to survive. They are going to recap the discussion early in the ERC. After they mention the properties of the habitat. Introduce the need and importance of food in any organism life. Introduce the second activity.

**Activity II:**

**Evolution in foodweb**

**Objective:** The kids will learn the connection between different organisms and how the are connected in the food chain.

**Location:** Any open space at camp

**Time:** 20 minutes

**Age:** 8-14

**Materials:** None

**Procedure:**

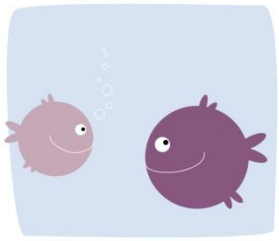
1. Ask the kids to make a circle, keep yourself in a place there they can see you.
2. Explain to them, "They are no longer humans" they are different organism that live in the streams and wetlands and as animals they have to survive in the wilderness.
3. Then, they have to play an evolution game:
    a. The game is going to follow the same rules of "rocks, paper, scissor"
        i. Remember: Rocks beats scissor, Scissors beats paper, Paper beats rocks
    b. The student who wins the round becomes the next organism in the evolution game and the person who loses start from the begging of the evolution stage.

c. The evolution stages are:

i. Everyone starts the game as a **weed**. As weed they have to extend their hand and walk wiggling until they find another weed.

ii. When the student (weed stage) finds another weed, they play rock, paper, and scissors. The winner becomes a **little fish.**

iii. **The little fish** is going to walk with their hands over their ears, moving, them in an up and down motion until he or she finds another little fish. They rock, paper and scissors and the winner becomes a big fish and while the loser goes back to being a weed again and start over the game.



iv. **The big fish** is going to walk with their hands together over their head and move their hands side by side to pretend to be a big fish; when they find another big fish, they rock, paper and scissors. The winner becomes a **Bald Eagle;** the loser becomes a weed again.

v. The eagles go around making the sounds of an eagle, and pretending that he or she is flying.

vi. **STOP THE GAME** WHEN YOU SEE THREE BALD EAGLES.

**Debrief the activity:**

1. Ask the kids to raise their hand to indicate whether they were: (1) weeds (2) little fish (3) big fish (4) Bald Eagle
2. Ask the children about their experiences (e.g., was it easy to get to the other stage? If not, why?)
3. Explain how this game relates to the natural world.

4. Ask, how different organisms survive in the same place, How organisms depend on each other?

***Bridge:*** When you are done debriefing the activity, start to walk them to the wetlands stop at the entrance of the wetland trail, and ask the students what type of animals and organisms can live in a place like that. Start to walk inside the wetlands and, on the way, talk about the characteristics of wetlands as habitat for animals. When you arrive to the Board Walk, introduce the third activity.

**Activity III:**

**Exploring the Wetland**

**Objective:** To observe and talk about different organisms that live in the wetlands and how they are connected.

**Location:** Wetland Trail

**Time:** 20 minutes

**Ages:** any

**Materials:**

- Who is living here? Board

**Procedure:**

- Explain the guidelines for hiking in the wetland and how they have to walk (single file line).
- Start the Wetlands walk.
- Stop at the **Who is living here?** board
- Read each the riddles on the board, when the answer is said, pull the riddle to see if the answer is correct.

- Discuss with the students how all of these animals can share the same place (house).
- Continue the hike, in the way point out the beaver dams, and possible niches for other animals.
- Discuss with the students about what they see and how many animals can live in such an environment.

At the end of the trail show the kids where the wetland start, ask: who lives here? Can you see any sight of animals in the area? Can you describe this area?

**Debrief the activity**

***Bridge:*** After the kids describe the area, point at the opposite site of the wetland (the stream). Ask them, what is the name of that place? Once they mention the stream, explain to them the difference between the two places. Ask the students how the speed of water can affect the organisms that live there? After the discussion you can walk the group to the stream section that you decide to develop your last activity.

**Activity IV:**

**Who is living in the fast lane?**

**Purpose:** To determine how animals can survive in this stream. Establish and recognize the weblife inside the stream. Find different species to determine what populations live in the stream, and how they live as a community.

**Location:** Stream in Brookside

**Time:** 35 minutes

**Ages:** Any

**Materials:**

- Stream investigation equipment

- Nets
- Cups
- Laminated Biotic Index
- Magnifying Boxes

**Procedures:**

1. Introduced the activity by asking the students to describe the stream (e.g., what is the speed of the water)? How does the speed of the water affect the plants and animals that live in the stream? Who could live there? How you can find out?).
2. Tell the students they will be catching organisms in the stream to determine what kind of organisms live in the stream.
3. Establish clear boundaries and set up expectations for minimal impact.
4. Demonstrate how they can find more organisms.
5. Set up a bin with water (cup) for organisms' observation.
6. After adequate collection time, reconvene and bring time to share their findings. Sum up the discussion with some of the concepts that may arise about who lives there, also discuss what things can affects their habitats and how?

***Wrap – UP***

- Ask the kids:
  - What is a population?
  - What is a community?
  - What are some of the animals and plants that they saw in the wetland?
  - How are they connected?

*Where are you going?*
*Cycles in the stream and wetland ecosystem for K-2*

***Cycles:***

The building materials of life (air, water, soil) are used over and over again.

***Standards:***

*I.1, I.2, IV.A.1, .IV.A.2, IV.A.3, IV.A.4, IV.A.5, VI.1, VI.2*

***Skills:***

Language arts, Creative movements, Science

**Notes: This activity required a lot pre-preparation before class.**

**Abstract:**

In this activity the student will recognize and described the water cycle.

**Objectives:**

**The students will:**

- Describe and learn the concept of water cycle.
- Illustrate the water cycle.

**Background information (www.usgs.gov, 2008):**

Earth's water is always in movement, and the **water cycle**, also known as the **hydrologic cycle**, describes the continuous movement of water on, above, and below the surface of the Earth. Since the water cycle is truly a "cycle," there is no beginning or end. Water can change states among liquid, vapor, and ice at various places in the water cycle, with these processes happening in the blink of an eye and over millions of years.

Although the balance of water on Earth remains fairly constant over time, individual water molecules can come and go in a hurry. The water in the apple you ate yesterday

may have fallen as rain half-way around the world last year or could have been used 100 million years ago by Mama Dinosaur to give her baby a bath.

**Where does all the Earth's water come from?**

Primordial Earth was an incandescent globe made of magma, but all magmas contain water. Water set free by magma began to cool down the Earth's atmosphere, until it could stay on the surface as a liquid. Volcanic activity kept and still keeps introducing water in the atmosphere, thus increasing the surface- and ground-water volume of the Earth.

**Lesson:**

Walk the students through an open space, the Center Green or Rotary Lodge if possible. When you arrive at your desired location, ask questions regarding WATER: What is water and how they can describe it? Where does it come from? After the discussion, introduce the next activity.

**Activity I:**

**Water here and water there** (www.epa.org/education/thirsty.html, 2008)

The students shall be able to

- Give an oral or written definition of precipitation.
- Tell at least two things that happen to precipitation after it falls to Earth.
- Give an oral definition of the concepts: aquifer and water table.

**Background Information:**

Precipitation is defined as water that falls to Earth in the form of rain, snow, or hail. Precipitation falls on all types of surfaces: water, mountains, grass, concrete and roof tops. Some of the precipitation evaporates, some runs down into bodies of water, and some seeps down into the ground and becomes part of the water table.

**Grades:** K-3

**Time:** 1 hour

**Materials:**

- Large paper grocery sacks for each child.
- Blue Crepe Paper
- Brown crepe paper.

**Terms you have to know:**

1. **Aquifer**: Porous, water-bearing layer of sand, gravel, and rock below the Earth's surface; reservoir for ground water.
2. **Precipitation**: water droplets or ice particles condensed from atmospheric water vapor and sufficiently massive to fall to the Earth's surface, such as rain or snow.
3. **Water table:** upper surface of the zone of saturation of groundwater.

**Advance Preparation:**

1. Cut grocery sacks (one per student).Make a hole in the bottom of the sack large enough for the student's head to fit through. Cut hole in each (short) side of the sack for the arms of the student to fit through. (Sack should resemble a t-shirt).

   **You can reuse the bags for features groups.**
2. Use blue crepe paper wrapped around a circle of chairs to form a body of water.
3. Use brown crepe paper wrapped around a circle of chairs to form a representation of an area of ground.

**Procedure:**

- Setting the stage
    a. Share Background information.
- Activity:

a. Give each student one prepared grocery sacks. Have each one draw a large raindrop on the front of the sack.
    i. Have 1/3 of the students also draw a snowflake on the backs on their sacks.
    ii. Have 1/3 of the students also draw a hailstone on the backs of their sacks.
    iii. Have 1/3 of the students also draw raindrops on the backs on their sacks.
b. Divide the students into groups. Each group should have some students dressed like rain, snow, and hail. Have one group stand behind the blue roped-off area and the other group stand behind the brown roped-off area. The snowflakes and hailstones should stand backwards so the pictures show.
c. Explain the activity to the kids.
d. Read the narration prompting students' movements as they dramatize the lesson.
e. **Narration:**
    - "Water falls to the Earth in three forms: rain, snow, and hail. This is called precipitation. Sometimes precipitation falls into a body of water". (Have one group jump into the blue "body of water").
    - "Snow and hail melt and become water. Sometimes precipitation falls on the ground". If enough precipitation falls to the ground, puddles may form. (Have part of the second group jump into the brown "ground" area).
    - "Snow and hail melt and become water. Some of the water runs off down a slope". (Have one student slide out from under the roped area).
    - "Some of the water seeps down through the ground (the students slowly squat), around rocks, and through soil and other rocks until it reaches a layer that is already filled with water. This layer is called an aquifer and the water in it is

called groundwater. Gradually, the water in the puddles seeps down through the ground or it evaporates" (Have some of the students stand up slowly)

- "Some of the water from the aquifer is pulled up through a well by pumps and is used by people. We all depend on groundwater and it should be kept clean."

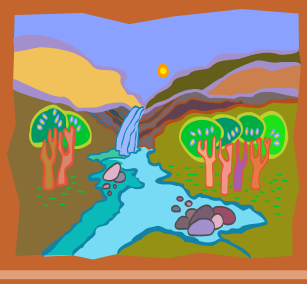
- **Debrief**
    a. Have the students draw pictures showing precipitation and water seeping down to an aquifer.
- **Extension:**
    a. Take the kids walking in the wetlands and pass them next to the stream.
    b. Discuss the water cycle in the streams and wetlands ecosystem.
    c. **Location: Outdoor**
    d. **Time:** 35 – 40 minutes
        **i.** Ask them how the water gets to that place.
        **ii.** Use the outdoors setting as a classroom (use the mountains to point out how the snow and hail get to the lake, and how the rain affect the zone).

**Wrap-Up:**

**1.** What is a cycle?

**2.** Can you explain the water cycle

**3.** How the water cycle is related to the streams and wetland?



*Where are you going?*
*Cycles in the stream and wetland ecosystem for 4th-8th grade*

***Cycles:***

The building materials of life (air, water, soil) are used over and over.

***Standards:***

*I.1, I.2, IV.A.1, IV.A.2, IV.A.3, IV.A.4, IV.A.5, VI.1, VI.2, VII.2*

***Skills:***

Science, Arts, Interpreted hike


***Abstract:***

In this activity the student will recognize and described the water cycles.


***Objectives:***

**The Students will:**

- Describe and learn the concept of water cycle.
- Illustrate the water cycle.
- Establish the differences in each stage inside the water cycle.

**Background Information** (Biggs, Kapicka& Loundgren, 1998**):**

The water is the most common liquid on Earth. It covers three-fourths of Earth's surface and makes up 70 to 95 percent of the weight of living things. Water has some extraordinary properties. Water molecules have the ability to attract and bond to other water molecules. Because water is strongly attracts to other molecules, it takes a lot of energy to make water evaporate. As water heats, its molecules vibrate

faster and faster. As more heat is applied, surface molecules begin to separate from the rest and evaporate into the air.

The evaporated air goes up into the sky and when the conditions are perfect (pressure, temperatures, altitudes and other) the air falls back to the surface of the Earth as $H_2O$ molecules. This water can fall over the ground or other bodies of $H_2O$. This process can repeat over and over.

**Lesson:**

When you gather the group, walk them to the activity location. When you arrive at the location, you can start to talk about water. What are the properties of the water? How these characteristics affect the stages of the water? And how these stages are reflected in nature? At this point you can introduce the first activity.

**Activity I:**

**Introducing the water movement**

**Ages:** 9-14

**Objectives:** The students will learn the concepts of water stages

**Materials:**

- One jar of hot water
- One jar of ice
- One jar empty

**Procedure:**

- Bring the two jars outside and set your class at one of the picnic tables (you also can use the ERC).
- Introduce the theme and discuss the background information.

- You can start to talk about the water and how the heat (energy) makes the molecules of the water move, this movement is what we call boiling. When there is enough heat the molecules of the water start to break from solid to vapor. Show to the kids the hot water. There should be vapor coming out.
- Pour the hot water inside the jar of ice.
- Observe how the ice starts to break and melt. During this process, you can observe the vapor coming out the jar.
- Discuss the process of the water cycle in the environment.

**Debrief:**

- Ask them about the different stages, and what it look like. (Liquid, solid, and gas).

***Bridge:*** After you're done with the first activity walk the kids to an open space. When you arrive to your location ask the students how the water stages are presented in nature? Ask them to describe it? After they describe the water stages in nature, you can introduce the water cycle concept. Ask them, how they can define the water cycle, and how water moves around the Adirondacks? After the discussion you can start the second activity.

**Activity II:**

**WATER CYCLE SPRINT** (*I. C.A.R.E., 2007*)

**Ages:** 9-14

**Objective:** To learn the concepts and terms of the water cycle

**Setting:** Field, or other open space.

**Materials:**

Four oranges cones or two ropes for making two lines

**Time:** 10 – 30 minutes

**About this activity**

This is an *I CARE* version of the game also know as “Ship to Shore” or “Captain’s coming”

**Procedure:**

- Ask participants to line up down the middle of the open space. Designate one direction to be the “sky” and the other to be the “ground” line.
- As an educator you have to announce a series of commands. The students must responds to these commands with a motion or an action. (For example, if you determined the left side as your sky and your right as your ground. The students have to move to the left if you scream sky).
- You can use the variations to make it more fun.
- Explain that anyone who moves in the wrong direction or don’t make the right command sits down.
- The game ends when you only have one left.
- You could add some drama by shooting a squirt gun in the air when you say “Precipitation”, or fool them with lines like “Perspiration!” or “Invitation!”

**Variations**

Once you’ve established the basic, add various weather/ water cycle related twist:

- Snowflakes: Participants move into groups of five and spin in a circle.
- Condensation: Two participants stand back to back, one with arms in the air like a blade of grass and the other making the shape of a dew drop.

- Cumulus Clouds: Participants pretend to float around in groups of three
- Hurricane: participants act like trees blowing in the wind.

**Debrief:**

Ask:

What is the relevance between this activity and the water cycle?

How they can describe the water cycle? How far the water can go? How the season or the temperature can affect the stage of the water?

***Bridge:*** After you finish the discussion of the second activity move the kids to the wetland entrance. Ask them if they can tell you how the water moves across the land. To accomplish this they will go in exploration hike. Start to hike the wetland and start the third activity.

**Activity III:**

**How the water runs?**

**Time:** 20-35 minutes

**Objectives:** The students will apply all the concepts already learn during a hike.

**Materials:**

- A piece of paper for each student.
- Pencil or color crayons.

**Procedure:**

1. Start hiking across the wetland walk and next to the stream.
2. Ask them, where the water is coming from?
    - How is the water get to that point?
    - How does the water cycle affect the water available is the area?
3. At the end of the trip, stop at one of the picnic tables.
4. Give them paper and tell to draw a water cycle using the places they saw on the hike.
5. Discuss and close your class.

**Debrief:**

Ask the students:

What was learned about the water cycle in the ecosystem you see?

What was your favorite activity? Why?

**Wrap-up:**

1. Which are the water cycle characteristics?
2. Which are the stages?
3. How the water cycle can affect the ecosystem?

*What is going on in my planet?*
*Learning how the watershed affects the stream and wetland ecosystem.*

***Awareness:***

Awareness leads to appreciation, which leads to action.

***Standards*:**

I.1, I.2, IV.1, IV.A.2, IV.A.3, IV.A.4, IV.A.5, IV.B.1, IV.B.6, IV. VI.1, VI.2, VII.2

***Skills*:**

Earth Science, Music, Language Arts, Art


***Abstract:***

The students will learn the physical process that occurs inside a watershed, and how this process affects the physical view of these ecosystems.


***Objectives:***

**The Students will:**

- Define the concept of watershed.
- Recognize the importance of resources for our lives and other organism.

**Background information:**

(*http://www.epa.gov/owow/watershed/whatis.html*, 2008):

**What is a watershed?**

It's an area of land that catches rain and snow and drains or seeps into a marsh, stream, river, lake or groundwater. John Weley Powell, scientist geographer, put it best when he said that a watershed:

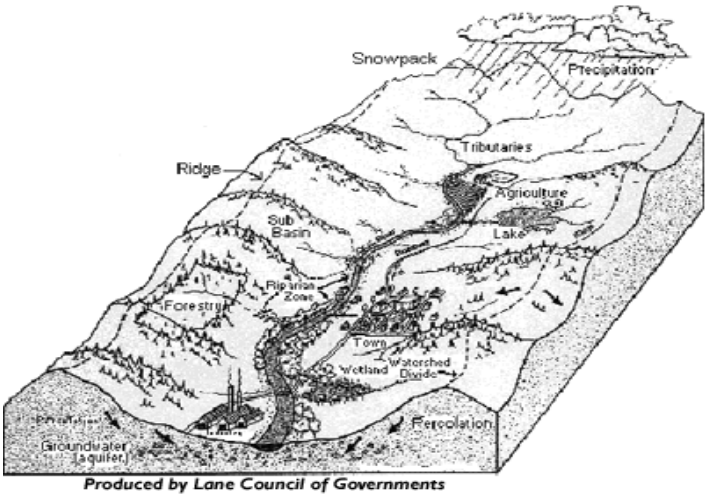
"that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community."

Watersheds come in all shapes and sizes. They cross county, state, and national boundaries. In the continental US, there are 2,110 watersheds; including Hawaii, Alaska, and Puerto Rico, there are 2,267 watersheds.

**Lesson:**

When you are taking the students to the ERC ask them to observe the landscape around camp. Is it flat? Is there any Mountain around camp?

After you arrive to the ERC you can ask the students to describe what they saw. How the contours or shape of the land can affect the water? What happened with the water in the top of Buck Mountain? After the students answer these questions you can start the first activity.




**Activity I:**

**Build a Watershed Model**

**Objective:** Activity 1A will help students understand the concept of a watershed, one of the most fundamental concepts in ecology and environmental studies. If students understand these concepts, they will begin to develop an awareness of their "environmental address"- a sense of their place on the globe and in the natural community.

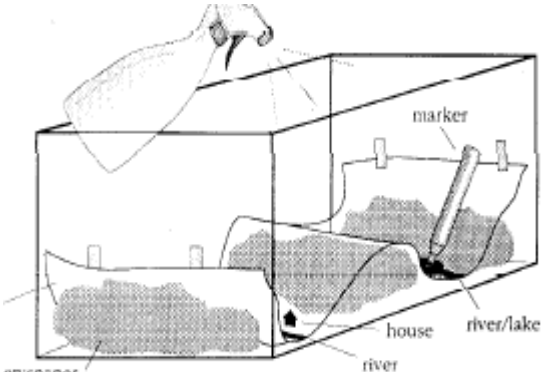
**Ages:** all

**Location:** ERC

**Time:** 35-40 minutes

**Activity 1A:**

**Materials:**




- Container
- Spray bottle with water
- Plastic sheet
- Waterproof magic markers
- Miniatures houses (Monopoly playing pieces)

**Procedure:**

1. Introduce the definition of Watershed to the kids.

2. If you have more than one container to work with, divide the class into groups to work on the watershed model set-up procedures below. If not, perform this activity as a demonstration.

3. Have the students crumble three sheets of newspaper and place them in the aquarium. Drape the plastic sheet over the paper, fitting it between the three pieces to form two valleys with a ridge in the middle. Tape the plastic to the walls of the aquarium to prevent

water from running down the side of the aquarium. You now have a model of three hills and two valleys.

4. Ask the students to describe what they think will happen when it "rains". Have them draw a river channel through the valleys on the plastic sheet, placing a few of the houses located alongside the river. Color in a lake where they expect the water to pool.

5. Gently spray some water into one half of the aquarium so that only one of the two watersheds gets wet. Point out how the water runs off the high points and forms a stream in the valley. This is how rain and melted snow run off the land. All of the land that drains into a stream is called watershed. Ask the students to think of a stream in town and talk about where the water comes from that feeds that stream.

6. Now ask the student what will happen when they spray water directly into the middle of the aquarium. Spray water so it hits the ridge between the two valleys. Some water will run into one stream, and some will run into the other. The ridge between these streams is called the watershed divide- it's the highest point of land between two bodies of water.

7. Ask the student if they can think of another stream in town and where there is a watershed divide that separates the two systems. Talk about the Continental Divide in the Adirondacks, where water gets to the Atlantic Ocean.

8. Call attention to how rapidly the water travels over the plastic surface. Ask the students what the plastic might represent in real life (pavement, roofs, others impervious surface).

**Debrief:**

- What is a watershed?
- Have you seen a watershed at home?
- How the human development can increase floods?
- What do you recommend to reduce flood in your neighbor?
- Is the rapid human growth beneficial to the natural ecosystems? If no, why?

***Bridge:*** After the kids are done with the experiment you can walk them out to the ERC's porch and ask them how the model is similar to the landscape in front of the porch. Show them using your hands how the water moves in the mountain. After that, you can start to walk into the wetlands. When you arrive to the entrance you can introduce the second activity.

**Activity II:**

**Following the watershed**

**Grades:** all grades

- Learn how the run off of the water cause accumulation of materials in the wetlands.
- Determine how the connection between the lake and the stream is affected for the amount of materials blocking the watershed.

**Materials:**

None

**Location:** Wetlands walks

**Time:** 20 to 30 minutes

**Procedure:**

1. Bring the kids to the wetlands trail.
2. Tell the instruction about how they have to behave in the area:
    a. All the students have to walk in a single file line.
    b. Anybody is allowed to walk in front of the leader or behind the sweeper.
    c. They students are not allowed to take or touch anything without the authorization of the educator.
3. When you start to hike, show the Beaver's dam,
4. Ask:
    a. Why do the beaver build these structures?
    b. What happen with the water that comes from the mountain?
    c. Is this type of structure interrupting the watershed function? Why?
5. Keep walking until you get to the wetlands dock.
6. Ask the kids:
    a. How you can describe the movement of the water?
    b. Are there any obstructions in the watershed?
    c. Where is this water ending?
    d. Is this the only water that goes to the lake?
7. Describe why all the organic material is in the bottom of the wetlands, and where most of the organic material comes from.

8. Keep walking until the end of the wetland.
9. Stop and discuss what they seen

**Debrief:**

- How does the model is similar to the wetlands?
- What is the role of trees and other structures to control the speed of the water?
- How does the slope of the land affect the speed of the water?
- How are organisms affected with the speed of the water?

***Bridge:*** After you finish the wetland walk you can go to the stream. Ask them to describe you the land. How does the land affect the water? Can they describe the speed of water? Ask them if the water is going really fast, what type of sound will produces this movement? What is the sound that water produces when goes really slow? After they describe the sound of water related with the speed, you can introduce the third activity.

**Activity III** (*Frost Valley Camp, How to Build a Watershed Manual,* 2006)**:**

**River Sticks**

**Grades:** 10 to 12 grade (with younger ages use art sticks)

**Time:** 20 to 30 minutes

**Materials:**

- A medium sized stick for each student (You can collect the sticks during the wetlands walks, only for older students).

- The stream

**Background Information:**

This activity is a simply sensory lesson that opens a whole new perception of the world of running water for the students. By listening to a flowing river with river sticks, the students will be able to hear the force and power of even the smallest currents.

**Procedures:**

1. Begin by taking your students to an area with running a waterway, i.e. a stream, river, curb by a storm drain.
2. Give each student a stick and explain that the sticks can be used to transport the sounds (vibrations) of the water up to their ears.
3. Tell the students to insert one of the stick in the water and the other stick will be touching the ear. Like a telephone.
4. Give the group the freedom to listen to a variety of places and compare the sounds. If the water is not flowing at your location, try listening to water while someone taps on the surface on the water or try this with the miniature waterfall produced by a faucet.
5. Ask the student to write down a description of the sounds that they heard in each place. Encourage the group to share their findings.

**Variation:**

- You can also use a "Hang-o-phone" to listen to the water. In order to make a hang-o-phone, take a wire hanger and hold it upside-down. Tie one 12 inch piece of string to each side of the long wire of the hanger. Holding each end the strings to each of your ears, lower the hanger into the water and listen. The vibrations will travel up the wire and

strings and allow you to hear the water movement. Try comparing the sound of water movement to the sound crated when you tap the hang-o-phone on a hard surface.

**Debrief Questions:**

- What does the sound you heard from the water remind you of?
- Many people use the sound of water to relax. How does the sound make you feel?
- Name some natural areas where you can hear running water. Name some areas in a city in which you can hear the sounds of water running.

**Wrap-up questions:**

1. What is a Watershed?
2. Can you name any example?
3. How you can describe our watershed (Camp Chingachgook)?
4. How the slope of the watershed can affect the speed of the water?

*What can I use from this planet?*
*Discovering the natural resources in the stream and Wetland*

***Resources:***

The decisions we make everyday have lasting consequences.

***Standards:***

*I.1, I.2, IV.1, IV.A.3, IV.A.4, IV.A.5, IV.B.1, IV.B.6, IV. VI.1, VI.2*

***Skills:***

Earth Science, Math, Motion and Hiking


***Abstract:***

Through the experience and experimentation students will determine the importance of the ecosystems inside the Stream and Wetlands.


***Objectives:***

**The students will:**

- Determine which types of organisms live and benefit from this ecosystem.
- Determine the importance of the wetlands as natural filter.
- Determine the importance of the soil inside the wetlands.

**Background Information:**

The natural resources are those material provided by the planet. The come from natural process like: water, soil, trees, oil and others.

The natural resources may be either *renewable* or *nonrenewable*. Renewable resources are those that are replaced in nature at a rate close to their rate of use. Nonrenewable resources exist in fixed amounts or are used up faster than they can be replaced in nature.

The stream and wetland are very complex ecosystems and they

provide us with lot natural resources. We can use the vegetation, animals, water, soil and other natural material for our benefits.

Streams and wetlands play an important role as habitats for a lot of organisms that we use later. This habitat could be permanent or temporal. A lot of organism use the stream and the wetland as a nursery and when they grown up the move to the lake or the ocean (e.g., salmon).

Also this type of ecosystem serves as flood control. The wetlands have an amazing capacity to store, and absorb great amounts of water. Most of the plants are adapted to absorb water, thus, keeping the water away from entering to the cities, houses or neighborhoods (e.g., mangroves).

Streams and wetlands also work as an excellent vacuum. They keep the pollution out of our water reservoir and lakes. Keep other areas clean. For example mangroves and Maple tree are found to be incredible species to absorb heavy metals as Mercury and other toxic material derived from the oil (H. Deng, Z. H. Ye, and M. H. Wong, 2004).

**Lesson:**

Walk the students to the activity location. When you arrive to your location introduce the subject of resources. Ask the students, what is a resource? And what type of natural resource they know? After the discussion you can briefly talk about natural resources, the difference between renewable or nonrenewable resources and the role of some of them. You can use the background information during the talk.

At this point you can mention soil as a natural resource. What characteristics does the soil have? and the role of soil inside an ecosystem like the wetland? In this section you can introduce the first activity.

**Activity I** (*www.epa.gov.watershed,* 2008)**:**

**Flood Storage**

**Overview:**

The students will observe how different soil components- peat, sand, gravel, and potting soil-

vary in their capacity to absorb and hold water. They will observe how peat, a component of

some wetland soils, is exceptional at absorbing large quantities of water.

**Background information:**

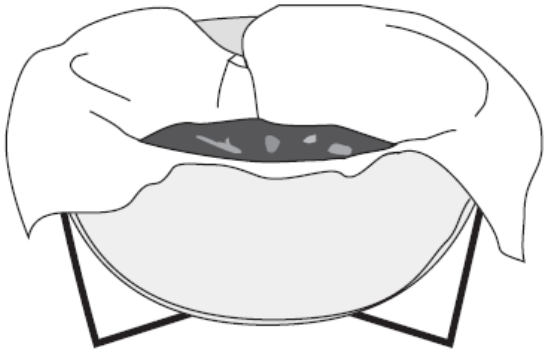
One important function of wetland is the capacity to absorb large amounts of water during rainstorm and to release it slowly over time to rivers, lake, and groundwater. This function prevents extreme flooding during storm and maintains a base level of water flow during dry spells. This water storage capacity is due in part to the presence of organic matter in wetland soils.

**Ages:** 10 to 12 (5$^{th}$ grade to upper grades)

**Location:** ERC or Picnic table

**Materials:**

- Peat moss, sand, gravel, potting soil
- Four sieves
- Cheesecloth or coffee filters
- Measuring cups
- Scales
- Copies of data sheet (appendix 1)



**Procedure:**

1. Break the groups with one sieve of material per group. If you have enough materials, give each group four sieves and samples of each soil type.

2. Place cheesecloth or a filter in each sieve and fill them with a different soil type.

3. Have students weigh out the filled sieve with the bowl on a scale and record this on the data sheet.

4. Instruct the students to fill the measuring cup with exactly one cup of water.

5. Pour the water into the sieve and let it soak in the bowl for 5 minutes.

6. Remove the sieve and pour the water out of the bowl.

7. Have the students re-weight the sieve, wet material, and bowl and record the weight on the sheet.

8. Now have the students calculate the percent of water absorbed by each material by subtracting the dry weight (A) from the wet weight (B) to yield (C). C/A x 100 = % water absorbed.

9. Have each group record its results on the blackboard and discuss the findings.

**Debrief Question:**

1. Which of the materials- peat, soil, sand, or gravel retained the most water? Why?

2. What factors influence the soil's capacity to hold or drain water? (Soil texture, its position the landscape, e.g., on a steep slope- *drains readily* – or low spot that collects water – *drains slowly.)*

3. What determines how much water a substance can hold? (amount of air [pore] space and shape of those pores)

4. What would happen to rainwater if there was nothing in the watershed (such a wetlands) to absorb it? (no buffer areas to absorb floodwaters, wouldn't be able to retain as much water in the watershed) What problems might this cause? (flooding of property during storms, little recharge of groundwater supplies)

5. Have any students had experience floods- in their own basements or in town?

6. Look through newspaper for articles about flooding. Do the news stories make any connections with the flooding to wetlands loss?

***Bridge:*** After the students learn about the role of soil inside the wetlands, explain how the type of soil can affect the wetland landscape and its function. Ask them what other things can affect the wetland function. Ask them, how the wetlands help environment and how we benefit from it.

Remember, some of the factors that can influence the wetlands are the slopes of the land, the presence of beaver that dams, the quantity of rain, among others. After you review which factors can affect the flow of the water, describe how the storage of water and intrusion of massive plants such as algae can influence in the function of this ecosystem as a habitat and as natural filter.

At this point you can start to walk to the wetland to start your second activity.

**Activity II:**

**Wetland Metaphor Bag** (Project Wild, 1986)

**Overview:**

Introduce common household items- sponge, sieve, coffee filters – as metaphors to the many functions wetlands provide. Working in groups, students will brainstorm which function each object represents.

**Objective:**

Students will use metaphors (familiar household objects) to help them understand some of the functions and values of wetlands.

**Background information:**

Many of the major characteristic of marshes, bogs, and swamps can be explored through metaphors. A metaphor an indirect comparison between two things – it gives a vivid image through comparison. Two examples: *A tree is a home, books are windows of though.*

For a review of the many functions of wetlands, refer to the background information. Use the table below as a guide to metaphors you can use and see if you can come up with some of your own.

| Object | Wetland Function |
|---|---|
| Sponge | Absorbs excess water, e.g., runoff, floodwaters |
| Bed | Resting place for migrating birds |
| Whisk | Mixes nutrients |
| House | Habitat for wildlife |
| Coffee filter | Purifies water |
| Sieve | Removes sediments from water |
| Food | Provides food for wildlife & people |

**Materials:**

- Sieve
- Whisk
- Beds (pictures)
- house (picture)
- Food
- Sponge
- Coffee filter

**Procedure:**

1. Prepare a *Mystery Metaphor Container (*pillowcase, bag, and box). This should be a container that the student can easily access to pull out at least one object.

2. Bring out the metaphor container or bag. Discuss the meaning of a metaphor and explain that objects in the container are metaphors for wetland functions.

3. Divide up the class into as many groups as there are objects in the container. Have each group pick an object and discuss the connection between their functions.

4. Ask student to summarize the major contributions wetland make to healthy habitat. Ask them if their own attitudes about wetlands are different as a result of doing this activity. If so, how?

**Extension**

You can do the activity during the wetlands walks. In that way they can see the metaphor with the environment.

***Bridge:*** After you finish the second activity with the students walk them to the stream. Discuss with them the importance of having a clean ecosystem. How clean water up stream can affect the downstream waters, the wetlands and eventually the lake? How the quality of the water that runs in the stream can affect the organisms that live there and in the wetland? How wetlands functions can be affected by this?

At this point you are going to introduce our last activity.

**Activity III:**

**How clean is this water?**

**Overview:** The students in this activity will learn how clean the stream is. They will learn that we are not the only ones that use water as a resource, so do other organisms.

**Location:** Stream between in Brookside

**Ages:** All

**Materials:**

- Stream investigation equipment:
    - Nets
    - Small bin
    - Laminated Biotic Index and Laminated list of animal Sensitive to pollution.

**Procedures:**

- Take the students to the stream to catch critters.
- Explain the boundaries and what they have to do.

- Show the kids how to catch critters using the net. After the demonstration gives the net to each student so they catch their own critters.
- Fill up a bin with freshwater from the stream. Show the bin with the water to the students and tell the kids that all the animals they catch have to go inside the bin.
- Remember they should only catch 2 organisms from the same species.
- All the organisms found in the stream have to go inside the bin with water.
- When you considered that is enough time for the activity call back all the students.
- Gather all the students around the bin and collect the nets.
- Take the ***Sensitive to Pollution*** Sheet and showed to the students.
- Ask;
    - What does pollution mean?
    - What critters are inside the bin?
    - Comparing with the **Sensitive Pollution Sheet,** Is the water clean?
- Conclude the class explaining how and why the water is so clean and discuss with them what they can do to improve the quality of the water?

**Debrief:**

- Ask the students:
    - Why is the water in Lake George so clean?
    - How the organisms benefit from clean water?
    - How can we benefit from clean water?
    - What we can do to improve the quality of water in the lake and water in general?

**Wrap-Up questions:**

1. What types of resources can you find in the stream?
2. What types of resources can you find in the wetland?
3. What is function of soil in the wetland ecosystem?
4. What is the importance of wetlands?

**The energy that makes us growth**

How the energy cycles affect the stream and wetland productivity?

***Energy Flow:***

The sun is the source of energy for all living things.

***Standards:***

*I.1, I.2, IV.1, IV.A.3, IV.A.4, IV.A.5, IV.B.1, IV.B.6, IV. VI.1, VI.2, VI.4, VI.6, VII.2*

***Skills:***

*Life and Earth Science, Chemistry, Math*

**Abstract:**
The students will learn the energy cycles and how they affect life inside the ecosystem.

**Objectives:**

**The students will:**

- Learn the energy cycle.
- Identify the different parts inside the energy cycle.
- How the energy cycle affects the ecosystem.

**Background information:**

Energy is important because it powers all life processes. It provides organisms with the ability to maintain homeostasis, grow, reproduce, move, and carry out other life functions.

Organisms obtain energy from the food they eat or, in the case of plants and several other types of organisms, the food that they produce. Plants can produce their own food

when they obtain the energy directly from the sunlight; this process is known as Photosynthesis.

For Instance, when you pick an apple from a tree and eat it, you are consuming carbon, nitrogen, and other elements the tree has used produce the fruit. That apple also contains energy from the sunlight trapped by the tree's leaves while the apple was growing and ripening.

**Energy Cycle** (*The Water Educational Training, (WET),* 2002)**:**

The energy Plants obtained from the sun is turned into food (chemical energy) that they use to grow. Because plants produce their own food, they are knows as **Producers**.

The animals that get their energy from eating plants are known as **Primary Consumers.** The animals which obtain energy by eating other animals are known as **Secondary Consumers.** All the energy is passed forward in the food chain until the organisms die. Then, decomposers break down the bodies and turn into nutrients used by plants. To start the energy cycle over again.

**Lesson:**

After you gather your group, ask the participants, what is energy? Why do we need energy, and where it comes from? At this point, you can introduce the definition of energy and talk about the background information. Also, you can introduce the different types of energy classification and show the students examples of producer, consumers and decomposers.

Go inside the wetlands trail and talk about the different types of organisms that live in the wetland and what classification they have. At this time you can introduce the sun as our main source of energy. Remember, the sun makes it possible for all plants to produce their own food so animals can eat the plants and get their energy and the fungi decompose what is dead.

When you are inside the wetland you can show the students how the energy moves from producer, through consumer and later to decomposer using the first activity.

**Activity I:**

**MAGIC CIRCLES (***Frost Valley*: *How to Build a Watershed Manual,* 2006)

**Energy flow:** The sun is the source of energy dir all living things.

**Age:** 9-12

**Goal:** To help participants see how a small- scale wetlands ecosystem uses energy from the sun to support all its members.

**Location:** Wetland area.

**Materials:**

One hula hoop per group of three or five participants

One magic circle activity sheet per group (page 66)

One pencil per group

**Time:** 20 – 30 minutes

**Background:**

An ecosystem is a community of organisms interacting with one another, as well as with the environment in which they live. Whether the ecosystem is large scale (the entirety of the Kattskill, for instance) or small scale (within a hula hoop), its members depend on one another.

One way they are linked is through the flow of energy that comes from the sun and changes forms as it progresses through the food chain.

Here are some common terms you might find useful when discussing an ecosystem:

- Producers: Mostly photosynthetic organism that use light energy to make sugar and other organic compounds. The organisms use the sugar and organic material as fuel for cellular respiration, as well as for growth.
- Consumer: Organisms that obtain their food by preying upon other organisms or by eating particles of organic matter.
- Decomposer: Organisms that help return nutrients and organic substances back to the ecosystem by feeding on and breaking down matter.

**Instructions:**

- Ahead of time, be sure to scope out an area where participants will likely find good examples of producers, consumers, and decomposers.
- Set up enough hula hoops for each group in one area. Leave five or six feet between each hoop.
- Begin by defining what an ecosystem is and explain how each organism in an ecosystem fulfills a role, whether it is as a producer, consumer, or decomposer.
- Ask them about how they can describe the wetland? What is the importance of these ecosystems for all the organisms that live in?

- Ask participants to break off into small groups and find a hula hoop that the groups can use as an "observation area".

- Ask the participants what they notice within their group's hula hoop. After about ten minutes, hand out the magic Circle activity sheet (activity in Appendix, page 66**)** and give the groups five minutes to fill it out.

**Extensions:** Students could use the magnifiers or the magnifying boxes to identify more organisms.

**Debrief:**

- What did you find inside the hula Hoop?

- Do you think these organisms can be found around the wetland? Why?

- Point out any cases in which participants found multiple producers, consumers, and decomposers.

***Bridge:*** After you finish the first activity discuss the role of the producers, consumers and decomposers inside the ecosystem. Ask them if they can mention any examples when you are taking them to the next location. You can make your next activity in open space like Baxter Park. When you arrive to your location you can gather your participants and form a circle in the field. Introduce the theme or subject of food chain relating the last activity with the energy flowing inside the ecosystems (i.e. primary consumer gets their energy eating plants or producers).

Discuss this for a few minutes when you think they are ready, introduce the second activity.

**Activity II:**

**Ecosystem Webbing Game** (*Discover Wetlands - A Curriculum Guide*, 2008*)*

**Grade**: K-12

**Location**: Open space

**Objectives**: Students will understand that in an ecosystem there are many relationships between living and non-living things and that some of those relationships are based on a cycle of nutrients in the system.

**Method:** Student will discuss ecological concepts and play a food-webbing game.

**Materials:**

- Ball of heavy cotton string (or yarn),
- index cards that contains examples and pictures of the sun, producers, consumers and decomposers

**Procedure:**

1. Sit in a circle and hand students an index card with pictures of the sun, producers, consumers and decomposers.
    a. Each student needs to briefly read over the information in the index cards.
    b. Explain that you are going to build an "ecosystem" (a web of life showing in interconnections between and among components in a wetland).
2. Give a ball of string to the student who is the "sun".

3. Discuss why the sun should start the web (i.e. the sun is the source of energy for plants to produce chlorophyll for their food).
4. The "sun" then passes the ball of string to the next link of the web, explaining why and what is the eco-connection between them (i.e. the sun can passed the ball of string to a algae or plant because they use the sun to produce chlorophyll).
5. Each student, in turn, passes the ball of string to another student, each time, explaining the connection and holding onto the string so that a web is formed (Note: make sure the kids follow the food chain rules, also as an effort to have a successful activity the ball of string can only be passed to the students who have not yet had a turn).

**Debrief:**

a. What is the connection between the non-living things and the living things inside the web?
b. Can you mention more examples of food chain
c. What is the role of the sun in the chain?
d. What happen if there is any missing part of the web (i.e. there is no plants, because human development).

***Bridge:*** After discussing the food web and how the energy moves in this web, you can tell them that they are going to be texting their knowledge through a critter hunt activity. At this point you can move the group to the site in the stream that you decide to develop the activity. When you are in the location, you can explain the components of riverine food web (using the background information from the next activity) and how the energy and the web move across the stream.

**Activity III:**

**I'm going on a critter Hunt.**

**Objectives:**

The students will determine the productivity of the stream. They will establish this observing the organisms inside and outside the creek.

**Background information:**

**What are the different components of a riverine food web?**

- **Drift** consists of the algae, bacteria, and detritus that flow through the water.
- **Grazers** like snails eat algae, moss, and bacteria.
- **Decomposers** like bacteria break down plant remains.
- **Shredders** like mayfly nymphs eat bigger plant remains.

**How do the upstream and downstream segments of a river differ?**

Upstream segments of a river may be cool, fast-flowing and rocky, but as a larger river flows downstream, it slows and spreads out throughout its floodplain. Marsh-like habitats can develop along the riverbanks. Trees cannot shade the entire river so the water temperature rises.

**What do rivers and streams provide?**

- Transportation, food, drinking water, and recreation

**Ages:** 10- upper

**Time:** 30 minutes

**Location:** Stream in the Brookside

**Materials:**

- Fish nets (one for each participant)
- Bin
- Magnifier glasses
- Pencils
- Paper

**Procedure:**

1. Tell the students to look around.
2. Talk about the background information with the participants.
3. Ask them, what types of producer and consumer can they see?
4. Explain to them that they are going to make a real food chain with organism of the stream. To accomplish this activity they will have a net to collect organism inside the riverine area.
5. Give them the fish nets, and set the boundaries.
6. Tell them too look for critters everywhere, down logs and rocks.
7. Fill up a bin with water and show students where the bin is located so they can put inside all the critters they find.
8. Tell them to observe everything they grab (i.e., if the grab a rock inside the water, Is this rock surrounding by algae?)
9. When students are done collecting, ask them. What they found, which organisms are producers, consumers or decomposers?

10. Give them paper and pencil so they can draw a food chain using the organism they found in the stream.

**Question to continue the activity:**

1. What happens if you remove one of the components in the ecosystem? (e.g., if you take away the decomposers)
2. What happen if we build a dam? What happen with the organisms that depend on the nutrients and plants of this area?

**Wrap-up:**

1. What is energy?
2. What is an energy food web?
3. Mention 2 examples of produces
4. Mention 2 examples of consumers
5. Mention 1 example of decomposer
6. What is the role of the sun inside the web?
7. How the human intervention can affect this web?

# Appendix:

## Flood Storage Data Sheet

| Material | Dryweight(A) | Wetweight(B) | B – A = C | Percent(%)water absorbed = (C/A) x 100 |
|---|---|---|---|---|
| *Peat* | | | | |
| *Soil* | | | | |
| *Sand* | | | | |
| *Gravel* | | | | |

**Magic circles activity sheet**

Find something in your circle that begins with:

**S:**

_____
_____

**H:**

_____
_____

**A:**

_____
_____

**R:**

_____
_____

**E:**

_____
_____

**Is there anything in the circle that is NOT important to the ecosystem?**

_____
_____
_____

**In your circle, find an example of:**

- **A producer (use photosynthesis)**

_____

- **A consumer (eats plants or animals)**

_____

- **A decomposer (breaks down dead matter)**

_____

# More Resource for the OE staff

**WATER WALK** (*Frost Valley How to build a Watershed Manual, 2006)*

**Grades:** Elementary

**Objective:** Earth and Life Science, Social Studies

**Materials:** Paper and pencils for each student

**Information:**

"The joys of exploration are as varied as the numbers and character of the explorers themselves, and the joys change during the lifetime of each person." – Charles William Beebe

We as humans need and use water in a wide variety of ways throughout our lives form nutrition to industry to transportation. Many students do not realize the importance of water in our lives as in the other life forms with which we share the planet's water. An adult human can live for approximately one month without food, but only a few days to a week without drinking water. We need water for every system in our body. Water makes up 83% of our blood and approximately 70 % of our brain. Water helps digest our food and keeps or bodies cool.

All plants and other animals also need water. Some desert plants have huge root systems that utilize every ounce of water in meager water supplies available to them. Saltwater animals have special filtration systems in their bodies that separate out the salt from the water. Water is one thing we all have in common. Every living thing needs water to survive.

**Procedures:**

1. Have the student list of the ways that people use water. Ask them to then rank ten most important water uses and state why their first choice is the most important.

2. Take the student for a walk around the property and grounds and ask them to look for the uses of water in action. Instruct the student to add the uses they find to their current list.

3. When the lists are completed, discuss their findings. Add all of the different organisms they found that were using water in the area (i.e. kids, plants, birds). Talk about any examples of water being wasted in the area (i.e. dripping faucets, students allowing the drinking faucet to run while they talk).

**Variation:**

- Do this activity in a variety of environments (inside the school, out in a field) then compare and contrast how water is being used in each location.

**Watershed Discussion Questions:**

- How is water used in New York City? In the Adirondacks Watersheds?
- Why is water important to both the Adirondacks community and New York City residents?
- What water uses do you have in common with someone in another community?

**WHAT DO YOU THINK? (*I. C.A.R.E.*, 2007*)***

**Awareness:** Awareness leads to appreciation, which leads to action.

**Ages:** All

**Goal**: To teach participants basic concepts and general knowledge about reptiles and dispel many misconception and irrational fears surrounding them.

**Instructions:**

Open by explaining to the participants that you will be discussing reptiles and hope to challenge the stereotype that they are scary, ugly, or mean animals.

Define *reptiles*: A cold- blooded vertebrate that has an external covering of scales or plates and breaths by means lungs.

On your whiteboard write a list of statements a person might make about reptiles, including facts as well as misconceptions, (For ideas, see the examples following theses instructions.)

Read each statement aloud. Have participants give a "thumbs-up" sign if they think it is true or a "thumbs-down" sign if they think it is false. Those who aren't sure can hold their thumbs sideways.

Tally the responses after each question and allow the participants to share why they answered true, false, or not sure.

After the students have shared their options, give them the most accurate answer or acknowledge the participant(s) who answered the questions correctly.

**Examples**

- **Reptiles are scary and creepy**
    - ***There is no right or wrong answer:*** You are just gauging the participant's points of view on the topic. Note: *You can ask this question at the end again to see if anyone's views changed.*
- **All turtles are slow**

- ***False:*** Many turtles are slow. Some of the big tortoise, for example, walks at a pace of 1/8 of a mile per hour- compare that to the average speed of people, who walk about three miles per hour! A few turtles, however, can really move fast. For example, in one hour, green sea turtles can swim *twenty* miles.

- **Lizards and snakes are slimy.**

  - ***False:*** Like all reptiles, snakes and lizards have dry skin. But many amphibians – salamanders and some frogs- are slimy. Their skin contains glands that produce mucus, which helps to keep the animals from drying out.

- **Most snakes are poisonous to people.**

  - ***False:*** less than 10 percent of all snakes have venom that is capable of harming people. More people die each year from bee sting than snake bites.

- **Some turtle can live more than 100 years.**

  - ***True:*** The oldest know turtles was thought to be at least 152 years old when or died – and the tortoise did not even die of old age! This captive's tortoise might have lived a lot longer if it had not accidentally taken a fatal fall.

**THE TROUBLE WITH TURBIDITY** (*Frost Valley How to build a Watershed Manual, 2006)*

**Grades:** middle and upper

**Objectives:** to measure the amount of turbidity caused by materials suspended in water

**Subjects:** Earth and Life Science, Chemistry, Social Studies, Health

**Materials:**

**Materials:** Black paper (2 sheets), a large glass jar, a flashlight, Water, Silt or fine dirt

**Background:**

Water's ability to dissolve just about any substance given the proper conditions and enough times has earned in the title of "universal solvent". Understanding the dynamics of substances dissolving in water can lead a student to a world of comprehension in subjects including drinking water can lead a student to a world of comprehension in subjects including drinking water potability, aquatic animal respiration and plant photosynthesis.

Water pollutants that are not fully dissolved in water are instead suspended, or buoyant, in the solution. The stirring of heavy sediment or foreign particles in a solution is referred to as turbidity. If some materials, like silt, are suspended in moderate amounts in water, the particles may actually serve as substrate or foundations upon which bacteria or other pathogens may remains dispersed throughout a water column for lengthy periods of time.

Suspended particles may also form physical barriers preventing light from reaching aquatic plants below the surface and/or curtailing the flow of oxygenated water through the respiratory devices of gill-breathing animals. If suspended particles carrying nutrients such as nitrates or phosphates settle out of water runoff, they may cause physical, chemical and even biological changes in a lake, estuary or slow-stream.

Whether sediments are affecting the capacity of the reservoir to hold water or the portability of our drinking water, suspension of substances in water is a concern to be explored. The following

activity will encourage students to investigate turbidity in water solutions and gain an understanding of the critical difference between dissolved and suspended substances.

**Procedures:**

1. This experiment is set up to demonstrate how you can measure the amount of the turbidity in water by measuring the amount of light penetration through
2. Wrap the paper around a jar and secure it in place.
3. Fill the jar ¾ full with clean water.
4. Shine the beam of light from the flashlight trough the holes in the paper. Observe and record the light intensity on another black sheet of paper as the beam emerges from the jar. (**Note:** To obtain a quantitative intensity measurement, use an inexpensive photographic light meter to check each of the samples.) The meter may be within your school's photography or science departments.
5. Add silt to the jar of water, shaking the jar to keep it in suspension.
6. Repeat step #4 and observe and record the reduction of light penetration through the jar. This could also be done in gradual steps, adding silt until it no longer dissolves and continuing until no penetration in evident.

**PUMP IT UP (*Frost Valley Watershed Manual*, 2006)**

**Grades:** middle and upper

**Objective:** to illustrate the movement of groundwater through soils

**Subjects:** Earth Science, Social Studies, Health

**Materials:** 2 liter clear plastic containers, pump sprayers from a bottle of all-purpose cleaner, small pieces of nylon fabric, masking tape or rubber bands, scissors, transparent straws, small rocks, clean sand, food coloring, spray container with water, disposable water syringe.

**Information:**

"It is until the well runs dry, that we know the worth of water" – *Benjamin Franklin*

It is said that at any given time, the world's fresh-water lakes in one hundred times that with nearly 30,000 cubic miles of water. Even this amount pales in comparison to the amount in the world's groundwater which is estimated to be 1,000,000 cubic miles of water. However, only a fraction of this underground reservoir can be actually be tapped and made available to us on a perennial basis through wells and springs. (*U.S. Geological Survey)*These are important points when you consider the fact that up to 80% of the Catskill Watersheds' resident use groundwater for their water supplies. (NYC DEP)

The flow model will help student visualize the movement of water through the ground recording the processes of tapping an underground reservoir and the effect of contamination of these resources.

**Procedures:**

1. Begin by having groups of students follow the directions for making a flow model.
    a. Secure a piece of nylon over the end of the pump sprayer with masking tape or a rubber band. The nylon will act as a pump screen.

b. Cut the top off of a plastic 2 liter container.

c. Insert the pump sprayer into the rocks and hold it vertically near the side of the bottle while filling the container with sand to within two inches from the top.

d. Insert a straw into the sand into the sand near the outside of the container opposite the pump sprayer.

2. Add water slowly to the containers to saturate the sand and rocks. Observe the water table in each and discuss how the addition of precipitation affects the level of a water table. The sprayers represent wells which will be operated to utilize the underground.

3. Use the pump sprayer to withdraw water from the flow model. During pumping, stops. Observe and record how the well is able to affect the level of the water table.

4. Draw the water level below the surface of the sand. Spil some “pollutant” (food coloring) on the top of the sand. Use the well pump to withdraw water from the model and observe any movement in the pollutant.

5. Spray water on the sand to simulate rain and draw water from the model with the pump. Observe and record the difference in the action of the pollutant when the chemical comes in contact with the water.

6. Next, add food coloring into the straw using a syringe of water and inject the pollutant into the top layer of water in the sand. Use the well pump to withdraw

water from the model and observe and record the difference in the action of the pollutant through the groundwater.

7. Take this opportunity to discuss the dynamics of aquifers and the process and time necessary to clean any contaminated groundwater.

**Variations:**

- Investigate how different soils influence the rate of groundwater flow by replacing the sand and rocks in the flow model with clay or other types of soil.

- Discover how much water different materials will hold by performing the following experiment. Begin with several containers holding the same amounts of different soil materials. Pour know quantities of water into each of the materials measuring the amount the soils are able to absorb. This experiment will help students discover the soil beneficial for groundwater supplies. For example, sand is ideal to get groundwater from because it holds water more than gravel, and also allows the water to flow faster than in clay.

- Further explore how water runoff from urban or rural communities and well use by adding this set up to the landform models in this guide's activity The Lay of the Land.

**Watershed Discussion Questions:**

1. Name something in your community that may contaminate your groundwater supplies (i.e. landfills, storm drain runoff).

2. What would a community do if their groundwater became undrinkable? To find out what New York City did when it was in that situation, see from Wells to Watersheds.

**Extension from Build Your Own Watershed** (www.epa.gov, 2008)

**Ages:** All

**EXTENSION FROM BUIL YOUR OWN WATERSHED** (www.epa.gov, 2008)

**Ages:** All

**Materials:** Same aquarium/container empty, Spray bottle with water, a few apple-sized rocks, sand, gravel, soil, clay, paper towels or small sponge, food coloring, wetlands plants-cotton swabs (painted brown), pine needles, dried flower heads

**Procedure**

1. Place the rocks in a heap at both ends of the aquarium. Put gravel around the rocks, and spread them out so that they slope downhill toward the middle of the tank. Place a layer of sand over the gravel, also sloping toward the middle. On one side of the tank, pack the soil on the top of the sand. On the other side, cover some of the sand with a thin layer of clay.

2. Ask the students what will happen when it rains. How will rain affect this landscape differently from the completely impervious landscape? Spray water into the tank, and watch how some of it runs over the surface and some of it sink in. The water that stays on top is called surface water, forming streams, rivers, ponds, lakes, oceans. The water that sinks into the earth (infiltrates or percolates) is called groundwater. As you continue

spraying water will accumulate in the air spaces (interstices) between the gravel and sand at bottom of the tank. This body of underground water is called an aquifer.

3. Now make a wetland. Review with the students the definition of a wetland and its characteristics: presence of water, special hydro soils, and water-loving hydrophilic plants. Take the small sponges, or a tightly rolled paper towel, and place it in the lowest part of your landscape alongside the river. Place the cotton swabs, pine needles, or other "wetlands plant" materials in the sponge. Continue spraying water into the tank. Get the soil really wet to create excess water running down toward the wetland. The towel/sponge should absorb the water and become saturated, slowing the flow to the river.
4. Introduce the functions of the wetland 1) by holding large quantities of water, it kept the river from flooding; 2) it slowed the velocity of water as it approached the river, preventing the sand and soil from eroding; 3) it acted as a filter by trapping soil from running directly into the river.
5. Now take the towel/sponge out and squeeze the water from it. This illustrates to wetlands act like a large sink by sorting water during storms and releasing it slowly during dry spells. In this way wetlands help to maintain a more even flow of water in our rivers, streams, ponds, and lakes, which is very important for the plants and animals that live there.

*Adapted from Water Watchers* with permission from the Massachusetts Water Resources Authority.

**Extension:**

Initiate a discussion about drinking water in your town. Ask student if they know where the water comes from when they turn on the tap. If you live in a rural or suburban area, chances are at least part you drinking water supply comes from surface reservoirs.

**WHO'S ROTTING THIS LOG?** (*I. C.A.R.E.*, 2007)

**Ages:** 8-11

**Goal:** To show participants how a fallen tree becomes soil and what roles different creatures play in this decomposition process.

**Setting:** Wetlands entrance (either the Mountainside or next to the basketball court).

**Materials:** Rotten log(s) or stump(s), paper, pencil, hand lens magnifiers or magnifying glasses, Optional: flag pins to mark discoveries

**Time: 30 minutes**

**Background:**

Where do plants get their energy? The sun is the energy source for plants. Right! What happens to fallen leaves in the autumn? They decompose. Decompose is a fancy name for "rot". Many types of organisms do the "breakdown" work to turn the dead leaf into soil.

What happens when the whole tree dies?

The same process happens, the sun hit the log helping to accelerate the process of decomposition (chemical compounds start to degraded the material of the wood). Fungi start to help the process of break down. Spiders, ants and other organism use this place as a habitat during the

decomposition process. Eventually this log becomes soil and provides nutrients to plants and other producer organisms to survive (Lynch, 2001).

So let's be scientists and see if we can identify the decomposers that are at work in a rotten log.

**Procedure:**

- Divide into groups of 2 to 4, have participants examine the log with hand lenses for different organisms.
- Check if there are any signs of life (e.g., ants holes, spider webs, and other)
- If you can see any signs of life they can write it down on the paper. (You can mark the organisms with a flag pin).
- Take the temperature outside the log and inside the log. (write on the paper)
- If the log is really rotten take a piece and squeeze making sure that the liquid falls inside a cup.
- Using a pH paper test determine the acidity of the log.
- Discuss the data found and answer the guided questions.

**GUIDED THEM WITH THESE QUESTIONS**

- Have you found anything with legs? What color are they?
- Have you found any holes? Do you know who made those holes?
- Have you found anything that is green?
- Have you found anything that's growing that isn't green? What could it be?
- What's the tiniest thing you've found?

**Wrap –up**

Discuss their findings. Have them discuss how the different decomposers (algae, fungi, mosses, insects, rodents, etc) find in the log, and what will happen to them when the log has completely broken down into dirt. What would happen if the decomposers were all destroyed by chemicals? If all logs were burned for firewood and not allowed to be decompose?

Ask them to discuss how long it takes to decompose an entire tree into soil. How much time? That's why it is so important to take care of our soils. If we let them erode into stream and rivers, it takes years and years to replace. Ask participants to think about what they could do at home to prevent soil erosion and to encourage decomposition to create new and better soil (composting, etc.)

# Guidelines for the Educator

**How to make an Assessment of Your Class? What You Need to develop one?**

**Progress Monitoring a Class**

Points to Ponder (take from MPS- Teach New to teaching, 2008)

- What academic goals do I have for learner (e.g., remembering, identifying, applying, comparing, and creating)?
- What behavioral goals do I have for learners (e.g., collaboration with peers, demonstrating respect)?
- What motivational goals do I have for learners (e.g., high levels of interest and engagement, belief in their ability to be successful)?
- Why are these goals important? What data am I basing this on?
- Are the more important goals?

**What strategies will I use to support learning?**

- Why am I using these strategies? What strategies might be more effective? What research evidence support these strategies?
- How will establish, monitor, and maintain learner engagement?
- How is instruction being modified to support the language learner?

**What will success look like?**

- How will I know success when I see it?
- How will I determine whether learners recognize success?

**How will I determined whether learners are successful?**

- How will I ensure that learners success? What are the criteria for success?
- How often and when will I monitor progress?

**What prior knowledge and skills do learners need to be successful?**

- Do all learners have a realistic opportunity to experience success?
- What will I do if learners do not have the prerequisite Skills?

**What do learners already know?**

- How will I determine what they already know?
- How do intend to build on what they already know?
- What are learners' attitudes toward this topic?
- How I am ensuring that learners focus to learners needs?
- How might I tailor the lessons to learner needs?

**What are learners' judgments of their ability to be successful?**

- How will I ensure that learners develop or maintain positive self-judgments of their ability?

**What are some challenges I expect to encounter?**

- What special circumstance of learners needs do I need to be aware of?

**How do I intend to address those circumstances or needs?**

- How might this special circumstance impede our ability to monitor progress?

## GUIDELINES FOR KINDERGARDEN TO FOURTH GRADE

Learners should be able to meet the guidelines included in this section by the end of fourth grade.

The kindergarten through fourth grade years is a time of tremendous cognitive development. By third and fourth grades, learners have developed some basic skills that help them construct grade guidelines as a target, extrapolating from this end goal appropriate activities and lessons for younger learners.

In these early years of formal education, learners tend to be concrete thinkers with a natural curiosity about the world around focusing on observation and exploration of the environment – beginning close to home.

**Examining Environmental Issues:**

Many educators believe that exploring issues helps fourth-grade learners make important links between conceptual understanding, what is happening in their community, and their own responsibility for environmental quality. Others caution that fourth graders are only beginning to synthesize their knowledge into the kind of complex understanding that is essential to examining environmental issues. When deciding how to handle environmental issues in the fourth grade classroom, educators must rely on their own judgment about what each class-and each student-is ready to handle.

Basic guidelines for examining environmental issues with fourth grades are:

- Keep it simple.
- Keep it local.
- Make close links with what they're observing and learning.

## GUIDELINES THROUGH FIFTH TO EIGHTH GRADE

Learners should be able to meet the guidelines included in this section by the end of eighth grade.

In the fifth through eighth grades, learners begin to develop skills in abstract thinking and continue to develop creative thinking skills—and along with these, the ability to understand the interplay of environmental and human social systems in greater depth. Environmental education can foster this development by focusing on investigation of local environmental systems, problems, and issues. As learners become actively engaged in deciding for them what is right

and wrong, educators can use environmental problems to help learners explore their own responsibilities and ethics.

**GUIDELINES FOR TWELFTH GRADE**

Learners should be able to meet the guidelines included in this section by the time they graduate from high school. By the end of twelfth grade, learners are well on their way to environmental literacy. They should possess the basic skills and dispositions they need to understand and act on environmental problems and issues as responsible citizens— and to continue the learning process throughout their lives. In the ninth through twelfth grades, environmental education can promote active and responsible citizenship by challenging learners to hone and apply problem-solving, analysis, persuasive communication, and other higher level skills—often in real-world contexts. in real-world contexts.

# Understanding the Local Environment

Experiencing and observing the local environment is an essential part of environmental education. Understanding their surroundings helps learners build a strong foundation of skills and knowledge for reaching out further into the world and deeper into the conceptual understandings that environmental literacy demands. Direct experience in the environment also helps foster the awareness and appreciation that motivate learners to further questioning, better understanding, and appropriate concern and action.

The following chart suggests ways in which learners at different grade levels might explore and understand the local environment. It is printed in each grade level section of these guidelines to help show progression as learners mature. Other ideas are included in the guidelines.

## Grades Pre K-4

Identify basic types of habitats (e.g., forests, wetlands, or lakes). Create a short list of plants and animals found in each.

Trace the source of their drinking water and where it goes after it is used.

Recognize resident animal species, migrants, and those that pass through on migratory routes.

Collect or produce images of the area at the beginning of European settlement.

Describe aspects of the environment that change on a daily, weekly, monthly, and yearly basis.

Record weather observations such as precipitation, temperature, or cloud cover.

Identify food crops that are grown or processed locally.

## Grades 5-8

Classify local ecosystems (e.g., oak-hickory forest or sedge meadow). Create food webs to show—or describe their function in terms of—the interaction of specific plant and animal species.

Describe how drinking water and wastewater are treated.

Map migratory routes of birds, butterflies, and other animals that pass through the area. Identify their local habitat needs.

Monitor changes in water or air quality, or other aspects of the local environment.

Identify species that are locally threatened, endangered, or declining in population. Describe their habitat needs.

Identify sources of electricity used in the community (e.g., hydroelectric, fossil fuels, solar, nuclear).

Describe the area's climate and identify factors that contribute to it.

Create a map for the local area that shows where food that is consumed locally comes from.

## Grades 9-12

Identify several plants and animals common to local ecosystems. Describe concepts such as succession, competition, predator/prey relationships, and parasitism.

Evaluate sources of nonpoint source pollution of local bodies of water, including sources that are not local.

Investigate short- and long-term environmental changes in a local watershed, and aquifer, or in air quality. Or document changes in land use and their environmental effects.

Research population trends for a locally threatened species. Describe changes, activities, and other factors that seem to affect the population trends.

Calculate the potential for generating wind or solar power on a particular site.

Trace human population trends for their region and make projections, based on research findings, for the future.

**Other Resources available:**

Activities and library Resources inside the ERC that you can use:

- Project WILD
- WET Project
- The YMCA "I CARE" Manual
- Ecology for Every Kid, easy activities that make learning science fun by Janice VanCleaves
- How to Build a Watershed? From the YMCA Frost Valley or the CD More Resources about How to Build a Watershed?

- Internet Pages that you can use:
  - http://www.education-world.com/a_curr/curr216.shtml
  - www.naaee.org
  - www.audubon.org
  - www.earthsky.org
  - www.ed.gov
  - www.education.usgs.gov
  - www.eelink.net
  - www.el.erdc.usace.army.mil/wetlands/ysi.html
  - www.emsc.nysed.gov
  - www.fws.gov/refuges/education/NatureOfLearning.html
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Other source:

YMCA Camp Chingachgook Outdoor Education Manual

# CHAPTER V

## Conclusions, limitations and Recommendations

Conclusions:

The Environmental Education is hunger for change and commitment of citizens to solve our human crisis. These problems can only be solving by educating our society to overcome the challenges from 21st century, the use and abuse of our natural resources (Smith- Sebasto, 2008; Venkataraman, 2008; Simmons, 1991; Hungerford, 1990).

The education these individuals receive has to be multi and interdisciplinary, providing different alternative to develop new and dynamics solutions to our environmental problems (Tréllez, 2000; Gardner, 1999). For this reason the education can not only be inside the traditional classroom, has to go outside (Palmer, 1998).

In our scenario the YMCA Camp Chingachgook is becoming an excellent tool for connecting young and adults to the environment. Not only connecting the individual to the outdoor but also providing the knowledge necessary to understand the natural process that occurs in nature. For this reason we provide an Environmental Activities Guide for the Curse of Streams and Wetlands. With this guide we establish a better educational and multidisciplinary tool for the educators that work in the outdoor center. With this new educational tool we expect to increase and improve the quality of the Streams and Wetlands Course.

If the YMCA Camp Chingachgook follows the guidelines set for the environmental education in ***The Streams and Wetlands: Environmental Activities***, the learner will grow from awareness and understanding to concern and action (National Science Teacher, 1999).

This Guide not only provide excellence guidelines for the outdoor educators that work in YMCA Camp Chingachgook also establish activities that are non-formal, dynamics and with high content of scientific material perfect for our teaching structure.

In conclusion, the quality and the excellence of the curses that we teach in Camp Chingachgook, including the Streams and Wetlands, will be depend if YMCA Camp Chingachgook follow the guidelines set for the environmental educational. These standards are specified in the Streams and Wetlands: Environmental Activities to help the outdoor educators to understand the importance of teaching activities dynamics, multidisciplinary and with high educational content.

**Limitations:**

1. The time of validation was limited.
    a. The YMCA Camp Chingachgook Outdoor Education Spring Season starts at the end of the month of March, when the presentation of the project was due on May, making the validation process limited.
2. The amount of information available was not enough and not updated to develop the guide and the theoretical framework.
3. The principals Environmental Education Materials (e.g., WET Project, Wild Project and EPA) are mainly prepared for formal educational curses. Where the students have more than one period learning one subject.

**Recommendations:**

1. The YMCA Camp Chingachgook should monitored and gave more often feedbacks to the educators, evaluated the educator in mid season and final season

2. The center should up-dated the Environmental Resources Classroom with more and new environmental books, more recent
3. Trained the staff or outdoor educator in the areas of: Guidelines For Excellence in the lesson plans NAAEE, the NY Curriculum Standards for K-12 and others

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