

The Hudson River: Communities & Biodiversity

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COVER SHEET

Project Description

This is the Science portion of a fifth grade interdisciplinary unit combining Social Studies and Science curriculums. The Goal is to promote ecological awareness in students. The focus is on American History, the Living Environment, and the Hudson River. Students will explore the relationship between the Hudson River and human and wildlife communities.

The Social Studies lens looks at the Hudson River importance in American History, from pre-colonial times through present day efforts to clean up and preserve the river.

The Science lens looks at the river's rich biodiversity. Students learn about temperate and river biomes. They learn about the flora and fauna that make up a complex and interdependent food web.

This focus serves to enrich students' understanding of local history and the importance of natural resources to our country's present and future quality of life.

Intended Audience

Grade 5, Regular Education

How long the instructional activities will take the student

The activities described in this unit may take an entire fall semester. The post activity capstone project of a Hudson River Web Site should be completed in the spring.

Each activity described in this unit plan may take longer than one day. Teachers may decide to assign the final projects as homework, or complete them during consecutive class periods.

Description of Pre-Activities leading up to the project

Echohawk by Lynda Durrant

Class reading: Echohawk by Lynda Durrant. This is about a colonial boy who was captured and adopted by the Mahican Indian tribe during the late 1700's. Read at beginning of year/Hudson River Curriculum. Students keep reading journals.

Library Research Skills

Searching skills using table of contents, indexes, and encyclopedias. Begin before Algonquian research.

Algonquian Way of Life

Conduct after reading Echohawk. Research using indexes, encyclopedias, Internet, and index cards. Students learn about the river's plants and wildlife.

Online Searching Skills

Begin after Algonquian research. Parallel and point of need instruction. Online Searching Skills unit may be found at: http://www.emslibrary.org/teacher_resources.htm

Online Collaborative Projects

Start at beginning of school year.

Journey North shows the importance of rivers for migratory species. Bucket Buddies compares water samples from ponds and rivers around the world

“Journey North: A Global Study of Wildlife Migration and Seasonal Change”
<http://www.learner.org/jnorth/>

“Bucket Buddies”
<http://k12science.ati.stevens-tech.edu/curriculum/bucketproj/index.html>

Field Trip and Environmental Workshops

Schedule as available. It is important to hold at least one workshop early in the year as introductory tool. Seining trips must be scheduled once a month starting in September.

Hudson River Education Programs-Field Trips
<http://www.hudsonriver.org/education.htm>

Clearwater in the Classroom
<http://www.clearwater.org/classroom.html>

Seining Field Trip

Conduct 3 times: September, October, and November. Seine for vertebrate and invertebrate life forms; take temperature readings on water, air; look for dissolved oxygen reading.

A seine is a large net with sinkers on one end and floats on the other that hangs vertically in the water and is used to enclose fish when its ends are pulled together or are drawn ashore. -Merriam-Webster Online <<http://www.m-w.com/>>

Seine Catch List

Students compile a list of flora and fauna that they find in the net. Give list to librarian for assistance in finding resources.

Description of Post-Activities

Hudson River Web Site

Capstone Project: Create web site directed to general public, business owners, and political leaders that describes the Hudson River's history, current usage, pollution, and what can be done to preserve the river's biodiversity and health. Site should also explain the importance of clean rivers and biodiversity.

Computer/Technology curriculum will focus on scaffolding skills all year such as how to design and build a web page. Students may select projects created during the year to display on site.

This project will demonstrate what students have learned all year about the importance of biodiversity. They will use the knowledge they have gained to create solutions to the problems of pollution and endangerment to various species that throw the ecosystem out of balance.

Students will self evaluate their project by using web evaluation rubrics such as Kathy Schrock's 5 W's of Evaluating Web Sites

<http://kathyschrock.net/abceval/5ws.htm>

Critical Evaluation of a Site: Elementary School Level

<http://school.discovery.com/schrockguide/evalelem.html>

Dissection of a Whale Fish

Conduct dissection after first river field trip and after students complete drawing the anatomy and physiology of a fish. Allow one fish per 2-3 students. See modifications under Activity Day 2.

Present Day Hudson River Model

Labeled natural resources that the River provides today (e.g. fish, wildlife, and plants); recreation, industry, and transportation. Optional formats include poster board or clay models, or any other illustrative format.

Diversity

The concept of diversity is at the heart of this unit. The concept of diversity embraces not only the human race, but also all of life on this planet. This unit is part of a curriculum that illustrates the importance of respecting and preserving diversity in all forms.

The unit goal states that students will know that biodiversity of the living environment is important to the balance of an ecosystem, which may be upset if large numbers of a species are destroyed.

The diverse needs of human communities versus the River Valley's ecosystem's needs will be addressed in the spring as students begin to study the history of industrial development and increasing levels of human population in the river valley. Students will study the impact of community and industrial development on the river, and will attempt to find solutions that balance the needs of humans and the natural environment, while recognizing our dependency upon biological diversity.

The Social Studies lens focuses on the early years of immigration. The comparison may be made to the effects on society when one ethnic group, such as the Native Americans, are suppressed and forced to leave. Teachers may also make comparisons between invader plant and animals species that take over ecosystems and the effect of human immigration on native populations.

A Constructivist Activity

This Hudson River interdisciplinary curriculum builds towards increasing amounts of constructivist type learning as the year progresses. The activities described in this unit are not all completely constructivist, although each of them contains constructivist elements.

Day One's lesson is conducted at the beginning of the year. It serves to gather and organize knowledge necessary to construct later understandings. Yet, there are still constructivist elements because students are actively engaged in building knowledge. They are not "passive vessels waiting to be filled by the teacher." (PBS, 2004) Even at this stage of gathering facts, the student is taking ownership of learning:

"In the constructivist classroom, the focus tends to shift from the teacher to the students." (PBS, 2004)

Day Two progresses into further questioning, but is still an exercise primarily in scaffolding research skills and content knowledge for later projects. Again, however, the environment of student-centered activity is an example of a constructivist classroom environment.

Day Three breaks into a constructivist model that builds on the knowledge built in Day One and Day Two: The students work in cooperative groups, using what they have learned to diagram food chains. This is an example of constructivism in which students ask questions, explore, and assess what they know. This begins the unit's focus on solving real world problems that threaten balanced ecosystems. Students evaluate the final projects as a class under the teacher's guidance (PBS, 2004).

Day Four is a perfect example of constructivism: Working together, students gather data and rearrange it into a different format by creating charts that contribute to new understandings. They then use this knowledge to solve a real world ‘problem’ of protecting backyard diversity. The teacher is an active participant helping students

construct their own knowledge (PBS, 2004)

Day Five continues with a group activity that requires new organization and perceptions of priorities. The class time is interactive as students work together to articulate what they know into a creative format.

The final Web Site project relies completely on constructing new knowledge from what students have already learned. They are asked to analyze all sides of the biodiversity issue and provide real world solutions. “Publishing” it on the Internet adds authenticity to the project.

Differentiated Instruction

Each activity provides alternative materials and presentation formats to accommodate varied learning levels and disabilities.

A/V resources may supplement reading. Echohawk by Lynda Durrant, however, is not available as a movie, so teachers may choose to read it aloud to a class if the reading level is too high for some students. Activities 3-5 are cooperative, but 1 and 2 may be conducted in groups of 2 or more students to combine the strengths and weaknesses of different students.

Alternative formats may be offered as substitutes for some projects. Students may opt to create a Power Point project or a written report instead of a drawing in Day 2’s activity. Another option is to require all students to produce a drawing, but emphasize that this is not an art project; students are drawing to learn.

School backyards may not be wheel chair accessible. In those cases, classes can go to a town or city park, or they may use A/V materials to supplement actual nature walks.

Math, Science and Technology

Math

Standard I, Analysis, Inquiry, and Design is an integral part of this curriculum’s goals: As students gather knowledge through research and observation, they “will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.” Their acquired knowledge and solutions to preventing pollution and preserving biodiversity will be the focus of a year-end Hudson River Web Site. This year-end project will engage mathematical applications from data

gathered in the online collaborative projects. These projects are ongoing throughout the year. Organizing the data into tables and charts aligns with MST Standard 3 – Mathematics. Specifically, on Day 4 students construct tables, charts, and graphs (Performance Indicator-Key Idea 3). Students will analyze real world data they have gathered on the biodiversity in Hudson River and on pollution levels as post-activities in Web Site project.

Students will “use mathematical reasoning to analyze mathematical situations, make conjectures, gather evidence, and construct an argument.” (Math Reasoning-Key Idea 1). They will construct arguments on the importance of biodiversity through gathering evidence and using mathematical reasoning. They will also be taking temperature readings on water and air during the seining field trips.

Science

Day One and Two’s activities align with Science Standard 4 because students describe the characteristics and life processes of fish. They will then see the variations between many fish when all the projects are displayed (Living Environment Key Idea 1).

The “Journey North” migration project and the National Wildlife Federation’s backyard project both integrate “scientific inquiry to develop explanations of natural phenomena in a continuing, creative process.” (Key Idea 1) Students will question prior conceptions of migration and biodiversity against their own observations. This standard also applies to the Web Site project in which students will construct their own solutions and procedures for preserving the river’s environment.

The entire unit is centered upon Science Standard Four in which “Students 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.” In the first few lessons they learn how plants and animals depend on each other and their physical environment (Living Environment: Key Idea 6). The Inspiration project requires students to describe how plants and animals depend upon each other. By the end of the year, students should understand the full impact of humans’ decisions and activities on the physical and living environment (LE-Key Idea 7). Through both the Social Studies and the Science lens, students will identify ways in which humans have changed their environment and the effects of those changes” (LE-Key Idea 7)

Technology

Technology has impacted the Hudson River’s ecosystem tremendously. This study examines the river’s environment from early colonial times to the present. The Social Studies lens heightens the issue of society’s technological advancements on the river. Students must identify technological developments that have significantly accelerated human progress. Students will be using what they have learned about healthy river ecosystems as a foundation for studying the impact of industrialization on the river’s water quality as a post activity. (Technology-Key Idea 5)

Students will also study technology's positive and negative effects on the environment and on the way people live and work. (Performance Indicator-Key Idea 6) They will understand that the river's environment deteriorated since pre-colonial times, but that technology can now serve as a tool to help the river by using the Internet to record and share information among scientists and communities as shown in "Journey North," and in the equipment used during seining trips to record data. (Technology-Key Idea 6)

Modifications

Single Computer Environment

- Print materials serve as major resource for research.
- At least one computer with Internet access is required for this unit
- Schedule computer time for all students
- Students may work in groups for all projects
- Substitute hand drawn diagrams for Inspiration diagrams
- Use A/V materials for instruction when available
- Students create hand drawn tables of data readings, which can be scanned, or class can evaluate tables and charts, picking the best one to be posted on the web as an excel or word table.
- Hudson River Web Site: Students choose content to be posted. Only these items are entered and saved on the computer. Students design web organization on paper. Each student has a job on web site construction. Again, computer time has to be scheduled to optimize use for all students.
- More organization is required, but unit does not depend on more than one computer with Internet Access.

Classroom Cluster Environment

- Print materials still serve as major resource for research
- Modifications are much the same as in a single computer environment: Substitute manually drawn diagrams and tables instead of software applications.
- Schedule group use.

Lab Environment

- The Internet provides information for research.
- Students may have more hands on practice with applications such as Inspiration
- Students have option of designing and publishing own page on web site.
- Students may all participate simultaneously in online virtual dissection
- Students may all participate simultaneously in all online collaboration projects.
- Adds freedom of choice for classroom activities.

HUDSON RIVER UNIT

ESSENTIAL QUESTIONS

- 1) What is the relationship between plants and animals, including humans?
- 2) How has society's impact on the river affected the mutual dependency of plants and animals and the River's environment?
- 3) How can we respect the individual needs of diverse animal and plant life, while preserving biodiversity?

OBJECTIVES

Students will:

- Describe the kinds of fish, flora, and fauna that live in the Hudson River Valley.
- Describe the mutual dependency of specific plants and animals and the River.
- Diagram a food chain representing Hudson River flora and fauna
- Create a web page describing one species indigenous to the Hudson River
- Gather data and create tables representing a backyard habitat
- Analyze habitat according to standards of biodiversity
- Design and create a game on biodiversity
- Develop an argument and a plan for preserving biodiversity in the Hudson River ecosystem.
- Create a Hudson River Web Site incorporating research and plan for preserving the Hudson River's biodiversity

ACTIVITIES

Living Environment Project: Fish, Birds, Invertebrates, Plants

Part 1: Research

Location: Science Room, & Library

Time: 1-2 45 minutes periods

Description: 4 Separate projects. Students will choose one species to research. They will learn about food and environment requirements, as well as anatomy and physiology. Resources will include books and the Internet. Lists of flora and fauna will be compiled in field trip as a pre-activity.

Living Environment Project: Fish, Birds, Invertebrates, Plants

Part 2: Poster Board Drawing

Location: Science Room

Time: 1-2 45 minutes periods

Description: Students draw and label the anatomy and physiology of their species.

Drawings will include the following information: common and scientific name, food, habitat, and reproduction

Physiology: 1. A branch of biology that deals with the functions and activities of life or of living matter (as organs, tissues, or cells) and of the physical and chemical phenomena involved. 2. The organic processes and phenomena of an organism or any of its parts or of a particular bodily process.

Anatomy: Structural makeup especially of an organism or any of its parts.

Merriam-Webster Online < <http://www.m-w.com/>>

Web Page & Food Chain Inspiration Diagram

Location: Computer Lab or Classroom with computer(s)

Time: 4-6 45 minutes periods

Description: Using the information they have learned, students will create an Inspiration diagram of their fish's place in the food chain. They will then create a web page incorporating the Inspiration diagram, an imported image of their fish drawing with the accompanying information. They will explain why this species is valued.

National Wildlife Federation's Backyard Habitat Program

Location: School Backyard or Local Park; Classroom with Computer(s)

Time: 2 45 minutes periods

Description: Students will log onto National Wildlife Federation's Backyard Habitat Program <http://www.nwf.org/action> They will record and chart observations of the school's backyard environment and determine its environmental rating. They will create charts of data from both "Journey North" (pre-activity) and the NWF "Habitat Planner. They will draw conclusions on how to improve the school's natural environment for local flora and fauna.

The Hudson River Biodiversity Game

Location: Computer Lab or Classroom with Computer(s)

Time: 2-4 45 minutes periods

Description: Working in groups, students will design a Hudson River biodiversity game modeled on the activities found on "Biodiversity 911"

<http://www.biodiversity911.org/FunandGames/funandgames.html#>

ASSESSMENT RUBRICS

Flora/Fauna Poster Projects Rubric
Adapted from Poster Project Rubric
<http://rubistar.4teachers.org/index.php>

CATEGORY	4 Fantastic	3 Very Good	2 Needs Improvement	1 Try Again
Use of Class Time	Used time well during each class period. Focused on getting the project done. Never distracted others.	Used time well during each class period. Usually focused on getting the project done and never distracted others.	Used some of the time well during each class period. There was some focus on getting the project done but occasionally distracted others.	Did not use class time to focus on the project OR often distracted others.
Labels	All items of importance on the poster are clearly labeled with labels that can be read from at least 3 ft. away.	Almost all items of importance on the poster are clearly labeled with labels that can be read from at least 3 ft. away.	Several items of importance on the poster are clearly labeled with labels that can be read from at least 3 ft. away.	Labels are too small to view OR no important items were labeled.
Required Elements	The poster includes all required elements as well as additional information.	All required elements are included on the poster.	All but 1 of the required elements are included on the poster.	Several required elements were missing.
Knowledge Gained	Student can accurately answer all questions related to facts in the poster and processes used to create the poster.	Student can accurately answer most questions related to facts in the poster and processes used to create the poster.	Student can accurately answer about 75% of questions related to facts in the poster and processes used to create the poster.	Student appears to have insufficient knowledge about the facts or processes used in the poster.
Content -	At least 7	5-6 accurate		Less than 3

Accuracy	accurate facts are displayed on the poster.	facts are displayed on the poster.	3-4 accurate facts are displayed on the poster.	accurate facts are displayed on the poster.
Title	Title can be read from 6 ft. away and is quite creative. Includes common & scientific name	Title can be read from 6 ft. away. Includes common & scientific name.	Title includes common & scientific name	The title is missing either common or scientific name.
Mechanics	Capitalization and punctuation are correct throughout the poster.	There is 1 error in capitalization or punctuation.	There are 2 errors in capitalization or punctuation.	There are more than 2 errors in capitalization or punctuation.
Grammar	There are no grammatical mistakes on the poster.	There is 1 grammatical mistake on the poster.	There are 2 grammatical mistakes on the poster.	There are more than 2 grammatical mistakes on the poster.

Inspiration Food Chain Rubric
Adapted from Poster Project Rubric
<http://rubistar.4teachers.org/index.php>

CATEGORY	4 Fantastic	3 Very Good	4 Needs Improvement	1 Unsatisfactory
Attractiveness	Makes excellent use of font, color, graphics, effects, etc. to enhance the presentation.	Makes good use of font, color, graphics, effects, etc. to enhance to presentation.	Makes use of font, color, graphics, effects, etc. but occasionally these detract from the presentation content.	Use of font, color, graphics, effects etc. but these often distract from the presentation content.
Organization	Content is	Uses headings	Content is	

	well organized using headings or bulleted lists to group related material.	or bulleted lists to organize, but the overall organization of topics appears flawed.	logically organized for the most part.	There was no clear or logical organizational structure, just lots of facts.
Mechanics	No misspellings or grammatical errors.	Three or fewer misspellings and/or mechanical errors.	Four misspellings and/or grammatical errors.	More than 4 errors in spelling or grammar.

Hudson River Diversity Game Rubric

Adapted from Game Rubric

<http://rubistar.4teachers.org/index.php>

CATEGORY	4 Fantastic	3 Very Good	2 Good	1 Needs Improvement
Knowledge Gained	All students in group could easily and correctly state several facts about the topic used for the game without looking at the game.	All students in the group could easily and correctly state 1-2 facts about the topic used for the game without looking at the game.	Most students in the group could easily and correctly state 1-2 facts about the topic used for the game without looking at the game	Several students in the group could NOT correctly state facts about the topic used for the game without looking at the game.
Content Accuracy	All information cards made for the game are correct.	All but one of the information cards made for the game are correct.	All but two of the information cards made for the game are correct.	Several information cards made for the game are not accurate.
Attractiveness	Contrasting colors and at	Contrasting colors and at	Contrasting colors and	

	least 3 original graphics were used to give the cards and gameboard visual appeal.	least 1 original graphic were used to give the cards and gameboard visual appeal.	"borrowed" graphics were used to give the cards and gameboard visual appeal.	Little or no color or fewer than 3 graphics were included.
Rules	Rules were written clearly enough that all could easily participate.	Rules were written, but one part of the game needed slightly more explanation.	Rules were written, but people had some difficulty figuring out the game.	The rules were not written.
Cooperative work	The group worked well together with all members contributing significant amounts of quality work.	The group generally worked well together with all members contributing some quality work.	The group worked fairly well together with all members contributing some work	The group often did not work well together and the game appeared to be the work of only 1-2 students in the group.
Creativity	The group put a lot of thought into making the game interesting and fun to play as shown by creative questions, game pieces and/or game board.	The group put some thought into making the game interesting and fun to play by using textures, fancy writing, and/or interesting characters.	The group tried to make the game interesting and fun, but some of the things made it harder to understand/enjoy the game.	Little thought was put into making the game interesting or fun.

Single Web Page Design Rubric

Flora and Fauna Project
Adapted from Web Site Design Rubric
<http://rubistar.4teachers.org/index.php>

CATEGORY	4 Fantastic	3 Very Good	2 Needs Improvement	1 Try Again
Background	Background is exceptionally attractive, adds to the theme or purpose of the site, and does not detract from readability.	Background is attractive, adds to the theme or purpose of the site, and does not detract from readability.	Background does not detract from readability.	Background detracts from the readability of the site.
Color Choices	Colors of background, fonts, unvisited and visited links form a pleasing palette, do not detract from the content.	Colors of background, fonts, unvisited and visited links do not detract from the content.	Colors of background, fonts, unvisited and visited links do not detract from the content.	Colors of background, fonts, unvisited and visited links make the content hard to read or otherwise distract the reader.
Fonts	The fonts are consistent, easy to read and point size varies appropriately for headings and text. Use of font styles (italic, bold, underline) is used consistently and improves readability.	The fonts are consistent, easy to read and point size varies appropriately for headings and text.	The fonts are consistent and point size varies appropriately for headings and text.	A wide variety of fonts, styles and point sizes was used.
Graphics	Graphics are related to the theme/purpose of the page are thoughtfully	Graphics are related to the theme/purpose of the page, are of good quality	Graphics are related to the theme/purpose of the page, and are of good	Graphics seem randomly chosen, are of low quality, OR distract the

	cropped, are of high quality and enhance reader interest or understanding.	and enhance reader interest or understanding.	quality.	reader.
Contact Information	Web page contains a statement of authorship, school name, and date of publication/date last edited.	Web page contains a statement of authorship, school name, but no date of publication/date last edited.	Web page contains a statement of authorship, but no school name or date of publication/last edited.	Web page does not contain a statement of authorship, school name, and/or date of publication/date last edited.
Links (content)	All links point to high quality, up-to-date, credible sites.	Almost all links point to high quality, up-to-date, credible sites.	Most links point to high quality, up-to-date, credible sites.	Less than 3/4 of the links point to high quality, up-to-date, credible sites.
Copyright	Fair use guidelines are followed with clear, easy-to-locate and accurate citations for all borrowed material. No material is included from sources that state that permission is required unless permission has been obtained.	Fair use guidelines are followed with clear, easy-to-locate and accurate citations for almost all borrowed material. No material is included from sources that state that permission is required unless permission has been obtained.	Fair use guidelines are followed with clear, easy-to-locate and accurate citations for most borrowed material. No material is included from sources that state that permission is required unless permission has been obtained.	Borrowed materials are not properly documented OR material was borrowed without permission from resources that require permission
Spelling and Grammar	There are no errors in spelling, punctuation or grammar in the final draft of the Web page.	There are 1-3 errors in spelling, punctuation or grammar in the final draft of the Web page.	There are 4-5 errors in spelling, punctuation or grammar in the final draft of the Web page.	There are more than 5 errors in spelling, punctuation or grammar in the final draft of the Web page.
Content	The page has a	The page has a	The purpose	The page lacks

	well-stated clear purpose and theme that is carried out throughout the site.	clearly stated purpose and theme, but may have one or two elements that do not seem to be related to it.	and theme of the page is somewhat muddy or vague.	a purpose and theme.
Layout	The Web page has an exceptionally attractive and usable layout. It is easy to locate all important elements. White space, graphic elements and/or alignment are used effectively to organize material.	The Web page has an attractive and usable layout. It is easy to locate all important elements.	The Web page has a usable layout, but may appear busy or boring. It is easy to locate most of the important elements.	The Web page is cluttered looking or confusing. It is often difficult to locate important elements.
Content Accuracy	All information provided by the student on the Web page is accurate and all the requirements of the assignment have been met.	Almost all the information provided by the student on the Web page is accurate and all requirements of the assignment have been met.	Almost all of the information provided by the student on the Web page is accurate and almost all of the requirements have been met.	There are several inaccuracies in the content provided by the students OR many of the requirements were not met.

Web Site Design Rubric
Hudson River Web Site
Adapted from Web Site Design Rubric
<http://rubistar.4teachers.org/index.php>

Additional Web Site Evaluation Rubrics may be found at:

Kathy Schrock's 5 W's of Evaluating Web Sites
<http://kathyschrock.net/abceval/5ws.htm>
Critical Evaluation of a Site: Elementary School Level
<http://school.discovery.com/schrockguide/evalelem.html>

CATEGORY	4 Fantastic	3 Very Good	2 Needs Improvement	1 Try Again
Background	Background is exceptionally attractive, consistent across pages, adds to the theme or purpose of the site, and does not detract from readability.	Background is attractive, consistent across pages, adds to the theme or purpose of the site, and does not detract from readability.	Background is consistent across pages and does not detract from readability.	Background detracts from the readability of the site.
Color Choices	Colors of background, fonts, unvisited and visited links form a pleasing palette, do not detract from the content, and are consistent across pages.	Colors of background, fonts, unvisited and visited links do not detract from the content, and are consistent across pages.	Colors of background, fonts, unvisited and visited links do not detract from the content.	Colors of background, fonts, unvisited and visited links make the content hard to read or otherwise distract the reader.
Fonts	The fonts are consistent, easy to read and point size varies appropriately for headings	The fonts are consistent, easy to read and point size varies appropriately for headings	The fonts are consistent and point size varies appropriately for headings and text.	A wide variety of fonts, styles and point sizes was used.

	and text. Use of font styles (italic, bold, underline) is used consistently and improves readability.	and text.		
Graphics	Graphics are related to the theme/purpose of the site, are thoughtfully cropped, are of high quality and enhance reader interest or understanding.	Graphics are related to the theme/purpose of the site, are of good quality and enhance reader interest or understanding.	Graphics are related to the theme/purpose of the site, and are of good quality.	Graphics seem randomly chosen, are of low quality, OR distract the reader.
Contact Information	Every Web page contains a statement of authorship, school name, and date of publication/date last edited.	Almost all Web pages contain a statement of authorship, school name, and date of publication/date last edited.	Most (75-80%) Web pages contain a statement of authorship, school name, and date of publication/date last edited.	Several Web pages do not contain a statement of authorship, school name, and/or date of publication/date last edited.
Links (content)	All links point to high quality, up-to-date, credible sites.	Almost all links point to high quality, up-to-date, credible sites.	Most links point to high quality, up-to-date, credible sites.	Less than 3/4 of the links point to high quality, up-to-date, credible sites.
Copyright	Fair use guidelines are followed with clear, easy-to-locate and accurate citations for all borrowed material. No material is included from Web sites that	Fair use guidelines are followed with clear, easy-to-locate and accurate citations for almost all borrowed material. No material is included from	Fair use guidelines are followed with clear, easy-to-locate and accurate citations for most borrowed material. No material is included from Web sites that	Borrowed materials are not properly documented OR material was borrowed without permission from a site that requires permission

	state that permission is required unless permission has been obtained.	Web sites that state that permission is required unless permission has been obtained.	state that permission is required unless permission has been obtained.	
Spelling and Grammar	There are no errors in spelling, punctuation or grammar in the final draft of the Web site.	There are 1-3 errors in spelling, punctuation or grammar in the final draft of the Web site.	There are 4-5 errors in spelling, punctuation or grammar in the final draft of the Web site.	There are more than 5 errors in spelling, punctuation or grammar in the final draft of the Web site.
Content	The site has a well-stated clear purpose and theme that is carried out throughout the site.	The site has a clearly stated purpose and theme, but may have one or two elements that do not seem to be related to it.	The purpose and theme of the site is somewhat muddy or vague.	The site lacks a purpose and theme.
Layout	The Web site has an exceptionally attractive and usable layout. It is easy to locate all important elements. White space, graphic elements and/or alignment are used effectively to organize material.	The Web pages have an attractive and usable layout. It is easy to locate all important elements.	The Web pages have a usable layout, but may appear busy or boring. It is easy to locate most of the important elements.	The Web pages are cluttered looking or confusing. It is often difficult to locate important elements.
Navigation	Links for navigation are clearly labeled, consistently placed, allow the reader to easily move from a page to related pages (forward and	Links for navigation are clearly labeled, allow the reader to easily move from a page to related pages (forward and back), and internal links	Links for navigation take the reader where s/he expects to go, but some needed links seem to be missing. A user sometimes gets lost.	Some links do not take the reader to the sites described. A user typically feels lost.

	back), and take the reader where s/he expects to go. A user does not become lost.	take the reader where s/he expects to go. A user rarely becomes lost.		
Content Accuracy	All information provided by the student on the Web site is accurate and all the requirements of the assignment have been met.	Almost all the information provided by the student on the Web site is accurate and all requirements of the assignment have been met.	Almost all of the information provided by the student on the Web site is accurate and almost all of the requirements have been met.	There are several inaccuracies in the content provided by the students OR many of the requirements were not met.

STANDARDS AND PERFORMANCE INDICATORS

Standard 1 - Analysis, Inquiry, and Design

Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

Scientific Inquiry: Key Idea 1

The central purpose of scientific inquiry is to develop explanations of natural phenomena in a continuing, creative process.

Performance Indicators

Elementary

- ask 'why' questions in attempts to seek greater understanding concerning objects and events they have observed and heard about.
- develop relationships among observations to construct descriptions of objects and events and to form their own tentative explanations of what they have observed.

Scientific Inquiry: Key Idea 3

The observations made while testing proposed explanations, when analyzed using conventional and invented methods, provide new insights into phenomena.

Performance Indicator - Elementary

- organize observations and measurements of objects and events through classification and the preparation of simple charts and tables.

Standard 3 - Mathematics

Students will understand mathematics and become mathematically confident by communicating and reasoning mathematically, by applying mathematics in real-world settings, and by solving problems through the integrated study of number systems, geometry, algebra, data analysis, probability, and trigonometry.

Modeling/Multiple Representation : Key Idea 4

Students use mathematical modeling/multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships.

Performance Indicator - Elementary

- construct tables, charts, and graphs to display and analyze real-world data.

Measurement: Key Idea 5

Students use measurement in both metric and English measure to provide a major link between the abstractions of mathematics and the real world in order to describe and compare objects and data.

Performance Indicator - Elementary

- understand that measurement is approximate, never exact.

Standard 4 - Science

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.

Physical Setting: Key Idea 2

Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

Performance Indicator - Elementary

- describe the relationships among air, water, and land on Earth.

The Living Environment: Key Idea 1

Living things are both similar to and different from each other and nonliving things.

Performance Indicators

Elementary

- describe the characteristics of and variations between living and nonliving things.

The Living Environment: Key Idea 5

Organisms maintain a dynamic equilibrium that sustains life.

Performance Indicators

Elementary

- describe basic life functions of common living specimens (guppy, mealworm, gerbil).

The Living Environment: Key Idea 6

Plants and animals depend on each other and their physical environment.

Performance Indicators

Elementary

- describe how plants and animals, including humans, depend upon each other and the nonliving environment.

The Living Environment: Key Idea 7

Human decisions and activities have had a profound impact on the physical and living environment.

Performance Indicator - Elementary

- identify ways in which humans have changed their environment and the effects of those changes.

Standard 5 - Technology

Students will apply technological knowledge and skills to design, construct, use, and evaluate products and systems to satisfy human and environmental needs.

Computer Technology: Key Idea 3

Computers, as tools for design, modeling, information processing, communication, and system control, have greatly increased human productivity and knowledge.

Performance Indicators

Elementary

- use the computer as a tool for generating and drawing ideas.

Impacts of Technology: Key Idea 6

Technology can have positive and negative impacts on individuals, society, and the environment and humans have the capability and responsibility to constrain or promote technological development.

Performance Indicators

Elementary

- describe how technology can have positive and negative effects on the environment and on the way people live and work.

ELA Standard 1 - Language for Information and Understanding

Students will read, write, listen, and speak for information and understanding - As listeners and readers, students will collect data, facts, and ideas; discover relationships, concepts, and generalizations; and use knowledge generated from oral, written, and electronically produced texts. As speakers and writers, they will use oral and written language to acquire, interpret, apply, and transmit information.

Listening and Reading: Key Idea 1

Listening and reading to acquire information and understanding involves collecting data,

facts, and ideas; discovering relationships, concepts, and generalizations; and using knowledge from oral, written, and electronic sources.

Performance Indicators

Elementary

- gather and interpret information from children's reference books, magazines, textbooks, electronic bulletin boards, audio and media presentations, oral interviews, and from such forms as charts, graphs, maps, and diagrams.
- select information appropriate to the purpose of their investigation and relate ideas from one text to another.
- select and use strategies they have been taught for notetaking, organizing, and categorizing information.
- ask specific questions to clarify and extend meaning.
- make appropriate and effective use of strategies to construct meaning from print, such as prior knowledge about a subject, structural and context clues, and an understanding of letter-sound relationships to decode difficult words.
- support inferences about information and ideas with reference to text features, such as vocabulary and organizational patterns.

Speaking and Writing : Key Idea 2

Speaking and writing to acquire and transmit information requires asking probing and clarifying questions, interpreting information in one's own words, applying information from one context to another, and presenting the information and interpretation clearly, concisely, and comprehensibly.

Performance Indicators

Elementary

- present information clearly in a variety of oral and written forms such as summaries, paraphrases, brief reports, stories, posters, and charts.
- select a focus, organization, and point of view for oral and written presentations.
- use a few traditional structures for conveying information such as chronological order, cause and effect, and similarity and difference.

- include relevant information and exclude extraneous material.
- use the process of pre-writing, drafting, revising, and proofreading (the 'writing process') to produce well-constructed informational texts.
- observe basic writing conventions, such as correct spelling, punctuation, and capitalization, as well as sentence and paragraph structures appropriate to written forms.

RATIONALE

The goal of this interdisciplinary curriculum is to promote ecological awareness in students. The Social Studies lens will teach students how human society is inextricably linked with our living environment. The Science lens will teach students to see the relationship between plants and animals. Animals, including human animals, can't live on earth without food and algae. Our very existence depends upon keeping our environment healthy. Students will learn that biodiversity of the living environment is important to the balance of an ecosystem, which may be upset if large numbers of a species are destroyed. They will learn this by studying the needs of various flora and fauna and creating food chains. They will also learn these principles by looking outside of our immediate Hudson River Valley environment to migration paths, thereby understanding the local community's role in preserving global diversity.

Finally, an understanding may grow that the idea of valuing biodiversity is similar in importance to valuing diversity among all cultures and peoples of our world.

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Summary:

A twelve-year-old white boy, adopted and raised by Mochicans in the Hudson
River Valley during the 1730's, is sent with his younger brother to an English
settlement for schooling.

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See also:

,*Golden guides*. Racine, WI: Western Publishing Company

This is an excellent series of pocket paperback guides to pond life, sea shores, fishes, birds, and other areas related to the natural world.

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*Requires username and password

EXTENSION ACTIVITIES

Take it further...

- Complete all post-activities
- Join or form online collaborative environmental projects with students around the world
- Share your knowledge. Publicize web site through local newspapers, government, and environmental groups
- Organize a panel of local government, business, and environmental groups to discuss the challenges of preserving biodiversity while meeting the demands of local citizens
- Make a video of what you have learned
- Form a local river advocacy youth group

PROJECT DESCRIPTIONS

Project 1: Living Environment Projects: Flora and Fauna Research

Example: Fish

Students will create lists of fish they found on their Hudson River seining trip. They will then research for information on one species using their own lists and those provided by the teacher. A sample list of Hudson River fish is enclosed with the Curriculum Pages. Students will search for information using both print materials and the Internet.

They will take notes on the following information for fish:

- Common and scientific name
- Anatomy and physiology of a fish
- Definition of cold blooded animals
- The food and environment fish need to thrive
- External anatomy
- Common and scientific name
- Dangers to their survival
- How fish protect themselves,
- How do they get food?
- Where do they live? Do they migrate?
- Reproduction cycle

Project 2: Living Environment Project: A Drawing

Students will create poster board drawings of their fish. Each drawing will contain the following information:

- Drawing of external anatomy with labeled parts
- Information boxes containing information gathered in Day 1
- Title Heading should include both common and scientific name

The teacher should stress that this is not an art project. The goal should be a clear and informative drawing that includes the required information.

Dissection of a fish follows as a post-activity for fish project.

Project 3 – Inspiration Diagram and Web Page

Using the information they have learned, students will create an Inspiration diagram of their fish's place in the food chain. They will then create a web page incorporating the Inspiration diagram, an imported image of their fish drawing with the accompanying information. They will explain why this species is valued.

Project 4 – NWF's Backyard Habitat Program

Students will participate in The National Wildlife Federation's Backyard Habitat Program. They will observe and record data from the school's backyard or a local park and rate the environment according to the NWF's standards. Using this information and the data gathered in the pre-activity, "Journey North," they will create charts/tables of data in software programs such as excel or in word tables. They will then analyze the data to find ways to improve the local habitat.

Project 5 – The Hudson River Biodiversity Game

Students will learn about the importance of biodiversity around the world by playing biodiversity games on "Biodiversity 911." Working in groups, they will design their own games modeled on the ones they found on "Biodiversity 911." They will assess group projects by using a game rubric.

CURRICULUM PAGES

Classes: 45 minute periods

PROJECT ONE

LIVING ENVIRONMENT PROJECT

Fish

This project should be repeated with a variety of Flora and Fauna of the Hudson River. Teacher may assign as separate projects, or vary among classmates according to time constraints and student abilities.

Location

Science room or library

Time

2 class periods

Objectives Days 1 and 2

Students will know:

- Fish are vertebrates that live in the water
- Anatomy and Physiology of a fish
- Definition of cold blooded animals
- The food and environment fish need to thrive

Materials

- Attached List of Fish that live in the Hudson River
- Books and/or Internet
- Activity One Worksheet

Process

- Students will use books and the Internet to look up the different kinds of fish that live in the Hudson.
- Students will fill out Fish Project Worksheet.
- Students will list fish that they would like to research.

Modifications

Technology: Books may be used instead of Internet

Differentiated Teaching:

- Pair students to combine learning styles
- Use A/V resources to supplement reading

Web Sites

Go to the following sites for information on the flora and fauna that live in the Hudson River:

Beczak Environmental Education Center
http://www.beczak.org/udson_history.htm

The Audubon Society: Birds and Science
<http://www.audubon.org/bird/index.html>

Enchanted Learning's Botany and Paleobotany Dictionary
<http://www.enchantedlearning.com/subjects/plants/glossary/index.shtml>

FishBase,
<http://www.fishbase.org/home.htm>

Hudson River History
http://www.beczak.org/udson_history.htm

Hudson River Study
<http://elisabethmorrow.org/classroomnews/udsonrv.html>

Missouri Botanical Garden
<http://mbgnet.mobot.org/fresh/rivers/index.htm>

Worldbook Online
<http://www.worldbookonline.com>
Type in username and password. Search for fish.

For an extensive directory go to:
The Hudson: An Internet Hotlist
<http://www.kn.sbc.com/wired/fil/pages/listthehudsph.html>

FISH OF THE HUDSON RIVER

Atlantic Sturgeon
Shortnose Sturgeon
Summer Flounder
Winter Flunder
Hogchoker
Windowpane (flounder)
Atlantic Tomcod
Lined Seahorse
Northern Pipefish
Tesselated Darter
American Eel
American shad
Alewife
Menhaden
Striped Bass
White perch
Bluefish
Weakfish
Banded Killifish
Striped Killifish
Mummichog
Bay Anchovy
Atlantic Silverside
Fourspine Stickleback
Kingfish
Tautog
Drumfish
Black Crappie
Largemouth Bass (usually freshwater)
Pumpkinseed (Freshwater)
White Catfish
Brown Bullhead (usually Freshwater)

PROJECT TWO

LIVING ENVIRONMENT PROJECT - continued

Location

Science room or library

Time

2 class periods

Objectives

See Day 1

Materials

Drawing supplies-

- Paper, pencils (required)
- Colored pencils, crayons (optional)
- Books and/or Internet

Process

Students research their assigned fish for the following information:

- External anatomy
- Common and scientific name
- Dangers to their survival
- How fish protect themselves,
- How do they get food?
- Where do they live? Do they migrate?
- How do they reproduce?

Final Product

- Drawing of external anatomy with labeled parts
- Information boxes containing information
- Reproduction cycle
- Title Heading should include both common and scientific name

Note: Drawing may be completed in extra classes, or as a homework assignment if necessary.

Assessment

Rubric

Post-Activity

See Dissection of a Fish in Cover Sheet list of post-activities

Modifications

Technology: Books may be used instead of Internet

Differentiated Teaching:

- Pair students to combine learning styles
- Use A/V resources to supplement reading
- Options for Drawing: Students are told that the drawing is for learning, not for art. Every student is required to draw, but will not be judged for artistic ability.
- Options for dissection: Students who cannot participate in actual dissection may conduct online virtual dissection.

Web Sites

Beczak Environmental Education Center

http://www.beczak.org/hudson_history.htm

The Audubon Society: Birds and Science

<http://www.audubon.org/bird/index.html>

Enchanted Learning's Botany and Paleobotany Dictionary

<http://www.enchantedlearning.com/subjects/plants/glossary/index.shtml>

FishBase,

<http://www.fishbase.org/home.htm>

Hudson River History

http://www.beczak.org/hudson_history.htm

Missouri Botanical Garden

<http://mbgnet.mobot.org/fresh/rivers/index.htm>

Worldbook Online

<http://www.worldbookonline.com>

Type in username and password. Search for fish.

For an extensive directory go to:

The Hudson: An Internet Hotlist

<http://www.kn.sbc.com/wired/fil/pages/listthehudsph.html>

PROJECT 3

INSPIRATION FOOD CHAIN

Location

Accessibility to computers with Inspiration (computer lab, library, etc)

Pre-Activities

Students have

- Completed fish, birds, flora, and fauna projects
- Received introductory level Inspiration training
- Participated in field trip to Hudson River
- Prior knowledge of photo-synthesis
- Received introductory training on the design and mechanics of creating a web page
- Received introductory training in the Inspiration software program

Objectives

Students will:

- Know that fish, birds, flora, and fauna are part of food chains,
- Diagram a food chain which represents flora or fauna in the balance of the Hudson River Valley's living environment
- Create a web page incorporating Inspiration diagram, images of fish, information, and reasons why this species is valued
- Understand relationships between plants and animals; animals cannot live on earth without food and algae

Materials

- Computers with inspiration and web publishing software

Process

Students will:

- Work in groups of 2-4
- Assign leadership roles to group members:
 - Information gatherer
 - Visual Organizer
 - Technology Coordinator
 - Producer/Manager
- Using Inspiration software, design food chain from one of the groups represented in poster projects
- Present their diagrams to class

- Discuss, modify, and create food web which incorporates all of the groups' food chains
- Create web pages of their species

Final Products

- Groups: Inspiration or Poster Board Food Chain
- Class: Inspiration or Poster Board Food Web
- Web Page incorporating Inspiration food chain, images of fish, and description

Assessment

Rubric – see attached

Class uses rubric to evaluate groups' rubrics

Modifications

Technology: Substitute drawing supplies if you don't have these software programs. Students draw the food chain diagram and add to poster board drawing project

Differentiated Teaching:

- Pair students to combine learning styles
- Provide options for final product such as Power Point or written report

Web Sites

Audubon Science - Bird Links

http://www.audubon.org/bird/bird_resources.html.

Enchanted Learning's Botany and Paleobotany

<http://www.enchantedlearning.com/subjects/plants/glossary/index.shtml> .

FirstGov for Kids:Science & Math

http://www.kids.gov/k_science.htm

FishBase

<http://www.fishbase.org/home.htm> .

Hudson River History

http://www.beczak.org/hudson_history.htm

Invertebrates

<http://elisabethmorrow.org/classroomnews/inverte.html>

Missouri Botanical Garden- Rivers and Streams

<http://mbgnet.mobot.org/fresh/rivers/index.htm>.

NatureServe: A Network Connecting Science with Conservation

<http://www.natureserve.org/index.jsp> .

PROJECT 4

YOUR SCHOOL'S BACKYARD HABITAT

Location

Computer lab or classroom with Internet access
School backyard or local park

Pre-Activities

Students will

- Participate in “Journey North: A Global Study of Wildlife Migration and Seasonal Change” <http://www.learner.org/jnorth/>
- Study wildlife migration and the seasons by recording bird and butterfly sightings in the Hudson Valley
- This activity should begin as soon as school starts and ideally continue from previous year’s fifth grade in order to analyze patterns of migration.
- Create charts of species and sightings in excel or word tables.

Objectives

Students will:

- Participate in The National Wildlife Federation’s Backyard Habitat Program <http://www.nwf.org/action/>
- Record and chart observations of school’s backyard environment
- Analyze environmental rating of school’s backyard

Materials

- Computers with Internet access
- Excel or Word software_or
- Paper (optional-grid)

Process

- Students log onto NWF’s Backyard Habit site and conduct analysis of school’s backyard environmental rating
- Create charts of data from “Journey North” and the “NWF Habitat Planner”
- Draw conclusions on how to improve school’s backyard for local wildlife

Assessment

- Compare charts with Inspiration Food Chain diagrams
- NWF's rating

Modifications

Technology:

- Buy NWF books on backyard habitats.
- Conduct field trips with journals to record flora and fauna.

Differentiated:

- Wheel Chair accessible ramps, or A/V presentations if backyard not accessible to handicapped
- Pair students to combine learning types

Web Sites

Journey North

<http://www.learner.org/jnorth/>

National Wildlife Federation: Backyard Wildlife Habitat Program

http://www.enature.com/backyardwildlife/nwf_bwh_home.asp

PROJECT 5 THE HUDSON RIVER BIODIVERSITY GAME

Location

Computer Lab or classroom with computers

Objectives

Students will:

- Learn about the importance of biodiversity around the world by playing biodiversity games on "Biodiversity 911 – Fun and Games"
<http://www.biodiversity911.org/FunandGames/funandgames.html#>
- Working in groups, design their own games modeled on "Biodiversity 911" that focus on the importance of biodiversity in the Hudson River Valley.

Materials

- Computers with Internet access
- Arts and Crafts materials for designing board games (poster board, markers, mover items, etc)

Process

Students will:

- Play biodiversity games in pairs on “Biodiversity 911”
- Design “Hudson River Valley Biodiversity Game”

Assessment

Students work in groups to make games or activities that focus on biodiversity in the Hudson River Valley. Groups assess games by using attached Game Rubric

Modifications

Technology:

- Books from NFW on Biodiversity
- A/V resources

Differentiated

- Pair students to combine learning types
- Power Point project or written report

Web Sites

Biodiversity Project

<http://www.biodiversityproject.org/index.htm> .

Biodiversity 911: Saving Life on Earth

<http://www.biodiversity911.org/default.html> .