

A Trail To Every Classroom (TTEC) Curriculum Development Tool

UNIT DESIGN COVER SHEET

Author contact: **Melissa Jellison**

School name, state and town: **The Whitefield School,
Jellison, NH**



Title: **Advocating for a Forgotten Wetland**

Abstract/Vignette: *To have a working understanding of the finite quality of healthy water by doing a place-based service learning project to improve and maintain the health of the school's wetlands.*

Grade level(s): Please check all that apply.

- K-2 3-5 6-8 9-12 College and Lifelong Learning

Discipline: Please check all that apply.

- Art and Music Health and PE Foreign Language
- Literature and Language Arts Mathematics Science
- Social Studies and Geography History Technology

Year Developed: **2009**

Period (month, week, year): **Year**

Teaching environment:

- In the Classroom (indoors) On the Trail
- In the Community Online/Virtual

A Trail to Place-Based Service-Learning Curriculum

Connecting Youth & Communities
Along the Appalachian Trail



Start Here!

Big Idea

What is the main idea you want your students to come away from the unit knowing?
To have a working understanding to the finite quality of healthy water by doing place-based service learning project to improve and maintain the health of the school's wetlands.

Service Project

What project(s) could your class undertake that would actively engage your students in learning about this theme? What could the final product be?

Immediate: To use water monitoring to gather data on the health of school wetland. Investigate area surrounding water for plants and animals to learn about the overall health of the water ecosystem.

Future: Continue the data collection and upkeep of the school's wetland and use water monitoring skills to adopt another in town water source. Also, study streams that come down off the AT in the area to inform through hikers of water health.

Partnerships & Benefit(s)

Who are potential community partners that could assist you in this project? What are the potential benefits for your class and your partners of working together?

- Appalachian Mountain Club~ benefits include community ties, place of resources.
- KIDS Consortium~ benefits include opportunity for grants, and Green School Summit.
- EPA~ benefit include wealth of information
- TTEC~ benefits include grant opportunities, resources
- NH Fish and Game~ benefits include resources, information, professional guidance

Project Name:

Teacher(s): Melissa Jellison

Grade Level: 6th grade

Time Frame: 2009-2010 school yr.

Your Evaluation of the Unit

How will you evaluate the unit and make note of what worked well and what could be improved? How will you analyze and interpret project outcomes?

- *Pre and Post surveys based on essential understandings
- *Student developed plan for the wetland
- *Understanding of water as a limited resource.

State Standards

(Objectives/Anchors/Outcomes)

Which elements of the state framework of standards does this unit address? What are the skills and outcomes you are working towards?

Skills and Habits of Mind

What are the academic or life skills students will gain from this unit? What habits of mind do you expect them to demonstrate? Think all disciplines.

Skills acquired:

- *Scientific Method
- *Understanding Citizenship
- *Informational Reading & Writing
 1. Writing for a purpose
 2. Writing for a specific purpose
 3. Compare and contrast writing
 4. Support conclusions with evidence
- *Obtain information through a variety of texts
- *Analyze data
- *Capture Nature with photography

Resources

Describe resources (books, articles, materials, supplies) you will use to support this unit?

- *Place-Based Education ~ David Sobel
- *Stream Study Workbook: adapted for wetland observations.
- *Water monitoring: pH, dissolved oxygen, nitrogen
- *Field Guides
- *Magnifying glasses
- *Camera

Models & Examples

How will students understand the expectations for their project? What exemplars of student work will they see? What opportunities will there be for them to critique each other's work?

- Students will use the adapted stream study data collection worksheets.
- Comparing wetland data to our data
- Student reflection
- Public service announcement posters

Reflection

How will reflection be built in to your curriculum and activity(ies)?

- Pre-reflection questions based on essential questions.
- Reflections on Data
- Nature Photography

Final Celebration

How will you celebrate the success of your unit and share its results with the school and community?

After 9-10 months worth of data, report findings and developed plan to either:

1. improve health of wetland
2. maintain health of wetland

Students will have three opportunities to share their project.

1. Green School Summit
2. Community Place-Based/Service Learning Night
3. School Board meeting

Unveil student made nature calendar. Funds made through selling the calendar will be put towards next year's water monitoring project.

Student Assessment

How will you assess student learning? How will you know if they have met the goals for the established outcomes?

- *Understanding of monitoring equipment
- *Proper use of data collection worksheets.
- *Use of scientific process to solve a problem
- *Lab reports that depict the analysis of data monitored
- *Reflections on understanding the finite quality of water
- *Proficient of stand standards listed
- *Understanding of informational writing

Essential Questions (Unit Objectives)

What are the essential questions that will help guide students toward understanding the Big Idea?

*Why is Healthy water important?

*Where does water come from?

* Why is water finite?

*What is quality water?

Student Role (Youth Voice)

How will you guide your students to express ideas, be involved in project decisions, and evaluate outcomes?

Student Responsibility:

- *Data Collection
- *Analysis of Data
- *Determine level of Health:
 - animal species
 - plant species
 - water quality
- *Based on Data:
 - how to maintain health
 - how to make the wetlands healthy
- *Create Presentation to various community members about water health with an action plan.
- plan would include either a way to make the wetland healthy or a way to maintain health.
- *Create a nature calendar with images taken of project for fundraising purposes

Community Connections

What opportunities or needs exist in your school or community that could be addressed by a student project related to your big idea for learning?

When the Whitefield School was built, there was much attention given to the future opportunity for "outdoor classrooms." The wetland that is located on the school property used to be used as a teaching tool. Years have passed since it was last used for that purpose. Trees are dying and the wetland is being overrun by emergent plants. It is our hope to rekindle the importance of an outdoor classroom and make the wetland an area the school community can enjoy once again.

Wetland Advocates Curriculum Guide



Melissa Jellison
The Whitefield School

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Background

The pre-K through eighth grade school was built in the mid 1990's adjacent to a wetland. The town of Whitefield, NH allowed a permit so the school building could be built there, with the condition that the wetland would be taken care of. The town intended for the wetland to become a place in which the students would enjoy and learn from. Through the years, the wetland has become forgotten and is now in poor condition

Big Idea

The purpose of the project would be to have the students in sixth grade become the advocates for the forgotten wetland. Through the project, students will come to understand the finite quality of water, as they come to appreciate the importance of the natural resource. Students will be involved in water testing and investigating plants and animals of the fragile ecosystem; all in an effort to judge the health of the wetlands. Students will also start to appreciate the importance of becoming citizens of the community in which they live.

State Standards

Standards based on New Hampshire State Standards

- Science
 - Plants and Animals
 - S:LS2:6:1.2 Explain that most **microorganisms** do not cause disease and that many are beneficial to the environment
 - S:LS3:6:1.1 Provide examples of how all organisms, including humans, impact their environment; and explain how some changes can be detrimental to other organisms.
 - S:LS3:6:1.2 Explain how changes in environmental conditions can affect the survival of individual **organisms** and the entire **species**.
 - S:LS3:6:2.1 Describe the fundamental concepts related to **biological evolution**, such as **biological adaptations** and the **diversity** of species.
 - S:LS3:6:3.1 Recognize that there are **genetic variations** among individuals in groups of organisms and provide examples of how these variations affect the survival of an organism.
 - S:LS5:6:1.1 Recognize that an agricultural system is designed to maximize the use of all the elements in the system, including using plants for food, oxygen, for the filtration of air and water, and for making compost.
 - Common Threads
 - S:LS5:6:2.1 Demonstrate the appropriate use of tools, such as thermometers, probes, microscopes and computers to gather, analyze and interpret data in the life sciences.
 - S:LS5:6:4.1 Understand that some form of science is used in most jobs/careers and that some jobs/careers specifically require knowledge of life science.

- Social Studies
 - Civics & Government
 - **SS:CV:6:3.3:** Discuss the reasons for conflicts between and among countries and peoples; e.g. natural resources, religion.
 - Geography
 - **SS:GE:6:4.3:** Understand the effects of movement on the characteristics of places; e.g. acculturation, assimilation, movement.
 - **SS:GE:6:4.4:** Analyze the spatial patterns of settlement; e.g. urbanization along rivers, agriculture on fertile plains.
 - **SS:GE:6:4.5:** Know the functions, sizes, and spatial arrangements of settlement; e.g. urban, suburban, rural.
 - **SS:GE:6:5.3:** Appreciate how characteristics of different physical environments provide opportunities human; e.g. winter sports tourism, annual flood patterns
 - **SS:GE:6:5.4:** Assess why people have different viewpoints regarding resource use; e.g. water rationing, recycling.
- Language Arts
 - Initial Understanding of Informational Text
 - **R:IT:6:1.1a:** Obtaining information from text features; e.g. table of contents, glossary, index, transition words /phrases, bold or italicized text, headings, subheadings, graphic organizers, charts, graphs, illustrations
 - **R:IT:6:1.1b:** Obtaining information from text features; e.g. maps, diagrams, tables, captions, timelines, citations, transitional devices
 - **R:IT:6:1.3:** Organizing information to show understanding representing main/central ideas or details within text through; charting, mapping, paraphrasing, summarizing, comparing/contrasting.
 - **R:IT:6:1.5:** Identifying the characteristics of a variety of types of **reference** texts: dictionaries, glossaries, thesauruses, encyclopedias, reports, magazines, newspapers, textbooks, biographies, autobiographies, internet websites, public documents and discourse, essays, articles
 - Analysis and Interpretation of Informational Text
 - **R:IT:6:2.3:** Drawing inferences about text, including; author's purpose (e.g., to inform, explain, entertain, persuade), *author's* message, forming and supporting opinions/judgments and assertions about central ideas that are relevant .
 - **R:IT:6:2.4:** Distinguishing fact from opinion, and identifying possible bias/propaganda
 - **R:IT:6:2.5:** Making inferences about causes or effects
 - Breadth of Reading
 - **R:B:6:3.3:** Gathering, organizing, and interpreting the information
 - **R:B:6:3.4:** Using evidence to support conclusions
 - Informational Writing
 - **W:IW:6:1.1:** Using an organizational text structure appropriate to focus/controlling idea
 - **W:IW:6:1.2:** Selecting appropriate information to set context, which may include a lead/hook
 - **W:IW:6:2.1:** Establishing a topic
 - **W:IW:6:2.2:** Stating and maintaining a focus/controlling idea on a topic
 - **W:IW:6:2.3:** Writing with a sense of audience, when appropriate

- **W:IW:6:3.1:** Including facts and details relevant to focus/controlling idea, and excluding extraneous information
 - **W:IW:6:3.2:** Including sufficient details or facts for appropriate depth of information.
 - **W:IW:6:3.3:** Addressing readers' concerns (including counterarguments – in persuasive writing; addressing potential problems –in procedures; providing context –in reports)
 - **W:IW:6:3.4:** Commenting on the significance of information, when appropriate
 - Math
 - Data Stats & Probability
 - **M:DSP:6:1 Interprets a given representation; e.g.** analyzes the data, formulates or justify conclusions, makes predictions, solves problems
 - **M:DSP:6:2 Analyzes patterns, trends, or distributions in data in a variety of contexts; e.g.** Measures of central tendency (mean, median, mode), dispersion (range) in order to; analyze situations, solve problems
 - **M:DSP:6:3 Organizes and displays data.** Uses tables, line graphs, and stem-and-leaf plots to: Answer questions related to the data, Analyze the data to formulate or justify conclusions, Make predictions, Solve problems
 - **M:DSP:6:6 Responds to a teacher or student generated question or hypothesis; e.g.** Decides the most effective method(EXAMPLE: survey, observation, experimentation) to collect the data(numerical or categorical) necessary to answer the question, collects, organizes and appropriately displays data, analyzes the data to draw conclusions about the hypothesis being tested, when appropriate, makes predictions and asks new questions, makes connections to real world situations.
 - Problem Solving, Reasoning & Proof
 - **M:PRP:8:1 Use problem solving strategies to investigate and understand increasingly complex mathematical content.** Determine, collect, and organize the relevant information needed to solve real world problems. Apply integrated problem solving strategies to solve problems in the physical, natural, and social sciences and in pure mathematics. Use technology when appropriate to solve problems.
 - **M:PRP:8:2 Use mathematical reasoning and proof to;** Draw logical conclusions. Make generalizations using deductive and inductive reasoning. Formulate, test, and justify mathematical conjectures and arguments. Construct and determine the validity of mathematical argument or a solution. Apply mathematical reasoning skills in other disciplines.

Essential Questions

*Why is Healthy water important?

*Where does water come from?

* Why is water finite?

*What is quality water?

*Why is it important to become an advocate for a worthy cause?

Student Role

Through the wetland project, students will be responsible for all the data collection (pH, dissolved oxygen, temperature, total phosphate, nitrates, variety and identification of plant and animal species). Once data is collected students will need to analyze it to determine the health of the animal species, plant species and overall water quality. Once several months of data is recorded and analyzed students will need to develop a plan to either maintain the health or how to make the wetlands healthy once again. Students will have to read informational texts about local wetlands in the area and compare them so they have a deeper understanding of what a Great North Woods New Hampshire wetland should look like.

At the end of the year students will have the opportunity to speak in front of various community members, school board members, and partners about the discoveries they have made and to share their report. They will have to prepare informational packets for all who attend about their findings as well as reasons for community members to become advocates for other water sources in the district. The overall message from the students will be their understanding of water as a natural resource that needs to be taken care of.

Also, throughout the year students will be taking pictures of the wetlands. These pictures will be done with an “artful” eye as they will be made into a nature calendar. This calendar will be student made and will act as a fundraiser so future sixth graders can continue in being the school’s wetland advocates.

Community Connections

When the Whitefield School was built, there was much attention given to the future opportunity for “outdoor classrooms.” The wetland that is located on the school property used to be used as a teaching tool. Years have passed since it was last used for that purpose. Trees are dying and the wetland is being overrun by emergent plants. It is our hope to rekindle the importance of an outdoor classroom and make the wetland an area the school community can enjoy once again.

Skills and Habits of Mind

Skills & Habits acquired:

- *Using Scientific Method to solve a scientific problem
- *Understanding the importance of Citizenship
- *Have an understanding and respect for water as a finite natural resource.
- *Understand the importance of being an advocate for a worthy cause.
- *Develop the love of the outdoors.
- *Learn to separate fact from opinion
- *Learn to make cross curricular connection.

*Informational Reading & Writing

1. Writing for a purpose
2. Writing for a specific purpose
3. Compare and contrast writing
4. Support conclusions with evidence

*Learn to obtain information through a variety of texts

*Learn to analyze data

*Capture Nature with photography

Service Project

Immediate: To use water monitoring to gather data on the health of school wetland. Investigate area surrounding water for plants and animals to learn about the overall health of the water ecosystem.

Future: Continue the data collection and upkeep of the school's wetland and use water monitoring skills to adopt another in town water source. Also, study streams that come down off the AT in the area to inform through hikers of water health.

Partnerships and Benefits

Including local partners and community members will be crucial to this project. There is a wealth of knowledge to be tapped into. Very close by to the school is the Appalachian Mountain Club, Fish Hatchery, and Fish and Game offices. We will also be using resources from Project Learning Tree; which is award-winning environmental education program designed for teachers and other educators, parents, and community leaders. Other resources will come from Trail to Every Classroom, and from United States Environmental Protection Agency.

Another group of partners will come right from our district. We would work hand in hand with both the district technology education coordinator, and a high school biology teacher. Both of these connections will help bridge the gap between middle school and high school.

Resources

Place-Based Education by David Sobel

Stream Study Workbook: adapted for wetland observations. (see attached)

*Water monitoring kits: pH, dissolved oxygen, nitrogen

*Field Guides for plant and animal species

*Magnifying glasses, bug collectors, ice cube tray, dichotomous bug key, small hand net and thermometers.

*Digital Camera

*Wetland Discovery Journal (see attached)

*National Youth Leadership Council: K-12 Service-learning Standards for Quality Practice.

*Project Learning Tree: Exploring Environmental Issues: Places we live.

Models & Examples

The whole idea for this place-based service-learning project was inspired by a Stream Study: Instructions and Data Collection provided by the Appalachian Mountain Classroom which is affiliate of the Appalachian Mountain Club. Through that model, the Wetland Discovery Journal was created. It is a place where student observations can be kept as well as track the water quality testing data.

For this project the sixth grade is broken into two classes. Each class will be given designated testing spots. We will be able to compare both sets of data in order to get a clearer picture of the water quality.

Throughout the year students will be making Public Service Announce (PSA) posters to inform other students of the project. PSAs will be made by students and graded for information and effectiveness by their peers and myself on a rubric. Students will also be writing reflections and keeping track of their understandings in their Science Portfolios. Students are always excited to share the thoughts and feelings with other classmates.

Reflections

Reflections for this project are threefold; beginning, middle, end.

Beginning:

- *Students will complete a survey based on the essential questions.
- *Students will take initial observations on the wetland before the project is announced. They will have the opportunity to reflect on what the environment looks like.

Middle:

- *Students will make Survey's for other classes in the school based on the essential questions.
- *Students will reflect each time they take a trip down to the wetlands.
- *Students will collect and analyze data in order to develop a plan of action.

End:

- *At the end of the year students will take the same survey to see if their understanding and knowledge have changed through participating in the project.
- *Students will also resurvey the classes from before if the PSAs had an impact.

- *Students will have the opportunity to share their plan to a community forum.
- *Students will have a chance to share their project and spark interest with the current fifth graders.
- *Through making a nature calendar they will have a chance to reflect on the overall project.

Student Assessment

Student Assessment will be based on the following:

- *Understanding of monitoring equipment
- *Proper use of data collection worksheets.
- *Use of scientific process to solve a problem
- *Lab reports that depict the analysis of data monitored
- *Reflections on understanding the finite quality of water
- *Proficient of standards listed above
- *Understanding of informational writing
- *Public Speaking abilities

Final Celebration

After 9-10 months worth of data, report findings and developed plan to either:

1. improve health of wetland
2. maintain health of wetland

Students will have three opportunities to share their project.

1. Community Place-Based/Service Learning Night
2. School Board meeting
3. Current 5th grade class

Unveil student made nature calendar. Funds made through selling the calendar will be put towards next year's water monitoring project.

Evaluation of the Unit

- *Pre and Post surveys based on essential understandings
 - *Student developed plan for the wetland
 - *Understanding of the overall big idea: water as a limited resource
 - *Student reflections of the overall project.
 - *End report about the importance of becoming an advocate of a worthy cause.
- Have students start to think about what service learning project they would like to be involved with next for the district.