Abstract/Vignette:

Students will facilitate a service learning project at Mill Creek Park, a true hidden treasure tucked away in our town which is within close proximity to the Angel’s Rest section of the Appalachian Trail. This area is in need of community awareness and support.

The service learning project will consist of creating an interpretive brochure, building a kiosk with a Phenology form drop box at Mill Creek Park, as well as learning about the ecosystems within the park and how to maintain a healthy environment which will sustain the natural environment.

The interpretive brochure will encompass multiple aspects of science objectives spanning three grade levels to create awareness and tourism of the Mill Creek area.

These aspects include:

- observing and evaluating the ecosystems of Mill Creek Park
- observing ecosystems and how they change seasonally as well as over a longer period of time
- the impact that abiotic factors have on the macrorganisms and microorganisms
the effects of human impact, weathering, and erosion on the surfaces of Mill Creek.

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

Year Developed: 2013

Period: We anticipate that sections of this project will be ongoing, as it branches out into new classes in the future for data comparison. The start date will be in the near future and the groundwork for the project will be laid out by the 2013/2014 classes in the 5th, 6th, and 7th grades.

- The months of September through October of 2013 will be used for collecting data, photos, and information to create the interpretive brochure
- Each year, seasonally the approximate months of September, January, March and June will be used for data collection, observations, and quests
- One week will be the approximate time frame for building the Kiosk and Phenology form drop boxes
Teaching environment:

- In the Classroom (indoors)
- In the Community
- On the Trail
- Online/Virtual
# A Trail To Every Classroom (TTEC)
## Curriculum Development Tool
### UNIT DESIGN TEMPLATE

<table>
<thead>
<tr>
<th><strong>Unit Title:</strong> Mill Creek Project</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>School:</strong> Narrows Elementary Middle School</td>
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<tr>
<td><strong>Grade level/s:</strong> 5th, 6th, and 7th</td>
</tr>
<tr>
<td><strong>Discipline/s:</strong> Science, Language Arts, History, Math</td>
</tr>
<tr>
<td><strong>Unit Designer/s:</strong> Donna Ralph, Sarah McGlothlin, and Crystal Dunn</td>
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</tbody>
</table>

### Stage 1 – Desired Results

**A. “Big Ideas”**
- Build an appreciation for the natural environment
- Understanding of Phenology
- Impact of humans on the natural environment
- Empowering youth to maintain and sustain the natural environment
- Community Awareness
- Increase Tourism
- Foster a desire to extend hiking adventures to the Appalachian Trail

**B. “Enduring Understandings”**
Our goal is to instill in the youth of our community the knowledge and ability to maintain Mill Creek Park, the desire to sustain their local natural environment, as well as to extend their efforts to conserve their entire natural environment.

**C. “Essential Question(s)”:**
- How does the eutrophication of Mill Creek increase or decrease population of specific organisms?
- How do the abiotic (nonliving) factors determine the type of ecosystem, as well as the location and distribution of macro/microorganisms in Mill Creek?
- What are the human activities that have altered the abiotic components that impact natural processes?
- How does the ecosystems in Mill Creek change overtime in response to seasonal and long term changes in the environment?
- Can I locate and evaluate the human impact at Mill Creek?

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1 This TTEC planning tool is adapted from Understanding by Design (UbD) from Wiggins & McTighe (1998, 2005, 2011)
• How has weathering, erosion, and deposition had an impact Mill Creek Park?

D. Place-based Service Learning Lens (Assumes PBSL Principle #5 Integrated & Principle #6 Rigorous):

Grounded in Place

The Mill Creek Park area of Narrows, Virginia is an important historical location that served as the town’s first grist mill and in later years Mill Creek became one of the town’s water reservoirs. Despite being in close proximity to Angel's Rest, a popular section of the Appalachian Trail, our community rarely visits this location. The location has recently become the focus of revitalization. Trails have been designed and incorporated into the area for multiple uses, picnic areas have been established, and the overall restoration of the park needs to become a community effort.

The Giles County area has become a tourist destination for outdoor sports such as; hiking, biking, boating, and horseback riding. Mill Creek Park boasts wide trails which will lead you to four waterfalls, the Mill Creek Dam, and views of the New River, Alleghany Plateaus of West Virginia, East River, Peters Mountain, Stoney Creek valley. The summit is 3,440 ft. above sea level with open cliff top views of Wolf Creek Mountain. The county has been working on promoting the natural beauty that surrounds our local towns. Since Mill Creek is within short driving of our school, we chose it as our Place Based Service Learning Project. Our project will help to promote Mill Creek Park as an attraction to the local community and tourists wishing to have more outdoor experiences.

Real

Mill Creek Park project will increase much needed awareness by creating interpretive brochures which will promote Mill Creek’s natural beauty. The Mill Creek project kiosk will be designed by our students this will be an information center for tourists and community members. At this location, citizens will attain a brochure as well as be able to report the phonological data that they have collected. Our project will also require students to request involvement from the community to help maintain and sustain our local natural environment by evaluating the impact of humans and natural elements.

Empowering

Every aspect of our project will empower our students. The project will allow them to take on meaningful roles in the design, progress, and outcome of the project.

• The brochure phase of the project will lead students to become photographers, quest designers, and brochure makers.
• The kiosk phase of the project will focus on students to design and help construct the kiosk.
• The data collection and recording phase will encourage students to take on roles of examining and evaluating the environment.
• Students will be empowered to maintain Mill Creek Park while they experience the internal rewards of stewardship.
• Due to the pride and effort placed into the park and the learning activities, students will become role models for other youth and other locations in the future.

Collaborative

The Mountain Lake Biological Station in Giles County will be offering assistance with collection of water samples at the Mill Creek Park.

Ralph Robertson has restored the area, built biking trails, and created hand drawn maps of the park. He will be an integral part of our entire project. He has agreed to assist with all aspects of our project.

Judy Nusen a member of the town council in Narrows and Progress In Narrows Now has been contacted to
assist with our project.

Wayne Woodyard Modern Woodmen Ecology Awareness Program

Rickey Shortt of Peaks and Paths Blogspot.com

E. Content Standard(s):

5.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which:
   a) items such as rocks, minerals, and organisms are identified using various classification keys;
   b) estimates are made and accurate measurements of length, mass, volume, and temperature are made in metric units using proper tools;
   c) estimates are made and accurate measurements of elapsed time are made using proper tools;
   d) hypotheses are formed from testable questions;
   e) independent and dependent variables are identified;
   f) constants in an experimental situation are identified;
   g) data are collected, recorded, analyzed, and communicated using proper graphical representations and metric measurements;
   h) predictions are made using patterns from data collected, and simple graphical data are generated;
   i) inferences are made and conclusions are drawn;
   j) models are constructed to clarify explanations, demonstrate relationships, and solve needs; and
   k) current applications are used to reinforce science concepts.

5.7 The student will investigate and understand how Earth’s surface is constantly changing. Key concepts include
   a) identification of rock types;
   b) the rock cycle and how transformations between rocks occur;
   c) Earth history and fossil evidence;
   d) the basic structure of Earth’s interior;
   e) changes in Earth’s crust due to plate tectonics;
   f) weathering, erosion, and deposition; and
   g) human impact.

6.1 The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which
   a) observations are made involving fine discrimination between similar objects and organisms;
   b) precise and approximate measurements are recorded;
   c) scale models are used to estimate distance, volume, and quantity;
   d) hypotheses are stated in ways that identify the independent and dependent variables;
   e) a method is devised to test the validity of predictions and inferences;
   f) one variable is manipulated over time, using many repeated trials;
   g) data are collected, recorded, analyzed, and reported using metric measurements and tools;
   h) data are analyzed and communicated through graphical representation;
   i) models and simulations are designed and used to illustrate and explain phenomena and systems; and
   j) current applications are used to reinforce science concepts.

6.5 The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made
environment. Key concepts include:

a) water as the universal solvent;
b) the properties of water in all three phases;
c) the action of water in physical and chemical weathering;
d) the ability of large bodies of water to store thermal energy and moderate climate;
e) the importance of water for agriculture, power generation, and public health; and the importance of protecting and maintaining water resources.

6.7
The student will investigate and understand the natural processes and human interactions that affect watershed systems. Key concepts include:

a) the health of ecosystems and the abiotic factors of a watershed;
b) the location and structure of Virginia's regional watershed systems;
c) divides, tributaries, river systems, and river and stream processes;
d) wetlands;
e) estuaries;
f) major conservation, health, and safety issues associated with watersheds; and
g) water monitoring and analysis using field equipment including hand-held technology.

6.5
The student will investigate and understand the unique properties and characteristics of water and its roles in the natural and human-made environment. Key concepts include

a) water as the universal solvent;
b) the properties of water in all three phases;
c) the action of water in physical and chemical weathering;
d) the ability of large bodies of water to store thermal energy and moderate climate;
e) the importance of water for agriculture, power generation, and public health; and the importance of protecting and maintaining water resources.

LS.1
The student will demonstrate an understanding of scientific reasoning, logic, and the nature of science by planning and conducting investigations in which

a) data are organized into tables showing repeated trials and means;
b) a classification system is developed based on multiple attributes;
c) triple beam and electronic balances, thermometers, metric rulers, graduated cylinders, and probeware are used to gather data;
d) models and simulations are constructed and used to illustrate and explain phenomena;
e) sources of experimental error are identified;
f) dependent variables, independent variables, and constants are identified;
g) variables are controlled to test hypotheses, and trials are repeated;
h) data are organized, communicated through graphical representation, interpreted, and used to make predictions;
i) patterns are identified in data and are interpreted and evaluated; and
j) current applications are used to reinforce life science concepts.

LS.9
The student will investigate and understand how organisms adapt to biotic and abiotic factors in an ecosystem. Key concepts include

a) differences between ecosystems and biomes;
b) characteristics of land, marine, and freshwater ecosystems; and
c) adaptations that enable organisms to survive within a specific ecosystem.

**LS.10**
The student will investigate and understand that ecosystems, communities, populations, and organisms are dynamic, change over time, and respond to daily, seasonal, and long-term changes in their environment. Key concepts include:
- a) phototropism, hibernation, and dormancy;
- b) factors that increase or decrease population size; and
- c) eutrophication, climate changes, and catastrophic disturbances.

**LS.11**
The student will investigate and understand the relationships between ecosystem dynamics and human activity. Key concepts include:
- a) food production and harvest;
- b) change in habitat size, quality, or structure;
- c) change in species competition;
- d) population disturbances and factors that threaten or enhance species survival; and
- e) environmental issues.

**Stage 2 – Acceptable Evidence**

<table>
<thead>
<tr>
<th>Performance Task(s): Learners will show that they really understand by:</th>
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<tbody>
<tr>
<td>Students will know…</td>
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<tr>
<td>Students will be skilled at…</td>
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</table>

**Evaluative Criteria**
| Alignment with Desired Outcomes (Big Ideas, Enduring Understandings. Student Learning Objectives) and/or Content Standards | **Other Evidence:**  
Students will show they have achieved Stage 1 (Desired Outcome) goals by… | Evaluative Criteria (score sheets, rubrics, observation check-lists, grading key) |
|---|---|---|
| **Stage 3 – Learning Plan** | **Learning Activities** (includes timing, supplies, & links):  
Progress monitoring through pre-assessments, simulations, formative & summative assessments |
Adaptations

*Learner-centered and context-sensitive adaptations for our TTEC unit include:*

<table>
<thead>
<tr>
<th>Adaptations</th>
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<tbody>
<tr>
<td>Reflections</td>
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</table>

*Post-instruction reflections by TTEC unit designer(s)/ instructor(s) include:*
### Stage 1 – Desired Results

**Big Idea(s):**

**Enduring Understanding(s):**

**Essential Question(s):**

**Content Standard(s):**

**Place-based Service Learning Lens** (Assumes PBSL Principle #5 Integrated & Principle #6 Rigorous):

**Grounded in Place**

*In what ways is your unit a direct reflection of local landscapes, resources, culture, and values?*

**Real**

*What authentic, real-world need or opportunity will students address through their project?*

**Empowering**

*What opportunities exist or can be created for students to have meaningful roles in project design, decision-making, and evaluation?*

**Collaborative**

*What opportunities will students have for mutually beneficial collaboration with other disciplines, community or public land partners?*

### Stage 2 – Assessment Evidence

**PBSL Performance Task(s):**

**Other Evidence:**

### Stage 3 – Learning Plan

**Learning Activities:**

**Adaptations**

**Reflections**