



Climate Change Lesson: Tradition

Tradition: Climate Change Lesson

We are proud of it. We learn from it. We are not bound by it.

Overview

This lesson introduces youth to the NPS value of Tradition, and its relationship to anthropogenic climate change. Youth will learn the historical importance of fossil fuel use, the science behind climate change and its effects, and discuss possible solutions or future steps to mitigate climate change.

Learning Objectives

- Explore the concept of tradition and its relation to “change.”
- Understand the historical use of fossil fuels and its significance.
- Understand the scientific process of climate change and the challenges it poses.
- Discuss possible solutions to mitigate or adapt to climate change.

Materials Needed

- Notepads and writing utensils
- Laptop/Projector for videos

General Outline

1. Opening Discussion

- a. Youth will discuss the value of Tradition and how it may relate to anthropogenic climate change.

2. “We are proud of it”: Historical Fossil Fuel Use

- a. Youth will understand the significance of fossil fuel use in the Battle of Monocacy.

3. “We learn from it”: Climate Change & its Impacts

- a. Youth will explore the history of climate science, evidence of climate change, and future climate projections. Additionally, they will make connections between possible climate change impacts and the Battle of Monocacy.

4. “We are not bound by it”: Sustainable Solutions

- a. Youth will explore alternative options to traditional fossil fuel practices.



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Background

Climate change and warming temperatures are the result of human activity, specifically the burning of fossil fuels. Carbon dioxide and other gases are released into the atmosphere when fossil fuels, like coal, oil, and natural gas, are burned. As the gases accumulate in the atmosphere, less heat is able to escape into space, which results in warming global temperatures. This phenomenon, known as the greenhouse effect, allows for Earth to remain warm enough to be livable. However, the increased warming due to additional CO₂ inputs has caused a multitude of environmental problems.

This lesson attempts to form connections between the value of tradition, historical fossil fuel use, climate change impacts, and sustainable future solutions. It will view fossil fuel use and consequent climate change from a holistic lens that is ultimately focused on understanding traditional practices, learning from them, and moving beyond them for a better future.

Procedure

1. Opening Discussion

- a. To begin, ask the group: “What does the word tradition mean to you?”
 - i. Field all responses. Then, explain to youth: “The Merriam-Webster Dictionary defines tradition as “an inherited, established, or customary pattern of thought, action, or behavior.” The National Park Service describes Tradition through the phrases ‘We are proud of it. We learn from it. We are not bound by it.’ You’ll notice that the NPS adds that we are not bound, or stuck permanently, to traditional values or behaviors.”
- b. Follow up with the question: “Why might it be important to establish that although we can take pride in our tradition, we aren’t necessarily anchored to it?”
 - i. Field all responses. Then, explain to youth: “By establishing that we are not bound to tradition, it allows us to adjust our actions to account for future changes that we did not see coming. While we respect and honor our tradition, we are not held back by it.”
- c. Then, say: “Now that we understand the NPS interpretation of tradition, we can begin to relate it to anthropogenic climate change. Throughout the lesson, we will be discussing each part of Tradition: “We are proud of it. We learn from it. We are not bound by it.” In order to accomplish this, we will begin by understanding the process of anthropogenic climate change.”



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2. “We are proud of it”: Historical Fossil Fuel Use

- a. To begin, explain to youth: “We will first watch an introductory video on the Greenhouse Effect, to understand how our traditional practices have led to changes in Earth’s climate (<https://www.youtube.com/watch?v=VYMjSule0Bw>). As you watch, keep in mind the relationship between humans and the environment.”
- b. Then, ask youth: “How have human actions led to changes in Earth’s climate?”
 - i. Field all responses. Then, explain, “Increased burning of fossil fuels, like coal, oil, and natural gas, releases carbon dioxide into the atmosphere. As carbon dioxide, a greenhouse gas, increases, less heat can escape Earth’s atmosphere into space. This leads to a global increase in Earth’s temperature.”
- c. Inform youth: “Now that we understand the relationship between the burning of fossil fuels, the Greenhouse Effect, and climate change, we can start relating these concepts to the value of Tradition. We will explore the historical use of fossil fuels surrounding MONO, and understand how we can be proud of their use.”
- d. Ask youth: “Brainstorm ways that fossil fuels may have been used during the Battle of Monocacy, Civil War, or in the years that followed.”
 - i. Field all responses. Then explain, “During the Civil War, fossil fuels, specifically coal, were burned to provide energy for railroad transportation and weapon factories. The Baltimore & Ohio Railroad was responsible for transporting soldiers, supplies, equipment, and wounded individuals between Washington, D.C. and the rest of the Union. The B&O’s President, John Garrett, was notified by railroad agents that Confederate troops were moving down the Shenandoah Valley, days before the Battle of Monocacy. Garrett reported this information to Union authorities, and convinced Major General Lee Wallace to strengthen the Union troops at Monocacy Junction. Additional troops, ammunition, and rations were quickly transported to Monocacy through the B&O Railroad, therefore helping to prevent the Confederates from seizing Washington, D.C. Outside of the War, fossil fuels have allowed for the manufacturing and transportation of goods and people, and catalyzed the growth of influential cities surrounding Monocacy (NPS Monocacy National Battlefield).”



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- e. Conclude this section by saying: “As you can see, the use of fossil fuels has allowed for many historical successes and shaped our society, and for that we can be proud.”
- 3. **“We learn from it”: Climate Change & Its Impacts**
 - a. To begin, ask youth: “If you had to take a guess, when do you think science behind climate change originated?”
 - i. Field all responses. Then inform:
 - 1. “Beginning in the early 1800s, scientists have suggested that the Earth’s atmosphere has the ability to capture heat, because if not the world would be much colder. In 1904, Swedish scientist Svante Arrhenius, calculated that increased CO₂ emissions from human activity could be changing the Earth’s climate. This theory was proved in the 1960s, when Charles David Keeling measured steady increases in atmospheric CO₂ levels at the Mauna Loa Observatory in Hawaii. Today, 97% of climate science experts agree that human fossil fuel emissions are driving global climate change.”
 - b. Explain to youth:
 - i. “Even today, we are continuing to learn about how our traditional fossil fuel use is changing Earth’s climate. We see evidence of changes when we analyze scientific data on various climate factors - temperature, precipitation - in combination with atmospheric CO₂ trends. Climate scientists utilize hard data and computer software to model future climate change impacts. Let’s watch a video to explain the evolution and importance of climate modeling. ”
<https://www.youtube.com/watch?v=i9EyFghIt5o>
 - c. Distribute notepads and writing materials to youth. Then explain: “Brainstorm and make a list of any climate change impacts that you have learned about previously, seen in the news, or experienced in real life. Place a star next to those that you think are occurring at, or influencing Monocacy. Be prepared to explain why you starred some impacts over others.”
 - i. Have youth share their lists and explain why they starred certain impacts.
 - ii. If youth differ in their starred choices, however can justify their trains of thought, explain:



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1. “Many impacts of climate change can influence each other, and can overlap between varying scales of space and time. While there is a scientific consensus that humans are causing climate change, there is not a consensus on the magnitude of climate change impacts. We are still researching, learning, and understanding the extent to which climate change impacts different resources and regions.”
- d. Then explain:
 - i. “Since climate change impacts can vary greatly in different parts of the world, it’s important to understand consequences and develop solutions at a localized level. In MONO and the surrounding area, climate scientists have combined scientific data and modelling software to predict future changes, so that we are able to respond accordingly in the present.”
- e. Distribute the Projected Changes at Monocacy Battlefield sheet to youth. Then, tell youth: “Take a few minutes to read over this list and discover how scientists think MONO will be impacted by climate change.”
- f. Then, explain to youth:
 - i. “Using what we’ve learned about current and predicted climate change impacts, let’s think about how these changes may have impacted the Battle of Monocacy. Imagine the year is 1864, and you are a young soldier preparing for battle. You are presented with a few challenges related to changes in climate. For each, consider conflicts that may arise, new strategies that you may need to consider, and/or any unexpected consequences.”
- g. Read each of the following scenarios to youth one at a time. Allow youth to brainstorm and record their responses, then share and discuss with the group. Supplement the discussion of each scenario with the corresponding suggested responses.
 - i. “The first scenario involves changes in precipitation. What if the river had been flooded or in drought? How might that have affected the battle?”
 1. Movement of troops? Strategic positions? Objectives for each side? Transportation of necessary materials?
 2. Other considerations: increased flooding of fields, increased insect populations (mosquitos), illness, visibility issues, etc.



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- ii. “The second scenario involves changes in temperature. What if the battle had taken place during an extreme heat wave? How might the battle have been affected?”
 - 1. Health of soldiers? Stamina and endurance? Performance of the cavalry?
 - 2. Other considerations: dehydration, extreme storm events, wildfires, sunburn, etc.
 - iii. “The third scenario involves changes in vegetation. What if there had been different species of plants and trees present? How might that have affected the battle?”
 - 1. Medicines on the battlefield/possible medical treatments?
Challenges from vegetation like poison ivy/poison oak? Forest composition and influence on strategic positions?
 - 2. Other considerations: presence of certain animals, availability of natural supplies, effect on orientation, etc.
 - iv. “The final scenario involves changes in crop growing season. What if crops experienced an earlier or later growing season? How might this have affected the battle?”
 - 1. Cover for troops? Strategic positions of soldiers? Line of sight?
 - 2. Other considerations: certain insect migrations, availability of foodstuffs, higher civilian presence, etc.
 - h. Conclude this section by emphasizing the second principle of Tradition: “We are continuously learning more about the consequences of our traditional practices, and we can utilize what we’ve learned to improve future actions.”
- 4. “We are not bound by it”: Sustainable Solutions**
- a. To begin, explain: “So far, we’ve understood how to be proud of our traditional fossil fuel use and learn from the impacts it has made on Earth’s climate. In this last section, we will discuss how we are able to shift our tradition to meet the needs of present and future times.”
 - b. Ask youth: “Considering what you’ve learned about our traditional practices and their impacts, what alternative practices/behaviors could be beneficial in mitigating the effects of climate change? What about at MONO specifically?”
 - i. Field all responses. Then explain: “Since climate change is such a global issue, it can be intimidating or counterproductive to try tackling it at a



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large scale. The solution is to introduce smaller, localized improvements to previous practices. Here at MONO, changes have already been made to reduce the park's impact on climate:

1. Renewable energy sources, like solar panels have been installed on the roofs of the Visitor Center and maintenance shop. Using renewable energy over fossil fuels allows for reductions in carbon dioxide emissions.
 2. Higher efficiency technology, like LED and CFL bulbs, light dimmers, motion sensors, and low-flow faucets, have been installed to reduce energy consumption and reduce greenhouse gas emissions.
 3. Two hybrid vehicles are owned and operated by the park, and employees are encouraged to teleconference (when possible) to reduce greenhouse gas emissions. Additionally, carpooling throughout the park is made enjoyable and convenient because of the auto tour.”
- c. Conclude by explaining: “In the midst of a changing climate, it is important to understand the significance of our historical traditions, learn from them, and modify them to meet the needs of the future.”



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Projected Changes at Monocacy Battlefield

1. Temperature:
 - a. The number of dangerously hot days will increase. The number of days each year that are hotter than 90°F are projected to double or triple if action is not taken to reduce greenhouse gas emissions.
 - b. Maryland's average temperature is expected to increase by 3.6°F by 2050.
2. Precipitation:
 - a. Overall increase in precipitation, especially in winter and spring. Dry months will tend to stay dry or become drier, and rainfall will become more sporadic.
 - b. Additional runoff in the winter and spring months will likely lead to increased flash flooding and lower water quality.
3. Vegetation and Wildlife:
 - a. Wildfire frequency in Maryland is expected to increase with rising temperatures.
 - b. Stress from heat waves and other changes to the climate will leave trees more vulnerable to pests and disease.
 - c. Over time, Monocacy's forest structure could change to one more resembling the pine heavy forests of North Carolina, instead of the maple heavy forests of today.
4. Agriculture:
 - a. Expected increase in the frequency of short-term droughts. Drier soils in the summer will require increased water usage to grow crops.
 - b. Warmer winters could lead to the spread of pests normally limited by cold temperatures.



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References

NPS Monocacy National Battlefield. John W. Garrett, President, B & O Railroad. Retrieved from: https://www.nps.gov/mono/learn/historyculture/john_w_garrett.htm

R. Chea, C. Tamayo, C. Habel. 2017. What if? Climate Change Dialogue at Monocacy

SciShow. 2017. How Climate Scientists Predict the Future. Retrieved from: <https://www.youtube.com/watch?v=i9EyFghIt5o>

U.S. Environmental Protection Agency. 2015. The Greenhouse Effect. Retrieved from: <https://www.youtube.com/watch?v=VYMjSule0Bw>



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Quest Activity for Monocacy YCC Lesson - Tradition: Climate Change

The following document explains the idea of a Quest Activity to go along with the “Tradition: Climate Change” lesson for the Monocacy National Battlefield YCC program. The quest would utilize information from the “What if?” infographic and the “Facilitated Discussion Guide at Monocacy National Battlefield”.

Quest activities are uniquely engaging because they present youth with problem “what if?” scenarios, and task them with developing solutions to these problems. Depending on the chosen solution, a new problem scenario may be presented. In this way, youth can follow a path of possible scenarios depending on how they choose to respond in different situations.

Youth will take on the role of young soldiers at the Battle of Monocacy in 1864. They should dive into this role completely, and keep in mind the soldiers’ mindsets, health statuses (mental and physical), responsibilities, values, etc. They should be given a map of Monocacy National Battlefield - preferably one that is zoomed in/focused around the Thomas House Headquarters). Ideally, youth should be able to make their own individual decisions and follow the quest accordingly. However, this may be difficult to do if all youth are going in different directions around the park. Another option is to have youth work together, discussing solutions at each step, and making a unified group decision on what they agree is the next best move.

A general outline could be something like this:

1. “Begin outside of the Thomas Headquarters. Climate change has caused an unpredictable crop growing season. Choose whether you’d like to experience a premature or delayed growing season.”
 - a. Premature: “What effects may this have on your troops?”
 - i. Have youth FIRST brainstorm these effects. Then, present the listed effects, and have them choose their next step:
 1. High crop cover reduces your available line of sight. You can either:
 - a. Use time and manpower to cut down crops to have improved vision.
 - b. Transition troops to higher ground.
 - b. Delayed: “What effects may this have on your troops?”



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- i. Have youth FIRST brainstorm these effects. Then, present the listed effects, and have them choose their next step:
 1. Your troops relied on these crops for food supplies. The delay causes food shortages, which means you will need to ration food even further. Keep in mind what this may do to your strength and endurance.
 2. Your troops relied on these crops for cover from the opposing army.
You can either:
 - a. Move into more forested areas.
 - b. Move to higher ground. Opposing troops will still be able to see you, but you have the advantage of higher ground.

NOTES:

- As you can see, the quest process can go in many different routes. To minimize confusion, while still having youth incorporate their own creative process, a strategy must be developed to keep track of where they can choose to go next. When they arrive at each new “place” they will be faced with a new problem scenario. Some examples:
 - If they choose to go into more forested areas:
 - What if there are different/unexpected species of plants and animals due to changes in climate?
 - They could be faced with increased poison ivy/poison oak -- which decreases their overall health.
 - They could try to utilize new plants as medicines - however, there is risk associated with experimenting with unknown species.
 - They could end up backing themselves up to the Monocacy River as enemy troops are approaching them.
 - If they get backed up to Monocacy River:
 - What if the area had been experiencing an extreme amount of rain and the river is flooded?
 - They may have issues moving across men, supplies, etc. They may end up losing weapons, food, etc. while trying to cross.
 - Oppositely, what if the area had been experiencing extreme drought and the river is low/dried out?
 - They could be at risk for dehydration.



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- It may be helpful to develop the quest in a diagram form (similar to flow quizzes in youth magazines) and place instructions at each stop before youth begin the quest.
- If an in-the-field quest is too complicated, a printed diagram/map can be used as an alternative.
- The main goal of an activity like this is to get youth thinking about how climate change causes unexpected consequences and can impact all parts of life, even war strategy. It will also allow them to think critically about the decisions they make, and how certain decisions have effects on their own personal livelihoods, health, etc. They will make connections between modern environmental issues and historical events, which will, in turn, have them thinking about how people will have to adapt to future issues.



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