USING CURRENT SCIENCE ARTICLES TO EVALUATE THE EFFECT ON
STUDENTS SEEING RELEVANCE OF SCIENCE IN THEIR EVERYDAY LIVES

by

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In this classroom research project, current events were used to help students integrate environmental science concepts into their lives. The project focused on determining whether the use of current events influenced ‘aha’ moments, and if it influenced student learning. Students were given a relevant current events article to read during three separate units of study. Writing prompts followed each of the three articles. In order to evaluate the effectiveness of current events in the classroom, students were surveyed and interviewed, class discussion followed the writing prompts, teacher journaling took place, and the students were assessed on corresponding free response questions on the three units’ summative assessments. Collected data suggests that current events help students understand the relevance of science in their lives and also have a positive impact on student learning.
INTRODUCTION

As a high school science teacher, I always have students asking the questions, “Why do I have to learn this?” and “When will I ever have to use this in my life?” I have always wanted my students to be able to make a connection between the science they are learning in the classroom and their everyday lives. In today’s media, there are so many outlets where the students are exposed to science news and they should be able to read and apply the information in their lives.

I believe my students would be more successful in school if they were able to see the relationship between science, current events, and their everyday lives. In this classroom research project, I had my students read a variety of science media articles relating to what they are learning in the classroom. By using current events, the students developed the ability to connect the readings to the real world. Norris, Phillip, and Korpan (2003) studied university level readers’ ability to identify truthfulness of a text as a way to see students’ evaluative competence and found that students tend to overestimate truth in media reports. Jarman and McClune (2001) suggest that although students are interested in science in the news, they need to see how the science is relevant to their world and lives so that they can make informed decisions about the world around them.

Throughout the study, the students in my Advanced Placement Environmental Science (APES) class were able to incorporate various science concepts into their everyday lives. By exposing my students to global issues regarding environmental
science, the students were able to understand complex concepts and how processes and systems on Earth are interconnected.

The APES students read current events articles and responded to open ended questions regarding the articles. The readings took place after the units were taught. The questions evaluated whether the students saw the articles as relevant to their lives and whether they had any ‘aha’ moments, where something they learned in class suddenly became clearer for them.

The primary focus of my classroom research project was to encourage students to think about science outside of the parameters of the classroom, to apply what they had learned to ‘real life.’ The question I addressed in the study was: “Does using current events enable students to see the relevance of science in their everyday lives?”

Secondary questions addressed:

- Does using a post-unit reading affect ‘aha’ moments?
- Does using current events articles affect student learning?

**Teaching and Classroom Environment**

I have been a teacher at Pine Grove Area School District for the past eight years. I teach a variety of science courses, Advanced Placement Environmental Science, Biology, Environmental Science, and Genetics. Throughout the school year, I teach approximately 150 students.

Pine Grove Area High School is located in Pine Grove, Pennsylvania and is a public school with approximately 500 students. Graduating classes contain an average of 125 students. The percentage of students receiving free and reduced lunch is 31% and
the school is located in a rural farming area. Most students come from low to middle class backgrounds and the importance of education is not always emphasized in the home. The majority of students are Caucasian race and there is not much ethnic diversity within the school district. The closest major city to Pine Grove is Harrisburg, Pennsylvania’s state capital, which is approximately a one-hour driving distance (“District Overview”, n.d.).

CONCEPTUAL FRAMEWORK

Trying to help students make a connection between abstract science topics and their everyday lives is sometimes difficult as a science teacher. I am constantly searching for new ways to help students understand and incorporate what we are learning in class into their day to day routine. I believe incorporating current events into the classroom enables students to see the relevance of the topics they are learning and retain the information.

In a study performed by Singh (2011), students were given a National Aeronautics and Space Administration (NASA) article to read prior to a related physics topic being introduced. After reading, the students were asked to answer various reading comprehension questions. The unit material was covered in class and afterward the students were asked to read the same article. Singh states: “Every time I have tried this (in at least six different physical science classes), there have been several visible ‘aha’ moments, whereby students have suddenly connected the ideas they learned about in class” (p. 483).
McCullough (2006) incorporated reading into her classroom through the use of *Science News magazine*. The students were to choose an article from the magazine, which presents current science research in more understandable terminology. After they had chosen an article and read it, the students wrote a review on why they had chosen the article and what they found interesting about it. In this way, McCullough gave the students ownership of what they were learning. At the end of the semester, she had the students write a reflection paper about the types of articles they had chosen. The results of the assignment were very positive and McCullough (2006) states:

> Students were eager for the arrival of the new issue each week. I received many papers early, far more than I ever received on a problem assignment. An interesting side effect was that student workers in the lab where *Science News* was kept found the reading fascinating and looked forward to the new issue each week. One student worker mentioned that each week something he read connected directly to one of his classes (p. 33).

When choosing material that the students will read, it is important to choose articles from accurate and reliable sources. Pellechia (1997) studied trends in science coverage of three major newspapers over the previous thirty years. It was found that while there was an increase in science coverage, the range of topics covered had not differed drastically. Burnham states that “the tendency to deliver scientific news as ‘important snippets of news’ omitting many important details in these accounts, results in both a trivialization and misunderstanding of specific research results, as well as of science in general” (as cited in Pellechia, 1997, p. 64).

Hicks and Ewing (2003) present an in-depth look at how teachers can use online newspaper articles in the classroom. They discuss how global newspapers are “especially suited to assignments that ask students to compare and contrast different perspectives on
similar events, explore the regional significance of a particular process, or examine a particular country, culture, or population over time and in-depth” (p. 134).

Misconceptions about science are another problem that teachers face when discussing science current events with students. In a study of 308 first and second year university students’ interpretation of media reports, Norris, Phillips, and Korpan (2003) evaluated the students’ ability to identify truthfulness, status (as to what prompted the scientists to do the research), and role (whether statements were identified and explained in the report or there was evidence for the statement in the report) using 15 interpretive questions per report. Students identified true statements more accurately than false statements. The study concluded that the reason might be that true statements are the most identifiable because they are the type found most commonly found in science textbooks. Students were also more likely to correctly identify observation and method statements, but be confused by cause and correlation statements. The students thought they were more capable of reading and interpreting science reports than what their results showed. On a consistent basis, the students overestimate the truthfulness of the statements in the news articles. They had a sort of “inflated view of their ability” to understand what they had read in the assigned science media reports. The study states:

Participants found it quite difficult to interpret descriptive statements of phenomena and explanatory statements. These types of statements were identified on average by only about a third of the participants. If one were to ask a group of scientists to describe the essence of science, description of phenomena and explanation would probably be included. Yet, these participants, who have relatively strong backgrounds in science compared to most non-scientists, showed little understanding of these ideas when they were presented in the context of media reports (p. 137).
In a similar study by Phillips and Norris (1999), 91 high school students were asked to read four media science articles from a popular science magazine, a non-science magazine, or newspaper. Each article had varying degrees of scientific evidence presented within it and the students were evaluated on whether they could critically evaluate the text or whether they deferred to their existing beliefs on the subject. Students were asked about their background beliefs on the topic prior to reading the report. They were then asked to turn the page and read the report. For example, before reading the first report “Weather Can Make You Sick” (Weinhouse, 1992), students were asked to answer ‘Do you believe that weather can make you sick? Why do you say that?’ (p. 321). The researchers found that the students, in general, “readily accepted the claims made in the reports, and adopted beliefs in accord with them, whether or not those beliefs were in accord with ones they held prior to reading the reports” (p. 325). This leads me to believe that we, as teachers, not only have a responsibility of introducing students to science in the media, but we also have the obligation of helping students develop critical thinking and questioning skills when they are exposed to science in the news. They should be questioning the source, and whether it is accurate and reliable. Phillips and Norris (1999) state:

66-88% of students adopted text-based positions towards the reports. They either deferred absolutely to the reports (deference), simply paraphrased the reports to support their position (echoing), or agreed with the text on the grounds that their own beliefs and the text coincided (affirmation). Of the students, 7-21% adopted a background-belief-based position of imposing interpretations on the text to accord with their own background beliefs (domination) (p. 325).

A small percentage of students took on a critical thinking stance, by listing reasons they think the article should be believed or challenging that the text had issues on the basis of
reasons. As these students become citizens and move through their everyday lives, they will be obtaining more and more of their information about science through media outlets.

Teachers need to prepare students by teaching them how to engage with science in the news. Jarman & McClune (2009) give suggestions on how to address this issue in the classroom. The authors recommend having students work with text that contains errors and have them correct the text. Students should recognize that they cannot believe everything they read in the media, but they should also be able to critically evaluate text. Another strategy is comparing the same science story from two different sources, for example a tabloid and a science magazine. In this exercise, students would be able to see that different sources present information in different ways. The last suggestion is to “study a study” (p.73). This involves reading and evaluating the study that was cited in the media article. The authors suggest supporting the reading by answering questions such as:

How was the scientific investigation conducted?
What is the evidence for the conclusion?
What is the social context? Of the science? Of the newspaper?
What do others say? Other scientists? Other newspapers?
What is the relevance of the work? For me? For others? (p. 74).

Through various research the Michigan Educational Assessment Program (1994), Miller and Osborne (1998), and Calhoun, Panwar, and Shrum (1997) all maintain that:

Findings suggest that many of our best educated students are lacking the evaluation skills essential to this form of scientific literacy with its potential importance to lifelong learning. Concern about these skills has led some science educators and curriculum designers to recommend the use of science news in curriculum design and assessment (as cited in Kachan, Guilbert, & Bisanz, 2005, p. 497).
It is then of the utmost importance that teachers prepare the students to become critical thinkers and prepare them for information they will be receiving through the media. The students need to be able to examine various reports and discern and comprehend the merit and trustworthiness of science coverage in the news and how it applies to their everyday lives.

According to Timmerman (2002) “You can use current events to bridge the gap between book knowledge and real-world science.” At the beginning of each semester, Timmerman assigns a weekly science article of the students’ choosing that has been approved by the teacher. The students keep a current events journal and must summarize the article, why they chose the article, and define five words that they were unfamiliar with in the article. Through using this activity, the students feel they have ownership over what they read, improve their reading, writing, vocabulary, and communication skills, and are more able to determine important information in a reading (Timmerman, 2002).

Ultimately, is it important that students are able to read science media reports and both incorporate them into their lives and understand how to think critically about science reports. In a study by Jarman and McClune (2001), it was found that many teachers believe that it is. This is supported by the fact that a large number of teachers use science media reports to back their science teaching. The researchers found “the most common reason, reported by 76% of teachers, was to illustrate the links between science and everyday life” (p. 71). The study also found, however, that only 4.3% of teachers used the science media reports to promote critical evaluation in their students.
Textbook learning is often not current because science is constantly changing and textbooks become quickly outdated. By helping the students read and evaluate current events, teachers can students relate the science back to their everyday lives. This critical thinking skill is essential to the students’ lives regardless of the professional path that they choose after high school. By making connections, more science knowledge will be retained by the students.

METHODOLOGY

The purpose of this classroom research project was to introduce science current events into the classroom as a way for students to see the relevance of science in their everyday lives. By introducing them to news articles and having them discuss current environmental science topics, I hoped to pique their interest in the sciences and encourage them to incorporate their understanding of science concepts in their everyday lives.

The classroom research project was carried out in my Advanced Placement Environmental Science (APES) class over a period of seven weeks and three units of study, from mid-January until the beginning of March, 2016. All students in the class participated in the research. The class consisted of six students: five 12th grade females and one 10th grade male. Five of these students were Caucasian descent and one of Chinese descent who moved to the United States four years ago.

The 2014-2015 APES class did not read the current events articles and, therefore, are considered the non-treatment group. This class consisted of 11 females and three males. Grade levels for the non-treatment group were 10th through 12th grade. The
students were all of Caucasian descent. The non-treatment group and the treatment group were given the same free response questions (FRQs) on their unit assessments. The FRQs and scoring guidelines were taken from past APES exams, which are published for teachers to use in the classroom.

The three treatments were post-unit readings and corresponding prompt questions regarding the topic that would be tested in the free response section of the unit assessment. The three units involved in the study were: Nonrenewable Resources, Renewable Resources, and Air Pollution and Stratospheric Ozone Depletion. The articles were taken from three news sources: National Geographic, Biodiesel Magazine, and ABC News. Treatment one was completed after students read a current events news article from National Geographic about the ban on drilling in the Alaska National Wildlife Refuge (Appendix A). Treatment two was completed after students read an article from Biodiesel Magazine regarding Michigan State University and ExxonMobil entering a one million dollar algae research partnership (Appendix B). Treatment three was completed after students read an article from ABC News regarding the ozone hole over Antarctica (Appendix C).

The units were taught, in the same way for the non-treatment and treatment groups, through a variety of lessons, labs, and lectures. After the units were completed, the treatment group read the articles. The units each ranged in length from two to three weeks. The treatment group was given three open-ended writing prompts, one per unit. The questions evaluated important things they learned, if they could relate the article to their life, and if they had any ‘aha’ moments where something they learned in the unit
was clarified for them. After the treatment group completed the writing prompts, a class discussion followed. The class discussion approach was used for students to share their connections and ‘aha’ moments with each other.

Singh (2011) used a before and after reading approach to evaluate whether students could connect physics topics to their lives. The same article was read pre-unit and post-unit to evaluate the ‘aha’ moment. The author states that through this approach there are always visible clarifying moments where the students can make a connection between the article and something they have learned in class.

Student surveys were specifically designed to evaluate the students’ perception of science relevance in their lives. The survey was given to the treatment group, both before and after the three treatments, to assess whether the treatments had any effect on the students’ opinions. The prompts were adapted from Julie Ann Morris’s MSSE professional paper (Morris, 2013). The student survey can be found in Appendix D.

The primary question being addressed in this classroom research project was “Does using current events enable students to see the relevance of science in their everyday lives?” Were they able to connect something in the readings to their lives? Did they see how everything is interconnected and their life is ultimately affected by the decisions of others? To gather data on this question, I used student interviews. Student interviews involved all students in the treatment group, due to the small sample size (N=6). The interviews were conducted once at the end of the three treatments. The student interview questions were designed to evaluate if the students could relate the readings back to their lives. Student interview questions were adapted from Nancy Lee
Bryant’s MSSE professional paper (Bryant, 2011) and are located in Appendix E of this paper.

The free response question (FRQ) portion of the unit assessments were used to quantitatively compare this year’s treatment group to last year’s non-treatment group. This enabled me to evaluate if the articles had any effect on student learning. The non-treatment group did not read the current events articles. However, they took same FRQs as the treatment group on their unit assessments. The FRQs and scoring guidelines were taken from past APES exams, which are published for teachers to use in the classroom.

The current events articles were chosen to specifically parallel the FRQs tested on the unit assessments. The Nonrenewable Resources unit FRQ assessed drilling in the Alaska National Wildlife Refuge (“AP Environmental Science 2005 Scoring Guidelines,” 2005), which corresponded with the National Geographic article on the ban of drilling in the Alaska National Wildlife Refuge (Appendix G). The Renewable Resources unit FRQ assessed algae for use as biodiesel (“AP Environmental Science 2008 Scoring Guidelines,” 2008), which corresponded to the Biodiesel Magazine article regarding Michigan State University and ExxonMobil entering a one million dollar algae research partnership (Appendix H). The Air Pollution and Stratospheric Ozone Depletion unit FRQ assessed the hole in the ozone layer (“AP Environmental Science 2007 Scoring Guidelines,” 2007), which corresponded to the article from ABC News regarding the ozone hole over Antarctica (Appendix I). The AP Environmental Science scoring guidelines were used because they are the resources used to score FRQs throughout the year in the APES class.
In order to fully evaluate the articles’ effect on student learning, a pre-treatment Soil Conservation FRQ (Appendix J) was graded for both the treatment group and the non-treatment group. The FRQ was also adapted from the APES exam and the APES exam scoring guidelines were used (“AP Environmental Science 2004 Scoring Guidelines,” 2004). The Pretreatment FRQ and the treatment FRQs were compared by analyzing the percent change between them for both the non-treatment and treatment groups. A summary of the treatments is shown in Table 1.

**Table 1**  
*Treatment Group Articles and Corresponding Free Response Questions*

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Unit</th>
<th>Article</th>
<th>Source</th>
<th>Free Response Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretreatment</td>
<td>Land, Public and Private</td>
<td></td>
<td>Soil Conservation</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Nonrenewable Resources</td>
<td>What Obama's Drilling Bans Mean for Alaska and the Arctic</td>
<td>National Geographic</td>
<td>Drilling in the Alaska National Wildlife Refuge</td>
</tr>
<tr>
<td>2</td>
<td>Renewable Resources</td>
<td>Michigan State, ExxonMobil enter $1M algae research partnership</td>
<td>Biodiesel Magazine</td>
<td>Algae for Use as Biodiesel</td>
</tr>
<tr>
<td>3</td>
<td>Air Pollution and Stratospheric Ozone Depletion</td>
<td>Ozone hole over Antarctica expands to near-record levels, now four times size of Australia</td>
<td>ABC News</td>
<td>Ozone Layer Hole</td>
</tr>
</tbody>
</table>

Teacher personal journaling was used to evaluate if the treatment affected ‘aha’ moments in the students during class discussion. Journaling took place both during and after the students’ class discussion. This enabled me to record any additional thoughts or
clarifying moments the students had while discussing the articles with their peers. I was looking for the transition from not knowing to an increase in understanding of a topic, which is often evident on a student’s face. In addition, some words I was searching for in the discussion were ‘Then I knew,’ ‘Suddenly, I realized,’ or ‘It became clear.’ The personal journal prompts are located in Appendix F.

Table 2 shows the triangulation matrix summarizing the data collection used in the research.

<table>
<thead>
<tr>
<th>Focus Questions:</th>
<th>Data Source 1</th>
<th>Data Source 2</th>
<th>Data Source 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Question:</strong> Does using current events enable students to see the relevance of science in their everyday lives?</td>
<td>Post-unit reading prompt questions</td>
<td>Student Surveys</td>
<td>Student Interviews</td>
</tr>
<tr>
<td><strong>Subquestion 1:</strong> Does using a post-unit reading affect ‘aha’ moments?</td>
<td>Post-unit reading prompt questions</td>
<td>Class Discussion</td>
<td>Personal journaling</td>
</tr>
<tr>
<td><strong>Subquestion 2:</strong> Does using current events articles affect student learning?</td>
<td>Post-unit reading prompt questions</td>
<td>Unit assessment free response questions</td>
<td>Student Interviews</td>
</tr>
</tbody>
</table>

The research methodology for this project received an exemption by Montana State University's Institutional Review Board and compliance for working with human subjects was maintained.
DATA ANALYSIS

The goal of this classroom research project was to determine if using current events in the classroom enabled students to relate science to their everyday lives. The research also looked at whether the reading prompts influenced ‘aha’ moments, and if the current events articles affected student learning.

Science Relevance through Use of Current Events

The primary question of this study was “Does using current events enable students to see the relevance of science in their everyday lives?” Three data sources, post-unit reading prompts, student surveys, and student interviews, were used to collect data on this question.

The three post-unit reading prompts regarding drilling in the Alaska National Wildlife Refuge (ANWR), algae for use as biodiesel, and the ozone hole over Antarctica, all evaluated student perception of science relevance through the question, ‘Does the subject matter covered in this article have any relevance in your life? In your future? Can you think of a way that this can be considered a personal issue to you?’ All of the students were able to describe how these articles were relevant to their lives. In response to the ANWR prompt (Appendix A), six out of six of the students replied that the subject matter did have relevance to their lives. One student said,

Yes, because if drilling is allowed to occur here, it could increase global warming and release more harmful gases into the environment. This issue becomes personal to me because it doesn’t just affect Alaska; it affects all of us, our lives, our health, and our future.

Another student stated that future generations will not be able to appreciate certain species if they become extinct, but also took an economic stance by writing, “If they
don’t drill, the US can remain threatened by other countries and remain in debt.” For the Biodiesel prompt (Appendix B), again six out of six students responded that the subject matter did have relevance in their lives. One student responded “It might become the major energy source in the future and I could become a user of biofuel.” Another student believed it would impact her life because the biofuels will be cheaper than fossil fuels. For the Ozone prompt (Appendix C), five out of six of the students responded that the subject did seem relevant to their life. Most students stated that an ozone hole can lead to skin cancer. The student who did not see the subject as applicable stated, “Not really, since I do not live in Antarctica, but if ozone holes appear over North America, it would.”

A student survey (Appendix D) was used pre-treatment and post-treatment to evaluate students’ perceptions of science relevance both before and after the classroom research project. The results for the student survey showed a positive shift for the four statements evaluated. The results of the pretreatment and post-treatment student surveys are shown in Figure 1 through Figure 4.

Statement one, ‘I do not see how science applies to my daily life’ pre-treatment results were five, Strongly Disagree and one, Neither Agree nor Disagree. The post-treatment results were five, Strongly Disagree and one, Disagree. This showed a small positive shift because one student shifted toward seeing how science applies to their daily life. This shift, however, was not significant because only one student changed their position. The results are shown in Figure 1.
Figure 1. Results for survey statement, “I do not see how science applies to my daily life,” (N=6).

Statement two, ‘Science helps me to understand the world around me’

pretreatment results were one, Disagree, one, Neither Agree nor Disagree, one, Agree, and three, Strongly Agree. The post-treatment results were two, Agree and four, Strongly Agree. This showed the most positive shift out of the four statements evaluated because three students shifted toward agreeing that science helps them understand their world. It is possible that the shift in this statement is due to the use of current events. The students were able to relate the science we were learning and reading about to their lives. The results are shown in Figure 2.
Statement three, ‘When I read about science issues outside of school, I can relate it to something I have learned in science class’ pretreatment results were six, Agree. The post-treatment results were five, Agree, one, Strongly Agree. This was not a significant shift because only one student changed their position from Agree to Strongly Agree. The results are shown in Figure 3.
Figure 3. Results for survey statement, “When I read about science issues outside of school, I can relate it to something I have learned in science class,” (N=6).

Statement four, ‘When I watch TV and there is a scientific topic covered, I can relate it to something I have learned in science class’ pretreatment data results were six, Agree. The post-treatment results were five, Agree and one, Strongly Agree. This was also not a significant change because only one student moved from the position of Agree to Strongly Agree. The results are shown in Figure 4.
Figure 4. Results for survey statement, “When I watch TV and there is a scientific topic covered, I can relate it to something I have learned in science class,” (N=6).

The student interviews (Appendix E) were the last piece of evidence used to assess the primary question. The six students all agreed that they thought the current events articles were helpful to them when answering the question ‘How did you feel about using current events articles in the classroom?’ One student responded, “I liked using the current events articles in class because they were always something that we talked about in class, but reading something about the topic that actually pertains to the real world just helped me to understand the topic more and how that topic actually fits in to the real world or affects my life.” Another student said that the articles, “Made everything more realistic and understandable.”

The student interview question, ‘Did any of the articles encourage you to share the information you learned with your family or friends? If so, which one?’ was
evaluated. Students were evenly split in their responses to this question. Of the students that responded that they shared information, one student responded “Environmental issues don’t come up too often in conversation in my family.” Another responded, “The ANWR article made me excited and I wanted to learn as much as possible about it. As soon as I would get home, I would tell my mom about the article and class discussion.”

Overall, the data from the post-unit reading prompt questions, student surveys, and student interviews supported the idea that current events help students to see the relevance of science in their lives.

Post-Unit Reading and ‘Aha’ Moments

Data was gathered to determine whether using a post-unit reading affected ‘aha’ moments. Specifically, did the articles enable the students to make a connection to what they had learned in class? A question on the post-unit reading prompt was assessed, in addition to teacher personal journaling and class discussion.

Students answered the question ‘Did you have any ‘aha’ moments, where something we covered in class was suddenly clarified for you? Explain.’ For the Alaska National Wildlife Refuge (ANWR) prompt, the six students were able to connect something read in the article to concepts we learned in class. The responses were very different and included seismic tests being used to explore for oil, the actual amount of oil in ANWR (two students), surrounding countries already drilling in the Arctic, drilling being a good economic investment for the US, and the amount of Porcupine caribou actually present in ANWR.
The Biodiesel prompt had very similar responses, with four out of six students stating that the article clarified the process of how algae are converted into biodiesel. One student stated, “My ‘aha’ moment was the entire explanation of the process that has to occur for the algae to be turned into a biofuel. In class, we talked about using algae for fuels, but the article just defined everything in detail and what the stance is on it now.” The remaining two students gave vague answers that did not address the question that they were being asked.

The Ozone prompt responses included ozone recovery time (one student), human symptoms from depletion of stratospheric ozone (two students), ozone hole size (two students), and human causes of ozone depletion (one student). One student’s response was, “The article listed the specifics to the problems and the effects that it will have on humans.” Another student stated that the ozone recovery time was clarified for her and she supported her answer with evidence from the article.

In order to record additional information regarding the students’ ‘aha’ moments, class discussion and teacher personal journaling were used. After each article was read, we had a class discussion so the students could share any clarifying moments that they had while reading the article. I recorded my observations of the discussion using the personal journaling prompt in Appendix F.

The connections were not overwhelming for the students and some were simply reiterations of what they had read. I was looking for the transition from not knowing to more fully understanding a topic, which is often evident on a student’s face. In addition, some words I was searching for in the discussion were ‘Then I knew,’ ‘Suddenly I
realized,’ or ‘It became clear.’ The students did not deeply explain their ‘aha’ moments, despite my questioning. The impact on students making connections between the article and class discussion was insufficient. While they did provide examples of their clarifying moments in writing, when asked to discuss, the students were not able to explain how they connected the reading to class. Throughout the journaling, I did not see any specific ‘aha’ moments, where I could observe that something visibly clicked in the students’ minds.

Overall, the evidence of ‘aha’ moments was inconclusive. The students did provide examples of clarifying moments on paper; however, it seems they were just trying to write an answer to the question. When debriefed about their moment of deep insight, the students were not able to explain any instances where a concept became clear and obvious.

Current Events Effect on Student Learning

In order to answer the question, ‘Does using current events articles affect student learning?’ three pieces of evidence were used: post-unit reading prompt questions, unit assessment free response questions (FRQs), and student interviews. The data indicated that the current events articles did have a positive impact on the students’ learning.

The question, ‘What is one important thing you learned from this article?’ was asked of the students on the post-unit reading prompt. The students were to answer the question after reading the article. Three common themes were found throughout the responses for the Alaska National Wildlife Refuge (ANWR) prompt. They were location of the drilling (one student), oil amount (two students), and Alaskan economy (three
students). One student used evidence from the reading, stating “more than 90% of Alaska’s revenue comes from taxes on oil and gas.” The data from the Biodiesel prompt showed three common themes, which were amount of land needed for algae biofuels (two students), process to produce biodiesel (three students), and Exxon being a leader in researching biofuels (one student). Lastly, the Ozone prompt had three themes, which were weather affecting ozone hole size (two students), ozone hole size (three students), and human symptoms from ozone hole (one student). One student said “One thing I learned from this article is that the hole in the ozone covers an area almost four times the size of Australia. I knew the hole was large, but I didn’t know it was that large!”

The free response questions (FRQs) on the unit assessments were used to compare this year’s treatment class to last year’s non-treatment class. The current events articles, read only by the treatment group, were chosen to correspond to the FRQs tested on the unit assessments. Each group’s scores were averaged for the FRQs: Pretreatment Soil Conservation, ANWR, Biodiesel, and Ozone.

The Pretreatment Soil Conservation FRQ (Appendix J) was evaluated for both the treatment group and the non-treatment group. The treatment group did not have a current events article to read prior to taking the pretreatment unit assessment. The FRQ was adapted from the Advanced Placement Environmental Science (APES) exam and the APES exam scoring guidelines were used (“AP Environmental Science 2004 Scoring Guidelines”, 2004). The average results were 72% for the non-treatment group and 54% for the treatment group. A percent change was calculated for the ANWR, Biodiesel, and Ozone FRQs using these Pretreatment averages as a baseline.
The Nonrenewable Resources unit FRQ (Appendix G) assessed drilling in ANWR ("AP Environmental Science 2005 Scoring Guidelines," 2005), which corresponded with the *National Geographic* article on the ban of drilling in the Alaska National Wildlife Refuge. The average results were 79\% for the non-treatment group and 69\% for the treatment group.

The Renewable Resources unit FRQ (Appendix H) assessed algae for use as biodiesel ("AP Environmental Science 2008 Scoring Guidelines," 2008), which corresponded to the *Biodiesel Magazine* article regarding Michigan State University and ExxonMobil entering a one million dollar algae research partnership. The average results were 64\% for the non-treatment group and 56\% for the treatment group.

The Air Pollution and Stratospheric Ozone Depletion unit FRQ (Appendix I) assessed the hole in the ozone layer ("AP Environmental Science 2007 Scoring Guidelines," 2007), which corresponded to the article from ABC News regarding the ozone hole over Antarctica. The average results were 67\% for the non-treatment group and 71\% for the treatment group.

The non-treatment group and treatment group average scores for the Pretreatment Soil Conservation and ANWR, Biodiesel, and Ozone data were compared and the percent change from the Pretreatment Soil Conservation was calculated as an attempt to normalize scores to the pretreatment assessment. The results are shown in Figure 5 below.
Figure 5. Percent difference from the pretreatment, ($N_{Non-Treatment}=14, N_{Treatment}=6$).

When analyzing the ANWR FRQ, there was a 10% change in the non-treatment group and a 28% change in the treatment group, showing an 18% greater change in the treatment group. The Biodiesel FRQ showed a -11% change in the non-treatment group and a 4% change in the treatment group, which was a 15% greater change in the treatment group. The Ozone FRQ showed a -7% change in the non-treatment group and a 31% change in the treatment group, which was a 38% greater change in the treatment group.

The question ‘Did the ANWR, Biodiesel, or Ozone article help you to answer the free response question on your test?’ was asked in the student interview (Appendix E). In regard to the ANWR article, five students responded positively and one student indicated that the article did not help. The student who responded ‘No,’ replied “I feel I knew the answers more so from my notes and class discussions, so I would have to say the article
did not help me to answer the free response question.” Five students replied ‘Yes’ and one student replied ‘No’ when asked about the Biodiesel article. One student stated, “Yes, I think that the article did help me to answer the question because the questions asked on the test were almost exactly what the article talked about.” Five students replied ‘Yes’ and one student replied ‘No’ when asked if the Ozone article helped them to answer the FRQ. One student answered, “Yes, because it went more in depth and told us the causes of ozone depletion.”

Overall, the data from the post-unit reading prompt questions, unit assessment FRQs, and student interviews indicated that the current events articles did have a positive impact on the students’ learning. The students were able to take information learned in the current events articles to meaningfully answer the FRQs on their unit assessments. The treatment group performed better than the non-treatment group on all FRQs when the scores were compared to the Pretreatment FRQ.

The study provided evidence that using current events articles in the classroom helped students connect environmental science topics to their lives. When evaluating the link between ‘aha’ moments and current events, the study was inconclusive. No visible moments of clarity were observed in the students after the articles were read and discussed. Lastly, evidence was collected that supports the claim that current events articles have a positive impact on student learning. The treatment group showed a more positive improvement across all three treatments when compared to the non-treatment group.
This classroom research project provided evidence that current events led to the students having an increased awareness of how science affects their lives. Throughout the research project, students became more attentive and mindful of science concepts they heard or read about outside of the classroom. My students came to me multiple times since the completion of the project to discuss things that pertained to environmental science. McCullough (2006) found that students were very interested in current events readings and would look forward to the new issues each week. I can say that I definitely saw similar interest in my students.

The students were able to incorporate specific examples of concepts they learned in the readings into their answers on the free response questions (FRQs) in the unit assessments. The percent change from the Pretreatment was greater for the treatment group across all three FRQs when compared to the non-treatment group. This showed that the current events articles allowed the students to gain a deeper understanding of the concepts being taught.

The small sample size did not provide enough data to answer all of the questions posed in this research project, however, I have seen enthusiasm and increased interest in my students since incorporating current events into the classroom. With a sample size of six, the data collected cannot be considered very accurate. In order to fully assess the questions, the project would need to be carried out with a larger sample size. Using current events makes science more understandable for students and as one student stated, “It shows me that Mrs. Yourey and Bill Nye aren’t lying.”
In the following year, I will incorporate current events into all classes I teach. At least one current event will be used per unit and will be related to the information being taught. I would also like to include lessons where the students have to decipher between a reliable and unreliable media source. The students will read about the same research from two different sources and see if they could find discrepancies between the reliable and unreliable source. Another idea is to “study a study,” as suggested by Jarman and McClune (2009). The authors suggest supporting the reading by answering questions such as:

- How was the scientific investigation conducted?
- What is the evidence for the conclusion?
- What is the social context? Of the science? Of the newspaper?
- What do others say? Other scientists? Other newspapers?
- What is the relevance of the work? For me? For others? (p. 74).

There are many great ideas on how to incorporate current events into the classroom. After collecting data, and seeing firsthand the benefits, I will definitely work toward making current events an integral part of my classroom.

**VALUE**

I feel the use of current events gave me insight into how students learn. Even though, as a teacher, you read about the importance of making your subject as real to life as possible, I never collected data on this recommendation. I gained an awareness of the importance of current events in the classroom and how it does seem to have positive impact on the students’ learning and ability to see relevance of science in their lives. The students do need more exposure to current events from a variety of sources in order to be able to critically evaluate science text.
I would like to increase interest in science and students’ perception of science by incorporating more current events into the classroom. I will integrate current events into all of my courses. This research project provided evidence that it helps the students understand and retain scientific concepts.

This experience positively impacted me as a teacher. Collecting data enabled me to see the positive correlation between current events and learning. I hope that this exposure enables the students to score higher on the Advanced Placement Environmental Science exams. I feel very motivated by the results and will continue to improve myself as a teacher and use current events to benefit my students.

Reading to gain knowledge is a skill the students will utilize throughout their lives. If teachers give the students a strong base knowledge on how to read and understand complex text, this will benefit them in college and in the work force. If the students can relate science to their lives, they will retain more of the information and have prior knowledge upon which to build their education in the future. Although this classroom research project was only six weeks in length, it validated the importance of incorporating current events into the classroom. Ultimately, I hope the students were able to see that environmental issues are incredibly important, especially in today’s world. Everything on Earth is connected and the ability to understand these issues is very relevant to their future.
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APPENDICES
APPENDIX A

ALASKA NATIONAL WILDLIFE REFUGE PROMPT
Name: _____________________________________
Nonrenewable Resources Unit
ANWR Reading
Participation in this research is voluntary and participation or non-participation will not affect a student’s grades or class standing in any way.

Directions: Go to my website. Click on Links and change the section to AP Environmental Science. Open the link, “What Obama's Drilling Bans Mean for Alaska and the Arctic.” Read the article and answer the corresponding questions. Please answer the questions as completely and elaborately as possible.

1. Does this article present various viewpoints? Explain.

2. What is one important thing you learned from this article?

3. Do you think the website is a reliable scientific news source? Why?

4. Does the subject matter covered in this article have any relevance in your life? In your future? Can you think of a way that this can be considered a personal issue to you? Explain.

5. Did you have any ‘aha’ moments, where something we covered in class was suddenly clarified for you? Explain.
APPENDIX B

BIODIESEL PROMPT
Name: _____________________________________

Renewable Resources Unit
Algae Reading
http://www.biodieselmagazine.com/articles/540940/michigan-state-exxonmobil-enter-1m-algae-research-partnership

Participation in this research is voluntary and participation or non-participation will not affect a student’s grades or class standing in any way.

Directions: Go to my website. Click on Links and change the section to AP Environmental Science. Open the link, “Michigan State, ExxonMobil enter $1M algae research partnership.” Read the article and answer the corresponding questions. Please answer the questions as completely and elaborately as possible.

1. Does this article present various viewpoints? Explain.

2. What is one important thing you learned from this article?

3. Do you think the website is a reliable scientific news source? Why?

4. Does the subject matter covered in this article have any relevance in your life? In your future? Can you think of a way that this can be considered a personal issue to you? Explain.

5. Did you have any ‘aha’ moments, where something we covered in class was suddenly clarified for you? Explain.
APPENDIX C

OZONE PROMPT
Name: _____________________________________

Air Pollution and Stratospheric Ozone Depletion
Ozone Hole Reading

Participation in this research is voluntary and participation or non-participation will not affect a student’s grades or class standing in any way.

**Directions:** Go to my website. Click on Links and change the section to AP Environmental Science. Open the link, “Ozone hole over Antarctica expands to near-record levels, now four times size of Australia.” Read the article and answer the corresponding questions. Please answer the questions as completely and elaborately as possible.

1. Does this article present various viewpoints? Explain.

2. What is one important thing you learned from this article?

3. Do you think the website is a reliable scientific news source? Why?

4. Does the subject matter covered in this article have any relevance in your life? In your future? Can you think of a way that this can be considered a personal issue to you? Explain.

5. Did you have any ‘aha’ moments, where something we covered in class was suddenly clarified for you? Explain.
APPENDIX D

STUDENT SURVEY
**Student Survey**

Participation in this survey is voluntary and will not affect your grade in any way. Please answer the questions as thoughtfully and honestly as possible. Please place an ‘X’ in the box indicating whether you agree or disagree to the statement and to what extent.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neither Agree nor Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
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<tbody>
<tr>
<td>I do not see how science applies to my daily life.</td>
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<tr>
<td>I will not be using science in my future career.</td>
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<tr>
<td>Science helps me to understand the world around me.</td>
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<tr>
<td>World issues cannot be explained using science.</td>
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<tr>
<td>I never talk about science with my family or friends.</td>
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<tr>
<td>When I read about science issues outside of school, I can relate it to something I have learned in science class.</td>
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<tr>
<td>When I watch TV and there is a scientific topic covered, I can relate it to something I have learned in science class.</td>
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APPENDIX E

STUDENT INTERVIEW
Student Interview Questions

Participation in this research is voluntary and participation or non-participation will not affect a student’s grades or class standing in any way. Your answers will be recorded so I am able to evaluate your responses. Do I have your permission to record you?

Questions:

1. How did you feel about using current events articles in the classroom?
2. Did having a class discussion after answering your reading prompts help you to understand other classmates’ points of view?

Here are print outs of the three articles we read and the corresponding prompt questions. Please refer to these as you are answering the following questions I ask you.

3. Did any of the articles encourage you to share the information you learned with your family or friends? If so, which one?
4. Did any article encourage you to do extra research about the topic on your own? Why?
5. Did any of the articles make you change your lifestyle because of the information you learned? If yes, how and why?
6. Did the ANWR article help you to answer the free response question on your test?
7. Did the Biodiesel article help you to answer the free response question on your test?
8. Did the Ozone article help you to answer the free response question on your test?
9. Did any of the articles change your views concerning an environmental issue? Is yes, which one, how and why?
10. Do you think you are able to distinguish between a reliable and unreliable news source? How and why?
APPENDIX F

PERSONAL JOURNALING PROMPT
Personal Teacher Journaling Prompt Questions
Date: ________________________________

1. What impact did the article have on student learning?

2. Did the discussion format help students make connections between the reading and what we learned in class?

3. Did the discussion help students make connections between the content and their lives? Observation of specific wording: ‘Then I knew,’ ‘Suddenly I realized,’ or ‘It became clear.’

4. Did using the current events articles impact my role as a teacher?

5. How can this be beneficial to my teaching?

6. After today’s reading and discussion, should anything involving the treatment be changed?

7. What is a positive and a negative observation from today?
APPENDIX G

ALASKA NATIONAL WILDLIFE REFUGE FREE RESPONSE QUESTION
Short Answer

The Alaskan National Wildlife Refuge (ANWR) on Alaska’s North Slope is frequently in the news because petroleum geologists estimate that there are billions of barrels of economically recoverable oil beneath the surface of its frozen tundra. According to a 1998 United States Geological Survey (USGS) estimate, ANWR could contain up to 10 billion barrels of technically recoverable oil. Oil company officials advocate opening the refuge to oil exploration and the subsequent development of its petroleum resources. Environmentalists argue that oil exploration and development will damage this fragile ecosystem and urge Congress to protect ANWR by designating it a wilderness area.

a) The United States consumes approximately 20 million barrels of oil per day. According to the USGS estimate, for how many days would the technically recoverable oil resource in ANWR supply the total United States demand for oil?

b) Describe TWO characteristics of arctic tundra that make it fragile and explain how these two characteristics make the tundra particularly susceptible to damage from human impacts.

c) Identify TWO activities that would be associated with the development of ANWR petroleum resources and describe a substantial environmental impact of each in ANWR.

d) Identify and describe a major end use of the 20 million barrels of oil that the US consumes each day and describe a conservation measure that would substantially reduce US consumption.
APPENDIX H

Biodiesel Free Response Question
Short Answer

Read the article and answer the following questions.

*a* Calculate the number of acres required to produce 1,000 gallons of oil in one year from:

i. Microalgae

ii. Soybeans

*b* Describe TWO environmental advantages that biodiesel production from microalgae offers over production from the other crops listed in the table.

*c* Explain why burning biodiesel fuel has a different impact on atmospheric CO₂ concentrations than does burning fossil fuels.

*d* Discuss an economic or societal problem associated with producing fuel from corn.
APPENDIX I

OZONE FREE RESPONSE QUESTION
Short Answer

In the mid-1970s, Sherwood Rowland and Mario Molina predicted a thinning of the stratospheric ozone layer over Antarctica. The thinning was confirmed in the late twentieth century and has continued into the twenty-first century.

a. Identify the class of chemical compounds that is primarily responsible for the thinning of the stratospheric ozone layer and describe TWO major uses for which these chemicals were manufactured.

b. Describe how the chemical compounds that you identified in part (a) destroy stratospheric ozone molecules. You may use chemical equations as part of your answer.

c. Identify the major environmental consequence of the depletion of stratospheric ozone and describe TWO effects on ecosystems and/or human health that can result.

d. Ozone formed at ground level is a harmful pollutant. Describe TWO effects that ground-level ozone can have on ecosystems and/or human health.
APPENDIX J

PRETREATMENT SOIL CONSERVATION FREE RESPONSE QUESTION
Short Answer

Suppose that you have just started a summer internship working for a cooperative extension service, where you will collect soil samples, conduct laboratory and field tests, and make recommendations on soil conservation and agricultural practices.

a. Identify and describe one chemical (we performed one in our lab) and one physical soil test (we performed one in our lab and one with the soil scientists) that could be performed and explain how the results of these tests will allow the cooperative extension service to make specific recommendations for sustainable agricultural practices.

b. Describe a soil conservation practice that is designed to decrease soil erosion (Discussed by the soil scientists).

c. The temperate deciduous forest is characterized by soil that is rich in humus. Describe how humus originated in the soils of this biome and ONE way that humus improves soil conditions for plant growth.