



## **Energizing the Debate: The Pros and Cons of Renewable Sources of Energy**

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### **Unit Description**

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The core of this unit is the art of persuasion and its use to promote social and environmental change. In particular, this unit focuses on writing and speaking about climate change in Delaware. I used the steps involved in argumentative writing that are outlined in *Teaching to Exceed the English Language Arts Common Core State Standards*, as a framework. <sup>1</sup> The steps include identifying issues and stances on issues, conducting rhetorical analysis of nonfiction and informational texts, and analyzing rhetorical appeals: logos, pathos, and ethos. The second part of the unit is a formal classroom debate on three issues facing Delaware residents due to climate change. I want the students to learn how to argue a point in a respectful, but powerful way using evidence to support their ideas. They should see the rebuttals of their classmates as collaboration and not an attack. As we work to solve this environmental problem, I want the students to be open-minded enough to consider the arguments of their peers. I hope to foster respectful interactions to create a culture where a diversity of ideas are valued, even if everyone isn't always in agreement.

### **Rationale**

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About five minutes into a lesson on the likelihood and impacts of sea level rise in Wilmington, Delaware, my student, Luis, became extremely upset and put his head down on his desk. From that point until the end of the class period, he was unable to engage in the discussion any further. Luis was terrified at the idea that by the end of the century Wilmington could, in fact, be underwater. The facts are alarming. According to the Delaware Department of Natural Resources and Environmental Control, "Delaware lies within a sea level rise "hotspot" where sea levels could rise faster and higher than elsewhere due to a combination of rising seas and sinking land." After seeing Luis upset by the statistics, I worked to make sure that he and the other students were not upset. No matter what I said, I could not assure Luis that everything would be all right. His sensitivity made me reflect on my method of delivery and the sequence of activities for the lesson. My instruction had greater emphasis on the negative impacts of sea level rise and not enough weight on the ways in which we can take action to improve the projected scenario for our city.

So my problem lies in taking a very difficult situation, one that is incomprehensible to most, and turning it into a lesson that is empowering instead of frightening. Through my research I found signs of empowerment and gained an understanding of how we, as the human species, can impact our environment and reverse some of the damage that has been done. Instead of "business as usual" we can work together to create a future that includes the human species, not destroy it. In his opening remarks, Peter Droege states this concept beautifully, "Around the world, cities and urban communities plant the seeds to a great transformation, unprecedented in history in its reach and magnitude." <sup>2</sup> I want to present this opportunity to make a change as an opportunity; I want the students to see that they can be ambassadors of change. Instead of focusing on the negatives for our city, I want to have a classroom of informed citizens that can use this negative outlook for our city and turn it into a means for change, unprecedented change. Al Gore shares this perspective in his work, he stated, "We should feel a sense of joy that those of us today have a rare privilege that few generations in history have known: the chance to undertake a historic mission worthy of our best efforts." <sup>3</sup>

## Introduction

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My school, like schools all over the country, serves a diverse population of students. Skyline Middle School consists of students from Pike Creek and Wilmington in northern Delaware, where I teach four sections of sixth-grade social studies. The students come from diverse backgrounds and cultural groups, including African American, Asian American, Caucasian, Hispanic, and low income. This diversity poses challenges in planning and implementing lessons to meet the needs of each child. It is, therefore, imperative that my lessons are student-centered and employ a variety of teaching strategies, especially since we will be moving to 90-minute block classes this year.

In my school district, as well as far too many others, social studies education is not at the forefront. With standardized testing focused on math and English, the social studies and science curriculums have become secondary in importance. In my conversations with elementary teachers, I learned that most of the instructional time in the elementary classroom is devoted to math and English instruction. This makes sense as the incentives for teaching these subjects are high because school and teacher ratings are based upon the standardized test scores of students in these areas. At my school in particular, the supports for social studies and science have been redirected to the math and English departments. As a result, the social studies and science departments face higher class sizes, broader range of student abilities, and fewer resources inside and outside of the classroom. For these reasons, my aim is to create a unit that illustrates the importance of social studies in the implementation of Common Core English Language Arts Standards.

In Delaware social studies classes, we are required to follow the Delaware Recommended Curriculum. Curricular units have been created for most of the Delaware content standards to ensure the rigor of the classroom discussions, activities, and assessments in achieving the standards. The unit I propose would improve upon a district-mandated unit of study focusing on human-environment interaction. Currently, the required lessons related to man's interaction with the environment in relation to developing sources of energy is comprised of rote-memorization and simplistic, bland activities. I plan to energize this portion of the unit to foster a more positive outlook for the future of Wilmington, DE. The unit will be conducted in the form of a debate that requires the students to research and present findings about alternative energy sources appropriate for Wilmington, DE.

This unit was designed with social literacy as a basis; the students will actively develop literacy skills as they solve a real world problem. In *Teaching to Exceed the English Language Arts Common Core State Standards*, Beach, Thein, and Webb express, "Perceiving literary practices as social moves us from a focus on individual acquisition of literacy to literacy as a community resource serving the collective goals of a group engaged in an activity." The students need to participate curricular "events" that allow the development of literacy and collaborative skills. Creating a curricular event instead of a typical research project will increase student engagement and accountability as the students feel responsible for their role and strive to perform to the standards of their peers. The curricular event of this unit will be a formal classroom debate. <sup>4</sup>

## Standards

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The unit is based on a Delaware Social Studies Content Standard and two Common Core English standards. The Delaware content standard states, "Students will develop knowledge of the ways humans modify and respond to the natural environment." <sup>5</sup> The Common Core standards are centered on the presentation of ideas and the use of relevant evidence to support claims. Specifically, the standards state, "Write arguments to support claims with clear reasons and relevant evidence," and "Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation." <sup>6</sup> The theme of the unit is the development and delivery of persuasive speech, in the form of a debate, which illustrates the pros and cons of a proposed solution to the issue of climate change and its impact on the environment and residents of Wilmington, Delaware. These three standards can be seamlessly incorporated together in a unit that requires the students to analyze primary and secondary source materials to come to a logical course of action that will combat climate change.

## Background

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Even before the earliest human societies were established, changes in the climate have taken place. Most evidence of this has been found through the scientific study of air bubbles discovered in deep sea mud and ice. Scientists believe that these climatic changes have most likely been caused by natural phenomenon such as volcanic eruptions, the Earth's orbit, changes in ocean currents and ice sheets, and changes in the sun's energy. <sup>7</sup> So humans have survived climate change. Around 200,000 years ago the Earth and its people endured an Ice Age. The temperatures were between 7 and 14 degrees cooler than they are today. Ten thousand years ago the climate warmed up and held steady, causing a population explosion. <sup>8</sup> The climate change we are facing is different, thought; is happening at a much faster rate.

Unlike the early humans, our complex civilizations of today cannot be quickly dismantled and then reestablished in a safer location. With our complex infrastructure, geopolitics, political boundaries, and economy the idea of moving an entire city's population would be difficult, if not impossible. Our way of life is highly dependent on our current climate and significant changes to our current climatic conditions would cause change to the way we grow food, the items we produce and use, and the way we use our land and

resources. <sup>9</sup> Climate change adds increased pressure on our environment, humans and organisms. Significant changes in temperature have taken place in the Earth's history but not at the speed in which the change is taking place now. <sup>10</sup>

How did we allow things to get to this point? Al Gore, former Vice President and environmental activist, explained that global warming can be traced to six families of pollutants including carbon dioxide, methane, black carbon, halocarbons, carbon monoxide and volatile organic compounds, and nitrous oxide. Of these, carbon dioxide is the major contributor to climate change; this is why most strategies to combat climate change focus on carbon dioxide. <sup>11</sup> When carbon is released into the atmosphere, it warms the Earth through the greenhouse effect. As the temperature of the Earth becomes warmer, glaciers melt increasing the volume of water in the rivers they feed. With a greater volume of water, the river's course will likely change causing flooding in some areas and greater amounts of absorption in others. With more subsurface flow, there will be more evaporation leading to more precipitation and droughts depending on the location. <sup>12</sup> Human activities are significantly changing the amount of CO<sub>2</sub> in the atmosphere, and we are beginning to see the results.

But greenhouse gasses are not the enemy: without them, the Earth would be too cold for human habitation. The problem is that in recent times, there has been too great a concentration of the greenhouse gasses trapped in the atmosphere causing the climate to change. The air quality diminishes with higher temperatures, especially in urban areas putting increased pressure on the electricity grid. In these regions, more pollution is released from power plants and higher concentrations of ozone result. Ozone at ground level poses problems for individuals with asthma and other respiratory conditions. The Environmental Protection Agency warns, "Humans have never experienced such a rapid rise in greenhouse gasses. In effect, a large and uncontrolled planet-wide experiment is being conducted." <sup>13</sup> The truth is we cannot predict what is going to happen with complete accuracy because this has never happened before.

So, where is all of this CO<sub>2</sub> coming from? To understand the problem we need to understand our role in the CO<sub>2</sub> emissions cycle. The majority of human-caused CO<sub>2</sub> in the atmosphere is from the burning of fossil fuels. The world as we know it would not exist without these sources of energy. Oil-based products such as gasoline, diesel, and jet fuel are burned for transportation. To power our homes, businesses, and schools we rely on the burning of coal, oil, and natural gas. Burning of fossil fuels is 85% of the primary energy source of the world. Clearing land for building projects or burning away trees and vegetation accounts for 25% of the human-caused CO<sub>2</sub> in the atmosphere. If current practices continue, humans may not be able to live on this Earth in the future. The Earth's surface temperature has increased by about 1.5 degrees over the past 150 years due to human activities. If heat trapping emissions continue, the temperature of the Earth is predicted to rise between 2 degrees and 9 degrees Fahrenheit by the end of the century. In short, our current use of fossil fuels cannot be sustained in the long term. <sup>14</sup>

Our reliance on fossil fuels has led to conflicts in Afghanistan and Iraq and will continue if the United States cannot move toward alternative sources of energy. Al Gore summarizes it at such, "The United States is still borrowing money from China to buy oil from the Persian Gulf to burn in ways that destroy the planet. Every bit of that has got to change." This change, to a smaller carbon footprint, involves individuals but cannot be done alone, everyone, as global citizens, must work together to solve this global crisis. In essence, we need to work together as humans. Al Gore explains, "Our success in transforming the global economy to a low carbon pattern will bring about needed solutions for problems that have been allowed to fester for too many centuries." He believes that problems such as poverty, deforestation, pollutions, and dependency on fossil fuels can be solved through a global movement toward alternative sources of energy. Environmental changes

and new ways of life may help to change the many people of the world that are living in extreme poverty with lack of food and clean water. Opposition to change in the United States and around the globe has made the transition to alternative energies difficult. <sup>15</sup>

Those in opposition to climate change use the reliability of scientific projections to dismiss the impacts of climate change. Katharine Hayhoe, climate scientist, explains, "The primary challenge in climate impact analysis is the reliability of future information. A common axiom warns that the only aspect of the future that can be predicted with any certainty is the fact that it is impossible to do so. However, in the case of climate change, we do know one thing: future climate will not be as it is today. That is why it is important to incorporate projected climate changes into long-term planning." <sup>16</sup> The scientific community is doing their best to make projections with fidelity. Computer simulations and circulation models have been created to predict the climate in the coming years. Models such as the Intergovernmental Panel on Climate Change and United Kingdom Hadley Centre's Climate Model have been created to take into consideration current and future emissions, natural and human, and predict the future climatic and weather patterns so we can make informed decisions. <sup>17</sup> Above all, we need to rely on the information we have to prepare for the future. The evidence is happening all around us.

Climate change has been a topic of discussion since the 1980s and several international agreements on climate change have been developed. The United Nations Framework Convention on Climate Change took effect in 1994 and worked to stabilize greenhouse gas emissions. The Kyoto Protocol was established in 2005 to also reduce greenhouse gas emissions. The Intergovernmental Panel on Climate Change looks at the risk of human-induced climate change and develops adaptation strategies. Even with these international committees, change has not been easy. Mitsutsune Yamaguchi, in *Climate Change Mitigation*, expresses five main reasons why a global movement toward climate change mitigation has been entirely unsuccessful thus far: the necessary cooperation between diverse countries of the world, some countries are less motivated to change due to a belief that they will benefit from or will not be affected by climate change, a need for things to be "fair" from one generation to the next (same types of opportunities), an inability to monetize the value of climatic change that could take place if action is not taken, and uncertainty in the scientific predictions of temperature changes, sea level rise, damage, and costs. <sup>18</sup>

## Climate Change and Delaware

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Delaware is part of a region known as the Delaware Estuary that includes New Jersey and Pennsylvania. Estuaries are bodies of water where salt water from the ocean mixes with the fresh water flowing off the land. In this region, the Delaware Estuary, Chesapeake Bay, and group of estuaries called the Inland Bay feed freshwater to the Atlantic Ocean. The Delaware Estuary includes millions of people, five large oil refineries, a large freshwater port, essential fisheries, and a dynamic ecosystem. Delaware has 381 miles of shoreline including barrier beaches, inland bays, productive estuaries, and marshes. The shoreline already faces erosion problems and many of the coastal beach areas have sand rejuvenation programs in place. With climate change and the impending sea level rise, Delaware's coastal areas will be at high risk for flooding, erosion, saltwater contamination, and loss of wetlands. <sup>19</sup>

Delaware drains to the Delaware Bay and Chesapeake Bay. The state has a shallow groundwater supply and

some regions have contaminated groundwater due to industrial activity. Increased precipitation, without making necessary infrastructural improvements, could cause further contamination of the groundwater supply due to runoff near industrial sites. <sup>20</sup>

Delaware is part of the Mid-Atlantic region that includes Washington, D.C., Maryland, New York, New Jersey, Pennsylvania, Virginia, and West Virginia. The predicted climatic changes for the Mid-Atlantic region are similar to other regions of the same latitude across the globe. First, there will be temperature increases, especially in the summer months. According to the models, Delaware will have an average temperature increase of 3 degrees; it would increase by 1-7 degrees in the spring and 2-9 throughout the rest of the year. Dover, Delaware's capital, will experience a temperature increase of about 1.7 degrees by the end of the century. <sup>21</sup> The warmer temperatures will probably result in Delaware seeming to have the climate of a state further south along the Atlantic coast. Warmer winters mean a longer growing season for the chief crops of corn, soybeans and wheat. The change in plant life would affect the animals that can survive in our state including the Great Blue Heron, Osprey, Gray Squirrel, deer, and Red Fox. Human behavior would also change in response to the warmer temperatures, the demand for heating and cooling would likely change. With hotter summers there would be a greater demand for air conditioning, requiring more electricity. According to the models, there will be an increase in extremely hot days throughout the summer. The extreme heat poses health hazards to DE residents and would impact the economy of the coastal tourism regions as people would not want to spend time outdoors in dangerously high temperatures. A reduction in extremely cold days has also been predicted. <sup>22</sup>

This change in temperature, although warmer winters potentially benefit humans, would impact the species native to Delaware causing possible over infestations or migrations. Climate change could cause an increase in disease-carrying insects as the warmer and wetter temperatures are ideal breeding conditions for some harmful organisms native to the Mid-Atlantic region. Mosquitos potentially carrying malaria or eastern equine encephalitis and ticks potentially carrying Lyme disease could become more prevalent as these species are attracted to warmer and wetter habitats. Algal blooms become more intense due to warmer waters damaging delicate ecosystems of the Atlantic coast and posing a risk to human health as they carry dangerous bacteria such as cholera. <sup>23</sup>

Delaware is expected to have increased precipitation due to the warmer temperatures; in some parts of the state it can be as high as 10% more precipitation as in the past. <sup>24</sup> Higher temperatures will lead to a more active water cycle, especially in terms of evaporation. With more evaporation there will be an increase in the amount of precipitation in the winter months and fewer rainy days in the summer months. During the summer, water will become more scarce and the demand for water will increase as residents use the water for their lawns, pools, and crops. Heavier precipitations will be more frequent which could lead to drainage problems, storm damage, and erosion. Overall, throughout the next fifty years, Delaware residents will be facing more hot, dry days with no precipitation and fewer cool, wet days. <sup>25</sup>

All three of Delaware's counties will be affected by sea level rise, but the twenty-four miles of coastline on the Atlantic Ocean will face the most drastic changes. <sup>26</sup> Using moderate estimates of global warming, the sea level rise in Delaware is projected to be about 3.3 feet between now and 2100. Inundation will undermine the utilities, homes, schools and businesses. It is possible that parts of the state would become unusable and people would be forced to relocate. According to the Sea Level Advisory Committee, in *Preparing for Tomorrow's High Tide*, secondary impacts would include the loss of jobs, loss of community or sense of place, contaminate releases from industrial sites or storage tanks, loss of habitat, and increased need for



government services or intervention. <sup>27</sup> The impacts of sea level rise include a decreased tax base as fewer homes and businesses are built in coastal regions, increased cost of maintaining infrastructure, loss of habitats, and loss of community landmarks. <sup>28</sup>

The Sea Level Advisory Committee lists three methods for adapting to sea level rise: protection, accommodation, and retreat. Protection strategies would be methods that prevent the rising waters from damaging areas by building dikes, levees, and sea walls. Accommodation involves using an area that has been inundated without building sea walls or other structures. Accommodation involves changing behavior in response to the water levels. Retreat strategies involve the movement of people and structures out of areas that are no longer habitable. <sup>29</sup>

Delaware has been making significant progress toward climate change preparation and reduction in CO<sub>2</sub> emissions. Delaware is a founding member of the Regional Greenhouse Gas Initiative, a nine state carbon dioxide budget trading program. This initiative works to cap and reduce CO<sub>2</sub> emissions coming from our power plants. According to the Delaware Department of Natural Resources and Environmental Control, "In the last round of funding, projects reduced more than 26,000 metric tons of carbon dioxide annually, which is equivalent to taking 5,000 cars off the road or equivalent to the emissions from powering 3,000 homes for one year." 42% of Delaware's CO<sub>2</sub> emissions come from the transportation sector, to reduce emissions twelve Northeast and Mid-Atlantic jurisdictions created the Transportation Climate Initiative to develop renewable a clean energy sources with a focus on transportation. This initiative focuses on clean vehicles and fuels, sustainable communities, freight efficiency, and communication technology. Delaware also participates in a program hosted by the U.S. Department of Energy to reduce petroleum usage in the transportation sector through the Clean Cities Program. <sup>30</sup>

Throughout the state, regions are being assessed and plans are being developed and refined to prepare for greater amounts of precipitation, stronger storms, and a rising sea level. Work is being done in Delaware's northern county, New Castle County, to protect homes, businesses, and people, and to contain a contaminated site as climatic changes occur. In Kent County, the middle portion of the state, the strategies are mainly focused around the protection of wildlife sites. If current structures fail, large areas would be impacted by flooding. In Sussex County, the region furthest south, evacuation routes are of major concern. Up to 6% of the current evacuation routes could potentially be flooded, flooded roadways can make evacuation inefficient or prevent it entirely. <sup>31</sup>

## **Background for Debate Topic 1: Delaware's Coast**

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The first motion will be, "Delaware should build a sea wall along its coastline as protection from the rising sea." A sea wall can be a beneficial way for a community to combat sea level rise that allows the residents to maintain their land area. Sea walls are typically vertical so they take up less space than other water containment structures. They form a defensive barrier against erosion that is caused by tidal waves and winds. Sea walls, depending on their size, can be versatile, in Delaware the sea wall could be used as a tourist attraction by making it into a walkway. This will help in regions where the coast is already being used as a recreational beach area such as Rehoboth, Lewes, and Bethany beaches. Sea walls can be upgraded as the sea level rises, the wall can be made higher as long as emphasis is placed on reinforcing the joints between

the old and new construction. Building and maintaining these walls would provide jobs for Delawareans. The wall would encourage people to stay in the area and make them feel safe and protected. The security of the wall would attract new businesses and allow established businesses to stay in their current location, maintaining the economic activity of the region. Areas behind the wall would face less damage to the infrastructure during storms and hurricanes. The wall will also protect against salt-water intrusion, which could destroy crops and contaminate the drinking water. <sup>32</sup>

Building a sea wall is expensive; it poses a large tax burden for the state and can be seen as unfair for those living further away from the coast. The wall prevents the natural movement of organisms and disrupts the delicate ecosystem along the coast. An ineffective sea wall can cause greater damage than if the water was allowed to take its natural course. Access to coastal areas would become more difficult for emergency vehicles and handicapped individuals as well as animal and plant species. In the areas on the aquatic side of the wall, higher rates of erosion would be problematic for the stability of the wall. <sup>33</sup>

Alternatives to building a sea wall include soft, non-structural stabilizers, relocation, and/or taking no action. Some believe that the projections for sea level risk may not be accurate and that states should not waste resources and put further stress on the environment if the risk is not real. <sup>34</sup>

## **Background for Debate Topic 2: Ethanol E85 Requirement for Delaware Drivers**

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The second debate topic is, "Delaware residents should be mandated to use ethanol E85 Flex Fuel in their cars." Ethanol is an energy source known as biomass, a material derived from plant matter. Most of the ethanol produced in the United States comes from corn but it can also be produced from other plants such as sugarcane and grasses. Typically ethanol is used to oxygenate fuel which reduces air pollution. Ethanol is becoming more widely used in the United States, in 2001 Americans used 1.7 billion gallons and in 2012, American used 12.9 billion gallons. Ethanol comes in low-level and high-level blends; most usage of it in the U.S. is considered a low-level blend. Ethanol E85 contains 85% ethanol and 15% gasoline and significantly reduces air pollution as compared to using gasoline in its pure form. <sup>35</sup>

Ethanol can be created using crops grown in the United States whereas gasoline is dependent on fossil fuels from the Middle East. Ethanol is renewable, more corn, sugarcane, and grasses can be grown as needed. This type of fuel reduces carbon emissions, when ethanol is burned it releases CO<sub>2</sub> but this is CO<sub>2</sub> that already existed in the atmosphere. To grow plants use CO<sub>2</sub>, taking carbon from the atmosphere as they grow and then the CO<sub>2</sub> is released back in to the air as ethanol is burned. Ethanol reduces imports of oil and increases jobs in the United States. Finally, the cost to convert a car to using E85 ethanol is relatively low. <sup>36</sup>

Growing corn and other crops used to produce ethanol takes up arable land that could be used for growing crops to feed people. If a farmer is growing corn for fuel, it cannot be used to grow crops for food. It takes energy to grow, harvest, ferment, and distill the corn. When the conversion process is completed, the ethanol must be transported to where it will be sold, this also requires energy. Ethanol is mostly mixed with gasoline in the United States; this is because most cars are not equipped to run on ethanol in its pure form. There is limited availability of ethanol in its finished form. When using ethanol, the automobile gets fewer miles per



gallon, generally 3-5% fewer miles per gallon. <sup>37</sup>

## **Background for Debate Topic 3: Wind Energy for Delaware**

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The third debate topic is, "Delaware should work toward the use of wind energy as its primary source of energy." Wind energy is renewable and already in use all over the globe. The power of the wind is converted into energy as it propels wind turbines that are connected to an electric power transmission network. Wind farms are a group of wind turbines that offer renewable and clean energy that takes up a relatively small area of land. There are no carbon emissions when using wind power. In Delaware, the use of electricity from this power source would save 1,100,000 gallons of water each year. But Delaware is only 39<sup>th</sup> in the nation for wind energy and has only one wind turbine in the state that was built in 2010. According to the American Wind Energy Association, "The wind power installed in Delaware will avoid 3,000 metric tons of carbon dioxide emissions annually, the equivalent of taking 550 cars off the road." and wind power is capable of "providing more than four times Delaware's current electricity demand." <sup>38</sup>

The windiest places in the United States are typically far from large populations this requires the energy to be moved through power lines that are costly to build and maintain. The wind turbines themselves are expensive to construct and many residents consider them to be eyesores, ruining the scenic view. Wind turbines can be loud which has been shown to have a negative affect on animal behavior in the region. Wind is variable, it can be unreliable so communities relying on wind energy must have a backup power source. <sup>39</sup>

## **Governor Markell and Climate Change**

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Governor Jack Markell has been the Democratic Governor of Delaware since 2009. Over the years, Markell has been working to reduce carbon emissions and prepare Delaware for climate change. On his blog he wrote, "Some of the highest ranking politicians in Washington have decided that they can dismiss discussion about climate change by simply saying they are not scientists, but governors do not have the luxury of pretending that climate change is not causing real damage." The Governor created the Climate Prosperity Strategy to clean up our environment and create jobs. In particular, the strategy focuses on improving energy efficiency of homes and businesses and producing marine energy. In 2013, Governor Markell signed Executive Order 41, "Preparing Delaware for Emerging Climate Impacts and Seizing Economic Opportunities from Reducing Emissions." He believes that responses to climate change and sea level rise should not be looked at as just protecting the environment; it is to protect Delaware residents and our economy. <sup>40</sup>

## Teaching Strategies

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### Student Choice

With large class sizes and a need for all students to be engaged in the debate, I decided to host three debates. I will pose the three debate topics and allow the students to choose the topic that they feel most compelled to debate. Student choice, especially in middle school, increases student motivation. According to Kevin Perks in *Crafting Effective Choices to Motivate Students*, there are three ways that student choice increases student motivation. First, it gives the students a sense of control. Instead of assigning each student to a debate topic, I will allow them to choose the one that they feel most strongly about or are most familiar with. This will hopefully lead to the students internalizing the problem and taking a firm stance on it.

Second, making choices in the classroom gives the students a sense of purpose. Allowing choice during the activity itself will help the students to capitalize on their skills and feel a sense of their purpose for participating in the activity. For the debate, six students will be placed on a team and will work together to present the group's findings and position on the motion. Three of the students will be the official speakers but all six of the students will work together to select and extend evidence, plan rebuttals, and offer help to the speakers in preparation of delivering the group's information.

Third, choice gives the students a sense of competency. Concepts in the social studies classroom are difficult for many students due to the complexity of nonfiction texts and concept vocabulary. When students are able to choose their debate topic, they will be making a judgment on which topic they feel most competent working on. This will give the students more confidence and lead to higher motivation and achievement throughout the debate. <sup>41</sup>

### Debate Format

Once the three debate topics have been selected, I will organize the students into six teams of no more than six students. These six groups represent the three affirmative and three opposition groups, one of each for the three debates. The debate format I will use is from *Great Performances: Creating Classroom-Based Assessment Tasks*. The teacher begins by posing the motion and allows time for the students to develop their arguments. In the groups of six, three will be speaking throughout the debate and all will be responsible for collecting evidence and helping the speaker with how the information should be delivered. The affirmative group will make the first proposition. This will be a speech containing assertions, evidence, and facts in support of the motion. After each speaker, I will allow for two minutes of debrief so that the groups have time to discredit information from the other team's support or opposition of the motion.

Next comes the first opposition speaker, this student will present arguments against the facts and evidence that was presented by the other group. They must clearly state how the other team's idea is incorrect or not best suited for Delaware. The third speaker is the second speaker from the proposition group, this student will support the original notion stated by the first proposition student. This speaker should also answer to or discredit all of the arguments made by the first opposition speaker. This speaker will present additional ideas and evidence to further persuade the audience to their idea. The fourth student to speak will be the second opposition speaker who will work to extend the case of his or her team against the motion. They should continue to refute the affirmative group's ideas and bring in new ideas to strengthen their position. Next is the opposition rebuttal where the third opposition speaker refutes the proposition group's facts and evidence.

They conclude that given the evidence, or lack thereof, the opposition is the winner of the debate. The last speaker makes the proposition rebuttal. The third proposition speaker refutes the arguments from throughout the debate, extending the ideas of the other speakers. The debate is concluded when this speaker explains that based on the information presented throughout the debate, the proposition wins. <sup>42</sup>

## **Activity 1: Can Delaware residents really make changes that benefit the environment?**

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This activity is comprised of two news items related to a technology center and power plant that was going to be built on the University of Delaware's campus. The objective of this activity is to demonstrate the way argumentation is an important aspect of the civic process. Active citizenry means staying informed on current issues and understanding the evidence for people's stances on issues. I want the students to investigate a real-world example of people taking a stand against carbon dioxide emissions.

Step 1: Identifying Issues and Stances on the Issues- The first activity is centered around a Delaware resident's question raised on National Public Radio's *Radio Times*. The caller asks about a highly-debated power plant project for Newark, Delaware. When answering the caller's question, Governor Markell changes the conversation and avoids the CO2 emissions problem altogether. Questions for discussion include: What is the issue? What is the caller's stance? What is Governor Markell's stance? The students should recognize that the issue is the building of the data center and power plant on the University of Delaware campus. The caller's stance is against the building of the power plant in the region, as it will diminish the air quality of the region. Governor Markell's stance is not as clear; he implies that he agrees with the building of the data center and power plant on the basis of the potential jobs it will create in the region. <sup>43</sup>

Step 2: Conducting Rhetorical Analysis of Nonfiction, Informational Texts-The next item is an article from Newsworks.org, "University of Delaware Terminates Data Center Project". Plans for a fossil fuel based power plant on newly acquired University of Delaware land has been a hot topic in Delaware. Residents and students were concerned about the potential CO2 emissions and expressed the idea that the campus should set an example of energy efficiency. Through town hall meetings and protests, a committee of University of Delaware officials and professors voted down the technology center and power plant. <sup>44</sup>

This step requires the students to think deeply about a claim presented in nonfiction text. They must identify the claim and determine what reasons and evidence is used to persuade the reader to agree with the claim. The students should be encouraged to think about and examine the claims for accuracy. First, ask the students to identify the issue posed in the article. Through closely reading the article, the students should determine that the issue is the building of the data center and power plant on University of Delaware's STAR campus. Next, the students should identify the evidence in the article that supports the data center power plant and evidence that is against it. To make it easier, the students could highlight the affirmative evidence in one color and the negative in another. Finally, the students should be asked to determine what the outcome was. They should find that due to the advice of Delaware residents and environmental groups, the data center and power plant was not built.

Step 3: Activity Closure/ Check for Understanding- Based on the NPR clip and statements about the power plant expressed in the article, what do you think is Governor Markell's ultimate goal? Use evidence from the

NPR clip and news article to support your answer. The students should understand that Governor Markell's ultimate goal is to create jobs and strengthen Delaware's economy. The students will be assessed using the two-point rubric below.

<b>2 points</b>	The student response identified Governor Markell's goal and supported their answer with accurate and relevant evidence from the news clip and/or article.
<b>1 point</b>	The student response identified Governor Markell's goal but did not support it with accurate or relevant evidence from the news clip and/or article.
<b>0 points</b>	The student did not correctly identify Governor Markell's goal.

## Activity 2: Choosing the Right Words

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Step 1: The Power of Words- This activity requires the students to explore the way Delaware residents successfully stopped the power plant from being built. In small groups the students will read, "New Power Plant Stopped on University of Delaware Campus," an article posted online by the Sierra Club. The article clearly states the course of action that the Delaware residents took to ensure that the power plant was not successful. The students should identify and discuss the course of action. Also, at the end of the article Jen Wallace, a community activist, explains that part of the success can be attributed to their fact-based campaign. This is an important connection to make with the students. The students should be encouraged to think about the impact of using facts and evidence as opposed to just opinion and emotional appeals. <sup>45</sup>

Step 2: Speaking to Persuade- To help students understand the power of persuasive speech, they will watch Dr. Chajes, professor from University of Delaware, speak to city council in his speech "Do Everything You Can to Stop the Power Plant." Encourage the students to take notes as they listen to the speech related to the following topics: the speaker's style, clarity of his message, and the content of the speech. For students with auditory difficulties, a transcript of the speech is available under the "about" tab on the You Tube video page.

<sup>46</sup>

Step 3: Debate- To facilitate the number of students in my classes, three different debate topics will be offered. The first, "Delaware should build a sea wall along its coastline as protection from the rising sea." The second is, "Delaware residents should be mandated to use ethanol E85 Flex Fuel in their cars." The third debate topic is, "Delaware should work toward the use of wind energy as its primary source of energy." I will pose all three debate topics by projecting them on the SMARTboard. I will allow the students some time to think about the topic they would like to debate on. Next, I will set up six stations in the room, two stations for each debate topic. I will label them as follows: sea wall affirmative, sea wall negative, ethanol E85 affirmative, ethanol E85 negative, wind power affirmative, and wind power negative. I will have the students make their final decision by moving to the appropriate table.

Next, I will explain to the students how the debate will be structured. I created a table to make the debate structure more comprehensible for the students.

Time	Affirmative	Negative
5 minutes	<b>Speaker 1-</b> Deliver a speech in support of the motion that includes facts and evidence from the text.	Listen carefully for any flaws in logic or weak evidence. Take notes as you listen to the speaker.
2 minutes	Reflect on the speech, prepare for rebuttal from opposing team.	Determine which facts and evidence can be used to discredit the affirmative's support of the motion.
5 minutes	Listen carefully for any flaws in logic or weak evidence. Take notes as you listen to the speaker.	<b>Speaker 1-</b> Deliver a speech that pinpoints exactly what is wrong with the affirmative's support of the motion. Clearly state how their idea is incorrect or will not work for Delaware.
2 minutes	Determine which facts and evidence can be used to discredit the opposition speaker.	Reflect on speech, prepare for rebuttal from opposing team.
5 minutes	<b>Speaker 2-</b> Deliver a speech that further extends support of the motion including new includes facts and evidence from the text. Your speech must also answer to or discredit the arguments made by the first opposition speaker.	Listen carefully for any flaws in logic or weak evidence. Take notes as you listen to the speaker.
2 minutes	Reflect on speech, prepare for rebuttal from opposing team.	Determine which facts and evidence can be used to discredit the second affirmative speaker.
5 minutes	Listen carefully for any flaws in logic or weak evidence. Take notes as you listen to the speaker.	<b>Speaker 2-</b> Deliver a speech that extends the case of your team in opposition to the motion. Be sure to refute the affirmative group's ideas and bring in new evidence or facts to support your position.



2 minutes	Prepare for final rebuttal.	Prepare for final rebuttal.
5 minutes	Listen carefully for any flaws in logic or weak evidence. Take notes as you listen to the speaker.	<b>Speaker 3-</b> Deliver a concluding speech that refutes the proposition group's facts and evidence. Include a concluding sentence summarizing the main points of the argument.
5 minutes	<b>Speaker 3-</b> Deliver a concluding speech that refutes the opposition group's facts and evidence. Include a concluding sentence summarizing the main points of the argument.	Listen carefully to affirmative group's concluding speech.

Next, I will have the students choose their roles within their debate teams. The roles are as follows: speaker 1, speaker 2, speaker 3, and the remaining students are responsible for helping in the data collection, speech writing, and active listening. Once the roles have been established I will give the students time to look over their casebooks that contain articles related to their debate topic. Links to websites and articles are in the table below. Since access to the computers is problematic in my school, I will be giving the groups print copies of each item. They should highlight important facts and evidence that will help them in supporting their stance. Finally, the groups should begin writing a framework for the three speeches that will be delivered during the debate. I will tell the students that they must remember that to be effective, their speeches will have to be reworked throughout the debate to disprove the information of the other team.

### Casebooks

The webpages and articles listed in the table below will be printed for each group of students to use in preparation for the debate. All of the information has been organized into the following categories: background information, costs, pros and cons, and real-world examples. The students will need to work together to sort through the information to determine what evidence should be used to prove their case. They should also think about the opposing team and what evidence they will most likely be using. The students will be given index cards and a small box to organize their findings. Having the facts written on index cards will allow the students to obtain the necessary information during the debate. Going back into the articles to find facts while the debate is going on will take much too long. The small boxes will have premade dividers using the same categories listed in the chart below.





**Motion 1: Delaware should build a sea wall along its coastline as protection from the rising sea.**

**Background Information**

- <http://www.coolgeography.co.uk/GCSE/AQA/Coastal%20Zone/Management/managing%20coastlines.htm>
- <http://www.climatetechwiki.org/content/seawalls>
- [http://www.ehow.com/about\\_4610120\\_seawalls.html](http://www.ehow.com/about_4610120_seawalls.html)

**Costs**

- <http://www.stronglevees.com/cost/>
- <http://www.caltax.org/member/digest/July2005/7.2005.Dutton-LeveeCostsBreakingBank.01.htm>

**Pros and Cons**

- <http://www.innovateus.net/innopedia/what-are-advantages-seawall>
- [http://www.ehow.com/info\\_10053762\\_advantages-seawall.html](http://www.ehow.com/info_10053762_advantages-seawall.html)

**Real-World Examples**

- <http://www.scientificamerican.com/article/sea-walls-may-be-cheaper-than-rising-waters/>
- <http://science.howstuffworks.com/engineering/structural/levee2.htm>

**Motion 2: Delaware residents should be mandated to use ethanol E85 Flex Fuel in their cars.**

Background Information

- <http://auto.howstuffworks.com/fuel-efficiency/alternative-fuels/how-e85-ethanol-flex-fuel-works1.htm>
- <http://chooseethanol.com/what-is-ethanol/entry/e85-information/>

Costs

- <http://www.e85prices.com/>
- <http://e85vehicles.com/converting-e85.htm>

Pros and Cons

- <http://www.consumerreports.org/cro/2011/01/the-great-ethanol-debate/index.htm>
- [http://www.greencarreports.com/news/1077734\\_ethanol-in-your-gasoline-tank-the-pros-and-cons](http://www.greencarreports.com/news/1077734_ethanol-in-your-gasoline-tank-the-pros-and-cons)
- <http://www.carsdirect.com/green-cars/ethanol-fuel-pros-and-cons>

Real-World Examples

- <http://online.wsj.com/news/articles/SB10001424052702303789604579195910936634756>

**Motion 3: Delaware should work toward the use of wind energy as its primary source of energy.**

**Background Information**

- <http://www.oceanenergycouncil.com/ocean-energy/offshore-wind-energy/>
- <http://windeis.anl.gov/guide/basics/>

**Costs**

- <http://science.howstuffworks.com/environmental/green-science/wind-power7.htm>

**Pros and Cons**

- <http://www.independent.co.uk/environment/offshore-wind-farms-create-reef-effect-perfect-for-marine-wildlife--especially-seals-9619371.html>
- <http://energy.gov/eere/wind/advantages-and-challenges-wind-energy>
- <http://www.triplepundit.com/2012/06/wind-power-pros-cons/>

**Real-World Examples**

- <http://www.bbc.com/news/science-environment-25623400>
- <http://breakingenergy.com/2013/02/01/the-top-10-wind-energy-states-in-2012/>

**Student Assessment/Check for Understanding**

As the three debates are conducted in the classroom, there will be students waiting for their debate to take place or who have already participated in their debate. These students will be the judges of the debate. They will fill in the following chart to assess each of the debates that they are not actively participating in. By having the students evaluate their classmates, they gain a better understanding of the debate topics and will be less likely to engage in disruptive behavior. The chart was adapted from the Northwest Association for Biomedical Research's educational strategies on classroom debates. <sup>47</sup>

### Position Sheet

Motion:

1. Based on my prior knowledge of this issue, my position is:

2. The main reasons that led me to this position are:

3. Notes

4. Questions for affirmative group:

5. Questions for negative group:

6. Based upon my prior knowledge and the arguments expressed during the debate, I now/still conclude that:

The completed position sheets and the following debate rubric will be used to deem the winning position for each debate.

<b>Affirmative</b>	<b>Score</b>	<b>Negative</b>	<b>Score</b>
<p><b>Speaker 1-</b></p> <hr/> <p>delivered an organized speech in support of the motion that includes facts and evidence from the text.</p>	<p>1 well below target 2 below target 3 meets target 4 exceeds target</p>	<p><b>Speaker 1-</b></p> <hr/> <p>delivered a speech that pinpoints exactly what is wrong with the affirmative's support of the motion. The student clearly stated how their idea is incorrect or will not work for Delaware.</p>	<p>1 well below target 2 below target 3 meets target 4 exceeds target</p>
<p><b>Speaker 2-</b></p> <hr/> <p>delivered a speech that further extends support of the motion that includes new facts and evidence from the text. The speech answered to or discredited the arguments made by the first opposition speaker.</p>	<p>1 well below target 2 below target 3 meets target 4 exceeds target</p>	<p><b>Speaker 2-</b></p> <hr/> <p>delivered a speech that extended the case of the team in opposition to the motion. The speaker refuted the affirmative group's ideas and brought in new evidence or facts to support their position.</p>	<p>1 well below target 2 below target 3 meets target 4 exceeds target</p>
<p><b>Speaker 3-</b></p> <hr/> <p>delivered a concluding speech that refutes the opposition group's facts and evidence. The speech included a concluding sentence summarizing the main points of the argument.</p>	<p>1 well below target 2 below target 3 meets target 4 exceeds target</p>	<p><b>Speaker 3-</b></p> <hr/> <p>delivered a concluding speech that refutes the proposition group's facts and evidence. The speech included a concluding sentence summarizing the main points of the argument.</p>	<p>1 well below target 2 below target 3 meets target 4 exceeds target</p>
<b>Affirmative Total:</b>		<b>Negative Total:</b>	

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This book provides a rationale and methods for teaching the Common Core ELA Standards in secondary classrooms. The book is easily navigable due to its highly organized structure.

Central, Inc. *Global weirdness: severe storms, deadly heat waves, relentless drought, rising seas, and the weather of the future*. New York: Pantheon Books, 2012.

This book is a to-the-point guide on climate change. It covers all of the pertinent information on the global impacts of climate change and the progress that is being made globally to make a change.

"Climate Change and Delaware." *Environmental Protection Agency 1 (1997): 1-4*. <http://nepis.epa.gov/Exe/ZyNET.exe> (accessed July 15, 2014).

This article presented projections for Delaware's future in relation to the changing climate. It presents information on Delaware's ecosystem, geography, and population and describes how climate change will impact the state.

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This lengthy article described the models used for collecting and projecting climate change data and outlined several courses of action for the state of Delaware.

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This is one of my favorite books for building literacy in middle school students. It includes student-friendly descriptions of different types of writing, graphic organizers, and self-evaluation tools. A must-have for teachers in any content area interested in incorporating high-quality writing assignments in their classroom.

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This book has an excellent section on setting up a classroom debate.

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Delaware Governor Jack Markell's blog. A great resource for current political issues in Delaware.

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