MODULE 3, Lesson 2: How Low Can You Go? Reducing Carbon Output Challenge

Grades: 6-12

Duration: 5 class periods: 2 (45-50 minutes) lessons and 1 (135-150 minutes) lesson

Objective:

- Students will be able to calculate economic social carbon costs to encourage discussion on climate change impacts
- Students will be able to compare and apply urban planning concepts as a means to reduce greenhouse gas output in a given area
- Students will be able to formulate arguments, as well as recognize argumentation strengths and weaknesses
- Students will be able to effectively utilize evidence to articulate a position on the advantages and disadvantages of carbon sequestration and carbon prevention

Materials: Activity 1- either a worksheet or whiteboard to display the numeric figures; Activity 2- whiteboard, student notebooks; Activity 3- research resources (teacher's discretion), index cards, cardstock (optional), classroom debate rubric

Suggested Standards:

NYS Content Standards:

Grade 6-8 Science Standards:
Standard 1—Analysis, Inquiry, and Design
M1.1; M2.1; M3.1; S2.1d; S3.1; S3.2 ; T1.1; T1.3; T1.5
Standard 2—Information Systems
1.2; 1.3; 1.5; 3.2
Standard 6—Interconnectedness: Common Themes
1.1; 1.2; 1.4; 2.1; 2.2; 2.3; 5.1; 5.2; 6.1
Standard 7—Interdisciplinary Problem Solving
1.1; 1.3; 1.4; 2.1

6-8 Life Science Standards
Standard 4:
6.1c; 6.2b; 7.1e; 7.2c; 7.2d

Grades 6-8 Physical Setting Standards
Standard 4:
2.1a; 2.2r;4.1b

Grades 9-12 Science Standards:
Standard 1:
1.1a; 1.1c; 1.2a; 1.2b; 1.3b;3.1a; M1.1; M2.1; M3.1
Engineering Design Key Idea 1
Information Systems Key Idea 1
Information Systems Key Idea 2
Standard 6- Interconnectedness: Common Themes
2.1; 2.2; 2.3; 3.1
Standard 7—Interdisciplinary Problem Solving
1.1; 1.3
Strategies Key Idea 2

Grades 9-12 Living Environment Standards
Standard 4:
6.1c; 7.1a; 7.1b; 7.1c; 7.2a; 7.2c; 7.3a; 7.3b

Grades 9-12 Earth Science Standards
Standard 4:
2.2d

Grades 6-8 Social Studies Practice & Content Standards
6.A6; 6.B3; 6.B4; 6.B6; 6.B8; 6.F1; 6.F6
7.A1; 7.A6; 7.B3; 7.B4; 7.B6; 7.B8
8.A1; 8.A6; 8.B1; 8.B3; 8.B4; 8.B6; 8.2a; 8.2b

Grades 9-12 Social Studies Practice & Content Standards
A1; A4; A5; A6; B3; B4; B5; B7; D3; D4; D5;D6; F1; F2; F3; F4; F5; F6; F8; 10.9c; 11.5a; 11.5b; 11.11c; 12.G5c; 12.G5d

Grades 6-12 Technology Standards
Standard 5 – Technology
1,2,3,4,5

Common Core State Standards:

Grade 6-8 College and Career Readiness Anchor Standards for Reading for Informational Text
CCSS.ELA-LITERACY.RI.6.1
CCSS.ELA-LITERACY.RI.6.7
CCSS.ELA-LITERACY.RI.7.1
CCSS.ELA-LITERACY.RI.7.8
CCSS.ELA-LITERACY.RI.7.9
CCSS.ELA-LITERACY.RI.8.9

Grade 9-12 College and Career Readiness Anchor Standards for Reading for Informational Text
CCSS.ELA-LITERACY.RI.9-10.1
CCSS.ELA-LITERACY.RI.11-12.1

Grade 6-8 College and Career Readiness Anchor Standards for Writing
CCSS.ELA-LITERACY.W.6.1
CCSS.ELA-LITERACY.W.6.7
CCSS.ELA-LITERACY.W.6.8
CCSS.ELA-LITERACY.W.6.9
CCSS.ELA-LITERACY.W.7.1
CCSS.ELA-LITERACY.W.7.7
CCSS.ELA-LITERACY.W.7.8
CCSS.ELA-LITERACY.W.7.9
CCSS.ELA-LITERACY.W.8.1
CCSS.ELA-LITERACY.W.8.7
CCSS.ELA-LITERACY.W.8.8
CCSS.ELA-LITERACY.W.8.9

Grade 9-12 College and Career Readiness Anchor Standards for Writing
CCSS.ELA-LITERACY.W.9-10.1
CCSS.ELA-LITERACY.W.9-10.7
CCSS.ELA-LITERACY.W.9-10.8
CCSS.ELA-LITERACY.W.9-10.9
CCSS.ELA-LITERACY.W.11-12.1
CCSS.ELA-LITERACY.W.11-12.7
CCSS.ELA-LITERACY.W.11-12.8
CCSS.ELA-LITERACY.W.11-12.9

Grade 6-8 College and Career Readiness Anchor Standards for Speaking and Listening
CCSS.ELA-LITERACY.SL.6.1
CCSS.ELA-LITERACY.SL.6.2
CCSS.ELA-LITERACY.SL.6.3
CCSS.ELA-LITERACY.SL.6.4
CCSS.ELA-LITERACY.SL.6.5
CCSS.ELA-LITERACY.SL.6.6
CCSS.ELA-LITERACY.SL.7.1
CCSS.ELA-LITERACY.SL.7.2
CCSS.ELA-LITERACY.SL.7.3
CCSS.ELA-LITERACY.SL.7.4
CCSS.ELA-LITERACY.SL.8.1
CCSS.ELA-LITERACY.SL.8.2
CCSS.ELA-LITERACY.SL.8.3
CCSS.ELA-LITERACY.SL.8.4

Grade 9-12 College and Career Readiness Anchor Standards for Speaking and Listening
CCSS.ELA-LITERACY.SL.9-10.1
CCSS.ELA-LITERACY.SL.9-10.2
CCSS.ELA-LITERACY.SL.9-10.3
CCSS.ELA-LITERACY.SL.9-10.4
CCSS.ELA-LITERACY.SL.11-12.1
CCSS.ELA-LITERACY.SL.11-12.2
CCSS.ELA-LITERACY.SL.11-12.3
CCSS.ELA-LITERACY.SL.11-12.4

Grades 6-8 Mathematics Standards:
CCSS.MATH.CONTENT.6.EE.A.2
CCSS.MATH.CONTENT.7.EE.A.1
CCSS.MATH.CONTENT.7.EE.B.4

Next Generation Science Standards

Grades 6-8 Life Science Standards:
MS-LS2-3; MS-LS2-4; MS-LS2-5

Grades 9-12 Life Science Standards:
HS-LS2-7; HS-LS4-6

Grades 6-8 Earth and Space Science Standards:
MS-ESS2-1; MS-ESS3-3; MS-ESS3-5

Grades 9-12 Earth and Space Science Standards:
HS-ESS2-4; HS-ESS3-1; HS-ESS3-3; HS-ESS3-4; HS-ESS3-5; HS-ESS3-6

Grades 6-8 Engineering, Technology, and Applications of Science Standards
MS-ETS1-1; MS-ETS1-2; MS-ETS1-3; MS-ETS1-4

Grades 9-12 Engineering, Technology, and Applications of Science Standards
HS-ETS1-1; HS-ETS1-3; HS-ETS1-4

ACTIVITY 1: The Cost of Carbon: A Landscape Approach (45-50 minutes)

In Lesson 1 students learned about the carbon cost of everyday choices and lifestyles. Now they will be examining the cost of carbon through another lens, an economic lens. Using the same vision as in Lesson 1 (the blocks surrounding your school), lifestyle groups (grouping is up to teacher discretion- maintain the group as is from Lesson 1 or create new group pairings) will continue to work together to calculate the monetary or "social" cost of carbon emissions within the vision. Students should be informed that monetary estimates are used to measure the economic damage of carbon emissions as a cost-benefit analysis for federal regulations. Governments use these monetary values to attempt to compare the costs of limiting our pollution to the costs of climate change impacts.

The spread of disease, decreased food production, coastal destruction, heat waves, increased flooding, more severe droughts, and decreased biodiversity are just a few of the problems that scientists foresee as a result of climate change. According to the Cost of Carbon Pollution Project, "The social cost of carbon pollution calculates the economic cost of these problems and estimates the damage done by each ton of carbon dioxide that is spewed into the air."[1] The 2015 U.S. Government social cost for carbon was $37 per ton (based off the 2007 USD) with a 3% discount rate. The discount rate is how economists measure money over time- the value of the dollar fluctuates and may not be worth the same in the future as it is today. The $37 per ton cost is the most commonly assumed "average" value; however, there are estimated costs with different discount rates, and different costs assumed for the level of damage done by climate change. These can be found in the chart below: [2]

Social Carbon Cost with Discount Rates (in 2007 USD per metric ton)				
Year	**5% Average**	**3% Average**	**2.5% Average**	**3% 95th percentile***
2015	$11	$37	$57	$109
2020	$12	$43	$64	$128

* 95th percentile = attempt to capture damages associated with extreme climatic outcomes

[1] The Cost of Carbon Pollution Project, *Frequently Asked Questions*, Environmental Defense Fund; NYU Institute for Policy Integrity; Natural Resources Defense Council, http://costofcarbon.org/faq.

[2] Peter Howard, "Omitted Damages: What's Missing from the Social Cost of Carbon," *The Cost of Carbon Pollution Project*, (2014): 46, http://costofcarbon.org/files/Omitted_Damages_Whats_Missing_From_the_Social_Cost_of_Carbon.pdf.

Start off by having students expand the table using algebraic equations to figure out the social carbon costs, across all discount rates, for the remaining future climate scenarios on Visionmaker's climate selector dropdown (years 2050, 2080, 2100).

Example

5% Average: $11 + (1)(\frac{Year-2015}{5})$

3% Average: $37 + (6)(\frac{Year-2015}{5})$

This would continue for all columns. This simple equation will allow students to make predictions for 5 year increments.

Next students will return to the class vision. Working in their specific lifestyle groups (Lenape, Average New Yorker, Average American, Eco-conscious, and Average Earthling), they will create a new chart calculating the social carbon cost for their lifestyle (remember that in order to do so, students must first convert kilograms of CO_2 into tons) *Student worksheets attached as separate document.*

Example

Eco-conscious lifestyle is 16,000,000 kg CO_2/year = 16,000 tons CO_2/year

Social Carbon Cost with Discount Rates for Eco- conscious lifestyle (in 2007 USD per metric ton)				
Year	**5% Average**	**3% Average**	**2.5% Average**	**3% 95th percentile***
2015 (based on the baseline climate dropdown 1970-2010)	**$176,000** 16,000 x 11 =	**$592,000** 16,000 x 37 =	**$912,000** 16,000 x 57 =	**$1,744,000** 16,000 x 109 =
2020	**$192,000** 16,000 x 12 =			
2050				
2080				
2100				

After students finish constructing their tables, have them do a think-pair-share regarding the monetary amounts generated. Remind students after they complete their table that the U.S. Government is currently operating at the average 3% discount rate ($37 per ton of CO_2). Inform students that estimated total damages from Hurricane Sandy amount to $50 billion or more. Ask students if they think the 3% discount is an appropriate operating rate for official government regulations? Have them explain their rationale in detail. Ask a few groups to share out with the rest of the class.

There are scientists from Stanford University who claim that the social carbon cost of $37 per ton is incorrect. According to their study, they claim the social carbon cost is $220 per ton.[3] The teacher should pose the following questions to students:

- What is the percentage increase between the current U.S. Government estimate and the Stanford estimate?
- What would the cost be in 2050 as it relates to the Stanford projections?

Students will work individually to answer these questions.

Example:

Percentage increase:

220-37=183

183÷37= 4.95 (rounded to the nearest hundredth)

4.95 x 100 = **495% increase**

2050 Stanford Projections

$220 + 6(\frac{2050-2015}{5}) = 262$

262 x 16,000 = **$4,192,000**

Conclude the lesson by having a whole-class discussion on whether or not students think having higher social carbon costs such as the $220 per ton estimate would be helpful or hurtful for future mitigation policies in terms of a cost-benefit analysis. *It may be helpful to refer to the*

[3] Ker Than, "Estimated Social Cost of Climate Change Not Accurate, Stanford Scientists Say," *Stanford News*, January 12, 2015. https://news.stanford.edu/2015/01/12/emissions-social-costs-011215/.

Stanford article for ideas to further discussion.[4] *Remember that the Danielson's Framework encourages teachers to pose questions to which they or their students may not know the answer to promote discussion and student thinking.* Remind students of the scale of these cost projections; they are only considering the cost of 1 NYC block. Ask them to imagine the magnitude of trying to create a social carbon cost for the entire city!

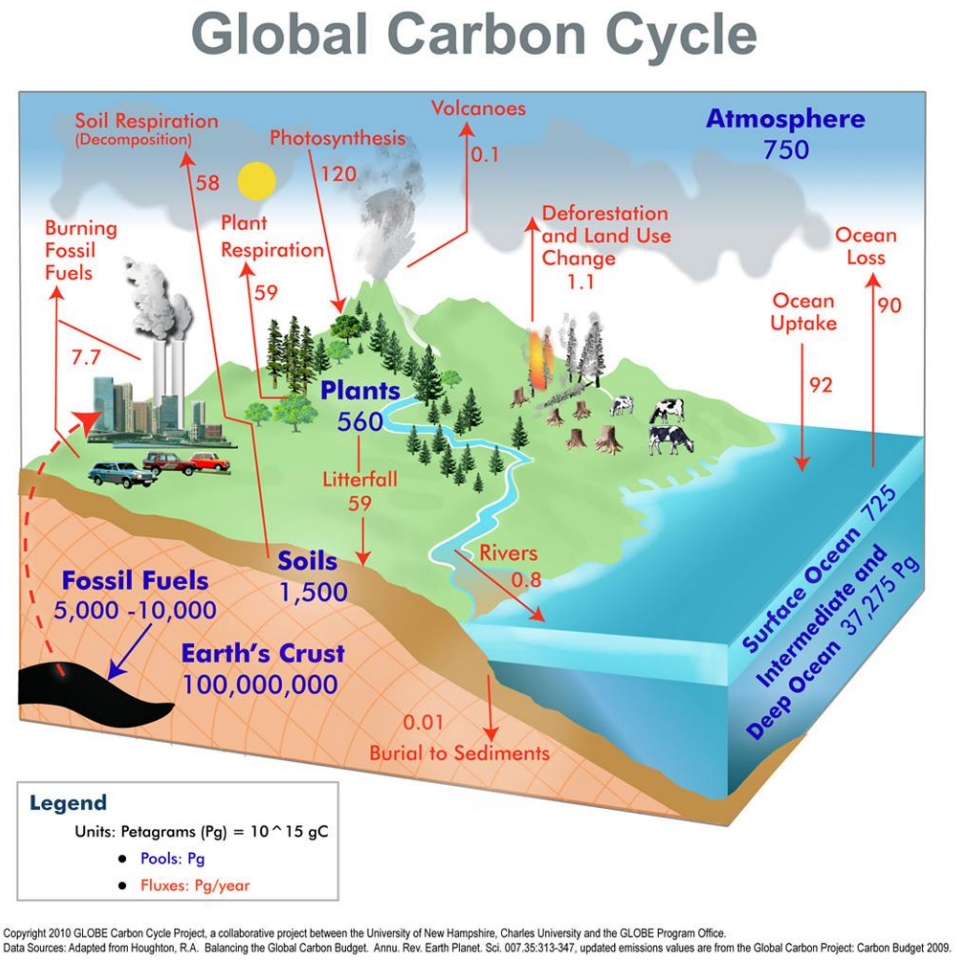
ACTIVITY 2: Reducing Greenhouse Gas Output using Visionmaker NYC (45-50 minutes)

In Activity 2, students will get the chance to make changes to the vision which they have been working with up until this point. Instead of taking baseline data, the teacher will pose a challenge to students, pushing them to think critically about ways to reduce greenhouse gas output and what actions would enable them to do so.

Before moving to the vision challenge, the teacher should briefly review with students the carbon cycle and highlight the differences between carbon sources and carbon sinks. Anything that produces atmosphere CO_2 is called a *source*, while things that absorb CO_2 are called *sinks*. Key points to highlight:

- Life of Earth is carbon-based
    - Carbon is found in all living things
    - It is present in the atmosphere, biosphere, hydrosphere and geosphere
    - 65,500 billion metric tons of carbon are stored in rocks
        - The rest exists in the ocean, atmosphere, plants, soil, and fossil fuels (oil, natural gas, coal)
        - Forests, oceans, and soil are the main carbon sinks on Earth
    - All sinks of CO_2 are or have the potential to be sources of CO_2 due to natural processes or as a result of human behavior

[4] Ibid.



Data Sources: Adapted from Houghton, R.A. Balancing the Global Carbon Budget. Annu. Rev. Earth Planet. Sci. 007.35:313-347, updated emissions values are from the Global Carbon Project: Carbon Budget 2009.

Once review is complete, the teacher will create a challenge for students (refer to the "Creating and Joining Groups" and "Creating a Challenge" documents in the appendices for additional assistance on how to accomplish this task). The teacher should modify the original class vision to change the year to 2050. This doesn't actually make any alterations to the vision itself, but may serve as a supportive reminder to students. Next they should alter the lifestyle/climate selector dropdown boxes to "Average New Yorker", "Future Climate in 2050s", and "Showers". The reason for these selections is to have the parameters coincide with some of the ambitions of Mayor de Blasio's OneNYC initiative. OneNYC is NYC's plan for addressing population increase, climate change, the evolving economy, and aging infrastructure. The plan has 4 main visions, one being "Our Sustainable City" which has a goal set to reduce the city's greenhouse gas emissions by 80% by 2050 relative to 2005 levels.[5]

[5] The City of New York, *One New York: The Plan for a Strong and Just City*, The City of New York, 2015, 166. http://www.nyc.gov/html/onenyc/downloads/pdf/publications/OneNYC.pdf.

Having set the lifestyle and climate parameters, select the parameters for the challenge. In keeping with OneNYC's 80 x 50 goal select the "fuel combustion (CO_2 output)" parameter, with the intention of reducing by 80% (*keep in mind in Visionmaker this will reflect an absolute change, not relative to 2005 levels*). Next choose the "workers" and "residents" parameter under the population metric, with the intention of maintaining both values. Have students work in small groups to create vision responses that attempt to meet the challenge by making changes to the vision using the toolbar options (Buildings, Nature, Transportation, Other, and Modifiers). Students will have to make strategic decisions on how best to accomplish the goal of reducing greenhouse gases by 80% without displacing the current population. (Note: altering the lifestyle dropdown can also figure into potential modifications and can be used as a variable to meet the challenge objectives). They should track changes as they make them in a notebook (i.e. added greenroofs, replaced 10 story office buildings with 3 story apartment building, etc.) to get a sense of carbon prevention vs. sequestration reliance. Students can check their percentage progress on all three parameters by referring back to the challenge response page of the original challenge. On that same page they can also look at other groups' response visions.

While making changes to the visions, groups should monitor the economics metric in the "data summary" tab to see the total cost of their alterations and reinforce the idea of cost-benefit analysis. (Note: There is no undo button in Visionmaker so if you alter the same squares with different tools; there will be either a construction or demolition cost associated with that change. The "paint to vision" tool will allow you to start fresh if necessary and will erase the monetary costs associated from past changes.) In Activity 1 the class examined the social carbon cost of CO_2 emissions. Now in Activity 2, they are examining the cost of urban planning. Every action, even if it is moving towards achieving environmental improvements, has up-front costs associated with it. That is why decisions should be well-thought out.

At the end of the lesson, ask students to individually describe in writing the most significant point made during the lesson that contributed to their learning.[6] This will serve as an informal assessment for the teacher to gauge student understanding, and see if major student takeaways meet the objectives of the lesson.

ACTIVITY 3: Debate: Carbon Prevention vs. Sequestration (135-150 minutes)

The teacher should conduct this lesson over three class periods. The teacher will divide the class in half in a method of their choice. Students will be engaging in an active debate, one team representing the environmental benefit of utilizing carbon prevention strategies and the other team representing carbon sequestration strategies. Each team will have to argue why either

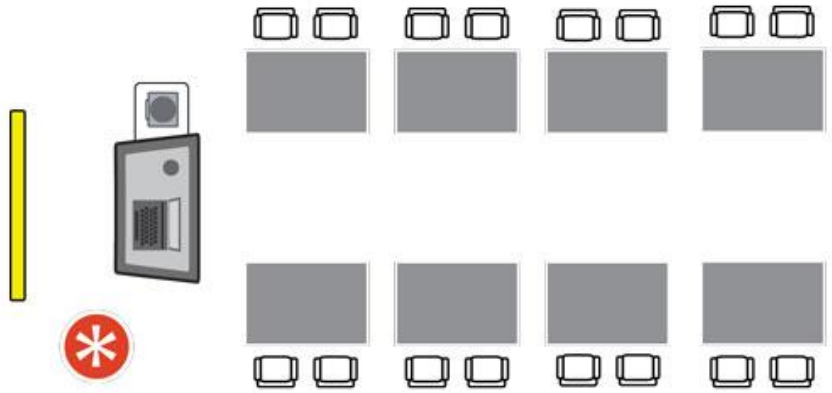
[6] Page Keeley, *Science Formative Assessment: 75 Practical Strategies for Linking Assessment, Instruction, and Learning* (Thousand Oaks, California: Corwin Press, 2008), 156.

carbon prevention or sequestration is a better strategy over the other for achieving a reduction in greenhouse gas emissions.

The teacher should encourage students to work in their team groups to review their notes from the past 5 lessons. What takeaways can they pull from those lessons that will contribute to their debate argument? The teacher should also feel free to provide teams with additional resources, or have them do their own additional research to prep for the debate. (The resources included for the Module 3 lessons may be appropriate for gifted and talented students, but the sophistication level may be too high for some students).

It will be the responsibility of both teams to prep key talking points to argue their side of the debate. However, it is important to be well versed in both sides of the debate. Both teams should anticipate potential talking points from the opposing team in order to strengthen their rebuttal and convince the audience that their carbon strategy is superior to the other. The teacher should inform students that they need to incorporate hard data and/or statistics to support and validate their argument. Issues of causality, connections, significance, and context are important for students to try to highlight when they are interpreting evidence to develop their main argument. It may take students a whole class period to do research, organize, and structure their debate, so the teacher should conduct this lesson over three class periods.

Arrange the classroom with desks in a linear fashion on two distinct sides of the room so that students engaging in the debate are facing one another (see image below). This setup will streamline the debate process. Students should seat themselves according to the order in which they will present (sequencing will be discussed in further detail on the next page). Make sure that there is physical space behind the desks so additional students can stand behind those seated. It is up to the teacher's discretion how they will assign debate roles for their specific demographic of students.



Original image: http://www.ampli.com/images/learning-center/room-setup-guide/perpendicular-layout.jpg

The teacher can choose which group should make the first opening remarks. The debate should be structured in this way (allow ~4-5 minutes of speaking time per role): [7]

1. *Carbon Prevention* debater presents constructive debate points.
2. *Carbon Sequestration* debater cross-examines prevention points.
3. *Carbon Sequestration* presents constructive debate points.
4. *Carbon Prevention* cross-examines sequestration points.
5. *Carbon Prevention* offers first rebuttal
6. *Carbon Sequestration* offers first rebuttal
7. *Carbon Prevention* offers second rebuttal
8. *Carbon Sequestration* offers second rebuttal
9. *Carbon Prevention* closes the debate by summarizing their teams' main points
10. *Carbon Sequestration* closes the debate by summarizing their teams' main points

For large class sizes, every student may not have the opportunity to speak during the debate. However, to be inclusive of all students and to keep them engaged in the activity, the teacher should assign additional "supportive roles" for non-elected speakers. Every speaker besides the lead constructive debater (positions 1 and 3) on both teams, should have between 3-4 supporting students who can aid the speakers in coming up with rebuttals or questioning talking points for the opposing team. It will allow all students to participate, while promoting collaboration and healthy competition. The students playing the support roles should stand behind the students with official speaking roles so that they can be easily accessible if they need to step in and provide assistance.

In true debate fashion, the teacher should decide an overall winner at the end of class. In order to be objective, the teacher should use a rubric to keep judging consistent and fair. An example of a rubric for potential use is attached on the following page.[8] The teacher can create their own rubric if the example provided does not best meet their needs.

[7] Education World, "Stage a Debate: A Primer for Teachers (Lincoln-Douglas Debate Format)," *Lesson Plans,* http://www.educationworld.com/a_lesson/03/lp304-01.shtml.

[8] Northern Illinois University: Faculty Development and Instructional Design Center, *Classroom Debate Rubric*, http://www.niu.edu/facdev/_pdf/guide/strategies/classroom_debate_rubric.pdf.

Visionmaker NYC Education
Wildlife Conservation Society 2016

Classroom Debate Rubric						
Criteria	**5 points**	**4 points**	**3 points**	**2 points**	**1 point**	**Total Points**
Respect for Other Team	All statements, body language, and responses were respectful and were free of inappropriate language	Statements and responses were respectful and used appropriate language, but once or twice body language was not	Most statements and responses were respectful and in appropriate language, but there was one sarcastic remark	Statements, responses and/or body language were borderline appropriate. Some sarcastic remarks	Statements, responses and/or body language were consistently not respectful	
Information	All information presented in this debate was clear, accurate and thorough	Most information presented in this debate was clear, accurate and thorough	Most information presented in the debate was clear and accurate, but was not usually thorough	Some information was accurate, but there were some minor inaccuracies	Information had some major inaccuracies OR was usually not clear	
Rebuttal	All counter-arguments were accurate, relevant and strong	Most counter-arguments were accurate, relevant, and strong	Most counter-arguments were accurate and relevant, but several were weak	Some counter arguments were weak and irrelevant	Counter-arguments were not accurate and/or relevant	
Use of Facts/Statistics	Every major point was well supported with several relevant facts, statistics and/or examples	Every major point was adequately supported with relevant facts, statistics and/or examples	Every major point was supported with facts, statistics and/or examples, but the relevance of some was questionable	Some points were supported well, others were not	All points were not supported	
Organization	All arguments were clearly tied to an idea (premise) and organized in a tight, logical fashion	Most arguments were clearly tied to an idea (premise) and organized in a tight, logical fashion	Most arguments were clearly tied to an idea (premise) and organized in a tight, logical fashion	Most arguments were clearly tied to an idea (premise) and organized in a tight, logical fashion	Most arguments were clearly tied to an idea (premise) and organized in a tight, logical fashion	
Understanding of Topic	The team clearly understood the topic in depth and presented their information forcefully and convincingly	The team clearly understood the topic in depth and presented their information with ease	The team seemed to understand the main points of the topic and presented those with ease	The team seemed to understand the main points of the topic, but didn't present with ease	The team did not show an adequate understanding of the topic	
					Total Points:	

Comments:

Appendix A- Creating and Joining Groups on Visionmaker NYC

Creating a Group:

- Go to Visionmaker.nyc
- Sign in with your account information
- Click on "Manage" in the top right
- Select "Groups"
- In the bottom right of the window, click on "+Create New Group"
- Fill in ALL the fields (if you don't your challenge will not be created), giving your challenge a name, and description
- Select a group to issue your challenge to – this can be a group you've already created, or you can create a new group if you don't already have one.
- Click "Next"
- Give your group a name in the "Group Name:" box
- If you know the usernames of the members you would like to be in your group you can enter them into the "Group Members:" box.
    - If not, you will be given a group code upon creation of your group, which you can give to anyone to join your group (instructions on this below)
- Decide if you would like members to receive an email when they are added or removed and either check or uncheck the box
    - If you created the usernames using your own email address, this check box will mean that you will receive an email whenever you add or remove a user from the group
- Click "Save Group" in the bottom right corner

To access your group code:

- In the groups tab of your "Manage" menu, find the group you are interested in.
- Click on the pencil icon at the right to edit
- At the bottom left you will see the Group Code

To Join a group:

- Go to Visionmaker.nyc
- Sign in with your account information
- Click on “Manage” in the top right
- Select “Groups”
- In the bottom left enter the code for the group you wish to join into the box and click “Join”

Appendix B- Creating a Challenge on Visionmaker NYC

Creating a challenge:

- Go to Visionmaker.nyc
- Sign in with your account information
- Click on “Manage” in the top right
- Select “Challenges”
- In the bottom right of the window, click on “+Create New Challenge”
- Fill in ALL the fields (if you don’t your challenge will not be created), giving your challenge a name, and description
- Select a group to issue your challenge to – this can be a group you’ve already created, or you can create a new group if you don’t already have one.
- Click “Next”
- Choose a vision to base your challenge on
    - If you see the name of the challenge you would like to use in the list that shows in the window, click the circle on the right to select that vision
    - If you do not see the challenge listed, click on “<<Search” in the top right and search for the vision you would like to use (you can search by vision name or author username, but remember that the search is sensitive to case and spaces). Then select it from the list by clicking the circle on the right
- Click “Next”

- Select the metric on which to focus your challenge. You can choose up to three parameters total from the list.
    - Be sure when you choose a metric, to also select, maintain, increase by, or decrease by, and the percentage change you are aiming for.
    - Remember that the "(i)" will give you information about what each metric is and how it is calculated.
- Click "Next"
- Review your challenge, and if you are satisfied, click "Save Challenge"
    - Now anyone in the group you issued it to, can view the challenge and create a response, and you can monitor their progress

<u>To create a Response to a Challenge:</u>

- Go to Visionmaker.nyc
- Sign in with your account information
- Click on "Manage" in the top right
- Select "Challenges"
- Find the challenge you are interested in responding
- Click "View Responses"
- Click "+Create New Response"
- In the window that pops up, you may make changes to the name, year, and description of your challenge response vision, but you do not need to
- When you are ready, click "save changes"
- Now you can zoom into your vision
    - on the far right of the screen find the zoom buttons
    - Click on the "Zoom #" in the middle and then select "Zoom to fit vision"
- Make any changes you want to try to meet the challenge.
- To check your status, go back to the challenge

- Click on “View Responses”
- Now you can see all the responses to this challenge and you can see the progress you are making toward meeting the challenge

Eco-Conscious- Lifestyle Social Carbon Cost

Eco-conscious lifestyle is _____ kg CO_2/year = _____ tons CO_2/year

Social Carbon Cost with Discount Rates for Eco- conscious lifestyle (in 2007 USD per metric ton)				
Year	**5% Average**	**3% Average**	**2.5% Average**	**3% 95th percentile***
2015 (based on the baseline climate dropdown 1970-2010)	**$** _____tons CO_2/year x 11 =	**$** _____tons CO_2/year x 37 =	**$** _____tons CO_2/year x 57 =	**$** _____tons CO_2/year x 109 =
2020	**$** _____tons CO_2/year x 12 =			
2050				
2080				
2100				

Lenape Lifestyle- Social Carbon Cost

Lenape lifestyle is _____ kg CO_2/year = _____ tons CO_2/year

Social Carbon Cost with Discount Rates for Lenape lifestyle (in 2007 USD per metric ton)				
Year	**5% Average**	**3% Average**	**2.5% Average**	**3% 95th percentile***
2015 (based on the baseline climate dropdown 1970-2010)	**$** _____tons CO_2/year x 11 =	**$** _____tons CO_2/year x 37 =	**$** _____tons CO_2/year x 57 =	**$** _____tons CO_2/year x 109 =
2020	**$** _____tons CO_2/year x 12 =			
2050				
2080				
2100				

Average New Yorker- Lifestyle Social Carbon Cost

Average New Yorker lifestyle is _____ kg CO_2/year =_____ tons CO_2/year

Social Carbon Cost with Discount Rates for Average New Yorker lifestyle (in 2007 USD per metric ton)				
Year	**5% Average**	**3% Average**	**2.5% Average**	**3% 95th percentile***
2015 (based on the baseline climate dropdown 1970-2010)	**$** _____tons CO_2/year x 11 =	**$** _____tons CO_2/year x 37 =	**$** _____tons CO_2/year x 57 =	**$** _____tons CO_2/year x 109 =
2020	**$** _____tons CO_2/year x 12 =			
2050				
2080				
2100				

Average American- Lifestyle Social Carbon Cost

Average American lifestyle is _____ kg CO_2/year = _____ tons CO_2/year

Social Carbon Cost with Discount Rates for Average American lifestyle (in 2007 USD per metric ton)				
Year	**5% Average**	**3% Average**	**2.5% Average**	**3% 95th percentile***
2015 (based on the baseline climate dropdown 1970-2010)	**$** _____tons CO_2/year x 11 =	**$** _____tons CO_2/year x 37 =	**$** _____tons CO_2/year x 57 =	**$** _____tons CO_2/year x 109 =
2020	**$** _____tons CO_2/year x 12 =			
2050				
2080				
2100				

Average Earthling Lifestyle- Social Carbon Cost

Average Earthling lifestyle is _____ kg CO_2/year = _____ tons CO_2/year

Social Carbon Cost with Discount Rates for Average Earthling lifestyle (in 2007 USD per metric ton)				
Year	**5% Average**	**3% Average**	**2.5% Average**	**3% 95th percentile***
2015 (based on the baseline climate dropdown 1970-2010)	**$** _____tons CO_2/year x 11 =	**$** _____tons CO_2/year x 37 =	**$** _____tons CO_2/year x 57 =	**$** _____tons CO_2/year x 109 =
2020	**$** _____tons CO_2/year x 12 =			
2050				
2080				
2100				