Name ______________

Climate Engineering Teaching Module

Lesson 3: Climate Engineering Designs Worksheet

Introduction

Use your content knowledge, the decision matrix, and your creativity to revise your climate engineering design.

Question Set 1 (Use the Decision Matrix to help decide which of your climate engineering designs you should develop further)

Criteria to Consider when Selecting and Revising your Designs	Score 1-5
How well does your design slow global warming and/or climate change? (1 - not well, 5 - very well)	
Does your technology modify or work with an environmental system? (1 - does not, 5 - perfect match)	
What is the cost of your technology (consider materials, resources, and upkeep)? (1 - high cost, 5 - low cost)	
Does your design scale well (can you test your technology on a small-scale, then expand to large-scale deployment)? (1 - not well, 5 - very well)	
Rate the amount of unintended negative consequences of deploying your technology? (1 - many, 5 - few)	
Total (max 25 points)	

1. What are the ratings of your three designs? Are you able to combine features of your designs to create a technology that scores high in all the criteria categories?

Engineering Blueprint Checklist

☐ Title

☐ A descriptive subtitle

☐ Drawings from at least two perspectives

☐ Label and a Table of important features

☐ Label and a Table of the size of your design

☐ Meets all criteria

Question Set 2 (Consider the questions before your final design)

2. Describe how your climate engineering design will function to slow global warming and/or climate change by modifying or working with an environmental system?

   Students will provide answers describing their climate engineering design and how it works by modifying an environmental system

3. What materials and natural resources are used for your design to function? Do you think your technology is expensive? Why or why not?

   Students can provide a list of materials that the technology is made from, and any natural resources used for its operation. Putting a numerical cost on their technology would be difficult, therefore, we ask the students to consider whether their technologies are expensive in a relative context.

4. Is your technology a solution to *global* warming and/or climate change, or is the technology better suited to resolve *regional* warming and/or climate change? Can your technology be scaled-up to a global scale?

   E.g., Technologies that capture CO_2 are solutions to global warming; solar radiation management technologies may be deployed on regional scales, but they can have a global effect if deployed at a relatively large scale for a long time; a space mirror or umbrella will impact the global radiation budget.

5. Is your technology a long-term solution to global warming and/or climate change? What is the impact if the technology breaks or malfunctions?
   This question and the next two urge the students to think about the global risks and consequences surrounding climate engineering. Does their technology remove greenhouse gases and is thus a long-term solution to climate change? Furthermore, students will begin to understand that climate change is not only a natural science and engineering issue, but a societal, economical, and diplomatic issue as well. These questions prepare the students for the next lesson, the Model U.N.

6. What may be some unintended negative consequences of deploying your technology?

7. Do you foresee any countries benefiting more from your technology? Do you foresee any countries experiencing negative outcomes from its deployment?