**Teaching Argumentation through Controversial Environmental Issues:**

**A Curriculum Model**

Dan Zalles

Here are guidelines that you can use to develop lessons for teaching about argumentation. For the sake of illustration, the guidelines apply the model to the topic of climate change. In so doing, they build off of NAAEE’s Environmental Issues Forums (EIF)[[1]](#footnote-1). However, the lesson structures can be applied to any controversial issue. Here you’ll find a set of directions and activities that you can customize for your own classroom. We’ve also provided a template or outline for adapting the model to issues of your choice. We invite you to try out the model, adapt it for your own students, and share your experiences.

**Teaching about argumentation**

Students, when confronted with arguments for and against different action options on controversial issues, can become bewildered and feel under pressure to make a definitive choice without really thinking things through. They may be swayed by an emotional appeal without really even recognizing it. However, when students are presented with and given the opportunity to practice argumentation their bewilderment is lessened and they gain a greater understanding of their own and others’ decision-making. They hone critical thinking skills, and become more skilled at framing an argument and making an effective case.

The following activities guide students through a structured process of

* Thinking about different types of arguments and their characteristics;
* Recognizing and reflecting about what matters most to them;
* Practicing group deliberative discourse;
* Finding common ground and thinking about what might constitute appropriate follow-up actions; and
* Reaching consensus about possible solutions.

This process does not proscribe a set of actions. Indeed, follow-up strategies can involve research as well as other forms of action, depending on the students’ conclusions. Key to thinking about follow-up research, however, would be to build in sufficient time to generate important questions that could be at least partially answered through the research.

To implement this model, your lessons should contain three activities:

**Activity #1** - Classifying categories of arguments (individual activity)

**Activity #2** - Applying understanding of the types to generate new arguments and identify which argument makes the most sense to the student personally (individual activity)

**Activity #3** - Sharing the argument in deliberative discourse with other students who have offered arguments in the same category (group activity)

Central to this process is a close examination of policy arguments and counterarguments. We’ll be using a set of arguments presented in NAAEE’s EIF guide *Climate Choices: How should we meet the challenges of a warming planet?*[[2]](#footnote-2) *Climate Choices* provides a deliberative framework for considering individual, group, and policy actions related to climate change. To encourage deliberation, the issue guide presents three options or alternative courses of actions for addressing climate change: 1) Sharply reduce carbon emissions 2) Prepare and protect our communities and 3) Accelerate innovation. Each of these options also includes a “What We Can Do” section that lays out five broad polity arguments and counterarguments related to specific actions.

For this sample lesson, we’ll use the “What We Can Do” section from Option #3: Accelerate Innovation as source material for our analysis. In the issue guide, five broad policy arguments and counter arguments are presented, with one focusing on geo-engineering.

The argument *for* geo-engineering is presented as:

“…by strengthening research, testing, and large-scale development of geo-engineering – scientific methods for modifying Earth’s climate – we could offset the effects of high levels of CO2 in the atmosphere.”

The *counterargument* is presented as:

“…few if any large scale geo-engineering tests have been performed to date. We do not know what the outcomes might be, and they might backfire or have unintended consequences, such as damaging Earth’s protective ozone layer, causing weather disruptions or worsening droughts.”

**Activity 1: Classifying Categories of Arguments (individual activity)**

In this first activity, students will work individually to review three illustrative statements related to geoengineering. Each of these statements is drawn from the argument/counterargument presented in Option #3 of *Climate Choices*.

After reading the three statements, they will classify the statements according to the following categories of argumentation[[3]](#footnote-3):

* Scientific – argument is based on the scientific merit of the solution
* Societal – argument is based on the acceptability of the solution to society and social stability
* Ethical – argument is based on the ethics of the solution, from the perspective of the values of the person or group making the argument

Begin the activity by distributing the student worksheet to class participants. Review the instructions with the class and lead a short discussion of the three categories of argumentation presented (e.g., Scientific, Societal, and Ethical). NOTE: Student Worksheets are reproduced starting on page 8.

**Activity 1 – Student Worksheet**

Three people were discussing geo-engineering and how it might be used to help address climate change.

1. Read each statement and think about what each person is saying about geo-engineering.
* Jeanette argued that there is not enough evidence to trust that geo-engineering solutions will be safe
* Frederico agreed but said the risks are worth it considering the severity of the problem of climate change.
* Marsha was completely opposed because she said it is not our place to play God with the natural environment.
1. Review the three categories of argumentation:
* Scientific – argument is based on the scientific merit of the solution
* Societal – argument is based on the acceptability of the solution to society and social stability
* Ethical – argument is based on the ethics of the solution, from the perspective of the values of the person or group making the argument
1. Answer the following questions:
* What kind of an argument is each person making? Is it Scientific, Societal, or Ethical?
* What are they saying that supports your classification?

**Activity 2: Generating New Arguments (individual activity)**

In this second activity, students write their own arguments and counterarguments designed to illustrate each of the three categories of arguments: Scientific, Societal, and Ethical.

**Activity 2 – Student Worksheet:**

1. Write three new argument or counterargument statements related to geo-engineering. One should be about the science, one about society, and one on the ethics.
2. At least one of the three statements should be based on what *you* truly believe.
3. Once you have written your three arguments: a) identify which of the three is consistent with your beliefs and b) determine if this argument is in support of geo-engineering, against geo-engineering, or somewhere in between.

**Activity 3: Practicing Deliberative Discourse (group activity)**

In this activity, students will build their understanding of argumentation by using the statements that they and their classmates generated in Activity 2. You should divide the class into small groups. If possible, there should be at least one small group for each of the three types of arguments (Scientific, Societal, and Ethical).

Each group will practice deliberative discourse – they will use their statements to discuss geo-engineering as a contributing solution to climate change. As they deliberate, they should see if there exists any common ground that binds all the members. The common ground need not be as ambitious as reaching consensus on a solution or strategy. At a minimum, however, the common ground should be acceptance that everybody holds certain standards or common concerns. For example, Group 1 (Scientific) may only find common ground in their belief that more studies need to be conducted. Or, Group 2 (Societal) may find common ground in the idea that geo-engineering could be an acceptable solution if it is preceded by a widespread public education campaign. Or, Group 3 (Ethical) may find common ground in the idea that societies should roll out geo-engineering solutions incrementally according to how severe climate change impacts are for people in different locations, thus driving the policy from a humanistic perspective.

In the end, expect that the individual group members will either be for or against geoengineering, or indecisive. Indecision is fine, as long as they listen to each other and try to find some common ground, whatever that may be.

To improve their listening skills, they could practice paraphrasing each other, posing clarification-seeking questions to other group members, or offering feedback after all participants express their arguments.

To begin the activity, ask the students to review their Activity 2 worksheets and circle the statement that reflects their own beliefs. They should confirm which category of argumentation the statement reflects (Scientific, Societal, or Ethical). These categories will be used as you assign students to their small groups.

Then, divide the students into groups based on the three types of argumentation. Assign students to:

**Group 1:** if the statement they circled focused on the science of the issue

**Group 2:** if the statement they circled focused on the societal dimensions of the issue

**Group 3:** if the statement they circled focused on the ethics of the issue

Once students are settled in their groups, distribute a copy of Activity 3 – Student Worksheet to each student. Review the directions. Make sure that students are clear on their assignments.

**Activity 3 – Student Worksheet**

1. As a group, discuss your arguments and counterarguments about geo-engineering.
* Using the argument/counterargument statements you developed in the previous activity, present your position about geoengineering and your supporting argument, even if your position is simply that you are not comfortable taking a position yet
* Listen to your groupmates’ reasoning. Take turns paraphrasing one of the arguments you heard them say so that it is clear that you listened carefully.
* Ask your groupmates questions about their positions and reasoning. These questions should be carefully worded to respectfully challenge individual positions or reasoning.

2.) Once all the group members have had a chance to present their positions and reasoning, and each group member has been able to practice paraphrasing and questioning strategies, turn your attention to finding common ground.

On a large sheet of paper or the white board, list what you all agree and disagree about. Write a statement or series of statements that express your common ground.

1. As a group, consider what you’d like to learn more about. Pose a series of questions that will help you follow up with research or appropriate actions related to geo-engineering. At least one question should be grounded in each of the three argument categories:
* Scientific
* Societal
* Ethical
1. Describe how each question could be followed up through research or actions.
2. As a group, brainstorm ideas for how that research or action could eventually be evaluated for effectiveness.

**Extension activity:**

Use this activity to extend your students’ understanding of the differences between a problem and a solution. In discourse about controversial issues, people often confuse the two, reducing clear thinking and the capability for finding common ground. Often, when one group hears that another group opposes a particular solution, they assume that the other group is denying the problem. This may not be true. For example, people who believe that state or local governments should develop and administer environmental regulations may be accused of being against controlling polluters when their real concern may be about which level of government would be more effective at doing this. Or, they may not believe in regulations at all. Or, they may care as much about the environment as the others, but think that pollution curbs would be more successful if the polluters are pressured by pro-environment consumer behavior rather than by regulations. All too often, the media, in its thirst for the confrontational and sensational, exaggerates this sort of confounding of problems and solutions.

Students can be sensitized to the differences between problems and solutions by answering a staggered set of questions on a particular topic. For example, on the topic of climate change, students can be prompted to pay attention to the delineation of what constitutes the problem and its causes. The articulation of perspectives about causes is critical to clarity about what is the problem. This problem clarity is needed before discussions of solutions can proceed.

For example, here are causal questions on climate change,

* Do you believe that dangerously rapid global climate change is currently occurring in the world?
* Do you believe that the humans are contributing to this rapid climate change?

These questions would be followed by questions about possible solutions, such as those laid out in the EIF *Climate Choices[[4]](#footnote-4)* curriculum.

For example,

* What are the best ways to encourage widespread adoption of new technologies and ways of doing things? Should this be mandated?
* What worries or makes us uncomfortable about geo-engineering?
* How important is cost-effectiveness when considering new technologies?

By decoupling the problems and solutions, people are freed up to reject solutions without being accused of denying the existence of the problem. This decoupling may assist in finding common ground for action.

**Activity 1 – Student Worksheet**

Three people were discussing geo-engineering and how it might be used to help address climate change.

1. Read each statement and think about what each person is saying about geo-engineering.
* Jeanette argued that there is not enough evidence to trust that geo-engineering solutions will be safe
* Frederico agreed but said the risks are worth it considering the severity of the problem of climate change.
* Marsha was completely opposed because she said it is not our place to play God with the natural environment.
1. Review the three categories of argumentation:
* Scientific – argument is based on the scientific merit of the solution
* Societal – argument is based on the acceptability of the solution to society and social stability
* Ethical – argument is based on the ethics of the solution, from the perspective of the values of the person or group making the argument
1. Answer the following questions:
* What kind of an argument is each person making? Is it Scientific, Societal, or Ethical?
* What are they saying that supports your classification?

**Activity 2 – Student Worksheet:**

1. Write three new argument or counterargument statements related to geo-engineering. One should be about the science, one about society, and one on the ethics.
2. At least one of the three statements should be based on what *you* truly believe.
3. Once you have written your three arguments:
4. identify which of the three is consistent with your beliefs

b) determine if this argument is in support of geo-engineering, against geo-engineering, or somewhere in between.

**Activity 3 – Student Worksheet**

1. As a group, discuss your arguments and counterarguments about geo-engineering.
* Using the argument/counterargument statements you developed in the previous activity, present your position about geoengineering and your supporting argument, even if your position is simply that you are not comfortable taking a position yet
* Listen to your groupmates’ reasoning. Take turns paraphrasing one of the arguments you heard them say so that it is clear that you listened carefully.
* Ask your groupmates questions about their positions and reasoning. These questions should be carefully worded to respectfully challenge individual positions or reasoning.
1. Once all the group members have had a chance to present their positions and reasoning, and each group member has been able to practice paraphrasing and questioning strategies, turn your attention to finding common ground.

On a large sheet of paper or the white board, list what you all agree and disagree about. Write a statement or series of statements that express your common ground.

3) As a group, consider what you’d like to learn more about. Pose a series of questions that will help you follow up with research or appropriate actions related to geo-engineering. At least one question should be grounded in each of the three argument categories:

Scientific

Societal

Ethical

1. Describe how each question could be followed up through research or actions.
2. As a group, brainstorm ideas for how that research or action could eventually be evaluated for effectiveness.
1. For more information and to download materials, visit NAAEE’s Environmental Issues Forums https://naaee.org/our-work/programs/environmental-issues-forums [↑](#footnote-ref-1)
2. For more information about EIF and to obtain a copy of Climate Choices, visit naaee.org/eif. [↑](#footnote-ref-2)
3. Legalistic argumentation is not in this model but could be added in if you want. The reason is that legalistic argumentation is focused on advocacy and persuasion for a predetermined point of view rather than deliberation. Precedent in the law and in prior judicial decisions are the key factors determining the argument’s strength. [↑](#footnote-ref-3)
4. For more information and to download materials, visit NAAEE’s Environmental Issues Forums https://naaee.org/our-work/programs/environmental-issues-forums [↑](#footnote-ref-4)