

## Project 2 Reflective Essay

### **Model**

*What were the strengths of your model?*

The strengths of our model were its focus on data and physics. Although it was unwieldy to have stocks of several different types, including mass, volume, temperature, and energy, physics equations allowed us to calculate their relationship and effectively keep track of all these factors in our model. This allowed us to display how much ice had melted into water per year, the change in upper ocean temperature, and change in sea level in our model. These quantities have all been measured or calculated by scientists, so it gave us a way to compare our model's results to actual data or more credible sources' predictions to check whether it is reasonable.

*What were its weaknesses?*

The weaknesses in our model were the assumptions that we made, including assuming a direct proportionality between CO<sub>2</sub> emissions and energy added to the ocean. Although this assumption is not without a basis in science, it is an oversimplification which is not entirely true. Additionally, simplifying out factors such as glacial melting and the heat exchange between the upper and lower ocean layers increased the scientific inaccuracy of our model.

*What next steps or iterations would you do if you had more time?*

If we had more time, I think we would go back and document our work better, including double checking and reformatting the differential equations and trying to write out a more simplified stock and flow diagram. This would have helped us to have a more concise and directed presentation of our model in class.

### **Teaming**

*How well did you and your partner(s) work as a team? What strategies or activities did your team use that seemed to work well? What did not work so well?*

Chris and I worked well together, and we made a project that I am proud of. I will say though, that the process to complete this project was a little rocky. Meeting in person really helped us sort out issues much more quickly, because we could work together and discuss things in real time instead of having to email back and forth.

The first week started out rough, when we didn't have a solid project proposal, so we met outside of class briefly to straighten out our proposal. Next, our model had too many moving pieces and

we needed to simplify, so we worked outside of class for two or three hours on simplifying the stock and flow diagram and figuring out the necessary equations. Then, even once we figured out our proposal and a simplified model, finding the data necessary to execute it was our next challenge, which we figured out mainly in class or on our own. Lastly, we found a conceptual error in our equations on the day before the presentation, leading us to meet a final time for several hours in order to rewrite a significant part of the update function as well as prepare for the presentation in class the next day.

I think that some of these challenges could have been more easily resolved with better communication, but since my cell phone had broken right at the start of the project, I had a hard time staying in communication and remembering to check my email on my laptop often enough.

### **Looking Back**

*What were the learning goals you set for yourself for Project 2? What progress did you make toward those goals?*

In my last reflection, I wrote that my learning goals for project two were to:

1. Frontload the work so that I'm not still working on the project on the day that it is due.
2. Write an overall code outline at the start and try to stay within that purview, to prevent becoming overambitious and keep the code organized.

I would say that I made progress on goal number two, because our model essentially followed our simplified stock and flow diagram from class, although when we decided to split the ocean into an upper and lower layer it complicated the model a bit, so I would say I was almost successful.

As for goal number one, it's clear that I did not make much progress on getting my work done early. I will continue to work on that during the next project, this time with a fully functional phone and no excuses.

### **Looking Ahead**

*Considering your experiences creating your model, constructing your computational essay, checking in with NINJAs and your instructor, and working in your team, what do you think you might do differently for Project 3?*

1. Start with a clearer picture of what needs to be accomplished, by writing out a task list in a shared document in order to figure out the details.
2. Frontload the work/get an early start so that we don't end up working on the project on the day that it is due.

**Sustainability**

*How has this project changed, formed, or solidified your thinking about or understanding of sustainability?*

I have gained a lot of general knowledge about climate systems, especially ocean warming and sea level rise. I've also found several really good sources and reports to read to learn more. Realizing how little I had learned about climate systems in my previous education made me slightly concerned. I had never learned much about climate systems in any of my science classes. I think that everyone should be better informed on the details of climate change and the science behind it. Increased awareness would allow people to make more informed decisions both in their own personal lives and about what or who they vote for in our democracy.