

Dispatches from the Future

Speculative Fiction and Climate Modeling in the Secondary Science Classroom

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Abstract

Students in traditional education settings are rarely engaged in the vital act of imagining. Instead, they are bombarded with data about the climate crisis that project a degraded and diminished future as a foregone conclusion. Here, I reflect on my experiences using published media, highly accessible climate modeling, and a mental time travel project to help students practice inhabiting better futures in a science-backed way. These activities are sequenced over at least five days. Considerations for various educational settings are included.

Keywords

computer modeling, ecological civilization, future thinking, speculative fiction, imagination

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Some years ago, I began using the [ENROADs](#) climate simulator as a way to build systems-thinking as well as a pedagogical device for students to test assumptions regarding our climate systems. Previous research has shown that using the simulator in classrooms effects sense of urgency and hope as well as intent to take action across sociopolitical categories (Rooney-Varga *et al.*, 2021) It required a bit of learning on my part to get comfortable using the simulator, but the resource articles, help videos, and training resources I found made it pretty painless. I was ready to bring it to my classes. It was great! Students were indeed being pushed into engaging discussions where they got to test out for themselves just what the latest scientific understandings said about their ideas. They wondered, for instance, whether we can solve the climate crisis and meet the Paris Climate Agreement goals if we just electrify our transportation. At the ends of these lessons, students left with a vague sense that, yes, it is possible to build a better world. More importantly, they had some ideas about paths to get there. Nevertheless, an abstract sense of things like PM2.5—otherwise known as particulate matter air pollution—is not too helpful in itself. It is not what drives students to make certain career choices, engage in local civics, or build sustainable businesses.

For that, I designed a six-day unit for my 11th grade biology students. After engaging with speculative fiction depicting ecological civilizations, students used computer modeling to simulate future climate scenarios. Ultimately, students drew on these [mentor texts](#) and computer modeling to design their own futures and create what I came to call a Dispatch from the Future.

Part 1: Looking Forward

To begin, I spend up to two weeks introducing students to various speculative fiction that depicts ecological futures. These mentor texts include podcast snippets, scenes from movies, [100-word stories](#), and more. One text that has proven engaging again and again is the [Black Panther](#) movie. Many students are already familiar with the Marvel Cinematic Universe and are prepared to engage in a deeper investigation of the ecological civilization envisioned in the worlds of the story. This popular movie has proven a more engaging way to dig into land use, resources, and the responsibilities of power than other texts I tried. As the class engages with these mentor texts, an activity I came to call *Looking Forward*, I ask students to use a journal and respond to these

questions following each exposure: What do you notice? What do you want? What do you wonder? These questions prompt critical observation, introspection, and discussions that students were excited to engage in.



Figure 1: Class slides used to prompt student journaling

Exposure to the *Looking Forward* mentor texts is important for two reasons. First, each experience shows students that using imagination to explore futures can be a serious business. In discussing these media, I often find students making comments like “I thought that part was really cool. But could we actually do something like that?” Second, each mentor text adds to a template of styles, modes, ideas, and themes that students can draw upon in as they create their own Dispatch from the Future. Having students keep a journal helps in this process as it may be several days before they engage with the Climate Action Simulation and begin working on their own projects that imagine actual ecological change.

Part 2: Climate Action Simulation

While the *Looking Forward* mentor texts can provide inspiration about futures in fiction, a deeper scientific understanding of climate systems can help students ground their thoughts of futures in reality. The [Climate Action Simulation \(CAS\)](#) has been developed by [Climate Interactive](#) and uses the ENROADs computer model. Other amazing [resources](#) exist, so my additional notes here are brief.

The CAS has different interest groups working together to protect their own interests as well as working toward the Paris Climate Agreement temperature goals. The interest groups include conventional energy, world governments, climate justice

hawks, agriculture and forestry, banking and finance, and more. I sort my students into teams based on their interests and skills. For instance, I have found success with placing some of my louder and more engaged students in the justice hawks group while placing quieter students with good synthesizing skills as the agriculture and forestry group.

For students who already have some background in climate science, I find it helpful to plan about two 60-minute periods for these activities. On the first day, we spend time developing team unity, helping them identify their platforms and goals, and encouraging some deal-making between groups. For instance, I may encourage the climate justice hawks to try to encourage the world governments that their primary obligations are to their citizens. The conventional energy group may work with the agriculture and forestry group to push for nature-based carbon removal. This builds excitement for the next day's activity and allows you to devote all of day two to a different format.

On day two, once your students reach their goal or time limits are near, be sure to spend a few minutes using ENROADs to examine some of the impacts of their choices (see Impacts menu of ENROADs). I highlight the PM2.5 air pollution and share that there are [approximately 8 million annual deaths](#) (Vohra et al., 2021) currently, while our future scenario drastically cuts that number. Throughout these activities, students will be engaged with various science and engineering practices while exploring different cross-cutting concepts. Because the simulations model several processes, there are opportunities to focus on multiple NGSS disciplinary core ideas. For example, middle school classes focusing on [MS-LS2-5](#) or [MS-ESS3-3](#) could highlight the ecosystem services of different nature-based mitigation strategies or the impacts of some human systems on other connected systems. High school classes may be interested in focusing on [HS-ESS3-1](#) or [HS-LS2-7](#) to explore links between human fossil fuel use and sea level or work to consider the societal impacts of different possible solutions.

Following this review of a possible future scenario, have students reflect on what they would love about living in a world that was on track to do these things. My students have written about many general things, such as having hope or not feeling guilty for simply trying to go to work. With more time given for reflecting on this,

students integrate these thoughts on a more personal level and consider specific people and places in their lives. Whatever they end up discussing and focusing on here can become perfect elements for their Dispatch from the Future.

Part 3: Dispatches from the Future

By this point in the unit, students will have collaboratively explored what the science says is possible. They will have also engaged different visions of the future and seen ways that artists and writers have packaged up those visions so that others can experience them. Now it is students' turn to imagine ecological futures! Send students to the future and have them bring some piece of it back. Consider something silly and ceremonial to help give them license to exercise their imaginations: flicker the lights with music, blow time-travel-dust, whatever fits for your setting.

I prompt my students to begin by thinking about a year (e.g. 2070), then three measures from the ENROADs modeling, a location, and characters. These prompts help students ground their imaginations in what the science says is possible and sets the pieces they need for assembling something more intimate than a ppm (or Parts Per Million) measurement of atmospheric greenhouse gas concentrations. One student created an audio recording of a dialogue between herself as an old woman recently awoken from a long coma and her granddaughter. Another student created a website from a future travel agency based on Mars, visiting locations on Earth. Another created TikTok-style interviews with various people in the future about their lives. Others have worked in written stories, performed dance, created video games, and more.

Once students have completed their projects, I have them present within the class as well as digitize their Dispatch so that it can be shared beyond the class with community members. I suggest a minimum of three days for students to work on these projects. I find that more time is always rewarding because of the levels of engagement and the pride students develop when they are working on something so personal and empowering. If time allows, I suggest at least two rounds of project presentations to allow for responses to feedback.

At a Glance

Title	Dispatches from the Future: Speculative Fiction and Climate Modeling in the Secondary Science Classroom
Unit Time	Part 1: 5-10 minutes daily and integrated with daily lessons spread over one to two weeks Part 2: Two days Part 3: Three to five days
Grade Level(s)	9-12 grade level
Core Text	Ryan Coogler's Black Panther (2018)
Supporting Texts	Mentor Texts for Dispatches
Climate Literacy Terms	computer modeling, ecological civilization , future thinking, speculative fiction, imagination
Objectives	The lesson arc builds an understanding of possible future scenarios, grounds those possibilities in the latest science, and has students envisioning ecological civilizations.
Materials and Resources	Lesson Overview Doc Resources Folder

Reflection

Ultimately, these lessons provide openings for students to use the tools of science to explore their worlds. The creative freedoms have encouraged students to open up and discuss their personal hopes and dreams for the future, along with their interpretations of the present.

After completing these lessons, students reflect on the experience. All their reflections have highlighted their appreciation that the project pushed them to envision futures that counter the common media narratives and back it with science.

- “This was a super cool project! The project topic of what we want for the future really helped me think through what is happening right now and what is possible.”
- “I think that it has made me more confident in people to save the world, and make the necessary changes. I used many of the topics in class to try to make accurate predictions. I think that everyone should imagine a better future”
- “I’m proud of what I’ve made”

References

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