

Topic of the Week: Solar Geoengineering

Chapters Covered: Chapters 7-10

Due: Monday 1/30 **Points:** 30 in the Assessment Category

Context as it relates to *Project Hail Mary*: Dr. Ryland Grace realizes he is in a different solar system due to the pace of rotation of flares on the sunspots. Throughout the next few chapters, we learn about the devastating revelation that microbes are eating the sun's energy and could lead to a new ice age. In chapter 8, the alien spaceship Blip A sends over a cylinder made of xenon that reveals a sphere connected to Tau Ceti - an indication that the planet this ship is from is experiencing the same dimming phenomenon earth is. They are both here to try to figure out why Tau Ceti is not being infected by the astrophage. In chapter 10, he meets an extraterrestrial he calls "Rocky" who shows that he understands the atmosphere on board the Hail Mary, and perhaps might understand more about this issue with Astrophage. As recorded by an array of hundreds of instruments deployed around the Earth, the period from the late 1950s through the early 1990s witnessed a clear and measurable decline (as much as 5% globally) in the amount of sunlight reaching the ground. In some regions the drop was even steeper. Satellite measurements show that although the sun remains as bright as ever, less sunlight has been penetrating through the atmosphere to the ground, accounting for the phenomenon now known to scientists as "global dimming." This is likely due to pollution. Pollution bounces incoming light off the airborne particles and back into space, and pollution causes more water droplets to condense out of the air, leading to darker, thicker clouds—which, of course, block more sunlight. Global warming also contributes to dimming: warmer air holds more water, and when condensed the warmer clouds are heavier and darker. For that reason, the dimming appears to be more pronounced on cloudy days than sunny ones. While scientists do not think we will likely see another ice age, we are experiencing Global Dimming. (Columbia.edu). This has led some scientists and climatologists to consider solar geoengineering.

Purpose: Knowing about and forming our own thinking about important ideas, technology, events, philosophies/ concepts, and people in our world is fundamental for our development as wise, critical, and ethical people. Each week you will be studying a topic related to the chapter or chapters you will have read in *Project Hail Mary* by Andy Weir.

Article Title: "Dimming the Sun to Cool the Planet Is a Desperate Idea, Yet We're Inching Toward It"

Article: [Website](#)

Article: [Google Doc](#)

Supplemental/Optional Readings:

<https://www.science.org/content/article/geoengineers-inch-closer-sun-dimming-balloon-test#:~:text=For%20years%2C%20the%20controversial%20idea,global%20warming%E2%80%94has%20been%20theoretical.>

<https://www.nature.com/articles/d41586-018-07533-4>

<https://www.theguardian.com/environment/2021/mar/25/top-us-scientists-back-100m-geoengineering-research-proposal>

<https://www.reuters.com/markets/commodities/after-sun-dimming-setback-geoengineers-seek-diplomatic-fix-2022-01-17/>

Assignment overview:

- Task One: **Read the curated article, research, or excerpt (linked above) chosen for you this week.** You may also want to read additional resources on your own to supplement your understanding of the topic and to better understand various viewpoints.
- Task Two: **Annotate the article or research document linked above that relates to the reading for this week in the novel.** Your annotations should show evidence of your engagement and thinking about the content and craft of the article, but also show your metacognition (being aware of your own thinking process).

For highlights and annotations, use the following directions:

- Copy and paste the article or research into a new Google doc and make a works cited page for the article (Tools>Citations>APA Format)
 - Highlight the most important ideas or main points in **yellow**
 - Highlight ideas that provoke a strong reaction in you (surprise, excitement, disagreement, etc.) in **blue**
 - Highlight places that are confusing or that prompt questions for you in **green**
 - In addition, you must **add 5 comments** that show your thoughtful engagement with the article. You may want to use the highlighting rules above on your “first pass” reading of the article and then add additional comments on your “second pass” reading of the article. Or you may do both kinds of annotations during a single reading.
- Task Three: **Write a brief (500-800 word) essay on the prompt below, and incorporate 2 direct quotes from the article given into your essay and [cite the 2 quotes in MLA format](#).** (Example: According to Helena Smith in her article “The Women Who Brought Down Greece’s Golden Dawn,” when historians examine this time period, they “see a nation whose political class was inexcusably slow in dealing with the rightwing menace and a society whose silence was deafening” (Smith).

By purposefully releasing particles into the atmosphere to reflect sunlight back into space, solar geoengineering is a revolutionary new method introduced to combat the consequences of climate change. This technology poses a variety of moral and practical issues while also having the ability to lower world temperatures and lessen the consequences of global warming.

Solar geoengineering might offer a somewhat speedy and efficient solution to the global warming dilemma, which is one of its key advantages. With the potential to significantly lower the rate of global

warming, perhaps within a few years after deployment (Bazilchuk) solar geoengineering can give us one last chance at the war on climate change.

Now, do countries find it sufficient enough to dedicate so many resources towards it? Well, for nations currently dealing with the repercussions of climate change, such as rising sea levels and more frequent and severe natural catastrophes, this might be especially advantageous. Its affordability and lack of disruptiveness is a major factor. In contrast to other suggested remedies for the issue of global warming, such as lowering greenhouse gas emissions or switching to renewable energy sources, solar geoengineering has the potential to be a comparatively inexpensive solution.

Solar geoengineering, however, has a number of disadvantages. The possibility of unforeseen repercussions, such as changes to weather patterns, lower agricultural yields, or interference with ecosystems, is one of the primary worries. (Spring) Very easily, it can have an unintended consequence of giving people a false feeling of security, causing them to continue emitting greenhouse gasses without fear of repercussions. (“The pros and cons of geoengineering”). With understanding how large corporations & humans are now before the switch of false security, it should be greatly taken into consideration what would happen afterwards.

Theoretically, solar geoengineering should be adequate to mitigate the impacts of climate change, which have both potential advantages and disadvantages. It might offer a speedy and efficient solution to the global warming dilemma, but it also has the potential to have unforeseen consequences and foster a false sense of security. To completely comprehend the consequences of solar geoengineering and decide if it is a workable solution to the climate catastrophe, further study is required.

In summary, solar geoengineering is a complicated and contentious topic with both possible advantages and disadvantages. On the one hand, it has the potential to significantly slow down the rate of global warming and offer a reasonably affordable response to the climate emergency. On the other side, it could have unforeseen effects that affect ecosystems, reduce food production, or change weather patterns. Additionally, it can give individuals a false feeling of security, making them think they can keep emitting greenhouse gasses without suffering any repercussions. When, obviously, we both know that is not true.

Works Cited

Bazilchuk, Nancy. "Blocking the sun to control global warming." *Phys.org*, 16 September 2021,
<https://phys.org/news/2021-09-blocking-sun-global.html>. Accessed 30 January 2023.

"The pros and cons of geoengineering." *New Scientist*, 20 September 2012,
<https://www.newscientist.com/gallery/geoengineering/>. Accessed 30 January 2023.

Spring, Jake. "Geoengineering marks scientific gains in U.N. report on dire climate future." *Reuters*, 10
August 2021,
<https://www.reuters.com/article/uk-climate-change-ipcc-geoengineering-idUKKBN2FB0MQ>.
Accessed 30 January 2023.