

HMDC Elementary Debate Class (Summer 2024) - T-Chart

Topic: Using “Geoengineering” to prevent climate change would be desirable.

Using Geoengineering

BACKGROUND:

Geoengineering is a method that uses advanced technology to try to cool the Earth and fight climate change. There are two main approaches: reflection and absorption. Reflection involves techniques like spraying tiny particles into the sky or using mirrors in space to bounce sunlight away from Earth, which helps lower temperatures. Absorption focuses on capturing carbon dioxide from the air, either by planting more trees or using machines designed to absorb this gas. While these methods offer potential solutions, many people worry about the risks and unknowns of using technology to fix a problem that might be caused by other technologies, like pollution from factories and cars. They fear that geoengineering could have unintended side effects or might distract from reducing greenhouse gas emissions through cleaner energy and conservation efforts.

Geoengineering is using science and technology to try to cool the Earth and prevent climate change. For example, scientists might spray tiny particles into the sky, put mirrors in space to reflect sunlight away from the Earth or develop artificial trees designed to absorb more CO₂ from the air than a regular tree.

GEOENGINEERING (PRO): General Ideas

1. **Cooler Temperatures Worldwide:** Geoengineering can help reduce the Earth's temperature by both reflecting sunlight away and removing carbon dioxide from the atmosphere. Reflecting sunlight is achieved by spraying tiny particles, like sulfur, into the upper atmosphere to form a reflective layer that bounces sunlight back into space. Removing carbon dioxide is done using machines or planting more trees to absorb this greenhouse gas from the air. By combining these approaches, geoengineering can directly lower global temperatures, making hot weather less extreme and more comfortable for people, plants, and animals.
2. **Slows Down Ice Melting:** Geoengineering can slow the melting of ice in the Arctic and Antarctic by reducing global temperatures. This is done through techniques like injecting reflective particles into the atmosphere or placing large mirrors in space. By lowering the temperature in these regions, geoengineering helps preserve ice caps, protecting the habitats of animals such as penguins and polar bears, and preventing rapid sea level rise that can result from melting ice.
3. **Reduces Severe Storms:** By reducing global temperatures, geoengineering can make severe storms, like hurricanes and typhoons, less intense. This is achieved by cooling ocean temperatures through methods such as spraying reflective particles into the atmosphere or brightening clouds. Cooler oceans have less energy to fuel these storms, making them weaker and less frequent. Geoengineering directly contributes to reducing the severity and occurrence of dangerous storms.
4. **Protecting Endangered Animals:** By cooling the Earth, geoengineering can help save animals that are at risk of extinction due to rising temperatures. Methods such as brightening clouds with seawater spray or using space mirrors to reflect sunlight away help maintain cooler habitats. These techniques directly contribute to preserving environments where endangered species, like polar bears and coral reefs, thrive, preventing their habitats from becoming too warm.
5. **Gives Time for Solutions:** Geoengineering provides more time to develop long-term solutions to climate change by temporarily slowing down global warming. Techniques like reflecting sunlight away or capturing carbon dioxide from the air can quickly reduce temperatures or greenhouse gases. This temporary fix buys time for society to implement more permanent changes, such as transitioning to cleaner energy sources and reforesting large areas.

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GEOENGINEERING (PRO): Specific Ideas

1. **Cooler Temperatures:** Geoengineering can cool the Earth because it reflects sunlight away from the planet, lowering global temperatures.
2. **Stops Floods:** Geoengineering can stop floods because it cools the planet and prevents ice caps from melting, which keeps sea levels lower and reduces flooding risk.
3. **Fewer Storms:** Geoengineering can reduce storms because it makes the oceans cooler, which means less energy for storm formation and weaker storms.
4. **Protects Animals:** Geoengineering helps animals because it keeps their habitats cooler, which is essential for their survival in a warming world.
5. **Buys Time:** Geoengineering buys time because it slows down global warming, giving society more time to find and implement permanent solutions.
6. **Preserves Ice:** Geoengineering saves ice because it lowers temperatures in polar regions, reducing the rate at which ice caps and glaciers melt.
7. **Reduces Drought:** Geoengineering can prevent droughts because it can influence rain patterns, making them more regular and ensuring water supply.
8. **Cools Cities:** Geoengineering can make cities cooler because it reduces the heat from the sun, making urban areas more comfortable and livable.
9. **Protects Coral Reefs:** Geoengineering helps coral reefs because it keeps ocean temperatures lower, which corals need to avoid bleaching and death.
10. **Health Benefits:** Geoengineering can improve health because it lowers extreme heat, reducing the risk of heat-related illnesses like heatstroke.
11. **More Comfortable Weather:** Geoengineering makes weather more comfortable because it reduces extreme temperatures, making daily life easier.
12. **Less Air Conditioning:** Geoengineering reduces the need for air conditioning because it makes the climate cooler, saving energy and money.
13. **Reduces Heatwaves:** Geoengineering can stop heatwaves because it lowers overall temperatures, making extreme heat events less frequent and severe.
14. **Improves Agriculture:** Geoengineering helps farming because it creates a stable climate for crops, which need consistent weather to grow well.
15. **Prevents Sea Level Rise:** Geoengineering stops sea levels from rising because it cools the planet and prevents ice from melting into the oceans.
16. **Protects Coastal Cities:** Geoengineering helps protect coastal cities because it prevents sea level rise, reducing the need for costly barriers and flood defenses.
17. **Reduces Wildfires:** Geoengineering can reduce wildfires because cooler temperatures and more regular rainfall make fire conditions less likely.
18. **Protects Water Supply:** Geoengineering helps protect water supplies because cooler temperatures mean less evaporation from lakes and rivers, preserving water.
19. **Enhances Biodiversity:** Geoengineering helps maintain biodiversity because it keeps habitats stable and prevents species from dying out due to extreme temperatures.
20. **Supports Fisheries:** Geoengineering supports fisheries because cooler oceans are better for many fish species that people rely on for food, ensuring sustainable fish populations.

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GEOENGINEERING (CON): General Ideas

1. **Doesn't Solve for Root Causes:** Geoengineering addresses the symptoms of climate change, such as high temperatures, but it does not tackle the root causes, like the burning of fossil fuels and deforestation. This means that pollution and greenhouse gas emissions will continue, potentially worsening other environmental problems. Relying on geoengineering might also reduce the urgency to adopt sustainable practices and technologies that are addressing the core issues.
2. **At Best a Temporary Fix:** The benefits of geoengineering might only last as long as the projects are maintained. For example, if we stop spraying particles into the atmosphere, the Earth's temperature could quickly rise again. This means geoengineering is not a permanent solution and might require continuous intervention, which is costly and potentially unsustainable in the long run. It also diverts attention and limited resources away from finding a more permanent solution to the climate change problem.
3. **Extremely High Costs:** Geoengineering projects can be extremely expensive to design, build, and maintain. For example, creating and launching space mirrors or deploying fleets of boats to spray seawater into the atmosphere requires significant financial investment. These high costs mean that only wealthy countries or organizations might be able to afford such solutions, potentially leading to inequality in who benefits from these technologies.
4. **Potential for International Conflicts:** Different countries might have varying opinions on how geoengineering should be used, leading to political disagreements and conflicts. For example, one country might want to implement a specific geoengineering technique that could inadvertently harm another country's environment or economy. These disagreements could escalate into international tensions or even conflicts, complicating global efforts to address climate change.
5. **Creating Unknown Side Effects:** We do not fully understand all the possible side effects of geoengineering. For instance, spraying tiny particles into the atmosphere could impact weather patterns, potentially causing droughts or altering rainfall in unpredictable ways. Additionally, there might be negative effects on human health and ecosystems, as these particles could interact with natural processes in unforeseen and harmful ways.

GEOENGINEERING (CON): Specific Ideas

1. **Unproven Technology:** Geoengineering is risky because it has never been tested on a large scale. We don't know if it will work properly or cause more problems.
2. **High Costs:** Geoengineering costs a lot of money because it needs expensive technology and materials. Many countries cannot afford it, making it unfair.
3. **Temporary Fix:** Geoengineering is only a temporary solution because it addresses the symptoms of climate change, not the root causes like pollution.
4. **Side Effects:** Geoengineering could cause unexpected side effects because changing the atmosphere might affect weather patterns in strange ways.
5. **Health Risks:** Geoengineering could harm people's health because particles in the air might cause breathing problems and other illnesses.
6. **International Conflict:** Geoengineering might cause disagreements between countries because they may not agree on how to use it, leading to political problems.
7. **Environmental Damage:** Geoengineering could harm the environment because it might disrupt ecosystems and hurt animals and plants.
8. **Waste of Resources:** Geoengineering uses resources that could be better spent on renewable energy and other solutions to fight climate change.
9. **False Security:** Geoengineering might make people feel too safe because they might think it's a complete solution, reducing efforts to cut emissions.

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GEOENGINEERING (CON): Specific Ideas (*Continued...*)

10. **Limited Effectiveness:** Geoengineering might not solve all climate problems because it doesn't address issues like ocean acidification.
11. **Dependence on Technology:** Geoengineering makes us depend on technology because it needs constant updates and maintenance to stay effective.
12. **Inequality:** Geoengineering might benefit rich countries more because they can afford it, leaving poor countries to suffer more from climate change.
13. **Distraction from Solutions:** Geoengineering might distract us from real solutions like reducing emissions and using renewable energy.
14. **Unknown Long-Term Effects:** Geoengineering has unknown long-term effects because we don't know how it will impact the planet in the future.
15. **Difficult to Implement:** Geoengineering is hard to manage because it requires cooperation between many countries, which can be very complicated.
16. **Encourages Risky Behavior:** Geoengineering might make people take more risks because they might think we can fix any climate problem easily.
17. **Technical Failures:** Geoengineering could fail because the technology might not work as planned or could break down unexpectedly.
18. **Economic Waste:** Geoengineering might waste money because the high costs may not be worth the benefits, especially if it doesn't work well.
19. **Public Worries:** Geoengineering might face opposition because many people are worried about its risks and potential negative effects.
20. **Ethical Concerns:** Geoengineering raises ethical questions because it involves changing the Earth's natural systems in ways that could have unknown consequences.