

The Global Warming Projects

by Redwood Coast Montessori High School

Three student projects designed to create a better understanding of global warming and how to begin to generate change.



Project Launch: Found Trash Mandalas

Students worked in groups and participated in a community clean-up to create mandalas and essential questions that lead to three different projects.



The Projects on Global Warming: Art, Diplomacy, Language

Art: Students create a public art installation, using found plastics in order to call attention to the stress on the Pacific ocean.

Diplomacy: Examining the Kyoto Protocol and the Paris Agreement, students created a supplementary document specifically for helping California meet greenhouse gas emissions targets.

Language: With the linguist George Lakoff's point that we have the wrong frames in place to understand and respond to the crisis, students created 5 different frames, creating a response to the question about what arguments can matter in the Global Warming debate.

Recycled Reef

A public art installation created by RCM students.



Recycled Reef, 2021
Found Plastic

Project

The RCM High art class created a public art installation to call attention to the detriments of pollution in our oceans. The sculpture is made of plastics that were saved from the Power Poles Beach in Samoa, community cleanups and students' garbage cans. The class created a beautiful ocean reef out of trash to signify that there's still hope to change our ways and curb climate change. If we continue on our current trends the amount of trash in the ocean by 2050 will out number the amount of fish. Such devastation will only get worse. Please try to educate yourselves and others on ways to properly recycle, dispose of trash, along with any way you can make a difference. Thank you

Located on the Pedestrian/Bike path in Arcata between 8th St. & Samoa Blvd.

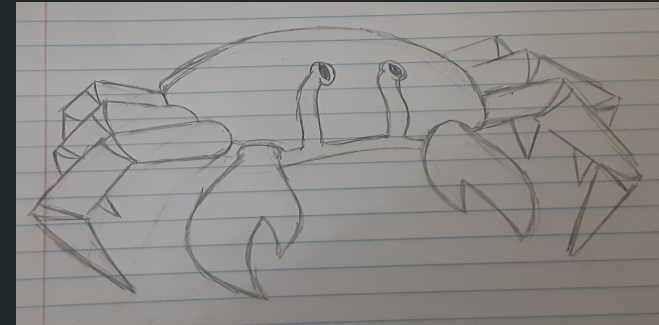
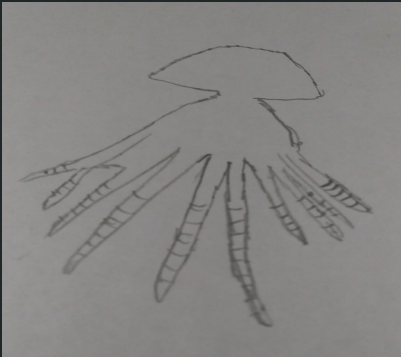
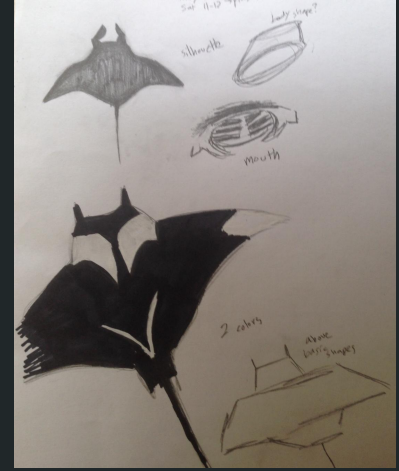
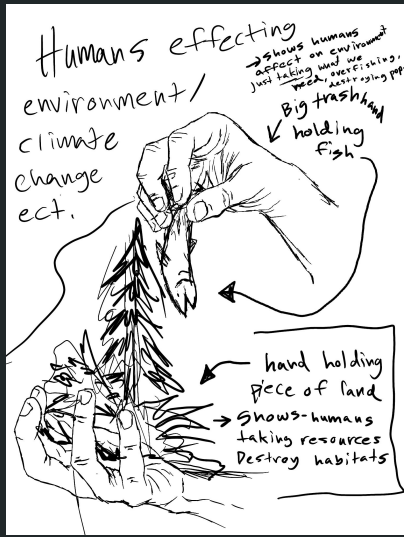
Process Gallery

Beach Clean-Up & Plastic Gathering



Process Gallery

Project Designs



Process Gallery

Final Project Work



Finished Artwork



Redwood Coast Montessori High, *Recycled Reef*, 2021,
Found Plastic

The Truth about Recycling and Ocean Plastics

Facts

- The average recycling contamination rate is 25%, or 1 in 4 items.
- The Environmental Protection Agency estimates that 75% of waste is recyclable, yet only close to 34% of it is recycled.
- The three-arrow triangle symbol on plastics does not necessarily indicate that the material is accepted in the local recycling stream. The symbol also shows the type of plastic it is. Plastics labeled #3 – #7 are typically only recycled in limited areas.
- Unlike plastic, glass and aluminum will always have a decent recycling market because both materials can easily be made into new packaging.
- It is estimated that 8 million tons of plastic enter the ocean annually.
- 10% of ocean litter is made of fishing gear such as nets, traps and lines. 500,000 - 1 million tons of fishing waste are estimated to enter our oceans every year.
- Approximately 46% of the 79 thousand tons of ocean plastic in the Great Pacific Garbage Patch is made up of fishing nets.
- Other commonly found ocean plastics include cigarette butts, food wrappers, beverage bottles, straws, cups and plates, bottle caps, and single-use bags.
- The number of species affected by either entanglement or ingestion of plastic debris has doubled since 1997, from 267 to 557 species. 66% of marine mammals, 50% of seabirds, and all 7 species of marine turtles.
- An estimated 30% percent of the decline in some fish populations is a result of discarded fishing equipment, while more than 70% of marine animal entanglements involve abandoned plastic fishing nets.

Wishful Recycling in Humboldt County

- Not all paper and plastics are recyclable. 25% of Humboldt County's Recycling is trash; such as clothing, garden hoses, laundry baskets, amazon packing slips, plastic bags, soiled paper, waxed paper, shredded paper, juice boxes etc.
- No one will clean it or sort it for you. Recyclables must be clean and dry or the entire bail may be thrown into the landfill due to contamination.
- Recology can pull 200 pounds of garbage off the recycling line in a 15-minute shift. This costs time and money resulting in price increases for customers.



What You Can Do

- Reduce your overall plastic use from purchasing sustainably to reusing as much as possible.
- Reduce wishful recycling.
- Don't put recyclables in plastic bags.
- If it seems like it could get tangled (think garden hoses, wire hangers, strings of lights) it shouldn't be recycled.
- Buy in bulk to limit containers.
- Choose aluminum or glass instead of plastic containers.
- Consume only sustainably sourced fish.
- Volunteer for a community cleanup or beach cleanup.





Addressing Climate Change Locally



PBL 2021



Questions At Issue

How can we get companies to reduce their emissions? - Orrin

What are some factors that make it hard to slow climate change? - Orrin

How have companies avoided working to reduce their emissions? - Orrin

Should climate change be the first problem on a politicians agenda? - August

What legal efforts have there been in the past to curb corporations environmental effects?
- Eric

What are roles citizens can play to stop the curve of climate change? - Aidan

What are laws and restrictions involving climate change America is lacking compared to other countries? - Aidan

How can we get corporations to reduce their effect on the environment? - Ian

Why haven't previous efforts to curb climate change worked? - Ian

Creating An Agreement or Protocol

Focus on Arcata, Humboldt, California, or the United States

What are the goals for the chosen area?

When is the deadline for those goals?

Who is involved in meeting the goals?

How do we meet those goals?

The Project

For our project we looked at some previous climate change protocols (e.g., the Paris Agreement) and talked about what we thought did and did not work. We did this to see examples of what our own protocol might look like and to see what actions had been taken in the past. Using the information about what actions had been taken and why some of the protocols failed, we split up to research different topics allowing us to have more diversity in what topics we could discuss and add to the protocol. We decided to create this protocol to inform and give examples about climate change and some of the things that are affecting it. We decided to generally focus on California for this protocol; so we didn't get too general or too specific for the information to be useful.

5 Frames Global Warming 2021

Redwood Coast Montessori

Creating Change: What arguments matter?

This project idea results from the Questions at Issue students generated about how to insure change and effectiveness of policy/actions.

Metaphor

Frog in the Pot

The frog in the pot metaphor is the idea that if you put a frog in a pot of boiling water it will jump out. However, if you put a frog in a pot of cold water and slowly heat it up, the frog will stay in the pot until it dies.

Doomists

Doomists function under the idea that since the world is going to continue to warm, there is no reason to try and stop it, because the outcome will be the same. They are comfortable sitting in the pot until they die.



Climate Activists

Climate Activists understand that global warming is a major threat, and if we take immediate action we can prevent some of the severe long term effects. They are trying to get out of the pot or turn down the heat.



The reason I made these frames how I did is because I connected with them. If people want to do something about global warming, they need to make a connection.



The tragedy of the commons is not about use of resources, it is about abuse of them.



What is a metaphor that best describes Global Warming?

A metaphor that best describes Global Warming is “Man Child”. This is connected to ignorance because it is the lack of knowledge or education. It is an example of our current climate change crisis.

A percentage of people are not aware or do not care about this, and some are plain irresponsible about it. A term we can use for these people are “Man Children”. Essentially, these are the people who are irresponsible and have a lack of knowledge.



This metaphor connects climate change with us being children because we did not see the outcome of using machines powered with fossil fuels. It was our irresponsibility that led us to this man-made crisis. And we are acting like children. Only some people have taken recognition and have started to help the environment. Even some countries have dedicated themselves to trying to help the world. There are, however, countries that give an example of ignorance.

A House on Fire: A Metaphor for the World and Global Warming



In this metaphor, the house is Earth, and the fire is caused by increased greenhouse gases being trapped in the atmosphere. The metaphor asks the audience to treat the climate crisis with the same agency and urgency they would have if their house was burning down.

- Metaphor works because the Earth “houses” all of humanity;
- The metaphor addresses the subject in a way that is not inherently political-- saving a home is universal, because generally, everyone is tied to a sense of home;
- Introduces the general concept of global warming;
- Takes a step towards moving the audience towards more urgency and agency, but there are pre existing frames and psychological effects that still work against the metaphor.

Issues:

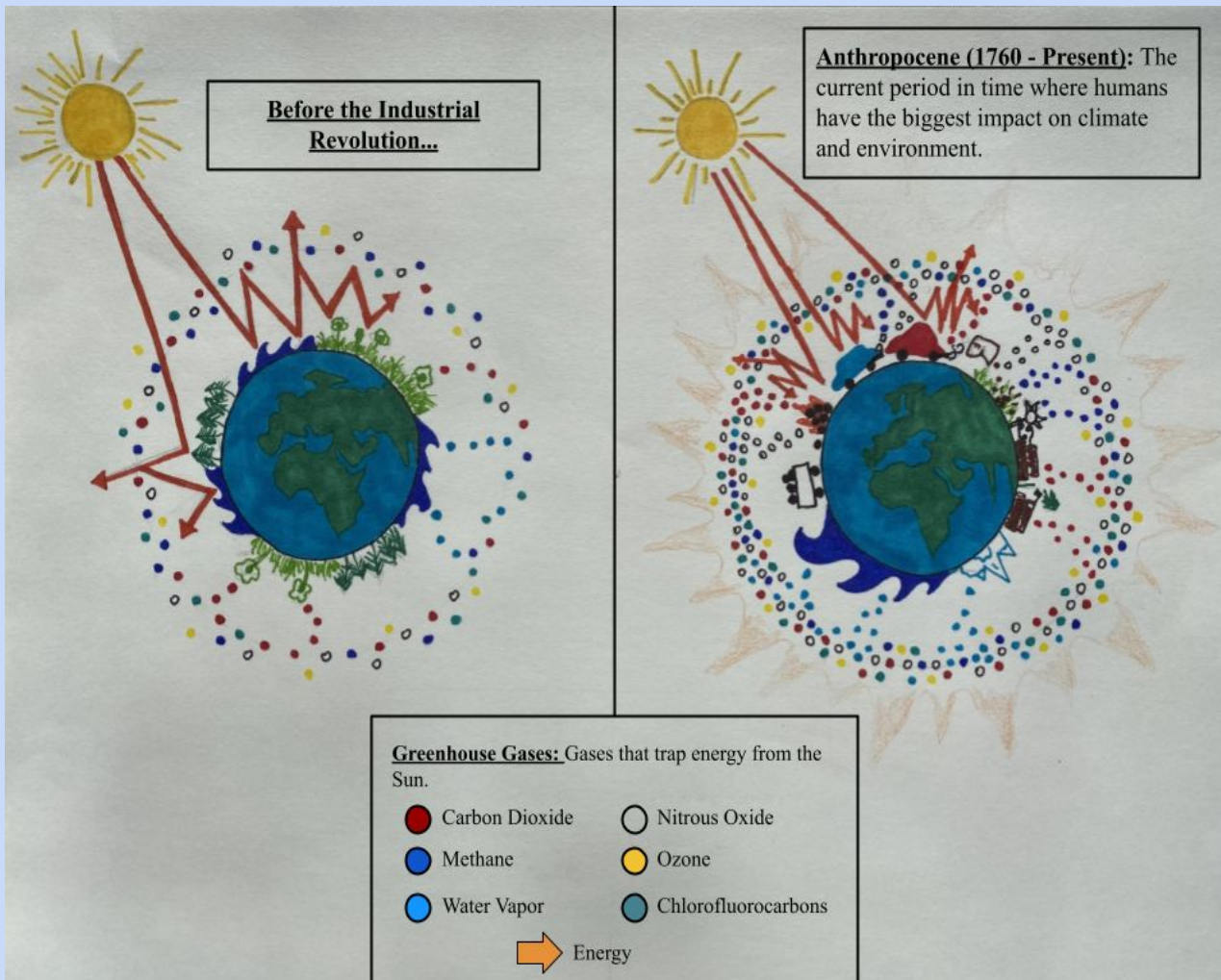
- Many people don’t consider their “house” to be on fire-- or because their “house” isn’t on fire (at the moment);
- Everyone wants to believe that if there was a crisis, they would be the person to run in and help in any way possible, but the truth is that it is simply not true due to the bystander effect, a psychological effect where individuals are unlikely to offer aid if there are others present; the thinking being that someone else will step in. The result is a mass cancellation of action-- since all the bystanders think this, no one moves.

Solutions:

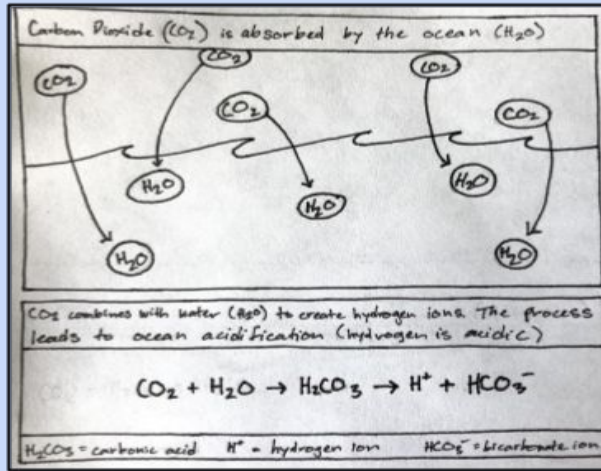
- The audience must be met wherever they are (politically, linguistically);
- Debate must be approached as conversation rather than a battle (where winning means bending the other to your argument, and losing means surrendering your views);
- Metaphors can be viewed as a introduction to a subject; as a way to try to help the audience understand a personal perspective, and a method to try to understand the audience’s perspective, rather than a way to force a different perspective to agree with points provided in a personal argument.

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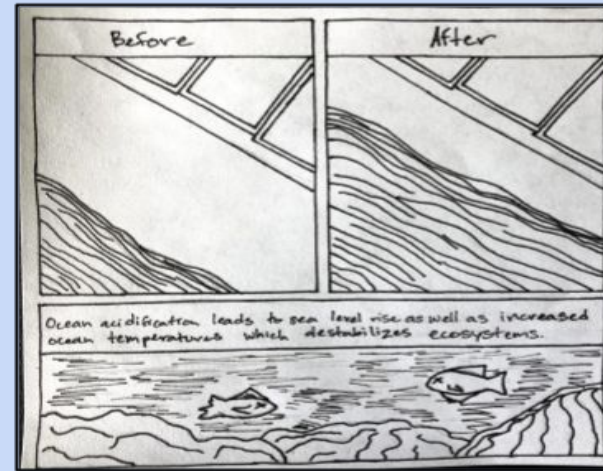
Key Terms



Global Warming and the acidification of oceans:



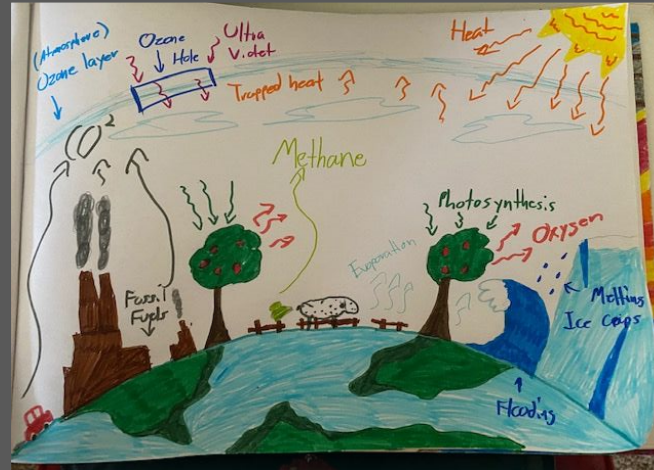
- **Carbon Dioxide (CO_2):**
 - primarily formed/released in a gaseous form from the burning fossil fuels (oil, coal) and land-use change.
- **Hydrogen Ions (H^+):**
 - hydrogen ions acidify water-- in chemistry, when the goal is acidification, the number of hydrogen ions are increased.
- **Ocean Acidification:**
 - Increased ocean acidity makes it harder for organisms such as shellfish and coral to build skeletons/shells. Their decreased ability to do so, in turn, affects the "biodiversity and productivity of the ecosystems."



- **Sea Level Rise:**
 - More greenhouse gases being trapped in the ocean result in increased water temperature as well as increased sea level (meaning more water available to take in more water)
 - Wetlands and other low-elevation ecosystems and cities can become open water due to coastal flooding-- destabilizing and/or displacing the populations established in those areas.
- **Increased Ocean Temperatures:**
 - Changes in ocean temperature (warmer waters) can lead to the development of stronger storms (hurricanes and such) that would otherwise only happen in tropical areas.

How is the Anthropocene the correct term for the current age?

- According to Paul Crutzen, The Anthropocene is the correct term for our current age because this is the age where humans have the biggest impact on the Earth. The amount of emissions from humans is 2 to 3 times more powerful than the natural emissions from nature.



<https://socratic.org/questions/how-do-greenhouse-gases-trap-heat#:~:text=Explanation%3A,radiation%20to%20pass%20through%20it.&text=Much%20the%20same%20way%20that,from%20the%20ground%20from%20escaping>

- Greenhouse gasses have the ability to trap heat because they allow visible light and a short amount of radiation to pass through. They also contribute to respiratory illnesses and diseases from smog and contaminated air.
- Extreme Weather, Food supply, and increased wildfires are also resulted by these greenhouse gasses and climate change
- Greenhouse gasses: Carbon Dioxide, Methane, Nitrous Oxide, Water Vapor, and Ozone



Greenhouse gases affect climate change in one major way. Enhancing heat. The usage of coal and other fossil fuels has lead to an excessive amount of greenhouse gases being released into the air, which causes warming. A good representation of this would be how extinguishing a cigarette carelessly can cause for a fire to start. Another good representation of how greenhouse gases could affect the environment would be how droughts have taken california over lately.

The background features a dark blue field with several geometric shapes in various shades of blue and green. In the top right corner, there are overlapping triangles and squares in light blue, medium blue, and dark blue. A large, solid green rectangle is positioned horizontally across the middle of the image.

Audience

Global Warming: A Conversation or a Debate?

In the article *Why it Matters How We Frame the Environment*, George Lakoff writes, "Many people have in their brain circuitry the wrong frames for understanding "the real crisis." That is, they have frames that would either contradict the right frames or lead them to ignore the relevant facts. Those wrong frames don't go away. You can't just present the relevant facts and have everyone erase significant circuitry in their brains. Brains don't work that way."

Opening a conversation about global warming can quickly deteriorate into arguments, especially if the parties involved share different political views. While the subject matter is not explicitly political, the solutions and ideas involved have become so. Viewing the subject matter as a debate does not help the case, because then there is then a winner and a loser, where winning means bending the other to your argument, and losing means surrendering your views-- therefore debate pushes people apart, rather than bringing them together.

The solution Lakoff posits is, "a constant effort to build up the background frames needed to understand the crisis, while building up neural circuitry to inhibit the wrong frames"-- i.e. there must be work done to (1) provide the correct information necessary to understand global warming; and (2) to reframe the way that another party views the subject. This method is a way to connect with another viewpoint while helping them understand the viewpoint that you are operating under.

While this method applies to everyone, the audience I'm intending to reach are liberal/progressive individuals who are looking for methods to actively engage in meaningful conversation about global warming with both those who share their perspective and those whose perspective may differ.



Key points:

- Approach the subject with conversation rather than debate.
- Learn before speaking (any argument must consider the past frames the audience operates under and you should be able to provide true information when reframing).
- Remember to meet the audience where they are.
- Ask questions and make sure that you fully understand their argument in their terms.
- Prioritize listening over speaking-- focus on understanding what they're saying (not how you're going to come back). Then the argument can be deconstructed using the pre existing frames from the other party.
- Focus on reframing over rebuttal. If correctly reframed, rebuttal will occur naturally without sparking conflict or defensiveness;
- Have patience.

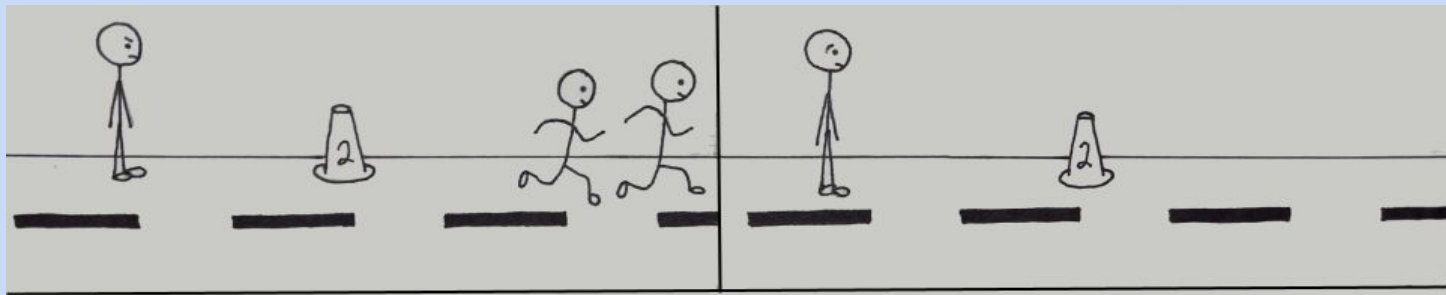
Who is my Audience?

People who don't care or think it's a hoax.

Most people don't recognize the situation. According to the Public Policy Voting Poll in 2013, 37% of people think that climate change is a hoax while 51% believe its true. People think that this is "government created". But there are conspiracy theories that are said to prove a different aspect on Climate Change.

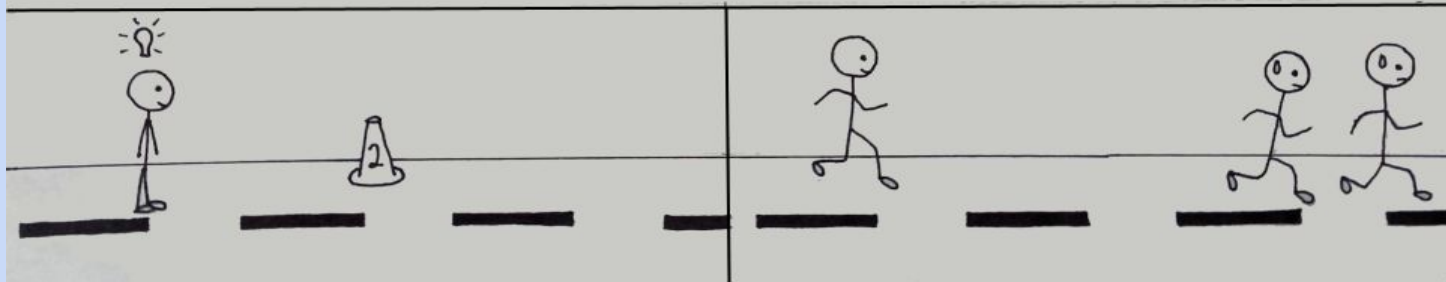
What Points do I want to give?

- I want to prove what is happening to the Earth
- I want to be able to tell people what the correct processes are to help slow down this crisis
- I want to provide factual information to people
- I want to prove that this crisis is not fake and that it is reality
- I want to show what a possible future is
- I want to show how wrong conspiracies are



Doomists

Doomists believe that the fight against global warming is futile. They believe there is no longer hope in stopping the drought, famine, extreme heat waves, air pollution, and other extreme effects that are predicted to come. Hearing the consequences of releasing greenhouse gases can seem scary or impossible to prevent. However, scientists have shown that if we take action now we can prevent some of them that are predicted to come in the next fifty to one hundred years. Think about combating Global Warming in terms of running a marathon. We aren't winning the race, so doomists are suggesting we just quit. Instead we need to finish, and work to pass a few people. In terms of fighting Global Warming, we continue to fight to limit the effects. Doomists need to finish the race because in order to lessen the effects of global warming all of us need to be working together.

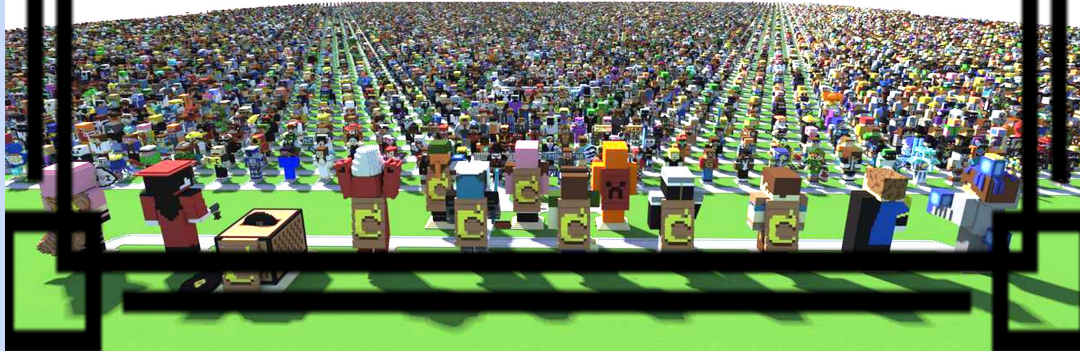


Who is my audience? What matters to them?

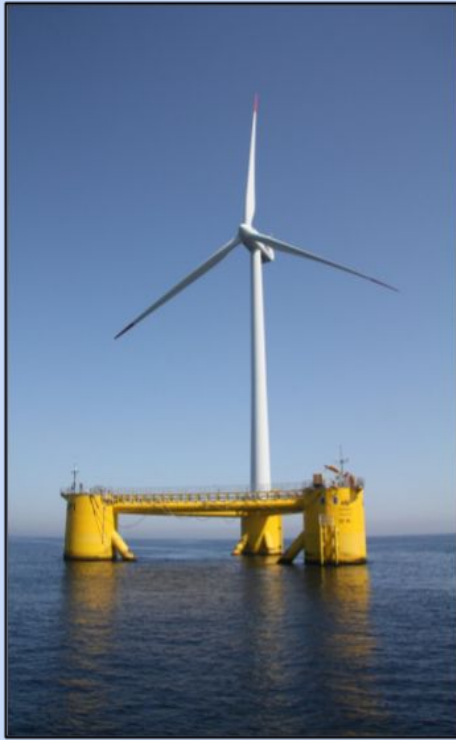
How can gaming help the environment?

-Spreading awareness through top streamers (Ninja, Tfue, xQc, etc.), gamers, (Hungrybox, s1mple, Shroud, Nadeshot) gaming companies, (Epic, EA, Valve) and major streaming platforms (e.g. Twitch & Mixer.) **This can be done through things similar to what popular youtuber MrBeast has done, where you create a website and collect donations to reach a goal.**

-Donating game sales to charities/non-profits to help the environment. **An example of this would be when Activision, the developers of Call of Duty: Cold War, helped veterans with profit from their in-game item sales.**



Impact Humboldt County



Per the U.S. Department of Energy.

The conflict is between weighing the need for larger clean energy projects and the chiefly unknown environmental effects of such developments. The traditions already established within the community must also be taken into account.

A Glimpse into Humboldt's Future: Wind Farms?

Humboldt County is particularly favorable for an offshore wind project due to the fact that it has docks to build the infrastructure, a coastal population and power-grid tie-in, and no obstructions to barges which would tow the wind floats from the docks out to the designated ocean area.

- The proposed project would place 10-20 wind turbines (600 feet tall) 20-30 miles off the coast of Humboldt.
- According to the National Renewable Energy Laboratory, the carbon dioxide (CO₂) emissions connected to wind projects (from start to finish) is averaged to be 11 grams of CO₂ per kilowatt-- the same or less than other similar forms of renewable energy.
- The introduction of wind farms to the area could bring in new jobs as well as an increase in tourism, as the farm could serve as an attraction.

Yet such a monumental and ambitious project is not without its drawbacks, and must consider the traditions and people already established in the area:

- A 2019 proposal for a land-based wind farm was rejected after lengthy discussion because 20 of 47 proposed turbines would be situated on Bear River Ridge, a sacred ancestral prayer site of the Wiyot Tribe called Tsakiyuwit.
- The area where this farm would be built has *rarely* been the subject of wildlife research-- the long terms effects of the wind farm on bird migration and marine life are unknown.
 - The wind farms could form predator traps-- algae would grow on the barges, attracting fish populations, which would then attract predators who would not leave the area.
- The issue is that research in the projected area cannot be conducted until the proposal for the wind farm is approved.

The last nuclear power plant in California is scheduled to be shut down in five years, so the cons of wind farms may eventually be outweighed, simply by the fact that we are running out of time.

What is Humboldt's biggest effect due to Climate Change?

- Sea level rise and Flooding has the biggest effect on the Humboldt Bay
- Along the California Coast, sea level is expected to rise 16 inches by 2050
- The 100 year Flood Plain shows that Multiple parts of Humboldt will be affected.
- 240 roads and 58 miles of highway 101, will be underwater.

- 7,800 residence will be affected by flooding in the future.
- 1.4 billion dollars of property will be damaged or destroyed due to flooding.
- Along the California Coast, sea level is expected to rise 16 inches by 2050
- Approximately 350,000 acres from California's critical wetlands will face flooding from sea level rise
- There is some good news, the wetlands will not be completely gone, they will migrate inland

<https://www.humboldtbaykeeper.org/humboldt-bay-information/bay-issues/305-climate-change-impacts-sea-level-rise>

Impact of Sea Level Rise on Humboldt County



Lost Coast Outpost: Laird's Estimate on Water Levels in 2120

Sea level rise is very dangerous for areas around Humboldt Bay. One reason is that a tectonic plate below the bay continues to sink as the sea level continues to rise. Furthermore, 75% of the shoreline is not natural. 41 miles of dikes that were created in the 1800's exist around the bay. These dikes are protecting saltwater marshes, residential areas, and highways. If the dikes are overrun by the rising sea level, it is very likely that all of these areas will be at risk. It is predicted that by 2050 the water could rise up 2-3 feet. Aldaron Laird, who has been studying sea

level rise in regards to Humboldt Bay, explains that even an extra foot of water could cause the King Tides to cover the dikes. We have already seen something like this happen before. A storm in 2005 blew in at the same time as the King Tide, and many of the dikes were overpassed and had to be repaired.

Areas at Risk with Sea Level Rise

- Residential Areas (King Salmon Communities, Fairhaven, Fields Landing)
- Highways
- Saltwater Marshes
- PG&E Power Plant storing old Nuclear Waste

Another potential hazard with the sea level rising is the nuclear waste sitting at an old PG&E power plant. The plant was set up around 60 years ago but went offline in 1977. Unfortunately, the decommission cost is \$382million. While taxpayers have been contributing to the fund to follow through with this, the price has risen to \$1billion. While a lot of the plant has been taken down, six casks of nuclear waste still remain at the site. Due to climate change it is very likely that these casks will be under sea level in the near future.

Facts that Stick

Global Warming: Ideas and Intention vs. Reality and Action

The environment is not inherently political; it has been made so. The conflict that has risen (due to the politicalization of the environment) between facts, personal/political views, and action has created another conflict-- one where there are many ideas coming from different intentions that do not quite line up with realities and action.

In the book *The New Climate War*, one of the world's foremost-known climate scientists and Pennsylvania State University, Michael Mann, addresses the failings of personal actions as a method to effectively tackle global warming-- a solution that was once considered crucial to tackling global warming.

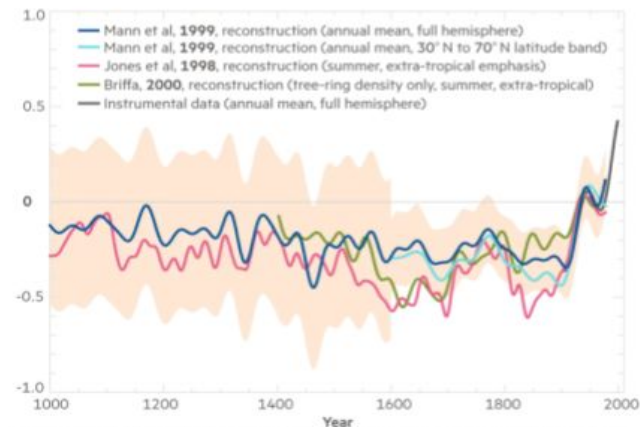
The problem with focusing on individual behavior rather than "broad, systemic measures" such as carbon pricing (putting an actual price on carbon emissions to push production and consumption towards lower-carbon emission choices) is that altering individual behavior is nothing compared to the immediate impact of corporations cutting their carbon emissions.

Not only that, but focusing on individual behavior creates the illusion of progress-- suggesting that because there are many individuals helping in little ways, the situation is better. This focus on individuals distracts from the real problem-- corporations. Corporations benefit from blaming people because it distracts them from their own actions. People are also able to write off their own behavior because of minimal actions such as buying an electric car or eating vegan.

Mann refers to these individual actions and focus on such actions as a part of the new war on climate; what was once an outright war on the science behind the argument for global warming, has become "soft denialism" where "inactivists" use denialism, deflection, and distraction together to slow cuts in emissions.

Mann's hockey stick: a chart that shook the world

Northern Hemisphere anomaly relative to 1961 to 1990 (°C)



Source: 'Observed Climate Variability and Change' by Michael Mann, et al, for the Intergovernmental Panel on Climate Change, 2001
© FT

*The shaded area represents the standard error limits

The Hockey Stick -- a chart created by Michael Mann and two colleagues which showed that while climate temperatures had fluctuated slightly for centuries, they skyrocketed drastically after the industrial revolution where demand and use of burned fossil fuels increased.

The Long Game -- While charts like the hockey stick are important because they provide evidence, what is now needed is a connection between evidence and action.

In order for this to happen, people must address their own soft denialism. They must reframe the arguments about global warming. People must then refocus their efforts into pressuring corporations and the government into the broad, systemic solutions that will result in faster, long-term impacts.

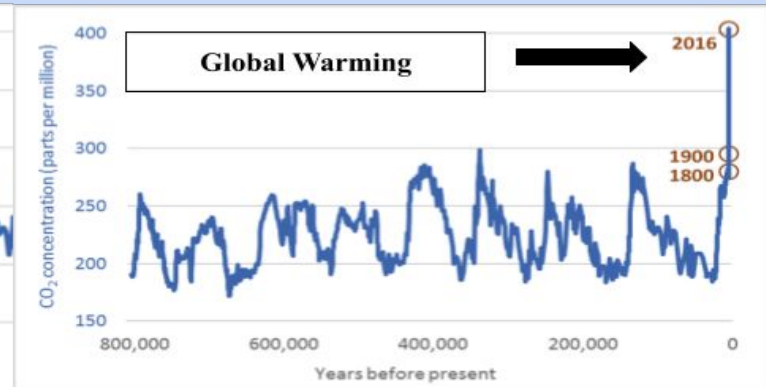
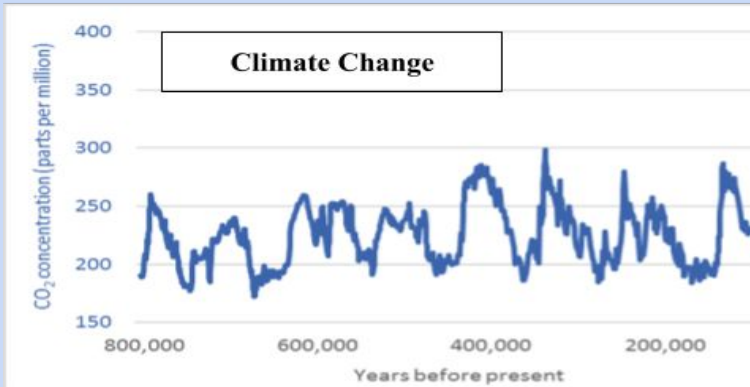
Stop Addressing Climate Change

We need to stop addressing Climate Change and instead address Global Warming. While we have been using these two words to address the same issue, only one of them gets at the main danger which is that the Earth is warming. The word Climate Change does not bring to mind the threat of drought and disease, Global Warming does. Climate Change is natural, Global Warming is not. A man named Frank Luntz made the word Climate Change popular. His goal was to make the idea of Global Warming less scary. However, Global Warming is supposed to be scary; it's supposed to initiate action.

Two of the actions we need to take:

1. Begin moving away from oil-based foods and start producing sun-based foods.
2. Better education for women, specifically about contraception.

One of the actions we need to take is moving away from oil-based food and begin producing sun-based foods. The majority of food in the US is oil-based, which contributes to global warming. Many people don't know this and we need to begin integrating these terms into the frame of global warming. I mean that people should think of the terms oil-based and sun-based food when the words global warming comes up. To begin working towards sun-based foods we need to globalize localism, growing food locally. To do this we need better population control which means better education for women especially about contraception. Women's education is more important information that needs to be added in the frame of global warming.



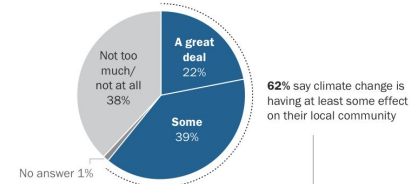
Three Point of view on Climate Change

- About 4/10 Americans expect harmful effects from climate change on wildlife, shorelines and weather patterns.
- However, many are optimistic that policy and individual effects to address climate change.
- A narrow majority of Americans rely on technological answers or solutions to climate change
- 61% percent of people believe that human life style will change in the next century

[Source](#)

A majority of U.S. adults say climate change is affecting their local community at least some

% of U.S. adults who say global climate change is affecting their local community ...



Among this 62%, percent who say each of these is a major way that climate change is currently affecting their local community



Note: Top figure based on all adults. Bottom figure based on those who say that climate change is affecting their local community a great deal or some.

Source: Survey conducted Oct. 1-13, 2019.

"U.S. Public Views on Climate and Energy"

PEW RESEARCH CENTER