

Forum:*Forum name*

Issue: *Topic in* ***exact phrasing***
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1. **Introduction**

 *Global warming, the gradual heating of Earth's surface, oceans and atmosphere, is caused by human activity, primarily the burning of fossil fuels that pump carbon dioxide (CO2), methane and other greenhouse gases into the atmosphere. Since the industrial revolution, human actions have caused average global temperatures to rise by almost 1°C. Levels of carbon dioxide and other heat-trapping greenhouse gases in the atmosphere are higher than they have been at any point in human existence and are still increasing. People and nature worldwide are already feeling the effects: water supplies are shrinking, extreme weather events increasing in frequency and intensity, forests burning, and coral reefs dying.*

 *As greater carbon dioxide concentrations released into the oceans, this results in increased ocean acidity. As ocean acidity increases, phytoplankton is reduced. This results in fewer ocean plants able to convert greenhouse gasses. Increased ocean acidity also threatens marine life, such as corals and shellfish, which may become extinct later this century from the chemical effects of carbon dioxide.*

 *One of the primary manifestations of climate change so far is melt. North America, Europe and Asia have all seen a trend toward less snow cover between 1960 and 2015. Ice is melting worldwide, especially at the Earth’s poles. This includes mountain glaciers, ice sheets covering West Antarctica and Greenland, and Arctic sea ice. In Montana's Glacier National Park the number of glaciers has declined to fewer than 30 from more than 150 in 1910. Much of this melting ice contributes to sea-level rise. Global sea levels are rising 0.13 inches (3.2 millimeters) a year, and the rise is occurring at a faster rate in recent years.*

1. **Definition of Key Terms**

*Fossil Fuels*

*A fuel that is naturally found such as gas or coal, and is formed using the geological pasts of the fossils and remains of multiple organisms.*

*Industrialization*

*The development that a country or a region goes through in terms of bettering their industries.*

*Average Global Temperatures*

*The average temperature of the entire earth’s surface.*

***Ocean Acidity***

*The increase of acids in the water of the ocean.*

***Manifestations***

 *An action or an object that visibly proves and shows something that is theoretical.*

***Infrared radiation***

*The electromagnetic radiation where wavelengths have a range of about 700 nanometers to 1 millimeter.*

***Ultraviolet radiation***

 *The electromagnetic radiation where wavelengths are around 400 nanometers. It is present in sunlight.*

1. **General Overview – Background information**

Temperature increase world wide:

*Our earth has been from many years ago, and still is, heating up slowly yet constantly. Every year, when the global average temperature is measured, it is always higher than it was the year before. The last time the global average temperature was measured was just last year, showing that our world is currently at 15 C. This temperature is higher than it should be, which raises many concerns. Scientists are now questioning the stability of the earth, since the side effects of this temperature increase can be unpredictable and harmful to many levels. This is called global warming, which is the most prevalent type of climate change.*

What causes this temperature increase?

*The reason behind this issue is completely human based. Research that is dated all the way back to the late 1700’s to early 1830’s shows that global warming actually became more of an issue then. This is due to the fact that the industrial revolution begun, and ended in that period of time. The industrial revolution is defined as the major changes in manufacturing. Many new ways of living were introduced, such as the burning of fossil fuels for heat and for the use of new machinery, new sources of energy were found and better ways of transportation were created. In much simpler terms, the industrial revolution was the beginning of our worlds rapid development and industrialization. This industrialization made our lives way easier as it provided us with everything we needed to live a stable life every single day as industrialization mostly revolves around improved food production, increase in job opportunities, more resources available for us to use and so much more. As much as industrialization contributes to a better living, it affects the environment in ways unimaginable having one of the most unfortunate side effects being global warming.*

*The cause for Global warming has been generally agreed to be the emission of greenhouse gases into the atmosphere. Greenhouse gases are gases that captivate infrared radiation which ultimately results to the heating of the earths surface. These greenhouse gases include methane, nitrous oxide and most commonly, carbon dioxide. (CO2) These gases are emitted through the burning of fossil fuels. Fossil fuels include coal, natural gas, petroleum, heavy oils etc. And are all used in our day to day activities. Such as driving our car from place to place, etc. All of these require energy, and all of this energy is derived from the burning of fossil fuels. With the increase in population, the more needs there are that need to be met. This will lead to more and more of the consumption then burning of fossil fuels, all in all leading to the increase in greenhouse gases such as carbon dioxide which will increase the earths temperature in the long run.*

What is the greenhouse effect:

*The earths atmosphere acts as a shield, surrounding the earth from all sides and is made up of a mixture of different gases. Just like an umbrella, this layer protects us from the harmful radiations from the sun.*

*Earth is constantly being flooded with enormous amounts of radiation from the sun which we receive in the form of light, and heat energy. These radiations come in two forms; ultraviolet and infrared rays. These rays have to pass by the earths atmosphere before reaching the surface of the earth. The ozone layer, which is present in the earths atmosphere blocks some amount of harmful ultraviolet rays reaching the surface. As for the remaining rays, part of them is absorbed by the earth, and some, especially the infrared rays are reflected back into space. But some gases in the atmosphere trap this heat radiation and re emits it to the surface, not allowing it to exit, which leads to heating up of the environment. About 26% of the radiations is reflected back into space, and 19% is absorbed by the atmosphere and clouds. Most of the remaining energy, which is around 55% is trapped in the surface of earth.*

*This exchange of incoming and outcoming radiation that warms the earth is referred as the greenhouse effect. This process gets its name from a normal greenhouse. A greenhouse is a glass building where plants that need protection from cold environments remain and grow. The glass building there traps heat inside the house to act as a hot environment for the plants. That process is really similar to what is happening to our earth. The atmosphere acts as the glass and traps the heat.*

*The natural greenhouse effect is essential in order to keep our planet warm. In the absence of this effect, we would not be able to survive. However, just like in a greenhouse, if the plants receive excess heat, it would burn. If you consider planet earth over the last two centuries, human activities have changed the earths atmosphere and allow too much heat to be trapped. This excessive, and unnatural greenhouse effect causes the increase in the earths average temperature. The heat that is trapped in the atmosphere is shone down on every single area of the earth, such as land and bodies of water. These areas are heavily impacted, some more than others.*

How does the temperature increase affect marine organisms?

*In June of 2009, the world's oceans reached 17 degrees Celsius, their highest average temperature since they began recording data back in the 19th century. Ever since then, a temperature that high has not been reached. However, that doesn’t necessarily mean that in the near future it won’t happen. Especially since nowadays, global warming is increasing at a rate like never before. This extremely high temperature that our oceans and seas are facing poses many threats to not only the marine life, but to us as well.*

*As for the marine life, there is a one-celled plant that lives at the oceans surface called Phytoplankton. This plant is used by algae, which is a plant that produces food for other marine life, for photosynthesis: the process that discards the carbon dioxide and turns it into organic carbon and oxygen, which is safe for humans to inhale and feeds almost every ecosystem.*

*A study conducted by NASA shows that this plant is more likely to thrive and function properly in cooler oceans. As well as algae. This means, that both plants are incapable of surviving in our oceans today, due to the ocean warming caused by climate change. Phytoplankton and algae are now vanishing, and are decreasing in number, which affects animals such as whales and seals.*

*In addition to that, carbon dioxide is released into the oceans which makes the chemistry of the ocean change drastically. When a lot of the gas is inserted into the ocean, that creates greater carbon dioxide concentrations that are released into the oceans, thus increasing ocean acidity. Carbon Dioxide is a toxic gas, so when a heavy amount of it is in the ocean, the ocean is bound to become toxic. As ocean acidity increases, phytoplankton is reduced. This results in fewer ocean plants being able to convert greenhouse gasses. Not only that, but increased ocean acidity also threatens marine life, such as corals and shellfish, which may become extinct later this century from the chemical effects of carbon dioxide.*

*Coral, which is one of the leading sources for the ocean's food and living is also changing with global warming as a new process called, ‘coral bleaching’ emerges. Coral bleaching, the breakdown in the relationship between coral and algae, is also occurring with warmer ocean temperatures. Algae is the source for the coral’s particular color. When put in harsh conditions such as warmer surroundings, the coral stresses and releases this algae. This leads to the loss of color of the coral.*

*Higher ocean temperatures are also harmful for the marine animals. These animals have been living in the ocean for years now and are more than used to the cool temperature. When global warming occurs, the patterns that these animals are used to will change drastically. It can affect their health in many ways such as the fact that many of these marine animals depend on the cool conditions and nutrients in the ocean in order to reproduce. The animals inhaled the toxins found in the ocean or due to the extreme heat, people will more than likely get sick due to the consumption of those fish.*

The melting of Polar Ice:

*Polar ice is defined as permanent sea ice that is found in the Arctic and Antarctic. With increasing temperatures, this polar ice is melting, and melting really quickly. According to recent studies, this is causing Antarctica to shrink.*

*With the absence of this ice in our oceans, the elimination process of algae is speeding up, since algae too depends on the polar ice having it provide the cool temperature they need. Not only that, but the ice acts as a home and habitat for many animals such as seals, penguins, walruses, and the Antarctic krill, which is a small animal that acts as a food source for many of the seabirds in the ocean.*

*When polar ice melts, that causes the sea levels to rise. Sea levels are the level of the sea’s surface. These sea levels may rise by as much as 69cm over the course of 100 years, which poses a threat on the marine life as well as us individuals. Since, it increases the chances of heavy flooding. In fact, researchers found that sea levels have been increasing around 3.1mm annually.*

*When this ice is melted and sea levels rise, the amount of light reaching offshore plants and algae will be reduced, while the habitats that reside on the surface (costal habitats) will be flooded. Rapid sea level rise will likely be the greatest climate change challenge to marine life ecosystems, which is why we need to reduce this issue as soon as possible.*

1. **Major Parties Involved and Their Views**

France:

France takes one of the highest possible spots in the rankings of countries that are taking action to combat climate change and global warming, especially our affected oceans. Taking into consideration the Paris Agreement, which is a convention that brings all countries who signed it, (around two hundred countries) to take more measures to combat climate change and global warming. This agreement was the first of its kind in the aspect of global warming. Not only that, but in 2017, the minister for the Ecological and Inclusive Transition presented the governments climate plan. This plan takes place over five years, and has special requirements that need to be met by all government departments across the board. Such terms include ensuring that the Paris Agreement cannot be reversed, improving everyday life for all French citizens in ways such as developing clean mobility to everyone, like financial compensation that will encourage the citizens to replace the vehicles they have that do not meet the “Crit’Air” (Air Quality Certificate Standards) with a cleaner one. In addition to using energy more responsibly. Other terms include turning away from fossil fuels and committing to a carbon-neutral approach and scaling up international action on climate change.

Climate Action Summit by the United Nations:

The United Nations has an upcoming summit called “The Climate Action Summit” that is going to take place on the 23rd of September, 2019. The secretary general, Antonio Guterres has made some very clear statements regarding climate change and global warming, encouraging everyone to take action about the issue. His way of taking action was planning this summit, where he invites and encourages all global leaders to join and participate to reach a unanimous agreement on what can and what should be done about global warming. Guterres makes it clear that the aim of this summit is to reduce as much emissions by 2020 as possible, and in order to achieve this, governments, international organizations and local authorities will all be brought together to develop impressive solutions in six areas: “A global transition to renewable energy, sustainable and resilient infrastructures and cities; sustainable agriculture and management of forests and oceans; resilience to climate impacts, and alignment of public and private finance with a net zero economy.” (From the official United Nations website.)

China:

China is probably considered one of the most, if not the most heavily polluted countries there is. China is a major member in the business world; their production rates are sky rocketing which means that they have multiple up and running factories and mines. This means that they burn a lot of fossil fuels. In fact, air pollution due to coal burning is the leading cause of air pollution in the country. According to the National Education Association (NEA) China has consumed around 2.81 billion metric tons in just the first three quarters of 2017. This proves that China is one of the major contributors to the increasing of the earth’s temperature, which is why, China must do more in order to combat climate change. Yes, it is taking part in major events such as the Paris Agreement, but considering that it is one of the world’s biggest sources for air pollution that eventually leads to climate change, it should do more locally and internationally.

1. **Timeline of Events**

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| **Date** | **Description of event** |
| *1890-1940* | *Average surface air temperatures increase by about 0.25 °C. Some scientists see the American Dust Bowl as a sign of the greenhouse effect at work.* |
| *1940-1945* | *International World War II. Military grand strategy is largely driven by a struggle to control oil fields. Additionally, the US Office of Naval Research begins generous funding of many fields of science, some of which happen to be useful for understanding climate change.* |
| *1945*  | *US Office of Naval Research begins generous funding of many fields of science, some of which happen to be useful for understanding climate change.* |
| *1958*  | *Telescope studies show a greenhouse effect raises temperature of the atmosphere of Venus far above the boiling point of water.* |
| *1966* | *Emiliani's analysis of deep-sea cores and Broecker's analysis of ancient corals show that the timing of ice ages was set by small orbital shifts, suggesting that the climate system is sensitive to small changes.* |
| *1967*  | *International Global Atmospheric Research Program established, mainly to gather data for better short-range weather prediction, but including climate.**Manabe and Wetherald make a convincing calculation that doubling CO2 would raise world temperatures a couple of degrees.* |
| *1970*  | *First Earth Day. Environmental movement attains strong influence, spreads concern about global degradation.**Creation of US National Oceanic and Atmospheric Administration, the world's leading funder of climate research.*  |
| *1968*  | *Studies suggest a possibility of collapse of Antarctic ice sheets, which would raise sea levels catastrophically.* |
| *1974*  | *Serious droughts since 1972 increase concern about climate, with cooling from aerosols suspected to be as likely as warming; scientists doubt all theories as journalists talk of a new ice age.* |
| *1975*  | *Warnings about environmental effects of airplanes lead to investigations of trace gases in the stratosphere and discovery of danger to ozone layer.* |
| *1979*  | *First World Climate Conference adopts climate change as major issue and calls on governments “to foresee and prevent potential man-made changes in climate.”* |
| *1985*  | *First major international conference on the greenhouse effect at Villach, Austria, warns that greenhouse gases will “in the first half of the next century, cause a rise of global mean temperature which is greater than any in man’s history.” This could cause sea levels to rise by up to one meter, researchers say. The conference also reports that gases other than CO2, such as methane, ozone, CFCs and nitrous oxide, also contribute to warming.* |
| *1987* | *Warmest year since records began. The 1980s turn out to be the hottest decade on record, with seven of the eight warmest years recorded up to 1990.*  |
| *1991* | *Mount Pinatubo erupts in the Philippines, throwing debris into the stratosphere that shields the Earth from solar energy, which helps interrupt the warming trend.* *Average temperatures drop for two years before rising again. Scientists point out that this event shows how sensitive global temperatures are to disruption.* |
| *1992* | *Climate Change Convention, signed by 154 nations in Rio, agrees to prevent “dangerous” warming from greenhouse gases and sets initial target of reducing emissions from industrialized countries to 1990 levels by the year 2000.* |
| *1996* | *At the second meeting of the Climate Change Convention, the US agrees for the first time to legally binding emissions targets and sides with the IPCC against influential skeptical scientists.*  |
| *1997* | *Kyoto Protocol agrees to legally binding emissions cuts for industrialized nations, averaging 5.4%, to be met by 2010.*  |
| *2000*  | *IPCC scientists re-assess likely future emissions and warn that, if things go badly, the world could warm by 6°C within a century. A series of major floods around the world reinforce public concerns that global warming is raising the risk of extreme weather events.*  |
| *2001* | *The new US president, George W Bush, renounces the Kyoto Protocol because he believes it will damage the US economy. After some hesitation, other nations agree to go ahead without him.*  |
| *2007* | *The fourth Assessment Report of the IPCC places the blame for global warming firmly on humankind, estimates the cost of stabilizing greenhouse gases at $1830 billion, and calls for governments to begin planning adaptive measures.* |
| *2008*  | *The polar bear is listed on the US endangered species act, because of the risk to its habitat from climate change. Alaska threatens to sue over the decision. The World Conservation Union finds that thousands of species are at risk from climate change.**Barack Obama becomes president of the United States, promising increases in science funding, especially for climate change and energy technology. He appoints Nobel laureate winner and renewables expert Steve Chu as energy secretary.* |

1. UN Involvement, Relevant Resolutions, Treaties and Events:
* *Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts, 17 November 2017* ***(A/RES/73/232)***

*Due to the concerns raised by Parties on the increasing frequency and severity of climate-related disasters that have affected many countries, including heat waves, drought, floods, tropical cyclones, dust storms and other extreme weather events. This resolution highlights the urgent need to avert, minimize and address these impacts through comprehensive risk management approaches through early warning systems, measures to enhance recovery and rehabilitation.*

* *Towards the sustainable development of the Caribbean Sea for present and future generations, 10 February 2009* ***(A/RES/63/214)***

*The countries surrounding the Caribbean Sea have a high degree of vulnerability occasioned by climate change, climate variability and associated phenomena, such as the rise in sea level. Therefore, this resolution encourages efforts by the member states of the Association of Caribbean States to develop and implement regional initiatives to promote the sustainable conservation and management of coastal and marine resources, and recognizing the need to take the steps necessary to ensure the recognition of the Caribbean Sea as a special area within the context of sustainable development.*

The UN Intergovernmental Panel on Climate Change (IPCC):

*The Intergovernmental Panel on Climate Change (IPCC) was set up by the World Meteorological Organization (WMO) and United Nations Environment to provide an objective source of scientific information. In 2013 the IPCC provided more clarity about the role of human activities in climate change when it released its Fifth Assessment Report.*

United Nations Framework Convention on Climate Change:

*In 1992, its “Earth Summit” produced the United Nations Framework Convention on Climate Change (UNFCCC) as a first step in addressing the climate change problem. Today, it has near-universal membership of 197 countries. The ultimate aim of the Convention is to prevent “dangerous” human interference with the climate system.*

1. Evaluation of Previous Attempts to Resolve the Issue

The Kyoto Protocol:

*The increase in the number of disasters caused by global warming prompted the United Nations Framework Convention on Climate Change (UNFCCC) to establish the Kyoto Protocol, the first international treaty for reducing excessive greenhouse gas emissions , to mitigate global warming. To prevent harmful changes from global warming catalyzed by human activity, the Kyoto Protocol was signed in 1997 and enacted in 2005. The Kyoto Protocol is supported by most countries, many of which have striven to amend and update their domestic policies in response to global concerns and have passed voluntary legislation or ratifications based on domestic public opinion. Many countries have integrated various regional and domestic policies enacted before and after introduction of the Kyoto Protocol.*

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*In the image above, the carbon emissions from all Kyoto Protocol members are evident. The chart demonstrates just how quickly emissions came down after 1990. In fact by 1994, which was 4 years before the Kyoto Protocol was even open for signatures, members had already reduced emissions by 11.2%. This was already well ahead of the Kyoto Protocol target of 4.7% CO2 reduction by 2012.*

*Unfortunately, this drastic and positive change wasn’t due to the common efforts of the countries that were part of the Kyoto Protocol. This decline was due to the fact that in December 1991 the Soviet Union (USSR) formally collapsed. In the process it acknowledged the independence of the Republics of the Soviet Union. These newly declared independent states included Ukraine, Uzbekistan, Belarus, Armenia, Azerbaijan, amongst others.*

*Therefore, after the collapse of the Soviet Union there was a rapid decline in heavy manufacturing industries across Russia and the newly independent states. This collapse was particularly significant in Russia and Ukraine, the two largest energy consumers in this group. In conclusion, the Kyoto Protocol in itself wasn’t successful, but the ongoing events that occurred during the same time period resulted in the decline of Carbon Emissions.*

The Paris Agreement:

*A previous and currently ongoing attempt to resolve the issue at hand would be the Paris Agreement held in Le Bourget on the 25th of December 2015. The Paris Agreement is an international treaty that replaced the Kyoto Protocol to bring together all nations into a common cause to undertake ambitious efforts to combat climate change and adapt to its effects.*

*The central aim behind the Paris Agreement is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.*

*Unfortunately, studies have shown that as of 2017, none of the major industrialized nations were implementing the policies they had envisioned and have not met their pledged emission reduction targets.  According to UNEP the emission cut targets in November 2016 have resulted in temperature rise by 3 °C, far above the 2 °C of the Paris climate agreement.*

*As for the written agreement, it does not include any reference to eliminate the use of fossil fuels. Additionally, the absence of emissions from global shipping and aviation, and vague references to technologies and actions which may pave the way for false solutions with potentially social and ecological harmful implications. Overall, this agreement has not proven to be effective or successful.*

1. Possible Solutions

*To put an end to this tremendous problem, an effort by all contributing countries may be achieved through organizing a summit. The Summit will bring together governments, the private sector, civil society, local authorities and other international organizations to develop ambitious solutions in various different areas such as: global transition to renewable energy; sustainable and resilient infrastructures and cities; sustainable agriculture and management of forests and oceans; and resilience and adaptation to climate impacts.*

*Additionally, to restore the damages that have already been done to marine and coastal ecosystem, various measures may be taken such as building artificial structures such as rock pools that act as surrogate habitats for organisms. Through this method, living organisms in the oceans will not be affected by the loss of corals. Moreover, boosting the resilience of species to warmer temperatures through assisted breeding techniques.*

*Another important solution to this problem would be Improving human adaptation towards the environment. This may be achieved through governments introducing policies to keep fisheries production within sustainable limits, for example by setting precautionary catch limits and eliminating subsidies to prevent overfishing. Additionally, the government could set coastal setback zones which prohibit all or certain types of development along the shoreline can minimize the damage from coastal flooding and erosion.*

1. Guiding Questions
2. *What is Climate Change?*
3. *Why is Climate change a prominent problem for all living organisms?*
4. *How is Climate change currently affecting the planet?*
5. *What impacts will global warming have in the future?*
6. *What is my country’s foreign policy towards the issue at hand?*
7. *Will the actions we take today be enough to forestall the direct impacts of climate change?*
8. *Will taking action make our lives better or safer, or will it only make a difference to future generations?*
9. *Given that renewable sources provide only a small percentage of our energy and that nuclear power is so expensive, what can we realistically do to get off fossil fuels as soon as possible?*
10. *What are the measures that have already been taken to resolve this issue?*
11. *How far has the issue extended and worsened today?*

1. Appendices and useful links
2. <https://beta.washingtonpost.com/energy-environment/2018/11/27/countries-vowed-cut-carbon-emissions-they-arent-even-close-their-goals-un-report-finds/?noredirect=on>
3. <https://www.un.org/en/climatechange/un-climate-summit-2019.shtml>
4. <https://www.iucn.org/resources/issues-briefs/ocean-warming>
5. <https://www.unenvironment.org/resources/emissions-gap-report-2018>
6. <https://www.iea.org/geco/emissions/>
7. <https://www.bbc.com/news/science-environment-46347453>
8. <https://www.theguardian.com/environment/2019/jan/25/worrying-rise-in-global-co2-forecast-for-2019>
9. <https://www.carbonbrief.org/analysis-fossil-fuel-emissions-in-2018-increasing-at-fastest-rate-for-seven-years>
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