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### Chill Out Earth

Why are environmentalists boiling? The discovery and analysis of ice ages in the distant past has proven that climate indeed changes. Infact, it proves that not only does climate change regionally, but globally. According to historian Amber Pariona (2018), the Little Ice Age was a time of fluctuating oceanic pressure, changes in the ocean currents, reduced solar energy, frequent volcanic eruptions, and increased forest growth. Although scientists do not know for certainty what caused the ice ages, there were lasting effects; however, it seems like the next massive climate change does not involve snowy white flakes. Many scientists believe the Earth is burning up. According to Stanford scientist Stephanie Pappas (2017), global warming is believed to have started over 8,000 years ago, but has rapidly increased within the last century due to the Industrial Revolution. The Industrial Revolution introduced gas-emitting machines into everyday life. Although seemingly crazy at the time, Swedish chemist Svante Arrhenius, now Nobel Prize winner, tried to warn about the effects of solar radiation hitting the Earth, getting trapped within the atmosphere by gases then bouncing off as heat. Little did he know that his idea would still be controversial today.

Despite the fact that President Donald Trump expressed in a flagrant tweet that he believes global warming is a hoax (“Trump,” 2012), many scientists agree with Arrhenius that global warming does not only exist, but is occurring faster than anyone expected. Scientists’ hypotheses are based on signs around the world, it appears the earth is having a major meltdown.

According to NASA (2019), Earth's average surface area has increased around 1.62 degrees Fahrenheit. This may seem like a small, insignificant difference, but the last five years have been the warmest on record. Imagine the smoldering hot summer days when the sweat drips off the forehead and the only thought is attaining water at any cost. Imagine if it was just two degrees cooler? One degree cooler? Those seemingly small degrees would make a big difference to most. The deep blue oceans are also being affected by the climate change. According to NASA, the top 2,300 feet of water have also been absorbing heat (which has nothing to do with the contribution of human bladder relief). NASA's data shows an increase of more than 0.4 degrees Fahrenheit since 1964. Now to the bitterly cold and beautifully white ice masses. According to NASA's Gravity Recovery and Climate Experiment (1993-2016), Antarctica and Greenland lost an average total of 400 billion tons of ice per year ("NASA"). To put that into perspective, the largest animal on earth is the Blue Whale, which weighs a whopping 180 tons. Now imagine two of those giant creatures together. The earth has lost more than two Blue Whales' weights combined. Not only that, but NASA's research also shows that glaciers in the Himalayas, Rockies, Africa, Alaska, and Alps are retreating. This is causing the sea level to rise eight inches. Other signs are longer, intenser, and frequenter heat waves, plants flowering earlier and according to National Geographic (2019), wildlife is on the move. For example, the Antarctic western peninsula is 90% melted, causing the Adelie penguin species to migrate. Other animals such as foxes and butterflies are also moving farther or higher to live in cooler areas. These observations are leading scientists to believe that global warming is happening.

Trump, however, is still not convinced. He fired a tweet regarding the recent Midwest temperature drop saying, "In the beautiful Midwest, windchill temperatures are reaching a minus 60 degrees, the coldest ever recorded. In coming days, expected to get even colder. People can't

last outside even for minutes. What the h\*ll is going on with Global Warming? Please come back fast, we need you” (“Trump,” 2019). This is not his first mockery tweet though. Earlier this month he wrote, “Be careful and try staying in your house. Large parts of the Country are suffering from tremendous amounts of snow and near record setting cold. Amazing how big this system is. Wouldn’t be bad to have a little of that good old fashioned Global Warming right now” (“Trump,” 2019). Trump believes that the Earth will begin cooling again and the cold weather is proof of that. There are scientists like Jason Furtado (2019), an assistant professor of meteorology from the University of Oklahoma, who have something to say to Trump about his opinions. Furtado says, “One cold day doesn't suddenly mean that the general trend in global climate change is suddenly going to the opposite direction.” He later explains that in order to have actual opposite effects appear the causes of global warming need to be addressed now (“Paul”). Many climate scientists agree that the central cause of global warming is, in fact, us. “Us” meaning, humans increasing their attribution to the greenhouse effect. The greenhouse effect, explained earlier, is the atmosphere’s capability to trap heat that radiates from Earth (see Figure 1). This heat is primarily trapped in by gases such as water vapor, nitrous oxide, methane and carbon dioxide. There are other possible causes of global warming like sun variability and deforestation, but greenhouse gasses are looked at as the number one manageable contributor.

Why are scientists so worried about global warming though? Why is this major climate change a problem? Although the consequences of global warming are hard to predict in entirety, warmer conditions will lead to warmer oceans causing the ecosystems to go out of whack. Glaciers and other ice will melt, not only causing the sea level to rise, but will expand our ocean. This could be very detrimental to many homes and businesses. It is predicted that evaporation and precipitation will change too, which will result in many regions wavering into the extreme

temperatures. Meanwhile, not only will vegetation areas alter, but crops and plants could grow vigorously and uncontrollably with the ample amount of Carbon Dioxide or the world might experience an extreme famine due to the heat.

Although Trump may not be fighting the heat, he does work with a group that does. According to the Environmental Protection Agency's (EPA) (2018), their goal is to "declare a national policy which will encourage productive and enjoyable harmony between man and his environment [and] to promote efforts which will prevent or eliminate damage to the environment and biosphere...." The EPA has approved many laws and regulations like the Clean Air Act, which specifically addresses greenhouse gases. According to Wisegeek (2019), the Clean Air Act was first approved in 1955, but instead of actually limiting air pollution, it dedicated five million dollars a year to the research of air pollution and its effects. With the addition of some amendments, the most revised act was proposed by George H.W. Bush and put a limit on allowable greenhouse gases in the United States ("What"). EPA's first step was to conquer the roads. They began working with the National Highway and Traffic Safety Administration to set greenhouse gas and fuel economy standards for vehicle models ranging from 2012 till now. Their Clean Air Act Overview shows these models have proved to cut down greenhouse gas emissions by six billion metric tons ("What"). In 2016, EPA issued new omens that curbed methane emissions from any new reconstructed or modified oil and gas sources. This has proven to diminish the smog forming volatile organic compounds. According to the Union of Concerned Scientists (2019), the Clean Air Act has a 40-year track record of reducing greenhouse gas emissions ("Global"). The Clean Air Act has made restrictions on trucks, cars, power plants, and other large industrial polluters, in hopes of stopping as much air pollution as possible, but according to Timothy Cama, from The Hill (2019), Trump's Administration has been quietly

reshaping how the EPA regulates companies' greenhouse gas production. After allowing EPA to be less-stringent when regulating certain facilities, Trump's administration has been receiving major backlash for avoiding the public's opinion until now. Many people think this will result in more air pollution and is a direct violation of the Clean Air Act's original purpose. Nevertheless, Bill Wehrum, head of the air office at EPA, wrote two memos that adjusted the Clean Air Act. The first specifies that the EPA can not "second guess" what companies set as their output air pollution calculations. The second actually repealed the "Once in, Always in" (Clinton-era policy) that makes "major" air pollution distributors able to be considered "minor" distributors if they are lower than the National Ambient Air Quality Standards. This is beneficial to many companies because "major" facilities are held to harsher rules. Trump's additional memo, ensures that the EPA will use more industry-friendly practices when carrying out these regulations. According to Juliet Eilperin and Toluse Olorunnipa from the Washington Post (2019), despite guidance from chief executives, Trump exited the Paris agreement in 2017, which pledged the United States to cut down greenhouse gas emission by 26% to 28% by 2025. Since then, climate change has not been a priority in the White house. Trump has been very consistent with his beliefs and has focused his energy on other concerns.

Despite Trump's skepticism, the conversation on climate change is not going away. Larry Bell, writer from Forbes said, "Even if the theory of global warming is wrong, we will be doing the right thing for the environment." Based on scientific research, major climate changes have happened in the past and there is no guarantee it won't happen in the future. Policies like the Clean Air Act have been put into place because they have been proven to reduce the gases that humans emit. If global warming is really going to be stopped, or even reversed, there is a high demand for more policies and regulations.

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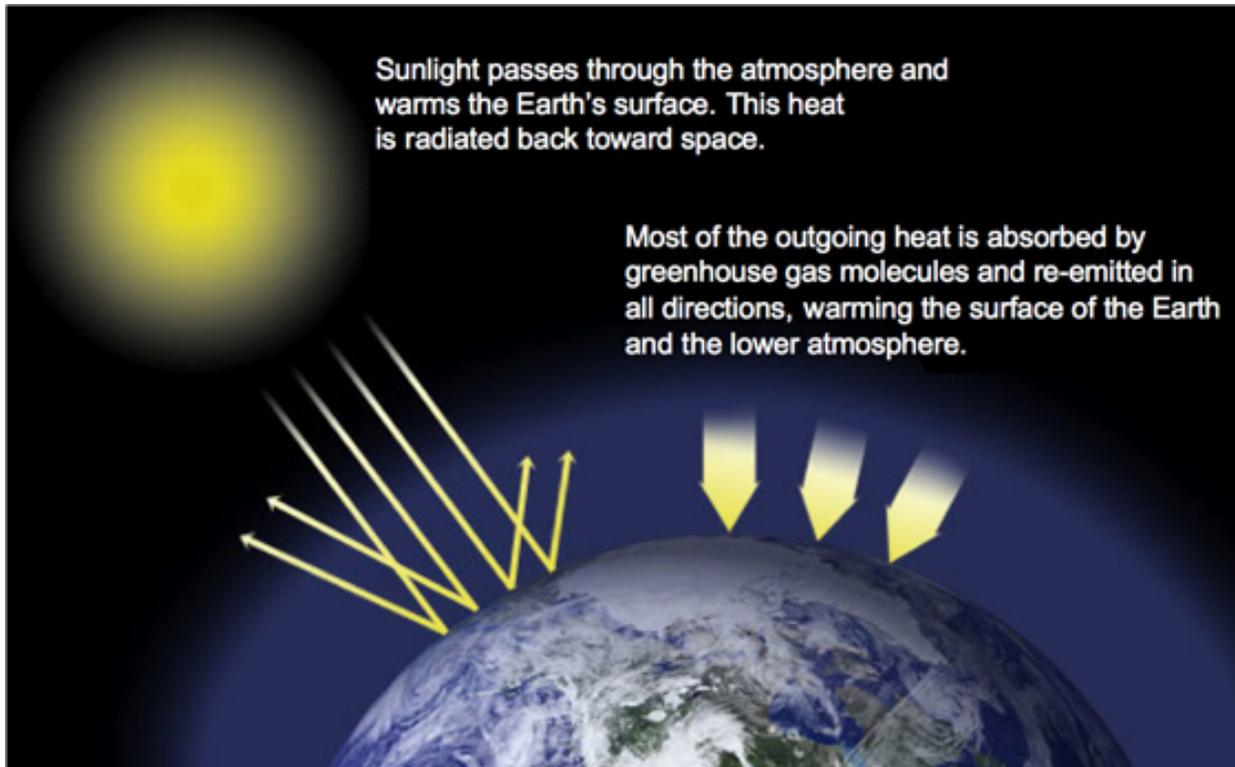
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*Figure 1.* The process of greenhouse gasses acting as a thermal blanket and absorbing heat; therefore, warming the Earth's surface. Adapted from "A Blanket Around the Earth," by NASA, 2019, *Global Climate Change*, retrieved from <https://climate.nasa.gov/causes/>