Environmental Scientist:

Carbon dioxide, along with nitrous oxide and methane, all prevent heat from escaping earth's atmosphere. This creates what is called a greenhouse effect that results in the gradual warming of the planet. These gasses are actually important in maintaining life on earth as the gasses trap ninety percent of the heat that is radiated off of the earth's surface, thus maintaining an average of fifty-nine degrees for life on earth. However, by 2016, human technological growth had caused a sharp increase in the amount of these greenhouse gasses in the atmosphere. A study in 2014 showed that the atmospheric levels of carbon dioxide had risen from 280 parts per million to 400 parts per million in the 150 years prior, and that it had caused much of the raise in temperature of the earth in the 50 years prior. The human activity at the time was the cause for these changes. Carbon dioxide rose as a result of deforestation and burning fossil fuels. Methane was produced during decomposition of trash in landfills, agriculture including rice fields, digestion, and manure management for domestic livestock. Nitrous oxide was produced during soil cultivation (including organic fertilizers), burning fossil fuels, and burning biomass.

The earth has natural ways of protecting itself and maintaining homeostasis. The rainforests plays an important role in cooling the planet. First, through evapotranspiration the rainforest's trees convert the water from the moist soil into clouds that reflect the sunlight; rather than the green leaves that absorb its heat. Secondly, the trees absorb the carbon in the atmosphere and used it for growth. This works to reduce the carbon dioxide content in the atmosphere which, in turn, allows more heat to escape from the atmosphere. Unfortunately, as the carbon levels continue to rise, the growth of the rainforest has begun to decline. Faster growing trees invest less energy in defenses against diseases so the quickly growing trees became less dense and often succumb to disease or fall over.

Storms caused by global warming were much less drastic in 2016 due to the presence of wetlands that had not yet been settled. Still, even then, much of the wetlands had been built upon to create beaches or coastal cities. Wetlands provide an important buffer from storms and flooding. In cases of storms, each mile of vegetative wetlands can reduce the height of the storm surges by one foot which, as we have seen, could drastically reduce the damages to coastal towns. Furthermore, wetlands work like sponges during floods by slowly distributing the water over the floodplain. A study in 2016 revealed that watersheds with fifteen percent wetlands had peak floods reduced by as much as sixty percent. Unfortunately, wetlands are extremely susceptible to sea level changes and, after the sea level had risen by one meter in the early 2020's, eighty-five percent of the global coastal wetland sites had been lost to the sea, especially because land development had prevented them from moving inland during the four years of sea level rise.

The ice covering the ocean and the land also plays an important role in controlling the temperature of the earth. Apart from storing the sea water out of the ocean, it is instrumental in cooling the planet. The white color of the ice has the same albedo effect as low-laying clouds. The white color reflects much of the sun's rays back into space before it can be absorbed by the earth. Sea ice protects the surrounding land from the ocean's erosion. It also protects the ocean underneath it by covering and preventing heat transfer between the ocean's surface and the warmer atmosphere. As a result, the water at the poles is much colder than even the surrounding areas. Furthermore, sea ice plays an important role in the world's ecosystems. The ice crystals that form have a lower salinity than the surrounding ocean. When the ice forms, the salt is

released into the polar ocean which increases the salinity of the water. When ice melts, the relatively purer water from the ice is returned to the ocean and the overall salinity of the ocean decreases. The variations in salinity and temperature at the poles causes much of the ocean's circulation as the cold, salty, nutrient filled, dense water sinks to the bottom and warm, purer, and less dense water flows upwards to replace it. With the melting of the ice caps, this current was disrupted. With the lack of circulation, warm water from the equator does not move north or south and the land in places like England cool off significantly as the water cools around them due to the high latitude.

Space Exploration Scientist:

There is no chance that this planet has the power to sustain the entirety of the human race much longer. A solution that makes sense but is morally questionable is to simply reduce the population on earth to reduce the overall heating. This solution does not morally make sense unless we have another location besides Earth for people to live comfortably. Unfortunately in our solar system there are only a few choices. The choice that makes most sense for the human race to colonize is Mars. Mars sits merely 225 million km away from the earth, making the time it takes to get there in a short six months by spacecraft. Mars might seem like a questionable place to colonize but it is the only option close to us that is plausible for many reasons. The time of a day on mars is very similar, which seems like a small part of it all but could potentially bring about some comfort to the new residents. However, the fuel needed to transport large quantities of people from earth to mars is a large problem.

Luckily, for the human race, engineers have developed techniques for cutting down on fuel and harnessing the natural celestial movements of Earth and its neighbors to propel crafts through space. This reduction in fuel use helped the first explorers to mars by allowing them to bring more equipment with them which also made it an easier way to provide them with food and supplies for their extended stay on the red planet. Early in the race to colonize Mars, engineers from around the world were communicating. The design of a four person sustainable habitats that had both pressure and heat for it to be able to survive the cold winds was designed through collaboration; making planet colonization that much closer. These living spaces harness the wind from the planet and the heat from the sun to generate electricity and heat.

The next task that NASA tackled was the localization and exploitation of water on mars. Mars has a large amount of the cave systems within it, helping humans find an easy access point to the water hidden beneath the red planet's surface. Water is essential to humans' survival in general, but even more so on mars. With a large access to water it can be used as drinking water, but also broken down through chemical reactions to produce oxygen and rocket fuel. These are two extremely vital resources. Once these cave systems were found to be in proximity of water, humans on mars could begin to implement a method similar to fracking, pulling up the water from the ground, to get water for themselves. Extensive testing will have to be done on the water to make sure there are no foreign chemicals within it.

Researchers are also working on using Martian soil to help grow food and sustain the human population that will be living there. Soil was taken from previous missions and brought back to be tested by some of the most highly renowned botanists on the earth. Scientist have discovered that combined with highly nutritious soil and additives, the Martian soil can be very fertile and grow food.