

## Mock Exam

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## Essay Topic

### Will Science Save Us?

#### Outline

#### 1/ Introduction

##### Thesis Statement

While science has proven its potential by addressing critical global challenges as climate change, health crises, food security through technological advancements, its ability to 'save us' ultimately depends upon on how these innovations are applied within ethical, political and societal framework to promote equity, sustainability and collaboration.

#### 2/ Science as a tool of global growth

(2A) The transformative impact of science on health

(28) Science offered solutions of climate change crises

(2C) Scientific innovation in agriculture - securing food supply

(2D) Artificial intelligence - Revolutionizing industries and improving efficiency

(2E) The Promise of Biotechnology to save health and environment!

(2F) Space explorations

(2G) Technological innovations in Water management

3/ Limitation to Scientific advancement - Science alone can not save us

(3A) Political and economic systems that resist change

(38) Social and Structural inequalities

(39) Overconsumption and unsustainable practices

(40) Technological disruptions and ethical risks

#### 4/ Conclusion

"The science of today is the technology of tomorrow."

(Edward Teller)

The role of science in addressing global challenges has been a topic of debate for centuries. Science has undoubtedly brought about significant advancements in various fields, from healthcare to technology, offering solutions to problems that once seemed impossible. However, the question remains: Will science save us? While science provides



its tools to address challenges like climate change, pandemics and resource depletion, its potential is limited by various factors. These include political resistance, ethical concerns and societal issues.

One of most compelling reasons, to begin with, that shows the potential of science as a saviour, is its transformative impact on health. Through innovations in medical research, vaccines and pharmaceuticals, science has been able to eradicate, control or manage diseases that once badly affected human populations. The most pertinent example to quote here is development of vaccines. The eradication of smallpox in 1980 and significant decrease in polio cases are major achievements. For instance, World Health Organization (WHO) has stated that polio vaccine, developed in 1950s, has saved million of lives, with global incidence of polio dropping by 99% since 1980 (WHO 2020). Thus, science has contributed major role in improving global health conditions, with

the rapid of COVID 19 vaccines in no time.

Moreover, climate change is probably the most urgent crisis humanity faces, and science offers its solution through the renewable energy technologies. These technologies can reduce greenhouse gases emissions and global warming. The transition of energy sources from fossil fuels to cleaner ones, such as solar, wind and geothermal energy, is a major contribution of science in mitigating climate change. Solar energy, for instance, has seen tremendous advancements and its cost has decreased significantly.

According to International Renewable Energy Agency (IRENA), the cost of solar power has dropped by 89% between 2010 and 2020, making it a feasible alternative of coal and oil. Additionally, wind power is one of most cost-effective sources of the electricity. Countries like Denmark and Germany have made impressive strides in transitioning to wind energy, with Denmark generating over 40% of its electricity from wind in 2020 (IRENA2020).

Similarly, another monumental achievement of science is the innovation in agriculture. With global population surpassing 9 billion by 2050, feeding world's population will be one of greatest challenges of 21<sup>st</sup> century. However, the advances in agriculture such as genetically modified (GM) crops, vertical farming and precision agriculture, offer solutions to enhance food production and ensure food security. According to a 2009 study by International Food Policy Research Institute (IFPRI), GM have increased yield by 10-20% and reduced pesticide use by approximately 37%.

Similarly, precision agriculture, which use data analytics and drones to monitor crop health and soil conditions is helping farmers optimize resource use, reduce waste and increase yield.

Hence, the sustainable agriculture which uses scientific techniques to optimize yield is another advancement.



of science.

Furthermore, the rapid development of artificial intelligence (AI) and machine learning has the potential to revolutionize the industries and improve efficiency in critical sectors such as healthcare, infrastructure and manufacturing. AI can be used to optimize the processes, predict outcomes and automate the routine tasks, leading to increased productivity and innovation. In healthcare, AI algorithms have shown great promise in diagnosing diseases more accurately and quickly than human doctors. For example, a study in *Nature* journal states that AI-powered diagnostic tools have been used to detect early signs of diseases like cancer, diabetes and cardio-vascular conditions, with greater precision than human counterparts. Thus, AI can revolutionize the industries and can work more efficiently than human sometimes, which is another great achievement of science.

Another watershed moment in the history of science is the development of Biotechnology. It offers solutions to some of world's most pressing health and environmental challenges. From gene editing to bioremediation, biotechnology has the potential to revolutionize the medicine, agriculture and environmental protection. For example, the development of CRISPR-Cas 9 gene editing technology has opened a new way of possibilities for treating genetic disorders like sickle cell anemia. In agriculture, biotechnology has enabled the development of drought resistant crops that can withstand extreme climate change, helping to secure food production in region vulnerable to climate change.

Moving on, Space exploration is another hallmark of scientific achievement, pushing boundaries of human knowledge and technological



capabilities. Beyond the excitement of space travel, space exploration has led to numerous applications that have practical applications on Earth. As Neil Armstrong said:

"That one small step for man, one giant leap for mankind." Technologies developed for space exploration, such as satellite systems, GPS and advanced materials, have been adapted for use in industries ranging from telecom to medicine. For instance, As per report of NASA 2015, the water purification systems and solar energy developed by NASA are being widely used by developed and developing countries. Thus, science has not opened ways to space but also introduced human to some useful technologies and practices as well.

Last but not the least, water scarcity is another major problem across the world. Technological innovations in water management system have helped

to address this global problem. One of most notable technology is Desalination - which converts seawater to drinkable water. National Library of Australia states that Israel and Saudi Arabia meet most of their water demand through desalination. Israel, in particular meets 40% of its water demand through it. Similarly, water recycling systems have been developed to purify water waste from industries and agriculture. As per FAO report 2021, in agriculture, innovations like drip irrigation, have helped optimize water use, especially in arid region, reducing waste and improving crops yield. Thus, the science have also contributed in mitigating water scarcity issue and availability of freshwater.

It is evident from the above discussion that science offers powerful tools to address many issues, but it is not panacea. Science alone can not save the world ; its true potential can

be realized when coupled with ethical considerations, political will and systemic societal reforms.

Firstly, scientific advancements in gene editing and artificial intelligence raise significant ethical dilemmas.

The unintended gene spread can lead to genetic pollution in crops which can cause creation of superseeds and herbicide resistant crops. Moreover, the gene editing in humans, which allows for precise alteration to human genomes, can cure genetic diseases but also poses risk of unintended consequences.

In 2018, Chinese scientist He Jiankui controversially used CRISPR to edit genes of twin babies to make them HIV resistant, sparking global outrage and calls for stricter regulations.

Suffice is to say, without clear moral obligations, scientific advancement could lead to harm rather than benefit, proving that science alone can not save the world.



Secondly, many global challenges that science aims to address - such as climate change, and resource depletion - are deeply entrenched in political and economic systems that resist change. Fossil fuel industry, despite overwhelming scientific evidence of climate change receive substantial subsidies from governments worldwide.

As per IMF 2021 report, in 2020 global subsidies for fossil fuels amounted \$ 5.9 trillion - more than global spending on healthcare. Thus, political will and policy changes are crucial to implement scientific innovations.

Thirdly, the social disruptions and structural inequalities hinder the equitable distribution of resources and benefits. During COVID 19, wealthier countries secured majority of vaccine supplies, leaving poorer countries with limited access. As per WHO 2021 report, as of late 2021, only

3% of people in low income countries had received at least once dose of a COVID 19 vaccine, compared to over 70% in high income countries.

This disparity in access of resources underscores the fact that social and economic structures play pivotal role in determining who benefits from scientific advancements.

Fourthly, while science has developed technologies to address environmental issues, such as renewable energy and water saving innovations, over-consumption and unsustainable practices still continue to put strain on planet's resources. As Lester Brown of earth policy institute stated that it would take 1.5 Earths to meet our current consumption. Without a shift in consumption practices, science alone can not save the world from ecological collapse.

Concludingly, science has potential to provide solutions to many pressing problems like health crises, climate change, food security and technological advancements. Yet it can not save the world alone without ethical guidelines, political will and social reforms. Without these, complementary actions, science, no matter how advanced, will be enough to save the world.