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The Importance of Continuing Space Exploration

From the beginning of human civilization, people have been looking up at the night sky. The company NASA, or the National Aeronautic and Space Administration, has set their sights on the stars ever since they were founded in 1958. Countless spacecraft have been designed, constructed, and sent into orbit around both our planet and others in our solar system and beyond. For decades NASA has been proving the impossible. When Neil Armstrong and Buzz Aldrin landed on the moon in 1969, the future of space exploration seemed bright. Emotions were high as countless people all over the world watched in awe as these two American men claimed the moon as their own. Even today, those who watched the landing in 1969 can vividly remember the time and place that they watched it from. Large historic events such as this are able to bring together different people from different countries around the world, as can be seen from the millions of people watching and praying for Armstrong and Aldrin as they made their “giant leap for mankind”.

Ever since the moon landing there have been fewer manned space missions, and none other than those to the moon or International Space Station. There are shared opinions that space research nowadays is a waste of money that could be used to help solve problems here on Earth. Along with these beliefs are also those of people who believe in space exploration and its importance to our understanding of the universe. Researching outside of our planet is crucial for scientific development, as the knowledge and information that we gain from interstellar research will help to improve technology and society back on Earth.

Scientific research in general helps to better our understanding of ourselves, as well as the world around us. When performing research, scientists must ask a question to start, and then their thesis or hypothesis is in response to that question. Once they have a hypothesis, then they are ready to start making observations, or performing the experiment to collect data. The data that is taken during these labs is later analyzed, and certain conclusions can be made regarding the initial question or hypothesis. Sometimes, however, the hypothesis will be refuted by the data, in which case another study must be performed to fix the lab and collect accurate findings. This overall process of performing the labs and collecting data has led to our entire understanding of the universe and the things it contains.

From the beginning of the space race, people have been fascinated with the universe outside of our planet. The initial race to the moon held audiences captive for hours, and inspired entire generations of scientists. Many kids wanted to take up the study of science after watching men land on the moon in 1969. Buzz Aldrin and Neil Armstrong have become national heroes, and they are looked up to even today for their bravery and curiosity, as well as their passion for bettering our understanding of the universe. Men like this, as well as all of the astronauts who have come before and after them have helped to pave the way for space exploration. This idea of leaving Earth and travelling to new worlds has always fascinated me, and has fueled my love of physics and astronomy.

Today, there are companies working to get civilians into space. One company is Orion Span, which has turned the standard twenty-four month training period into just three months. There are suites located in the space station, and up to four people at a time will be able to make this journey. This company will most likely still rely on SpaceX to actually send the passengers up to the space station. Another company planning to send civilians into space is Virgin Galactic. Here, they are planning on making space a simply scenic tour, with a trip lasting just minutes but requiring no preparation or training whatsoever. This company is charging two hundred and fifty thousand dollars per ticket to go on this ride, and as of 2017 over six hundred passes had been

purchased (Popular Science). These companies and many more have been making huge strides in civilian space travel, and it will not be long before regular people's dreams of going into outer space will be fulfilled.

There are so many parts of our universe that are yet to be studied, and the only way to do so is by continuing our research, and creating bigger and better telescopes that are capable of unveiling the secrets hidden in the cosmos. Along with telescopes, spacecrafts are being designed to be faster and more versatile, able to be landed back on Earth safely and reused. Other spacecraft are able to be sent out into the cosmos and send data back to Earth. This data can be in the form of images, such as those of exoplanets and planets in other parts of our galaxy. The long voyages made by these unmanned craft have proven incredibly useful in providing astronomers with knowledge of what else is calls the universe its home. There have been many findings of planets that may even contain life or be in the habitable zone for their star, and all of these planets have been discovered through the use of telescopes such as the Hubble as well as probes and cameras sent into deep space.

The knowledge that we obtain from studying our galaxy and the universe helps to improve science, technology, and society back on Earth. Science is improved because we learn about new phenomena that can affect even our planet. An example of new phenomena being observed is when scientists were

able to observe gravitational waves for the first time. Previously, these waves were only a theory, and there had been no way of directly finding or measuring such breathtaking phenomena. With the improvement of new technology comes new findings, however, and the collision of two black holes millions of lightyears away was able to be observed and studied back on Earth. This was able to confirm the theories that had already existed, and it also led to new questions that must now be studied more in depth in the future.

Discoveries via the Hubble Space Telescope have been numerous. This telescope was built in 1990 and send into space with the help of the appropriately named Space Shuttle Discovery. This telescope originally had a lense out of focus, causing all of the images to appear blurry to observers down on Earth. A repair crew was sent into space to fix the problem, and apart from minor updates from time to time, the telescope has been working perfectly and providing us with incredible images ever since. Hubble's low-Earth orbit proves useful for its observations, as it orbits above the clouds with little to atmosphere in its way.

Many times throughout history, technology has been improved or developed through the need for its use in space. Technologies such as this include camera phones, scratch resistant lenses, freeze-dried food, and many more. When going into space, cameras are required to observe astronauts performing their required tasks. Since the shuttles taken into space must be as

light as possible, cameras were designed to be incredibly small and compact. These small cameras led to the type found in our cell phones, which must be small in order to fit into the palm of our hands. Scratch resistant lenses came about through the desired need for astronauts to be able to look out the window during flight. In order for this to be the case, glass was designed to withstand the effects of being in a vacuum, as well as being constantly bombarded by high-speed particles hurtling through space. This newly designed glass can now be seen in many types of glasses, making them stronger for everyday wear.

Finally, freeze-dried food is the easiest to store when going on long trips into space, and this food can now be found in supermarkets worldwide for a source of a quick snack. In the future, if there are manned missions that would last months or even years, such as a trip to Mars, it is important that astronauts are provided with enough sustenance to keep them alive the duration of their flight. Freeze dried food comes in thin packets, is lightweight, and can still provide the nutrients that one needs in their daily life (Space.com). Space travel has influenced the designs of many other products and companies, and its impacts can be seen worldwide in our society, technology, and culture as a whole.

Space contains an overwhelming amount of untapped potential when it comes to resources. Right now, millions of mineral-rich asteroids are hurtling

through just our galaxy alone, and these asteroids have the potential to be mined, with the resources being collected and brought back to Earth. Asteroid mining is already in progress. An example is the OSIRIS-REx mission, which was launched in 2016. This craft was launched with the intention of orbiting and studying asteroid Bennu. The purpose of the mission is to take samples from the asteroid surface, as well as study the effects of light on the orbital paths of such space rocks (NASA). Samples taken on Bennu's surface may help scientists determine more about the universe as well as the resources that could possibly be collected by mining asteroids such as this in the future.

There are many people who believe that we should limit the amount of money to continue space exploration include the overwhelming amount of money it requires, as well as a lack of focus on problems here on Earth. While it is true that NASA uses large amounts of money building spacecraft and performing research in outer space, the money goes to a good cause. Without funding, programs like the Hubble Telescope and the Voyager Missions would never exist. There is still an entire universe to discover. The parts that we have been able to focus on are not even a drop in the bucket compared to the rest of our ever-expanding universe. It is also important to focus on worlds other than our own to find possible habitable planets. These planets may one day be necessary to live on should something happen to the Earth.

NASA is not the only industry working on space flight. Private companies like SpaceX are constantly designing and testing rockets, making the process of space exploration even more widely distributed than it has ever been. There is a similar driving force behind each one of these companies. This driving force is curiosity. Humans are curious creatures, and looking up at the stars it can be seen just how small we really are in the grand scheme of the universe. There is so much more space out of our reach, and it requires the dedication and commitment to unravel the mysteries that choose to remain hidden.

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