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Candidate session number			
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Examination session (May or November)	May	Year	2013

Diploma Programme subject in which this extended essay is registered: Environmental Science
(For an extended essay in the area of languages, state the language and whether it is group 1 or group 2.)

Title of the extended essay: HOW does Global Warming Effect Polar Bears?

Candidate's declaration

This declaration must be signed by the candidate; otherwise a grade may not be issued.

The extended essay I am submitting is my own work (apart from guidance allowed by the International Baccalaureate).

I have acknowledged each use of the words, graphics or ideas of another person, whether written, oral or visual.

I am aware that the word limit for all extended essays is 4000 words and that examiners are not required to read beyond this limit.

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Please comment, as appropriate, on the candidate's performance, the context in which the candidate undertook the research for the extended essay, any difficulties encountered and how these were overcome (see page 13 of the extended essay guide). The concluding interview (viva voce) may provide useful information. These comments can help the examiner award a level for criterion K (holistic judgment). Do not comment on any adverse personal circumstances that may have affected the candidate. If the amount of time spent with the candidate was zero, you must explain this, in particular how it was then possible to authenticate the essay as the candidate's own work. You may attach an additional sheet if there is insufficient space here.

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To the best of my knowledge, the extended essay is the authentic work of the candidate.

I spent hours with the candidate discussing the progress of the extended essay

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Assessment form (for examiner use only)



Achievement level

Criteria	Examiner 1		Examiner 2		Examiner 3	
	Score	maximum	Score	maximum	Score	maximum
A research question	1	2		2		
B introduction	0	2		2		
C investigation	0	4		4		
D knowledge and understanding	1	4		4		
E reasoned argument	1	4		4		
F analysis and evaluation	0	4		4		
G use of subject language	2	4		4		
H conclusion	0	2		2		
I formal presentation	2	4		4		
J abstract	1	2		2		
K holistic judgment	1	4		4		
Total out of 36	9					

Research Question- How does Global Warming Effect
Polar Bears?

Subject: Environmental Science

Supervisor:

Pages Attached: 18

Word Count: 3922

Session: September 2011

The question my research addresses is “How does Global Warming effect Polar Bears?” I began my research by finding information about Global Warming. In order to have a basis for my topic, I wanted to get background information first. I found that global warming is affecting several animals, but especially polar bears. It is causing ice to glaciers to melt in the Arctic and other frozen places such as Greenland. After defining global warming, I went on to research how global warming was affecting polar bears. I found that polar are dying and their population is becoming endangered as a result. They are having difficulty finding food and swimming is becoming difficult due to the lack of sea ice available for them to rest on. Also, in some places the ice is melting in the summer leaving the polar bears no ice to live on. Instead, they are forced to live on land which is not natural for them. The Polar Bears are definitely being affected according to these sources. I then researched any conflicting research. Some people said that global warming is not even real. They stated many factors as to why global warming could not be true and is not occurring. One of their reasons was that in many places teperatures have decreased instead of increased. Others said that statistics have been exaggerated and cannot be depended on for evidence. Many people still don't know if global warming is true and several questions still exist. After considering all of the research I found, I came up with my own answer to the question. I decided that Global Warming is true and Polar Bears are being affected by it as a result.

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Introduction: Addressing Global Warming and its Proposed Issues

How have polar bears been impacted by Global Warming? Over the past few decades, many scientists have concluded that the Earth is going through a process called global warming. Many people are not aware of what global warming actually is and if it is a threat to the environment, and all of the Earth's inhabitants including humans and animals. Global warming is the very complex theory that the "globe" or world is "warming" or getting warmer. What causes global warming? "Carbon dioxide and other air pollution that is collecting in the atmosphere like a thickening blanket, trapping the sun's heat and causing the planet to warm" (NRDC Global). Carbon Dioxide is put into the atmosphere mainly through the burning of fossil fuels. Coal burning power plants and automobiles generate the majority of the carbon dioxide that is emitted into the Earth's atmosphere. Studies have shown that each year the Earth's temperature has progressively increased, due to even larger and larger amounts of carbon dioxide. Scientific experts have predicted that the average temperatures in the United States will be increased by three to nine degrees by the end of the twenty first century, unless global emissions are drastically reduced (NRDC Global).

The effects of global warming have been seen on all types of living organisms. Global warming has affected tropical animals, birds, humans, polar bears, and so much more. Due to the increasing amount of heat in the atmosphere, wetlands have been dried up, ice has melted, and forests have been destroyed. Most people know that animals and all living organisms need water to survive. Since the temperature is so much higher, wetlands that animals have depended on their whole life are being dried up. These animals, birds and other land animals, are suffering from dehydration and are therefore

dying. This excessive increase in heat has also dried up lakes and prevented rainfall in several countries. These places are now suffering from a shortage of water, thus causing chaos because people are not aware of what to do in this certain type of situation. Also, due to the increase in temperatures and lack of rainfall, there has been an increase in forest fires. As a result of these forest fires, animal habitats have been destroyed. These animals no longer have a place to live and reproduce. The melting of Polar ice caps in the Arctic, Polar Regions, and places similar to and including Glacier National Park across the Earth, have also caused a major issue to arise. The Melting ice caps are causing the sea level to rise, and if our living patterns do not change, it has been estimated that there will be an increase in the sea level by ten to twenty three inches. As a result, cities that are below sea level or rather close to sea level could possibly experience a flood of water into their city. Therefore, they would have to move to another city. In Glacier National Park scientists have stated that in the year 1910, there were one hundred and fifty glaciers, and now, as the result of Global Warming, there are only twenty five glaciers left. One of the most important problems with the glaciers melting, and what is going to be addressed, is the drastic decline in the polar bear population (Climate Change Impacts).

In the year 2008, polar bears were placed on the Endangered Species Act list along with the other species that have been greatly affected by our global climate change. The United States Geological Survey indicated that by the mid century, the world's polar bear population could be decreased by two thirds, as long as sea ice continues to melt away (Climate Change Impacts). "They have only one enemy, traditional Inuit natives

who hunt the bear for their meat and fur. But now they have another enemy - human-caused global warming” (Russell).

Why Am I Asking This Question?

Now, one might be wondering why this is an important question? Polar Bear becoming extinct is an important concern and how humans are affecting the Earth and how global warming is then affecting living organisms and the environment as a result of non-environmental safe actions. One should be greatly concerned about polar bears that are dying due to the lack of ice existing in the Arctic regions. Anyone who love animals should be concerned with the harming and dying of polar bears due to the carelessness people have towards the Earth. Also, if polar bears become extinct, the ecosystem will likely be affected. Research should be done in order to know more about how polar bears are being affected, how the environment is being affected, and what global warming actually is. Many have heard about global warming and how everyday humans are affecting the Earth by their actions, but never really knew what was true and what wasn't, and if it was truly a problem.

Existing Barriers to The Question

When responding to the question, there are several people who oppose global warming and believe it is false and not occurring. “Scientists clearly agree that the planet is warming. Yet the current debate centers on the cause: Is it part of a natural cycle?” (“Climate Change”) Even though practically all scientists have stated that global

warming is occurring, there are still people who have other opinions and refuse to believe those scientists. “They don't think the data show a measurable upward trend in global temperatures” (HowStuffWorks). So, in other words, they believe that the Earth could just be warming for a temporary amount of time and that it will go back to its normal temperature soon. Other scientists believe that people are paranoid about global warming and therefore, when they are examining statistics, they search for evidence that supports global warming. Some people dispute that the Earth is going through a natural shift in climate and therefore the Earth was supposed to do this despite human interference. This is only a small group of people who have disagreements towards the occurrence of global warming (HowStuffWorks).

Answers to the Question

When conducting the research in order to answer the question on how global warming is affecting polar bears, several answers have arisen, that all interconnect with one another. Each answer is just as overwhelming and unimaginable as the other. As a result of Global Warming, as earlier stated, the polar ice caps, glaciers, or sea ice, have been melting at an unbelievably fast pace (The Big Picture). Therefore, leaving polar bears helpless and in severe danger of dying and becoming extinct. Sea ice to bears is like land to humans. One may believe that bears these polar bears just need a little bit of land and a huge pool of open water that extend for miles and miles. However, this is a false assumption. Hence the name “polar” bears, they heavily rely on sea ice for food purposes, travel, and den making. “Polar bear survival is entirely dependant on sea ice as

a platform for hunting the marine mammals that provide their nutritional needs" (Polar Bears). Polar bears practically live on ice. They sleep on it, and they rest on it when traveling across the sea and when feeding on seals. The polar ice caps are retreating faster than they once used to. "Although the magnificent creatures are well adapted to the water, and can swim scores of miles to solid land, the distance is getting ever greater as the Arctic ice diminishes" (Mouland). The glaciers now freeze later in the fall and begin to melt earlier in the spring. As a result, polar bears have less time to hunt before going into hibernation for the winter. This is not good because this is the most important time in the year for hunting because bears will be hidden away for many consecutive months. Also, "It forces bears to swim longer distances, using up some of their fat reserves" (Blackburn). Since the polar bears now hunt less, they are eating less and there is an increase in the scarcity of food in the sea. One statistic shows that the average weight in female bears has declined by twenty one percent between the years 1980 and 2004. Due to the decline in the bear's weight, the reproduction rate of baby bears has declined. So, they are not reproducing as much and as fast as they once used to in their life time. This is yet another reason that explains why global warming is contributing to the decline in the polar bear populations all around the world (Blackburn).

The population size of the polar bears is a main concern. The crucial sea ice has been changing its patterns and moving further and further apart. As a result, the water that the polar bears must travel through is very rough and dangerous; making it harder to swim through, thus the bears are drowning. Another result of the melting of polar ice is that bears must spend more time on the land. In Hudson Bay, Canada sea ice has become

completely melted during the summer months. As a result, the polar bears are now living on the land and they are eating barely anything. “The Hudson Bay population is down by more than 20 percent.” Also, “The average Bear weight has dropped by more than 15 Percent” (Global Warming and Polar Bears). Due to the major lack of food, “there have been several recent reports of polar bears resorting to cannibalism” (Fashing).

They are eating each other because they are starving for food. Polar bears do kill one another for dominance or mating purposes, however this is normal for polar bears to do. Never in past history have polar bears killed one another due to the fact that they have little or no food at all. As one can see, because of the large decline in the amount of the polar ice caps which is attributed to global warming, polar bears are suffering greatly (Fashing).

Conflicting Research

There is also conflicting evidence with all of the above facts and statistics. The majority of the fight is the fact that many people believe that global warming is a hoax and that it is not real. There are several opinions and facts that support this contradicting statement. When researching there were many interesting views in response to global warming. One idea was stated that one should “just use logic” to prove that the Earth’s warming temperatures is a false statement. They listed many facts that would support their belief on global warming. For starters, they stated that carbon dioxide is way too heavy of a gas to rise up into the atmosphere in order to cause a greenhouse effect; instead it is water that is rising and creating water vapor. Also there have been record

lows in the temperature across the Earth. Not only have there been record temperatures, but there have been record amounts of snowfall, resulting in snow storms and long ski seasons. They also stated that although we have heard that the ice caps have been decreasing in size and melting rapidly, glaciers in Greenland have instead been thickening; not thinning like we have been told. Not only has the ice in Greenland been thickening, but so has the ice down in the Arctic. To add on to their previous statements, they said that the government has previously stated the fact that polar bears are not dying in the vast arctic sea. Also, volcanoes and oceans are known to emit carbon dioxide in to the Earth's atmosphere; therefore, contributing to the largest amounts of carbon dioxide and other harmful greenhouse gases that are released in to the atmosphere. Lastly, they stated that the National Aeronautics and Space Administration, otherwise known as NASA, was caught taking so called "warming data." NASA was said to have submitted the same temperatures taken in September for the month of October; therefore, it appeared that October was abnormally hot in that certain year. All of these statements, conflict with the current proposed theory of global warming (Global Warming is Fake).

To add on to the ideas and observations above, there have been several statistics that have contributed to the belief that global warming is a scam. Supposedly the data about the arctic ice melting has been greatly exaggerated. Harper Collins has previously stated that Greenland, one of the main locations of glacial ice on Earth, has lost an average of fifteen percent of it ice caps in recent years past. However, this was proven wrong; it was actually point one percent of the glacial ice cap's mass that had been either melted or demolished (Greenland). People against global warming have also stated that

researchers who are trying to defend and support global warming have used information gathered from inexperienced scientists and used those facts as correct information. They then take this information and embellish on top of it, and thus resulting in an exaggeration of data supporting global warming. Some believe that the statement that the polar bears are dying is a false explanation. “A scientific paper was published in a 2006 issue of the journal *Polar Biology* is filled with baseless assumptions about four specific polar bear deaths” (Global Warming Fraud). However, the article did not back up those deaths by stating how the bears had died. It was assumed that they died due to sea ice breaking off, but maybe there was a bad wind storm, it is unknown. This possibly false data was then used to make calculations on how polar bears were going to decrease in population because of the quick conclusion drawn stating that because sea ice was melting, polar bears were dying. Therefore, one doesn't know why those polar bears, or any others for that matter, have died. The above theories have brought up an opposition to the argument on global warming (Global Warming Fraud).

Is The Research Plausible?

The information above is plausible in some ways and not plausible in other ways. Some statements people have made about their views on global warming make complete sense and one could believe that they are true. However, there is some information above that could be contradictory. For starters, ideas coming from various people that support global warming and that believe that polar bears are being greatly affected as a result of global warming could be opposed. All of the research about how the Earth's temperature

is constantly rising is possibly not totally true based on personal experience. In Charlotte I know that we have had record lows during the winter and record snow storms. This past winter we experienced a white Christmas which had not occurred for several decades. Up in the Rocky Mountains and Appalachian Mountains they have had huge snow storms. As a result, there have been extended ski seasons and really thick amounts of snow on the ski slopes. In Boone, North Carolina last winter, school was out for around 20 days straight because of all of the snow fall and the inability of people to drive on the road. So, how could the Earth be warming if there is so much snow fall during the winter seasons? The answer is, it might be a temporary cooling trend and this is only one portion of the country. However, it is a known fact that the globe is warming. "We know that the Earth is warming from surface temperatures and satellites measuring the temperatures of Earth's surface lower atmosphere," and "sea levels are rising" (The Big). However, there is plausible evidence stating that the sea ice caps have been melting and wearing away. There are several statistics that confirm that the glacial ice in Greenland and Antarctica and even places like Hudson Bay, Canada has been melting rapidly and there is less of it. Due to the melted ice caps, one can conclude that the polar bears are suffering from this. There is lots of data that supports the fact that polar bears are dying. There have been pictures of polar bears stranded out on small pieces of glacial ice that had broken off from the larger sheets. Although, how does one know that pro global warming researchers and scientists are just publishing pictures of polar bears that are in danger in order to fool people and get their attention (Global Warming Fraud). This is where some of the not so plausible evidence exists (Fashing).

When looking at the side of the ones that are against global warming, there is also some plausible and implausible statements. The fact that carbon dioxide is too heavy to lift in to the atmosphere is somewhat controversial (Global Warming is Fake). Scientists have discovered and know that fossil fuels and coal burning power plants release carbon dioxide up into the atmosphere (NRDC Global). Also the fact that the government says polar bears are not dying is false because there is an obvious decrease in their population (Global Warming is Fake). The fact that one source says that glacial ice is melting and another says it is thickening, is a very hypocritical (Climate). This statement about the ice thickening is very controversial (Global Warming is Fake). The opinion or statement about how one doesn't know for sure that the polar bears are dying is due to global warming is very plausible. Just as stated above, one automatically assumes that a random dead polar bear floating around down in the Arctic sea was "killed" due to global warming. This can not be assumed because there are other factors that come into play. They could have been harmed by humans or by wind or maybe they were really old and it was time for them to die anyways (Global Warming Fraud). The fact that there have been temperature lows over the past few years and huge snow storms is also very plausible; thus conflicted with the idea that the globe is warming (Global Warming is Fake). All other stats stated that defend the fact that global warming is a hoax is plausible and appear to be true.

The Correct Answer to the Question

What is the answer to the question? Well after much thought and consideration of both sides of the story, global warming is true and as a result polar bears are being affected. There is plenty of sufficient evidence supporting that the temperatures are rising all around the country (Climate). Through my own experience, I know that Charlotte has been very hot through the summer months. However, it has hit record lows in the winter months. The statement that the glaciers and sea ice are melting should be supported. It is common knowledge that when the temperatures increase, more ice will melt. Not only will more ice melt, but the ice will melt faster. In the arctic, ice is an absolute necessity for the polar bears. They need the ice for habitat, searching for food, and resting when traveling. If polar bears do not have enough sea ice, they will be affected greatly. Since there is an obvious decline in the polar bear population, something with great affects must be causing it to occur. Therefore, it is certain that global warming is drastically affecting polar bears. Global warming is one of the reasons for the death of polar bears. Without sufficient ice, polar bears can not take the time they need to search for food; as a result, they are eating less and starving themselves. This produces all of the scenarios above that have been discussed, such as less reproduction and death (Blackburn). However, what should be acknowledged is the fact that many polar bears are dying due to global warming, but this is not the only reason for their mortality. There are many other elements in nature that can kill a bear. I bear could be dead because of a strong windstorm that it could not resist, it could die because of old age, or even a human could have killed it (Global Warming Fraud). Since not all polar

bears die because of global warming, scientist and other supporters of global warming should be restricted on what they can say about the relationship between polar bears and global warming. They need to keep the polar bears that die of other causes out of their calculations because that can greatly alter their statistics, making the effect of global warming on polar bears sounds much worse than it actually is. The government should closely regulate the data produced by scientists. Scientists often exaggerate their data and make up things in order to make a large profit; this is not acceptable and should be prevented. Global warming is supported based on the fact that companies are making energy efficient and hybrid products. If global warming was a hoax, this would not be occurring.

Why This Answer is the Most Plausible

This answer is very plausible because unlike other people's answers it provides a little bit of both sides of the story. Although global warming is occurring and it is causing many polar bears to die (Climate), the facts from some of the views of the people against global warming should also be supported. Not all data given by scientists is true and should not be published; thus limiting the global warming activists. This view is plausible because it doesn't give all power to the scientists allowing them to say what ever they want and persuade people to fully believe them.

How This Response May Be Utilized

After reading this response government should take action and begin to address scientists' publication of data. Scientists should then follow this and produce data that does not cause controversy. Also, people would begin to use energy efficient appliances and try to save as much gas as possible. Everyone needs to do all they can to prevent polar bears from becoming extinct. Also, in order to protect polar bears human interaction with them should be prohibited until their population rises back to normal. There should also be work done to bring back their population. This response should be taken very seriously and not left alone.

Questions That Still Exist

Scientists are still unsure of how global warming is going to continue to affect the Earth. They don't know if widespread disease could occur due to the increases in temperature. Also, it is unknown if the polar bear population will die out. Will all the glaciers melt? These are all unknown questions that still exist about global warming and create a questionable future (Some)

Conclusion: Similar Conclusions as Opposing Answers

While researching, there was information found that practically all scientists that supported the theory that Global warming affects polar bears, believed all of the same statements. Their data was very similar and they drew the same conclusions from it.

They all seemed to have the same argument and talk about all of the same problems that dealt with global warming. The few scientists who were against global warming also all seemed to have the same arguments and address the same topics. They would all find fault with global warming by stating random facts about why it is not true. Their data was all very discombobulated and did not flow together very well. However, if all of these scientists believed that same thing, then something must be true about what they are saying.

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