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AP SEMINAR PERFORMANCE TASK RUBRIC: INDIVIDUAL RESEARCH-BASED ESSAY & PRESENTATION
COMPONENT 1 OF 3: INDIVIDUAL WRITTEN ARGUMENT

CONTENT AREA	PERFORMANCE LEVELS		
1 Understanding and Analyzing Context	The essay identifies a research question that is trivial, overly broad in scope, or poorly connected to the context of the source materials. 2	The essay identifies a research question of reasonable scope; however, the question is not sustained or is not controlling the argument throughout the essay; or, it might be only tangentially related to the context of the source materials. 4	The essay identifies a complex research question that is clearly articulated within the context of the source materials. The question is sustained and controls the argument throughout the essay. 6
2 Understanding and Analyzing Perspective	The essay omits or inaccurately represents multiple perspectives and conclusions. It omits or misstates objections, implications, or limitations of one or more perspectives. 2	The essay identifies multiple perspectives and conclusions. It identifies some objections, implications, or limitations of these perspectives. 4	The essay evaluates multiple perspectives and conclusions. It explains objections, implications, and/or limitations of these perspectives. 6
3 Selecting and Using Evidence	The argument incorporates evidence from a minimal range of sources or ineffectively or inaccurately incorporates evidence. 2	The argument uses some combination of evidence, but from a narrow range of sources; or, a wide range of evidence is present but might not be accurately interpreted or synthesized. 4	The argument accurately and thoroughly interprets and synthesizes evidence from a wide range of sources. 6
4 Analyzing and Evaluating Evidence	The essay makes few distinctions among various pieces of evidence, treating all evidence as relevant (or irrelevant), credible (or incredible). 2	The essay distinguishes among various pieces of evidence in terms of their relevance and/or credibility. 4	The essay explicitly distinguishes well among various pieces of evidence in terms of their relevance and credibility. 6
5 Building and Communicating an Argument	The argument is disorganized and poorly reasoned or overly general. The argument presents few or no specific resolutions, conclusions, and/or solutions. 2	The argument is logically organized, but the reasoning may be faulty, or it may be misaligned with the research question. The argument presents specific resolutions, conclusions, and/or solutions that are impractical or do not derive from the line of reasoning. 4	The argument is logically organized, well-reasoned, and complex. The argument presents resolutions, conclusions, and/or solutions that are unambiguously linked to evidence and fully address the research question. 6
6 Building and Communicating an Argument	The essay omits commentary about connections between claims and evidence or offers only very general commentary. 2	The essay uses minimal commentary to link claims and evidence. 4	The essay clearly and convincingly uses commentary to link claims and evidence. 6

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7 Selecting and Using Evidence	The response includes many errors in attribution and citation. The bibliography, if included, is inconsistent in style and format and/or incomplete in citation elements. 1	The response attributes and cites sources used with a reasonable amount of accuracy and thoroughness. The bibliography includes nearly all referenced sources, most of which are consistent and complete in citation elements. 2	The response appears to accurately attribute and cite the sources used. The bibliography includes all referenced sources and is consistent and complete in citation elements. 3
8 Grammar and Style	The report contains many flaws in grammar and style that interfere with communication to the reader. 1	The report contains some flaws in grammar or style that minimally interfere with communication to the reader. 2	The report contains few flaws in grammar or style and clearly communicates to the reader. 3

ADDITIONAL SCORES: In addition to the scores represented on the rubrics, readers can also assign scores of **0** (zero) and **NR** (No Response).

0 (Zero)

A score of **0** is assigned to a single row of the rubric when the response displays a below-minimum level of quality as identified in that row of the rubric. Scores of **0** are assigned to all rows of the rubric when the response is off-topic; a repetition of a prompt; entirely crossed-out; a drawing or other markings; or a response in a language other than English.

NR (No Response)

A score of **NR** is assigned to responses that are blank.

Fertilizer Overload: Something Smells Fishy

The application of fertilizer is a complex and important process that not enough take seriously. For example, Suzanne Simard, a forest ecologist at the University of British Columbia, worries that fertilizer overload can "damage or destroy delicate mycorrhizal networks," which are formed by a symbiotic relationship between fungi and plants, allowing plants with a surplus of food to share nutrients and water with the more unfortunate plants (Simard qtd. in Jabr). Uneven or excessive application of fertilizer can destroy these networks, resulting in different nutrient levels in farmed plants (Jabr). Ultimately, the inconsistency in nutrient levels results in less healthy crops, demonstrating that fertilizer application requires more precision than commonly believed.

However, excessive fertilizer has much more widespread effects than simply destroying fungal networks. Runoff into bodies of water can result in eutrophication, or "the process by which a body of water acquires a high concentration of nutrients, especially phosphates and nitrates" ("Eutrophication"). The surplus of nutrients encourages algal blooms, which cover the surface of the water and block sunlight from penetrating through to the underwater plants. As the underwater plants and the algae die and decompose, they deplete the underlying water of its oxygen content, killing the underwater organisms and leaving behind a "dead zone" in which no organisms can survive (Freeman).

Runoff into bodies of water near farms can result in eutrophic waters, having environmental, medical, and economic repercussions. In addition to destroying underwater environments, toxins produced by the algae in the algal blooms are harmful to humans and other animals and are difficult and expensive to filter out. The Great Lakes in Iowa, the leading

producer of corn in the U.S. according to the Iowa Farm Bureau, are currently becoming eutrophic, presenting multiple dangers to Iowa citizens. Because eutrophication is a natural process spanning thousands of years, Iowa's Great Lakes were most likely mildly eutrophic for "several thousand years," judging by the lack of severe changes in sediment rate or trophic levels, as asserted by John Richard Jones from Iowa State University. However, Donald M. Anderson and his colleagues explained in their article for *Estuaries*, the bimonthly journal of the Estuarine Research Federation, that human intervention in the environment by way of fertilizer has hastened the process dramatically, which has transpired in Iowa's Great Lakes. Fertilizer runoff is not the only factor contributing to eutrophication; runoff from feedlots, places where livestock are kept and fattened up, also add to the nutrient levels in the Iowa Great Lakes (Jones). However, feedlots do not contribute nutrients to the same degree as fertilizer. According to Jamie Bartram, a Don and Jennifer Holzworth Distinguished Professor of Environmental Science and Engineering at UNC Gillings School of Global Public Health, and Ingrid Chorus, a Professor at Umweltbundesamt, Germany, in their book published by the World Health Organization, phosphate levels seem to control how often algal blooms occur, while nitrate levels seem to control the amount of cyanobacteria[1] (and subsequently the levels of cyanotoxins) in those blooms. Feedlots, like fertilizer, contribute to the phosphorous level in lakes, and thus to how often algal blooms occur; however, they do not contribute nitrates to the extent that fertilizer runoff does, so this paper will focus on fertilizer runoff from Iowa's corn industry. Moreover, corn, Iowa's largest crop, is the "most intense user of nitrogen fertilizer" (Delgado, et al., Wheeler). Even so, the economic benefit of increased crop yield due to nitrate and phosphate

[1] Cyanobacteria are photosynthetic bacteria and produce toxins broadly referred to as "cyanotoxins," which in large amounts are dangerous to humans (Bartram).

fertilizer has stopped the Iowa government or other organizations from acting. Weighing the costs and benefits of agricultural fertilizer supplies the question, "Should agricultural fertilizers be regulated by the Iowa government to prevent more harm to the environment due to eutrophication?" Ultimately, a legal, environmental, medical, and economic analysis shows that the costs of the current fertilizer application significantly outweigh the economic benefits. Instead, the most reliable, environmentally- and economically-friendly fertilizer alternative is an alginate-based fertilizer, which slowly releases the nitrate and phosphate nutrients from a gel capsule into the soil, without the need of reapplication after every irrigation or storm, and remains in the ground for more than one planting season, decreasing the chance or fertilizer overload and lowering the economic cost for farmers.

The first part of the question that must be addressed is whether the Iowa government has any responsibility to intervene and regulate agricultural fertilizers. Thomas Frieden, director of the Centers for Disease Control and Prevention, states in his article for the *New England Journal of Medicine* that government has a responsibility to "protect individuals from unhealthy environments," including environments where the health risks are created by natural occurrences or by people or organizations. If the situation in Iowa's eutrophic Great Lakes present health risks to Iowa citizens, Iowa's state government has a duty to intervene should intervene. Furthermore, Frieden argues that a key role of government is to protect health through "population-wide action," which is "often more effective and efficient" than the actions of individuals. Although some oppose government regulation and intervention, arguing that it is unnecessary, if the harms of the current fertilizer practices are found to outweigh the benefits, then it is our responsibility as a society to ensure safety for our fellow citizens. Unfortunately,

the problem of eutrophication is too great for individual organizations to correct. Furthermore, there are no government-independent organizations focused solely on the problems of eutrophication and fertilizer overload, and the formation of such a group would take far too long, delaying much-needed relief. Thus, a government action is the best method of promoting alginate-based fertilizers, instead of individual organizations promoting alginate-based fertilizers.

Through a thorough medical analysis, it is clear that eutrophication and algal blooms present health risks to Iowa's citizens. Algal blooms are commonly made up of cyanobacteria and a strain of dinoflagellates[2] known as *pfiesteria*, and both present dangers to humans. The World Health Organization Regional Office for Europe and the European Union collaborated on the article "Eutrophication and Health," reporting that cyanobacteria, which proliferate rapidly in eutrophic freshwater, produce toxins that have been implicated in previous animal and human poisoning. Cyanotoxins are produced in about 75% of all cyanobacterial blooms, and so it is very likely that the algal blooms in Iowa contain cyanotoxins (Bonnefoy f11). These cyanotoxins affect cells, tissues, and organs of the nervous, digestive, respiratory, and cutaneous systems at the molecular level, resulting in symptoms such as "fatigue, headache, diarrhoea, vomiting, sore throat, fever and skin irritations" (Bonnefoy f10). Furthermore, Wayne W. Carmichael, a Professor of Aquatic Biology/Toxicology at Wright State University, along with Geoffrey A. Codd, an Emeritus Professor of Microbiology at the University of Dundee, and Olav M. Skulberg, a co-founder of the NIVA Culture Collection of Algae, found that drinking contaminated water has been shown to rapidly kill animals, presenting a danger to humans whose drinking water sources are eutrophic. Unfortunately, one of Iowa's main sources of

[2] Dinoflagellates are protists, single-celled organisms that cannot be classified as true animals, plants, or fungi ("Dinoflagellates," Corliss).

drinking water is seven deep wells in four well fields around Clinton, Iowa ("Iowa American Water"). Despite being underground, the wells are not safe, as nitrogen is "quite mobile in soil and can easily reach groundwater," thus threatening the integrity of Iowa's drinking water (Patz).

Pfiesteria, a type of dinoflagellate, also produces dangerous toxins. An article published in *Environmental Health Perspectives* explains that there are thought to be two receptors responsive to the toxin, including one neurotransmitter. Professor Jonathan Patz, director of the Global Health Institute at the University of Wisconsin-Madison, writes that humans can be affected merely by coming into physical contact with the toxins, resulting in memory loss or confusion, headache, skin rashes at the site of water contact, a sensation of burning skin, eye irritation, upper respiratory irritation, muscle cramps, and gastrointestinal upset. As with cyanobacteria, *pfiesteria* is difficult to remove once it is in the water, so it is vital that eutrophication be prevented in the first place, before the nutrient levels in the water get too great.

The most prominent argument for fertilizer use is that it increases crop yield and therefore helps the economy. However, such intensive and excessive fertilizer use hurts the economy by making water filtration unnecessarily expensive, posing a danger to fisheries, and decreasing recreational revenue. First, organic matter is, by itself, difficult to filter out (Freeman). Coupled with toxins, eutrophic water becomes expensive to treat, especially considering that the end product is not guaranteed safe to drink or touch (Freeman). The European Commission and WHO agree that the best way to deal with eutrophic water sources is to switch to another source altogether, as it is too difficult, expensive, and unpredictable to filter eutrophic, toxic water (Bonnefoy f16). As Iowa's water sources are not yet a lost cause, Iowa

should focus on mitigating fertilizer runoff to prevent the eutrophication level from becoming so extreme that it forms dead zones.

Eutrophication also poses a danger to fisheries. Algal blooms deplete aquatic environments of oxygen and block sunlight from underwater plants, thus resulting in an oxygen-depleted environment in which fish cannot survive. The California Environmental Protection Agency states that farmed fish living in eutrophic waters often die, or absorb the toxins that may be passed onto humans once consumed. Fish raised for game-stocking purposes also have trouble surviving, due to both the oxygen-depletion and the toxins released by bacteria making up the algal blooms (Jones). Although Jones wrote for the California Environmental Protection Agency, her article warns of human and economic detriments that are not specific to California, but instead possible in many areas, as fisheries are generally placed in comparable environments throughout the United States, so the harms this article speaks of are relevant to Iowa. Furthermore, the state stands to lose recreational revenue, as toxins produced by the bacteria in algal blooms can harm humans just through physical contact (Patz). As Iowa's citizens may be physically harmed, the state government of Iowa has a duty to protect them and prevent any further harm, which Thomas Frieden, director of the Centers for Disease Control and Prevention, establishes as a fundamental governmental obligation.

One proposed solution to prevent further eutrophication is to ban fall fertilizer applications, with the rationale being that, since crops are planted in the spring, applying fertilizer during the fall was superfluous. However, Daniel Otto, an Emeritus Professor at Iowa State University, argues that this proposal has negative agronomic and economic implications. First, fall fertilizer increases the nutrient availability and crop yield, as well as lessens the labor

and equipment loading during the stressful springtime; if fall fertilizer were to be banned, additional fieldwork in the spring to compensate could result in planting delays and lower yields and economic returns (Otto). Furthermore, fall fertilizer can minimize soil compaction, which "impairs [soil's] natural aeration and water-holding capacity" and may damage the soil structure (Otto). Thus, banning fall fertilizer is not a viable option, as it does more harm than good.

However, alginate-based fertilizers, while not well-known, present a practical alternative to the intensive fertilizer application currently in use. An article published in the *Transactions of the Kansas Academy of Science* introduces alginate-based fertilizers as feasible solution for the problem of nutrient runoff. Alginate-based fertilizers are fertilizers that contain sodium alginate, a non-toxic gelling agent that might itself might give nutrients to the plant, as a base for the fertilizer. This base, in the form of a capsule, would allow for the nutrients to be released slowly, whenever the plant needed nutrients. Furthermore, the fertilizer would not have to be reapplied as frequently as it is currently, such as after irrigation or rain, as the capsules are underground and last for at least one planting season. This would mean not only an economic benefit for the farmers, as they would not have to spend so much time and money reapplying fertilizer, but also would significantly reduce the environmental harms of current fertilizers, which have a short lifespan and run off into streams easily.

Ultimately, although fertilizer increases crop yield, runoff into bodies of water damages aquatic environments and encourages the growth of dangerous, toxin-producing algae. Furthermore, it is expensive to filter out the organic matter from drinking water, and the toxins can be harmful just through physical contact, decreasing recreational revenue. It would be much easier to prevent eutrophication from occurring in the first place, and an alginate-based fertilizer,

while not well-known, is the most environmentally- and economically-friendly alternative to conventional fertilizing methods. A state-wide act by the Iowa government would be most effective in establishing alginate-based fertilizers; furthermore, the government has a fundamental obligation to take measures to protect its citizens from the dangers presented by eutrophication. Beyond mandating the use of alginate-based fertilizers to prevent further eutrophication, the damaging effects of eutrophication and the subsequent algal blooms must be made well-know so that citizens everywhere, not just in Iowa, can be protected from the deadly toxins produced by the bacteria that make up the algal blooms.

(word count: 2134)

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Muse and Wolf

AP Seminar

29 March 2016

Language: Its Transformation and Effects

Introduction:

Language is defined as: “a system of communication by speaking, writing, or making signs in a way that can be understood, or any different systems of communication used in particular regions”(“Language Definition in the Cambridge English Dictionary). Unfortunately, one language dies every 14 days, and it is of English, Spanish, and Mandarin (Rhymer). For several, language is a sense of expression, a display of things loved, foods that are eaten, or even celebratory events. For others, language is simply a means of business, mere communication to receive necessary funds to complete trade to estimated that by the next century that the seven thousand tongues spoken on Earth will become extinct in favor survive. As technology has developed universally, communication has become more important to increase both foreign and domestic trade worldwide. Throughout this paper I will display how the increasing need for a dominant language has increased in the world of academics as well as business and international affairs, and has led to the decrease of language as well as the loss of certain cultural activities and/or practices.

English: Its Growing Influence

English is everywhere. 380 million speak it as their native language, and about 2/3 of the population speak it as their second. With about a billion individuals learning to speak it every day it is predicted to be the outlook for business, the lingua franca; and common language of all

of the world (Johnson). English is the language of both the world of computers and the worldwide web. The tongue that derived from the 1300s was once used by "the low people of England, as Robert of Gloucester put at that time and has come a long way" (Johnson). A relative example of why the English language is arising to be the global tongue is because of academic means. When viewing globalization it is important to examine what factors are behind the phenomenon itself. For globalization there are three key factors: "the factors that influence it, what drives the factors, and lastly the manifestations it produces in everyday life" (Johnson). An ethnographic case study was conducted by Macalester college student Anne Johnson, who spoke with English students in Beijing China as well as English students in Maastricht Netherlands during their spring semester of school. After interviewing several of the students she learned that many were disappointed that they weren't encouraged to speak their own native languages and in fact several accounted that they were "encouraged to speak English frequently on all forms of communication" (Johnson).

Spanish: its Growing Influence

Among the top three languages for business, commerce, and academics would be Spanish (Flamey). As of 2015, close to almost half of America is composed of Hispanic ethnicity or descent (U.S. Census Looking at Big Changes in how it asks about Race and Ethnicity). This makes Spanish a close contender to English as a dominant language, though English still overpowers it. This has caused for schools to make ESOL, "English for Speakers of other Languages" programs for these children. The program consists of a teacher who is a bilingual speaker, mainly dominant in Spanish, who takes the designated group of students to a separate classroom for individual English learning. The creation of this program proves a point about why

the push for a dominant language is occurring. A common scenario that many ESOL kids have is the fact that they feel isolated and different because they are in a different classroom and don't speak the language that they grew up with. On the other hand some Hispanic parents find that even though it is somewhat necessary for them to assimilate into school, it takes away from their traditional practices at home because they are busy studying Spanish (Gonzalez). In the perspective of the children it is hard for them to decipher whether they should adapt to either or language, but a majority feel that English is more important because that is what the other students are speaking at school. This causes a decrease in many Hispanic celebrations such as Cinco de Mayo and quinceneras(15^{th} birthday celebration) because some children were noted to want to do more Americanized and English tradition parties(Gonzalez). The reason for the need of a dominant language in school is understandable as it makes life easier on the teachers, but there is also an impact left on the kids that have to separate to learn just so they can catch up with the English learners.

The need for a Dominant Language in Business

When speaking in terms of commerce, international sectors for trade use English for all trade conducted (Cook). In most areas of international commerce, besides retail, English is used as the official language because it's not only spoken by more than 380 million people but also the highest second language taught in a majority of non-English speaking countries(Johnson). Reuters, the largest international agency for multimedia and international affairs, estimates that out of a survey of "16,344 employed adults in 26 countries showed that 67 percent, or just over two-thirds, of workers who deal with people beyond their borders said English was the language used most often, with Spanish a very distant second at five percent" (Alsilbly). From this survey

it was also accounted about sixty one percent said that the language that they had used for such business transactions were different from their native language. Essential they study concluded that more than “two thirds of workers in the Asia-Pacific regions, Middle east and Africa also have the dominant language when dealing with business transactions and individuals of other countries” (Alsilbly). Dorie Cook business executive and contributor to Forbes magazine column conducted study on dominant language through standardized testing. The 1.6 million test takers spanned over fifty countries noted that they partook in the English assessment to “better their chances at a job and catch on to the world’s language” (Cook). Studies like this illustrate how English has become dominant on all fronts, especially business. As of year 2020 it is estimated that English will be spoken by two billion people, more than triple the amount that there is presently ("Rangelands for the Future" 3-4).

How Culture is lost

Unfortunately with the need for a dominant language calls for a decrease in the languages seldom used. This has led to what I will be describing as “decrease in traditional language as well as culture”. The increase of globalization leads to the decrease in cultural diversity, because with globalization and growing businesses there needs to be a uniform set of language so that goods and factions can be transferred and transported. Athabaskan, a language spoken by the Siletz tribe in the Pacific Northwest is an example of a language that is becoming extinct in this area (Donovan). Not only is the language dying, but so are traditional practices that the language contains, which are how they wash their clothes with the ocean water, eat certain foods, and celebrate certain events and occurrences (Donovan). Another example of unfortunate culture loss can be illustrated with that of the Eyak culture. The Eyak tribe were an indigenous group that

was located on the Copper River Delta, near a town about east of Cordova Alaska ("Alaskan People: Alaska Eyak Tribe"). They were known to have a culture of shamanism, in which they displayed in their painted wooden figures of humans, animals, and objects that they found significant to the culture. Unfortunately due to the high need of globalization of one of their most exported goods, Zinc and lead ores/concentrates as well as fresh meats, there was a high need to stabilize one language to make trade and communication easier throughout the whole state. (Statistics). In 2008, Chief Marie Smith Jones of Anchorage, Alaska passed away and so did the Eyak language because of the globalization. She was the last individual who tried hard to keep it alive for others to follow the Eyak culture, but unfortunately with her death the Eyak language died as well (Donovan).

Significance in Language preservation

There is high value in the perseverance of all languages because in language evokes the culture and voice of people. It is said that there is significant amounts of cultural identity in one's language which is why it is truly important to read and annotate different languages and capture "what lives in a language before it "dies" (Harrison). Language is similar to DNA, it is the building blocks and readings of culture, and to decipher it we must keep it and decode it. (Ettlinger) Understanding how a language works and develops can ultimately provide insight into helping the elderly of the population with specific language impairment. There may be some scientific linkage on how studying language in the brain can unlock secrets to why some diseases occur and why they affect the brain the way they do. Researchers from the University of Ghent in Belgium recently published a study that added to the growing evidence that bilingualism can delay the onset of Alzheimer's. The study consisted of 134 individuals who were receiving

Alzheimer treatments over a period of one year. According to the study's results, 65 of the individuals who were either bilingual or multilingual had better results than those who were monolingual. In other words the analysis showed that those who had known another language or more could last longer without the dreadful effects of the disease (Sauer). Through their cognitive research it was noted that having “more or one language acting in the brain challenges the brain's grey cells and keeps them from degenerating”(Sauer)This study argues the fact that forcing a dominant language and decreasing other languages could take away the life span of some individuals who are bilingual or multilingual.(Sauer).

Conclusion

Language is something that can be lost and found. For many they feel as though when a language is out to the side and somewhat “forgotten” that the language will soon disappear. Implications of my claim would be the fact that there are still several multilingual cultures around today. There are several who study their language diligently and never let their culture slide for a lingua franca. Unfortunately due to both pressing needs for growth in the economy as well as adjustments needed to be made in the system of academics it is hard to salvage languages that aren’t dominantly practiced. In terms of education, there is the unfortunate need for one language to decrease the amount of confusion in schools and increase the amount of efficiency for all students attending. With the aforementioned implications, my claim still stands strong on the fact that the need for dominant languages has called for the abrupt decreases in traditional practices and activities illustrated prior. On the point of counterclaims many feel that language is something that each holds within themselves and is never truly lost. Adversely, there is evidence throughout the essay that proves otherwise. Unfortunately in such a world of large business and

an ever growing economy there needs to be room for ecological advance and with that the need for dominant language has arisen. Ultimately there needs to be a dominant language to help increase uniformity but also there needs to be a way to still let those who choose to have their own cultural practices continue without feeling intimidated. (2173 words)

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Introduction

Plants have tendencies to grow in relation to each other. But, how would we know what's the communication? How do we know the comparison of one another? Research has come to a conclusion that plants do communicate in their own special way. Plants often interact within the plant, plant to plant, and plant to insect.

Background Information

According to the article "Do plants communicate by Bill Robertson", He mentions that plants do communicate. They have significant ways of communicating and he tells us a little about it. For example, "You most likely realize that plants draw supplements and liquids in through their roots and afterward transport those things to whatever remains of the plant. How leaves cooperate with the environment influences the inside weight of the plant and along these lines influence the transportation of materials from the roots to whatever is left of the plant". This information goes to show how plants communicate within their self. It is important to recognize this because; it gives basic information on one reason why plants communicate with the atmosphere. However, the interaction of the leaves with the sun is also how plants communicate. Photosynthesis gives off food that is needed for the plants. But then digs deeper into experiment. "Plants, like humans, use long chain molecules called ribonucleic acid (RNA) to send messages from one cell to another". This basically is a basic component of how Messenger molecule travels in both directions and affects the levels of protein.

Plant to Plant

Plants communicate with the outside world in variety of ways. One way is through the roots. The roots release chemicals that can be attractive or repelled against organisms. Majority of the times it's beneficial to the plant but sometimes it's not. According to the article do plants communicate it states that "there are certain kinds of parasitic plants (plants that live off other plants with or without giving a benefit to the "host" plant) that requires the presence of particular chemicals." In other words, the most important chemicals come from the host plant. Plants communicate with other plants through chemicals being released into the air. For example, the Karban and Baxter plants. Scientist made an investigation that, when cutting off their leaves it releases a chemical to prevent insects from damaging the plant. As stated by Bill Robertson in the article Q: Do plants communicate? "Researcher examined a region that contained both sorts of plants (Karban and Baxter 2001). They cut the leaves of a percentage of the sagebrush plants in a way that emulated harm brought on by creepy crawlies. This cause the wise brush to discharge a compound (methyljasmonate)…"! This shows how as I said before, the chemical being released in the air contacts another plant and that's how they communicate to keep the insects away and damaging the plant.

Plant to insect

Plants communicate with insects visually. Plants need insects to reproduce so they have to have a connection between one another. For example, "insects (and some birds and bats) go after the pollen and nectar in flowers because, well, they use them." This information is an example of how plants communicate. It is important to recognize this because it gives an appearance of how plants and insects have a communication between each other. One the other hand,

Plant Behavior

Plant behaviors are as rapid as a car drive on the highway. Plants behavior has recently been an intense research and has several reviews. Plants leaves and roots placement allows them to actively modify their essentials of water, sunlight and nutrients. According to plants behavior and communication article, the chart states that, foraging movement is a behavior, contact, light, gravity is the stimulus and it has many tissue responding. The consequence of this is basically and advantage which is improved resources. Also, another behavior is Reproductive strategy. Its stimulus is Environ conditions, pollinators. It has a shoot meristems tissue responding and the consequence is outcrossing rates, reproductive success. There are plenty more, but as of now I'll only give off those few. Those examples are basically the consequence that borders environments plant experiences.

Plants eavesdrop

Plants can easily eavesdrop on the signal of another plant and sometimes respond to it. 48 studies have shown that plants increase their defense after their neighbor is damaged. For example, "when wounded by a hornworm, sagebrush releases defensive proteins called trypsin proteinase inhibitors (TPIs), which prevent the insect from digesting protein and stunt its growth. When neighboring plants—even other species—are exposed to the chemical signals of damaged sagebrush, they begin readying their defenses. Wild tobacco, scientists found, begins prepping to make these TPIs when it senses a distress call from sagebrush, giving it a head start on defending itself if the caterpillar comes calling." This information is the jest of how, when plants eavesdrop on one another the outcome and what's happening during that period of time.

Plants and Mammals

Some plants again release a chemical that warns other plants of attacks. Due to animals interacting with plants it interferes and their process of growing which indicates that they will die and the chemical that is being release from the plant that was originated from the animal, warns the other plants. This research then became even deeper because of the simple fact that; animals have a huge part on the communication between them. This is like a sunflower and a bee. For instance, when the bee takes the nectar out of the sunflower, the flower dies. During this process a chemical is then released to the other plants that weren't involved in the bee process. It gives off a chemical that can more or likely fight off the interaction between itself and a bee that may come for some nectar out of the next sunflower. All in all, plants and animals have a communication that can be both a good and bad connotation.

Conclusion

In summation to this research, plants communication in several different ways. Whether its within itself or, with other non or living things. It shows how they communicate in both the positive and negative connotation." In last 15 years the idea that plants are communicating has become much more accepted. It's exciting to unravel all these different realms of plant communication. —Richard Karban, University of California, Davis".

View Point

I personally think that the research was awesome. The feedback that I've received from documents online and articles about my topic was more than effective. It gave me a clear understanding on my topic and forced me to learn more and more about "plants communicating". This was an interesting topic about plants that not even in my biology class I went that deep into.

I find it unclear on why I haven't been experienced to this material while in school or if I missed a day of school and they decided to go over this while I wasn't there. But it sure did help me out tremendously with my investigation. Honestly, if I didn't take it upon myself to choose this topic and research it I would still be stuck in the blind. Not knowing what plants do other than growing for crops, food and etc. Also, the chemical that plants release before they die also was something NEW to me.

Resolution

There can be plenty of ways to fix plants communication though. For example, because plants communicate by giving off a chemical, it can somehow get into the air and affect humans. Maybe if the soil was another way plants communicate I think that will, help out a lot. The chemical can be harmful to individuals that are of life. For example, humans. We may be affected by the chemical that plants give off. Because it's not visible to our eyes we wouldn't know how to avoid it when coming in our direction. An experiment should be done to test the chemical and see how dangerous and can be to humans like us. Meanwhile, we are just sitting around not doing anything about the problem because we think it is okay. Yes, it is okay for plants to communicate to warn others about anything harmful that is coming their way but what is the chemical the plant is releasing is actually doing the damage to human like things. How would you felt if the chemical was really DANGEROUS? Will you then want to take notice and start an investigation? What will move you to "get up" and think about what the chemical is doing to life.

One of my suggestions would be to come together as a community to observe what the chemical may or may not be doing to our environment. What can we do as a whole to

solve this problem? Make the community look and feel better so that we can live our life as whole and keep our place clean. Also, we would be able to communicate

Citation page

http://mentalfloss.com/article/66302/5-ways-plants-communicate

Plant behavior and communication

Q: Do plants communicate?

Darwin (1880), Braam (2005)

Bradshaw (1965) Paige and Whitham (1987)

http://www.bbc.co.uk/schools/gcsebitesize/science/triple_edexcel/behaviour/animal_plant_behaviour/revision/4/

http://www.the-scientist.com/?articles.view/articleNo/38727/title/Plant-Talk/

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Performance Task 2 — Individual Written Argument

Overview

This task assessed students' ability to:

- Enter into the academic conversation;
- Write at the college level;
- Generate a relevant research question based on provided stimulus material;
- Synthesize information from provided sources;
- Identify a theme rather than simply isolate a topic for an expository or descriptive essay;
- Conduct an independent inquiry of specific interest;
- Conduct scholarly research;
- Read, analyze, and evaluate complex arguments;
- Transition the research process from conception to written document;
- Generate their own perspective/position from the context of the source materials;
- Articulate an evidence-based argument avoiding oversimplification;;
- Evaluate the credibility and relevance of evidence and/or resources that they have discovered and intend to use;
- Use relevant and credible evidence to support claims and cite sources correctly;
- Challenge claims and critique arguments;
- Evaluate multiple perspectives on a single topic;
- Reach conclusions and formulate arguments that are connected to evidence; and
- Acknowledge the limitations and/or implications of their own conclusions, solutions and/or resolutions.

Sample: A
Content Area: Understanding and Analyzing Context — Row 1 Score: 6
Content Area: Understanding and Analyzing Perspective — Row 2 Score: 6
Content Area: Selecting and Using Evidence — Row 3 Score: 6
Content Area: Analyzing and Evaluating Evidence — Row 4 Score: 6
Content Area: Building and Communicating an Argument — Row 5 Score: 6
Content Area: Building and Communicating an Argument — Row 6 Score: 6
Content Area: Selecting and Using Evidence — Row 7 Score: 3
Content Area: Grammar and Style — Row 8 Score: 3

HIGH SAMPLE RESPONSE

Content Area: Understanding and Analyzing Context — Row 1
The response earned 6 points in this row because it uses "The Secret Life of Plants" to identify the area of inquiry. Furthermore, the research question – "Should agricultural fertilizers be regulated by the Iowa government to prevent more harm to the environment due to eutrophication?" – has a reasonable scope, limiting its examination to specifically the Iowa government and eutrophication. The question invites debate through the weighing of the benefits and detriments of agricultural fertilizers.

Content Area: Understanding and Analyzing Perspective — Row 2
The response earned 6 points in this row because it addresses many stakeholders and facets of the issue regarding agricultural fertilizers in Iowa. It first establishes the government's obligation, it then demonstrates the medical and environmental detriments of using these fertilizers, and it thoughtfully examines the economic ramifications for industries. Additionally, after the response's

examination of each perspective, it engages with the implications of its findings (e.g., "Although some oppose government regulation and intervention, arguing that it is unnecessary, if the harms of the current fertilizer practices are found to outweigh the benefits, then it is our responsibility as a society to ensure safety for our fellow citizens.")

Content Area: Selecting and Using Evidence — Row 3
The response earned 6 points in this row because of the wide range of sources it employs, as seen in the extensive works cited page. The response makes use of academic sources as well as sources that represent different stakeholders involved in the issue. The response also synthesizes the sources well, as it selects concise, relevant text from sources which is thoughtfully integrated into the response's claims.

Content Area: Analyzing and Evaluating Evidence — Row 4
The response earned 6 points in this row because it thoughtfully and consistently analyzes sources' relevance and credibility. For example, the response, when using a source speaking on California, clarified its relevance: "Although Jones wrote for the California Environmental Protection Agency, her article warns of human and economic detriments that are not specific to California, but instead possible in many areas, as fisheries are generally placed in comparable environments throughout the United States." Additionally, the response goes beyond merely citing the credentials/background of the sources' authors, and delves into the reasoning behind sources' conclusions: "However, Daniel Otto, an Emeritus Professor at Iowa State University, argues that this proposal has negative agronomic and economic implications. First, fall fertilizer increases the nutrient availability and crop yield, as well as lessens the labor and equipment loading during the stressful springtime. If fall fertilizer were to be banned, additional fieldwork in the spring to compensate could result in planting delays and lower yields and economic returns (Otto)."

Content Area: Building and Communicating an Argument — Row 5
The response earned 6 points in this row because it is thoughtfully organized. The response identifies an area of inquiry and examines the significance of the issue as well as justifying the scope of the question (looking specifically toward Iowa and eutrophication). It establishes the role of the government (the actor in the research question), then details the environmental/medical detriments (to determine whether the government should intervene), then examines the supposed economic benefits (and uncovering the actual costs), and finally considers two potential solutions to Iowa's current agricultural fertilizer use.

Content Area: Building and Communicating an Argument — Row 6
The response earned 6 points in this row because the commentary thoughtfully connects evidence to claims. The voice of the response is prominent, as it clearly and convincingly employs commentary to link evidence to claims. For example, on pages 3-4, the response's analysis of and commentary on the Frieden source allows it to arrive at the conclusion that "a government action is the best method of promoting alginate-based fertilizers, instead of individual organizations promoting alginate-based fertilizers."

Content Area: Selecting and Using Evidence — Row 7
The response earned 3 points in this row because it thoroughly and consistently cites information that is treated as factual. Additionally, the bibliography is complete, as it includes an entry for all in-text citations. The bibliographic citations and the parenthetical citations are written in a consistent manner.

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Performance Task 2 — Individual Written Argument

Content Area: Grammar and Style — Row 8
The response earned 3 points in this row because it contains few flaws in grammar. It is well-written: its precise diction and concise style allow it to clearly communicate to the reader.

Sample: B
Content Area: Understanding and Analyzing Context — Row 1 Score: 4
Content Area: Understanding and Analyzing Perspective — Row 2 Score: 4
Content Area: Selecting and Using Evidence — Row 3 Score: 4
Content Area: Analyzing and Evaluating Evidence — Row 4 Score: 4
Content Area: Building and Communicating an Argument — Row 5 Score: 4
Content Area: Building and Communicating an Argument — Row 6 Score: 2
Content Area: Selecting and Using Evidence — Row 7 Score: 2
Content Area: Grammar and Style — Row 8 Score: 3

MEDIUM SAMPLE RESPONSE

Content Area: Understanding and Analyzing Context — Row 1
The response earned 4 points for this row because of the quality of the question: the implied research question -- What are the benefits of a dominant language? -- is broad and lacks complexity. The response does, however, have a strong connection to the source material (Vanishing Voices), in that it acts almost as a counterpoint to "Vanishing Voices" in identifying what is gained in having a dominant language, rather than examining what is lost. While it could have been narrower in scope, the question effectively controls the argument throughout the response.

Content Area: Understanding and Analyzing Perspective — Row 2
The response earned 4 points for this row because there is little assessment done of the objections, implications, and limitations of the given perspectives. Moreover, the different perspectives are not placed in conversation with each other, further limiting the discussion of objections, implications, and limitations. The response does, however, clearly identify perspectives (i.e., the role of English, the role of Spanish, language in business, language as a part of culture, etc.).

Content Area: Selecting and Using Evidence — Row 3
The response earned 4 points in this row because the range of sources and the incorporation of said sources are adequate. While the response does include a range of sources – a book, articles, a research study – the response primarily makes use of journalistic sources, thus limiting the effectiveness of the evidence. Additionally, when incorporating the evidence, the response often does not clearly distinguish between its own voice and the voice of the sources. While evidence is present throughout the response, the quality of synthesis is inconsistent as evidence is often presented without interpretation.

Content Area: Analyzing and Evaluating Evidence — Row 4
The response earned 4 points in this row because most of the sources are cited exclusively through parenthetical citations and not analyzed for credibility or relevance. There are, however, moments of credibility assessment -- "Dorie Cook business executive and contributor to Forbes magazine column." The attempts at assessment of credibility identify credentials of authors but fail to explain the relevance of those credentials to the claims presented. To move to a higher score, this

response would have needed to further and more consistently discuss the relevance of an authors credentials or the credibility of the evidence presented.

Content Area: Building and Communicating an Argument — Row 5
The response earned 4 points in this row because despite it having identified important perspectives and describing each of those important perspectives, it does not connect the aforementioned perspectives together to make a cohesive argument or a clear line of reasoning. The implicit connections between the different subsections of the response are logical. To move to a higher score, this response would have needed to make the links explicit to build a stronger line of reasoning.

Content Area: Building and Communicating an Argument — Row 6
The response earned 4 points in this row because it does provide some commentary: "The reason for the need of a dominant language in school is understandable as it makes life easier on the teachers, but there is also an impact left on the kids that have to separate to learn just so they can catch up with English speakers." However, on the whole, the response presents evidence with only minimal linking of evidence to claims. Many of the paper's subsections conclude with evidence from sources, rather than student commentary.

Content Area: Selecting and Using Evidence — Row 7
The response earned 2 points in this row because while there is a reasonable attempt at accuracy and consistency, the citation is inconsistent at times: ("Language Definition in the Cambridge English Dictionary). The order of the bibliography is hard to follow and contains incomplete information about sources.

Content Area: Grammar and Style — Row 8
The response earned 2 points in this row because most of the writing is clear, but there are sections that lack clarity: "Essential they study concluded..."

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Performance Task 2 — Individual Written Argument

Sample: C
Content Area: Understanding and Analyzing Context — Row 1 Score: 2
Content Area: Understanding and Analyzing Perspective — Row 2 Score: 2
Content Area: Selecting and Using Evidence — Row 3 Score: 2
Content Area: Analyzing and Evaluating Evidence — Row 4 Score: 2
Content Area: Building and Communicating an Argument — Row 5 Score: 2
Content Area: Building and Communicating an Argument — Row 6 Score: 2
Content Area: Selecting and Using Evidence — Row 7 Score: 1
Content Area: Grammar and Style — Row 8 Score: 1

LOW SAMPLE RESPONSE

Content Area: Understanding and Analyzing Context — Row 1
The response earned 2 points in this row because, the question -- "How do we know what's the communication? How do we know the comparison of one another?" -- is simple, broad, and expository. Instead of framing an argument, the question sets up the response to be descriptive. While the topic itself was clearly connected to the context of the source material (The Secret Life of Plants), there is no explicit treatment of the source.

Content Area: Understanding and Analyzing Perspective — Row 2
The response earned 2 points in this row because it only conveys the perspective that plants do communicate, without inviting any debate or exploring implications and/or limitations of that one perspective. The response does provide different ways that plants communicate, but those ways do not qualify as different perspectives.

Content Area: Selecting and Using Evidence — Row 3
The response earned 2 points in this row because there are a limited number of sources. Due to the lack of complete citation and student analysis, it is impossible to discern the quality and range of sources. The sources are not incorporated well, as the response fails to introduce or contextualize quotes. The response, many times, introduces a quotation by simply saying "for example." The bibliography is incomplete and the sources that are identifiable by links (mentalfloss.com, BBC, and the-scientist.com) are from a narrow range of source types that are largely journalistic.

Content Area: Analyzing and Evaluating Evidence — Row 4
The response earned 2 points in this row because it does not distinguish between sources. For example, when citing Bill Roberston, it just articulates his name without any discussion of relevance or credibility of either the author or the evidence itself. Additionally, sometimes quotations are included without an indication of the author, which does not allow for any discussion of relevance or credibility. While the response makes use of sources claims, it does not delve into the reasoning or evidence behind those claims.

Content Area: Building and Communicating an Argument — Row 5
The response earned 2 points in this row because the organization is unclear and the response fails to develop any specific conclusions. The response divides the argument into subheadings, but does not describe the connections between the different subsections of the paper, which makes the order and purpose behind the organization unclear. The only discernable conclusion, that plants communicate, is stated as a fact in the introduction instead of an argument to be developed

throughout the response. Therefore, the response does not develop any "conclusions," as the argument does not arrive anywhere new. The response ends by exploring a "resolution" to an expository question, indicating that it is misaligned from the research question. The lack of a clear question that invited debate and complexity impeded the responses ability to develop an organized argument with strongly supported conclusions, solutions, or resolutions.

Content Area: Building and Communicating an Argument — Row 6
The response earned 2 points in this row because the quotations often overwhelm the paper and leave little room for student commentary. For example, in the "Plants eavesdrop" section of the paper, the quotation comprises almost the entirety of that subsection. The commentary that is present in the response is overly general and not linked to evidence (e.g., “All in all, plants and animals have a communication that can be both a good and bad connotation.”).

Content Area: Selecting and Using Evidence — Row 7
The response earned 1 point in this row because the works cited lacks both consistency and clarity. In the “citation page,” some of the sources have the article's title, some have the author's last name and year published, and some are just links.

Content Area: Grammar and Style — Row 8
The response earned 1 point in this row because the response has several errors (e.g., "But then digs deeper into experiment"). The prose is generally clear but the conversational tone can at times distract from the strength of the argument. The writing also appears to be incomplete as the response ends with “Also, we would be able to communicate”; the lack of period makes it unclear whether the final sentence was meant to be the response’s conclusion or if the response remained unfinished.