



Frontenac, Lennox & Addington Science Fair

Expo-sciences de Frontenac, Lennox & Addington

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Prefair Report

2403 **Madysen Webb**

Div/Cat **Human Health / Junior**

Title: **Light and its affects on human emotions**

Summary: Hypothesis:
I believe that different light sources can have different effects on human emotions. from my research i have found four different colours (blue, green, purple, orange) each colour has different effect on your emotions. I think that every possible colour will make you have different emotions.

Research Findings:
I found out through my research that my hypothesis is correct. From the four different colours I chose they each have different effects on human emotions for example, Blue light known as the "bringer of peace" blue can be used to lower high blood pressure or to calm people down. It's also used for light therapies for people who have circadian rhythm disorders. In lighting and interior design, blue can be used to portray trust, loyalty, wisdom, confidence, intelligence, faith, truth, sincerity, cleanliness, air, sky, water, health.

Green light is known as the "strength provider," green is the colour of nature. Green light therapy stimulates of growth hormones and strengthen your muscles, bones and other tissues. It can also boost your immune system. In lighting and interior design, green can be portray nature, growth, cool, money, health, envy, harmony, calmness, fertility, safety, ambition.

Purple light can help reduce emotional and mental stress. Lighting and interior design projects can implement purple to portray royalty, power, nobility, luxury, ambition, wisdom, dignity, independence, creativity, mystery, magic and romance.

Orange light is known as the "source of creativity," orange stimulates the creative thought process and can help and can help people come up with new ideas. In lighting and interior design, orange can be used to portray happiness, energy, enthusiasm, warmth, wealth, prosperity, sophistication, change and stimulation.

(the rest is in progress)

Conclusion:
In conclusion from my research I have found that each colour has different effects on human emotions, different colours of light can make you feel different things. From my research I found that having different colours of light can be very good for us but can also have a negative effect on people.



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Prefair Report

2404 Isabel McDonald, Daisy Crawford

Div/Cat Human Health / Junior

Title: iMemory

Summary: iMemory

There has been much discussion recently about the effects of electronics on the brain, in particular, the ability to remember information. It is hypothesized that electronics do affect how well people remember information, and so we are constructing an experiment to determine this. Our project seeks to investigate and later prove that media, specifically paper versus electronic text, affects students ability to learn and retain information. And here is how we are going about it. We have a group of students that we are testing, and they will be divided into two groups. Group 1 will start with Story A on the computer and Group 2 will start with Story A on paper. Each group will be told that they are to read the story in front of them and then answer the questions about the story within a set time. Then the groups will switch, as well as the stories. Group 1 will read Story B on paper and Group 2 will read Story B on the computer. Once the time is up, each group will answer the questions for Story B. The reason for us switching which story goes on paper and which story goes on the computer for each group is so that if both stories when on paper get more answers answered correctly than on the computer, it may be that electronics do affect memory. We are also gathering additional information from the students we are testing to make sure that there are no additional factors that might influence our data/result. We have prepared our stories and questions to be answered and are about to run the tests. We have arranged a testing room and asked for volunteers. We hope to have some results this week that we can then report at the science fair.



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Prefair Report

2405 **Addie Yarbrough**
Div/Cat **Human Health / Junior**
Title: **Moldy Madness!**

Summary: In my background research, I researched about what mold is. This is what I found: Mold is a microscopic fungus. It is a spore in the air and when it falls onto a food or something damp, it grows into mold. Molds are found in virtually every environment and can be detected both indoor and outdoor, year-round. Mold needs moisture to grow. Mold is responsible for important medications, including penicillin - an antibiotic discovered by Alexander Fleming, by accident. Molds are also used to produce soy bean paste and soy sauce in a process that involves fermentation.

The purpose of my project is to inform people on which foods mold fastest. I think that the milk mold fastest, because the climate at which milk needs to be refrigerated is different then the climate of which I am testing at. I also think that the banana will mold the second fastest because fruits tend to rot faster if not taken proper care of. And finally, I believe that cheese and the bread which have preservatives, mold the slowest because they are protected with preservatives. I tested this question by leaving each element in a kitchen cabinet for a straight week and took pictures of progress.

My results showed exactly what my hypothesis explained. I observed that on the milk there were little slits of holes. On the underside of the chunky substance, was a crystal clear and yellow layer. On the banana, it was very brown and mushy. On the cheese and bread, no mold grew.

The real life significance of my results is that so people can then know that they have to buy foods and use their foods before they expire, because some can expire very fast.

Some future projects or studies relating to this project are to analyze which is better: preservative foods or non-preservative foods. I would then look at them in different ways and decide which is better.



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Prefair Report

2406 **Lucy Bonham, Clara Smallman**

Div/Cat **Human Health / Junior**

Title: **Laws of Learning**

Summary: Our project is called Laws of Learning. This experiment focuses on the three most common learning styles. These include: kinesthetic, visual, and auditory. Kinesthetic learning involves hands on activities. Some examples are: flash cards, labs, manipulatives and more. Visual learning is the most common learning style, and consists of: highlighting text, diagrams, and graphics. Finally, auditory learning is concerned with listening activities. For example, auditory learners would benefit from and prefer audio books, listening to music while they work, and having concepts verbally explained to them. In our project, we wanted to find out which style is the most effective while teaching a lesson to a group of students. To test this, we went to a elementary school classroom with students in grades five and six. We split the class into three smaller groups, one for each learning style. We then prepared three seperate lessons on the same topic to fit each learning type. We made sure that each lesson contained the same amount of information so that no group was at a disadvantage. After we taught each group their lessons, we handed all of the students the same short quiz with four short answer questions on the topic. We made sure that the students recorded which group they were in on their quiz. The quizzes were then collected and studied to see which learning style was the most effective when teaching the groups.



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Prefair Report

2407 **Elias Wand**

Div/Cat **Human Health / Junior**

Title: **How does texting affect reaction time?**

Summary: How does texting affect reaction time?

Will texting affect the reaction time of kids ages 12-14?

I predict that texting will negatively affect (reduce) the reaction time in kids ages 12-14.

Design/ Method:

Each subject will place their thumb and forefinger on either side of the meter stick.

The meter stick will then be dropped and the subject will attempt to catch it.

This will be repeated 10 times and the average will be recorded.

Two subjects will then text each other while their reaction times are recorded once again.

Observations: Overall, 12 of 20 students attempting the ruler drop 10 times each had an improved reaction time while texting. 5 of 20 students also had their reaction time stay within a cm without distraction and during texting. However, 3 out of 20 students had a slower reaction time while texting compared to when they were not texting.

Overall, 4 of the 8 male volunteers had a faster reaction time while texting compared to only 2 of the 8 male volunteers had a worse reaction time while texting. 2 of the 8 male volunteers also had a similar reaction time when they were and were not texting. Overall, 8 of the 12 female volunteers had a better reaction time while texting while just 1 of the 12 female volunteers had a slower reaction time while texting. Another 3 of the 12 female volunteers had a very similar reaction time while texting and while not texting.

Overall, six grade sevens had a better reaction time while texting while just 1 had a worse reaction time. In grade seven there were also four people who had a similar reaction time with and without texting. In grade eight six kids had a better reaction time while texting however, two had a worse reaction time while texting. There was also one person with a similar reaction time with and without texting.

Interpretations/Conclusions/Applications: Based on the results above my prediction that texting would negatively impact the reaction time in kids ages 12-14 was not supported by this experiment. There was also little difference between both gender and age in this experiment. A larger sample size would be necessary in order to find a more accurate result. The results of this experiment could show that kids ages 12-14 are also good at multitasking resulting in a faster reaction time while texting.



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Prefair Report

2408 **Karina McMullen**

Div/Cat **Human Health / Junior**

Title: **Ebola: Will Modern Treatments Be The Cure?**

Summary: Zaire ebolavirus is a deadly strand of Ebola that is found in the Congo. Since its discovery in 1976, it has taken the lives of thousands of individuals. New possible solutions are being developed by the World Health Organization (WHO), including a vaccine with a 100% cure. This poses the question: "Will modern medical advancements be the cure to Ebola?"

It is hypothesized that a new vaccine is effective at protecting against Ebola, but it will not end the appearance of Ebola amongst the African population and it may decrease the number of cases in outbreaks that will certainly occur in the future. Other methods of protection including educating the community and border screenings can contain Ebola, however traditional African culture is against these strategies and can hamper efforts done by the WHO. If Africans and global health organizations are able to work collaboratively, there would be a greater chance that future epidemics could be prevented.

The WHO has been a leader in attempting to control the spread of Ebola across West Africa for decades. They are currently using a variety of strategies including aggressive case identification, intensive border screenings, educating the community, and safe burial practises in an effort to prevent new cases from appearing. One of the newest methods of treatment is the use of the experimental rVSV-ZEBOV vaccine that, when tested on humans in 2015, had a 100% case protection rate. The impact of the vaccination efforts was seen in the reduction in case fatality rate (39%) for the West African Epidemic compared to case fatality rates in prior outbreaks (71-88%) before the development of the vaccine. However it is still undergoing trials and it's availability is dependant on donations from a drug company with under 260,000 doses remaining for use in the ongoing epidemic.

Despite the WHO's efforts to control Ebola, many Africans are opposed to these modern medical techniques. Some believe in using witch doctors and natural remedies to cure sickness and many refuse to get the vaccine. Modern folk songs such as "White Ebola" imply that global health programs are the ones spreading Ebola, and that their treatments are actually used to harm them. This has created a sense of distrust between the two groups and as a result, many citizens are not reporting cases of Ebola and heading to healthcare facilities where they would be placed under quarantine. The WHO is also against traditional African burial ceremonies, where the family kisses and bathes the Ebola-ridden body. They have initiated safer burial procedures where contact with the body isn't made, however the majority of Africans are against this as they believe that improper burial ceremonies will lead to bad luck. As a result, these practices continue, often with several family members catching Ebola in the process.

Overall, advances in modern medical techniques have shown promising effects, however until the social and cultural determinants of health in Africa can be addressed, it is unlikely that future Ebola outbreaks will be eradicated.



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2409 **Joseph Guay**

Div/Cat **Human Health / Junior**

Title: **What if a lie made you perform better?... Testing the placebo effect**

Summary: "My project is about the placebo effect. Most of us have heard of placebo pills used in some social experiments, but can it affect your mind? The goal of my science fair project is to find out. My overall question is: how does the placebo effect affect mental performance? I will use a test containing all sorts of mental logic puzzles and memory testing. But before that, I research in sites like the U.S National Library of Medicine and Science Daily, but also in a Quebec TV show "Le Pharmachien", which puts medical myths to test. After researching and having a thorough understanding of the subject, I move on to testing. This is my procedure. 3 groups of 5 people will be given a test. It will be conducted in a room with no distractions, just me, the test subject, and the test. All 3 groups will be given a test, which is the same for all groups. All 3 groups will be given the exact same music during the test. The music will be at a medium-low volume and they will be given headphones. For one group, I will tell them that the music will improve their performance. For another, I will instruct them that the music will decline their performance. For the third and final group, I won't tell them anything, just give them the music. After the tests are conducted, I will average each group's scores.
I will then compare and conclude. I will have a sample of the test and music at the fair. Hopefully the results will be interesting..."



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Prefair Report

2410 **Cory Hilton**

Div/Cat **Human Health / Junior**

Title: **A Grave Mis-Steak**

Summary: Les grandes chefs et bouchées locaux nous dit que le boeuf âgée est non seulement la meilleur qualité de boeuf, mais supérieur que du boeuf non âgée en chaque façon. Je veux tester si le boeuf âgée à ce est supérieur. Je vais faire deux test avec chaque morceau de boeuf pour finalement décider et prouver quel morceau de boeuf est supérieur. Pour compléter cette expérience, je fais deux test, le premier est le goût et le deuxième est la conservabilité. Je peux compléter cette expérience car pour cuire les deux steak je les cuit à 130°F et les deux steaks sont mise dans un réfrigérateur dan la même assiette. Cette expérience est pertinent à ma vie et peut être ta vie car après avoir écouté à cette présentation vous aller voire la différence entre le boeuf âgée et le boeuf non-âgée. Je pense que vous aimerais avoire ma présentation dans votre compétition car je suis travaillent, respectueux et j'ai misé beaucoup d'effort dans une présentation que j'espères que vous aimez. La raison que j'ai choisie cette expérience au lieux de tous les autres est car j'ai la viande et je sais beaucoup la dessus, quelque chose que je ne savais pas est pourquoi le boeuf âgée est plus chère, mais après cette expérience je sais la réponse.



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Prefair Report

2411 **Rosie Ouellet**

Div/Cat **Human Health / Junior**

Title: **Sport vs healthy**

Summary: "Dans les boisson énergisante comme le "Gatorade powerade et vitaminwater" Il y a une substance appelée les électrolyte. Ceux-ci sont une substance conductive, car elle contient des ions. Les électrolytes sont soit liquides ou solides. Ceux liquides proviennent du sel soluble et du sel fondu et sont faits d'ions. Les électrolytes sont des minéraux dans le corps humain qui se débarrassent par la sueur et l'urine. Ainsi, il faut ravitailler notre stock corporel d'électrolytes avec des substances riches en ces derniers pour garder un bon niveau d'énergie. Les légumineuse, les légume verre et les céréale complète son riche en électrolyte. Donc les gens boivent des boisson énergisante pour garder leur niveau d'électrolyte assez haut. La plupart des préparations d'électrolytes vendues sur le marché associent le sodium, le chlore, le potassium, le calcium et le magnésium. Chacun d'entre eux a un rôle précis et peut véritablement amener plus loin votre entraînement. Avons nous actuellement besoin de boisson énergisante ou le jus d'orange pourrais faire le même. Les boisson énergisante on t'elle plus d'électrolyte que le jus d'orange Donc le but de mon expérience est de trouver si dans le jus d'orange 100% jus, il y a le même montant d'électrolyte que dans les boisson énergisante sur le marché. Avec plusieurs essai je vais trouver la moyenne et noter laquelle a le plus. D'après moi le jus d'orange aura proche du même nombre que dans la boisson sportif. Je n'ai pas fini cette expérience donc je n'ai pas encore les résultat.

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Prefair Report

2412 **Aava Kahani**

Div/Cat **Human Health / Junior**

Title: **Death Rays: UVC + E.Coli**

Summary: "This year for my science fair project, I decided to dig deeper into Ultraviolets and bacteria, specifically Escherichia coli. My topic this year, is on how much UVC exposure can kill bacteria. I chose to do this project because the purpose of finding a way to help cure harmful mutations as a result of UV exposure piqued my interests. But recent and past news reports regarding the dangerous spreads and affect it has on the environment has caused me to want to find a cure. In my background research, I decided to research what Ultraviolet Rays are, and found that there are 3 different types of UV rays; UVA, UVB, UVC, which all have different lengths and abilities. My project specifically requires UVC are they are known as the "Germicidal" Ray, used for killing bacteria and sanitizing. Scientists have already found that Ultraviolet lights can damage DNA molecules, and if a cell's DNA repair mechanisms can't keep up with the damage, it can result in mutations. And as harmful mutations accrue, the cell will eventually die. So, how much ultraviolet light is too much for a bacterial cell? Or, in more specified terms: how many e.coli colonies survive certain short-term durations of exposure, without our bodies' repair mechanisms on hand? The purpose of my project being to observe the effects and convince the world's greater population that not applying sunscreen before being exposed to UV rays is unsafe. In order to test this question, I borrowed a UVC light, Petri dishes, and Sterile Swabs from Mme. Zohra Dahmani of École Secondaire Catholique Marie-Rivier. I designed my experiment so that each duration of exposure was tested 3 times. For example, the 5 durations of exposure were 15 secs, 30 secs, 1 min, 2 min, 5 min, and for each one, I tested 3 times, each half covered with a piece of cardstock (the "sunscreen protected" sides). I then incubated them and recorded observations and statistics meanwhile. In my results phase, I found that in the first 3 tests (15 secs, 30 secs, & 1 min), most of the bacteria colonies survived, decreasing to close to none as the duration grew. But during the 4th test of 2 minutes, I found that none of the bacteria colonies survived in all 3 Petri dishes. And by most expected, the 5-minute test left none surviving as well. In the end, my results were indeed supported my hypothesis and taught me a lot about why we should cover ourselves with sunscreen and what happens in our bodies when we don't. It also helped me learn more about sanitization and different method we can use. I hope you enjoy speaking to me and learning about my project as I did. "



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Prefair Report

2413 **Jacob Fu**

Div/Cat **Human Health / Junior**

Title: **Aspartame on Health**

Summary: "Question/Hypothesis

What type of relationship between aspartame, an artificial sweetener, and human health?

I think that aspartame would have a positive relationship with our health and that we should encourage the use of aspartame in our daily lives. There are a lot of suspicions and warnings about aspartame on social media, and the internet, but most of them have no real evidence or was misinterpreted. There are some negative effects that aspartame can cause, such as increasing the need for sweeter food, weight increase, and could change the way you taste foods, etc. The thing is, most of the negative effects haven't been proved long-term.

Research Findings-

I have found that people with a certain disorder, called PKU, should be restricted from any use of aspartame. This is because aspartame is an amino compound, which includes, phenylalanine. PKU is a genetic defect which leaves the person vulnerable to the build-up of phenylalanine. The person would risk permanent brain damage and other significant health problems. note, artificial sweeteners also have possible health benefits. Aspartame is zero-calorie, which can help in weight control/loss. Since aspartame is not a carbohydrate, they can help people with diabetes satisfy their sweet tooth without raising their blood pressure. Aspartame has been a huge help to diabetics and will always be, for their sweetness without the restrictions. Numerous rumours and concerns involving health problems with consuming aspartame. Although food organizations such as the US Food and Drug Administration(FDA) and the European Food Safety Authority(EFSA), have numerously deemed aspartame as safe, the rumours and concerns are still there. One of the biggest concerns is that aspartame can cause cancer but this was debunked by the FDA and the EFSA. This concern had arisen when an Italian study had results that said that blood-related cancer could be related to aspartame. However, the study itself had been questioned for its reliability. The FDA and the EFSA have reviewed the study and stated that problems in the experiments could have tampered the results. Parents have been highly recommended to keep their children away from any artificial sweetener, including aspartame. This is because of how children are having their tastes still shaping, and giving them a diet with a chemical sweetness could affect them later in life. However, this hasn't been proven long-termed. Obesity in children is never wanted, so aspartame could help. With its low calories, over-weight kids could diet much easier. Also, aspartame could help kids with diabetes to have a normal life with their non-diabetic friends. The final answer to if children should have aspartame is that if parents are in doubt, don't give it to them.

Conclusions- The conclusions will be shown in the science fair.

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Prefair Report

2414 Hilary Sun

Div/Cat Human Health / Junior

Title: Eyewitness error, More than meets the eye: The Effects of Questioning on Accuracy of Memory

Summary: "This experiment was designed to determine the effect of misleading questions and emotional wording of questions on accuracy of memory. It was hypothesised that both factors will negatively affect the accuracy compared to neutral questions, which has implications for the reliability of eyewitness testimony.

15 Gr.7-8 students were invited to watch a short clip in a classroom at the same time. The 3-minute clip involved an Asian woman's interaction with police in her apartment before being taken away. Immediately after watching the clip, participants randomly received one of the 3 versions of the questionnaire, asking them about things they had seen in the clip. The 3 versions had 4 identical questions, and 6 altered questions. These 6 altered questions were similar but asked in slightly different ways. In the neutral version, the questions were asked in an objective way [e.g., How many men enter the woman's apartment in total?]; in the emotional version, the same questions were asked with emotion-arousing word(s) [e.g., How many people intrude into the woman's apartment in total?]; in the misleading version, the same questions were asked with a misleading component [e.g., How many men enter the woman's apartment? How many women? - in reality no women had entered the apartment.) The questionnaires were then collected, and the responses were coded for accuracy by two independent coders.

When comparing the average % of questions answered correctly and the number of correct-answers for each question between the groups, I found that misleading questions did indeed have a negative effect on the accuracy of witness memory. The average percentage of correctly answered questions for the neutral and emotional groups were 65% and 62% respectively, compared to the misleading group, which had an average of 33%. For individual questions, interestingly enough, the neutral questions group always had the highest, or equal to, the number of correct answers on unaltered questions that remained the same between all three groups. When it came to altered questions, the neutral group or emotional group always had the most correct answers.

As a result of the observations made, it can be concluded that misleading questioning does have a negative impact on accuracy of memory, whereas emotional questions may not. In society, tactics used such as misleading questions, which may be framed by using wording to limit the range of answers, can direct a person into giving a particular response that lacks accuracy. Although Loftus and Palmer's experiment may indicate that wording can alter a person's recollection of an event, contrasting studies have shown that victims of a crime outside of a lab may retain an accurate recollection. However, when looking at the results of this experiment, smaller sample size and individual abilities and biases must be factored in, which could cause outliers and experimental errors. Regardless, the results of this experiment show that misleading questions have a negative effect on witness accuracy. These results can prove the unreliability of eyewitness testimony if questioning tactics are unintentionally altering witness recollection.



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Prefair Report

2415 **Gavin Doherty**
Div/Cat **Human Health / Junior**
Title: **How music effects literacy**

Summary: My project is testing whether music helps the brain with literacy or not . I want to do this project because of its potential to possibly improve peoples literacy skill IE: people might be able to wright or read faster if certain music is playing. some of the genres i will be using are: classical , rock , old country , pop , rap , and maybe more . how i came up with this idea was when i was working on a book report i had wondered if there was a way i could naturally speed up and then that's when i came up with the idea in my head and i decided to use the science fair as a place to see which music was best fit for literacy prowess . i came up with a good idea to test the musics benefits , what i came up with was i would have a person wright down a sentence like: "The quick brown fox jumps over the lazy dog," which is just an example , for the reading part i will have the person read a paragraph. but they will do this multiple times while different music is being played , i will also be timing the person each time with there different music.



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Prefair Report

2417 **Bryn Bain**

Div/Cat **Human Health / Junior**

Title: **An Act of Kindness a Day May Keep the Blues at Bay**

Summary:

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There is no dispute that mental health/well-being is on the decline in Canada and research reveals that adolescents are the most vulnerable. One in five of Canada's youth experience a mental health issue. Health care visits related to mental health have increased 60% in the past decade for Canadian youth. The consequences of untreated adolescent mental health extend into adulthood with up to 70% of mental health problems reported as having their onset during childhood or adolescence. Beyond the impacts of poor mental health on the direct safety of those affected (suicide and addiction) as well as their social and family circle, there is a literal and staggering effect on the cost to society. This stems from health care costs, lost time at work and disability payments as examples.

The benefits of improved adolescent mental health will manifest both with the individual as well as their immediate and extended socioeconomic community.

The causes for and treatment of mental illness are broad and can be complex. However, there are simple measures that can be taken. Ideally promotion of mental health and prevention of mental illness is desirable over the treatment of established mental disease. While this may not always be possible, promotion and prevention strategies have a role in mental health.

Several international studies have demonstrated that performing simple random acts of kindness translates to an improved perceived and measured (physical/biochemical) mental and physical well-being. These studies to date have been largely reported in the adult population.

The purpose of this experiment was to observe how the performance of simple random acts of kindness affects adolescent mental well-being.

I predict that an adolescent's mental well-being can be improved as a consequence of that adolescent having performed simple random acts of kindness.

This study adhered to the Participation of Humans - Low Risk CWSF Ethics Policy. Parental/guardian and subject informed consent for participation was obtained from 42 students (both male and female) ages 13-14.

Students were randomised into control and intervention groups.

All participants were given a 5-10 minute questionnaire addressing sleep quality, happiness, stress and self-esteem. These are key components reflective of mental well-being. The questionnaire was compiled using reputable surveys available for public use.

The intervention group was then directed to perform a minimum of 6 simple random acts of kindness per week for the following 2 consecutive weeks (14 days). Each participant was provided



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a sheet with examples of simple random acts of kindness. Participants were advised that this was a guide and that their acts of kindness were not limited to the provided examples.

At the end of the two week period, all participants will be given the 5-10 minute questionnaire addressing sleep quality, happiness, stress and self-esteem. The intervention group will have additional questions regarding an approximate number of the random acts of kindness performed and a few examples of the random acts of kindness performed.

This second survey has not been completed to date. Results for my study are pending.



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Prefair Report

2418 **Zoé Cunningham**

Div/Cat **Human Health / Junior**

Title: **Les Facteurs Qui Influencent La Fréquence Cardiaque**

Summary: "Est ce que tu t'es déjà questionné par rapport à ta fréquence cardiaque? Quelles sont des influences qui peuvent influencer ta fréquence cardiaque? Le montant de sommeil que tu as eu hier soir, ton alimentation ou même la température peuvent t'il augmenter ta fréquence cardiaque? Plus précisément, quelle température, chaude ou froide, auras le plus grand impact sur ta fréquence cardiaque?
Le but de mon expérience est de calculer ma fréquence cardiaque durant l'exercice dans le chaud, et de nouveau dans le froid, puis je vais observer les différence dans ma fréquence cardiaque. Finalement, je vais déterminer quelle température démontre une augmentation plus élevée à l'aide d'un tableau de comparaison.
J'ai postulé quelques théories par rapport à ce sujet: Depuis que le froid ralentit la circulation sanguine, est ce que cela veut dire que ta fréquence cardiaque ralentit aussi? Ou, est ce que ta fréquence cardiaque augmentera pour maintenir ton corps au chaud?
À l'aide de recherches, et du site ci dessous: ----, j'ai trouvé que la température froide cause tes vaisseaux sanguines et des artères de se rétrécir, qui limite le débit sanguine et réduit l'oxygène au coeur. Pour cette raison, ton coeur doit pomper plus fort pour faire circuler le sang. Lorsque ceci se produit votre tension artérielle et votre fréquence cardiaque augmente. Cependant, selon ce site :-----, Ils disent que les températures plus chaudes accélèrent les battements du coeur et exercent une pression considérable sur le corps. En termes simples, quand il fait chaud, le corps doit acheminer plus de sang vers la peau pour le refroidir tout en maintenant le flux sanguin vers les muscles.
Dans cette expérience, je vais déterminer quelle théorie est vraie, et subir une expérience d'exercice cardio vasculaire dans des températures chaudes et froides. Je vais courir une course de 10 minutes sur la piste de course intérieur aux gymnase CMR (RMC gym), et une course de 10 minutes sur la piste de course extérieur à l'école catholique Marie Rivier.
Je vais trouver ma fréquence cardiaque moyenne et maximale durant l'exercice (dans le chaud). Trouver ma fréquence cardiaque moyenne et maximale durant l'exercice (dans le froid). Calculer la différence entre ma fréquence cardiaque durant l'exercice dans le froid à ma fréquence cardiaque originale durant l'exercice dans le chaud. Comparer les résultats finale pour conclure l'expérience et déterminer quelle température augmente le plus ta fréquence cardiaque.
"



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Prefair Report

2419 **Isabella Côté**
Div/Cat **Human Health / Junior**
Title: **The Stroop Effect**

Summary: "The Stroop effect is a test that is used to see how fast it takes for your brain to try to figure out the colour of the ink of the words written down without confusing it with the words itself. The purpose of this experiment is to see how long it will take people to correctly identify the ink color. My hypothesis is that it will take people much more time (about double the time) for them to read the colors correctly because of the interference their will be from what their brain wants them to say, which is the word itself. The materials that I will need are...
A paper with words matching the color of the ink
A paper with the words in a different color than the ink
I will need around 50 volunteers, 25 girls and 25 boys, that will be ranging in age; I will simply ask them to name the color of the ink and while they do that I will be timing them. I will later on compare the different results and see how much of a time difference their is for both of the tests, and if there's a difference between boys and girls in different age ranges.



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Prefair Report

2420 **Maggie Munt**

Div/Cat **Human Health / Junior**

Title: **The Effects Blue Light Has On the Human Brain/Emotion**

Summary: The purpose of this experiment is to collect data to determine if blue light has a positive or negative effect on human emotion. I will examine how blue light enters the eyes and affects the brain. I think that the blue light will have a positive effect on the participants' emotions. I have looked at studies that show that some kinds of blue light have a positive effect on the human body. Personally I experience that a dark room lit with blue light changes your emotions, it makes you feel more emotional. For example, if I was watching a movie that was sad in a room that had normal white lights I wouldn't feel as emotional. If the light in the room looked more blue I would be more emotional.

I chose to do this study because I have noticed more recently that the lighting in the room I am in affects how I feel. I didn't know if this was just me thinking that or there was a real explanation for why I felt like that. Also if there was an explanation I wanted to know the science behind it. When I started to do some research about blue light I found many websites saying similar things. They all would say things along the lines of not all blue light is bad, in fact some research has shown that some blue light exposure is good for your health. I was fascinated by this and I did more research.

In conclusion the study has shown that blue light has negative and positive effects on the human brain and its emotions. It can either help cure a disease or disorder, help memory and cognitive function, elevate mood, lower high blood pressure, or calm people down. But it also can cause many negative health effects, such as affecting the circadian rhythm. Having all the information on blue light that we have can help people understand the benefits and disadvantages of electronics and how it affects our brains and the way we think.



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Prefair Report

2421 **Brandon Ombuoro**

Div/Cat **Human Health / Junior**

Title: **The effect of football on the human brain**

Summary: I would like to discuss and analyze the effects of football on the human brain. It has been suggested that with the impact and aggressiveness experienced by players on the field, this could lead to serious long term effects on their brain.

through scientific study and analysis it has been proven that about 99% of football players experience some brain problems at one point or another. this is of course as a result of constant blunt force injuries to the head. Which in turn affects one internally.

Concussions in particular have become a cause of concern, as they increase the risk of mental illness, like dementia and chronic traumatic encephalopathy or CTE. In approximately 111 players tested, 11 were found to have some sort of damage to their brains.

I will therefore examine the game of football, analyze the impact of the continued injuries to the head, discuss the effects these injuries have on the players and their long term effects and then give a comparative study between non players and players of the sport.

In closing I will further discuss what these injuries mean for the players and if their continued participation in the sport is encouraged. Also ways in which the sports community can offer support to players affected by this.



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Prefair Report

2422 **Neha Gill**
Div/Cat **Human Health / Junior**
Title: **In Memory of Sleep**

Summary: The purpose of this study is to explore how sleep affects memory in a positive way. I chose to investigate this topic because I have noticed that when teens stay up late working and then get up early for school it has a negative effect on their learning and their life outside of school. I hypothesized that this was because their memory was in a bad state, and unable to absorb necessary information properly.

There were 11 participants in the study, a mix of boys and girls all from grade 7. They were asked to record how long they slept and rate their quality of sleep using a subjective scale. Then they took an online verbal memory test from the Human Benchmark Lab. This process was repeated for five days, to ensure consistent results. The process was performed in the same quiet, distraction-free space each time.

From the data collected, I observed that the quality and amount of sleep do not affect memory as much as I expected. Some participants had slept for a long period of time and rated their sleep as being high quality but their verbal memory score was poor. For others, the amount of sleep, the quality of sleep or both were high and so was their verbal memory score. For example, there were participants that had their quality of sleep as a 9/10 and had a memory score between the 70 and 80. The highest score achieved by a participant during this study was 177. From this data, I have deduced that while sleep and memory are related, they are not as closely as I expected. I think this is because the brain was able to organize most if not all of the data that it had learned the previous day and was now prepared for the new data.



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Prefair Report

2423 **Matteo Piomelli**

Div/Cat **Human Health / Junior**

Title: **How does music affect logical reasoning?**

Summary:

Question/Hypothesis

The question for my experiment was "how does music affect logical reasoning?". And I hypothesized that classical music would calm the brain, therefore making it easier to solve a sudoku puzzle.

Design/Method

9 people were given a 6x6 sudoku puzzle to solve. There was a timer on-screen so when they finished they wrote down their time. I repeated the process but put classical music on the speakers. Then I repeated the process again but with heavy metal music. The three sudoku puzzles that were given out were different, but all had the same difficulty level. Figure 1 shows the data collected.

Observations

When everyone finished and I sorted the data, it was clear that music did not affect solving these puzzles very much. The average times were all very similar with classical music being the longest, heavy metal was second, and no music at a very close third. Since only nine people were tested, the three results can be considered equal. If more people were used (maybe one hundred) the conclusion might be different.

Interpretation/Conclusions/Applications

As a result of the observations, the conclusion was that music did not affect solving puzzles/logical reasoning. Even the noisiest type of music did not affect the thinking of the participants.



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Prefair Report

2424 Rachel Kim

Div/Cat Human Health / Junior

Title: Do You See What Eye See?

Summary: "What type of relationship exists between optical illusions, the brain and the real life world?"

Question/Hypothesis:

My study is on why the brain is affected by optical illusions and how optical illusions can help us in the real-life world. I predicted that optical illusions wouldn't be useful in the real life world since I didn't know how to apply it or when it would come to use. I originally thought that they were moreover for entertainment and visual purposes. However after researching, I believe they are very useful and are a unique way to make the roads safer. There have been many experiments with this and after looking at different results, I believe that optical illusions should in fact be used for safety purposes because they can be very beneficial.

Research Findings:

From the research I have done so far, I know how the brain is "tricked" by optical illusions. Optical illusions happen when there is a misunderstanding when the visual areas in your brain interpret and process senses of when someone sees an optical illusion. Since optical illusions are perceived by the brain than the eye, many scientists believe they should be called visual illusions. A good example of an optical illusion many experience is floaters. Floaters are small dots or specks that people see through their vision and are caused by irregularities in the fluid that is in the eye. Floaters are more common when one gets older. These illusions are in fact one of the only illusions that actually happen inside the eye. A real-world example of an illusion has to do with pilots. Pilots may experience illusions such as a fake horizon. They are trained to ignore these signs and keep flying safely.

I also found that optical illusions can be painted onto the streets for safety purposes. I recently found a painting online of a girl crossing the street where at one angle, looked like a real person. When the cars see this image, they would slow down or stop to let this "person" go by. This would help with the safety of roads as cars would be cautious and would self-consciously slow down or stop driving, like a stop sign. As police cars are not always watching, many don't stop at signs like stop signs. If we used optical illusions, it'd be more effective than using ordinary signs.

Interpretation/Conclusions/Application:

From my research findings, I conclude that optical illusions are helpful in the real world and more underestimated than they actually are. Many, including me, probably think that optical illusions are more for entertainment and art purposes and are useful in our world. My research has let me know that optical illusions are actually useful and can be used for the safety of the world. In Kingston, optical illusions aren't used in the roads, etc; however, they are being used in places like Chicago. I strongly suggest that optical illusions get used in our community they would help make our city safer for everyone.



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Prefair Report

2425 **Sreyas Jariwala, Shaurya Dugala**

Div/Cat **Human Health / Junior**

Title: **Can we Genetically Modify Bacteriophages**

Summary: The question of our project was: Is there any way to genetically modify bacteriophages. It was hypothesized that yes, it is possible to modify phages. The purpose of this study was to see if there was a safe, easy and reliable way to engineer bacteriophages. And if so, should we apply the practice of them in phage therapy.

We found in our research that there is not just one, but many techniques to engineer phages. CRISPR- CAS system was thought to be one of the more interesting approaches. CRISPR in combination with cas are genes that form an "adaptive" immune system within bacteria and archaea, thus protecting microbial cells from an invasion of foreign DNA. We also found that synthetic phages have much more advantages over simple phages. The most general one is that modified phages can eliminate many of the disadvantages that come along with wild bacteriophages. This is very good as it can remove some of the risks involved with phage therapy.

In conclusion, we can say that our hypothesis was correct. There are lots of ways phages can be modified. And, it is good that they can as we are going to need them. As the dawn of the new era of medicine, the trusty antibiotics are beginning to fail us and phage therapy is seeming like the right way but has some flaws. Genetically modified phages could be the force we need to prosper in the future.



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Prefair Report

2426 **Emma Sun**

Div/Cat **Human Health / Junior**

Title: **En Pointe**

Summary: My project is about the effect of ballet on the human body. I included both positive and negative effect, physically and mentally. I hypothesized that dance would improve coordination, flexibility, strength, and balance. I also thought it would enhance reflexes. Although it has so many benefits, it can lead to injuries, for example, sprains and stress fractures. The most common areas to get injured are the ankles, hips, feet, lower back, and knees. Dancing can boost your mental health but it can also cause problems and induce disorders like anorexia.

I did a lot of research on the effect that ballet has on the body and I discovered many interesting physical changes and benefits as well as drawbacks. As I predicted, dance does help with balance and coordination. It is really important to keep a stable center of balance especially when you're turning or doing pirouettes. Another interesting fact I found is that a dancer's brain can recover from spinning dizziness much faster than the average human. Coordination also plays a significant role in dance. Many jumps and turns require coordination to be performed. When you are doing group dances, coordination is also essential for everyone to stay together and move as one. Ballet also helps you have better posture since you gain stronger muscle tone. Even with so many physical benefits, ballet has its cons too. One major con is the effect of going en pointe. Ballet dancers who have been doing pointe for a while usually have bad feet. They can get blisters, the toenails can fall off, and the foot growth can be hindered. If it becomes more serious, the dancer may even need to undergo surgery to correct bone anomaly. Ballet and all types of dances can raise self-esteem, improve mood and some cognitive skills, like visual recognition and decision-making. Dance helps reduce stress and can be therapeutic. I was correct with the fact that dance does sharpen reflexes because dancers tend to have a higher concentration and focus rate. Dance can lead to mental health issues though, like anorexia.

With the research I had so far, I concluded that ballet and all types of dances change the way the human body functions and how it is formed in both good and bad ways. There are many positive physical and mental changes, but if dancing becomes a profession or is done excessively, consequences may start to emerge, like injuries.



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Prefair Report

2427 **Zakariyya Brewster**

Div/Cat **Human Health / Junior**

Title: **Fighting Off Parkinson's Disease**

Summary: This study was conducted to determine the effect exercise has on Parkinson's Disease. Parkinson's disease is a degenerative disease of the central nervous system that affects mobility. It is hypothesized that exercise will reduce the severity of a Parkinson's Disease related tremor. On three different occasions, measurements of the subject's tremor were taken without any exercise to act as a baseline. The measurements were taken using the TREMOR12 app, which uses the mobile device's accelerometer to detect movements, such as roll, pitch, yaw, rotation speed, acceleration, and gravity. The mobile device was strapped to the subject's hand using a tensor bandage. The exercise consisted of 5 minutes of boxing drills. Measurements were taken before and after to see if the exercise had any effect on the subject's tremor. At the end of a 2 week period, over 5 sessions of exercise and measurements, observations were made, and in the first 3 sessions, the measurements taken after the exercise showed that the tremor severity, calculated using the range of all the measurements, increased after exercise. In the fourth session on February 13, the results were split, with some factors larger in the measurements taken before, and some factors larger in the measurements taken after. In the last session on February 17, the results showed that the tremor size decreased after the exercise. According to a study by the National Parkinson Foundation Quality Improvement Initiative, regular exercise was associated with small but significant positive effects on health-related quality of life and mobility over two years. According to another study, it is concluded that beyond its benefits on physical health, exercise gives patients a more active role in the management of their PD. Patients are eager for this kind of role, which is consistent with a patient-centred care model in which healthcare is "closely congruent with and responsive to patients' wants, needs, and preferences. After processing the data, no clear, continuous correlation can be determined. With the slow change from a larger tremor after exercise to a smaller tremor, we can infer that with an extended experimental time frame, that trend would continue and we could possibly see the subject's tremor decreased with consistent exercise. This information can be useful for further Parkinson's Disease research as more effort can be put into finding a positive correlation between exercise and Parkinson's Disease. The possibility for an improvement in the severity of a Parkinson's tremor over a small period of time can be useful in further experimentation and study.



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Prefair Report

2428 **Manal Safeer**
Div/Cat **Human Health / Junior**
Title: **Forget-Me-Not**

Summary: HYPOTHESIS

As symptoms of Alzheimer's disease impact the everyday life of a patient, mentally and physically, the communication and development of neurons slow, or even stop. This is because a hallmark cause of the disease are the plaques and tangles that gather among the neurons. While these plaques and tangles accumulate as the disease reaches later stages, levels of neurotransmitters decrease and transportation systems deteriorate. This may result in neurons being cut off from the environment around them, limiting their ability to develop and communicate. This could be why Alzheimer's is a rapidly spreading disease, since neurons impacted in one part of the brain cause others to lose their ability to perform their specific functions for maintaining a healthy brain, body, and even lifestyle.

RESEARCH FINDINGS

Alzheimer's disease is a progressive disease, a form of dementia that impacts one's thought, memory and language. Patients with Late Onset Alzheimer's disease will begin to show noticeable symptoms in their mid 60's, while Early Onset Alzheimer's can occur from the mid 30's to the 50's. Amyloid plaques, thought to be one of the causes of the disease, are a result of an alteration in protein-controlling enzymes, causing the release of toxic beta-amyloid fragments. Neurofibrillary tangles are made of tau protein. Strands of tau combine and tangle, disabling the neuron food transportation system and resulting in a lack of neurotransmitters. These tangles are also thought to be a cause of the disease.

Patients may face aspiration, pneumonia, falls, bedsores, malnutrition and dehydration. Alzheimer's causes one to lose the ability to follow a basic routine or even remain aware of their surroundings. Diagnosis of the disease can be done by observing changes in the brain with scans depicting structural changes in the brain. Evaluations observing a patient's memory/cognitive skills, and recording medical history and genetics of the disease are part of a regular routine for diagnosing Alzheimer's.

Prescribed medications may help slow the progress of the disease. Cholinesterase inhibitors prevent the breakdown of chemical messengers, encouraging healthy memory and cognitive skills, delaying common symptoms. Memantine is another common medication, regulating the activity of glutamate, improving mental functions and more. Vaccinations against Abeta42 are also effective.

CONCLUSION

Alzheimer's disease greatly alters the functions and structure of neurons and the brain. Due to plaques/tangles in the brain, neurons will lose the ability to take in information from their surroundings, receive food from internal transportation systems, and maintain a stable structure that is able to efficiently contribute to a healthy brain. I have found that Alzheimer's disease more so impacts the communication of brain cells, rather than their development. Patients experience drastic changes in the later stages of their lives when neurons are fully developed, and have maintained a stable structure for a long period of time. Knowing your brain can help you notice and describe signs of abnormalities in yourself or your loved ones, and how to deal with reactions in the form of illnesses when they begin to impact your daily life.



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Prefair Report

2429 **Maximus Sotiriadis**

Div/Cat **Human Health / Junior**

Title: **Forget-Me-Not Do people retain information better visually or verbally?**

Summary: How do different methods of delivering information affect humans abilities to retain the information? The purpose of this experiment is to determine if humans can retain information better using visual or auditory cues. This experiment tests a variety of people on their ability to remember a sequence of letters and numbers. According to the collected research, humans are able to remember things better with visual cues. It is hypothesized that participants will be able to remember information that is obtained through visual cues rather than verbal better. There are two different primary steps in this experiment. First, a random selection of numbers and letters on a piece paper is showed to the participant for exactly 5 seconds. The participant then has to repeat the sequence verbally directly afterwards. The second step is verbally telling the same participant another sequence of letters and numbers, and having them repeat the sequence directly afterwards as well. Each sequence is completely randomized, and contains 8 characters, with 4 numbers and 4 letters. As well, to eliminate the amount of unwanted variables in this experiment, the participants will always repeat the sequence verbally. A large variety and amount of participants will be tested, each being tested fives times for both visual and verbal information retention. This experiment applies to everyday life in a variety of important ways. In schools, students have different learning styles, which should be accommodated for. Researching the best ways to relay information will help to make students more successful in their educations. As well, further research and experimentation could be done to look at the best ways to help people suffering from memory loss, dementia, or even blindness or deafness. Currently, data is still being collected to determine the answer to this experiment's scientific question.



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Prefair Report

2430 **Zaara Mazhar**

Div/Cat **Human Health / Junior**

Title: **Hazed and Confused; The relationship between Air Pollution and Dementia**

Summary: Dementia is an illness that results in cognitive and behavioral impairment and has recently claimed to be the seventh leading cause of death in the world. This unfortunate statistic intrigued many researchers to further investigate the health condition and its prevention techniques. Studies have previously determined that factors such as diet, exercise, and smoking can affect one's risk of dementia, however, the theory stating whether exposure to air pollution can be a cause of this neurodegenerative disorder, continues to be heavily debated. Studies have also aroused in China proving a relationship between dirty air and severe reduction in intelligence, estimated to the loss of an entire year's worth of education. I hypothesized that there would be a positive correlation between poor air quality and dementia because breathing dirty air has been known to potentially lead to various other health conditions, (such as cardiovascular and respiratory disease). Therefore air pollution also negatively impacting brain health would not be a logical prediction as there is evidence that tiny air particles frequently enter our brains.

During my research, I studied an observational study recently conducted regarding this topic among older adults in London, England, an area with exceedingly high amounts of pollution. The study used 130,978 adults between the ages 50-79, each with no recorded background of dementia. Factors such as traffic intensity, average noise levels, distance from major roads, pollution levels and concentrations of nitrogen dioxide were then measured and linked to participants through their postcodes. The residents' health records were continuously monitored over 7 seven years, during which 2,181 (1.7%) participants were diagnosed with Dementia, with 39% of the patient's cases concerning Alzheimer's. The data was analyzed and the conclusion was drawn that those in the top fifth levels of exposure faced a higher risk of dementia compared to those living in the bottom fifth. Similar studies were also carried out in North America, and even in areas with significantly less annual pollution, the outcome remained the same and conclusions supporting a positive relationship between dementia and pollution continued to be delivered. Furthermore, unique studies using rodents have also confirmed the link. In these experiments, mice and rats were exposed to traffic pollution in labs, which later resulted in symptoms of cognitive impairment including overall poorer learning ability, and complete loss of their memory and motor skills.

I concluded that air pollution is indeed a cause of dementia as it was confirmed from studies of brain tissue that magnetite particles from pollution can gain access to the brain via the bloodstream or directly through the nose. These particles are the main components of the protein deposits, amyloid plaques, which are found in the brains of dementia patients. As dementia is globally on the rise, the demand for a cure and prevention tactics rapidly increases and as breathing dirty air is guaranteed to affect both our health and our environment, it is essential to understand the importance of acting urgently to reduce worldwide pollution.



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Prefair Report

2431 **Malak Belhadjhamida**
Div/Cat **Human Health / Junior**
Title: **How Climate Change Is affecting Ebola**

Summary: How Climate Change Is affecting Ebola
Question/hypothesis
What is the relationship between climate change and the increasing number of ebola outbreaks in West Africa?
I hypothesize that as climate change increases the severity of droughts in West Africa then this will cause an increase in the number of ebola outbreaks within the region. This is because the effect of climate change on crop outcomes threatens the food security of the region which causes more people to scavenge for food in forests in times of drought, thus increasing more contact between ebola carrying fruit bats and people.

Research Findings

During the duration of my research I have found out how much climate change is affecting the spread of ebola. What I originally thought in my hypothesis was proven to be true, droughts are forcing an increase in contact between humans and fruit bats since the people in West Africa have to scavenge for food during times of drought. Deforestation is also pushing more contact between people and fruit bats. Deforestation leaves people vulnerable to fruit bat contacts since you are taking away their home and main source of food when you cut down trees. While I was researching severe droughts, I compared 2 graphs from the website eros.usgs.gov and one from the news paper website forbes. One graph showed me when the ebola epidemic happened and the other graph showed me occurrences of severe rainfall anomalies within the region. The years of a severe drought in West Africa was during the years of 2010, 2012, and 2013 to 2014. The ebola epidemic then began in 2014 and ended in 2016. By observing the graphs and info that I have collected, I have come to the conclusion that climate change can and has affected the spread of ebola by pushing more contact between people and Ebola carriers .

Conclusion

From my research I have confirmed my hypothesis that climate change has an effect on Ebola. The effect of climate change is that it pushes humans into closer contact with Ebola carriers through human scavenging for food in forests due to food insecurity. All of my research and graphs drew up to that conclusion with deforestation also being a factor of forcing people and Ebola carriers into closer contact.



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Prefair Report

2432 **Julia Kolosov**

Div/Cat **Human Health / Junior**

Title: **How do Cognitive Biases Alter Decision Making?**

Summary: Every day we are faced with decisions and how we decide to approach them shapes our lives. Advertisements can be very influential for big brand company business and for consumers to choose which companies best fit their needs. Many industries use certain tactics to attract more customers using certain methods or biases to make their products look more appealing. For example, during normal decision making, individuals anchor or overly rely on specific information or a specific value and then adjust to that value to account for other elements of the circumstance. Usually, once the anchor is set, there is a bias toward that value. Are you aware of these biases, how businesses rely on the gullibility of customers and how biases may benefit you?

Observations/ Some research: When my classmates participated in an experimental survey that I have designed, some of the results were surprising and many closely fell in the category where research has proven to be most accurate. An example question from my survey was: "A risk-averse investor might tend to put their money into "safe" investments such as government bonds and bank deposits, as opposed to more volatile investments such as stocks and funds. Would you rather make safer investments and have less pay-off or make a more unknown investment in which the payoff could be greater?" This question has the ambiguity effect, a cognitive bias, placed in this situation. The ambiguity effect is where decision making is affected by a lack of information, or "ambiguity". This effect suggests that people tend to select options for which the probability of a favourable outcome is known, over an option for which the probability of a favourable outcome is unknown. My survey results conclude that 66.7% of my classmates would prefer to make a safer investment, thus the relevance of the ambiguity effect. The other 33.3% decided that they would make a more unknown investment with a varying result if the investment would give or lose money. These two different types of people's' tendencies could have been an influence on their answer, but the safer investment is more popular as it is part of our human nature to make safer decisions.

Conclusions: Cognitive biases are around us every day and most of the time they slip right by us. Like many things in the world, there is a positive side to biases that can be useful in one's decision-making. However, biases can also place consumers at a disadvantage, misleading consumers with creatively designed marketing strategies that work to maximize business profitability. As mentioned in one of my experiment questions, genetically, some people are more affected by biases. If people are more educated on these topics then it becomes easier to identify and avoid being preyed on by these marketing tricks.



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Prefair Report

2433 **Lena Renwick**

Div/Cat **Human Health / Junior**

Title: **How Do Different Types of Illusions Work**

Summary: I have researched different types of illusions, Tactile, Optical, and Auditory. There are three main different types of Optical illusions, which is what I thought. One is called a psychological illusion which is when the brain assumes that the image is an effect of excessive interaction or stimulation of a physical stimulus. This stimulus would be competing in a particular aspect of colour, brightness, size, movement, etc. There is another type of optical illusion called a cognitive illusion which is when the brain makes an unconscious inference/decision due to one's beliefs and assumptions. Cognitive illusions are normally put into these four categories: ambiguous illusions, distorting illusions, paradox illusions, or fiction illusions. Finally, there is a main type of illusion called a literal illusion which is when the brain makes out different images from the objects that make them. Basically many smaller images that are not related to the overall image created. I have also researched Auditory illusions which are the result of how the human brain thinks that it can hear something that is either not "there" or the brain perceives a sound differently than how it was formed. One auditory illusion I have researched is the "McGurk effect". This auditory illusion happens when someone says a word like sun and the way the speaker's mouth has been formed, people might hear fun. I have also researched an auditory illusion called speech to song, which is when the brain converts a sentence into a song because of either repetition or because of how the words were pronounced. Lastly, I researched tactile illusions. Tactile illusions are found when the perception of the quality of an object through the sense of touch does not seem to be in agreement with the physical stimulus. One tactile illusion I researched is called the Aristotle illusion which is when you cross your fingers, touch something small and spherical, or your nose, and it feels like you're touching two things at once. My final illusion/tactile illusion I researched is called Hot and Cold coins. This is when you put two coins in the freezer and one coin at room temp, and you put your fingers on it the two cold coins on the index and ring finger and it feels like all the coins are cold.



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Prefair Report

2434 **Hussain Al Hejami**

Div/Cat **Human Health / Junior**

Title: **How do Video Games affect Academic Performance?**

Summary: Introduction
Gaming is a generally fun activity that many students engage in. The main idea of my study is to see how video games affect academic performance, in a positive way or a negative way. I have predicted that students that play 10 hours or more (usually) hand work in late, this could lead in a lower grade if it is a strict due dates. Students that play 10 hours or less would still hand work in late, just not as much. I also think that different types of games like shooters to strategy games can affect your performance. In conclusion I think that video games can affect your attention span, gaming can also lead to problems with behaviour at school. Researching this topic I found that there are arguments on both sides on how video games affect academic performance.

Design Method

In 2014, data on an experiment on how video games affect academic performance reanalyzed data from 192000 plus students in 22 OECD countries (Organization of Economic Cooperation and Development), these countries were western industrial nations. They assessed the frequency (time played) of single player games and multiplayer games. To do this they conducted standardized psychometric tests and measured the performance of the students in science, mathematics and their ability to read through this standardized test (Mathematics, science, and the ability to read were assessed through an international average of 500 and a standard of about 100, see figure 1).

Observations

The results of the experiment on how video games affect academic performance were minor (the results were compared to students that played daily multiplayer games and those that didn't). Mathematics, science and the ability to read were not affected as the use of single and multiplayer games increased. The differences that occurred during the experiments were minor, but reading was most affected by an increase in video game use. Although reading was most affected most it is still a small change between students that played daily multiplayer games and students that never play.

Interpretation/Conclusions/Applications

In conclusion, video games do not greatly impact your academic performance, I think that this happened because there is no decline in your knowledge while playing video games. It makes sense to me that the amount spent reading was a different from gamers and non-gamers.



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Prefair Report

2435 **Madeline Perry**

Div/Cat **Human Health / Junior**

Title: **How good is your posture??**

Summary: How good is your posture?? And what makes your posture good or bad?? I'm going to be testing my family members posture and researching how the spine is supposed be structured. I will be testing them and taking into consideration what their emotions, personality, genes, and health are to see how that affects how they stand. I feel that the stress level and family history are going to affect their posture more than other contributing factors. The age range is from a child to an adult and I would like to know how their spine developed over a long period of time. As a dancer I think it is the most natural thing for me to keep my spine aligned but for other people who haven't been taught to keep their back straight and lined up I think it would be much harder for them to learn and keep their back straight. I'm excited to see how I can teach my family to keep their back straighter and see if they can improve their health. I would also like to try using equipment that help keep the back straight and aligned to see if those are actually things that could help with some side effects of having an unaligned back for example... back pain, neck pain and hunchback (for some extreme cases).I am excited to see the conclusion and the results of trying to help people with this problem because it can leave really horrible long-term side effects.



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Prefair Report

2436 **Edward Li**

Div/Cat **Human Health / Junior**

Title: **Struggling with cancer? Apoptosis is the answer**

Summary: Intrinsic Apoptosis and the links to cancer research:
A study by Edward Li

Question

What is apoptosis, how does it relate to cancer, and how can we use apoptosis to help cancer research?

Hypothesis

I hypothesize that apoptosis can be utilized for cancer treatments. This is because apoptosis is responsible for many kinds of cancer, so it is logical that it could be used to treat or reverse the effects of cancer.

Research findings

For the project, I chose to focus on one of the two pathways apoptosis is activated by: the intrinsic pathway (the other is the extrinsic pathway). I also chose to focus on the p53 gene, an important player in the regulation of apoptosis, as well as DNA repair.

Intrinsic apoptosis is when the cell senses DNA damage or inner stress. BAX, an apoptosis regulator, cycles around the mitochondria (the powerhouse of the cell) and punctures the outer membrane. BAX interacts with VDAC (voltage-dependent anion channels) and releases Cytochrome C (a hemeprotein).

CYTC binds to APAF-1 (apoptotic peptidase activating factor 1) to activate CASP9. CASP9 activates caspases 3 and 7, the executioner caspases. They cleave away the cell, leaving apoptotic bodies (fragments of the cell) behind.

Diagram showing how apoptosis works

The p53 gene has a negative counterpart, MDM2 (mouse double minute genome 2). MDM2 keeps p53 in check, and when MDM2 has attached to p53 it is disabled. Protein kinase B, or AKT, is activated when stress signals are received. AKT blocks off MDM2's effects on p53. p53 is now active, meaning that it can do its job of tumour suppression.

This means that the chain reaction AKT starts can be used as a treatment for cancer. Even better, AKT has already been cloned in a laboratory. This means that making AKT widely available and effective can help significantly in cancer research.



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Synthetic peptides (amino acid monomers) derived from the C-terminus of the p53 gene can also be used to not only control cell proliferation but also assist mutated p53 genes as well.

Conclusions/Applications

It can be concluded that the AKT protein (and parts of the p53 gene) can be used in cancer research. However, it would be difficult to administer the right amount as tumours grow unpredictably.

Sources

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2117903/>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3384434/>
<https://en.wikipedia.org/wiki/Apoptosis>
<https://en.wikipedia.org/wiki/Caspase>
https://www.youtube.com/watch?v=8kbAQq_Pp8g
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5864239/>
http://thebrain.mcgill.ca/flash/capsules/outil_bleu17.html
<https://en.wikipedia.org/wiki/Cancer>
<https://academic.oup.com/carcin/article/21/3/485/2365672>
<https://en.wikipedia.org/wiki/P53>
<https://en.wikipedia.org/wiki/Mdm2>
<https://academic.oup.com/carcin/article/26/2/263/2476038>
<https://en.wikipedia.org/wiki/Mdm2>
<https://academic.oup.com/carcin/article/26/2/263/2476038>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4152228/>
https://en.wikipedia.org/wiki/Protein_kinase_B

Some sources omitted



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Prefair Report

2437 **Gryffin Little**

Div/Cat **Human Health / Junior**

Title: **gum disease and how it can affect alzhiemers**

Summary: My science fair this year is a research project about gum disease and how can affect alzhiemers. Alzhiemers is a very dangerous brain condition that affects your memory, personality and mood. Here's how it works; a healthy human brain is made up of billions of neurons that process and transmit signals to other parts of your brain, when someone has alzheimer's disease the neurons die off. Without proper functioning neurons in your brain you lose the ability to repair the damages, it also blocks the connection between your neurons and other parts of your brain like the entorhinal cortex and the hippocampus.

In Canada there are about 500,000 people living with alzheimer's, and 44 million worldwide. Alzheimers is very mysterious because there aren't many obvious causes other than your family's genetics. Therefore it is hard to prevent and impossible to treat, although gum disease is. The only gum disease that you can treat is gingivitis and it is only treatable if you are aware of it early. To treat it you can get surgery and you can use antibiotics. Gum disease is an infection in your gums that is caused by the lack of brushing your teeth or a lack of oral hygiene in general. According to The Dental Health Association of Canada 7 out of 10 Canadians will develop gum disease in there lives, therefore it is quite common. In my science fair project I want to determine the relation between the two diseases and how common it is to get Alzhemers if you have gum disease. I also want to research how to prevent Alzheimers of if there is even a way to prevent it.



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Prefair Report

2438 Michael Xu

Div/Cat Human Health / Junior

Title: The Future Age of Phage: Finer Drugs for Superbugs

Summary: Purpose:

Antibiotic-resistant bacteria is significant to the scientific world because it's a global threat, like cancer, but it is also a global threat that can be easily prevented and solved, unlike cancer. Antibiotic-resistance is happening and rising globally, especially in developed countries that use the most antibiotics. We are doing this study because it is important to raise awareness for such a major issue and encourage people to not carelessly add to the problem by overconsuming antibiotics. There's also a viable replacement for antibiotics, which is phage therapy, but unfortunately, many countries do not accept it as safe. Therefore, it's also important to raise awareness about phage therapy and why it should replace antibiotics as our bacteria killer.

Question: What type of relationship exists between antibiotic-resistance and phage therapy?

Hypothesis: I hypothesize that phage therapy will become the new, evolvable bacterial-killer as the scientific world struggles to find suitable and better antibiotics that can override antibiotic-resistant bacteria.

Research findings:

I researched antibiotic-resistance and phage therapy history, where I found out that antibiotics were discovered in 1928 by Alexander Fleming, and bacteriophages were first noticed in 1896 for their antibacterial action, but Félix d'Herelle was the first person to recognize in 1917 that bacteriophages could be applied as phage therapy. I also discovered what, why, and how antibiotic resistance and phage therapy functioned. Antibiotic-resistance is the ability of a bacteria or microbe to resist the antibiotic medical effect to successfully treat the microbe/bacteria. It occurs through either a beneficial genetic mutation or natural resistance, or by acquiring the resistance from another bacterium through horizontal gene transfer, which includes conjugation, transformation, and transduction. The reason behind why antibiotic-resistance is spreading faster than normal is because of humans: We accelerate and drive the bacteria's natural selection process into evolutionary pressure mainly by overusing or misusing antibiotics and not having proper sanitation or infection control against spreading bacteria.

Phage therapy is the therapeutic use of bacteriophages to treat bacterial infections. They should replace antibiotics because as viruses, they're able to evolve to overcome the bacteria's immunity to them, unlike antibiotics. Phages are also much more specific than antibiotics, since they're harmless to beneficial bacteria and will eliminate harmful bacteria through their viral reproduction process, which preferably uses the lytic cycle.

Conclusions and Applications:

According to my research, my hypothesis is correct because the pros of utilizing phage therapy over antibiotics greatly outweigh the cons, and consequently, the scientific world will eventually realize this as they struggle to find viable antibiotics. Individually, phage therapy classifies as therapeutic technology and relates to the applications of virology, while antibiotic-resistant bacteria



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relate to bacteriology and bacterial evolution. When both these topics are combined, they ultimately relate to microbiology, which encompasses bacteria and viruses, and the biomedical branches of sciences, technology, engineering, and biomedicine. It's important to raise awareness about these topics because antibiotic-resistance could kill many animals and humans in our society/environment, and it could be prevented if phage therapy was globally legalized to replace antibiotics.



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Prefair Report

2439 **Christopher Alberto Bakyta**

Div/Cat **Human Health / Junior**

Title: **The power of silence**

Summary: For my science project I decided to investigate how noise affects concentration in middle school students. I have always been interested in this topic because I struggle myself at times to read when there is loud noise around. It was only after doing research that I found out that boys could be affected by noise differently than girls. According to some studies, girls are distracted by much softer noise levels than boys. However, I was surprised to read this since none of my girl classmates have complained about noise. Based on this, I hypothesized that boys can concentrate better than girls despite the environment noise.

For my experiment, I tested five boys and five girls from grades seven and eight (ages 12 to 14) who volunteered to help in the study. They all had to complete a study appropriate for their grade under four different environment conditions: first in silence, second with a background noise of a ticking clock, third with classical music, and fourth with pop music. All three stages with noise had sounds emitted at the same level: from small loudspeakers at 100% volume connected to my computer which was at 50% volume. The number of decibels (dB) for each stage were recorded as: 1) 0-5 dB, 2) 40 dB, 3) 41-45 dB, and 4) 50-55dB. The loudspeakers were at a radius of about one meter from the students that formed a circle around them.

The results of my experiment were quite interesting. In the first stage, there was no body language that signaled the students could not focus. During the second stage, I could see some participants, mainly girls, fidgeting, bouncing their feet up and down, and resting their heads on their hands. I even noticed that a female student wrote on the test that she could not focus and did not circle any answers. During the third stage, I could see that hardly anybody could focus including a male student constantly looking outside the classroom window. During the final stage, the same female student that had written that she could not focus circled random answers and left the class. When I marked the tests, I found out that the mean was 83.6% for boys while for girls it was 59.8% and the highest marks were achieved in silence for both boys and girls. Also, girls required the most amount of time to finish their tests.

From this research, I can conclude that noise affects concentration in middle school students while reading, especially girls. Also, body language was a clear way some students expressed discomfort. This information might help the productivity of students while doing work at home and in the classroom. Honestly, it made me feel good to know that I am not alone when it comes to reading with noise! It will be interesting to see if these observations also apply for other subjects such as Math where there is often significantly less reading.



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Prefair Report

2440 **Kaylan Bridges**

Div/Cat **Human Health / Junior**

Title: **The Talk About Paralinguistics**

Summary: QUESTION / HYPOTHESIS

How do the forms of paralinguistics influence our daily lives?

Believe it or not, paralinguistics make up approximately 93% of a conversation- body language contributes 55% while tone contributes 38%. The rest is simplified verbal components. My hypothesis goes hand-in-hand with this, because I think that paralinguistics influence our daily lives by simple things such as: feet turning towards the person you are (or want) talking to, giving a thumbs up, putting an emphasis on a word in a sentence, or sighing. And all of these differ in our cultures! Some are considered rude, while others are considered the norm. This study aims to look deeper into the whole premise of paralinguistics in different cultures and to affirm my hypothesis at the same time.

RESEARCH FINDINGS

For this project, I have been doing lots of research about paralinguistics- tones, body language, etc. Most of the research is based on very broad subjects, but some of it is also in the specifics (such as paralinguistics in different cultures). The broad and specific research were put together to answer various questions, as well as my own for this research study. Even though I have been researching, I plan on extending all of this in the future so I'm able to gain more knowledge about the subject of paralinguistics.

From the research I have so far, this is what I have to back up my hypothesis:

Cultural differences in body language- Even a handshake can differ from culture to culture. While Americans tend to give firm handshakes, this may cause a misunderstanding on their part if they, say for an example, shake a turk's hand that way- it's considered aggressive for them. Anyways, on to facial expressions in different cultures. Psychologists have found out that there are seven different facial expressions which correspond to distinct universal facial emotions:

Happiness - Raising and lowering of mouth corners, cheeks raised, and muscles around the eyes are tightened.

Sadness - lowering of mouth corners and raising inner portion of brows.

Surprise - Arching of eyebrows, eyelids pulled up and sclera exposed, mouth open.

Now, gestures! In America, using your index finger to 'beckon' someone is normal, but it's considered rude in other countries. For example, in the Philippines, you can even get arrested for doing so.

Eye contact with different cultures can be pretty different, too. In many middle-eastern countries, same-gender eye contact tends to be more sustained and intense than the western standard. In



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some of these countries, eye contact beyond a brief glance between the sexes is deemed inappropriate.

In some parts of India, people tilt their head from side to side to confirm something and demonstrate that they are actively listening. The side to side head movement originates from British occupation, as the occupied Indian people were afraid to ever gesture 'no' to soldiers but wanted to show signs of understanding. There was also a video that decoded the handshakes in India!



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Prefair Report

2441 **Mada Bender, Danielle Montgomerie**

Div/Cat **Human Health / Junior**

Title: **To Grow or Not to Grow?**

Summary: Title: To Grow or Not to Grow?

Subject: What relationship exists between creating vital organs needed for emergent transplants and stem cells?

Project prepared by: Mada Bender and Danielle Montgomerie

Our research study is based on the information that we have collected regarding the following question: What relationship exists between creating vital organs needed for emergent transplants and stem cells? Thus far in our research we have discovered the various different types of stem cells (Embryonic stem cells, Tissue-specific stem cells, Mesenchymal stem cells, and Induced pluripotent stem cells), how stem cells are harvested, how they function and develop into tissue/muscle cells, where stem cells are found in humans (newborns, children, adults, and elderly people), potential uses for stem cells and stem cell research, as well as the controversy surrounding stem cell research.

We now know that a stem cell is a cell within the human body that is able to differentiate itself into any other kind of cell, they can also self-divide to produce more of the same cells. These cells are very important to human life and can help our society in a variety of different ways. Stem cells can be harvested from embryos (more precisely the blastocyst), from bone marrow in the pelvic bones, and/or from umbilical cords. Stem cells are especially useful to us as they can aid in the development of new drugs as well as their testing, and they can provide key evidence in monitoring how certain diseases affect our bodies. Overall, the largest and what seems to be the most important component of stem cell research is organ growth from embryonic stem cells, that can then be used in much-needed transplants.

In this project, we decided to focus mainly on how stem cells can be grown to form kidneys due to the fact that it is a fascinating topic and kidneys are one of the most widely needed organs for transplants worldwide apart from the liver and lungs. Another major motivation for choosing this topic is the fact that Mada would like to become a surgeon or seek another job within the medical field, and Danielle is interested in biology and is considering pursuing a job in biology - this topic relates to subjects that are explored in both of these careers.

Further, we hope to learn more specifically how stem cells are used once they are harvested to grow organs, and whether or not this is a sustainable and effective method of organ transplant. In addition, rather than solely looking at organ transplant in relation to stem cells, we also will research diseases like Parkinson's and Huntington's disease and how stem cell research can affect them.



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Prefair Report

2442 Olivia Lloyd

Div/Cat Human Health / Junior

Title: Under the Influence: How does advertising affect our choices and perception?

Summary: The intention of this experiment is to investigate how advertising affects our everyday choices and influence our perception. I used water in this experiment as an example of a product that everyone uses and makes choices about. I think that the subjects will be influenced by the brands as advertisements are strategically planned to make us want to buy their product. It has already been proven that we are at least somewhat influenced by advertising, however it will be interesting to see how much kids my age will be affected by this.

Each subject will blind taste three samples of water: tap water, Selection brand bottled water and Evian brand bottled water. Next each participant will try the three samples again, however this time they will know which one is which. Then the subjects will try three samples that are all tap water, but these samples will be presented as though they're different. Each participant will also answer a questionnaire to see how they are affected by other factors. It is important to note that for the first group of eleven participants, the tap water was cold but the other waters were room temperature, while in the second group of fourteen participants, they were all the same temperature. This may have affected the participants' choices.

In the first group, most participants chose tap water in the first two stations, which I think was largely due to the temperature difference. But in the third station, where all samples were the same, a lot less participants chose tap water. This shows that, when the samples all tasted the same, the participant chose purely based on the brand, resulting in a different choice than the previous stations.

In the second group, the results were more balanced in the first station. However, in the second station the majority chose the more expensive Evian. Most participants chose a different sample at the second station where they could see the brands than they did when they blind tasted the samples. This shows that advertising does have an effect on grade 7 and 8 students.

In the combined results, it was clear that several of the participants had been influenced enough by the brand of the water to change their decisions. I believe the participants may have been more influenced by the brand if I had used a product that appealed more to their age group and that they had more experience with purchasing and making decisions about.

It can be concluded that the participants' choices were at least somewhat influenced by the brands. I think it would be fascinating to see the difference if I were to do this experiment with older teens or adults. This experiment relates to the world as it shows the effects of advertising, which we experience every day.



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Prefair Report

2443 **Ephraim Graham**

Div/Cat **Human Health / Junior**

Title: **Video Games and Youth Emotional Health**

Summary: Video Games and Mental Health

Background Information

Over the past decades, video game usage has increased exponentially as the industry has expanded dramatically. This trend is especially true for youth and adolescents. Much research has been done regarding the effects video games have on people. While some studies have found positive effects, many have highlighted the adverse impact on both physical and mental health. In fact, video game addiction has even been classified as a mental health condition by the World Health Organization.

Coincidentally, mental health experts have voiced concerns in recent years about the declining emotional health of youth. Many more adolescents and children are reporting increased levels of depression, anxiety and loneliness. As both of these trends have occurred simultaneously, it raises the question, "Could these two phenomena be connected?"

Experiment

For my experiment, I am studying the possible effects of playing video games on adolescent and child emotional health. The reason I am looking at this possible connection is because it is a potential problem affecting society. Since video game addiction is now classified as a mental health condition, I feel it is important that people are aware of the potential negative impact on their emotional well-being.

Participants in this study were asked to play video games of their choice and fill out a self-reporting survey both immediately before and after playing. Levels of sadness, happiness, anxiety and calmness were each recorded on a sliding scale from a low of 0 to a high of 10. Subjects were asked to fill out a maximum of five surveys over a period of two weeks. They were also asked to indicate their age, gender, game played, time played and reason for ending play.

Data collection, at the time of writing this report, is ongoing



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Prefair Report

2444 **Rachelle Bray**

Div/Cat **Human Health / Junior**

Title: **Artificial Versus Natural Sweeteners - Which One is the Sweetest?**

Summary: My science fair project this year is on which type of sweetener is the sweetest and why. I wanted to perform this experiment because I wanted to find out more about sweeteners and if all types of sugar tasted the same or not. I also am obsessed with all things sweet so I wanted to do a project revolving around sugar. The purpose of this experiment was to inform people about which sweeteners are sweeter than others. In my project, I learned about sucralose, a type of artificial sweetener. I also learned how to bake with different sweeteners and I learned which one was the sweetest. My dependent variable was the taste of the different sugars I used, which were sucralose, white table sugar, brown table sugar, and honey. My independent variable was the different types of sugars and my control variable is just regular white table sugar. For my experiment I baked a batch of cookies using each kind of sugar, and performed a blind test where I tested 18 people from my school and asked them which type of cookie they thought was the sweetest. In my results, I found out that my hypothesis was correct and that sucralose was indeed the sweetest sweetener. I calculated the averages of responses and the number of highest rankings and sucralose was voted as the sweetest. There were a few sources of error however. I only tested kids from my school so perhaps adults would have given different results, the answers of some of the younger children may have been affected by what somebody else thought was the sweetest. I could also only test 18 kids from my school since not enough students brought back their permission forms. I think in the future it would be interesting to find out which sugar is healthiest and why.



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Prefair Report

2445 **Meem Zulkernine**

Div/Cat **Human Health / Junior**

Title: **Blue Light: The Good and the Bad**

Summary: **QUESTION / HYPOTHESIS**

How does blue light affect our bodies?

I hypothesize that blue light affects the different parts of our bodies including skin, eyes, sleep and energy levels in both positive and negative ways. On the visible colour spectrum, UV rays lie just beyond the blue end. Since the energy levels and wavelengths between UV radiation and blue light are similar, I think that blue light causes effects that are similar to those of UV rays such as skin damage and boosting energy levels. I predict that from my research I will also see how artificial blue light and natural blue light differs when observing the effects on the body.

RESEARCH FINDINGS

Blue light is a colour in the visible light spectrum. It has shorter wavelengths and contains a lot of energy. This part of the spectrum is also known as HEV (High- Energy Visible) light.

Studies have shown that HEV light damages skin. In the long term, exposure to concentrated amounts of blue light can cause changes due to the free radicals (also known as ROS- Reactive Oxygen Species) it generates. The ROS causes skin cells to produce enzymes that break down collagen and elastin in the skin.

Blue light also affects our circadian rhythm. The hypothalamus of our brains sets our sleep schedules based on the light outside. Depending on if it's light or dark, our brains create hormones like melatonin and cortisol to keep us awake or put us to sleep. When our body becomes exposed to artificial light, especially at night, our brain becomes confused, resulting in an improper sleep schedule.

I have also learned that blue light affects our eyes negatively. Blue light from our phones contributes to digital eye strain. It could also be contributing to macular degeneration, a condition that is usually associated with old age.

Despite these negative effects, blue light can benefit us by boosting reaction times, attention and mood.

INTERPRETATION / CONCLUSIONS / APPLICATIONS

I can confirm that my hypothesis was correct. Blue light affects our sleep, eyes, brain, and skin. I have learned that artificial light and natural light have different effects. I hope that we can apply this knowledge in technology. We are always told to avoid phones and spend more time in the sun and now we know why. Knowing this, we can engage in more face to face interaction and be more cautious about our health. Now that we know how harmful the blue light from our phones are, we can work towards innovating safer technology.



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Prefair Report

2446 **Aria Yang**

Div/Cat **Human Health / Junior**

Title: **Changes in Vitamin C Levels in Vegetables Cooked in Different Ways**

Summary: The purpose of this experiment was to find out how different methods of cooking foods change the level of vitamin C in multiple vegetables, I wanted to find out which vegetable, cooked which way, contains the most vitamin C, and decided to use the vitamin C titration protocol, which uses tincture of iodine, vitamin C tablets, and cornstarch.

I hypothesized that some vitamin C will be lost when steaming vegetables because vitamin C is soluble in water. Some of the vitamin C will likely leave the vegetables while coming into contact with water. Vitamin C, or ascorbic acid, is also susceptible to heat and air and breaks down over a period of time when exposed to oxygen, leading to a decrease thereof. I also hypothesized that when a vegetable is left to cook, it will lose vitamin C because by making it hotter, some of the water inside the vegetable will evaporate. I predicted that boiling and steaming vegetables will lower the amount of vitamin C in a vegetable the most, and raw vegetables will have the most vitamin C. I hypothesized that sautéing and baking will slightly reduce the amount of vitamin C in a vegetable as well.

The experiment consisted of two parts: determining how many drops of iodine is required to react with one milligram of vitamin C, using iodine and cornstarch in a bucket of water with vitamin C; and using this information to figure out how many milligrams of vitamin C were in each vegetable cooked different ways. To improve accuracy, I repeated each measurement 3 times.

I tested raw, boiled, steamed, sautéed, and baked carrots, potatoes, cabbages, bell peppers, jalapeños, onions, zucchini, and mushrooms.

When cooked in different ways, vegetable weights changed. Weights either decreased because water was evaporated out of vegetables, or increased because vegetables absorbed water. This did not affect my data, however, as I was determining how much vitamin C there is in one gram of a vegetable.

Of the vegetables I tested, baked mushrooms had the most vitamin C per gram, at 0.66 milligrams. Baked cabbages had the second most, at 0.6 milligrams, and sautéed zucchini had the third most, at 0.56 milligrams. Boiled potatoes had the least vitamin C at 0.05mg per gram of food, and steamed potatoes had the second least, with 0.06mg. Contrary to my hypothesis, raw vegetables didn't have the highest levels of vitamin C. Different vegetables had different methods of cooking that gave the highest level of vitamin C, but baking and sautéing yielded the highest levels of vitamin C in the most vegetables, and raw and boiling yielded the lowest levels of vitamin C. In conclusion, eating baked mushrooms, baked cabbages, and sautéed zucchini will give you the most vitamin C, and baking or sautéing vegetables will give you the most vitamin C.



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Prefair Report

2447 **Aastha Sah**

Div/Cat **Human Health / Junior**

Title: **Cooking The Vitamins Away?**

Summary: Project Title: Cooking the Vitamins Away?

Question/Hypothesis

The study performed was designed in an effort to determine the loss of Vitamin C when cooking food. Specifically, the Vitamin levels of broccoli were examined as it is a vegetable which contains a high amount of Vitamin C. I predict that boiling broccoli will be the cause for the loss of Vitamin C. This is because the Vitamin C molecule has properties that can dissolve in water. The Vitamin C molecule is water soluble.

Design/Method

Firstly, an iodine and starch-based Vitamin C indicator is made. To complete this, 1 tablespoon of cornstarch is mixed with 2 tsp water until a paste is formed. Then it is boiled with 100mL water and 10 drops of the solution is added to 40mL water in a test tube. With a stirrer, it is mixed thoroughly. Two drops of 5% iodine tincture are added to make the starch solution turn into a dark blue or dark purple colored mixture. This solution will turn amber or clear in the presence of Vitamin C. Once the indicator is made, the broccoli is microwaved, processed with 100mL of water and then the juice is strained. This process is repeated with all of the other cooking methods. The juice is used as the Vitamin C to make the iodine-starch turn clear/amber. The more concentrated the Vitamin C is in these liquids, the fewer drops it will take to make the solution turn clear. The green colour of the broccoli juice will impact the end result because instead of it turning clear it will turn green.

Observations

After completing the experiment, I found that steaming broccoli was the best way to preserve the Vitamin C content. It only used 40 drops of the broccoli juice to turn the solution clear. While microwaving and baking used an abounding amount of drops, which ultimately also turned the solution to green colour instead of amber or clear, steaming and boiling had astonishing amounts of concentrated Vitamin C. Though boiling made it in second place, when compared to steaming, there is a significant difference. Steaming only used 40 drops whereas boiling used 80 drops. I would like to perform this experiment one more time to make sure my results and numerical values are correct. I would also like to compare these results to raw broccoli as it would give me more accurate results.

Interpretations/ conclusions/ Applications

As a result of the observations, I can come to the conclusion that cooking definitely does vary the levels of Vitamin C in vegetables (broccoli). The conclusions made are helpful because it focuses on health which can apply to all of us. It will also help society in making healthier choices in the future to sustain long, fit lives. People who have Vitamin C deficiencies can also look at this report for beneficial information. I would like to extend this experiment to get more accurate results as well as get additional information.



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Prefair Report

2448

Sam Diaz

Div/Cat

Human Health / Junior

Title:

Crime scene conundrum- The Kastle-Meyer test

Summary:

Question/hypothesis

What different substances test positive on the Kastle-Meyer test for blood?

I believe that not many substances will test positive on the Kastle-Meyer test because the Kastle-Meyer test is used to detect the presence of hemoglobin and I have talked to people and they have said that not many substances contain hemoglobin. Hemoglobin is a protein in your red blood cells that carry oxygen through your body and there are ways to increase your hemoglobin but there are very few substances that contain hemoglobin.

Research Findings

In my research about the Kastle-Meyer test, I have found that potatoes, cauliflower, broccoli and horseradish test positive on the Kastle-Meyer test. Raw ground beef, broccoli, cauliflower and horseradish test positive with a chemical called luminol. Luminol is a chemical that forensic investigators use to detect the blood at crime scenes because luminol reacts to the iron in hemoglobin. These fruits don't test positive in any circumstance: Watermelon, strawberries, blueberries, cantaloupe, grapes, almonds, bananas, lime, raspberry, plum, peach, grapefruit, true lemon, nectarine. Also I have found that most meats test positive on the Kastle-Meyer test for blood because meat from animals which have blood. These substances test positive because vegetables have peroxidases that trigger what's called a "false positive" on the Kastle-Meyer test. Another thing I found is that the Kastle-Meyer test will give positive results even if the blood isn't human blood because all blood contains hemoglobin.

INTERPRETATION / CONCLUSIONS / APPLICATIONS

After this research, I have found that my hypothesis was correct that not many substances test positive on the Kastle-Meyer test for blood. This study has implications to so many people such as policemen, crime scene teams, and forensic scientists. With these results, cops around the world can have an idea that it is a possibility that the Kastle-Meyer test can give false positives and that further research is required.



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