



Science Fest

Learn it. Share it. Celebrate it.

May 2nd - 6th, 2016



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Welcome

Welcome to the 2nd annual ScienceFest! You have all worked very hard all semester - planning, discussing, building, planting, observing, growing, tabulating, calculating, writing, and all your hard work has culminated to this point. Congratulations for making it this far.

A large part of scientific research is being able to communicate your experiment and results to others. We hope you enjoy the variety of the projects on display and take the opportunity to socialize and discuss your projects with each other as well as with other members of the Dawson community.

I would like to take this opportunity to thank everyone who has helped put this event together: the students, our sponsors, the support staff members, and the faculty members. This event would not be able to run without the continual efforts of all of you.

Finally, thank you presenters and participants, for taking part in this event. Thank you for sharing your knowledge and passion for science.

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Cover Design is an excerpt from the ScienceFest 2016 poster designed by 3rd year Illustration and Design student Yu Xiang Ren

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ScienceFest Homepage: www.dawsoncollege.qc.ca/science-fest

Instructions to Participants

Oral Presentations

Please consult the conference schedule to see when and where you will be presenting. Please come to your allotted location with your presentation in hand (on a USB or saved online). You will be using a college computer to do your presentation and you will have internet access. If alternate arrangements need to be made, please specify ahead of time. A conference organizer will be in the room to assist you with set-up and the timing of your presentation.

Poster Presentations

Your posters can be attached directly to the separators In Conrods with thumb tacks. Your poster should be installed in your specified location; look for your project title.

Poster set-up – Monday, May 2nd, 9:00am

Poster take-down – Anytime after 4:00pm on Friday, May 6th

For conference awards purposes, the posters will be evaluated by our conference judges. Judges will be looking at presentation as well as content to determine prizes. Although it is not absolutely necessary for candidates to be present while the judging process is occurring, students are encouraged to spend time at their poster and answer any questions observers and judges may have. Please note, your teachers may have additional instructions/assignments linked to the presentation of your poster. Please consult with them for any further evaluations.

Project Displays & Demonstrations

Project Demonstrations will follow the same guidelines as “Oral Presentations”. These Demonstrations will take place in Conrods.

Weeklong project displays will follow the same guidelines as “Poster Presentations”.

Notes

Project Abstracts – Oral Presentations

The Paint-Stained Telescope: Focusing on the Intersection of Art and Science

Bettina Forget

ScienceFest Plenary Speaker

Scientist/artist, logic/emotion, left brain/right brain, lab coats/paint-stained jeans. Polar opposites.

Or are they?

Bettina Forget works at the intersection of art and science. It is her mission to disrupt the artificial separation between these disciplines, and to stimulate curiosity, spark discussion, and to foster a profound appreciation for the natural world.

In her ScienceFest presentation Bettina will outline her astronomy-informed artistic practice, the mandate of her art-science gallery Visual Voice, and her upcoming activities as art/science researcher at the SETI (Search for Extraterrestrial Intelligence) Institute.

Scientific inquiry and creative practice: two disciplines that are as much alike as they are different.

A Sit Down with Julie Payette

Javier Amoretti-Petrelli

Pure & Applied Sciences

Physical activity, physical fitness and physical exercise are terms that are for one, misunderstood and often confused with one another. Each term is easily distinguishable from one another, and this presentation will explain what each signifies and how they can have different effects on us in our daily lives directly and/or indirectly. According to WHO, physical activity is defined as any bodily movement produced by skeletal muscles that require energy expenditure, physical fitness is your ability to carry out tasks without undue fatigue and exercise is physical activity that is planned, structured, and repetitive for the purpose of conditioning any part of the body. With this being said, this presentation will analyze how each of these have a different impact on our cardiovascular, nervous and muscular systems and how medical professionals have started to integrate them in their practise in the treatment of their patients. Knowing how each affects our body on Earth, I will discuss the importance of being active and keeping fit in space. To do so, I will have a sit down with Miss Julie Payette, Canadian engineer and astronaut who completed two spaceflights, STS-96 and STS-127. She will explain to me how important physical activity was during both her stays on the International Space Station and what exactly happens to your body when in outer space.

The Future of Nuclear Energy

Firas Babar

Radiation Oncology

I want to talk about the future of nuclear energy. Where we are at and what is the up sides and down sides of using nuclear energy for the future.

A venture into the 5th Dimension

Jonathan Boretsky, Sam Fisher

Pure & Applied Sciences

Our goal is to study the Radion, a graviscalar existing in 5 dimensions, and produce a graph showing the lower bound on the value of its partial decay width into gluons. The partial decay width of a particle is defined as the average number of decays into a particular product the particle undergoes per unit time. Though the actual existence of the Radion is still undetermined, we will still study it using data about the partial decay width of the Higgs obtained at the Large Hadron Collider. It is shown that the decay width of the radion is directly proportional to the known decay width of the Higgs, so the problem is reduced to putting a lower bound on the proportionality constant. This constant is found using real data describing the Higgs decay from the LHC. An understanding of the Radion's properties can prove indispensable in the future as we develop the technologies to possibly detect the particle in our colliders. Knowing its properties before hand will prove essential when it comes to searching for and recognizing the particle. If the radion is ever discovered, it would offer an interesting solution to the hierarchy problem, an explanation to why gravity is by far the weakest force in the universe.

This project exposes breaking edge, current ideas in particle physics at a level suitable for college students. This is a gateway to higher studies in physics and deeper understanding of the constituents of our universe.

Cholesterol and its complications

Samantha Shapiro, Iman Sadri

Health Science

Cardiovascular diseases are one of the leading causes of death, hospitalization and drug prescription in Canada. In 2012, more than 66 000 Canadians died due to heart disease or stroke. In fact, there are presently upwards of 1.3 million Canadians living with some form of heart disease. There are many risk factors for these diseases, some of which are uncontrollable, such as genetic predisposition, ethnicity and age. Fortunately, tobacco usage, alcohol consumption, hypertension, unhealthy diets, and lack of physical activity are other risk factors that can be controlled in order to reduce a person's chance of getting heart disease. Another major factor that affects risk of cardiovascular disease is cholesterol levels. Cholesterol is a steroid molecule of the larger family of lipids. It plays an essential role in the fluidity of cellular membranes. Cholesterol is also transformed into bile salts in the liver, a substance that plays a very important part in the absorption of fats in the lumen. The liver produces around 80% of the total cholesterol requirement of the organism through a rather simple biosynthetic mechanism. These molecules are transported from the liver to the body in macromolecular structures called Very Low Density Lipoproteins (VLDL). They are identified by cells of the body through LDL-r membrane receptors. The composition of these lipoproteins changes as they deliver cholesterol to the cells of the body. The danger of cholesterol starts with its accumulation in the blood in the form of LDL, commonly called bad cholesterol. To counter this, our body has evolved a mechanism that essentially drains the cholesterol out of the blood, a process called reverse cholesterol transport. This process is driven by another category of lipoproteins called High Density Lipoproteins (HDL). In this presentation, we will start by explaining the various mechanisms mentioned above. We will then elaborate on how cholesterol ends up increasing our risks of atherosclerosis. In addition, we will explain a special genetic disorder called Familial Hypercholesterolemia. Finally, we will take a look at two different medical solutions that are available in order to help people with high cholesterol levels: statins and miRNA-30c. Statins play a role in inhibiting the biosynthesis of cholesterol in the liver by blocking the hydroxymethylglutaryl-CoA reductase (HMG-CoA reductase) enzyme. MiRNA-30c helps degrade the 3' tail of the mRNA coding for the microsomal triglyceride transfer protein (MTP), a protein that is directly related to the overproduction of LDL.

Alzheimer's Disease

Katerina Giannios

Health Science

The purpose of this project is the vulgarisation of Alzheimer's disease. Neurodegenerative diseases are complex in their nature and physiology, and proper understanding of them is often difficult. Because it is so common, it is worth knowing the complexities behind Alzheimer's disease. The mechanisms by which pathological markers such as beta-amyloid plaques and neurofibrillary tangles are made will be presented. Other topics such as disease diagnosis, treatment, and progression will also be touched upon. The presentation will be accompanied by a video of hand-drawn animations, which will help make the information easier to visualise and understand.

In short, this project is an overview of the basics of Alzheimer's disease with the purpose of summarising complex information in such a way that it is easy to comprehend.

Cluster Headaches

Justina Anderson

Health Science

Cluster headaches are excruciatingly painful headaches that affect "less than 1% of the population" and are more prevalent in men than in women. The pain is similar to that of a hot, metal poker being driven into the eye on one side of the head. It is considered by many to be one of the worst pains known to mankind. Cluster headaches occur over a cycle. An episode can last from several weeks to months. It is usually followed by a period of remission; however, once that period of remission is over, the cluster headaches will appear again. Within an episode, the pain manifests itself on a timed schedule with several "attacks" happening in one day – each lasting for 15 minutes to 3 hours. A cluster headache attack may be triggered outside of its timed schedule by many factors such as alcohol, smoking, and sometimes light and sound among many others. A person experiencing cluster headaches may be restless thus distinguishing the pain from that of migraines. There is also the occurrence of nocturnal cluster headaches in which a person will wake up in pain. The cause for this rare condition is unknown; however, scientists have many theories about it. Some suspect a problem within a person's hypothalamus, a low level of melatonin in the body and/or an issue with the vasodilation of blood vessels within the head. There are many treatments that are used to prevent the pain and/or abort it but there is no treatment that will fully cure a person of this condition. Some of the most predominant treatments are Imitrex (sumatriptan) and pure oxygen. In my oral presentation, I will be explaining in further detail cluster headaches. I will begin with a brief introduction to the condition and to the nervous system. Then I will do a literature review and a case study. I will conclude with hypotheses and connections that were made between the literature review, the case study and the nervous system.

Effect of Alcohol on adolescent brain development

Mahmud Miah

Pure & Applied Science

95% of the alcohol that enters the body is metabolized by the liver before it is eliminated. Because alcohol cannot be stored anywhere in the body, it continues to circulate in the body until it is metabolized which means that if more alcohol is consumed than is being metabolized, both the blood alcohol level and the degree of intoxication increase with consumption. While moderate consumption of alcohol has been proven to be linked with better cognitive health than abstinence, excessive drinking of alcohol can have devastating effects on an individual. The brain is made up of more than 100 billion neurons. Each makes tens of thousands of connections throughout our bodies. Many factors determine the impact of alcohol on the central nervous system, abbreviated CNS, such as the amount of alcohol drunk, time period over which the alcohol is drunk, the genetic background of the individual drinking alcohol, the size, weight, and sex of the person (alcohol has a stronger effect on women than on men). Researchers used to think that most brain development took place during the first few years of life, but new findings have shown that during the teen years, important changes are taking place. For example, parts of the brain that help teens make decisions and control their impulses are still forming. Too much alcohol can damage or even kill neurons, perhaps changing the development of those parts of the teenage brain that are still forming. Because of the way different parts of the brain respond to alcohol, teens may engage in behaviors that are not good for them. For example, drinking alcohol can lead to making bad decisions; because the prefrontal cortex is not mature, too much alcohol can harm a teen's ability to reason and weigh choices. In this presentation, I will explore the use of alcohol on the different parts of an adolescent's brain and how it affects its development

Driven to Invent

Eitan Gabbay

Pure & Applied Sciences

This year I participated in SPACE. There were many other student projects happening that interested me and I didn't want to choose a single project. I am curious about how things work and the process of invention, so instead I developed a bunch of ideas. I will present some of these ideas and how they originated. Finally, I will demonstrate how a hydrogen fuel cell works as an introduction to a collaborative project to build a model car next year in SPACE with other students.

Elevating Space

Chelsea Chisholm

Pure & Applied Sciences

I will be speaking about my experience designing a space elevator, my project for SPACE this semester. This project blends my interests in physics, engineering, material sciences, and concept design. My focus is on how I combined all of these disciplines into one complex design, my work thus far, and how I plan to proceed next year.

Ecology & Culture in Costa Rica

Michelle Rijski, James Theodore, Yulia Toncheva, Carol-Anne Williams
Health Science

The presentation will be about our experience in our trip to Costa Rica in January 2016. This is mainly to encourage next year students to apply to this fun class. We will cover the great experiences there and all the fun organisms that we got to encounter.

Ecology & Culture in Costa Rica

Jessica Di Bartolomeo, Nensi Alivodej, Samantha Bennett, Julia Cohen, Cristina Pop
Health Science

We will be presenting our experience in Costa Rica as part of the Ecology and Culture complementary course offered at Dawson. We will talk about the experience of living with welcoming Costa Rican families, the food, the history, the culture, and also about scientific discoveries we learned over there.

Ex.R.A.

George Vlad Calapod
Pure & Applied Sciences

Ex.R.A. is an experimental project aiming to create Exoskeletal Running Augments which would allow the user to walk and run more efficiently over longer distances and at greater speeds. By enhancing the Achilles tendon with external springs supported by an exoskeletal framework, energy that would otherwise be lost to heat dissipation by the Achilles tendon, whose principal role in the human body is shock absorption, is instead stored as potential energy in the springs. This energy is then later released in the stride to boost the user's forward momentum, thus increasing the efficiency of their movement.

Note: This project will also be presented as a display and demonstration.

Fetal Development

Ilanie Elharrar
Health Science

Every stage of development precisely designs the fetus to function and survive in the postnatal world. The prenatal period is often neglected in considering how significantly it affects development. A woman carrying a child must be conscious of everything she does during her pregnancy because all her actions and behaviours are consequential to fetal advancement. Prenatal exposure to teratogens such as alcohol and tobacco permanently affect the structure and function of individuals' organs, as well as individuals' behaviour. Between 5% and 26% of women in the United States and Europe smoke during their pregnancies with the highest rates being teenagers. Aside from the toxic carbon monoxide being inhaled by the mother, the nicotine within the tobacco crosses the placenta and spreads throughout the fetal compartments accumulating as early as in the first 7 weeks in active and passive smokers. These toxins put the fetus at risk of developing withdrawal symptoms as well as brain and neuropsychological function alterations. The effects of a careless mother on her unborn child not only will influence the fetus postnatally, but throughout adulthood and even through the next generation.

FOOD: THE KRYPTONITE AGAINST CANCER?

Salima Ramdani

Health Science

Cancer is an incredibly clever and evil disease that can be seen as a supervillain. To fully understand its weaknesses, we have to understand its superpowers: immortality, the ability to drive all resources of the body to itself, the ability to seem invisible to immune system cells and finally, the deadliest and scariest, its ability to reject chemotherapy products. These advantages that have enabled it to survive in the body can actually be used against it...with food! In this project, the anti-carcinogenic, anti-angiogenic and antioxidant properties of EGCG, found in green tea, will be used against the main mechanisms of cancer. We will combine it with the anti-inflammatory and pro-apoptotic properties of curcumin, found in turmeric, to increase the chances of stopping tumor growth in breast cancer tissue. This way, many of the superpowers of the cancer mass will be shut down at once, hopefully leaving it almost no chances. This approach's main limitation is the low concentration to which cells are subjected to: they would have very limited preventative effects if given alone. To maximize the concentration that can be absorbed by cancer cells, you will have to come and find out! In this presentation, I will do a brief review of the literature and present my research protocol combined with a grant proposal.

Note: This project will also be presented as a poster as well as a display.

Getting creative: my experience in engineering a robotic snake

Noah Ferrarotto

Pure & Applied Sciences

In this talk, I will outline the steps involved in the creation of a robotic snake with a team of students involved with SPACE. I will specifically explore the difficulties encountered during the working phase of this complex engineering challenge. Finally, I will discuss what I learned about my own creative process.

Hidden Danger: The Not So Peaceful Skies

Claudio Guedes

Radiation Oncology

"Flying is not just a hobby, it's my life." With well over 10,000 airliners in the sky at any given time, what's really happening to us when we fly?

We'll take a look at the relatively new and up-and-coming world of aviation radiation exposure, its effects on passengers and crew, as well as what can/is being done today to solve the problem. A definite must-see for anyone traveling this summer.

You will never look at the sky the same way again...

Introducing Carbon to Water

Jon Zlotnik, Avigayil Sorokine
Health Science

In exploring the wondrous world of organic chemistry we fell upon this beautiful section of carbon based fullerenes. They are found as cylinders, spheres, and even weird flattened football structures. Being students of the health science variety, we naturally begin looking at applications to using these structures within the human body. We find quite quickly that it is possible to trap certain atoms and molecules inside the spherical fullerenes, and so with this in mind, we come up with a few ideas involving fluorescence, magnetism, nano structure building, nano machine propulsion, and much more! But FIRST, we need make the fullerenes soluble in serum!

Note: This project will also be presented as a display.

How a Power Outage Test Went Horribly Wrong: The Chernobyl Disaster

Antonella Cantera, Myriam Dimanche
Diagnostic Imaging

We will present an overlook of the Chernobyl disaster and its subsequent effects. From a biological aspect, we will illustrate the correlation between the incident and cancer rates.

Metacognition

Julien Otis-Laperrière
Pure & Applied Sciences

The evolution of technology is bringing about a storm of change. Experts are split on the possible consequences on employment, and one of the ways to prepare for the worst is to educate the next generations better than today's, by preparing them for change, not routine work. Learning has to be looked at at large: why, when, what and how we learn and should learn. Some of these questions have definite answers, some of them don't; however what matter the most is that we, as a society, start thinking about these seriously, and implement change swiftly.

Monty the Python

Isa Nanic, Omar Alsafadi, Steven Cangul, Noah Ferrarotto, Edris Jebran, Clara Scattolin, Saverio Vadicchino
Pure & Applied Sciences

"Monty the Python" is a project engaging several disciplines in the hardware and software construction of a robotic snake. It is a challenging learn-by-design activity for Dawson students involved with SPACE that gets them to seek creative and collaborative solutions to open-ended problems in science and engineering. But mostly the idea of building a robotic snake is just so cool.

Note: This project will also be presented as a display and demonstration.

Neurologic Music Therapy: Linking Music and Learning

Esther ShinHyun Kang

Health Science

Within the past few centuries, music has developed from a form of social interaction to a psychological therapy and now a key influence on brain activity and physiology. This use of music is called Neurologic Music Therapy. This independent project was modeled after the experiment "Musical structures facilitates verbal learning in multiple sclerosis" performed by Dr. Michael Thaut and his team of neurologic music therapists. The purpose of his experiment was to determine whether music influences verbal learning and memory performance in patients with multiple sclerosis - which was proven to be true. The aim of this project is to answer the same question, but directed towards a closer audience: students. Does music enhance memory and verbal learning in students with learning disabilities?

Nursing Health Promotion projects

To be determined

Nursing

The Health Promotion Project is designed to teach the population how to achieve and maintain optimal physical and mental health. Some topics the project may focus on might include stress management techniques, the benefits of exercise, nutrition, and time management. Students are asked to survey their peers' knowledge of the subject prior to preparing their "teaching session". A second survey at the end of the session is used to determine the effectiveness of the presentation.

Research on how Stress Affects the Human Immune System

Nathalie Van

Health Science

Stress is a state of mind that everyone feels more and more everyday with work, school, or just their life in general. Every stress response is unique to each person and many consequences can follow on sociocultural, psychological, and many more levels and can even cause degeneration of the physical body (psoriasis, increase of risk of heart attacks, stroke, etc.). However, even if each person deals with it differently physically and psychologically, the human physiology reacts to the stress mostly in the same way: through hormones that re-establish homeostasis that has been disrupted by the stress factors. We can categorize stress in a very simple way: good (acute) stress, which provokes our flight-fight reactions, and the bad (chronic) stress. Generally, acute stress will cause reaction within minutes and is short-term as opposed to chronic stress which can last up to a few months. Whenever something, such as a disease or an addiction becomes "chronic," it is a flashing red light. In fact, it greatly affects the health of a person by suppressing the immune system. Have you ever wondered why you got sick after long period of stress? This is, in part, because of our immune system that is slowed down or even stopped in presence of high concentrations of cortisol, the hormone responsible for long-term physiologic stress reactions. This presentation will make a link between stress and the immune system by giving an insight of what are the stress reactions in the human body systems and how chronic stress causes the body to become immunosuppressive.

Key words: stress, immune system, immunity, chronic stress, health, cortisol.

Science on Tourne CE

Oussama Akhiyat , Sarah Assedo

Pure & Applied Sciences

We have to do a presentation on the performance, building process of our machine concerning the Science on Tourne project. We will be explaining the positive and negative sources that helped us understand the fundamental concepts of mechanical engineering. We will also be explaining the sources of error that affected our machines.

Should Elite Endurance Athletes Train at High Altitudes?

Matthew Lassman

Health Science

Elite endurance athletes have been training at high altitudes in order to gain a possible advantage over their competitors. The belief is that high altitude training may improve the efficiency of oxyhemoglobin delivery to systemic cells. As well, it is believed that the reduced partial pressure of oxygen in the air at high elevations forces the body to increase its hemoglobin mass by producing more red blood cells. The objective of the experiment is to determine whether it is more beneficial for the acclimatizing athlete to train at the altitude of competition or at a higher altitude. Two elite hockey players were subjected to an identical workout program that consisted of one hour circuit-type training which followed a 1:2 work-rest ratio three times per week for a period of six weeks. One subject wore an elevation training mask meanwhile the other subject trained under normal environmental conditions for the duration of the workouts. The elevation mask used by subject 1 was initially set at 3,000 feet and increased by 1,500 feet increments every two weeks. The major tests conducted both prior and following the experiment on both subjects were the VO₂ Max and peak flow spirometry tests . The rate of improvement over the course of the experiment is to be compared in order to validate or reject the benefit of high altitude training in elite endurance athletes. I will be presenting a 10-15 minute a power point slideshow, which will consist of photos, videos, spreadsheets, graphs and journal entries including a question and answer period.

The Anatomy of a Mechanical Watch: Creation Process

Catalin Paul Suarasan, Xue Wei Tan

Health Science

In our highly developed North American society, people tend to take for granted the vast array of technology that they have at their disposal. They see them as benign and do therefore not question themselves on how they actually function. One such tool is a watch. Everyone knows what they are used for, but only a few really understand the process behind the simple display of time. With the idea to sensitize the masses about the mechanism of timepieces in mind, we decided to build a large scaled mechanical watch. This was the easy portion; the hard part of figuring out how it could be done was then upon us. The creation process for such a massive project contains more than a few twists and turns that continuously makes us reinvent and innovate. Although we weren't quite able to reach our endpoint, the journey itself proved to be quite a learning experience as we got the opportunity to enrich our knowledge of watches as well as get a hands on experience into the different steps required to achieve such a complicated goal. It takes a lot for an idea to germinate and fully come to fruition.

Studies of Pain

Rusaila Shakhtur-Alqawasma, Gio Mrakadi

Health Science

Presentation of an experiment designed to study pain subjectivity and the possibility of an objective pain scale. Concepts of pain will also be mentioned in order to maximise comprehension of the subject.

Note: This project will also be presented as a display.

The Health Benefits of a Vegan Diet

Véronique Lafrance

Pure & Applied Sciences

Vegan diets exclude the consumption of all animal products, such as meat, fish, dairy, eggs and honey. Numerous studies have shown the astonishing health benefits of following such a diet, which is higher in dietary fibres, folic acid, vitamin E and C, potassium, magnesium and cancer-protective phytochemical. Vegan diets are also lower in saturated fat and are free of cholesterol. Vegans have decreased risks in a variety of health problems including, high blood pressure, multiples types of cancer, strokes, autoimmune diseases, brain diseases, diabetes, kidney stones as well as cardiovascular diseases. The two leading causes of death in Canada are cancers and heart diseases which caused respectively 72,476 and 47,627 deaths in 2011 and are mainly caused by the high meat, dairy and eggs content of the Western Diet. Studies in England and Germany have found that vegetarians are 40% less likely to develop cancer, when compared to omnivores. Studies conducted by Harvard on tens of thousands of people have concluded that eating meat regularly increases the risk of developing colon cancer by almost 300 percent. Diets that are high in animal fats stimulate the production of estrogen, which is related to breast cancer. One study has reported that the rate of breast cancer increases by one third in premenopausal women with a high intake of animal fat. Dairy has been associated with an increased risk of ovarian cancer; the breaking down of lactose into galactose has been shown to take a toll on the ovaries. High levels of LDL cholesterol (bad cholesterol) have been directly linked to heart diseases, due to the fact that excess cholesterol in the blood builds up in the walls of arteries, narrowing the passage and slowing blood flow to the heart. Studies have demonstrated that LDL cholesterol levels are 44% lower amongst vegans than amongst meat-eaters as vegan diets contain no cholesterol, therefore the cholesterol levels of vegans are solely determined by the cholesterol their body makes. In this presentation, I will examine the reasons why a vegan diet is a healthier dietary choice than an omnivorous diet.

The Mantis Shrimp in all its Glory

Mazzn Ali

Health Science

When you ask someone what their top ten most awesome animals are, they would rarely include the mantis shrimp in that list. This presentation's objective is to show how wrong these people are by looking at this creature's incredible eye sight, which far surpasses ours, as well as its devastating punch, which has the acceleration of a 22 caliber bullet. If you're the kind of person that loves to learn while laughing, free up your time and attend this presentation, for I guarantee you, you won't regret it.

The Solar Wind

Mahassen Hawraa El Sayegh

Pure & Applied Sciences

This project is a research about the "solar wind". It will explain the whole process of formation of the solar wind on the star, its movement through space, interaction with Earth's Magnetic field and atmosphere, and discussion of theories regarding Mars' atmosphere.

The Sound of DNA

Emily Luu

Health Science

Indeed, it is possible to hear the sound of DNA. By translating a DNA sequence into a MIDI file, each nitrogenous base is associated to a tone, and the result is a simple four-toned melody. In order to make things more complex, the MIDI file is sent to a digital audio work station, where the sounds can be altered. By superposing different translated sequences, adding different instruments and other compositions, a song is created: the one of DNA.

The Zika Virus

Connor Lynch-Staunton

Pure & Applied Sciences

The Zika virus is an illness spread by certain species of the Aedes genus of mosquitos. The virus is related to the West Nile and dengue viruses. An infected individual will most commonly be asymptomatic however some will experience symptoms similar to a mild case of dengue. Possible symptoms produced by the virus include fever, arthralgia, conjunctivitis, myalgia, headache, and maculopapular rash. The symptomatic period of infection will typically last two to seven days and mortality is extremely rare. It has been speculated that Zika virus infection may lead to the development of Guillain-Barré syndrome in adults. Although Guillain-Barré syndrome produces crippling symptoms, fatalities are not typical and patients generally recover after anywhere from several weeks to a year after the onset of symptoms. While the virus poses few dangers to healthy adults, its potential transmission from a pregnant mother to her unborn child and the severe consequences thereof are causes for grave concern. A causal relationship has been established between Zika virus infection and severe birth defects in newborns. Microcephaly is the most common birth defect seen in newborns infected with Zika; the child may be born with an abnormally small cranium and an underdeveloped brain. Should a child be born with microcephaly, they will suffer from severe intellectual disability, impaired motor coordination, seizures and a greatly shortened lifespan. Zika virus has long been known to exist in Brazil and other parts of South America, the virus has gained significant attention in both the medical community and the media after its spread to North America in 2015. In early 2016 the World Health Organization declared a "public health emergency of international concern[4]," in response to the resurgence of the virus and its potential for causing microcephaly and neurological disorders. To date, there is no vaccine or cure for the virus. In my presentation I will provide a description of the virus while explaining its epidemiology, the morbidities suffered by infected newborns and discuss the theoretical ramifications of the recent Zika outbreak.

Wind and Potential Energy Challenge

Christopher Lariccia, Adamo Foglietta

Pure & Applied Sciences

We will be presenting the projects of H. Nadeau's Engineering Physics class for the "Science, On Tourne!" competition: we will describe the project and its rules, how all the cars were made and what the outcomes were for each one.

Note: This project will also be presented as a poster.

Total Knee Replacement

Julia Escobar

Health Science

Total knee replacement surgery is most commonly used, in the U.S., to treat those with imperative knee pain due osteoarthritis or an accident causing major damage to the knee joint. "Osteoarthritis affects an estimated 10%-12% of Canadian adults". Osteoarthritis of the knee is the most common reasoning for "musculoskeletal pain and disability in the knee joint". Total knee replacement surgery involves surgery to replace a damaged knee joint with an artificial or prosthetic joint; the three types of total knee replacement surgery include: Non-constrained, semi-constrained and constrained prostheses. During knee replacement surgery, orthopaedic surgeons cap "the end of the femur (thigh bone) and tibia (shin bone) with plastic and or metal pieces. These pieces are glued in place to form an artificial joint surface." Total knee replacement is a "major surgical procedure that requires multidisciplinary input prior to and after surgery to ensure the best possible outcome". Post surgery, patients must participate in rehabilitation activities to restore their mobility; this process takes up to 12 months post surgery for optimal gain. "While the majority who undergo [total knee replacement surgery] report improvements in pain and function following surgery, a significant proportion of patients report dissatisfaction with surgery as a result of ongoing pain or poor function." This surgery can also become extremely costly; there are about sixty different brands of prosthetics out there today. A study done in the U.K. by 'Plos ONE' researched the effectiveness and cost effectiveness of different brands, coming to the conclusion that the "AGC Biomet prostheses are the least costly cemented unconstrained fixed brand for TKR but Nexgen prostheses lead to improved patient outcomes, at low additional cost." It was also recommended that this be a first choice prosthetic for "patients with osteoarthritis who require [total knee replacement surgery]." In this presentation I will be showing how a total knee replacement looks, using the newest model with the best mobility on the market, in Canada. I will also be discussing how this mimics a real knee joint, along with the benefits.

TWO-in-ONE

Lina Belabbas

Health Science

Thanks to World Wide Web, information is more and more easily accessible. For many, however, science is still beyond reach. This project addresses the issue with the inaccessibility of scientific literature to the general public. The majority would rather read entertainment news than a research article. Why is that? Simply because the former is much more readily available and easy to digest. Hence, the goal is to create an interactive and innovating event that would attract students from various disciplines in order to re-engage with sciences. The 2-in-1 project aims to combine entrepreneurship and science in order to make this field more accessible through the Science Fest Conference. The SF has the power to unit all of us in an amazing knowledge exchange. It is both a unique setting where students can stand out and celebrate their achievement and hard work, and a golden opportunity to promote the importance of scientific research and why it should be within reach.

Departmental Talks

TransLuminal

going beyond the speed of light

Joel Trudeau

Physics Department

The *TransLuminal* project is a light-box-enclosed mural exploring notions of crossing boundaries completed in 2015 with the contributions of more than 200 members of the Dawson College community. Light provides the conceptual framework through its origins in the Cosmos, its spectral properties and diverse analogies. The parameters are outlined by scientific data and theory—interpreted through digital image manipulation, image transfer, the application of paint, texture, and other media, one layer over the other—and re-interpreted through the interactions and reflections of the many individuals who contributed to its co-creation.

For ScienceFest, this talk will present the conceptual framework of the *TransLuminal* project with an emphasis on the experimental data and ideas from theoretical cosmology that are embedded within it.

Notes

Project Abstracts – Displays & Demonstrations

3D printing & design

Lennart Lemaire

Pure & Applied Sciences

As 3D printers become cheaper and more common, we need to ask ourselves what are the household applications of such a technology. This leap for modern manufacturing will surely impact all of us greatly. But what are its advantages for individuals like us?

Aeolus

Mitchell Keeley

Pure & Applied Sciences

This project began when I built a wind turbine in high school, with the goal of charging a 12v battery. When I started, the turbine was still missing several components before it could be used safely and successfully. The rotating base of the turbine needed to be installed, and a method devised to prevent the wires from twisting. A charge controller also had to be incorporated into the system to prevent the battery from being overcharged. Furthermore, while the original turbine blades I had made were adequate, there was still significant room for improvement. These were the largest improvements that needed to be made, but not the only ones.

Over the last couple of months, I have progressed through several stages of design and implementation, modifying both the major and minor components of the system in order to increase my power output. The second prototype has recently been completed, and I am currently working on the third iteration. While I am continuing to work towards my initial goal, what I am really seeking to achieve with this project is to familiarize myself with the challenges of designing and then creating a functioning power source. I'm trying to learn practical skills and gain experience working through real-world challenges that cannot be solved from a classroom desk.

Betty

Michael O'Meara

Pure & Applied Sciences

Betty is the name of this vehicle that was designed for the science on tour competition at Dawson. The vehicle can only use wind and gravity to function. Initially, the vehicle starts by propelling itself forward by transferring gravitational energy from a pulley system, into mechanical energy. Then, the vehicle approaches a fan a certain distance away and uses its wind energy to come back to the starting line.

CRC Robot project

Ben Marois, Clara Scattolin, Kyle Tannahill, Jonathan Antebi, Janarthan Selvarajah, Eitan Gabbay, Jonathan Bijeau, Fiona Man

Mechanical Engineering Technologies

We are sharing the fruits of our labor from this year's CRC (Canadian Robotics Competition) entry. The Canadian Robotics Competition (CRC) is an annual event open to high schools and CEGEPS in the greater Montreal region. It is a multi-disciplinary event with the objective of building a robot, themed kiosk, website and short video. This year, the competition ran for two days from Feb 25th to 27th and was hosted at College Montmorency. This represents the sixth consecutive year Dawson has participated in CRC. I am proud to announce that our team did exceptionally well this year making it to the finals and placing 4th! This was a difficult task considering the competition objectives: to design a robot capable of extracting a foam noodle from a holding post, move to another section of the playing field, and place it into a series of stacked tubes in order to accumulate points. Dawson was up against 27 other CEGEP's and high schools, some of which were unable to even get their robot to work... Malfunction were abound, tensions were high, but the atmosphere was one of healthy competitiveness and sportsmanship

DrJes Booth

Salima Ramdani, Anna Wong, Katerina Giannios, and others

Science

The editors of Dr Jes would like to present the wonderful scientific articles written by fellow Dawsonites. We wish to promote our journal and experimental science at Dawson. We want to encourage people to send their experiments and CEs to our team.

RESEARCH IS AWESOME. JOIN THE DARK SIDE.

FOOD: THE KRYPTONITE AGAINST CANCER?

Salima Ramdani

Health Science

Cancer is an incredibly clever and evil disease that can be seen as a supervillain. To fully understand its weaknesses, we have to understand its superpowers: immortality, the ability to drive all resources of the body to itself, the ability to seem invisible to immune system cells and finally, the deadliest and scariest, its ability to reject chemotherapy products. These advantages that have enabled it to survive in the body can actually be used against it...with food! In this project, the anti-carcinogenic, anti-angiogenic and antioxidant properties of EGCG, found in green tea, will be used against the main mechanisms of cancer. We will combine it with the anti-inflammatory and pro-apoptotic properties of curcumin, found in turmeric, to increase the chances of stopping tumor growth in breast cancer tissue. This way, many of the superpowers of the cancer mass will be shut down at once, hopefully leaving it almost no chances. This approach's main limitation is the low concentration to which cells are subjected to: they would have very limited preventative effects if given alone. To maximize the concentration that can be absorbed by cancer cells, you will have to come and find out! In this presentation, I will do a brief review of the literature and present my research protocol combined with a grant proposal.

Note: This project will also be presented as a poster as well as an oral presentation.

Ex.R.A.

George Vlad Calapod
Pure & Applied Sciences

Ex.R.A. is an experimental project aiming to create Exoskeletal Running Augments which would allow the user to walk and run more efficiently over longer distances and at greater speeds. By enhancing the Achilles tendon with external springs supported by an exoskeletal framework, energy that would otherwise be lost to heat dissipation by the Achilles tendon, whose principal role in the human body is shock absorption, is instead stored as potential energy in the springs. This energy is then later released in the stride to boost the user's forward momentum, thus increasing the efficiency of their movement.

Note: This project will also be presented as an oral presentation.

Introducing Carbon to Water

Jon Zlotnik, Avigayil Sorokine
Health Science

In exploring the wondrous world of organic chemistry we fell upon this beautiful section of carbon based fullerenes. They are found as cylinders, spheres, and even weird flattened football structures. Being students of the health science variety, we naturally begin looking at applications to using these structures within the human body. We find quite quickly that it is possible to trap certain atoms and molecules inside the spherical fullerenes, and so with this in mind, we come up with a few ideas involving fluorescence, magnetism, nano structure building, nano machine propulsion, and much more! But FIRST, we need make the fullerenes soluble in serum!

Note: This project will also be presented as an oral presentation.

Math Challenge

Jonathan Boretsky, Sam Fisher
Pure & Applied Sciences

We will present solutions to this year's weekly math challenge, presented by Varuzhan Ohanyan, of Dawson's Math Department. We will also present some other intriguing proofs (there are the same number of integers as there are algebraic numbers) and some of our own independent research projects.

Mini LISA Interferometer

Emily McIsaac, Jared Cohen, Alexandra Zajda
Pure & Applied Sciences

Gravitational waves were recently observed for the first time. This opened up a whole new window of exploration for our universe. This project demonstrates the basic idea of interferometry, which was the method used to measure gravitational waves. A small version of the LISA (Laser Interferometer Space Antenna) interferometer will be built and showcased.

Note: This project will also be presented as a poster.

Monty the Python

Isa Nanic, Omar Alsafadi, Steven Cangul, Noah Ferrarotto, Edris Jebran, Clara Scattolin, Saverio Vadicchino
Pure & Applied Sciences

"Monty the Python" is a project engaging several disciplines in the hardware and software construction of a robotic snake. It is a challenging learn-by-design activity for Dawson students involved with SPACE that gets them to seek creative and collaborative solutions to open-ended problems in science and engineering. But mostly the idea of building a robotic snake is just so cool.

Note: This project will also be presented as an oral presentation.

Studies of Pain

Rusaila Shakhtur-Alqawasma, Gio Mrakadi
Health Science

Presentation of an experiment designed to study pain subjectivity and the possibility of an objective pain scale. Concepts of pain will also be mentioned in order to maximise comprehension of the subject.

Note: This project will also be presented as an oral presentation.

Departmental Activities

DNA Profiling Activity

Register with Joel Rubin, jrubin@dawsoncollege.qc.ca

Biology Department

Participants will use the polymerase chain reaction (PCR) to determine their genotype for the PV92 polymorphic region of human chromosome 16. Genotyping DNA polymorphisms is used to profile DNA in forensic studies and paternity testing. This activity will be done over two sessions:

Part 1: Isolate your DNA from cells and set-up the polymerase chain reaction. When: Thursday, May 5, 11:00 AM - 1:00 PM, Lab 5A.23

Part 2: Visualize the results by DNA agarose gel electrophoresis and determine your genotype. When: Friday, May 6, 11:00 AM – 1:00 PM, Conrod's

Sir Isaac Newton Exam

Register with Maria Dikeakos, mdikeakos@dawsoncollege.qc.ca

Physics Department

Each year, thousands of students from around the world compete, applying BASIC PHYSICS and COMMON KNOWLEDGE to solve problem situations. SIN Exam results are not seen by admissions committees and can never affect negatively student admission. Students have nothing to lose, so rise to the challenge! PRIZES & AWARDS:

Dawson College: \$100 grand prize to top local student, book prizes to 2nd & 3rd place local students.

University of Waterloo: additional prizes (e.g. scholarships) to overall top-ranking participants.

Magic!

Chemistry Department

Come explore the wonderful world of chemistry with us. Live demonstration with light, colour, smells and fun!

Demonstrations Thursday, May 5, 11:00 and again at 1:00.

Project Abstracts – Poster Presentations

Acid rain

Douna Husin, Helen Shimansky, Sabrina Willard, Viviane Luu
Health Science

We grew plants using vinegar; experimental group. Trying to prove that the plants wouldn't grow as fast. Plot twist ! They grew taller than our control group; why is that? We shall find out

Affect of PH on Mold Growth

Amritpal Padda, Abis Rizvi, Andrew Augusto
Health Science

The fungi that cause mold growth rely on nutrients in the immediate surroundings of the fungi to grow. The acidic solutions will make the surrounding bread less hospitable for the fungi cells and thus reduced the size of the mold growth and increase the time it takes for the mold to grow.

Ants' Preference between Artificial and Table Sugar

Rachel Copnick, Feliscia Falvo, Arielle Grossman, Jeremy Schafer-Abisdri
Health Science

In this experiment we will determine whether or not Western Harvester ants prefer natural or artificial sugars. The importance in doing so is to understand if they prefer the sweetness qualities of sugars or the nutritional values that sugar has. We hypothesized that ants will prefer the natural sugar i.e., white table sugar over the artificial sugar i.e., Splenda. This is so, since Splenda's main component is sucralose, which is sweeter than natural sugar but it will not be broken down into two monosaccharides and will not be absorbed by animals. In comparison to sucrose, the main component in table sugar, animals will break it down and absorb it which gives sucrose, a carbohydrate, a higher nutritional value. Therefore we predicted that if the ants are exposed to artificial and natural sugar, then they will prefer the natural sugar to the artificial one.

This experiment will be a paired testing, meaning that the four experimental groups will also act as their own control group. Each group will contain 15 harvester ants, making a total population of 60, in a closed container with a perforated top so that the air can circulate inside. To begin with, each container will act as a control where the two bowls are empty but all other conditions in the environment remain constant. This would indicate if the actions of the ants would solely be influenced by their preference of sugar or by external factors. After the control is carried out, the sugars will be added to the bowls. A small amount of water will also be added, forming a substance similar to a paste. This experiment will be carried out in the same fashion as the control, the only difference being the sugary pastes inside the two bowls. Results to come.

Ants versus spice

Erica Assayag, Victoria Bleau, Meaghan Lowrey, Sarah Spagnuolo
Health Science

Do ants have taste receptors that allow them to sense spicy food? Several experiments demonstrate that ants are attracted to sweet foods and are less attracted to other flavours. We will test whether or not ants are repelled by spices. The spice used in this experiment is cayenne pepper. This would allow us to use spices as natural repellents for ants instead of using toxic pesticides.

Caffeine reversal of the short-term cognitive effects of sleep deprivation

Alexander Hassler, Francesca Scardera, Danilo Mira, Catalin Suarasan
Health science

The purpose of this experiment was to study how caffeine affects the short-term cognitive consequences of sleep deprivation, notably reaction time and short-term memory. It was hypothesized that caffeine would positively influence sleep-deprived individuals to the point that their reaction time and short-memory would be at the same level as well-rested individuals who hadn't ingested caffeine. A group of 15 individuals who are not frequent coffee drinkers were each tested twice: once when they were sleep-deprived, and once when they were well-rested. Each time an individual was tested, he/she was given an online memory test as well as an online reaction time test, drank a medium cup of coffee, then redid the two online cognitive tests an hour later. Conducting a few t-tests on the numerical data gathered from the online tests not only led to testing our hypothesis, but also to examine further links between other groups within our experiment, for example, comparing sleep-deprived individuals with caffeine to well-rested individuals with caffeine.

Cricket Noises

Han Yan Xue, Juan-Carlos Sreng-Flores, Minh-Tan Nguyen
Health Science

In this project, we grew two different crops of radish: one from organic seeds, and one from conventional seeds. The products harvested from each crop were then fed separately to several test groups of crickets to observe their reactions to the different types of radishes. This experiment was designed to see if insects (here crickets) would notice a difference between the organic and conventional-grown radish, and whether this reaction would influence how we perceive and eat these organic or possibly genetically-modified produce.

Do Meal Worms Prefer Dry or Moist Food

Wisang Sugiarta, John Read, Nathalie Esgurra, Vincent Le Bourdais-Gross
Health Science

Our project's goal is to see if mealworms prefer moist or dry food. We used oatmeal grains as the food of choice to see which would attract more mealworms. Our independent variable was the dryness of the grains while our dependent was how many mealworms it would attract. We used a control with only dry food to compare it to the experimental. Our results suggested that there was no statistical evidence that mealworms preferred one over the other.

Do plants need water to grow or do they just need to be wet

Victoria Virgilio, Athina Tzinevrakis, Jason Pizzuco

Health Science

The objective of this experiment is to find out whether plants need water to grow or do they just need to be kept wet. In order to determine this, the experiment was carried out with five different liquids; water (which was the control), Coke, Gatorade, milk, and Orange juice. We all know that plants need sunlight, nutrient filled soil and water to grow. But there are some plants that can grow without using water. This experiment tests if a regular green bean plant can grow without water and with the help of another liquid listed above. Our hypothesis was that the plant that was watered with water will grow longer than the plants watered with the other liquids. We carried out our experiment for about a month and a half and observed and analyzed the results.

Does the presence of caffeine affect the growth and multiplication of cells?

Amanda Prizant, Brianna Brown-Viaud, Nick Di Marco, Alisia Agostinelli

Health Science

It has often been speculated that intake of caffeine on a regular basis can stunt the growth of early aged humans and eukaryotes in general as a result of its' effects on the cell cycle and key cell cycle regulatory proteins leading to stunted growth and reduced multiplication of cells.

We hypothesize that the presence of caffeine will stunt the growth and multiplication of the cells.

Our experiment is designed to observe the effects of caffeine on 3 treatment groups consisting of 1 control and 2 experimental groups, where the control group receives no caffeine and the 2 separate experimental groups receive samples of caffeine equivalent to 1 cup of caffeine and 2 cups of caffeine respectively.

We will observe the difference in mass of the yeast at the end of our experiment compared with the mass of caffeine added in mg, the production of CO₂ gas in liters, and the observed height of yeast growth following caffeine addition. Experiment is still in progress, results pending.

Eco-friendly: Fact or Fiction?

Aurely Abitbol, Sydney Elfassy, Dina Gutierrez

Health Science

The purpose of this experiment was to see if ten hours of exposure to ecologically friendly detergent would have a less damaging effect on the leaves of the *Aeschynanthus radicans* as opposed to ten hours of exposure to a regular detergent. To do this seven leaves of similar size were taken from the same plant and submerged individually into 250ml mason jars. Three of the mason jars contained a solution of 50ml eco-friendly detergent mixed with 100ml of distilled water (150ml total). Another three contained a similar solution except that this time the detergent was the regular kind. The final mason jar was filled with 150ml of distilled water and served as the control for the experiment. All of the jars (which were naturally clear) were all covered with tin foil and sealed at the top. The leaves were submerged for intervals of thirty minutes for the first two hours in order to document the progression and were then left sealed and unperturbed for the remaining eight hours. Throughout the whole experiment the temperature was kept at a constant 24.00°C. While the leaves in both the eco-friendly and regular detergent showed signs of distress within the first two hours, in the end, the damage on the leaves submerged in the solution of regular detergent proved greater than the damage to those submerged in the eco-friendly solution. As such, it can be concluded that ecologically friendly detergent is less damaging than regular detergent, at least in the case of the *Aeschynanthus radicans*.

Effect of Acid Rain on Plants (pH)

Cristiana Deac, Mia Vu, Christina Guluzian
Health Science

Since acid rain is an important matter in our society, this experiment will show more in details the effect of acid rain. In fact, in this experiment the effect of tap water versus the effect of a substitute for acid rain will be used, sulphuric acid on lentils who require little sunshine, and grow easily. Moreover, there will be a variance in the pH of the solution, which will ultimately affect the plant.

Effect of composted soil on growth of Radishes

Emma Beattie, Annabelle Sirois, Prana Khayargoli, Melanie Tachdjian
Health Science

The goal of our experiment was to test whether composted soil was better for the growth of radishes than regular unfertilized potting soil. This was done by observing the size of the radishes as well as the length of their stems over a span of 25 days.

Effect of fungal inhibitors on bread.

Jamie Beaulieu, Neal Ismaël
Health Science

Demonstrating the inhibition effect of household detergents on the growth of bread mold.

Effect of light colour on plant growth

Alexandra Katz, Jessie Young, Nicholas Kudo, Jacob Azoulay
Health Science

To determine the effects of different coloured light-emitting diodes (white, blue and pink) on plant growth.

Effect of the Microwave on Yeast Growth

Feriel Taoussi, Kainaat Sheikh, Ramandeep Singh, Daniel Lofeodo
Health Science, Pure & Applied Sciences

Our project evaluates the effect of microwave radiation (42 GHz) on yeast growth and development. We claimed that the yeast will develop faster after being exposed to the waves than not at all, based on a couple of studies. Our data states that the radiation has no significant impact on the metabolism of the yeast, which does not support our hypothesis.

Effect of music on people's moods

Brodesco Nicoleta, Langlois Brad, Yu Amanda, Sabdy Sangerman Garcia Aranza
Health Science, Pure & Applied Sciences

Music is often used to cope with stress and bad mood. But could it also be the cause of someone's bad mood? We hypothesized that people who will listen to music they dislike for three consecutive days will have their mood affected negatively. We observed the effect of music on people's mood in an experimental group of 10 people aged between 18 and 20 years old, who were not allowed to listen to any other music except the music they dislike for 90 minutes per day during 3 days & in a control group of 10 people aged between 18 and 20 years old, who were allowed to listen to the music they like for 90 minutes per day during 3 days. Our results proved our hypothesis and indicated that listening to disliked music affects people's moods negatively. This experiment is important because it proves the direct impact of music on people's general state of mind.

Electrical Pasteurization

Fatemen Ghiasi, Chance Chase-Rawlings, Melina Medjoub, Wissam Lydia Ait-Haddad
Health Science

Fruit juice contains many types of bacteria and fungus, depending on the methods of handling and treating the juice. The shelf-life of a product is the amount of time before it reaches a certain concentration of a certain species of bacteria or fungus that can be potentially pathogenic, or has altered in taste and/or texture. There are many methods of increasing the shelf-life of a product. One of the most commonly used methods is to decrease the initial amount of micro-organisms within the product. This is usually achieved via thermal pasteurization. One of the problems with the commonly used thermal pasteurization is that it denature proteins within the juice, and speeds up chemical reactions that alter flavor compounds, leading to juice that is less appetizing.

One of the novel methods of decreasing the initial concentration of micro-organisms in liquid is via applying an electrical field. When an electric field is applied to an electrolytic solution, cations migrate towards the cathode, and anions migrate towards the anode. Within bacterial and fungal cells, there are metal ions. When an electrical field is applied, these metal cations are pulled towards the cathode, and puncture the cell wall, which is fatal to the cell. In our experiment, we applied different voltages, ranging from 5 volts to 30 volts, of electric current to fresh squeezed orange juice samples for sixty seconds, to determine the optimal voltage for the electrical pasteurization of orange juice.

Flowers changing color

Millane Olgun, Kinnah Lopez-Allas, Vinicio Calderon Salas
Health Science

This experiment emphasizes how essential the functions of roots and stems are to plant growth. Food dye is added to water as flowers rest in it for a certain amount of time. As the colored water is absorbed, students will be able to see how the water is absorbed into the plant and will be amazed when the petals of the carnation change color.

Empathetic Dogs

Frederique Rondeau Sweeney, Cassandra Mayor
Health Science

The empathetic behavior of dogs was studied by observing the individual responses when exposed to sighing humans.

Ethylene Gas: Using Ripe Fruit to Ripen Fruit

Victoria Miller, Yacine Brahim, Kelly Arenas
Health Science

Our project explores the effect that ethylene gas has on unripe fruit. Through research we have learned that as fruit ripen, or when they are injured, they produce the phytohormone ethylene (which is why it is called the "aging hormone"). Knowing this, we decided to experiment ripe and injured fruit affects the ripening process of those who have yet to age. Three separate treatments are being done to observe this. All groups follow the same setup consisting of 6 bananas in a Ziploc bag left over a period of 2-3 days. The control group consists of 6 unripened bananas, the first experimental group has 2 that are ripe and 4 that are not, and in the last experimental group 2 are bruised and 4 are unripe. Data has yet to be collected however we predict that we will observe the fastest ripening process in experimental group 1 with 2 ripe bananas and 4 unripe ones because ripe fruit produces more ethylene.

Excuse me, can you repeat that?

Zahin Khan, Meri Arushanyan, Nicholas Adornato
Health Science

In a situation where it is difficult to hear, does being familiar with a voice aid an individual to better understand what is trying to be communicated versus an unfamiliar voice?

FOOD: THE KRYPTONITE AGAINST CANCER?

Salima Ramdani
Health Science

Cancer is an incredibly clever and evil disease that can be seen as a supervillain. To fully understand its weaknesses, we have to understand its superpowers: immortality, the ability to drive all resources of the body to itself, the ability to seem invisible to immune system cells and finally, the deadliest and scariest, its ability to reject chemotherapy products. These advantages that have enabled it to survive in the body can actually be used against it...with food! In this project, the anti-carcinogenic, anti-angiogenic and antioxidant properties of EGCG, found in green tea, will be used against the main mechanisms of cancer. We will combine it with the anti-inflammatory and pro-apoptotic properties of curcumin, found in turmeric, to increase the chances of stopping tumor growth in breast cancer tissue. This way, many of the superpowers of the cancer mass will be shut down at once, hopefully leaving it almost no chances. This approach's main limitation is the low concentration to which cells are subjected to: they would have very limited preventative effects if given alone. To maximize the concentration that can be absorbed by cancer cells, you will have to come and find out! In this presentation, I will do a brief review of the literature and present my research protocol combined with a grant proposal.

Note: This project will also be presented as an oral presentation as well as a display.

Grass Growth vs. Soil Type

Tanya Cripotos, Sarah Krjnevic

Health Science

In our experiment we analyzed two types of soil; sponge and earth and their effects on the growth of grass. Three pots of each type of soil were grown and both groups were exposed to the same amount of water and sunlight to have the most amount of controlled variables. The initial hypothesis was that the earth would cause greater grass growth. After analyzing the daily recorded data for fourteen days, we concluded that the earth did cause greater grass growth. Therefore, there is a significant difference on the growth of grass by the type of soil used.

Gestr

Nadav Ami

Electronics Engineering Technology

Gestr is a home automation device which allows the user wireless control over electrical appliances, using simple non-contact hand gestures. It can make and receive calls, act as a computer input device, and turn on/off any electrical appliance.

The idea behind Gestr is to allow people to control their devices even while their hands are wet or dirty. There are many instances in our day to day lives where this would be useful. For example, being able to scroll through a recipe while cooking without having to stop for hand washing.

Gestr works by measuring changes in an electric field to determine which gesture has been made. This information is then relayed to the microprocessor that can lookup the corresponding function. Finally, this data is sent wirelessly to a sub-module which will execute the action.

Gravitaitonal Waves

Leif Truesdale

Pure & Applied Sciences

This poster presentation will include a short description of Einstein's theories of General Relativity and of Gravitational Waves, as well as a brief explanation of the technology required to detect gravitational waves: interferometers. The main focus will be on gravitational waves, and what they mean for our understanding of the universe.

Group Summer Internship on Brain Imaging

Jessica Di Bartolomeo, Myriam Dimanche

Health Science, Diagnostic Imaging

This presentation will give an overview of our experience participating in a summer internship on brain imaging with Dr. H el ene Nadeau of Dawson College. We will first go over what we learned about the physics and functioning of magnetic resonance imaging (MRI) and diffusion tensor imaging (DTI) scans. We will then explain the components of pre-processing of brain images, including removal of non-brain tissues and image registration in order to prepare the scans for analysis. We will also discuss the software used to accomplish these various tasks. Finally, will talk about what we learned about the research process and what we took away most from the experience.

How to Improve Your Memory: Open Your Eyes and Close Your Ears

Tara Shomali, Emma Wilson, Felix Wawrosz

Health Science

Our experiment compares how two different stimuli, the auditory and visual, affect declarative memory. Fourteen females, all aged between the 17 and 19 years, were the subject group. Their task was to memorize two sets of twenty relatively simple words within a given time frame. One set of words was provided in the written form, while the other set was stated orally. When the required time had elapsed, the candidates were asked to write down as many words as they could remember; any incorrect spelling was disregarded.

Our stated hypothesis is that the word retention from the visual stimulus would prove more effective than that provided by the auditory stimulus. This view is supported by other research on this particular subject. Our results indicate that all participants had a greater recollection of the words using the visual stimulus, than when words are provided orally. Therefore, our hypothesis is validated, and supports other research in the field of declarative memory.

Growth in *Ocimum basilicum*: amino acid supplementation impact on plant height and leaf number

Megan Cipro, Simona D'Adamo, John Marrone, and Jessica Mastrangelo

Health Science

In the efforts of responding to the increasingly high demands of a population's agricultural needs, it is of interest as to whether or not the additional application of supplementary amino acids will aid in the growth of certain plants and therefore increase the crop yield. This experiment was conducted in order to establish the effect that foliar application of branched-chain amino acids (BCAAs) would have on plant growth, *Ocimum basilicum*, also commonly referred to as basil, being the plant of interest for this particular experiment. Prior to completing the experiment, the formed hypothesis was that the addition of the amino acid spray will positively impact the *Ocimum basilicum* growth, in terms of its leaf count and total height. In order to further explore this topic, a total sample size of 10 basil plants were purchased. Upon separating the total sample size into two groups of 5 plants each, only one group, and therefore a total of 5 of the basil plants, were sprayed with the additional amino acid solution. Over a period of 14 consecutive days, the designated experimental group had received 5 sprays of the amino acid supplementation and all plants had received 25 mL of water. With the intentions of keeping the experiment as controlled as possible, by the end it was possible to note that the experimental group did in fact exhibit greater plant growth, as demonstrated in both its height and leaf count. The statistical calculations chosen, the unpaired t-test, further support this since both calculated t-values, 3.69 and 4.11, for the leaf count and plant height respectively, were greater than that of the critical t-value, 1.85955. Consequently, the null hypothesis for this experiment is rejected and the suggested hypothesis is supported. The conclusions retained from this experiment can thus prove useful in developing further research concerning this topic. The foliar application of BCAAs to plants can be further explored and perhaps prove to be very useful in the agricultural field.

How to Build a Time Machine

Maude Bédard

Pure & Applied Sciences

The goal of this project is to explore different ways of travelling in time using theoretical physics.

Human reaction speed: The finger's response time to a visual and tactile stimulus

Briana Cabral, LiAnna Carusone, Meghan Gagnon, Sophia Ghiassi, Nuzha Noorah
Health Science

Reaction time is defined by the speed at which an organism responds to a stimulus. While there are different types of stimuli, this experiment focused on the difference in response time between visual and tactile stimuli. In order to test the reaction time to each stimulus, a sample group of 20 females, ranging from the age of 17 to 20 years old, had to tap the screen of a smartphone with their finger as fast as they could once they perceived the stimulus. Our statistical analysis demonstrated that the reaction time to a tactile stimulus was significantly faster than to a visual stimulus. In fact, the average reaction time to a tactile stimulus was 240.41 ± 40.56 milliseconds while the average reaction time to a visual stimulus was 263.24 ± 35.14 milliseconds. As predicted, the results support our expectation that the reaction to a tactile stimulus is shorter than that of a visual stimulus. This leads us to question whether the response to a tactile stimulus is faster due to the somatosensory cortex being closer within the brain to the motor cortex than to the visual cortex.

Is 5 Seconds Too Long?

Katerina Sita, Ariana Pagnotta, Megan Santori, Annie Plotkin, Liora Elfassy
Health Science, Pure & Applied Sciences

The 5 second rule is the age old rule that states that when someone drops something on the floor it is safe to eat if picked up before 5 seconds has gone by. However, no evidence was used to prove this rule and it simply became well known around the world, but what people don't know is that even if the food has only touched the surface floor for a mere 5 seconds it could have picked up plenty of bacteria. In that case, the project here is to prove that the 5 second rule is a myth and how it can actually be harmful to humans if they eat food that has fallen on the ground. The experiment was done using 9 agar dishes in order to culture the bacteria in an enclosed environment. The food source used was multiple slices of apple. The control group was the swabbed fruit before having touched the ground and the two experimental groups included the swabbed fruit after having being left on a kitchen tile floor for 5 seconds, as well as after the fruit had been left on a wooden floor for 5 seconds. The results were then tabulated and a T-test was used in order to evaluate the results. The wooden floor showed a significant amount of bacteria, much like the kitchen floor. The results obtained were expected and proved the hypothesis, which stated that after 5 seconds of being on the ground the surface of the fruit will contain more bacteria.

Is it a good idea to keep your bananas and kiwis together?

Téana Sirard, Sandrine Mathieu, Sarah Métellus, Kevin-Raphaël Velasquez Merlos
Health Science

This project mainly consists of evaluating the effect of ripening fruits on other fruits. In this experiment, we will concentrate on the effect of fresh bananas and spoiling ones on the speed of ripening of kiwis, each enclosed in a paper bag.

This project was inspired by the discovery of a grand number of fruits and vegetables who release an orderless ethylene gas that can increase the speed of a fruit's ripening.

Is reaction time to staring related to gender?

Vincent Tambay, Parham Rashidi, George-Nicholas Kromidakis
Health Science

In this experiment, the theories studied combine both biology and gender studies, comparing male and females. Specifically, reaction time to staring was analyzed and compared between males and females. Reaction time is the amount of time it takes for muscular reaction to occur after the appearance of a stimulus. Pre-laboratory research has indicated that men should react faster than women, and that this may be due to the fact that through millennia, males were involved in more physical activities and developed greater motor skills. In this experiment, the reaction times of a total of 14 college students, aged 17 to 20, were recorded and then examined. To do so, 7 college males and 7 college females were stared at, and the time it took for them to react was recorded. The experiment yielded an average of 14.14 seconds for males and an average of 24.14 seconds for females.

Is sound the new pesticide?

Gio Mrakade, Camille Valentin, Nikol Govshievich, Xue Wei Tan
Health Science

Everyone knows that most modern day pesticides are harmful to the environment. However, are they our only option to get rid of unwanted organisms? We put this question to the test, by attempting to use sound as a repellent. In order to do so, we hypothesized that crickets would express negative phonotaxis when subjected to a high sound frequency; this means that they would move away from sound. We set up an experiment, that consisted of five trials, where we would observe the behaviour of 10 crickets in a closed transparent box. Hence, our control group was the crickets prior to being exposed to sound. We then added a source of sound to one side of the box (experimental variable). Our results did not support our hypothesis. To our surprise, the crickets exhibited a positive phonotaxis response, the movement towards sound. However, further research might suggest that sound could prove itself useful for the agricultural industry, as well as be beneficial for our health in the long run.

Is Sunlight More Prevalent Than Artificial Light for Plant Growth?

Alex Brisson, Catherine Lavoie, Ronald Tariro Manyara, Tiffany Zeng
Health Science, Pure & Applied Sciences

What happens to plants when they are only subjected to artificial light? Will this affect their growth? Is sunlight more beneficial for plant growth? With this experiment, all of the questions above will be answered.

Two groups of plants is compared. One is strictly exposed to sunlight, while the other is strictly exposed to artificial lighting. After a certain amount of time, the height of each of the groups will be compared.

Jog Your Memory: The effect of Physical Exertion on Memory

Daniel Bell, Gabriel Santaguida
Pure & Applied Sciences

Ever wondered if going for a run before studying for an exam was a good idea? This experiment will attempt to shed light on this question. A variety of methods for testing memory will be used in conjunction with physical exertion to determine if mixing the two is a good idea.

Making It Rain: Do fungal communities decrease the impact of acid rain on plants?

Ikram Aslam, Khandideh Williams, Allyana Cunanan, Jessica Mae Navar

Health Science

Acid rain is one of the major stumbling blocks in agriculture. Farmers often turn to fertilizers in order to decrease the damage of high acidity levels on crops. Would fungal communities present in soil be able to do the same, and if so, how efficiently? In this experiment, two groups of pea plants: one grown in fungal soil and the other, in regular soil will be subjected to a simulation of acid rain. Which plant group will reap less damage? Find out as we make it rain.

Mini LISA Interferometer

Emily McIsaac, Jared Cohen, Alexandra Zajda

Pure & Applied Sciences

Gravitational waves were recently observed for the first time. This opened up a whole new window of exploration for our universe. This project demonstrates the basic idea of interferometry, which was the method used to measure gravitational waves. A small version of the LISA (Laser Interferometer Space Antenna) interferometer will be built and showcased.

Note: This project will also be presented as a demonstration.

Nose blind

Nimra Shahid, Maryam Parvez, Phoebe Wilson

Health Science

Have you ever wondered if what you taste is affected by what you smell? Well we decided to test this theory out. We took 15 people and had a juice taste test. The four juices consisted of orange, apple, fruit punch and pineapple. They were required to once drink each juice while being blindfolded and have their nose open, once with their nose blocked and once with a spoonful of cinnamon next to their nose. To see the what the results were, come see us at ScienceFest!

Nursing Health Promotion projects

To be determined

Nursing

The Health Promotion Project is designed to teach the population how to achieve and maintain optimal physical and mental health. Some topics the project may focus on might include stress management techniques, the benefits of exercise, nutrition, and time management. Students are asked to survey their peers' knowledge of the subject prior to preparing their "teaching session". A second survey at the end of the session is used to determine the effectiveness of the presentation.

Photophobic behaviour of *Dugesia tigrina* in response to a specific wavelength

Thadshaini Senthurchandar, William Wong, Andrew Centa, Harrison Weinreb, Vidhisha Patel.

Pure & Applied Sciences

In this experiment, we will observe the behaviour of flatworms, *Dugesia tigrina*, in response to green light. The independent variables would be the wavelength of the light source and the dependent variable would be the number of flatworms. The controlled variables would be the number of flatworms, the temperature of the environment, and the size of the environment.

Photosensitivity in humans: the effect of eye color on light tolerance

Avery Albert, Olivia Skipper, Emilie Knafo, Nathaniel Gomolin

Health Science

The basis of our CE project was to conduct an experiment in order to determine whether an individual's eye colour has any affect on how sensitive they are to light. In order to do this, we tested individuals who have brown eyes and individuals who have other colours (i.e.: blue, green) in the same fashion, and compared our results. Individuals were all in the same age group (15-20) and had perfect eyesight, among other controlled variables.

Pneumatic Air Gun

Zachary Bys

Pure & Applied Sciences

A pneumatic air gun which propels objects using compressed air, built out of PVC and ABS pipes.

Reaction time of drivers exposed vs not exposed to navigation systems while driving

Josh Krasner, Jon Perez, Spencer Miller

Health Sciences

Research was conducted in order to test the reaction time of a driver when exposed to a navigation system compared to not being exposed to a navigation system. To test this change in reaction time, drivers were tested for their reaction in braking and steering when a red light was illuminated. All the test subjects had to be male, between the ages of 17 and 19, and have a sufficient energy level in order to control as many variables as possible. The results of the experiment confirmed the null hypothesis, indicating that there is not a change in the reaction time of a driver when exposed to a navigation system.

Soil-altering effects of the *Lumbricus terrestris* (earthworm) on the biomass development (stem length) of *Zinnia elegans*

Madison Le Gallee, Chloe Gordon, Lévana Znaty, Emily Steinberg
Health Science

The effects of the presence of *Lumbricus terrestris* in the potted soil of *Zinnia elegans* were observed and quantified according to the subsequent plant growth (stem length) of the experimental specimens. The experiment sought to determine whether the presence of common decomposers could influence the growth of household plants. It was hypothesized that the plants containing the earthworms would reveal accelerated growth and consequently, would have longer stems. In conducting this experiment, 22 pots were fitted with 2 cups of pure black earth, with 4 seeds gently buried in each. 11 plants were destined to belong to the experimental group and the remaining 11, the control group. For a period of one week, the seedlings were left to germinate in the absence of any remarkable treatment, and for the remaining experimentation period of three weeks, 11 experimental plants grew in the presence of two earthworms. All 22 plants were given equal amounts of vegetation (kale, and carrot shavings alike) to sustain the decomposers and regulate constant treatment to all specimens.

Study of Electrolyte Drinks: Effect of Electrolytes and Carbohydrates on Runners' Performance

Asha Islam, Thanina Madaci, Danna Pho
Health Science

Electrolyte drinks contains both carbohydrates and electrolytes, substances that are depleted when we exercise. Our hypothesis is that electrolyte drinks are beneficial to runners' performance mainly because of the carbohydrates it contains while the electrolytes' effects are negligible. To examine their effect on the performance of a runner, the time needed to run 380 m was collected before and after a runner drink 125 mL of either juice (rich in carbohydrates) or electrolyte water, for a total sample size of 8 boys and 8 girls. Unfortunately, after measuring our data by the mean of a t-test, the difference in time between our control and treatment group was not significant and more experiments varying in running distance and time needs to be done on the subject.

Testing the Five-Second Rule

Maria Giannoumis, Gajanan Velupillai, Samantha Thibault, Celia Lucia, Julia Graziani
Health Science

Should the five-second rule be trusted when dropping food? The five-second rule states that food dropped on the floor will not be contaminated with bacteria if it is picked up within five seconds of being dropped. We decided to test this ancient saying by culturing the bacteria picked up by meat when dropped for different amounts of time.

The Effects of Cutting Open Fruit on the Growth of Mold

Laura Abenaim, Solomon Bendayan
Health Science

We were interested in determining the effect of cutting fruit open, consequently exposing its moist interior, on the life span of various types of fruit. The experiment performed consisted of cutting open two types of fruit; namely, Citrus limon (lemon) and Malus domestica (apple). These fruits were then left to develop mold. The amount of days it took for mold to develop in the cut fruit and uncut fruit were compared to see if a significant difference existed. For the purposes of this experiment, we considered a fruit to be spoiled when mold visibly appeared anywhere on the fruit. We predicted that cutting fruit open will significantly shorten the life span of fruit as the moisture will cause mold to develop quicker and therefore decompose the fruit.

The antimicrobial effect of spices against soil microorganisms

Hind Benkerroum, Kajal Patel, Maria Makridis, Zahra Turki
Health Science

The antimicrobial effect of garlic, cinnamon, and clove was tested against a suspension of soil microorganisms by the disk method. The results showed that garlic was the most inhibitory to soil microorganisms followed by cinnamon as judged by the smaller diameters of the inhibition zones. While clove extract did not inhibit the microbial growth. No inhibition was observed with any of the spices or garlic extracts obtained with boiling water.

The attraction of house crickets to light

Ioana Alexandra Movila, Ciarra Callender, Mikey Schwartz, Hanna Johnston, Clara Assouline
Health Science

Crickets are generally more active at night. In fact, they are considered nocturnal creatures. This would explain why they are only heard communicating between one another mostly at night. Moreover, large predators, such as amphibians, reptiles, birds, etc. are more active during the day, meaning that crickets are more susceptible to be preyed on during that time. Thus, in order to avoid predators they only come out at night. House crickets generally eat dead or weakened insects, which are found under nooks and crannies. They also feed on fabrics like silk and wool, which explains why they have a tendency to live in houses and hide between the cracks of bricks and wooden floor, mainly dark environments. These basic life tendencies that house crickets have seem to support the hypothesis we are trying to prove that crickets will not be attracted to light.

The Effect of Aspirin on Plants

Ana Paula Facetti, Sophia Moutzouridi, Maya Stawska, Irina Stroica
Health Science

The purpose of this experiment was to test the effect of aspirin water on plants vs normal water. We wanted to test if watering plants with aspirin water would have a different effect than just watering them with normal tap water.
Possible differences: faster growth, slower growth, taller plants, shorter plants, death of plants.

The Effect of BPM Sounds on Human Reflexes

Sabrina Belcourt, Arielle Sadaka

Health Science

The effect of BPM sounds on human reflexes were tested to determine if faster BPM sounds would lead to faster reflexes and if slower BPM sounds would lead to slower reflexes.

The Effect of Bromelain on Gelatin

Nicolas Dimitrakopoulos, Viviane Tran-Le, Charlotte Lapointe, Ximena Canales

Health Science

This experiment will explore the effects of bromelain, a proteolytic enzyme found in large quantities in fresh pineapples, on the protein synthesis in gelatin. In specific, the goal of this experiment is to determine the extent, if it exists, that bromelain catalyzes the hydrolysis of gelatin. This will be possible to observe by preparing a gelatin and pineapple juice mixture at varied concentrations for each trial. Theoretically, this will result in a difference in the density of the final gelatin formation. To effectively measure this, a pencil is dropped from a determined height into each of the different gelatin solutions. The depth of the pencil in the mixture is then measured with a ruler. The results will demonstrate that the higher the concentration of pineapple juice, the less dense the gelatin would be, thus the pencil would sink more into the gelatin. In conclusion, these results would support research arguing that the presence of the bromelain enzyme, at increasing concentrations, significantly inhibits the dehydration of gelatin peptide bonds.

The effect of ethylene gas on the ripening of banana

Amirreza Borhani Manjili, Nima Taremi

Health Science

This study examined the effect of Ethylene gas on the ripening process of fruits. The research included bananas and kiwis and tested how the presence of kiwis (as the producers of Ethylene gas) set beside bananas in a controlled environment would affect the ripening of bananas. Three factors were measured as representatives of bananas' ripeness: amount of starch, fruit colour and fruit softness. The period of this experiment was 7 days after which data concerning changes in the three factors were recorded and each examined separately. The results from each of the factors were gathered and manipulated to see which factors were significantly affected. The final results showed that all the three factors were significantly affected by Ethylene gas and thus it was concluded that the presence of Ethylene gas accelerates color change, softness change and starch breakdown in fruits and overall accelerates their ripening.

The Effect of Noise on the Reaction Time of Young Male Humans

Zi Ian Truong, Andrew Burton, Niventhan Krishnapillai

Health Science, Pure & Applied Sciences

The Effect of Noise on the Reaction Time of Young Male Humans.

The Effect of Lack of Light on the Colour of Goldfish

Kelly MacDonald, Jill Caplan, Eli Dannenbaum, Oliver Wu Martinez
Health Science, Pure & Applied Sciences

The effect of light compared to lack of light on the colour of common goldfish was measured as it was observed by one of the experimenters that goldfish can lose their colour pigment. It was hypothesized that lack of light would cause the goldfish to lose their pigment, thus becoming a lighter shade of orange. Two tanks of six goldfish were used to conduct the experiment, where both tanks were exposed to lamplight. The control tank had a clear cover while the experimental tank had a black cover. Once a day, the colour of each goldfish was evaluated and recorded using a colour gradient scale. Change in colour was quantified by giving each shade a value, where the darkest had a value of 1 and the lightest, a value of 5. A higher overall score meant that the fish had been affected by the lack of light and had lightened. The mean colours were compared by comparing the averages in colour within each tank. The mean for the control group was 8.57 whereas in the experimental group it was 13.57, meaning the experimental group were lighter on average. By using the T-test it was established that the results were statistically significant and the null hypothesis was rejected. Therefore, there is a correlation between lack of light and decreased pigmentation in goldfish.

The Effect of Temperature on Intellectual Performance of 18-21 Year-Old Males

Jacob Marier, Juan Felipe Duran
Pure & Applied Science

The Effect of Temperature on Intellectual Performance of 18-21 Year-Old Males

The Effect of Plant Population Density on Plant Growth

Sarah Caron, Chris Sotirakos, Marilou Henry, Hugo Giard
Health Science, Pure & Applied Sciences

The experiment was conducted in order to determine the effects of population density on the growth of plants. This was tested by comparing the overall height of plants in a crowded area and an uncrowded area. We believe that there will competition between the plants in the overpopulated pot for resources which will cause a negative effect on their growth, Seeds that are planted close to one another will have a decrease on their overall height. We experimented this by using eight pots, four of them were the control pots and the other four were the experimental pots. We planted five seeds in the control and thirty-six seeds for the experimental pot. All the seeds were distributed equally in the pot and given appropriate sunlight and water to grow.

The Effect of Varying Copper Concentrations on Algae Growth

Abby Flood, Khalil Rifai, James Houghton, Ingrid Matei
Health Science

This experiment explores the effect of varying concentrations of copper solutions (based on a range of approximately what is expected in bodies of water) in order to investigate how the increased presence of this heavy metal in water sources affects the lowest (and therefore very important) part of the aquatic food chain in an era of water pollution. Samples of algae from the same source will be introduced to the varying concentrations and their growth will be studied to reach a conclusion on this.

The Effects of Exercise on Memory

Simone Pecora, Steven Colallilo, Andrew Augoustis

Health Science

Our project is the effect that exercise has on a person's memory. We predicted that exercising will indeed have an increasing effect on memory. We tested 10 people to see what would occur. Our control group is not exercising and letting the participants do a word test. Our experimental group is letting the participants exercise and then let them do the test to see how they would do. In the end 90% of our participants did better on the memory test after exercising.

The Effects of Music on Declarative Memory in Humans

Brandon Azimov, Megan Goldwax, Olivia Langburt

Health Science

To test whether music has an effect on declarative memory an experiment was conducted that included 20 people around the age of 18. Each person was given 45 seconds to memorize as many words as they could in a list of random words of 4-5 letters. One list was memorized in silence while the other was memorized while listening to the subjects favourite song.

The Five Second Rule

Samy Marciano, Benjamin Rehany, Benjamin Szwimer

Health Science

The amount of bacteria present once a food is in contact with the floor: The "Five Second Rule."

The objective of this experiment was to determine the amount of bacteria on a sample of food with respect to time. An orange was dropped on the floor for an amount of time and then swabbed onto a Petri dish for a few seconds. In each Petri dish different increments of time were tested (five, fifteen and thirty seconds). In addition, the control group which included the uncontaminated food that wasn't dropped at all. Ten trials were performed with the orange. The experiment demonstrated that there was a significant change in the amount of bacteria within the five second interval, however afterwards the food would accumulate more bacteria over time. In conclusion, this comes to show that the "5-Second Rule" is false since there is a change in the amount of bacteria between food that has fallen on the floor and that hasn't.

The Impact of Decomposers on Plant Growth

Lina Selma Bannour, Neta Fudim, Claudia Keurdjekian, Samuel Richer

Health Science

This poster presentation displays our experiment which we conducted for our CE project. In this experiment, we wanted to explore how decomposers, such as worms, affected the growth of plants. We knew that decomposers were very important organisms when observing the entirety of our ecosystem. For this reason, our presentation will demonstrate our particular research and experimental data. We will explain how well our data expressed our hypothesis. Our intention is to inform our views about the great importance that these tiny organisms have in our environment.

The Impact that Our Food Diet Has on Our Heart Health

Laila Benard
Health Science

Our dietary choices have a direct impact on our cardiovascular health. Even though we may have no control over certain factors influencing our health, many problems can be solved through a proper diet. Research have shown that an important factor in our heart health is our intake of cholesterol. More specifically, LDL cholesterol contributes to plaque which is a fatty substance that accumulates on our artery walls and that directly affects our blood flow in a way that can be fatal. LDL is found in certain types of food and its consumption can be limited by choosing, for instance, to adopt a plant-based diet. In fact, people that adopt this type of diet tend to have a lower fat intake and a higher consumption of certain types of food that contain antioxidants. Therefore, it seems logical to get informed on the benefits of the vegan diet, in addition of having an active lifestyle, to improve our cardiovascular health.

The Malleability of Memory

Cameryn Meloche, Vanessa Migliozi
Health Science, Pure & Applied Sciences

Memory, according to past research, can be easily manipulated through many ways, one of these being the Misinformation Effect. This implies that any source of bias such as a leading question or a suggestive word can impact the way in which an event is remembered. This project seeks to test the misinformation effect by testing how fast subjects estimate a ball was thrown depending on whether the word "whip" or the word "throw" was used when asking the question.

The Memory Span of Goldfish

Jessica Venditti, Sara Cipolla, Alyssa Trantino
Health Science

It is widely believed that goldfish have a memory span of three seconds. In order to observe the credibility of this myth, a sample of five *Carassius auratus* (goldfish) were subjected to a training period of five days. This training consisted of exposing the goldfish to both a red and blue divider, with holes large enough to permit the fish to pass through, but conditioning them to associate only the colour red with feeding time. It was hypothesized that after the training period, the goldfish would have a quicker reaction time towards the red divider over five days compared to the blue divider. The independent variable for this experiment was the colour of the divider behind which the food was placed whereas the dependent variable was the time, in seconds, each fish required to pass through the given divider. The design of this experiment required the control and experimental treatment groups to be paired. The experimental treatment consisted of timing the fish as they crossed through the red divider to obtain their food, whereas the control treatment involved timing the goldfish with respect to the blue divider. If the goldfish demonstrate a quicker reaction time to the red divider, then this would suggest that goldfish possess a long-term memory. The results obtained demonstrate a significant difference between the goldfish's reaction time to the red divider to the blue divider. This ultimately supports the alternative hypothesis due to the significant difference between the dependent variables of the experimental and control treatments.

The number of tennis balls caught according to the person's gender

Joseph Guddemi, Thomas Dubuc, Karina Marzella

Health Science

The effects of gender on hand-eye coordination for a person between the ages of 17 and 18.

The Prevalence of Left-Handedness in Ashkenazi Jews

Arianna Galbraith, Erica Hasen, Laura Dery

Health Science

This experiment examines the prevalence of left-handedness in a portion of the Ashkenazi Jewish population of Montreal, and compares it to the rest of country, to test for a correlation.

The smell: sighted vs. sightless?

Imane Mohamedi, Kamila Majidova, Merie Jean Reboldera

Health Science

The experiment was performed to determine if a human being can smell better in the dark than in the light. To obtain the results, we invited 12 females from 17 to 20 years old to smell 9 different objects, while being blindfold. Then they will be asked how strong the smell from scale 1 to 10 is, in which 10 is the strongest. After that, we made them smell the objects again, but this time without being blindfold. Furthermore, with the result of a chi-square test, we can conclude that the hypothesis is plausible because the critical chi-square test is 0.445 and it is smaller than the calculated values. Therefore, the null hypothesis is rejected that the people can smell different in light and in dark. Which means those people in the dark smell as well as in the light.

The Use of Natural Regimens on Yogurt to Test the Effectiveness of Preservation

Romina Filippelli, Michael Messina, Konstantinos Rougas

Health Science

In our experiment, the preservative behaviours of liquid honey and Vitamin E oil on Yogurt (*Lactobacillus Bulgaricus*) were examined. Fifteen dishes were filled with yogurt. Five of these dishes were left untouched and were considered the control dishes, while the other ten were mixed with either Vitamin E oil (Dishes 1-5) or liquid honey (Dishes 6-10). The amount of time required for the yogurt to display evidence of spoilage was examined. The dishes containing Vitamin E oil showed evidence of spoilage much quicker than the liquid honey dishes. Thus, it is strongly likely that the use of honey as a preservative will extend the lifetime of yogurt more than the use of Vitamin E as a preservative. These results are as we hypothesized. This discovery allows for the possibility of a facilitated preservation of yogurt.

The Visual System; Central Visual Pathways and Neurodegenerations & Macular degenerations

Imene Lammali

Health Science

Short presentation on the human visual system (Central Visual Pathways), and neurodegenerations & macular degenerations.

The Yeast Awakens

Mélieane Carrier-Favreau, Mavesa Nguyen, Veronica Ramirez, Mariya Yordanova
Health Science

We examined the evolution of yeast's metabolism of simple sugars when having adapted to complex sugars over multiple generations, by measuring the amount of carbon dioxide produced. For the experiment, the experimental group was fed with malt extract (maltose) and left to reproduced daily, and was placed, after a week, in a white sugar solution, while the control group received similar treatment but was fed white sugar exclusively for a week. We then compared the carbon dioxide production of these yeast colonies in order to evaluate the efficiency of the metabolism of glucose in relation to the yeast's previous diet; a significant difference could point to an adaptation of the maltose-fed yeast due to its environmental conditions.

Tree Yourself

Sabrina Amsel, Amanda Campbell, Sabina Elkins, Sophie Patenaude
Health Science

Tree growth is influenced by many different environmental factors, such as the amount of sunlight, the soil, amount of available water, etc. This experiment aims to compare tree growth in two very different environments: urban areas and rural areas. We hypothesized that the greater amount of pollution present in urban areas will have a detrimental impact on tree growth, resulting in the trees being stunted in their growth and development when compared to the trees in rural areas. We have tested this by examining the height, circumference and crown width (span) of a total of 20 maple trees in four different regions with varying degrees of urbanization: a Vermont forest, Hemmingford, Mount-Royal, and the area around the Lachine Canal. Our conclusions will allow us to gain a better understanding of the impacts of urban pollution on trees and plant life.

Vigna radiata: Effects of Light Colour on Plant Growth

Matthew D'Urbano, Alessia Cavalancia, Pheakaday So, Gaya Messar
Health Science, Pure & Applied Sciences

The wavelength and absorbance of light has an impact on the rate of plant growth. We tested the effects of light colour on *Vigna radiata* (Mung bean plants) using blue, green, yellow, orange, red and white (control) light. As we predicted, the wavelength and colour of light had a significant impact on the rate of growth of the *V. radiata*. Green light in particular displayed the lowest growth rate, due to the absorbance of light.

Will Listening to Music Help Plants Grow?

Vanessa Pisanelli, Kelly Mazzoca, Catalina Nicolai, Thaïna Jean-Baptiste
Health Science

The project will test the hypothesis of whether bean plants will grow longer while listening to classical music. The experimental group were able to listen to classical music as they grew while the controlled group grew listening to no music. The plants progression were documented for a time period of 20 days.

Visual acuity affected by age

Andrea Jimenez, Gurvir Grewal, Sakina Bamba
Health Science

Our group questioned whether age affected one's visual acuity. Is it possible that with age our visual acuity deteriorates? Our group thought that age and visual acuity were closely linked. We hypothesized that the older you are, the less perceptive you will be of colors and shapes at a given distance. We were brought into thinking this after reading a Yale University article written by Ilana Yurkiewicz. She explained how memory deteriorates with age due to the lack of mental exercises, and how it is mostly caused by a loss of neurons as we grow older. For our experiment, we tested 10 males aged 17 to 20 years and 10 males aged 50 to 55 years. The experiment consisted of presenting males with a sheet of paper on which the name of a color was written. Each name was filled in with a different color than what the word said. The results we gathered showed that there is no correlation between age and visual acuity. The calculated chi-test of 2.18 is smaller than the critical chi-square value of 3.841, therefore we did not reject our null hypothesis. The significance of our results is we cannot associate poor visual acuity skills for someone simply by looking at their age because it will make them miss out on job opportunities unfairly.

Wind and Potential Energy Challenge

Christopher Lariccia, Adamo Foglietta
Pure & Applied Sciences

We will be presenting the projects of H. Nadeau's Engineering Physics class for the "Science, On Tourne!" competition: we will describe the project and its rules, how all the cars were made and what the outcomes were for each one.
Note: This project will also be presented as an oral presentation.

Effect of music on memory

Tanya Cierson, Marco Di Francesco, Frédérique Grondin, Fotios Koufalis
Health Science

This goal of this experiment is to test whether classical music (Chopin-nocturne op.9 no 2) has an effect on a person's memory. By having our subjects memorize the suite and number of as many playing cards as possible out of 20 in 2 minutes, in two different experimental groups (the control without music playing and the experimental with music playing), we will hopefully be able to analyze and gather data to either support our hypothesis (that music will improve memory) or the null hypothesis (that music has no effect on memory).

How to Fight Cancer

Sierra Werbrouck, Sharleman Haque
Radiation Oncology

There are a couple of ways to fight cancer including surgery, chemotherapy, hormone therapy, and radiation therapy. Since the 1970's, Radiation Oncology has only been improving to the point where today some patient can be fully treated without relapse. For our presentation, we will be doing an overview of the Dawson Radiation Oncology program, what the program offers and what the profession is all about

Departmental Posters

Ecology & Culture Complementary Course

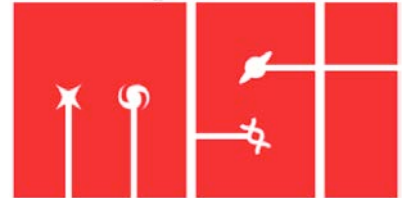
Register with Tonia DeBellis, tdebellis@dawsoncollege.qc.ca

Biology Department

Learn about how you can take part in the amazing student trip to Costa Rica. Experience one of the most biodiverse places on earth while immersing yourself in a completely different culture. Broaden your definition of “classroom”. To register for January 2017, contact Tonia DeBellis and be sure to check out the student presentations from last year’s group (p. 10) this week during ScienceFest.



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