

**Montreal Regional Science and Technology Fair Projects**  
**Project Presentation Schedule**  
**March 28-March 30, 2021**

Public Viewing : You need to [Click Here to Register](#)

Sunday March 28 <sup>th</sup> , 2021								
13 :30 to 15:00								
Time	Featured Projects							
13:30	#101	#103	#105	#107	#109	#111	#113	#115
13:45	#102	#104	#106	#108	#110	#112	#114	
14:00	#101	#103	#105	#107	#109	#111	#113	#115
	#117	#119	#121	#123	#125	#127	#131	
14:15	#102	#104	#106	#108	#110	#112	#114	#116
	#118	#120	#122	#124	#126	#128	#130	
14:30	#117	#119	#121	#123	#125	#127	#131	
14:45	#116	#118	#120	#122	#124	#126	#128	#130
15:00	END OF LIVE PUBLIC VIEWING PROJECTS REMAIN ON DISPLAY FOR BROWSING							
Monday March 29 <sup>th</sup> , 2021								
13 :00 to 15:00								
Time	Featured Projects							
13:00	#101	#103	#105	#107	#109	#111	#113	#115
13:15	#102	#104	#106	#108	#110	#112	#114	
13:30	#101	#103	#105	#107	#109	#111	#113	#115
13:45	#102	#104	#106	#108	#110	#112	#114	
14:00	#116	#118	#120	#122	#124	#126	#128	#130
14:15	#117	#119	#121	#123	#125	#127	#131	
14:30	#116	#118	#120	#122	#124	#126	#128	#130
14:45	#117	#119	#121	#123	#125	#127	#131	
15:00	END OF LIVE PUBLIC VIEWING PROJECTS REMAIN ON DISPLAY FOR BROWSING							

PROJECT DESCRIPTIONS BEGIN ON PAGE 3:

## Project Presentation Schedule

**Public Viewing : You need to [Click Here to Register](#) in order to view the project**

<b>Tuesday March 30<sup>th</sup>, 2021 9 :00 to 12:00</b>									
Time	<b>Featured Projects</b>								
9:00	#101	#103	#105	#107	#109	#111	#113	#115	
9:15	#102	#104	#106	#108	#110	#112	#114		
9:30	#101	#103	#105	#107	#109	#111	#113	#115	#132
9:45	#102	#104	#106	#108	#110	#112	#114	#129	
10:00	#101	#103	#105	#107	#109	#111	#113	#115	#132
10:15	#102	#104	#106	#108	#110	#112	#114	#129	
10:30	#116	#118	#120	#122	#124	#126	#128	#130	#132
10:45	#117	#119	#121	#123	#125	#127	#129	#131	
11:00	#116	#118	#120	#122	#124	#126	#128	#130	#132
11:15	#117	#119	#121	#123	#125	#127	#129	#131	
11:30	#116	#118	#120	#122	#124	#126	#128	#130	#132
11:45	#117	#119	#121	#123	#125	#127	#129	#131	
12:00	END OF LIVE PUBLIC VIEWING PROJECTS REMAIN ON DISPLAY FOR BROWSING								
<b>AWARDS CEREMONY</b> <b>Tuesday March 30<sup>th</sup>, 2021</b> <b>16 :00 to 17:00</b>									
<p>To attend the awards ceremony, you need to have registered at the link above.</p> <p>Once you have entered the Lobby of the event, please click on "CEREMONIES"</p> <p>Once you have entered the MRSTF Awards Ceremony, you will be asked to "JOIN A TABLE"</p>									

# Montreal Regional Science and Technology Fair Projects

## March 28-March 30, 2021

Project #	Student Name(s)	School	Project Title	Category	Project Type
<b>INTERMEDIATE PROJECTS</b> Secondary 2 & Secondary 3					
101	Sophia Ioannidis Aditi Pathak	Laval Senior High School	Antioxidant Potential of Vit. C	Life & Health	Experiment
Daily applications of Vitamin C can prolong premature aging and inflammation. UV rays, pollution and cigarette smoke are free radicals, that without Vitamin C, will damage our skin over time. We made 5%, 10%, 15% and 20% concentrations of a homemade Vitamin C serum that we tested on apple slices to demonstrate how they will undergo oxidative stress as the concentrations increase. We observed that the control apples browned completely, the apples treated in the 5% solution browned, and in the 10% solution apples began to oxidize while the 15% and 20% solution showed no oxidation.					
102	Ines Rebei	Kells Academy	Composting at Home	Environment & Ecosystems	Experiment
I tested my three different products that were labeled as biodegradable to see if they actually were. Some companies might lie about their products being biodegradable so that people buy it. Using biodegradable products is a good way to do your part in helping the earth so I tested three of them to see if I could actually use them and be environmentally friendly. I did this by putting them in a compost and wait for them to begin decomposing. I tested which would actually decompose and which was the fastest.					
103	Newsha Vakil Azad	Kells Academy	Corn-Made Ethanol	Life & Health	Experiment
In this experiment, I made a pot of corn mash using water, sugar, cornmeal, and yeast. Then, I used that mash to set up a distillation apparatus, and gathered a few millilitres of a mixture of ethanol and water. After that, I got my hands dirty with some potting soil, and tested the bacteria-killing ability of my ethanol (which was mixed with water) by counting the number of bacteria that were left on my hand after rubbing the ethanol.					
104	Briela Shpendi Brianna Shpendi	Laval Senior High School	COVID-19 Affecting Adolescents	Social	Experiment
In this study, we will be observing how we, adolescent twins, see our academic life with the interference of Covid-19. We will write about four moments we experienced in this pandemic during the school year and how it affected us (without telling each other yet.) We will then focus on the regressive and progressive aspects along with solutions that can fix the situation. (The issues we are focusing on have to deal with ourselves and Covid-19) Once we tell each other about our moments, we can then come up with a solution. This concept is a social methodology called duoethnography.					
105	Gia De Rosa	West Island College	E-Bike Experience	Engineering & Robotics	Design
In this project, it will explain some of the processes involved in creating an electric bike. It describes the experience of building an electric bike from the ground up, starting out with only a normal bicycle. It will also show the benefits of having an eco friendly mode of transportation, instead of using a vehicle such as a car or a motorized scooter. It also goes in depth about what each component inside an electric bike does, and what they do to move the bike forward.					

<b>106</b>	<b>Maya Samore</b>	<b>Laval Senior High School</b>	<b>Future of the Mealworm Farm</b>	<b>Environment &amp; Ecosystems</b>	<b>Design</b>
<p>With the world's population estimated to surpass 9.1 billion by 2050, it is time to look for more reliable resources or we are going to run into a major global food shortage. The solution to this problem is entomophagy. In this project, the goal was to make a design for an in-home mealworm farm. In the hopes to make the process of mealworm farming accessible and easier for the everyday consumer, a design plan with measurements and the materials that would be used to build it was created. This is a simple first step in the direction of sustainable livestock.</p>					
<b>107</b>	<b>Maria Bayder</b>	<b>West Island College</b>	<b>Hide and Seek Help</b>	<b>Engineering &amp; Robotics</b>	<b>Design</b>
<p>The "Hide and Seek Help" is a design project with the goal to improve the functionality of an existing key-finder to facilitate visually impaired people's search for small objects. The main objectives were to change simple sounds of each of the four key-finders to voice messages and to add braille letter labels to the remote controller. Research was done based on visual impairment information and data to understand the needs of people with this disability. The designs, modifications of key-finder sounds, and labeling of the remote controller were completed successfully to achieve the goal.</p>					
<b>108</b>	<b>Geneva Pham Yian Wu</b>	<b>The Study</b>	<b>Hugo</b>	<b>Engineering &amp; Robotics</b>	<b>Experiment</b>
<p>Artificial intelligence is now part of many different aspects of our lives. Through this project, we have programmed "Hugo", an AI-powered tic-tac-toe computer game that is able to learn from each of its opponents' tactics in order to gradually improve its performance in the game. We aim to demonstrate the effectiveness of AI to allow computers to learn and improve our lives, while addressing our audience's common stereotypical concerns around the threat of AI towards the human race by addressing associated ethical matters.</p>					
<b>109</b>	<b>Hong Minh Le</b>	<b>Kells Academy</b>	<b>Magic Plastic!</b>	<b>Environment &amp; Ecosystems</b>	<b>Experiment</b>
<p>Pollution is a really big problem in today's world, with plastic being a huge contributor. Of course, it is still necessary because of its durable and light nature. For my project, I wanted to create plastic at home to see how fast it would degrade compared to commercial plastic. If successful, it could replace and be an easy and environmentally friendly alternative. I had additions of yeast and starch to see if it would affect the process. I let the process develop for a month. In the end, the plastic degraded quickly, but was too hard to use.</p>					
<b>110</b>	<b>Evan Cecere</b>	<b>Kuper Academy</b>	<b>Orange is the New Green</b>	<b>Environment &amp; Ecosystems</b>	<b>Design</b>
<p>This project involves the design and development of bioplastic made from orange peels, a wasted resource. The production of bioplastic required a polymer (starch), a plasticizer (glycerine), an acid (vinegar), and a solvent (water). Eight trials were conducted and each product's texture, transparency, and flexibility were assessed. Based on the results obtained after each trial, modifications were made in the formulation in order to improve the quality of the bioplastic material produced. Trial #8 produced a bioplastic that is smooth, translucent, and very flexible.</p>					
<b>111</b>	<b>Nicholas Aravanis Adriano Ferraro</b>	<b>Laval Senior High School</b>	<b>Rc Car</b>	<b>Engineering &amp; Robotics</b>	<b>Design</b>
<p>In our project we made and coded a Remote Control car. This car is controlled by Bluetooth using an app called Bluetooth RC controller. Our parts are mostly from Amazon. For Our base an sheet (15x8) in centimetres. The coding software we used is arduino uno. We had to learn a bunch of functions and commands for the coding. It does not have a turning system. To turn you have to make the front wheels spin in a different direction from the back wheels. The directions vary from which side they are turning from.</p>					

<b>112</b>	<b>Sarah Pishdadi</b>	<b>Laval Senior High School</b>	<b>Refugee camp H2O filter design</b>	<b>Engineering &amp; Robotics</b>	<b>Design</b>
<p>Refugee camps are organized to receive thousands of refugees or initially displaced persons. These camps supply the refugees with basic human need such as water food and shelter. Although that is what it should supply them with, refugees stil suffer from lack of clean water to drink. This project focuses on designing a simple water filtration system to filter there water so that refugees can have access to a clean and sanitary supply of water.</p>					
<b>113</b>	<b>Antoine Frappier-Temcheff</b>	<b>Loyola High School</b>	<b>School Motivation and Stress</b>	<b>Social</b>	<b>Experiment</b>
<p>The pandemic has lead to stress in adolescents, but knowledge on the associations between stress and school motivation, and on the characteristics of students that would have benefit from school support is limited. The first objective was to assess whether stress was related to school motivation. The second objective was to identify characteristics of students who felt that their school had not helped them. General stress was linked to motivation. Students with lower school motivation, success and engagement were less likely to say that their school helped them cope, suggesting that schools should invest greater effort to assist these students.</p>					
<b>114</b>	<b>Victoria Alexakis Pina Cammisano</b>	<b>Laval Senior High School</b>	<b>Solving the Money Problem</b>	<b>Life &amp; Health</b>	<b>Design</b>
<p>My partner and I decided make a design that is able to disinfect money using a UV-C light. A UV-C light is able to kill 99.9% of bacteria and viruses. We decided to place the lights on the inside of an Automated Teller Machine (ATM). Doing this we hope to achieve our goal of disinfecting money notes. Money is one of the dirtiest things in the world, it goes from hand to hand daily without being disinfected, and while it's going from hand to hand it will come across many different pathogens.</p>					
<b>115</b>	<b>Malek Haddad</b>	<b>Kells Academy</b>	<b>The Green Air Conditioner</b>	<b>Environment &amp; Ecosystems</b>	<b>Experiment</b>
<p>Due to modern urbanization and industrialization, parking lots, skyscrapers, and shopping centres are being constructed at the expense of plant life. Plant life destruction is one of the catalysts for global warming. In some cities, plants are starting to be planted on rooftops to display a sleek and luxurious design. Moreover, these rooftop gardens can cool down the air around them due to evapotranspiration, where plants 'perspire' to cool their warm surroundings. Can rooftop gardens thus help with the rapid rise of so-called "Urban Heat Islands?" Can they help decrease the economical and environmental costs of traditional air conditioning?</p>					
<b>116</b>	<b>Nicolas Capolicchio</b>	<b>Selwyn House School</b>	<b>To Kill or Not to Kill</b>	<b>Life &amp; Health</b>	<b>Experiment</b>
<p>My project is trying to find what is the minimum alcohol requirement in a hand sanitizer for it to still be efficient. I grew bacteria and made my own hand sanitizers with different amounts of isopropyl alcohol in each sanitizer. I discovered that the amount of alcohol changes the amount of time takes to kill bacteria. I used materials given to me by my school such a an incubator and agar powder. I completed the project alone.</p>					
<b>117</b>	<b>William Birks</b>	<b>Selwyn House School</b>	<b>Which lace wins the race?</b>	<b>Engineering &amp; Robotics</b>	<b>Experiment</b>
<p>As a goalie, I have often wondered about the laces in my glove. More specifically the rebound of a puck off a glove influences how easy it is to catch and control the puck. To see which lace is the best at absorbing energy (has the smallest bounce) I built a machine to consistently shoot pucks at approximately 110km/h. With this machine, I fired pucks at the two different kinds of laces to see 'which lace wins the race'.</p>					

**INTERMEDIATE PROJECTS**  
**Secondary 4 & Secondary 5**

<b>118</b>	<b>Jixin Chen Artimes Fallah</b>	<b>Kuper Academy</b>	<b>A Green Cup</b>	<b>Environment &amp; Ecosystems</b>	<b>Design</b>
<p>Disposable beverage cups are not easily recycled due to the presence of a plastic lamination for water-proofing the layer of paper on the exterior. The purpose of this project is to replace the plastic lamination in disposable beverage cups with a more recyclable material: aluminum. Furthermore, this concept can be easily adapted and manufactured as the process for manufacturing all components in this project already exist. Therefore, along with the encouragement of using reusable cups, the consumption of plastic can be reduced.</p>					
<b>119</b>	<b>Siena O'Neill Ava Surette</b>	<b>Royal West Academy</b>	<b>Battling Cancer</b>	<b>Life &amp; Health</b>	<b>Experiment</b>
<p>Originally, we tested the effects of 6 foods and supplements that are said to have anti-cancer properties. After seeing the results of this experiment, we did a continuation of the project, using only the two products that had the greatest impact on the survival/division of the brain cancer cells: green tea and garlic. We also tested different variations of these food products to see which ones would have the greatest effect on the cancer cells. We kept the cells in the presence of different concentrations of these products for 24 hours, and observed changes in the number of cells.</p>					
<b>120</b>	<b>Shivaani Mohanraj</b>	<b>Kells Academy</b>	<b>Colouring Is Deceptive</b>	<b>Life &amp; Health</b>	<b>Experiment</b>
<p>Statistics in the Hair Color Industry indicate that precisely 85% of women bleach their hair once every eight weeks. Hair is an important part of our body, but do we take good care of it by dying hair? This is a small experiment to illustrate the ailing effects of hair colouring. With the help of hygrometers, a device used to evaluate the level of humidity in the air, we will be able to demonstrate the effect. It turns out that, synthetic lightening undoubtedly influences the structure of human hair.</p>					
<b>121</b>	<b>Mehnu Mahapatuna Nihari Senaratne</b>	<b>Kuper Academy</b>	<b>From the Ground Up</b>	<b>Environment &amp; Ecosystems</b>	<b>Experiment</b>
<p>We travelled to five locations in Montreal possessing varying levels of air pollution: an airport, farmland, a suburban area, a factory, and store-bought soil. Three soil samples were extracted from each of the physical locations. Several soil characteristic tests (nutrient, pH, salinity and water holding capacity) were performed on the samples. After observing and analyzing the results of the various experiments, we were able to determine what form of impact air pollution has on soil health and characteristics.</p>					
<b>122</b>	<b>Yufei Li Shenglei Sun</b>	<b>Kells Academy</b>	<b>Mask: Usage / Bacterial Growth</b>	<b>Life &amp; Health</b>	<b>Experiment</b>
<p>Our project is going to discuss the principle of masks and test how the effectiveness of them changes depends on the use of time and type of masks. We choose three kinds of popular mask choices on the market as our test subjects, which are cloth mask, procedural mask, and KN-95 mask. We designed different experiments based on three aspects: water-proof ability, static electricity and inner bacterial environment. After comparing and analyzing the experiment data, we are also going to research further on the science behind how the masks work.</p>					

<b>123</b>	<b>Alejandro Suarez - Serrano</b>	<b>Kells Academy</b>	<b>NFC Magnetic Door Lock</b>	<b>Engineering &amp; Robotics</b>	<b>Design</b>
<p>With the rapid automatization and the propagation of "smart" homes, which allow for the automatization of domestic tasks with a smartphone, it is only logical then, that locks and security follow suit. Near Field communication allows for the user to use their phone to open the lock. Furthermore, a micro controller such as the arduino is used as the central hub for all the operations of the lock. both of these components were used in tandem with a magnetic lock to create a mechanism that is unlockable with the tap of a phone.</p>					
<b>124</b>	<b>Logan Meehan Mansi</b>	<b>Kells Academy</b>	<b>Rocket Fuel</b>	<b>Engineering &amp; Robotics</b>	<b>Experiment</b>
<p>My projects title is: Evaluating the Effectiveness of a Pressurized Oxidizer on Flame Length Within a Hybrid Rocket Engine. In my project, I sought to evaluate the flame length on a home made hybrid rocket engine. In my hypothesis I predicted. A longer exit flame length will result from the introduction of a constant flow of pressurized air. This was later proven to be true. I tested my project first with a pilot test of no oxidizer. Then I did a secondary test in which I introduced 30 PSI of oxygen into the hybrid rocket engine.</p>					
<b>125</b>	<b>Justin Clerk</b>	<b>Kells Academy</b>	<b>Squirrel Traps and Baits</b>	<b>Engineering &amp; Robotics</b>	<b>Design</b>
<p>In this project I designed to eco-friendly squirrel traps. I studied which traps are most effective at catching squirrels. I also experimented with different baits to see which would be the best to lure the squirrels. The traps were made to move squirrels away from urban gardens so that people can keep their plants safe from the squirrels eating them. Both designs of squirrel traps were effective, although more testing was needed. I decided to design and experiment on ways t keep the squirrels from eating our future harvests.</p>					
<b>126</b>	<b>Aziz Kitana</b>	<b>Kells Academy</b>	<b>Wargaming Bot</b>	<b>Eng., Comp. &amp; Robotics</b>	<b>Design</b>
<p>I have created a program that guides a robotic arm to play a board game called star wars legion against an opponent. This is done by using a camera to detect the distances between each of the game pieces and then deciding what to do from that data. The arm is programmed in the Python programming language with the OpenCV library (extension), which adds camera and image processing capabilities to Python. The project has overheating issues and a margin of error which causes it to lose its target.</p>					
<b>127</b>	<b>Elias Rebei</b>	<b>Kells Academy</b>	<b>What a Picture!</b>	<b>Pure Sciences</b>	<b>Design</b>
<p>For this project, used a pinhole camera (which I made) and a Kodak Brownie Pliant Six-20 (produced from 1938-1940) to test the effect that exposure time would have on a photograph at different times of the day. For the Kodak camera, I used exposure times of 1, 3, 5, and 10 second exposure times and discovered that as the day gets darker, it would require a longer exposure time for the image of both cameras to be clear and focused. This would be reinforced by the pinhole camera.</p>					

**COLLEGIAL PROJECTS  
CEGEP 1 & 2**

<b>128</b>	<b>Joyce Li Angelina Volny</b>	<b>Marianopolis College</b>	<b>Bacterial Resistance Reversal</b>	<b>Life &amp; Health</b>	<b>Study</b>
<p>Bacterial resistance against antibiotics has, in recent years, become a huge health problem worldwide. Currently, antibiotic development aims to outpace evolution by creating stronger drugs faster than bacteria can adapt to them. In this project, we explore alternative lanes to counter this resistance, namely by inhibiting bacterial resistance mechanisms. Thus, we present here a threefold study centred on antibiotic action mechanisms, the defense mechanisms developed by bacteria, and the development of adjuvants to disable these defense mechanisms in order to restore antibiotic efficiency.</p>					
<b>129</b>	<b>Jordan Levett</b>	<b>Vanier College</b>	<b>MediGraph</b>	<b>Engineering &amp; Robotics</b>	<b>Experiment</b>
<p>This project encompasses the development of a novel end-to-end automated framework for literature extraction of machine learning applied in minimally invasive surgery by training the state-of-the-art Bidirectional Encoder Representations from Transformers (BERT) language model. A knowledge graph generated nodes and relationships through word embeddings and graph algorithms. Annotations were made semi-autonomously and the system was designed as a web application to be readily deployed in a clinical setting. The proposed framework can be used as a diagnosis and procedural assistant or used to accelerate literature and systematic reviews.</p>					
<b>130</b>	<b>Laurence Liang</b>	<b>Marianopolis College</b>	<b>miRNA Discovery for COVID-19</b>	<b>Life &amp; Health</b>	<b>Design</b>
<p>My project aims to identify a therapy to treat COVID-19 infections using gene expression and a computer-assisted approach. My computer program aims to identify endogenous human miRNA sequences that could bind and inhibit SARS-Cov-2 replication, through a phenomenon called RNA interference. To achieve this objective, my computer program feeds an existing tool, mirDB, the SARS-Cov-2 genome, and then independently filters results through analyzing conserved regions and by browsing existing scholarly literature. My project identified a shortlist of human miRNA sequences, notably mir-302c, which could be further experimented and tested as a therapy against COVID-19.</p>					
<b>131</b>	<b>Allison Engo</b>	<b>Marianopolis College</b>	<b>Saved on the Fly</b>	<b>Life &amp; Health</b>	<b>Experiment</b>
<p>Fruit flies are ideal scientific models because of their short lifespan, flexible diet and human-like biological responses. 5% dietary acai was fed to stressed fruit flies to under 3 stress conditions: 2% H2O2 (acute stress); 14 days of age (natural chronic stress); and genetic deficiency of the natural antioxidant enzyme SOD2. 5 assays were used to measure biological effects: adult motility, longevity, ROS by-product, progeny migration and fertility. Acai demonstrated protective effects for acutely stressed flies in many health parameters – the greatest benefit being for their fertility. However, it had little to no benefit for chronic stress nor longevity.</p>					
<b>132</b>	<b>Adam Elkaim</b>	<b>Marianopolis College</b>	<b>The Stem Cure</b>	<b>Life &amp; Health</b>	<b>Study</b>
<p>In today's medical context, stem cells show promising approaches to treating many diseases. This study will focus on stem cell reprogramming, particularly analyzing the effects of replacing the c-Myc gene with Glis1 to promote healthier differentiation of induced pluripotent stem cells (iPSCs). Given that the c-Myc factor is a proto-oncogene, it carries a risk of tumorigenesis, thereby hindering any clinical applications of iPSCs. Its replacement, Glis1, not only eliminates this risk but also further promoted healthier and more fully reprogrammed progenitor cells. Ultimately, this project aims to utilize this technique to build a genetic profile to make personalized treatments.</p>					







