



Thames Valley Science & Engineering Fair

1	The Effects of Taste on Facial Expressions	We are testing the effects of various tastes on 10 people (5 boys and 5 girls). We are providing 4 flavours of gum to people. We will record their faces and collect data on: facial expressions, side of chewing and position of gum based on taste. We hypothesize that sour taste will result in a unhappy facial expression and that the fruity flavour will result in the happiest expression. We also aim to understand if there are differences between the reactions of boys and girls.
2	To Be Determined	
3	Potato Battery	With this Science Fair you are going to be figuring out which vegetable or fruit have more power like electricity wise come on and see how my Potato Battery and see what it can do.
4	Should You Use The 5 Second Rule?	To find whether or not the 5 second rule should be used, we will conduct an experiment. It'll start with Glo Germ (a cream that you shine a uv light simulates about how much germs are on an object) spread across 3 different surfaces. Then a timer will be set to 5 seconds and a piece of bread will be dropped from 1 meter. After the 5 seconds are up, the bread will be inspected for amount of germs.
5	the circulatory system	my project is about the circulatory system. my question is how does the heart beat. I did lots of reaserch and found out how the heart beats. I will have a little heart model that beats in front of my project just for it to be more creative
6	Les Siphons	My project is mainly about siphons, how they work, and conditions necessary to function. What I hoped to get out this experiment was the relationship between the speed of siphoning a 1/2 cup of liquid through the siphon tube and the different liquids. The liquids I have used were water, milk, oil, diluted honey, and diluted dish soap. In conclusion, I have decided that viscosity of each liquid was the property that affected the results the most.
7	What Font Uses The Least Space	My project is looking and using different fonts and seeing what font uses the least amount of space on a computer. I will type the same things for each font and base my decision off of the look of the font and how much space it uses on the computer
8	Can Video Games Improve our Spatial Reasoning?	Video games are often criticized for being a waste of time. We wanted to investigate how video games might actually support learning. We have designed an experiment where our participants can experience either classical music or a building task in Minecraft before being put to three spatial challenges! Our 3 tests will include a building block challenge, an image reconstruction challenge, and a ping pong ball challenge. We plan to observe our participants using an observation checklist for each challenge and record our results to test our question.
9	The Effect of Video Games on the Body	In video games, you're in your own virtual world where enemies lurk around every corner. But how do these games impact your real life? The excitement of a computer or video game can be intense. Does your body the difference between real life enemies and those on the screen? Find out in this video game science fair project!



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10	Which ball will reach the bottom first?	I made a computer simulation of three balls going down differently curved slopes (linear, polynomial/slightly curved, and exponential/very curved) with no friction or air resistance to see how much time it will take for them to reach the bottom. Surprisingly the linear one was NOT the fastest one. I animated my simulation using khanacademy.org's Javascript/ProcessingJS environment.
11	Electrolysis of Water: Facilitating Efficiency	In my project, I explore the the scientific method in the process of applying the method of electrolysis to water. I add different impurities to see which would be the most efficient at speeding up the process. What kept me doing the experiment is the future potential of this technology. For example, when humans arrive on Mars, they will experience firsthand that Mars has very little oxygen in it's atmosphere. Storing large amounts of oxygen on already compacted spacecraft would be unpractical. What Mars already has on its surface is liquid water. If we could apply electrolysis to that water and add a specific impurity, we could provide the crew with oxygen and, potentially, the nuclear fusion rocket engines with an adequate amount of hydrogen...
12	Hover Craft	it uses a leaf blower to float off the ground and then a second air source to control where the hover craft goes. We used rubber cement and duct tape to attach the tube, wood and leaf blower.
13	Sucrose, Glucose and Fructose; Oh My!	My project is an investigation in theoretical biochemistry about the conversion of different sugars in the body and its relation to diabetes, hypoglycemia, and hyperglycemia and possible suggestions with insulin intakes.
14	How Long Does It Last?	We all like different flavors of gum but one of the things that makes gum taste good is if the flavor lasts a long time. So I thought about doing an experiment to test that. If I'm going to spend money, I want to know which gum will last the longest.
15	Effects of Temperature on Battery Life Ω	<p>i will have done the experiment at home but i will have the video of this project on my mac (Why i need electricity) i will be using the kirkland brand, energizer and duracell to conduct this experiment it will be tested in this manner: i will have them all (batteries) in little portable souvenir fans and place them around my house i will first test them in a temperature around -10 or -15 (outside in the cold) then when the transition of seasons i will place them outside again in a expected temperature of around 0 degrees to 10 degrees (March/April) and then finally i will be testing them in my house with a temperature of 21 degrees. I will have a poster board that i will glue my findings on ex: graphs and statistics... I will probably have a slideshow (if I'm not too lazy) including everything i did in this project step by step but i will obviously have my video on my iMac (Please note that the omega symbol (24th letter in greek alphabet)in the " Project Title " does not have anything to do with my project.</p> <p>I am Guntaas Mangat and i will be conducting an experiment on the Effects of Temperature on Battery Life &#937;</p>

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		The End
16	Thunderstorms	I looked at how thunderstorms are created using hot and cold water. I used coloured hot water and emersed it in cold water and documented the currents created simulating the generating of a thunderstorm.
17	Homemade Hovercraft	My project was to demonstrate that I could make a homemade hovercraft that would hold me up and move. I used common household materials only.
18	Juice and pop vs teeth	My project is about finding the ph of a pop drinks and juices. I want to test two thing:- 1- Is juice any better than pop? 2- what are the least acidic pops and juices? I am going to be finding the least acidic/harmful drinks that don't sacrifice on taste.
19	How Does Light Effect Fish?	A glimpse into the testing and tracking of artificial light manipulation and its effects on a fish. A live fish in it's habitat is included in the display.
20	Does playing team sports affect your acadamic score	Being on a basketball team myself i wanted to know if there were other benefits to being on a sports team other than socail skills, team work ect.and in my project i will mostly focus on acadamic score and if it affects it positively,negatively or not at all
21	Winter troubles	My project is is to see what skin moisturizer works best on dry skin to keep moist, because during winter our hands get dry a lot due to always washing it. My test subjects will be jello so the jello will be acting out as the skin and which ever moisturizer evaporates more will be the one that works best and which ever one that evaporates the least doesn't really work at all.
22	London Bridge is Falling Down!	We are testing different types of bridges, made out of popsicle sticks, to see what design can hold the most weight (or has the greatest strength to weight ratio). The bridge types used are suspension, truss and arch.
23	Infrared Waves	From this experiment, I want to understand two things, the range of infrared waves and if they can pass through objects. I conducted two experiments to understand the two properties. For the first experiment, I hypothesized the range of infrared waves to be 5 meters, but it was observed that the receiver stopped interacting after 3 meters. For the second experiment, I conducted two trials. The first trial was with a wooden door, and the second was with the tri-fold board. In my hypothesis I stated that wave would pass through both objects, however, it was only able to pass through the tri-fold board. In conclusion, the infrared waves can only communicate up to 3 meters, and they can pass through certain materials, including cardboard, but not all materials, including wood.

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24	Whitening or Regular Toothpaste for Pearly Whites	This project titled, " Whitening or Regular Toothpaste for Pearly Whites", investigates whether or not the whitening toothpastes of different toothpaste brands (Crest, Colgate and Sensodyne) work better at removing stains than the regular toothpastes. To test the efficiency of various whitening toothpastes, my partner and I used eggs shells as a substitute for teeth, and submerged the eggs shells in coffee to stain them. Then we used the different toothpastes, both whitening and regular to see which ones worked better at removing the coffee stains. Our control was using no toothpaste at all but simply brushing the eggs with a plain toothbrush. As the experiment went along we created an observation and analysis chart as well and took many pictures for the display. Our results surprised us! My partner and I wanted to make this our science project as we believe it is a relevant issue for everyone using toothpastes from known brands. Is it worth paying more money for the whitening toothpastes? Do they even make a significant difference to your pearly whites?
25	Do Certain Colours Affect The Memory Of Jack Chamber's Grade 6 Students in 2016.	To evaluate the effect of certain colours on Jack Chamber's Grade 6 Students in 2016. I will be writing simple words on different coloured sheets of paper and giving them to grade 6 students in my school. I will give them 2 minutes to read them and then I will take the sheets away and tell them to write down the words that they remember. I will match the words with their colours and average out which colour words they remembered the most.
26	A.D.F.-2000, Automatic Dog Feeder	I made a dog feeder that automatically feeds my dog, I will be bringing the dog feeder but the dog will not be coming, all of the hazardous wires are covered and it is not dangerous. I will need a three pronged electrical plug near the table where I am going to be.
27	Automated Chess Board	We have decided to make an automated chess board. You will be able to play without touching the board itself. The commands will either be given from a laptop or from a voice recognizing/recording device. There is a pretty big chance that we will need an electrical outlet. The box is very simple - jinx wood and cardboard. The bottom of the chess pieces will have an magnetizable device. We will have an electromagnet inside. An x and y axis thing will be able to move the electromagnet under the pieces, magnetize them, and then move them to their destination.
28	The Impact of Stress On the Mental Well Being	Hello my name is Khali Hawa Ahmed and today I will talk to you about my science fair project "The impact of stress on the mental well being". When a kid is stressed they tend to move around and touch things. In my science fair project I will experiment the way the kids would react while meditating. Also I want to see if they would imply the relaxation before they react to certain things.

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29	Capturing Data Remotely With Arduino	I am going to control a mobile platform with an electronic board based on Arduino and a computer program. Our target is to capture different data from sensors interfaced with Arduino and will be trying to get the data in the computer. This data can be used for different purposes.
30	how the nervous system works	we are using materials to create a model of how the nervous system works. some materials are bike string lights, a styrofoam head, some yarn and other things
31	Atomic H ₂ O Splitter	With technology today, there seems to be no lack of new ways of harnessing energy. The catch is that all these alternative energy sources seem to be expensive, inefficient, complicated, can emit ionizing radiation, toxic under pressure or just not good for the environment. Hydrogen fuel cell technology may seem as a great alternative, after all, hydrogen fuel cells are chemically and physically far more efficient at producing electricity than other energy producers since it is not affected by "Thermal Bottleneck" (A consequence of the 2nd law of Thermodynamics). Despite this hydrogen is hard to produce and can still see potential room for improvement. With our project, we aimed to bridge the gap that separates hydrogen fuel cells powering your everyday life. The negative and positive posts (Anode and Cathode) are the most important component of a hydrogen fuel cell if this could be improved further it could significantly affect the efficiency and performance of a fuel cell. We set out and built our very own fuel cell to see if we could alter components such as the posts to enhance the performance of our hydrogen fuel cell. This Project could potentially put the technology into high demand as the factors that hinder this technology into mass usage can be eliminated.
32	Electrical Motor Equals Happy Owner	This project involves the understanding of projectile motion and how to use it to improve our daily lives. By using an Electrical motor combined with a magnetic clutch, I was able to create a machine that is able to throw a ball at various angles.
33	Are Eyeglasses really Eye-deal?	My project is studying the disadvantage those with eye glasses may have against those who do not have eyeglasses. I have the two treatments which are people wearing glasses and people that do not wear glasses. Within these treatments, I'm getting each test subject to read an excerpt except different people get different font sizes to read the excerpt in. This is to see if this also affects the time it takes to read the excerpt. This may prove whether people with eyeglasses have to spend a longer amount of time reading a certain excerpt, compared to those without glasses. Maybe "corrected vision" may not be as corrected as we think.
34	Gravitational Repulsion as a	I have developed a graphical computer model which simulates the behavior of multiple autonomous agents in a dynamic environment. The agents may represent people, autonomous robots or self-driving

	Collision Avoidance Algorithm	cars. I have created a "gravitational repulsion" collision avoidance algorithm, which works for autonomous agents that have limited information about their surroundings. I experimented with different algorithm variables and analyzed their effect on group's overall performance.
35	Engineering gene vectors for long-term tracking of cell fate in animals with bioluminescence imaging	Cellular-genetic imaging can enable the fate of transplanted cells to be visualized in both animals and humans. This requires cells to be tagged using DNA vectors expressing imaging reporter genes prior to implantation into the subject. The ideal DNA vector enables high and persistent reporter expression so that cell number and location can be sensitively tracked over long periods of time. The promoter is a region of DNA on the vector that determines the expression of the encoded gene and is vital for achieving high expression, yet different promoters perform better in different cell types. I hypothesized that DNA cloning could be used to generate a UbiB(h) promoter-driven reporter gene plasmid that would have high and persistent expression over time. The original vector used in this project was the pcDNA3.1(+)/Luc2=tdT plasmid, which expresses a bioluminescent reporter gene (luciferase 2) and a red fluorescent protein (tdTomato) driven by the CMV promoter which has been shown to be silenced over time. I used DNA cloning to insert the UbiB(h) promoter into the pcDNA3.1(+)/Luc2=tdT plasmid and determined successful cloning by restriction enzyme digestion and sequence analysis. Future work will compare gene expression of CMV and UbiB(b) promoter plasmids by luciferase assay and fluorescence microscopy to assess the long term benefit of UbiB(b)-driven gene expression.
36	Generating Musical Accompaniment Using Machine Learning	This project demonstrates both the theory and the application of a machine learning model that generates a unique, pleasing musical accompaniment for a given melody using various principles of harmonics and information theory.
37	Use of Microbial Proteins as Industrial Biotechnology Hosts to Treat Epilepsy	Unicellular green algae <i>Chlamydomonas reinhardtii</i> expresses a channelrhodopsin-2 (ChR2) cation channel protein that controls the phototaxis movement of algae in response to blue light. Similarly, archaeon <i>Natronomonas pharaonis</i> (NpHR) expresses a monovalent anion channel protein halorhodopsin that responds to yellow light. These features of ChR2 and NpHR proteins can be used in optogenetic techniques to manipulate the firing pattern of neurons in epileptic seizures.
38	The role of Panx3 and CCN1 in intervertebral disc health in mice	Back pain resulting from intervertebral disc degeneration is the most common musculoskeletal problem, with an estimated lifetime prevalence of 84% in Canada. There is a pressing need to better understand the processes involved in disc degeneration, in order to develop disease modifying treatments for this clinical problem. My project involves studying the role of specific proteins in the intervertebral disc and whether or not they regulate disc aging or disease, using knockout mouse models. The two proteins I am studying are Panx3 and CCN1, which are highly expressed in specific compartments of the intervertebral disc. My hypothesis is that Panx3



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		and CCN1 knockout mice will experience accelerated intervertebral disc degeneration than control mice with Panx3 and CCN1 expression. The long-term goal of my research is to determine which proteins are essential for disc health and to investigate if these proteins can be targeted for therapeutic application for the spine.
39	Recolte d'energie	Energy harvesting of the waste heat from home composting using the Seebeck effect. This experiment was preformed to determine if 5 volts at 1 amp can be generated from the waste compost heat, enough energy to charge a cell phone.
40	Spin It To Win It	For our project we compared four different brands of D battery and tested which brand powered a simple electric motor for the longest amount of time. We tested Duracell, Duracell Quantum, Energizer and No-Name.
41	Will it Mold - A test of soap and sanitizer	This was a test of soap vs sanitizer tested on bread - to see which molded. There was a control of wet bread and plain bread.
42	Long Term Effects of Makeup	It is know that there are many toxic ingredients (in marginal amounts) in cosmetics, such as lipstick, eyeliner, etc. In this project we are looking at the long term effect of these toxins, and the theory of if these toxins are passed down by epigenetics.
43	Exploring Superconductors	This project looks at what atomic structures are able to support superconducting conditions such as quantum locking and levitation. Conditions were established to test superconductivity and several materials were then tested for their ability to support superconductivity under low temperature conditions.
44	Shut the freezer door	For our project we decided to test the Mpemba effect (can hot water freeze faster then cold). To test this, we heated hot water to a temp of 90°F and the cold water was at a temp of 50°F. Then we placed them in the freezer for an hour, checking at 15 min increments, to check the glaciation of each ice cube tray.
45	The Effect of Sugar Seeded on a String on the Final Volume of the Crystals That Form	This text is to fulfill the requirement of the system to have a description in order to close out the registration account for the project.
46	Turning LEDs Into Power: Considering if LED Power Generators are Possible	LEDs, or light-emitting diodes, are increasingly being used as extremely efficient lighting. However, can they also be used to make power, not just save it? My project looks into the possibility of using LEDs as photodiodes to generate power. LEDs and photovoltaic cells both work using the idea of the p-n junction of semiconductors, only in reverse to each other. If LEDs were to be able to produce electricity as well as generate light, they could be an extremely flexible utility in the future.
47	Styrofoam - A Problem We Need to (dis)-Solve	Styrofoam, also known as polystyrene is a serious environmental issue. It is estimated that one third of the world's landfills are taken up by polystyrene. It is difficult to collect in curbside collection programs as it blows away easily and remains in the environment

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		without breaking down for over 500 years. It is very difficult to transport as it takes up considerable volume with very little weight, so it has a very large footprint to transport for recycling. Limonene, a naturally occurring terpene, made from the rinds of citrus fruits, dissolves polystyrene. I have made a prototype process for municipal, local recycling that dissolves polystyrene with limonene, allowing it to be transported to a central facility for efficient recycling. The limonene is reclaimed for reuse. I have calculated the carbon footprint reduction and demonstrated the favourable environmental impact of this process.
48	3D printer building and troubleshooting & 3D Laser Scanning	After a year of learning 3D printer, I am trying to find a solution to build a 3D printer in a most economic way. Also, I am ready to make a 3D Laser Scanner with my classmates.
49	Gender Stereotypes	Have you ever seen a baby and wondered if it is a boy or girl ? In this project we will find out if young children will also stereotype children.
50	The affects of chemical fertilizer on the growth of plants	<p>Abstract</p> <p>Hello my name is Ahmed Salah and I am doing my project about the effect of chemical fertilizer on the growth of house hold plants. Plants are made up of cells like all living organisms, and they depend on nutrients in the soil responsible for growth and reproduction. Fertilizers replace the chemical components that are taken from the soil by growing plants. Fertilizer is any material of natural or synthetic origin that is applied to soils or to plant to supply one or more plant nutrients essential to the growth of plants. Modern synthetic fertilizers are composed mainly of nitrogen, phosphorous, and potassium compounds with secondary nutrients added. I started my project with two house hold plant and I applied the chemical fertilizer to one and left the other one without. Then I watched and monitored the two plants over a 2 months period to see the effect of the fertilizer on plants growth.</p>
51	Plastic Bubbling	I observed the foaming behaviors of different types of polyethylene under certain temperatures and times. Sodium bicarbonate and citric acid were chosen as the chemical foaming agent. The emphasis of this experiment was on foaming mechanism and optimization. The polyethylene foam was characterized by a density-meter while the bubbles were observed via an optical microscope. The optimal foaming conditions and maximum weight loss achievable were found in this study.
52	Death manufacturing	<p>my question is how does the co2 (carbon dioxide) affect the pH of the acid rain which affects the environment? i will be observing the mass of each rock that i will put in every jar that contain water that does have high pH because of the co2 i diffused in the water using the co2 injector.</p> <p>My purpose is to stop the disasters that occur due to high pH rain or Acid rain. Acid rain is a problem both US and CANADA suffer from until now.</p>

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		I want to solve the problem of sinkholes, landslides and old houses or statues falling due to acid rain. Not only that but global warming too and that is another whole science fair I want to give people a message and to how solve this problem that occur because of us since the industrial years. after each 24 hours i will measure the mass of the rock and the pH of water in each jar.
53	Different Mind types: Thinker vs Feeler	My projects purpose is to find out if the brain of people of different ages, and gender judge things mostly based of, of reason or emotion.
54	L'Effet de la Chaleur sur les Enzymes	We tested the effects of heat on the naturally occurring enzymes in pineapple and kiwi. We knew that the enzymes in these fruits would normally digest jello, turning it into a liquid. So we heated various fruit samples, to see if that process was affected by the increased temperature. Then we charted our results.
55	Making Bio-Plastic	Our project is about comparing how long it takes to make different plastics: bio plastics and factory made plastics. This is because factory made plastics are bad for the environment, take some time to make, and take long periods of time to degrade. For example, a normal sandwich bag takes 400 years to degrade and return to the earth. This is why we are trying to create homemade, bio plastics and see if they are quicker to make, and better for the environment. The ingredients we used are indeed environmental friendly. They are, potato starch from potatoes, and that makes it automatically environmental friendly because it's from a plant. Acetic acid, also known as vinegar, which, after a bit of research on the internet, we discovered that it is indeed, less harmful to the environment than ingredients used in factory made plastic. Glycerol, which is also more healthy to the ecosystem, and water. So, for our project we made bio plastic at home, to prove that it is easy to make. In addition to that, since there are many farms that harvest potatoes in Canada, it can be beneficial to the society, since we could make a lot of it, which would help Canada's economy as well. As for the factory made plastics, we did not make any, but we learned from research that it probably takes more time to make than the bio plastics we made at home.
56	Sugar, Carbs, and Tooth Decay?	My science fair project is about how sugary drinks decay our teeth. In my project I will observe the effect of sugary drinks like Mountain Dew, Pepsi, fruit juice, fluoride rinse, Powerade and water on a tooth. Also I will measure the decay for three weeks and determine how much the tooth had decayed and which drink has more sugar and harmful for teeth.
57	Can Reptiles Enter REM?	most scientists believe that reptiles cannot dream and go into REM. i will use EEG machines (brain wave recording), timelapse, and observation to find my answer.
58	La température et le croissance des cristaux	Our project is about the effect of temperature on crystals. We put borax crystals in 3 different places in 3 different temperatures to see which temperature can produce the first crystal.

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59	Can Human Sickness Transfer to Animals	My project involved observing and monitoring the behaviour of my gerbil before and after having given him mucus containing cold/flu virus to determine if he would display any symptoms.
60	A Sticky Situation	Our project this year is on glues and green adhesives, and to see if we can find replacements to chemical glues which are toxic to the environment. Glues or adhesives are a low-impact building material which are made from VOC (volatile organic compound)-emitting materials, rather than using building material that are toxic, we could use milk based paint, and these materials could be treated with boric acid to stop insect damage. "A study of emissions from materials by the State of California has shown that there are some green materials that have substantial emissions whereas some more "traditional" materials actually were lower emitters. Thus, the subject of emissions must be carefully investigated before concluding that natural materials are always the healthiest alternatives for occupants and for the Earth." Our experiment could lead to further awareness towards these toxic materials used in construction and help develop an organic alternative that could be used.
61	How to make glass invisible	My project is how to make glass invisible. I am going to use a bowl, glass cup, and baby oil. I am going to put the cup in the bowl. Then I will put baby oil in the bowl and live a small part between the cup and the baby oil. Then put the baby oil in the cup then you will find your answer.
62	Rapunzel's Dilemma - Solving the Problem of Hair Clogs in Drains	Drains that are clogged with human hair is a common household problem. I compared multiple commercially available household drain cleaners as well as some home made organic solutions to see which was the best at unclogging blocked drains. This was done by fashioning a clear plastic tube with a simulated hair plug, then adding each product in a standardized fashion and measuring the time taken to allow water to flow through the drain. I also tested these products to see how effectively each product dissolved hair. This was done by combining a set volume of the product with a measured weight of hair. All experiments were done with hair from the same person, so this variable could be controlled.
63	Study of Atom	The project is about the basic information of atom. The project talks about what atoms do and what they're made of. It also talks about how atoms connect to make molecules. It talks about what inside the atom does.
64	Smoking the secret killer	I will be showing the cause of smoking and what happens to our lungs with long term of smoking . How does it damage other organs as wel. Long term smoking can kill and also people around smokers can die of second hand smoking . Children at higher risk and addiction if parents are smoker. I will demonstrate a small experiment to show what smoking can do to human lungs .
65	Bioinformatics the perfect marriage of	In my science fair project I will use the method of bioinformatics to see why your DNA blueprint is important to your health and disease

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	computer science and medicine	
66	Listen Up	Does age affect a persons ability to hear high frequencies? Participants listened to various frequencies and the results were recorded. I found that age was a direct factor in a persons ability to hear high frequencies.
67	Bacteria Blockers	For my project I grew bacteria found in household items in Petri dishes with three different antibacterials and one without antibacterials. I tested ten different objects in the house and checked results daily. The antibacterial that worked the best was chloramphenicol. The other two remaining antibacterials I used were kanamycin and ampicillin. (Ampicillin worked the least of the three) I also tested negative and positive controls before my experiment.
68	Efficiency Deficiency: Impact of Cervical Spine Curvature on Brain Efficiency using smart gadget	My project uses different everyday situations to naturally force a participant to work in a certain positions while on gadgets (i.e. Phone, Tablet, Laptop). What this does is it allows for the cervical spine to bend anywhere from 0-60 degrees, allowing for stresses on it from 10-60 pounds. Some situations create excessive pressure on the heart and lungs, not allowing for enough oxygen and blood to reach the brain. Restricting the brain from functioning at its full potential. This leads to my experiment, looking at how the curvature of the cervical spine affects reactions times, (to simulate efficiency while doing work on different gadgets).
69	L'isolation	English: our project uses different insulation to test which is the best. We put boiling water in a cup, surround it with insulation and see how long it takes to become room temperature. Français: notre projet utilisent des différents types d'isolation pour voir quel est la meilleure? Nous avons mis l'eau chaud dans une tasse, mis l'isolation autour de la tasse et nous avons vu combien de temps ça prend pour être le même température de la salle.
70	What's the best insulator for ice?	I'm using natural insulators and testing to see which is the best insulator for ice. I'm going to use 3 natural insulators I found around my house.
71	Filtering Dirty Water	Our project is about how to filter dirty water. In North America we have access to clean water every where. But those in Africa and some parts of Asia don't have clean water at all! This project has been made to benefit those in need of clean water.
72	Flights Cancelled	My project is about the study of the impacts of global warming on migratory birds. The recent weather changes have impacted the destinations that the birds will migrate south for the winter. Considering the warm weather, and the availability of food, it is changing the habitat where the birds eventually migrate to. I will study and present my research of this recent change to our environment and what we should do to minimize its impact.
73	Are You Right Or Left Brained	In my project i will tell you what right brained is and what left brained is.and i will explain how you can find out if you are a left or right brained.



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74	Hydrogen	My project is hydrogen and my name is Omar Moftah. My address is 251 Platts Lane. My postal code is N6H4P4. My birth date is November 26, 2004.
75	SMART URBAN GRID - saving the environment	My project not only shows how rain water and sun light can be used to (1) help save the environment (2) reduce water and electricity bills in our homes but it also shows how a smaller "grid" of connected homes can share stored water and electricity with each other by using cisterns. Cisterns have been used for water storage as far back as the Neolithic age. Batteries are really just cisterns for electricity.
76	Gravity In Space	My project explores the question, How do the planets stay in orbit around the sun? It explores the theory of gravitational pull and how gravitational pull can also lead to the discovery of other planets in our solar system. I also looked at how our solar system is travelling through the Milky Way galaxy using forces.
77	Is Quantity of Sleep Impacted by High Intensity Physical Activity?	My project is a study to see if getting enough high intensity physical activity has an impact on the amount of sleep you get.
78	Boiling Secrets	Our project is about finding a way to boil water faster. To do this we have added different substances to water and boiled it. The substances we added were sugar, salt and baking soda.
79	Magnetic slime	I wanted to find out more about magnetism, to experiment the strength of neodymium magnet and find out why the slime sticks together. It also interests me because I am into chemistry.
80	The Soap Wars	We tested which soap works best (antibacterial, regular or all natural) at killing bacteria. We did this by cleaning utensils with saliva on them with the different soaps, then pressing the utensils to agar (a bacteria growing medium) and seeing how much bacteria grew from the utensils cleaned by each soap.
81	The Affect of Temperature On FingerPrints	The affect of temperature on fingerprints. I will see the best temperature to be able to the fingerprint clearly. I'm going to use hot, normal, and cold temperature.
82	no pain, lots of game	In my project I will show you how distraction relieves pain. I will have six volunteers, three boys three girls all in fifth grade. But I can't do the experiment in front of the judges because of time.
83	"The Dirt on Food Waste"	My science project is about the amount of food wasted in various households and kitchens, and the impact this food waste has on landfills. I chose this topic because London, ON is currently debating a green bin program, and I strongly believe that being less wasteful can positively impact our environment.

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		I measured the amount of food waste from various households and kitchens over a week long period, and analyzed these results to reach my conclusion.
84	Metal to Magnet	My project is about solenoids. The purpose of my project is to create something useful, and find out about solenoids. Solenoids are coils of a simple wire, which we use in our everyday life. During my project I found out that solenoids are used in many things, from cars to door locks to medical equipment. My hypothesis is that "there will be no change in a straight wire, no matter if there is current flowing through it or not. I hypothesize that there will be a different type of energy i.e. magnetic energy, is created if I coil the wire and then pass an electric current through it. Furthermore if the number of coils are increased the power of magnetism will too. I hypothesize that increasing the amount of current will also increase the magnetic power." I have built a few different solenoids to test my theory.
85	Water: Measurements of Water Clarity	I investigated the question of which type of water is the clearest. I used a laser and photocell to measure the clarity of water from several different sources. The results showed that filtered water was the clearest, and tap water was the least clear.
86	How to Make Fluorescein from Highlighter Markers	My project is about fluorescein making it from using highlighter markers i will be showing myself doing it at home and showing the judges my record so it wouldn't be dangerous over there
87	Rusting Away. Effects of pH on Steel	This project demonstrates the effects of pH on the creation of Iron Oxide or Rust.
88	How Much Sugar Do We Drink?	My project shows how much sugar there is in various drinks and there are graphs to show how much sugar is consumed. It is a project that hopefully educates people to see what the recommended daily intake of sugar should be and to actually see how much extra sugar we put into our bodies through beverages.
89	Card Pattern Power	I chose to do my project on testing if patterned dots are easier to recognize than dots that are randomly scattered. I used people from all ages and both genders to test if patterns help you instantly recognize how many dots were a card. My procedure was: first I would tell the test subject what I would do, then I take one of my cards with 1-10 dots on it (some randomly scattered and some in patterns like cards), the test subject would have 0.3 seconds to see the card and then tell me how many dots they thought there were. All correct answers were recorded and the amount of people.
90	The Contracting Universe	This project is to determine whether or not, after a certain period of time, the universe will contract. I will use different theories from other scientists to do this correlative project.
91	Bipolar Depression	We will present on how the brain changes through Bipolar depression. How a person suffering Bipolar thinks, and what jumping from episodes of Mania to Depression works. Also, where the suicidal



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		thoughts come from. On top of these few things we will present a postpone and maybe a cure to Bipolar Depression.
92	Phantom Sensations	Our project explores phantom pains; sensations felt in missing limbs of amputees. We use an illusion created by a mirror to have people experience phantom sensations in an effort to better teach real amputees how to deal with and perceive their problem in a more effective way. We are trying to create a more effective psychological treatment for phantom pain in amputees.
93	How Do Different Types of Water Affect the Growth of Borax Crystals?	My project is about borax crystals and how they grow in different types of water - tap water, reverse osmosis water and rain water. The result of this experiment was that rain water makes the largest borax crystals.
94	Gender Colours	our project was about gender colours. we thought over the past years blue has been a boy colour and pink has been a girl colour. we wanted to experiment and see if that was actually true. for our experiment we made rice krispie squares with pink chocolate drizzle and some with blue chocolate drizzle. we thought each division would have different results. And turned out that each division was different.
95	What's Really Working for your Teeth?	Determine which whitening toothpastes are most effective on teeth to remove tough stains and brighten and whiten. Also using a non-whitening toothpaste to determine if whitening is more effective than non-whitening.
96	No Milk No Bones	I want to find out whether milk/calcium is making bones weaker or stronger, I also want to see if drinking large amounts of pop will make bones weaker. I'm testing this by making a survey on survey-monkey and seeing if people who have had broken bones drink a lot of milk or a lot of pop. I also want to see what type of milk they drink, because different milk contains different things. I will also do a acid based titration to see how calcium reacts with different solutions.
97	Rocket, Propulsion & Gravitey	Would a model rocket launched at 45 and 90 degree, fly as far (on a 45 angle) as it would go high as the 90 degree angle.
98	How much sugar does your drink contain?	I will show how different drinks contain the most sugar using a big tub/container of water. I will also show the actual amounts of sugar in each drink. This way I know how much sugar I am consuming after drinking each beverage.
99	Dense Factor	To help people who might become lost in the forest, we tested four different types of woods to see if the density of each type would affect how long each burned. We wanted to determine which type of wood would be most effective in building and maintaining a fire in case of emergency.
100	"Dealing with diabetes: The road to developing an artificial pancreas"	This project is basically is about the difficulties a person with diabetes goes through and it goes in depth about what happens in their body and what it takes for them to keep going.



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101	Fruit Batteries	Can fruit power electronics? Can fruits charge your iPod. My project tests whether fruit can power my iPod. Which fruits have a stronger volt. Which combination of fruits produces the best charge?
102	pH de l'eau de boisson (et quels facteurs environnementaux influent sur elle)	A base experiment of testing the pH of various drinking waters coming from different sources. Each water is then stripped down to it's origins. I explain the factors that affect the pH from it's source, to it's packaging (focusing on rocks and lifeforms in drinking water souces).
103	viscosity	My project is about viscosity. I'm trying to find out about viscosity. I'm also trying to see what liquids have high viscosity and what liquids that have low viscosity.
104	Sugar Science	My experiment uses human retina endothelial cells in a high glucose environment to mimic diabetic hyperglycemia, which leads to diabetic retinopathy. The purpose of the present study was to determine if ginseng will help reduce the increase of fibronectin and collagen mRNA induced by high glucose, in order to prevent diabetic retinopathy.
105	Air Pollution: Think Before You Breathe...	Our project is about testing the level of particulate air pollution in three different environments. For this we have set up three paper plates, one in a school area, one in a forest and one in a busy neighborhood. We covered each in petroleum jelly. We left them at those locations for a week checking on the plates every day and recording how much air pollution we can find in a 2x2 centimeter square. At the end of the week we put together the results for each plate and concluded that the school plate had the most air pollution, the neighborhood plate was in the middle and the forest area plate had the least.
106	BioPlastics- Potatoes to Plastic	Plastic takes 500-1000 years to decompose in this world, whereas bio plastic takes 3-6 months to decompose. We decided to create bio plastic made from potatoes, and test this theory on the decomposing rate verses the rate of regular plastic.
107	Paper Chromatography of Markers	<p>Purpose:</p> <p>To find out how to separate colours in markers by using chromatography.</p> <p>To look at how different solvents affect separation.</p> <p>To discover what colour dyes make up markers.</p> <p>Conclusions:</p> <p>Paper chromatography is a good method for separating the pigments in water-soluble markers.</p> <p>Most markers are made up of more than one color.</p>



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		<p>Markers with similar colours are made up of the same colours, but in different amounts.</p> <p>Water was the best solvent for these markers.</p>
108	Home Made Lava lamp	<p>What I am making is called a home made lava lamp. It is a mixture of water and vegetable oil. I will gather the materials then fill up the plastic water bottle with vegetable oil. I will then add water to the neck of the water bottle, and add ten drops of blue food coloring until its rich colour is seen. Then break an Alka-Seltzer tablet into small pieces until the bubbling stops, which then I will replace the bottle cap.</p>
109	Dry Ice	<p>I will use a fire extinguisher to create dry ice and will demonstrate what are the uses of dry ice and how can we use it in our daily life. To benefit more it</p>
110	All The Wave: The Effects of Microwaves on Life, Food and Growth	<p>There are many claims that microwaves will damage life, food, and growth, while other reports show microwaves will not damage anything at all. In order to find out how microwaves truly affect life, food and growth I have performed two experiments demonstrating the effects on a much smaller scale.</p> <p>The first experiment involves microwaving orange, strawberry and red pepper juice and testing its vitamin C content compared to stove boiled juices and regular juices using titration in an iodine-starch solution. The second experiment involves plant growth and health in a plant when given microwaved water compared to growth and health in plants given stove boiled or regular water.</p> <p>In the end, the results showed that the microwaved juice had the highest vitamin C concentration compared to the other juices; while the microwaved plants grew the tallest but suffered minor wilt. In the end, microwaves had shown no effects on life, food or growth in my results.</p>
111	Shielding from electromagnetic and nuclear radiation	<p>I chose 3 areas in our home to take measurements - by the modem, the cordless phone and in the living room. I took measurements with various things covering the antenna (cardboard, plastic, aluminum, tinfoil, and stainless steel) to show what was effective at minimizing the electromagnetic radiation exposure. I also built a nuclear radiation detector and looked at several materials to see what would minimize the radiation from a radioactive source.</p>
112	Plant Progress	<p>The purpose of our experiment was to see which fertilizer, chemical or organic (compost), had a more positive effect on three different types of plants (onion sprouts, black eyed peas, and wheatgrass). We examined if the fertilizers had an effect on the way the plants looked (if they were darker or duller in colour), how tall they grew, and how many shoots/leaves each plant had. We hypothesized that the plants</p>

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		<p>fed with organic fertilizer would look healthier, but not grow as tall as the ones fed with chemical fertilizer. We found that the plants fed with organic fertilizer were healthier looking and also taller, and for the most part had more shoots/leaves than those fed with chemical fertilizer. A lot of farmers use chemical fertilizer for their plants, which needs a lot of energy to manufacture, and also costs more than organic fertilizer such as compost. Chemical fertilizers can also release toxins into soil and plants. On the other hand, if farmers and home gardeners use compost, they will save money and help the environment at the same time, and as our experiment shows, perhaps also get healthier plants.</p>
113	Bath Bombs: Hot Vs. Cold Water	<p>We wanted to see whether or not temperature of water effected the length of time a bath bomb lasted. Our hypothesis was that the bath bombs in colder water would not last as long as the ones in warmer water. To test our hypothesis we tried placing bath bombs in 5 different temperatures of water. Our hypothesis was right.</p>
114	Hover-Car	<p>The goal of this project is to build a model of a car without an engine that uses superconductors instead. In this project, a magnetic track is to be built for the model to "hover" on, liquid nitrogen will be used to cool the superconductor, and a superconductor will be placed inside a small car to allow it to "hover" on top of the magnetic track. From this project, "quantum locking" will be demonstrated.</p>
115	Which Beverage Has The Most Gas?	<p>In this project we will be looking at which beverage produces the most gas. This project will not involve any animals nor humans and is very very simple.</p>
116	The Effect of Auditory Vs Visual Distractions on Game Scores	<p>My project is about auditory vs visual distraction on game scores. I made a person play Fifa 16 and distracted them visually 3 times auditory 3 times and 3 times with no distractions</p>
117	Nano technology	<p>My project will be about nano technology and how it was invented, how it generally works and how it is used in our daily lives and hope scientists use it</p>
118	Where Goes the Cellulose?	<p>Four billion trees are cut down every year to make paper. Cellulose is the main ingredient in paper. Trees have 40 - 50 % cellulose. We made paper out of different rotting vegetables to test the cellulose content. We tested the sheets to see which one would be most like paper.</p>
119	Bacteria vs B.B.D	<p>Since people all over the world have been discarding food regularly, we decided to make a project that can help stop food waste. We tested foods before 'best before' date and foods after 'best before' date, to see if there are any differences between how much bacteria colonies in the before and after 'best before' labels, by doing that we can figure out if foods after the 'best before' date are still edible.</p>
120	Electricity	<p>My project is going to be about electricity and its application to the real world. I will be showing how electricity is able to power things using a battery powered car.</p>



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121	Les Biscuits	<p>A study about the cookies - shape/size/diameter - by decreasing the amount of flour in the recipe.</p> <p>Pictures and proper explanations are presented as proof for all three different approaches of the recipe.</p>
122	Detergent Duel	<p>After reading the ingredients in store-bought laundry detergent, I wanted to find a safer, less harmful option. After checking online, I found a recipe for homemade detergent. I decided to compare the two on stains from mustard, ketchup, and coffee.</p>
123	Do people know how much sugar is in their drinks?	<p>For my science fair project I decided to find out if people know how much sugar is in some drinks that they may normally drink. To start my project I picked seven different drinks to use. I then created a survey for people to fill out that would tell me how much sugar they think is in these drinks and their age. Once I had enough responses at 125, I looked at the summary of responses and calculated them all according to age about who got the answers right. The Apple Juice, Iced Tea, and the Coca Cola were overestimated while the Rockstar Energy Drink, Vitamin Water, Gatorade, and the Cappuccino were underestimated on average. People know that sugar is in sweetened drinks like juice, and pop, but tend to overestimate the amount. However I think they underestimate the amount in energy-like drinks because they are said to be good for you.</p> <p>For each drink the average of getting the answer right was 9.4%. Overall the 36 to 65 year old did the best with 10% of their answers correct and the 19 to 35 year old did the worst with 8%. The 66+ tied with the 12-18 year old at 9% right</p>
124	Reducing Industry Related Carbon Dioxide Emissions by the production of Baking Soda	<p>Sodium Bicarbonate is not only about sodium bicarbonate (baking soda), but also about magnesium bicarbonate and to a lesser degree potassium bicarbonate and calcium bicarbonate. However, the star of the show in this is bicarbonate. The second star is carbon dioxide (CO₂). Most of the conjugate acid of bicarbonate is in the form of dissolved carbon dioxide. The rapid and direct interconversion of dissolved CO₂ and bicarbonate ion is catalyzed by the enzyme carbonic anhydrase. Skyonic's cutting-edge and patented technology converts carbon emissions from flue gases into chemicals that can be used in many industries. CO₂ emissions can be captured and stored as carbon-negative products, such as sodium bicarbonate (baking soda), while the plant also produces hydrochloric acid, and household bleach.</p> <p>With our proven technologies, Skyonic can reduce the impact on the environment from new and existing industrial manufacturing facilities, refineries, steel mills, and other power plants. Additionally, we can help these facilities succeed by introducing another revenue source-creating marketable products that can be used in various applications without negatively impacting the atmosphere.</p> <p>The premise of the SkyMine® technology is to remove carbon dioxide (CO₂), acid gases such as sulfur oxides (SO_x) and nitrogen oxides (NO_x), and other heavy metals from industrial waste streams. Skyonic</p>

		captures these harmful pollutants from flue gases and transform them into marketable products, such as sodium bicarbonate (baking soda), hydrochloric acid, and bleach.
125	Effect of Adult Coloring as a Leisure Activity on Data Retention	Similar to the way in which listening to music affects academic performance, this study investigated the effect of Adult Coloring as a Leisure Activity on Data Retention.
126	Bioplastics.	The production of plastics emit tons of carbon dioxide emission, and our world cannot handle the increasing amounts of harmful emissions. Not only does the production of plastics produce harmful emissions, when they are thrown out they can leak toxins into our environment and waterlines. To find a more eco-friendly way of producing plastics and testing out the best type, our team studied the types of plastics, the most harmful one, and how to make the best consumer friendly bioplastics.
127	The Effect Of Caffeine On Grass Growth	We tested the effects that instant coffee powder had on the growth of grass seeds. We watered 4 different pots with different amounts of coffee and recorded the results. We found that caffeine has a negative affect on the growth of grass. It dried out the soil causing the grass to die.
128	Monte Carlo Simulation on Smart Traffic Crossing: A peek into the Internet of Things World	Traffic light systems are essential in resolving conflicting four-way traffic crossing. The existing lights are not only passive, but also blind in the sense that the light system and the traffic hardly communicate with each other. With the arrival of the Internet of Things (IoT), advanced connectivity and automation become possible for smarter devices, and smarter systems. IoT allows traffic light systems to know exactly where the traffic is and how it is moving, the moving vehicles can also know in advance how the lights will change before it changes. Using the Monte Carlo simulation method to model ongoing traffic, I can explore how the added intelligence of IoT can be utilized to revolutionize the traffic crossing at a simple four way intersection.
129	The effect of amyllum(starch) on the strength and durability of bioplastics	Plastic seems to be everywhere and is integrated in our daily lives whether we use it to carry our groceries or water. While plastics can improve our present quality of life, the mass production of plastics continue to negatively impact our environment. The world has managed to put 10-20 million tons of plastic in the oceans, causing an unbalance in the environment. To reduce the impact of plastic pollution, plastics can be substituted with a more environmentally friendly material, bio-plastics. Bio-plastics are derived from amyllum, commonly known as starch, which can allow the plastic to degrade significantly faster than the regular plastics we use today. While it can help to reduce the plastic pollution, the available bio-plastics are not functional or durable enough for daily use objects. We have created a bioplastic, and by altering the amount of starch used, we can identify which ratio is strongest and most practical. This experiment is a glimpse of how engineers are studying materials and working to find a solution to our environmental problems with pollution.



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130	The Theory Behind Music and Memory	Humans have amazing brains that they use everyday. Our brains can memorize millions of things using long-term and short-term memory, especially musicians. Musicians multitask during memorization, from things such as a 2 minute sax solo to a 30 minute full song guitar riff. In our project, we will use many resources around us to find out how the human brain can remember so much, and if musicians have better memory capacity than non-musicians.
131	The Effect of Different Wavelengths of Lasers on the Amount of Volts Produced in a Solar Module	My project is about testing the energy of different wavelengths. By using a solar module, voltmeter, and 3 lasers(5 mW); Blue(405 nm), Green(532nm), and Red(650 nm). I created a circuit and setup the voltmeter, placing the lasers 1 m away. What I found was the shorter the wavelength, the more volts it would create.
132	The Effect of Different Color Filters, on the Amount of Power Generated by a Solar Panel	The goal is to find the optimal amount of power from solar radiation by experimenting with wavelengths of light in the electromagnetic spectrum including the visible spectrum that are allowed to pass through the filters, and then being absorbed by the solar cell and converted to clean, usable electrical energy. To prepare for the experimentation of this project, it includes fourteen materials, and thirty-two steps of procedure. This experiment is conducted by placing twelve different color filters individually on the solar panel, then shine an incandescent light on top of the solar panel in a dark environment. The measurement include voltage and resistance, then uses this data to calculate power in watts. The results shows that as the wavelength of the color filter decreases, parts of the visible spectrum increased the power converted by the solar panel.
133	A Bloody Situation Pt.3	trying to find natural remedies for a bleeding disorder called hemophilia. to test out the effectiveness I use blood clot simulators and extracts of the natural remedies.
134	The relationship of type of makeup remover used on the amount of makeup residue on a sink	This project tests the type of makeup remover (combined with makeup) on the amount of makeup residue left on a sink and covers the potential repercussions and best method to circumvent or diminish the amount of makeup residue on a sink.
135	Fuel of the Future	One of the most significant contributors for the production of carbon emissions is the globally immense use of fossil fuels for transportation. Therefore, the our project is to identify the problems associated with the current fuels used in vehicles and to create two alternative fuels that focus on solving the environmental issues within the car industry.
136	Electricity Generating Insoles: Walking As A Source	Wouldn't it be amazing if you could charge your phone by going on a jog or walking to work? Utilizing the Piezoelectric effect, my project recycles some of the kinetic energy lost while we walk or run in order



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	Of Renewable Energy	to generate electricity. This comes in the form of a comfortable insole fitted with Piezoelectric transducers which generates a charge whenever force is applied to it. The electricity is stored in a power bank where it can be used to charge phones or other devices.
137	The Effect of Different Beverages on the Amount of Electrolytes	I made a conductance measuring circuit and measured the amount of current in different beverages. I then calculated their electrolyte content to determine which is the best rehydration beverage after strenuous exercise.
138	Pesti-Hiding in Plain Sight	This year I am trying to find a solution to end harmful pesticides. I am going to be testing a formula that I have been working on for 3 years now. Something else that was contradicting in this field are GMOs. I had an idea to test fruit flies and see if creating a fruit fly culture, one with GMO food vs. a culture with organic food. This is just a small summary of what I am doing this year for the TVSEF.
139	Sugar-coconut oil green exfoliant	The lab was created to find an affordable alternative to microbeads as they are affecting the bodies of water as well as the marine life that use these bodies of water as a habitat. Different alternatives have been tested and the sugar-coconut oil alternative was the best as it exfoliates the skin properly while staying at an affordable rate and is environmentally friendly.
140	Influencing Factors in a Chemical Reaction	Our project investigates the factors that influence the rate of a chemical reaction. We will analyze and answer the following questions: <ol style="list-style-type: none"> 1. How does increasing room temperature influence the speed of a reaction? 2. How does increasing the concentration of the reactants affect the speed of a reaction? 3. What role do catalysts play in the rate of a reaction?
141	Bioplastics	In order to reduce the negative effects that plastic has on the environment, we researched and created our own bioplastic. The bioplastic we made was constructed to act as a container to replace PVC plastic.
142	Different Types of Biofuel and their Effectiveness	To test the effectiveness of different types of biofuel using; canola oil, vegetable oil, and grape seed oil. The effectiveness will be tested by burning the different samples of biofuel and seeing how long they can sustain themselves. The purpose of this is to find a greener alternative to gasoline, which will act as a climate control solution.
143	Replacing microbeads from facial cleanser	Our project explores the dangers of microbeads in the environment and tries to look for nature friendly ingredients that will serve microbead's purpose in facial cleanser. Also, we will compare the effect of products containing microbeads with our facial cleanser containing natural ingredients on orange skins and human skins.
144	Varying the Concentration of the Solute in Electroplating	My science fair project studies the relationship between the concentration of the solute in electroplating, and the time it takes for a dime to become fully plated with copper. My hypothesis was that, if the concentration were increased, it would take less time for the dime to become fully plated. In the experiment, I created my own

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		<p>solute (copper acetate) using materials that would commonly be found in a house. Over the course of five tests, I systematically increased the concentration of the acetate to determine the concentration that would plate a coin the quickest. My results are shown in a table, a graph, and five electroplated dimes, plated in varying concentrations of copper acetate. My hypothesis was proven correct. This experiment benefits society by locating the appropriate concentration that will result in the least time spent electroplating objects. This may allow manufacturers to produce more plated items in a set period of time.</p>
145	How Do the Worms Feel in Warm Weather?	<p>My project looks at the whether changes in temperature affects the amount of mucus produced by earthworms, which was measured by calculating the soil moisture content after the testing period. If rises in temperature affect how much mucus they produce, then it could affect the arability of our soils since their burrowing is held together by the mucus they produce. These burrows which create pores in the soil help to retain water and oxygen and also, evenly disperse organic matter throughout the soil.</p>
146	Measuring how much enzyme catalase is needed to convert hydrogen peroxide into water and oxygen	<p>Question: To see how much enzyme catalase can convert hydrogen peroxide to water and oxygen. Hypothesis: The amount of hydrogen peroxide converted to water and oxygen will correspond to the amount of potato added to the hydrogen peroxide. More potato would mean more hydrogen peroxide converted to water and oxygen, and less potato would mean less hydrogen peroxide converted to water and oxygen. The PH of the solution would become from more acidic to more basic, from around 5.8 to around 6 or 7. As of the solution's physical appearance, the oxygen and water might form bubbles. Variables: The dependent variable is the PH, the volume of the new solution in MLs, and the solution's appearance described in a qualitative observation. The independent variable will be the amount of potato, which contains the enzyme catalase. Controlled variable will be the amount of hydrogen peroxide. Materials: Materials to be observed in experiment One Potato (must weigh at least 100 grams) 3 250 ml beakers full of 50 ml of hydrogen peroxide 3 strips PH paper Tools required but not needed to be observed A knife</p>
147	Factors Affecting Banana's A Ripening	<p>In this project, I will be experimenting the different storage qualities of an area to identify the proper storage of a banana. I will use three</p>



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		variable; Light, Humidity, and Temperature. I will use twelve groups of bananas and each group will have its unique storage factors. Using these factors I can later observe the bananas and check if they have acquired the needed qualities to be the most nutritious (like pH levels or starch content) and in how much time it took to do so. As the experiment goes, I will have charted and recorded information in 3 day intervals. my goal is to figure out the best storage qualities to properly store a banana (asked by many people) ;)
148	The effect of oils on the rate of popping corn	My project talks about the effect of oils on stove top popped popcorn. It shows how some oils are better for popping popcorn than others. It proves what oils you should use and what oils you shouldn't use.
149	Does cell phone radiation affect yeast fermentation?	I am investigating the relationship between cell phone radiation and the fermentation process of yeast. Many people keep their cell phones on them throughout the day, if the radiation from the cell phone can affect yeast fermentation in bakers yeast, it could also affect glycolysis in the human body.
150	I C Because of Circuitry	This project is about a new and creative method to reduce the amount of falls caused by ice. The method must be affordable and easy to use, as it will be used by the visually impaired. through this experiment, one will be able to determine whether ice can be detected by a light sensor, created by an LDR and a small circuit that is attached to the bottom of the cane.
151	Singing in The Shower	Singing in the Shower is an eco-friendly shampoo that was developed to satisfy our green chemistry project requirements. We built the shampoo from scratch, starting with different sources of saponin (a natural surfactant) other elements were built in and tested until we were left with a 100% natural and environmentally shampoo. Our shampoo is able to replace the synthetic and harmful chemically designed shampoos used by millions of people.
152	Alternative Solutions to Road Salt	This project studied the effectiveness of alternative solutions to road salt, with regard to how quickly they melt ice, the harmful impacts they may have on plants, and the effects they may have on corrosion.
153	The Effect of Different Types of Drugs on the Rate of Dissolution in Simulated Gastric Acid	In this experiment, different drugs were dissolved in simulated gastric acid(diluted hydrochloric acid) to determine how fast it took to dissolve in the solution of pH4 (average pH level of stomach acid).
154	Carbon Capture	Global warming is arguably the most significant challenge of the twenty-first century. Year by year, politicians and businessmen witness the devastating evidence of climate change and continue to turn a blind eye. Warming temperatures is quickly becoming critical that these decision makers begin to implement changes that will consolidate their economic goals with environmental concerns. Our design aims to improve upon current post-combustion capture



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		<p>methods to remove carbon dioxide from flue gas before it is emitted. Instead of using an amine solution, we tested the effectiveness of sodium hydroxide and potassium hydroxide which are both known carbon capturers and very accessible chemicals. In order to test this, we conducted our experiment in a closed system so that the percentage of carbon dioxide captured can be estimated. First, we neutralized calcium carbonate and hydrochloric acid to produce a known volume of carbon dioxide, which was transmitted to an absorption apparatus. Inside the absorber, the carbon dioxide was bubbled into either base and finally reacted with lime water to produce a precipitate that we could mass and use to determine the volume that was captured. In an industrial context, only the reaction with the base is necessary. Our design is an economically-sensible alternative to current technologies as it requires no energy. Additionally, the products, sodium bicarbonate and potassium bicarbonate are aqueous, which are cheap and easy to handle. They also have many uses, and can be sold to other industries so the business can recuperate on implementation costs.</p>
155	Using viruses to target tumors	<p>Our project includes an analysis of HIV and how the virus could be used to target and eliminate tumours, more specifically, cancerous tumors. This project presents a way that these viruses could be altered and some of the challenges and side effects this process may have.</p>
156	The Effect of Different Temp. on the Volume of Borax Crystals	<p>Purpose: To find out which temperature (cold or hot) makes the largest borax crystals in volume.</p> <p>In this experiment, the higher the temperature of the borax crystals environment produce the largest volume. This happens because the higher the temperature, the more of the solute will stay in the solution and therefore creating more crystals to bump into each other as they stick together and form larger pieces of borax crystals.</p>
157	Green nail polish remover	<p>The conventional nail polish contains acetone which is slightly poisonous to the environment and highly inflammable. We tried to create a green nail polish remover using some green chemicals and made the product as effective as conventional ones.</p>
158	Creating an alternative, all natural, antibacterial soap using Essential Oils	<p>Our project is based on the concept of green engineering. After researching the uses and production of hand soap, we were shocked at the severity of potentially dangerous chemicals used multiple times a day on our skin. A chemical called Triclosan, which has disturbing alleged affects on the human body and environment, is the most commonly used. As Triclosan is an antibacterial additive, the soaps created are neither environmentally friendly or healthy. We decided to create a soap that is healthy and environmentally friendly, while possessing antibacterial properties without the use of triclosan. To allow our soaps to have antibacterial properties we used to different essential oils, lemongrass and lavender oil, both proven to be among the top ten antibacterial essential oils. Three soaps were created and tested against the bacteria taken from keyboard keys.</p>



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		One soap contained no essential oil, another contained lemongrass oil and the last contained lavender oil.
159	How the Density of Clear Fluids Affect Their Refractivity	In short, we (Andrew Jiang and Kusha Sareen) will be examining how the density of a clear liquid affects their refractivity. We will also be showing how the results can have applicable uses, and whether or not there are patterns in the result of these tests.
160	Be Your Own Kind of Beautiful: Investigating Beauty with the Golden Ratio	Over 11 billion dollars were spent on cosmetic procedures alone in the United States in 2013. Face lifts, Botox injections, breast augmentations and many other procedures were performed for solely aesthetic reasons: to improve upon one's beauty. The purpose of this experiment was to determine if what humans perceive to be beautiful or attractive can be defined by the Golden Ratio, a specific ratio that can be found in many objects deemed beautiful throughout nature and history. A survey was presented to the test subjects asking them to choose from a variety of models which ones they believe to be the most attractive. It was found that, more often than not, the models that fit the Golden Ratio were selected most often. This information is useful to plastic surgeons; if they abide by the golden ratio they may have a greater number of satisfied patients. Advertisers may want to digitally enhance models to obey the Golden Ratio in hopes of selling more product. The final conclusion was drawn that the human eye finds the Golden Ratio attractive due to the fact that it is the easiest ratio for the brain to interpret. What this does not take into account is what one may consider to be true beauty - the consideration of one's personality, nature and actions. This is why I titled my project "Be Your Own Kind of Beautiful," because even though the Golden Ratio describes physical beauty, there are many more aspects to beauty than just appearance.
161	Chemicals in windshield	Our project is about the numerous chemicals used in windshields, the effects they have on the environment and finding an alternative way to make windshields that clean just as good.