

## Welcome to the 2026 Peterborough Regional Science Fair!

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In this document you will find information on our participants and their projects, including project titles and summaries. We invite you to experience the incredible creativity and dedication these students have brought to their work at our **Public Viewing on Wednesday, April 8, 2026**, from 11:30am-2:00pm at Trent University (Science Complex, Environmental Sciences, and Chemical Science Buildings).

Note: Items in this document are clickable! Click on the division and category below to read about projects under that heading. To return to this page, click on 'Welcome' on the bottom right of each page.

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## Primary (grades K-3): General Science

*A project summary is not required for participants in the primary category.*

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<b>Oil &amp; Water : Why can't they just get along</b>	1101 - Primary (K-Grade 3) - General Science
By: Elsie Boshart and Chelsea Fintelman	
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<b>Hidden Energy in Food</b>	1102 - Primary (K-Grade 3) - General Science
By: Kennedy Cole	
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<b>Sweet Science: A hummingbird experiment</b>	1103 - Primary (K-Grade 3) - General Science
By: Kalea Curry	
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<b>Testing counteracting forces with a magnetic train</b>	1104 - Primary (K-Grade 3) - General Science
By: Oliver Feldman Reyes	
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<b>How do clouds float?</b>	1105 - Primary (K-Grade 3) - General Science
By: Ruby Francis	
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<b>Liquid Lightning</b>	1106 - Primary (K-Grade 3) - General Science
By: Lucas Friesen	
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<b>Beyblades and Friction</b>	1107 - Primary (K-Grade 3) - General Science
By: Galvin Gagliardi-Stabler	
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<b>Light It Up!</b>	1108 - Primary (K-Grade 3) - General Science
By: Abigail Harnden	
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<b>Screen Time vs. Nature Time</b>	1109 - Primary (K-Grade 3) - General Science
By: Naomi Hartshorn	

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<b>Zombie-ant Fungus</b>	1110 - Primary (K-Grade 3) - General Science
By: Phia Higdon	
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<b>Earth's Rotation</b>	1111 - Primary (K-Grade 3) - General Science
By: Audrey mclean	
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<b>The Great Eggsperiment</b>	1112 - Primary (K-Grade 3) - General Science
By: Oliver Mertick	
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<b>Dirty to clean: Can I Clean water like a real water plant?</b>	1113 - Primary (K-Grade 3) - General Science
By: Iyanuoluwa (Iyanu) Omolola	
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<b>Weather &amp; Maple Syrup</b>	1114 - Primary (K-Grade 3) - General Science
By: Abigail Parker	
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<b>Whose nose knows best?</b>	1115 - Primary (K-Grade 3) - General Science
By: Norah Phillips	
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<b>Leg-cellent!</b>	1116 - Primary (K-Grade 3) - General Science
By: Addison Pieper	
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<b>Hydraulic Lift</b>	1117 - Primary (K-Grade 3) - General Science
By: Nitvik Rajeshkumar Indumathy	
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<b>Bubble Juggle</b>	1118 - Primary (K-Grade 3) - General Science
By: Parker Risko	
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<b>Brain, Blood and Bones</b>	1119 - Primary (K-Grade 3) - General Science
By: Diana Tobin	

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1120 - Primary (K-Grade 3) - General Science

### **The Big Bubble**

By: Renley Waddell

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1121 - Primary (K-Grade 3) - General Science

### **Pop! Pop! Pop!**

By: Brighton Wood

## **Elementary (grades 4-6): Biological Science**

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2201 - Elementary (Grades 4-6) - Biological Science

### **Milk or Plastic?**

By: Nash Avery and Fisher Boire

*Using milk fat to make plastic*

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2202 - Elementary (Grades 4-6) - Biological Science

### **which substances preserve apples the best**

By: Elliot Bierk and Dale Reader

*Our science fair topic is about which substance preserves apples the best. It's the worst when we have brown apples in our lunch so we wanted to find a way to preserve them. The substances that we put to the test are vinegar, lemon juice, plastic wrap, honey water, regular tap water, and one apple with nothing on it. Our hypothesis is that either vinegar or lemon juice will work well to preserve the apple because both lemon juice and vinegar are very acidic and from our experience acidic substances work well to keep things from spoiling. For our experiment we took six half apples and distributed the substances equally all over the open face of the half apple. Next we put the half apples in identical plastic containers and left them immersed overnight. We will rate the apples on a scale from one to five, with one being not brown and five being extremely brown. After we conducted the experiment we discovered that our hypothesis was partially correct. We were right about the lemon juice working the best but the vinegar actually worked the worst out of all the substances. During this process we have learned that vinegar makes the apple spoil faster than just leaving the apple out with nothing on it. We also learned that the best substance to use if we need to leave apples out is lemon juice because the lemon juice won't affect the taste of the apples or cause the apples to spoil.*

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2203 - Elementary (Grades 4-6) - Biological Science

### **Eye Colour Genetics**

By: Clara Boshart

*This project is on eye colour genetics. It is a study project, since experimenting with genes and DNA require special equipment and extensive knowledge. Since genetics is a complicated topic, this project explains it in one of the most simplest ways, Mendelian or classic genetics. While it is pretty accurate, Mendelian genetics cannot ensure completely correct results and this project tells this so that observers are not misled. This project also explains the role of HERCL and OCA2, the two main genes controlling*

[Welcome](#)

*eye colour. Eye Colour Genetics includes fun facts about eye colour too! After researching Mendelian genetics and dominant and recessive alleles, I made an eye colour family tree to demonstrate not only classic genetics but that you can't always predict eye colour using classic genetics. Eye Colour Genetics also includes a reference so you can research eye colour genetics a bit more.*

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2204 - Elementary (Grades 4-6) - Biological Science

### **nature vs. chemicals: how long does our food really last**

By: Ana Bourricaudy and Avery Maret

*Me and my partner Avery have decided to compare organic to non-organic (strawberries and bananas) and see which rots fastest. What we've done is taken organic and non-organic strawberries, we cut one strawberry in half and left the other one full, and we left them out for a week and took daily pictures to observe rotting. We also got organic and non-organic bananas. We cut a banana in half, peeled one half and left the peel on the other half for both the. Then we left them out for a week and took a picture every day, similar to the strawberries procedure.*

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2205 - Elementary (Grades 4-6) - Biological Science

### **What Household Substances Best Prevents Apples from Browning**

By: Caelyn Bradley and Brooklynn Sikma

*We wanted to take apple slices and place them in common household substances to see what would slow the browning process of the apple. We used ice water, salt water, vinegar and lemon juice. We soaked the apple slices in the substances to for 15 mins. We then removed them and observed any changes over a period of 2hours. We documented changes every 20 mins.*

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2206 - Elementary (Grades 4-6) - Biological Science

### **A Bite of Bacteria (What restaurant has the most bacteria)**

By: Thea Chambers and Whitney Mackay

*We love fast food and we always wonder which fast food restaurant has the most bacteria. So, when we heard about the science fair, we knew this is what we'd do it on. We drive to the restaurant of our choice, for example I will use McDonalds. We go in the door then begin our project. Our materials we are using inside the building are cotton swabs and petri dishes (with agar agar). We take out our cotton swabs. We swab EVERYWHERE like counters, door knobs, tables, and floors. Once we are done we put the cotton swabs in a plastic bag and drive home. We swab twice a day at the same restaurant, just in case they clean the place in the morning. Another reason we are swabbing twice is that there are more people in the afternoon and evening than in the morning. Therefore more germs/bacteria. When we get inside the house, we lay out the cotton swabs and begin. We have bought petri dishes with premade agar agar. We dab the cotton swab onto the agar agar inside the dish. After we have done that, we wait for the bacteria to grow after about two weeks. When those weeks are done and the bacteria has grown we look at the colonies of bacteria and that tells us what fast food restaurant has the most bacteria. Stay tuned for the fascinating results.*

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2207 - Elementary (Grades 4-6) - Biological Science

### **Pollution vs. Plants**

By: Max Chard and Ian Narduzzi

*In this experiment, we wanted to see the effects of pollution on plants. The main focus of our project is how plants react to polluted water compared to plants grown with clean water. We set up two aquariums where they can get sunlight. Then we proceeded to water and measure them once every week and take pictures every two days and record observations daily. We started this project on February eighth and will be finished on March eighth. This project will inform people about pollution and the effects in a more detailed way so that they can understand what happens to the plants. We started by asking our question: What is the impact of pollution on plants and the food chain? Our hypothesis is that while the clean water will make the first two plants thrive and grow healthy, the polluted water will make the second pair of plants die quicker. We researched how to make a polluted solution which we watered two plants with every week. We got everything all set-up and observed closely to see if our hypothesis was correct.*

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2208 - Elementary (Grades 4-6) - Biological Science

### **Your Favourite Foods vs Yucky Mold**

By: Samarpan Cheema

*My project is about how mold grows on different foods under different conditions. It is interesting to see how sometimes different foods gets mold the next day after purchasing and others stay fresh longer. Cheese, white bread, muffin, broccoli and orange were placed in separate bags and were placed in 3 separate location to have different environments. The observations were recorded for the 10 days for any mold or dark spots. My hypothesis is that the foods left on the kitchen counter will grow mold faster than other places because of being exposed to open air and cheese will grow mold faster due to the presence of bacteria. The foods placed is under the sink got mold faster due the higher temperature from dishwasher usage making the trapped air grow mold faster. Cheese was the first food to get mold. The foods placed left on the kitchen counter were next ones to grow mold. Due to less time no mold was observed on the food items left in the fridge.*

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2209 - Elementary (Grades 4-6) - Biological Science

### **Can you extra DNA fm fruit with household items?**

By: Jedidiah Copeland

*My topic was focused on DNA and how to extract it from fruits. I chose this topic because I thought it would be interesting to see how it would work with different fruits. My hypothesis was that other fruits like blackberries and raspberries would work the same way as strawberries. I started the experiment by crushing up strawberries and then mixing together a DNA extraction substance made of salt, dish soap and water and poured that into the bag with the crushed strawberries. I then poured the full mixture into a cup through a coffee filter and added rubbing alcohol. This revealed the DNA which could be extracted with a stick and coffee filter. This experiment worked again with blackberries and blueberries. I tried the same experiment with kiwis, I hypothesised that it would work the same as strawberries because I looked it up but unfortunately the experiment did not work with kiwis. My hypothesis for this is that the kiwi was too big or maybe because it was not ripe enough. I was able to extract DNA from a strawberry and a blueberry but not blackberries or a kiwi which was different than my hypothesis. The most surprising thing*

*about the experiment was that the kiwi experiment did not work the way I hypothesized. Through this project I learned that DNA could be extracted from fruit which I did not know before. I also learned that in science it is not all about being right and that sometimes your hypothesis will be wrong.*

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2210 - Elementary (Grades 4-6) - Biological Science

### **DNA and Fingerprint**

By: Isla Corvers and Eloise Finlay

*Fingerprints are influenced by both our genes (DNA) and our environments before birth. DNA plays an important role in forming fingerprint patterns with different proteins helping build the wave-like ridges and patterns on our skin. Before birth, temporary structures called volar pads develop on a fetus's fingertips with its size, shape, and positioning of these pads being determined by DNA. These volar pads decide whether a person's fingerprints form whorls, loops, or arches which are the three main fingerprint patterns inherited from parents. Fingerprints are also influenced by the environment the baby lives in before being born. The way ridges split and end on a fingerprint develops randomly as the fingers grow. Conditions such as the amount of fluid inside the mother's belly, the mom's blood pressure and oxygen levels, and the position of the baby can all affect fingerprint formation. These small differences in the environment causes siblings and identical twins who share the same DNA to have unique fingerprints. This experiment explores the question: If siblings share DNA from the same parents, will their fingerprints match? The hypothesis states that biological sibling's fingerprints will be similar because they share the same parents but will not match exactly. To test this hypothesis, fingerprints were collected from siblings, family members, and friends using either an ink pad or pencil-and-tape method. The prints were then examined with a magnifying glass to identify patterns and compare similarities between siblings.*

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2211 - Elementary (Grades 4-6) - Biological Science

### **Eggs, why you Stickin'?**

By: Jayna Denhoed

*My science project is about eggs, and how they stick to frying pans and other kitchen utensils. I learned that eggs have protein in the egg white, and that is what makes them sticky. I also learned that eggs were used back in medieval times to make glue. When I learned that eggs were used as glue in medieval times, I wanted to test it out with cardboard and paper. My project shows the results of my experiment of creating glue with eggs, and what I learned about why eggs stick to materials.*

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2212 - Elementary (Grades 4-6) - Biological Science

### **Plants Vs. Soil**

By: Cairo Edmund and Logan Demara

*Are topic is a study of how can different soil affect plant growth. We chose this topic because we wanted to see what soil benefits plants the most. Are hypothesis was that all the soils would grow the plants the same because they are getting the same amount of water and light. For the experiment, we filled three different potting cups with the different soils Sand based soil, Orchid bark, and Potting soil. We planted three seeds in each pot then waterd and monitored over the next three weeks. Each plant was waterd in between 8:00 am and 9:30 am every day starting the second week of January. During the experiment we saw that the plants in the Sand based soil where the fastest to sprout but the plants in the Orchid bark never broke the surface. Overall are hypothesis was wrong as the Sand based soil did the best by far and the Orchid bark did the worst not sprouting at all as it was way too dry.*

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2213 - Elementary (Grades 4-6) - Biological Science

### **Bendy Bones**

By: Norah Fintelman and Geneva Boshart

*We tested bones in five different liquids to test what liquid the bones would be strongest in over time and what liquid bones would weaken in over time.*

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2214 - Elementary (Grades 4-6) - Biological Science

### **What Water Works Best?**

By: Clara Fraser

*I tested how different types of water affect plant growth and health. My mom and I really like to garden, so I wondered how important the type of water we use is. We usually collect rainwater, but when it's dry, we use water from our well, which has minerals in it. When I lived in the city, we used city water, which has chlorine in it. For indoor plants we use water that has salt from the water softener in it. I wanted to see if these types of water had an impact on the plants. I think that plants watered with only rainwater will grow the tallest, fastest, and be the healthiest since rainwater is what plants use naturally to grow. I used water test strips to compare the different types of water. I grew yellow bean plants and watered them with the different types of water. I measured the plant height, calculated the growth rate, and compared the colour of the leaves to see which plants were healthier. All the plants grew well and were healthy, but some grew faster than others and there were slight differences in the leaf colour. I learned that reverse osmosis (control) and distilled water were not the best choice for watering plants! Well water helped the plants grow quickly and rainwater produced the darkest green leaves.*

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2215 - Elementary (Grades 4-6) - Biological Science

### **Tree-mendous Growth**

By: Leah Friesen and Naomi VanBerkel

*We studied what would help trees succeed in growing or what would slow their growth. Our question was "How does temperature and precipitation affect each tree species' growth in Peterborough?" Our hypothesis was that each tree species grows better in its own unique temperature and precipitation conditions. The way people treat the ecosystem, as well as diseases, can also change the way trees grow. We researched each tree species, including details like how old each tree gets, what the climate is like and what affects their growth each year. Then we researched the precipitation and temperature records for Peterborough and took the data and moved it into graphs. We then compared the size of the tree rings with the data we found about precipitation and temperature in Peterborough to find which tree species preferred which conditions. We found that even though all the trees grew in the same climate, some grew better depending on the conditions of that year. Different varieties grow at different rates, and both temperature and precipitation can affect how much a tree grows. We also researched diseases that trees can get. The way people treat the ecosystem is also changing the way trees grow. We found that the clear cutting that a lot of people are doing is making trees and nature die more because trees are an important part of any ecosystem. Trees clean the air for us and give us oxygen - actually a single tree can provide enough oxygen for 4 people a day.*

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2216 - Elementary (Grades 4-6) - Biological Science

### **Are Short-Form Videos Bad for Your Brain?**

By: Owen Gooderham and Kingsley Sager

*There's a lot of commotion about brain rot these days. We wanted to test if watching short-form videos (otherwise known as brain rot) would have a negative impact on brain function as measured by test scores. We made up a test for our Grade 5 class that included memory tasks and IQ type questions. We gave our friends the test, and the next day, we divided the class into 2 groups. One half of the class watched short-form videos before taking the test again, and the other half did a quiet colouring task before the test again. We graphed students' before-and-after scores as well as their test times, and investigated the difference in group scores for evidence that short-form videos have a negative impact on brain function.*

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2217 - Elementary (Grades 4-6) - Biological Science

### **On the Move**

By: Madeline Haan

*I wanted to know if a horse could run faster than a car, I thought that it could. I looked online and watched videos and also looked in books. I looked up how fast 4 different types of horses ( Clydesdale, Belgium, Przewalski and Quarter) could run and I looked up the maximum speed of 4 different types of cars (Toyota Matrix, Honda Pilot, Ford Mustang and Formula 1). I learnt that a horse can not run faster than a car. I learnt that a horse moves its body four ways, it can walk, trot, canter and run. A horse can't run faster than a car but it can run very fast to get away from predators. When a foal is born it can stand within 15 - 40 min and it can gallop on its first day, galloping is the fastest a horse can go. I did this project because I love horses and wanted to learn more about them and how they move. In the end my hypothesis was wrong but if you research the original car, a Ford model T, the fastest it could go was 70km/h but its "happy" speed was 56km/h. That means the Przewalski and Quarter horse could go faster!*

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2218 - Elementary (Grades 4-6) - Biological Science

### **Can Viruses Save Lives?!**

By: Hope Haggarty and Robbie Wade

*Our project is on bacteriophage (phage) which are non harmful viruses all around us that can kill bacteria. They may help to fight bacterial infections in people and animals some day instead of antibiotics. In our experiment we tried to see if t4 phage would effectively kill E. coli bacteria (a non harmful type provided by a lab).*

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2219 - Elementary (Grades 4-6) - Biological Science

### **Fire Tornadoes**

By: Felix Harber

*I have always been interest in weather and storms in particular. A couple years ago, I found out about firestorms, which can create fire tornadoes. While recreating a fire tornado at home is impossible, I can (with adult supervision and proper safety equipment) create a small fire whirl to observe how rotating fire behaves. I plan to do two similar experiments. In one, I will create a fire whirl inside a solid cylinder and then pull apart the 2 halves. This will demonstrate how wind from opposite directions creates and effects*

rotating fire. The second experiment will be creating a fire whirl on a spinning plate inside a wire mesh cylinder. I will compare different mesh sizes into order to better understand how different densities in the forest affect fire whirls and fire tornadoes. While I have not yet preformed the experiments, I have done lots of background research. Some interesting things that I've learned include the differences between a fire whirl and a fire tornado. A fire tornado is more than just rotating flame - it is an actual tornado just like a regular supercell produces, but instead of wind and rain, it is made of wind and fire. I also learned that firestorms last much much longer than regular thunderstorms because while a regular storm has rain to put itself out, the wildfire that caused the firestorm in the first place evaporates the rain before it reaches the fire, creating more hot moist air instead of less. This project still in progress. Complete results and conclusions will be presented on fair day.

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2220 - Elementary (Grades 4-6) - Biological Science

### **Un Gout De...Rien?**

By: Jane Hur and Carmen Gray

Avez-vous entendu de l'astuce qui promet de ne plus jamais ressentir le goût dégoûtant des médicaments dans la gorge? Si non, certaines personnes disent que si vous pincez le nez, et ferme les yeux, vous ne sentirez plus le goût. Dans ce projet, nous voulions savoir si l'odeur et ce qu'on voit, vraiment affecte ce qu'on goûte. Notre hypothèse est que si le sujet testé se pince le nez et a les yeux bandés, il ne sera pas en mesure de goûter la saveur de la même manière que s'il peut voire et ne pince pas son nez. Pour ce projet, on va utiliser du sucre, d'acide citrique, et du sel. On va donner un aliment et puis demander quelle aliment il pense que c'est. Après ça, on refait la même chose mais avec leurs yeux bander. La dernière étape est de répéter, mais demander aux sujet testés de pincer leur nez, goûter l'aliment et de nous dire quelle aliment il pense que c'est. Puis, on va comparer leurs réponses. Nous partagerons nos résultats avec vous le jour de la foire.

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2221 - Elementary (Grades 4-6) - Biological Science

### **Why Does it Hurt So Much to Stand on Lego?**

By: Sam Johnson

This is a project looking at why it hurts so much to stand on lego. I have researched what lego is made of, and the nerves in the bottom on the foot. My hypothesis is that stepping on smaller pieces hurts more than stepping on bigger pieces because they put more pressure into a smaller area of the foot. I am testing this hypothesis by getting people to stand on different sizes of lego pieces and rating their pain on a 0-10 scale.

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2222 - Elementary (Grades 4-6) - Biological Science

### **Farming on an Alien World**

By: Naomi Lennie

My project is about a recently discovered exoplanet called Trappist 1e, which is 41 light years away from Earth. I chose this because I want to know if there's another planet that could host life. So, I decided to test that by seeing how plants would grow there, because we need food to live. Two of the Trappist solar system's key features are the star is a red dwarf, and gives off infrared light and planet 1e is tidally locked. That means one side of the planet is always facing the star. Then, there is the other side, the one facing away. In between is a small strip always at sunset. To test how plants would grow, I planted beans, peas and sunflowers with four different types of lighting: - Infrared lights above the plants for noon; - Infrared

[Welcome](#)

*lights at a sideways angle for twilight; - Under a completely dark box for night; - And under a grow light for Earth. My hypothesis was that the noon plants would grow quickly, then wither. Twilight plants would grow slower than noon, but would not wither, dark would not germinate, and Earth plants would grow normally. I checked on them regularly, watering and measuring the heights of each plant for three weeks. Results are still being analyzed, and will be ready by the fair.*

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2223 - Elementary (Grades 4-6) - Biological Science

### **A Sticky Maple Tree Investigation**

By: Taylor McDannold and Nina Moloney

*This project is about learning how maple trees make sap and how that sap turns into maple syrup. We are studying three main questions: Does temperature affect how much sap a tree makes? Do different trees make different amounts of sap? And how much sap is needed to make syrup? We will tap maple trees and collect sap each day. We will measure how much sap we get and record the temperature. Then, with an adult's help, we will boil the sap to make syrup and see how much syrup we end up with. This project helps us understand how weather and tree size affect sap production and shows how maple syrup is made from nature. It also helps people know the best time to collect sap and how to take care of trees.*

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2224 - Elementary (Grades 4-6) - Biological Science

### **Theories Behind the Extinction of Dinosaurs**

By: Sophia McDavid

*My research project is about what happened to the dinosaurs before and after they became extinct. I have created two dioramas to show the big changes on Earth during this time. The first diorama shows dinosaurs before their extinction. I have included different kinds of dinosaurs, plants, and a bright, healthy environment. This represents a time when dinosaurs were the dominant animals on land, and the planet was full of life. The second diorama shows the world after the extinction event. In this scene, the sky is darker, there are fewer plants, and no living dinosaurs are left. I added details like ash, rocks, and a damaged landscape to show how an asteroid and volcanic activity may have caused fires, darkness, and cooler temperatures. My project shows how one major event can completely change life on Earth. By comparing the two dioramas, people can see how the environment, animals, and plants were different before and after the extinction. This helps us understand how fragile life can be and why it is important to protect our planet and the animals living on it today.*

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2225 - Elementary (Grades 4-6) - Biological Science

### **Covid-19 Vaccines and Why Health Matters**

By: Lydia McIntyre and Liliana Albedi

*Our project topic is health care through the covid vaccines! COVID changed everyone's lives forever. Scientists needed a quick and fast solution so they came up with the COVID vaccine. We think this is an important topic since people want to know what goes into their body. We also chose this topic because some people don't always trust vaccines. We think that it would be good for people to know what information is true or false. We hypothesize that it is valuable for people to have good knowledge about COVID vaccinations and to know why they are important. Here are some things we will talk about during our presentation. For example we will talk about the ingredients in a COVID vaccine, the most common COVID vaccines and clinical trial dates. Our presentation will also include a model of a vaccine and a*

corona virus. We are aiming for a well-rounded presentation about health care through the COVID vaccine. We hope you enjoy our presentation!

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2226 - Elementary (Grades 4-6) - Biological Science

### **Sweet Tooth**

By: Jade McNeven

*The purpose of this experiment is to test how eating candy affects your teeth, after 1 day, 1 week and 1 month. I am planning to place egg shells in dissolved candy solutions, to test different types of candy (gummies, chocolate, chewy and sour) to see which type of candy is the most damaging to tooth enamel. I also want to test the healthy version of each type of candy to see if they are less damaging than the original high sugar candy. I will also observe if brushing your teeth protects them from the harmful effects of sugar, by placing two different eggs in each candy solution and only brushing one of them.*

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2227 - Elementary (Grades 4-6) - Biological Science

### **Mold Manor**

By: Rowan Murdock and Roberto Escalera

*In this project we will be talking about why mold grows differently in different conditions. You might have seen mold growing on your bathroom and basement but it is most common on stumps, stones and food. It can grow in any biological condition and damp places. The reason we chose this subject is because we were curious about mold growing on food. For this project we put a variety of different breads in plastic bags. We started with Dempsters and Wonderbread whole wheat and white bread, and Dimpflmeier Pumpernickel Rye. We added water to some of the bread bags to make a good environment for mold growth. After reading about the preservatives added to these store bought breads that inhibit mold growth we added two bread conditions from a bakery (white and multigrain). Our hypothesis was that the homemade white bread would mold faster because it has more sugar and no preservatives which makes it more vulnerable to mold and bacteria. We had 12 bread slice conditions and found that the bakery breads, rye bread with water added and the white Wonderbread molded fastest and had the most mold. We learned about the preservatives that are added to some breads to prevent mold. The breads without preservatives developed more mold. We learned that mold can grow anywhere as long as it has an organic surface. Bread is a good material for mold growth.*

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2228 - Elementary (Grades 4-6) - Biological Science

### **Underground Urban Environments: Can mycorrhizal fungae survive above-ground habitat destruction?**

By: Sage Newland

*My project will see if mycorrhizal fungi can not only survive, but also nourish soil, without a plant partner. This could be crucial information for understanding the effects of habitat destruction because there is just so much mycorrhizae. My project will compare two trays of soil: one with microgreens and arbuscular mycorrhizae fungus and one with only arbuscular mycorrhizae fungus. I will then observe visually and measure weight to compare the resulting mycorrhizal growth in each tray. This project will replicate habitat destruction similar to that in an urban environment to find out what is truly happening to species underground.*

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2229 - Elementary (Grades 4-6) - Biological Science

### **Impact of liquids on plant growth**

By: Molly Nicholson

*Our topic is how different liquids affect plant growth. The liquids we picked are Sunny D orange juice, 7-up, black coffee and tap water. We chose this topic because we like plants and it's very interesting to see that there is a better way to give your plants nutrients. Our hypothesis is that the sugar from the Sunny D would help it grow. We also think that the carbonation and sugar in the 7-up would also help it grow faster. We think the coffee will take the longest to grow faster and healthier. We did the experiment by taking four plants with the same amount of soil and depth of the seeds and measuring 1 cup for each liquid and we pour them on the plants every three days. They are all in the same window. Our project is still in progress, complete results and conclusions to be presented on fair day. Right now our plants have not started growing but the coffee took the longest to absorb into the soil. The 7-up and Sunny D took about the same amount of time the water absorbed almost immediately after we poured it in. We picked basil for the plant because it's not hard to grow but not easy to grow either and it tastes really bad. We wanted to do the science fair because we like learning and experimenting.*

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2230 - Elementary (Grades 4-6) - Biological Science

### **Pearls**

By: Lydia Parker

*My project is about how oysters make pearls. It also talks about how there are different species of mollusks and how pearls come in many different shapes and colours. My project talks about why oysters make pearls and how water, environment, and the species of mollusk affects the colour of the pearl.*

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2231 - Elementary (Grades 4-6) - Biological Science

### **You've got to be kidney me.**

By: Olive Smith

*My project is about kidneys and how they work. I'm going to demonstrate how they work properly and what happens when kidneys get sick or stop working altogether. Why do we have kidneys? They clean your blood, balance your water and chemicals. They help your body work properly. A healthy kidney works to filter all the waste from your blood keeping your organs clean and healthy. A sick kidney still works but not well, making the person feel sick. A severely damaged kidney is not able to filter the blood at all; this means that it leaves the person at risk of needing dialysis or a kidney transplant to survive. My project is a demonstration to show how kidneys filter blood and waste. I get a jar and coffee filter. I place the coffee filter on top of the jar and then I get my mixture of blood needing to be cleaned by the kidneys. I pour all of it in then it demonstrates how a kidney filters by letting yellow urine go through but doesn't let the rocks and glitter go through at all. That is a healthy kidney. My version of a sick kidney allows some of the waste in the blood to filter through. My version of a severely damaged kidney does not filter anything at all, leaving the blood in the body full of waste products and making the person very sick.*

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2232 - Elementary (Grades 4-6) - Biological Science

### **FUTURE FOOD - FLY LARVAE**

By: Quinn Steuart

*My topic is about chickens and the type of food they eat. My experiment is feeding Soldier Fly Larvae to chickens and seeing differences in the eggs: if there's more of this less or if they're heavier or lighter. The reason I chose this project or experiment is because I have an outdoor flock of chickens and my mom brought up the topic of the soldier flies and I thought it would be interesting to see if anything changed. My hypothesis is that the egg production will go up - so far the experiment has indicated that will be true, but I will show my final results at the fair. I believe since they have more calcium and protein that they'll be able to lay more eggs. So how we did the experiment was we first had our control, (week one) which was just our normal grain. Then we added 5% of larva in (week two) and then we added 10% and that is the week we're on now. (week three) Occasionally we would add some kitchen scraps because we still need to get rid of that somehow and we're on a farm so we give the kitchen scraps to the chickens. So what happened in our experiment was that we have seen an increase in eggs and a slight decrease in weight so far. I learned from this project that farming fields like wheat and grains is inefficient. The greenhouse gases emitted from the farming equipment are high and also cause soil erosion. I am exploring new alternatives to feeding chickens that are healthier for the land and soil and also the chickens.*

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2233 - Elementary (Grades 4-6) - Biological Science

### **What will our future be humans or robots?**

By: Ella Stewart and Carmella bulatovic

*We (Carmella, and Ella), wanted to see the effect of Artificial Intelligence (AI) on people, so when we found out about this project, we knew we had the perfect idea. In the experiment, Ella is going to be handing out surveys to people in different age groups, gathering information, and then presenting the data found. Carmella will be giving them a quick test, with questions that have two answers, one That is the correct answer and one made by Artificial Intelligence (AI) Carmella will be trying to find out roughly how many people are using Artificial Intelligence (AI) and write the results after seeing how many people trust the Artificial Intelligence (AI) and answer or the correct one. After we gather this information, we will compare and see how many people disliked Artificial Intelligence (AI), how many people like Artificial Intelligence (AI), and roughly how many people trust Artificial Intelligence (AI).*

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2234 - Elementary (Grades 4-6) - Biological Science

### **Cut Flower Survival in Different Solutions**

By: Audrey Thomas

*My science project is testing to see in which solution cut flowers stay fresh the longest. I picked this idea because my mom has a garden and I wanted to know which solution would keep my mom's cut flowers fresh for longer. My hypothesis was that the flower with the lemon juice solution will do the best and that the flower with the salt solution will do the worst. I guessed that because lemon juice is natural like a flower and I think salt would be too salty for the plant. To start, I cut flowers to 30 cm. Then I poured one cup of 25oC water into nine jars and a teaspoon of each substance into the jars. I added the flowers one by one into the jars. I also labeled the jars to tell the substances apart. I kept track of what happened to each flower every day for a week to see what happened. The substances were: pennies, salt, bleach, red food colouring, lemon juice, vinegar, sugar, water and tea. The flower I decided to use is white carnations*

[Welcome](#)

*because it is white so I could really see if the colour changed on any of them. I started to see that the petals on some of the flowers were getting brown and crumpling up. I also noticed that some of the stems on the flowers had bent over. Overall, the three best solutions were: bleach, pennies and lemon juice and the worst solution was tea.*

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2235 - Elementary (Grades 4-6) - Biological Science

### **Extracting DNA From Strawberries**

By: Alexa Truong

*My project investigates life inside DNA by extracting different DNA using types of dish soap to do so. I chose this topic so I can educate others and myself about DNA and the interesting of it. My hypothesis stated that I thought Dawn dish soap would do the best because of its soft and gentle formula and Dawn's ability to remove stains really well. To test this, I started off by mixing the extracting liquid that contains salt, water and dish soap. Then crushed strawberries and added the extracting liquid. Straining was the next step and one of the most important. Finally rubbing alcohol was poured down the side so it would not mix in the juice. Scooping up the DNA was the last step. The results showed that Dawn did the best because of a compound called surfactants. Dawn contains more surfactants than any of the other dish soaps that were tested. In the future, I would weigh the strawberries for an extra precise experiment. This is an experiment that I will certainly try again.*

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2236 - Elementary (Grades 4-6) - Biological Science

### **Are door handles really dirty?**

By: Lily Young and Jada Khan

*Are the door handles really dirty? For our project, we decided to test the different door handles around our school to see which ones grow the most bacteria. We were curious about which areas of the school are actually the dirtiest. We are testing the doors of 4 different rooms in our school including the main office, and the staff room door. We wanted a mix of places where students go and places where mostly adults go. Our hypothesis is that the staff room door handle will have the most amount of bacteria in the Petri dishes. We think this because the staff room is a very busy place where many different staff members are going in and out all day. Since so many different hands are touching that one handle, we predict it will have the most bacteria. To do our experiment, we have a specific procedure. First, we take sterile swabs, which look like Q-tips, and we rub them all over the door handle to pick up any tiny germs that are there. Next, we wipe the swab into a Petri dish that has agar in it, which is like food for bacteria. We have to be very careful not to touch the swab with our fingers so we don't mess up the results. Finally, we are going to leave all the dishes in a warm spot for a few days to see what grows. We are making sure to observe them every day to see which room is the winner of being the dirtiest.*

## **Elementary (grades 4-6): Physical Science**

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2301 - Elementary (Grades 4-6) - Physical Science

### **Water Filtration**

By: Kaitlin Aiello

*Clean drinking water is important in the world. Something North America takes for granted. There are a lot of countries in the world that don't have access to clean drinking water that can lead to sickness, disease,*

[Welcome](#)

*and sometimes even death. I decided to do my project on water filtration because I'd like to show the importance of clean drinking water, as well as being able to see if your water is safe to drink. In this project, there were a variety of things learned such as: the safety of water at home, to things like if you were lost and needed a source of water and the natural resources you could use to filter the water. While making this project, I used six main materials; a variety stones, gravel, sand, cotton wool, charcoal, and dirt. Each have a different job, the rocks, gravel, and stones help filter out the bigger impurities. As for the charcoal, it takes away the impurities and bacteria that you can't see as they stick to the charcoal's surface. Sand, takes out the tiny impurities. Cotton, keeps the materials together, and helps act as a final filtration layer to trap left over sediments resulting in cleaner water.*

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2302 - Elementary (Grades 4-6) - Physical Science

### **The SnowMelt Bucket: A Simple Canadian Innovation for Winter Water Conservation**

By: Sophia Isabelle Balajadia and Samantha Vignarajah

*What if a simple bucket of snow could help save water and money across Canada? Our project, the SnowMelt Bucket, explores a creative way to reuse something we already have plenty of in winter—snow! Instead of treating snow as waste, we designed a special aluminum bucket that sits safely on top of a household heater vent. The project is based on a basic scientific concept: Snow + Heat = Water. The warm air from the vent melts the snow into water, which can then be reused for flushing toilets. Why flushing? Because toilets use about 30% of household water. That means almost one-third of the water in a home literally goes down the drain! If families used melted snow for flushing during the winter months, they could reduce tap water use and lower their water bills. We used aluminum for our bucket because it transfers heat well, is lightweight, and is affordable. The bottom is shaped to fit over a vent and includes a stand so it doesn't block airflow. This allows the house to stay warm while the snow melts efficiently. Based on research, an average household in Ontario could spend about \$42 per month just on toilet flushing. If many homes used this idea, the savings could add up to millions of dollars and millions of cubic meters of water saved every month. Although the bucket's size and melting speed limit how much water can be collected, using a larger storage container could improve the results. The SnowMelt Bucket shows that even a small idea—like melting snow—can have huge economic and environmental benefits.*

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2303 - Elementary (Grades 4-6) - Physical Science

### **Pop Perfection**

By: Callie Barraball and Jojo Clarke

*We decided to do this project because we love popcorn and we always wanted to know what the perfect time to cook our popcorn. We tested three different kinds - Orville, Act, and Skinny Pop at different times. We counted every popcorn kernel after we took it out of the microwave. By Callie & Jojo*

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2304 - Elementary (Grades 4-6) - Physical Science

### **The Whitening Toothpaste Showdown**

By: Ellie Bennett

*My project studied whitening toothpaste to see which one works the best. I chose Crest 3D, Colgate Optic White, and Sensodyne Extra White to test. I chose this project because everybody should be confident in their smile and if your teeth are stained that might cut into your confidence. My hypothesis is that Crest 3D will work the best because it has the most hydrogen peroxide and that is a chemical that can make*

*your teeth white. I started by placing 9 eggs in three different liquids that stain teeth: red wine, coffee and red Powerade. I let them sit in the liquid for just over 3 hours. I removed the eggs and dried them off. Then I brushed them with the different toothpastes for 2 minutes. All of the toothpastes worked good but overall, Crest 3D whitened the eggs the best. I learned that the more hydrogen peroxide the toothpaste had, the whiter the eggs would get. I know this because Crest 3D has the most hydrogen peroxide in it and it worked the best.*

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2305 - Elementary (Grades 4-6) - Physical Science

### **What Laundry Detergent Works Best On A Stained White T-shirt?**

By: Olivia Bush and Emma Gagne

*We investigated whether or not it matters what detergent you use, on certain stains to see if it helps get the stains out of a white t-shirt. We decided which stains we wanted to use (grape juice, coffee, worchestire sauce and ketchp) and used the same white t-shirt to keep the fabrics the same. We timed how long each stain each sat on the t-shirts to make sure it was the exact same time across all testing shirts and we tested out 4 different laundry detergents which boasted about being able to take out stains the best. We used the same washer cycle and water temperature for each t-shirt and the results were very interesting! We made sure to compare each shirt to one another noting how much of the stain was removed and how much was still there. This project helped us realize which stain remover detergent works best and why!*

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2306 - Elementary (Grades 4-6) - Physical Science

### **Paper Airplanes**

By: Ezekiel Butler

*My topic was what can change how far a paper airplane can go. I chose this topic, because I like building paper airplanes. It sounded fun. I have 2 hypotheses. My first hypothesis was that computer paper planes would always go further than construction paper planes. My second hypothesis was that the weight at the front would make the planes go further. For my experiment, I made paper airplanes with both types of papers. I tested them. I flew them a few times each and took the best distance to mark. When they hit the ground, I put tape down, marked, and measured it. I learned that the weight on the back and the weight on the front make a difference in how far my planes went. Having the weight at the back, pulls down the plane before it can glide. The weight at the front seems to give it a push forwards. This made me think of the weight on a real airplane and how they need to have a balance for a good flight.*

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2307 - Elementary (Grades 4-6) - Physical Science

### **Sky High Muffin Tops!**

By: Avila Callaghan

*What is the best technique to make those tall, bakery-style muffin-tops? I tested and compared 6 methods to see which produced the biggest muffins and which were just sad kitchen flops. I then researched the potential "why" behind the results, including the science that goes into mastering the art of baking!*

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2308 - Elementary (Grades 4-6) - Physical Science

## **Aerodynamics**

By: Wesley Clark and Declan Meiklejohn

*Our topic is about aerodynamics. We chose this topic because we are interested in the properties of flight. We had different hypotheses about our project. Wesley thought the pink plane would fly the farthest because the pink plane had a larger wingspan. Declan thought the blue plane would fly the farthest because the blue plane looks thinner and the blue one has no rips which could impact air flow. We used four different weights and colours of paper to build the same type of airplane. We found that some papers tore and were difficult to use. We then threw each plane using the same thrust. We marked where each plane landed and measured the distance each plane flew. Our hypothesis was rejected because we both thought that the lighter the plane the farther it would fly. We found out that the heavier the plane is the farther the plane flies. If we did this project again we would use different plane designs to explore other aspects of flight. Our results are important because when you are flying a plane you need aerodynamics to stay in the air and take off. Engineers also need to understand the concepts involved in aerodynamics when designing roller coasters or cars as the properties of flight (lift, thrust, drag and gravity) can impact design choices.*

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2309 - Elementary (Grades 4-6) - Physical Science

## **How Electricity Works**

By: Amelia Cranville

*My science fair project is about electricity. I picked this topic because my dad dose it for work, and I wanted to learn more about it too. I think electricity is really important and also very interesting. Electricity is important in everyday life because lots of things need it. Without electricity, your fridge would not work and your TV would not work. Lights, chargers, and other things in our homes also need electricity every day. For my project display, I am doing a lemon clock. A lemon can make a tiny bit of electricity if you use a zinc nail and a penny. This happens because of a small chemical reaction. It is cool because it shows that even something small like a lemon can help make electricity. A lemon or a potato can not power a house because it does not make enough electricity. It only makes a very tiny amount. In real life, electricity is made in bigger ways, like gas power plants, nuclear power plants, wind turbines, water power plants, solar power, and coal power plants. After electricity is made, it travels through power lines and transmission lines to get to our homes and schools. I think this project is interesting because my dad dose this kind of work. I learned that electricity is very useful and part of our lives every day.*

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2310 - Elementary (Grades 4-6) - Physical Science

## **The Frozen Ice Cube Race**

By: Shiven Dave and Orion Combrie

*In this project, we want to find out more about the thermal conductivity of different metals and how the heat transfer is affected by the type of metal used. We wanted to find out which one of our 5 metal sheets will keep the ice in solid form the longest from heat. The metal sheets we are using are brass, carbon steel, aluminum, stainless steel, and galvanized steel sheets. We will use 5 ice cubes of the same size and a metal griddle pan. Our hypothesis is that the stainless steel will keep the ice cube frozen the longest from the heat. But is that true? We can control which sheet we can use and how much heat we*

can provide, so the thermal conductivity is the same for all. Our main variable is the type of metal we use. We conducted this experiment by placing the frozen ice cube on a metal sheet preheated at 250 degree Fahrenheit. We repeated the procedure for all the metals at the same temperature and noted the time when the ice cube is fully melted. This experiment teaches us the thermal conductivity of different metals and how it is being utilized in our home for different purposes.

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2311 - Elementary (Grades 4-6) - Physical Science

### **Clean up Crew is on the Rescue!**

By: Annabelle DeBlock and Ella Drysdale

*This science project investigated which household cleaner is most effective at killing germs. To simulate a contaminated surface, a small area was rubbed with raw chicken to introduce bacteria. Several different household cleaners were then used to clean identical sections of the surface. After cleaning, samples were taken from each area and placed in petri dishes to allow any remaining bacteria to grow over a set period of time. The amount of bacterial growth was then compared between the different cleaners. The cleaner that resulted in the least bacterial growth was considered the most effective at killing germs. This experiment helps demonstrate how different cleaning products vary in their ability to remove or kill bacteria on household surfaces.*

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2312 - Elementary (Grades 4-6) - Physical Science

### **An Electromagnetic Tractor Beam**

By: Adelena Gagliardi-Stabler

*My project is inspired by the tractor beam in the television series Star Trek, the Next Generation. I will use an electromagnet to move objects in the same way that the tractor beam does in the show. I will experiment with the voltage, number of coils and distance from the objects. This experiment will explore how electricity and magnetism are related, and how and why the physical properties of a material affect how a magnet works. I will connect my results to what I see in Star Trek to predict how far the science fiction tractor beam is from our real life ability to move objects from a distance.*

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2313 - Elementary (Grades 4-6) - Physical Science

### **Homemade Batteries**

By: Isabel Harber

*My topic was homemade batteries because I thought it would be fun to make batteries as well as potentially helpful in case the power goes out. I also wanted to learn more about how electricity works. I knew that a potato would conduct electricity. My hypothesis was that carrots, apples, pears, lemons, limes, and oranges all have similar textures (hard on the outside and soft on the inside) and so would also conduct electricity. I also tested different combinations of coins to see if they conducted electricity. For my experiment, I wrapped zinc screws and copper pennies in copper wire. I put the pennies and the screws in either end of the fruits and vegetables. I connected the copper wire to a voltage meter to test the electricity. For the coins, I stacked the different coins with wet, salted paper towel squares. I then connected the voltage meter to the top and bottom to read the electricity. With the fruits and vegetables, all of them conducted different amounts of electricity. The coins mostly acted as an insulator to stop the electricity flowing, but some combinations worked. I compared the results I had to brand new batteries of different types. The batteries I made conducted some electricity but not enough to be a normal battery. Learning about electricity helped me understand electricity in any device or light bulb that uses it.*

[Welcome](#)

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2314 - Elementary (Grades 4-6) - Physical Science

### **Flour Power**

By: Layla Hipgrave

*My experiment will compare how cupcakes rise with different types of flour. I want to find out which type of flour rises the best when I bake cupcakes. I will make three different batches of cupcake mixtures using the exact same amounts of ingredients. The only difference will be the types of flour I use. One mixture will be made with all-purpose flour, one mixture will be made with whole wheat flour, and one mixture will be made with gluten-free flour. I will use a measuring cup to scoop the same amount of batter into identical muffin cups and pans. I will bake the cupcakes at the same temperature and for the same amount of time. Once they have baked, I will measure the cupcakes to see which batch is taller. If the cupcakes in a single batch have different heights, I will calculate the average height.*

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2315 - Elementary (Grades 4-6) - Physical Science

### **Inertia**

By: Clara Hutchinson

*What is INERTIA and how does it apply in our world*

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2316 - Elementary (Grades 4-6) - Physical Science

### **The power of Insulation**

By: Isabelle McLean

*In my town, a lot of people don't have homes, so they sleep in the cold. I wondered if there was a way to improve the thermal capacity (or how hot a sleeping bag stays) using materials that would be easy for people living outside to access. I wondered if using newspaper, cardboard or styrofoam as an extra layer of insulation would keep people warmer inside their sleeping bags. I also wondered if adding a grid of stitches to a sleeping bag would increase the amount of heat a sleeping bag can hold in. For my experiment I will make five miniature sleeping bags that will be lined with the different insulating materials (1 being a control and 1 with increased stitching) to see if the thermal capacity can be increased with cheap, easy to access materials.*

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2317 - Elementary (Grades 4-6) - Physical Science

### **Cosmology**

By: Willa Messervey and Keira Boeckner

*1: Our project investigated: Is the universe still growing? We chose this topic because the universe is hard to understand, explore and measure. Cosmology is the study of the universe which centers around the Big Bang Theory. The Big Bang Theory explains how the universe's expansion started after a massive explosion of energy. 2: We hypothesize that the universe is currently expanding, has been expanding since the moment of the Big Bang and will continue to expand into the future. We also think that the universe was created by the Big Bang 3: To investigate our hypothesis, we collected materials like, poster board, flash cards, coloured paper, glue, something that expands. Then we went to <https://science.nasa.gov/universe/overview/> to research about cosmology, the history of cosmology and The Big Bang. We took some of that information and turned it into our own words about the cosmology we are learning about, specifically the continued expansion of the universe. 4: We learned that the universe*

*is still expanding and will continue to expand for billions of years, as that is the dominant accepted theory in science today. The universe was created approximately 13.8 billion years ago when The Big Bang happened. 5: Conclusion:the universe is still expanding and will continue to for billions of trillions of years. It's the diameter of approximately 93 billion light-years.*

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2318 - Elementary (Grades 4-6) - Physical Science

### **The Science of Floating and Lifting**

By: Sierra Morrison

*How do you lift a boat in the water, from one body of water into another? That's what we are about to dive into and find out! My project is based on Pascals Principle, so the majority of questions or curiosity can be answered by this theory. "When you push on a liquid or gas in a closed container, that pressure spreads out equally in all directions." - Blaise Pascal. Growing up in Peterborough and the Kawartha's we have the Trent Severn Waterway which has 45 lock locations the majority of those locks being in our area. According to Parks Canada, it states "locks 19-36 with key feature lock 21 Peterborough Lift Locks" are local locks. My family and I live on Pigeon Lake, and we are always out on the boat or seadoo during the summer, and I've always wondered how do the locks work? So when my teacher mentioned the science fair I knew right away what I wanted to do. I will make a lock! But first research, I've been able to find all of my information from Parks Canada, which is very helpful and living so close means I am able to physically see the locks and there mechanisms (even though there are no boats going through being winter I am able recognize things from the Parks Canada videos and information). The Trent Severn Water Way, uses 3 style of locks: 1. The Conventional Lock. (Water tight chambers with gates on both ends like Bobcaygeon for example); 2. Hydraulic Lift Locks (Two balancing tubs, the heavier one gets, the weight pushes down rising the other tub up, like Peterborough Lift Locks) 3. Flight locks (Multiple conventional locks in one like a staircase , Healy Falls Lock 16&17 Campbellford) Even though there are different styles the all have a few things in common all 3 locks mentioned use gravity and water pressure to move boats, seadoo, kayaks,etc. My science project has taught me quite abit about locks, and I hope my model will help demonstrate how hydraulic lifts work. The display will highlight and hopefully answer some questions maybe other kids and adults might have too! Thank you for taking the time to read about my project on the locks I look forward to demonstrating how it works!*

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2319 - Elementary (Grades 4-6) - Physical Science

### **Can magnifying glass make a fire?**

By: Amir Odilov

*So first I am gonna grab a paper, magnifying glass and gonna use the sun to get the light to try to burn the paper. I personally think the paper will burn (some people would think it wouldn't burn), anyways I think it will burn because how hot is the sun but the earth have a atmosphere that helps it from not burning. But if the sun gets in the glass the light from the sun and it would be hot enough to burn the paper. Because the sunlight from the sun is about 5.500 C but the earth's surface blocks it which I have already told, anyways the earth's atmosphere makes the sunlight not as hot as it is.*

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2320 - Elementary (Grades 4-6) - Physical Science

### **Hot water vs Cold water**

By: Maeve Pearce and Olivia Heffernan

*we will have two bottle of water one bottle of water has hot water the other bottle has cold water we will be putting a balloon on them both on the balloon and its going to on the balloon for the hot water bow up and have a form but the cold water it will go down into the balloon and we have a poster board and we will write how it works and what matierals we used to make this project and we will tell u step by step how to do this*

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2321 - Elementary (Grades 4-6) - Physical Science

### **Oobleck vs slime similarities and differences**

By: Meyah Pinto and Lily Sangster

*Slime and Oobleck are both popular sensory materials often used in play and science activities, especially with children, because they are fun to touch and easy to make. Both substances help demonstrate basic concepts about matter, such as how materials can flow, stretch, or change shape. They are commonly used in classrooms and at home to encourage hands-on learning, creativity, and curiosity. Despite these similarities, slime and Oobleck behave very differently. Slime is stretchy, elastic, and cohesive, meaning it can be pulled and molded while still holding together as one mass. It flows slowly and feels smooth and rubbery. Oobleck, which is made from cornstarch and water, is a non-Newtonian fluid that becomes hard when squeezed or hit but turns runny when handled gently or left alone. Another key difference is how long each material lasts and how it is used. Slime is more durable and can be stored and reused for long periods if kept properly. Oobleck, on the other hand, dries out or separates over time and is much messier to clean up. While both are engaging and educational, slime focuses more on elasticity and polymers, whereas Oobleck highlights unusual fluid behavior and reactions to force.*

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2322 - Elementary (Grades 4-6) - Physical Science

### **Sweet Water**

By: Lincoln Rose

*My project studies the effect of different temperatures of water for dissolving sugar, and also what type of sugar dissolves the best in water. The reason I chose this was because I was interested in what type of sugar dissolves the best but I also wanted to learn the best temperature to test the sugar in. My hypothesis is that sugar cubes will dissolve best in the warmer temperature, and that icing sugar will dissolve fastest. First I tested for the best temperature to dissolve sugar cubes. I measured 500ml of water in my cup and marked the top of the water line with hockey tape so I could use the same amount of water every time. I used three different temperatures, room temperatures hot, and cold. I tested them one at a time to make sure it was the exact time in case it was milliseconds apart. Then plopped a sugar cube in and started a timer to test them. I stirred it with a spoon until it was fully dissolved then stopped the timer. I saw that the hot temperature worked best to dissolve the sugar so I used hot water in the next part to test which sugar type would dissolve the fastest for part 2, I used a thermometer to make sure every time it was 70°C to start and then I put the tablespoon of sugar in and stirred with a spoon until all the sugar particles were dissolved. I did this for all 4 types of sugar and recorded the data. I did learn that if*

*the water was too hot then the sugar dissolved too fast and I couldn't time it very accurately. I decided to use a lower temperature and a larger amount of sugar to make it take longer and easier to measure the data*

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2323 - Elementary (Grades 4-6) - Physical Science

### **Tube Speaker Project: Does Bigger Mean Louder?**

By: Austin Rowley and Henry Brake

*For our science fair project, we want to find out if the diameter of a tube affects how loud a tube and cup speaker can be. We are building three speakers using six red solo cups of the same size and cardboard tubes of the same length with different diameters (small, medium, and large). We will cut a slit in the middle of each tube so we can place an iPhone inside which will play music through the tube and out through the cups on either end of each tube. Our hypothesis is that the speaker with the largest tube (biggest diameter) will be the loudest because it will allow more sound waves to travel through it. To test this, we will play the same sound clip at the same volume for each speaker. We will use a decibel meter to measure how loud the sound is coming out of the cups on each speaker. We will test each speaker three times and write down the results to find an average. Through this experiment, we hope to learn more about how sound waves travel and how the diameter of a tube can change how loud the sound is. Our project is still in progress, so complete experiment results and conclusions are to be presented on fair day.*

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2324 - Elementary (Grades 4-6) - Physical Science

### **sensor based Garbage bin**

By: Israel Rozario and Antonio Mathew

*Our project is about a sensor based Garbage bin using Arduino uno R3, the other products used for this project are a Plastic bin, card board , ultra sonic sensor , 9 v Battery, Battery connector , Micro Servo Motor, Male to Female jumper wires ,and Male to Male jumper wires. This Garbage bin eliminates the need to use either your hand or foot to open the lid , once an object is brought close to the sensor , the lid of the Garbage bin opens automatically .*

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2325 - Elementary (Grades 4-6) - Physical Science

### **Boom! Energy in action.**

By: Quinn Smith

*This project demonstrates potential in kinetic energy. These two types of energy are all around us. We experience both types of energy many times throughout our day. Potential energy is energy stored in an object which can be used for work. Some examples of potential energy are: a bow string stretched by an archer, a roller coaster at the top of a hill, a compressed spring, or air stored inside a balloon. In contrast to potential energy, kinetic energy is energy in motion. It is possessed by any object in motion. The heavier an object, and the faster it's moving, the more kinetic energy it possesses. Some examples of kinetic energy are: a ball thrown through the air, a moving vehicle, a meteor plummeting towards earth, or a hammer striking a nail. my science fare project will demonstrate both potential and kinetic energy. My balloon powered model car will show the effect of decreasing and increasing potential energy. By increasing the amount of potential energy, by blowing up the balloon it increases the amount of kinetic energy power in the car. A small amount of potential energy stored in the balloon will power the car a short distance, relatively slowly, with little kinetic energy. A large amount of potential energy stored in the balloon will power the car forcefully for a longer distance with greater kinetic energy . Also, Increasing the*

*size of the balloon, or the weight of the car would both also increase the amount of potential energy, and therefore kinetic energy possessed by the car.*

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2326 - Elementary (Grades 4-6) - Physical Science

### **The Competition Of Fusion**

By: Annabelle Sutton and Emma Salmans

*Hello, my name is Annabelle and my partner's name is Emma. Today I will be talking about our project for the science fair. Our project is on ice melting. We will use sugar, salt, sand, and plain ice to see which melts ice the quickest. To connect it to real life we will see if they really do put enough salt on the roads. Our hypothesis is that the salted ice will melt the fastest since they put salt on the roads and since salt is a very effective product. After we find out which substance melts ice the fastest, we will connect it to real life by figuring out if they put enough salt on the roads. We will create an ice block which is 120 cubic inches and apply a measured amount of road salt they put onto that big block. We will measure how long it takes to fully melt and if there is enough salt. Our hypothesis for the road is that they do not put enough salt on the roads and that it will not melt quick enough for it to be as safe as it should be on the roads and sidewalks. The materials that we will be using for the project include ice, salt, sugar, sand, cardboard, crayons and ice moulds. We would be happy to share our full ice melting race project with you at Trent Science Fair.*

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2327 - Elementary (Grades 4-6) - Physical Science

### **Reaction Distraction**

By: Audrey Sweeney

*My project was used to investigate the impact distractions (loud music, talking, etc.) have on a person's ability to react and catch a falling meter stick. I measured the point at which each person caught the meter stick when not distracted and when distracted.*

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2328 - Elementary (Grades 4-6) - Physical Science

### **Can You Taste the Difference?**

By: Cameron Townshend

*For my science fair project I am going to see if you can taste that difference between cheap and expensive water. In my science fair project I used fiji water, iceland water, smart water, tap water, brita water, pc water and ph water. The expensive waters are iceland water, fiji water, ph water and smart water. The cheap waters are brita water and pc water. My hypothesis is that the expensive water will taste a little better but I don't think it is going to be worth the price. During the experiment you could tell what they are thinking because of their reaction. The results were really surprising. The results were pc water and brita water were tied in 1st place and smart water was in second place. Third place was iceland water fourth place was ph water and fifth place surprisingly was fiji water. So after all of that I figured out that I was half right and half wrong for my hypothesis because I said that the expensive water would taste a little better and that it would not be worth that money and the expensive water was the bad tasting water.*

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2329 - Elementary (Grades 4-6) - Physical Science

### **Sweet crystals that rock**

By: Veronica Wall and Kali Grylls

*Our project is about sugar crystals. We are going to learn about what they are and how they grow. We want to learn about whether temperature and seeding of crystals will affect the growth of the crystals overall. We will also compare the rate of growth of sugar crystals that have been seeded and ones that have not been seeded and prepared in solutions with room temperature water, cold water, and hot water. There are two variables in the experiment: first the temperature of the water sugar solution, and the second variable is whether the stick that was used was seeded with sugar when it was added to the solution. We expect to see increased crystal growth in the hotter solutions and in the seeded sticks.*

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2330 - Elementary (Grades 4-6) - Physical Science

### **Liquid Lock: The Science Of Super-Absorption**

By: Nyima Wasson

*I have been testing the absorbency of different paper towels to find which one is the best brand from three options: Bounty, Royal Tiger, and Sponge Towel Premium. My hypothesis is that Bounty absorbs the most water but will dry the slowest, while Royal Tiger will dry the fastest. To conduct my experiment and decide which one is the best, I looked at the cost of each paper towel, how long it took to absorb a liquid, and which was the most environmentally friendly.*

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2331 - Elementary (Grades 4-6) - Physical Science

### **H2-Whoa!**

By: Cavan Wood

*My project is called "H2-Whoa! Are They Actually Different?" I tested eleven brands of bottled water to find out whether the water in the different brands is the same and if some brands are better than others. I wanted to find out if more expensive brands like Fiji were actually better than less expensive brands. I hypothesized that the different brands would not be the same and the more expensive brands would have better test results. My criteria for being the best was which brand tested the lowest for 11 parameters with a water test kit as well as had the lowest ppm (parts per million) using a total dissolved solids (TDS) meter. The results from my testing showed the more expensive brands are not necessarily the best. The most expensive brand tested the best overall (Voss), but the 2nd most expensive brand tested the poorest (Fiji) and a more average priced brand tested 2nd best (Smartwater). While there are variations in the different brands of bottled water and some tested better than others, taste and budget are also factors in personal preference.*

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2332 - Elementary (Grades 4-6) - Physical Science

### **Electrolytes in Drinks**

By: Ellie Xi

*When some minerals are dissolved in water, they become electrically charged and can conduct electricity. These minerals are called electrolytes. In our bodies, electrolytes serve many purposes including helping muscles work through contraction and sending nerve signals from our brain to the rest of our body. Athletes often choose sports drinks to help replace electrolytes lost during physical activity*

*and sweating. I wanted to find out which drinks are the best for recovering electrolytes. I predicted that Powerade would have the most electrolytes followed by Gatorade, orange juice, ginger ale and distilled water. I used a simple circuit with a multimeter and sensor to measure the electrical current conducted by different drinks. Drinks with more electrolytes would result in a greater current. Results showed that my hypothesis was incorrect. I found that orange juice had the most electrolytes followed by Powerade, Gatorade, ginger ale and distilled water. This suggests that orange juice may be a better choice for getting electrolytes than the sports drinks that are marketed for that purpose.*

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2333 - Elementary (Grades 4-6) - Physical Science

## **Humpty Dumpty 2.0**

By: Sarah Young and Calia Hedges

*Our science project is called Humpty Dumpty 2.0. We are doing an egg drop challenge to see if we can stop an egg from breaking when it falls from a high place. The tricky part is that we can only spend ten dollars on materials, and our container has to weigh less than 60 grams. The point of our project is to figure out how to protect something really fragile. When the egg hits the ground, it can crack because of the impact. So we are creating something that can protect the egg when it hits the ground. We also wondered if a parachute would work better so it would slowly drop the egg to the ground. So now we have turned it into a competition. The competition is to see what will protect the egg better: a parachute, a popsicle stick house or a cardboard container.*

## **Junior (grades 7-8): Earth and Environmental Sciences**

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3401 - Junior (Grades 7-8) - Earth and Environmental Sciences

### **Power of negative and positive words on plant growth**

By: Zoe Giroux and Kenzie Gilkinson

*Our science fair project is on how negative and positive words affect plant growth. In this project we will demonstrate how talking negatively and positively affects how the plants grow. We will be using four spider plants, one at each of our houses. One of us will be saying negative things to the spider plant and one of us will be saying positive things to the spider plant. We will keep the plant near a window so it will get as much sunlight as possible. We will water the plants about once a week, or whenever the top 1–2 inches of soil feel dry. We will give the plants the same amount of care and make sure that they are healthy. Over the course of several weeks, we will carefully observe and record any changes in the plants, including their height, number of leaves, color, and overall health. We will take pictures and measure them regularly so we can compare the results accurately. At the end of the experiment, we will analyze our data to see if there are any noticeable differences between the plant that received positive words and the plant that received negative words. This will help us determine whether the type of words spoken to a plant can have an effect on its growth. Through this project, we hope to better understand how words and sound might influence living things.*

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3402 - Junior (Grades 7-8) - Earth and Environmental Sciences

### **How does carbon affect the layers of the ocean?**

By: Mason McPhail

*Carbon makes the ocean more acidic but it seems to affect more the top zones than the lower zones, because of what lives in these layers. Light also affects carbon absorption. I will attempt to demonstrate and test how carbon affects the ocean layers using home materials, and also examine how to combat the effects of increased carbon emissions on the ocean.*

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3403 - Junior (Grades 7-8) - Earth and Environmental Sciences

### **The Bin Lid**

By: Mackenzie Murdock and Claire Ruck

*We are going to be making a lid for a recycling bin. We chose this topic because we've noticed that a lot of recycling bins have been blowing over with the wind, and the recycling people don't pick it up, so it blows around outside. We made it out of pop cans because instead of them going to the Material Recovery Facilities we made something useful out of the cans. They are also waterproof for when there is rain or snow storms. Our hypothesis is that the lid will help prevent the littering around Peterborough. We have noticed that this has been a problem around several neighborhoods. First, we cut the top off the cans with a special tool. Secondly we glued 6 rows of 4 pop cans together with our metal super glue. Then we tied them with wire and taped them all together so that it is nice and sturdy. After we were finished we put magnets on all of the corners of the lid and the bin. Our results for the lid is that we were able to finish it but we have not yet tested it. Results are soon to come. We learned that working with the pop cans is harder than we expected. We also learned that the pop cans were not that sharp as you expect when you think of cutting them. Also it took a lot more time than we thought but in the end it is all worth it.*

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3404 - Junior (Grades 7-8) - Earth and Environmental Sciences

### **From Stress to Mutation**

By: Ashton Omland-Findlay

*My science fair project intends to determine whether environmental stress can affect genetic mutations. I believe under stressful conditions, "accidents" are more likely to occur and cause gene mutations. I will demonstrate what environmental stress is starting seeds and growing plants in several different conditions, including warm, stable temperatures and rapidly changing extremes. I hope to mimic stressful and chaotic environments using this experiment. I will also explain mutations using a Punnett square exhibit involving multiple scenarios and explaining how the mutations would be passed down in the scenarios. As my central project, I will combine the two into a demonstration where volunteers copy a DNA sequence under silent conditions and are then asked to repeat the exercise under chaotic and distracting conditions. If mistakes are made or the sequence under stress is shorter, a "mutation" has been caused! We will use these projects and demonstrations to explain and prove how stress affects genetic mutations.*

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3405 - Junior (Grades 7-8) - Earth and Environmental Sciences

### **Solar Pop Can Greenhouse Heater**

By: Henley Picken

*Henley's Solar Pop Can Greenhouse Heater is an innovative, low-cost solution designed to improve temperature regulation in small greenhouse environments using recycled materials. The system is constructed primarily from aluminum beverage cans that are cleaned, painted black to maximize heat absorption, and assembled into vertical columns within a sealed frame. These columns act as solar collectors. When sunlight enters the unit through a clear front panel (typically glass or polycarbonate), the blackened cans absorb and retain thermal energy. Air is drawn into the system through lower intake vents, heated as it passes over the warm aluminum surfaces, and then naturally rises and exits through upper vents into the greenhouse. This process creates passive convection without the need for electricity. The design emphasizes sustainability, affordability, and accessibility. By repurposing discarded materials, it reduces waste while providing an environmentally friendly heating option. It is particularly effective in extending the growing season in cooler climates by maintaining more stable internal temperatures during daylight hours. Henley's model demonstrates how simple engineering principles—solar gain, heat transfer, and airflow—can be applied to create practical solutions for everyday challenges in food production and environmental stewardship.*

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3406 - Junior (Grades 7-8) - Earth and Environmental Sciences

### **Glow and Grow**

By: Gabrielle Sonegra

*My project is an experiment on "What LED light color effects Bean plant growth the most?". In my project, I will have three bean plants under three different colored LED lights (Red, Blue, White). Everyday I will measure how tall the plant is and record it in a bar graph. My board will include how and what the different colored LED lights will effect the plant growth.*

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3407 - Junior (Grades 7-8) - Earth and Environmental Sciences

### **What Substance Melts Ice the Fastest**

By: Eliza Vardy and Makynlee Sheppard

*My partner and I were thinking about what we wanted to do for our project and we realized we always wanted to know why people use salt to melt ice and why not other substances so this is what we based our project on. We figured it out through experimenting. We got different substances and put them on ice cubes. We timed each substance to see which was the fastest. After our experiment we found out that salt does melt ice fastest. We researched and found out that salt melts ice the fastest because it lowers the freezing point of water. When salt is added, it disrupts the hydrogen bonds between water molecules, making it difficult for water to remain frozen.*

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3408 - Junior (Grades 7-8) - Earth and Environmental Sciences

### **The Future of Pollination**

By: Sahana Vignarajah

*My topic is on the future of pollination and how we can mimic the process of pollination using upcoming technologies. I chose this topic because of the declining numbers in Pollinators and since pollinators*

*maintain plants biodiversity and reproductive system plants being pollinated is essential for human life and food security. It will also ensure faster growth indoors allowing crops to grow in the winter. My hypothesis is that self pollinating the calamansi (Phillipine Lime) flower will make it stronger and more alive and just like a calamansi flower being pollinated by a bee. How it works is I attached two cotton swabs and the bottom of my small drone and then the fine hairs of the cotton swab worked like the bees allowing it to pick up the pollen. I used a microscope to ensure the cotton swab was collecting the pollen before moving to the calamansi flower allowing the drone and cotton swab to land on it to cross pollinate it. When I first did the experiment I grew the flower waiting for the buds to bloom then I carefully used the drone to brush the pollen from the tulip to the calamansi flower pollinating it so it can help it grow fruits. It worked making the calamansi flower sprout into a calamancy fruit therefore proving my hypothesis comparing regular pollination to the future to see that it's alike. What I learned from this project is growing plants indoors can be just as best from planting the plant outdoors. Pollination is essential in our world and we have to do our part to try to preserve it.*

## Junior (grades 7-8): Health & Life Sciences

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3501 - Junior (Grades 7-8) - Health and Life Sciences

### **Twin telepathy**

By: Hadeel Al Awad

*This science fair project is about “twin telepathy,” which is the idea that twins can share thoughts or feelings without using their senses. The purpose of this project was to test whether this idea is real by using a clear and controlled experiment. In the experiment, the twins sat in chairs facing each other, knee to knee. A solid barrier was placed between them so they could not see each other at all, preventing any chance of cheating with visual cues. The room was kept quiet to avoid sound clues. One twin, called the “sender,” was shown a set of random pictures, numbers, or simple words chosen without a pattern. The other twin, called the “receiver,” tried to guess what the sender was seeing. Each guess was recorded carefully to keep accurate data. The results showed that the number of correct guesses was very close to what would be expected by random chance. This means there was no strong evidence of telepathy in this test. In conclusion, this project suggests that twin telepathy is not scientifically supported. Instead, it may seem real because twins often think alike and know each other very well. This project is important because it uses a fair test, careful observations, and logical reasoning to investigate a popular idea, showing how science can be used to separate fact from belief.*

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3502 - Junior (Grades 7-8) - Health and Life Sciences

### **Sipping Illusions: When paper cups lie**

By: Kinsley Curry

*When we drink our to-go hot drinks, we assume that the paper cups are just that... paper. This project investigates the truth behind paper cups and if people are being illuded into believing they're being more environmentally and health conscious, then they really are.*

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3503 - Junior (Grades 7-8) - Health and Life Sciences

### **Perception of Time**

By: Nathan Da Pedra and Damon Murray

*In our perception of time poster board, we studied the perception of time. We compared how much time we thought had elapsed versus the real time. We had three subjects: stopping the time at the 5-minute mark with nothing to do, stopping the time at the 5-minute mark while listening to music, and stopping while scrolling through YouTube Shorts. We also included all the basics, such as why this experiment is important, the control, the constant conditions, data, our observations, sources of error, discussion, independent variable, safety precautions, procedure, equipment, hypothesis, and our purpose. Our project is on a Bristol board, and we included images and text about our experiment.*

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3504 - Junior (Grades 7-8) - Health and Life Sciences

### **The Reward Affect**

By: Quinn Dibranou

*My project falls under the Health and Life Sciences category. I chose this topic because I am interested in how the brain works and how motivation affects behavior and performance in everyday tasks like schoolwork, sports, and learning. Motivation is influenced by a chemical in the brain called dopamine, which is linked to reward and goal-directed behavior. Rewards are commonly used to encourage people to complete tasks, but they may not affect everyone in the same way. In some cases, rewards can increase focus, while in others they may create pressure or cause people to rush. The purpose of my experiment is to determine whether offering a reward increases motivation and improves task performance. Participants completed two similar tasks (mazes): one without a reward and one with a reward. During each trial, I measured completion time, number of errors, and self-reported motivation using a rating scale. The tasks were completed under similar conditions to ensure a fair comparison. My hypothesis is that participants will complete the task faster, make fewer errors, and report higher motivation when a reward is offered. However, some participants may make more errors due to rushing or pressure. This experiment helps us better understand how rewards influence behavior, which can be applied to learning, training, and goal-setting in real life.*

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3505 - Junior (Grades 7-8) - Health and Life Sciences

### **Can You Block Out the Noise? Evaluating Distraction Levels in Students**

By: Isla Girard and Riley Salo

*Our project is about how different sounds affect early aged teenagers. For this test, we chose 8 participants: 4 girls, and 4 boys. We tested how different their answers compared with stereotypical noises you would be met with during a test. We gave everyone a test with 7 questions, and used 6 sounds. We wanted to see how much of a difference each sound caused in peoples concentration level. In our test we found out very interesting results and can't wait to show them off to the judges at this years Science Fair.*

## Color Theory Applications

By: Fitz Harber

*I am an artist who has always been fascinated by colour palettes, the ways colours interact with each other, and give illusions of colours that aren't there. I wondered if there was a way to measure this phenomenon. I hypothesize that any colour can look pretty if put in the right palette, even "vomit green." Traditionally artists use their intuition to select ideal colour combinations. While art is inherently subjective, the science of the human eye may offer some insight into appeal. In this project, I am investigating if there is an objective equation or framework that could be used to calculate the best colour to pair with an individual colour in order to maximize appeal. First I researched colour theory and how humans perceive colour. I then isolated the variables that make colour: saturation, luminosity, and hue as well as chroma. I began with six base colours, using the additive primary colours (red, blue, green) and the subtractive primary colours (cyan, magenta, yellow). I isolated and individually adjusted each variable creating fifteen different pairings for each base colour. I put these pairings into a survey and had people rate how much they liked each one. Through social media and direct messaging, I was able to gather 170 responses. I'm currently synthesizing this data to try to find the ideal combination for any colour no matter how "ugly." I will then create a piece of digital art with four variations of colour palettes: my artistic intuition and the mean, median, and mode averages from the survey results. Finally, the respondents to the first survey who agreed to receive a follow-up, will rank the four pieces. This project still in progress. Complete results and conclusions will be presented on fair day; however, I have already learned that processing raw data is tedious and overwhelming but also fascinating. I can't wait for the final results!*

## how colour effects memory

By: Mackenzie Ironside and Taylyn Heemskerk

*In this project my partner and I will be doing a psychological test on whether colour affects memorization or not and in what way ( Positive or negative ). We will test at least 50 people of the ages 11-14 with first a list of grey words to memorize, we will list their score (how many words they remembered correctly) then we will show a list of words all in different colours and track their score. To assure the improvement is because of the colour and not just from doing a similar test twice we will randomize if they begin with grey or coloured words. We will do the same things with a combination of numbers. We will list their age and score for the memorization tests. Each person is their own control. We will be using the difference of their 4 memory scores to see if they have improved, gotten worse or stayed the same. We will also ask our test members a few questions about their results for example which did you find harder and why. After we have all the information we need we will begin looking for trends (eg: younger kids remember more coloured numbers then grey numbers) after all information is organized, graphed and conclusions drawn we will shorten the information and put a condensed version of all our information along with our graphs and hypothesis on a board with the conclusions of the two experiments and our thoughts throughout the experiment and an explanation of how it works. We have run the test with 5 people already to see if it is easy to do but will get us information.*

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3508 - Junior (Grades 7-8) - Health and Life Sciences

## **Fast Reflexes, Stronger Minds: Exploring the Link Between Reaction Based Sports and Cognitive**

### **Function**

By: Noah Jermyn and Lucas Cousineau

*We are curious to investigate if reaction-based sport athletes (ie: goalies, baseball hitters, tennis etc) have increased cognitive function (memory, processing speed) compared to non-athletes. We have conducted reaction speed data and cognitive tests with both groups to see if there is a correlation.*

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3509 - Junior (Grades 7-8) - Health and Life Sciences

## **Sensory Overload: Does Multitasking Affect Our Day-to-Day?**

By: Talia Lennie

*My experiment was about multitasking. I chose this because we multitask daily without realizing. I wondered if multitasking affects how well we do something, or how long it takes to complete it. So the question is... when does multitasking help, or hinder? I hypothesized that while multitasking, participants would take longer and perform more poorly on a task compared to single tasking. Seven willing participants did a series of tasks that covered each sense, to test whether varying senses were easier used in multitasking. These tasks were: - Taste five different jelly beans while blindfolded; taste a mystery jelly bean and choose which flavour it was; recall the order in which they ate them (taste). - Smell five different scents while blindfolded; smell a mystery scent and choose which scent it was, and recall the order in which they smelt them (smell). - Sort beads blindfolded into five containers based on shape, while being timed; accuracy was measured (touch). - Read a descriptive paragraph while being timed; take a 10-question multiple-choice test about the paragraph (sight). - Listen to the repeating chorus of a novel song; determine the correct written chorus among seven options (sound). These were the controls. The participants then multitasked by combining two of the single tasks for a total of 10 tasks. The conclusion has not been completed. So far, it appears that multitasking can have an effect for some. Full results will be revealed at the science fair.*

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3510 - Junior (Grades 7-8) - Health and Life Sciences

## **Blood Testing**

By: Leilana Lewis and Lilly Nolan

*This science fair project investigated the short-term effects of different beverages on blood glucose levels using a standard diabetes blood glucose tester. The experiment compared plain water (control), Coke Zero (zero-sugar, artificially sweetened with aspartame and acesulfame potassium, plus caffeine), and regular Coca-Cola (high in sugar) by measuring blood sugar readings after consumption. Participants consumed each beverage under controlled conditions, and blood glucose was monitored at consistent intervals. Surprisingly, Coke Zero produced the highest average blood glucose reading, exceeding both water and regular Coke in some cases, despite containing no sugar or calories. This unexpected result challenges the common assumption that zero-sugar drinks have no impact on blood sugar. The project hypothesizes that artificial sweeteners may trigger a cephalic phase response, where the sweet taste signals the body to prepare for incoming sugar, prompting insulin release or other metabolic changes. Additionally, the caffeine in Coke Zero could contribute by stimulating stress hormones like cortisol and adrenaline, which can temporarily elevate glucose levels in some individuals. While scientific literature*

*generally indicates artificial sweeteners do not directly raise blood glucose in most people (and regular Coke typically causes the largest spike due to its sugar content), individual variability exists due to factors like gut microbiome, insulin sensitivity, or personal physiology. This experiment highlights how real-world responses can differ from expectations and underscores the complexity of metabolic reactions to "sugar-free" products. The findings encourage further exploration of how non-nutritive sweeteners and additives influence the body beyond simple calorie counting, promoting awareness of hidden effects in everyday drinks.*

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3511 - Junior (Grades 7-8) - Health and Life Sciences

### **The Power of REM**

By: Kailey McDannold and Adria Andreoli

*This project explores REM sleep and how much is needed for different age groups to stay healthy. REM sleep is an important stage of sleep that helps with learning, memory, and brain development. The purpose of this experiment is to find out if people of different ages get different amounts of REM sleep and if the recommended amounts are accurate. To test this, sleep data will be collected from eight people using a Fitbit. The data will include how much time each person spends in REM sleep, light sleep, and deep sleep. The results will then be compared across age groups to see patterns and differences. This project also looks at how habits like staying up late or using devices before bed can affect sleep quality. By understanding REM sleep better, this project helps explain why getting enough sleep is important for both short-term health, like focus and mood, and long-term health, like preventing disease.*

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3512 - Junior (Grades 7-8) - Health and Life Sciences

### **the liquid palette**

By: Harishan 9Shan) Nadarajah and Jiaqian Cao

*This project uses red cabbage as a natural chemistry tool to visualize the invisible world of pH levels. By extracting a pigment called anthocyanin through boiling, you create a liquid indicator that reacts instantly to different chemical environments. When mixed with an acid, the solution shifts to red or pink, while alkaline substances turn it blue, green, or yellow. This experiment provides a simple, hands-on way to categorize household items based on their hydrogen ion concentration, effectively turning a kitchen into a science lab to demonstrate how chemical structures change color when they gain or lose protons.*

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3513 - Junior (Grades 7-8) - Health and Life Sciences

### **Peeling Back the Layers: Exploring DNA in Fruit**

By: Avery Vandenbrink

*I have always been interested in DNA and why science focuses on it so much. My hypothesis was that if I extracted DNA from a strawberry, kiwi, mango, and banana, the cells would pop and create a large, visible spiderweb shape with thick strings. To do this, I mashed the fruit in plastic bags and added a mix of water, dish soap, and salt. I filtered the mash through a coffee filter into a cup, then carefully poured cold rubbing alcohol down the side. After a few minutes, a white, webby substance appeared. This was the DNA! My hypothesis was mostly correct. I successfully found DNA in all four fruits, and they all looked like spiderwebs, but the strings were different for each one. The strawberry was the easiest to see because it had the most strings. Mango and kiwi looked similar. They had fewer strings, but they were very thin and long. The banana didn't produce as much liquid as the other fruit, but the DNA was still visible as a smaller, clump with thin, shorter strings. This experiment taught me that DNA is what makes living things*

*different from each other. I wonder if it is just as easy to extract DNA from other fruits, such as grapes, oranges or watermelon. I also learned about Roselind Franklin and how her DNA research was stolen by a group of male scientists who took credit for her discovery.*

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3514 - Junior (Grades 7-8) - Health and Life Sciences

### **The Bends**

By: Mia Voros and June Jackson

*How the human body reacts to diving at extreme depths.*

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3515 - Junior (Grades 7-8) - Health and Life Sciences

### **Sound You Can See: From Cymatic Patterns to Tissue Organization**

By: Lily Watson

*Exploring creating Cymatic patterns in sand with various frequencies and comparing to new medical research that scientists are doing with cells - creating tissue organization with frequencies in hope to create the same pattern and use those cells to repair damaged tissue.*

## **Junior (grades 4-6): Computer and Engineering Sciences**

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3601 - Junior (Grades 7-8) - Computer and Engineering Sciences

### **Light vs Sound in sensing technology**

By: Thomas Black and Yuze Li

*Our project is about comparing light and sound in a maze with a Raspberry Pi and Lego Spike Prime robot. Our goal is to see how long each sensor takes to go through the maze and compare which sensor goes faster. Our hypothesis is that light will do better because it travels way faster. We think sound will lose, because it travels a lot slower. The sound sensor we used also produces noise which is annoying to specific animals like dogs and cats. Light on the other hand only uses infrared light which is invisible to most mammals (snakes can see then they rely on seeing IR to hunt prey). However both have their bad parts. IR sensors use infrared light which can be absorbed by very dark surface colors like black. Sound on the other hand can be absorbed by a lot of soft things like carpet and foam rubber. It will cause the robot to crash if not seen. For the Raspberry Pi 5 we are using the IR because it is easier and less complicated than the ultrasonic which we are using Lego Spike Prime for. The IR sensor can measure to a set range but the ultrasonic uses sound and measures how long it takes for it to bounce back so it can take more accurate readings. That is our robot and summary, thanks for reading.*

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3602 - Junior (Grades 7-8) - Computer and Engineering Sciences

### **The Science Behind Speakers**

By: Gunner Cope and Rory Kivisto

*We built a speaker using a magnet and a coil of copper wire connected to an audio source. The electric current created a magnetic field that caused the coil to vibrate which produced sound waves.*

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3603 - Junior (Grades 7-8) - Computer and Engineering Sciences

### **Soda Can Striking Engine**

By: Carter Jory and Thomas Padgett

*The objective of our experiment is to build a working soda can striking engine. We chose this topic because we thought it would be fun to build an engine and it would help us to understand more about heat and motors.*

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3604 - Junior (Grades 7-8) - Computer and Engineering Sciences

### **The Shortcut Effect: Risks and Rewards of AI Usage in Students**

By: Heidi Kam and Aleena Aborig

*This project investigates the benefits and drawbacks of AI usage. Our goal for the experiment is to figure out when AI begins to limit our cognitive abilities and affect retention. We began our project by randomly dividing 15 students within the same grade level into 3 groups: A, B, and C. The students were given a short, unfamiliar article to summarize. The following day, students were tested in areas that were not only on accuracy but also on confidence, as well as the time used to complete the test on the material they had learned the previous day. Each group was permitted to use AI at different levels. In Group A, AI use was prohibited; the group of students relied on their brains to answer the questions. Group B had depended solely on AI and used it to complete the assignment, while Group C had been limited to only using AI as a learning tool and used it intelligently. We hypothesized that students who rely solely on AI will complete the test fastest but may show lower understanding and retention, while students who use AI as an assistant will balance speed and comprehension, achieving the highest retention rate and a great amount of confidence. Students who don't use AI might have a longer completion time but will retain information moderately well, relying entirely on their own thinking. In conclusion, AI can be a valuable asset in the education system, as long as we understand the ways to use it correctly.*

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3605 - Junior (Grades 7-8) - Computer and Engineering Sciences

### **How to Build a Mini DC electric car**

By: Carson Kok and Liam Campbell

*How to Build a DC Mini electric car*

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3606 - Junior (Grades 7-8) - Computer and Engineering Sciences

### **Top Gears: How does gear ration affect acceleration and top speed?**

By: Bohdan Renaud

*Using lego gears of all different sizes, I built a structure that allowed me to test different gear combinations (keeping gear 'A' as the controlled variable). I counted the teeth on each gear and found the ratio between Gear 'A' and the independent variable (the other gear). I then used my lego structure to turn the gears together to see how many revolutions the other gear would have during 1 of gear A's revolution. I compared that data to the ratio of the teeth. They were the same! This helped me understand exactly how gear ratios are calculated. My next step was to study the acceleration and power produced by each gear combination and relate that to my go kart racing. I now know how to select gearing for my races based on the track layout and weather. My goal is to become a better racer and, someday, a mechanical engineer!*

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3607 - Junior (Grades 7-8) - Computer and Engineering Sciences

### **Hydraulic Press**

By: Jack Stewart and Ryan Beers

*How Hydraulic Presses work*

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3608 - Junior (Grades 7-8) - Computer and Engineering Sciences

### **Expanding Goalie Glove Abilities (Hockey)**

By: Orion Teleki

*Purpose: The purpose is to increase the chances of goalies stopping more glove side shots, by enlarging the glove without making it more difficult to move the glove. I am carrying out this project because as a goalie myself I can see that having a bigger glove will help with more saves. With a regular glove there is only so much of a pocket where the puck can go. Most of the time goalies will just miss the puck by a fraction. By increasing the glove size not only will it increase the amount of saves, but it will also help players get better at shooting. Hypothesis: I believe that by using kinematic coupling, adhesive nano engineering, and an origami design, it can help goalies stop more pucks while still being able to move like a regular glove. Starting with the origami design, the glove only squeezes so far so the puck can fall out easily as the design leaves a gap. So an origami design will maximize the catching ability. By using kinematic coupling we can squeeze easier by transferring our kinetic energy through reinforced carbon mechanisms. We use adhesive nano engineering so the puck is able to stick to the glove because there is a chance that the puck hits the part without netting. We use it so it sticks when it makes contact and it will help with rebound control. I believe there are multi commercial uses, such as Fishing and other prototypes.*

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3609 - Junior (Grades 7-8) - Computer and Engineering Sciences

### **The Homemade Lightbulb**

By: Christian Walkey-Levesque and Logan Steinberg

*Christian and Logan together with different house hold items made a lightbulb function without an outlet source of energy.*

## **Junior (grades 4-6): Physical and Mathematical Sciences**

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3701 - Junior (Grades 7-8) - Physical and Mathematical Sciences

### **Splatter Science**

By: Jaxon Blacklock and Alex Sangster

*Alex and I plan on opening our own law firm in the future. We decided to explore forensic science and investigate if we could identify different blood splatter based on the object. We tested different objects and the splatter they created. We soaked a sponge with simulated blood. The sponge was placed in front of a white backdrop and hit once to create splatter on it. This was repeated three times with new backdrops for each object. We used objects with different surfaces to replicate different impacts. A hammer was used for heavyweight, a spatula for lightweight, a book for flat surface, and a baseball bat for*

*cylindrical surface. We analyzed the splatter created on each backdrop. Splatter can be broken down into low, medium and high velocity droplets. In order to differentiate the splatter of each tool used, we researched the different kinds of splatter droplets, including differences in velocity, angles and size. We found the heavier objects created more medium velocity droplets and lighter objects created larger more concentrated low velocity droplets. We observed no high velocity droplets, which are often created from high energy explosions and gunshots. The cylindrical object created a scattered pattern where the flat surface created concentrated lines. We found the shape of the object does create different splatter and concentration of droplets. Splatter science is used in a variety of ways to tell a silent story. Forensic scientists help catch criminals and prove/disprove self defence claims.*

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3702 - Junior (Grades 7-8) - Physical and Mathematical Sciences

### **Cloudy With A Chance of Radiation**

By: Thomas Boustead and Lucas Pearce

*Our goal was to find out how different objects with different properties would interact with radiation when put with a radioactive isotope and what it would do if they could interact.*

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3703 - Junior (Grades 7-8) - Physical and Mathematical Sciences

### **Can you spot AI**

By: Maddison Jory

*My project is one whether you can recognize if an image is real or AI*

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3704 - Junior (Grades 7-8) - Physical and Mathematical Sciences

### **Cabbage Chemistry**

By: Emma Kohut

*The project is about testing to see if red cabbage water can be used for pH testing. A base is something with a pH of above 7. An acid is something with a pH lower than 7. PH stands for power of hydrogen. Red cabbage contains anthocyanin which is the chemical necessary for the project. I tested this method because it was interesting. I used multiple clear and preferably colorless solutions, and tested it beforehand with an actual pH tester and then compared the two. The predictions I made were pretty accurate so yes you can use red cabbage water for pH testing.*

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3705 - Junior (Grades 7-8) - Physical and Mathematical Sciences

### **Static Electricity**

By: Daniel Murphy and Miles Scott

*In summary, our project compares the distance the aluminum leaves in the electroscope spread when experimenting with different conductors. Specifically, a rubber rod with wool cloth, a glass rod with silk cloth, and a balloon with human hair. The purpose of our experiment was to determine which materials conducted the most electric charge through experimentation. Static electricity occurs when electrons are transferred between materials, creating a buildup of charge. Based on our results, the rubber rod and wool cloth conducted the largest electric charge, and therefore spread the aluminum leaves farther apart than our other two materials. Of course, as in any experiment, there were multiple sources of error. These included, inconsistent rubbing times, the distance between the rods/balloon and the electroscope, and the deterioration of the materials after constant use. Our hypotheses stated that the rubber rod and wool*

cloth would produce the most favorable results due to the rubber's ability to highly attract electrons. Also, rubber rods are insulators, and insulators respond positively towards electroscopes, therefore giving it an advantage over the other materials. In the end, we concluded that our hypothesis was correct, and the rubber rod and wool cloth produced the highest results during this experiment. To ensure our findings were as accurate as possible, we repeated the same experiment with all 3 materials 5 different times, and averaged the results to get an accurate set of findings. Overall, this experiment helped us understand how different materials create and transfer static electricity, when dealing with an electroscope.

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3706 - Junior (Grades 7-8) - Physical and Mathematical Sciences

### **Drawn Together**

By: Tyler Smith and Logan Troy

*Our project, Drawn Together, is a scientific experiment that explores how strong the magnetic attraction between 2 magnets. To measure how distances affects magnetic force, we separated 2 magnets using pieces of cardboard, each pieces measured at 3 millimetres thick. By increasing the layers of cardboard we were able to observe the magnetic attraction change after each individual piece of cardboard was placed between the magnets. In addition to the experiment, we studied how magnetism is used in the world and explained the science behind how magnets work including the concept of magnetic fields. We researched examples such as Earths magnetosphere and electric vehicles (EV's), where magnetism plays a important role in functionality and efficiency. We also added a sustainability statement to ensure that all materials used in our project will be recycled or reused after the science fair is completed. This reflects our commitment to reducing waste and promoting environmental responsible practices. The goal of are project is to help others understand how magnets work, what the factors are that affect magnetic force, and the importance of magnetism in everyday life.*

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3707 - Junior (Grades 7-8) - Physical and Mathematical Sciences

### **Exploring Magnetic Feilds**

By: William Tamblyn-Sabo

*My project is on magnetic fields and how they affect each other. In my project I show two sets of magnets' magnetic fields at different distances and orientations. I do this by using iron filings to reveal the shape of the magnetic field. I also talk about the poles of a magnet and how poles interact with each other. I explore magnetic attraction and repulsion, and why they happen. The project has ten sections: Introduction, Objective, Hypothesis, Problem, Materials, Procedure, Photos, Observations, Key Terms, and Conclusion. I have three interactive activities for visitors which show magnetic fields, repulsion, attraction, and general magnetism. I showcase my project on a trifold display board.*

## Intermediate (grades 9-10): Earth and Environmental Sciences

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4401 - Intermediate (Grade 9-10) - Earth and Environmental Sciences

### **Effective and Eco-Friendly Cleaning: Analyzing Chemical vs. Organic Cleaners on their Effectiveness and Environmental Impact**

By: Ella Baklinski

*Our everyday household cleaners are filled with chemicals and additives that are toxic and dangerous to the environment. Inspired to help protect our water structure and plant health, I created a natural all-purpose cleaner with only four ingredients: distilled water, vinegar, lavandula angustifolia (lavender oil), and the Thieves Essential Oil blend. Both of these essential oils are mood enhancers, lavender oil is antiseptic, and Thieves oil has antimicrobial and immune-supportive properties. I tested my cleaner against leading brands of chemically based cleaners: Lysol Spray, Mr. Clean, Dawn dish-soap, and water as a control. I evaluated the cleaners in six different ways: smell, cleaning surfaces with grease and dirt, diluting the products and watering plants with the mixtures, adding some of the diluted blends to water and testing them for drinking water toxicity, and finally, testing for effectiveness in cleaning bacteria. I predict that the natural all-purpose cleaner will smell the best, have little to no effect on the plants and drinking water, and clean decently. In contrast, it seems likely that Mr. Clean will have the strongest negative effect on the plants and water structure while cleaning the most effectively. The project is still in progress, and complete results will be presented on fair day.*

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4402 - Intermediate (Grade 9-10) - Earth and Environmental Sciences

### **Contamination Experiment**

By: Kiera LeVon

*My science fair project will be conducting a test about nuclear contamination and what multi-barrel system works best to protect the ground water. In my experiment, I will be testing water contamination across 4 different layers of materials used normally to bury nuclear waste. I will be using dyed water to measure the "contamination" across the 4 different trials. I will be using bar graphs to show the average time for "contamination" and the "average contamination level" from my experiment. An inspiration for my project is the Onkalo Spent Nuclear Fuel Repository, in Finland. There are multiple barriers to protect soil and groundwater at Onkalo. My overall goal of my project is to see what is the best way to protect ground water and soil from contamination by nuclear waste.*

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4403 - Intermediate (Grade 9-10) - Earth and Environmental Sciences

### **A Novel, Biodegradable Treatment to Limit Drought and Wildfire Disaster and Retain Soil Nutrients**

By: Claire Sehn

*Our planet is facing serious environmental crises: global warming is causing wildfires, drought is decimating agricultural yields, and waning soil fertility is hindering crop growth. Current approaches to address these issues are generally singular in focus and limited in efficacy. A biodegradable treatment, capable of retaining moisture, limiting combustion, and sustaining nutrients, could address these environmental challenges simultaneously. A novel treatment was engineered consisting of hydrogels created from pineapple peel, pine needles or corn husk; calcium carbonate from milled mussel shells; and engineered wheat-based biochar. Four treatment groups including a control were applied to 20 soil samples and the moisture percentage was measured daily for five days. Treatments were applied to 40*

wood samples and were subjected to combustion tests. Four different combustion studies were measured. Trials involving mussel shells and biochar or the combination were brought to equilibrium in a 10 parts per million fertilizer:water solution and the nutrient adsorption percentage was measured using ion-chromatography. The triple combination treatment demonstrated the ability to mitigate effects of wildfire and drought by improving water retention ( $p < 0.05$ ) and limiting fire combustion ( $p < 0.05$ ) using standardized tests. The treatment was also effective in adsorbing phosphate and nitrate, thereby improving soil health. BET surface area analysis demonstrated that the engineered biochar had a porosity of  $2\text{m}^2/\text{g}$ . Raman spectroscopy and infrared spectrometry validated the structural characteristics of the engineered biochar and compost-based hydrogels. This study demonstrates the efficacy of manufacturing compost-based environment-protection treatments from materials readily available in Canada.

## Intermediate (grades 9-10): Health and Life Sciences

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4501 - Intermediate (Grade 9-10) - Health and Life Sciences

### Seeing is believing . . . or is it? Investigating the McGurk effect

By: Maryam Abid and Gabrielle Barona

*Our project investigates the McGurk effect. The McGurk effect is an illusion observed by showing people an edited video where movement of someone's mouth does not match the word or sound being vocalized, causing the brain to interpret what they are saying as something completely different. To investigate the occurrence of this illusion, we conducted an experiment of over 100 individuals showing them a video of one of us speaking. The first word said is "bill" with the lips also reading "bill". The second time however, the audio says "bill" again but the lips read "gill". According to scientific studies, some people's brains merge the "b" and the "g" to create a new sound, most commonly "d". We observe how often people fall for this illusion, and if its occurrence varies across different ages, sexes, and neurological/cognitive/neurodevelopmental differences. Such studies lay the foundation for future studies to explore if a person's susceptibility to this illusion relates to their learning styles, potentially allowing educators to better understand the learning needs of their students, thus helping them support their students better.*

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4502 - Intermediate (Grade 9-10) - Health and Life Sciences

### The Neuro-survival tactic

By: Kossy Akaeze

*"Project still in progress" Background/ introduction: Our brain is a lazy thinker and uses only 20% to process its abundance of data. Our ancestors developed heuristics or mental shortcuts in order to save time and survive. Heuristics are still here today but now it can take the form of unconscious bias regarding race or gender. Purpose and Hypothesis: This study is meant to investigate the reinforcement of those heuristics through the media. My hypothesis is that positions of power would be associated with male while more nurturing roles are associated with women. Results: Conclusion: This study shows that social roles are assigned early on in childhood. This information can be incredibly useful for parents/teachers who want to help their children see that anyone is capable of being a leader or caregiver, helping them prevent stereotypes.*

## Intermediate (grades 9-10): Physical and Mathematical Sciences

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4701 - Intermediate (Grade 9-10) - Physical and Mathematical Sciences

### The Relationship Between Loop Radius and Minimum Velocity Required for Circular Motion

By: Alexander Arrigo and Thuversan Uthayakumar

*This experiment aims to investigate the relationship between a loop's radius and the minimum velocity required to overcome gravity at its peak. Through this experiment, I determined the threshold where centripetal acceleration matches gravitational pull, ensuring the cart completes the vertical loop without losing contact. This experiment explores the physics of roller coaster loops, specifically the relationship between size and speed. Based on the law of conservation of energy, I hypothesized that the minimum velocity required at the loop's peak is  $v = \sqrt{gr}$ . Essentially, as the radius of the loop grows, the cart's starting speed must also scale up according to the square root of that radius to ensure it never loses contact with the rail. For this experiment, a 3D printed circular loop was used to demonstrate the roller coaster cart going on a track through a loop. A simulation was used for a different type of loop called a clothoid loop. A clothoid loop has a much smaller radius at the top of the loop; a circular loop has a much bigger radius at the top of the loop. These different types of loops provided differences in the experiment. Increasing the radius at the top of the circular loop proved to affect the minimum speed required to complete the loop without falling off the tracks. Since the radius is smaller at the top of a clothoid loop, it requires less speed for the cart to complete the loop. Therefore, the radius matters for the minimum velocity required.*

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4702 - Intermediate (Grade 9-10) - Physical and Mathematical Sciences

### Minimizing Aerospace Drag by Optimizing Nose Cone Shape and Angle

By: Daxton Etherington and Carter McGill

*Research Question: To investigate the effect of cone angle on the drag force of a supersonic aircraft. Project Summary: The cost of air travel has skyrocketed in recent years along with the amount of pollution provided by supersonic aircraft. Aerospace engineers are constantly looking at ways to improve efficiency. One variable that we are focusing on is the angle and shape of the cone. Based on research the optimal cone angle that creates the least amount of drag is 42 degrees on a rounded cone shape. A small scale wind tunnel has been constructed that is used to test the effect of cone angle on the drag force on a 1/48th scale model plane. Drag forces will be measured using video physics software that tracks the velocity of air moving past the model plane. Initial trials reveal a weak correlation between the cone angle and drag force. Independent variable: angle of nose cone; Dependent variable: drag force; Controlled variables: mass of plane, Temperature, Time of data collection, Materials used to build nose cones, Angle of video camera*

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4703 - Intermediate (Grade 9-10) - Physical and Mathematical Sciences

### The Effect of Barrel Length on Projectile Distance in a Combustion-Based Launcher

By: Lucas White

*This experiment investigates how barrel length affects the distance travelled by a projectile launched from a potato gun. This topic was chosen to better understand how acceleration and force influence motion. It is hypothesized that longer barrel lengths will result in greater distances, as the projectile will be exposed to accelerating forces for a longer period of time. In this experiment, a potato gun was fired at a constant angle of 30° and a fixed height of 76.2 cm. Five different barrel lengths were tested, and each*

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configuration was trialed three times. The distance travelled was measured and averaged. The results showed that longer barrels generally produced greater distances, supporting the hypothesis. This is because the expanding gases from combustion apply force over a longer distance, increasing the velocity of the projectile. This experiment demonstrates principles of projectile motion, Newton's laws, and the relationship between force, acceleration, and distance. External factors such as wind may have affected the results and are considered a limitation.

## Senior (grades 11-12): Earth and Environmental Sciences

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5401 - Senior (Grades 11-12) - Earth and Environmental Sciences

### Effects of Fungi on Plastic Degradation

By: Henry Elliott and Seth Gibson

*This project provides insight into the effects of Pestalotiopsis microspora on macro (larger than 5mm) and micro (between 1nm and 5mm) plastics composed of polyethylene terephthalate. It will explore the use of this fungus to potentially use plastic as its sole carbon source to help degrade polyethylene terephthalate more quickly, promoting environmental safety and non-hazardous disposal of the potentially harmful chemicals the plastics contain. Research has been done into what different fungi can break down plastics more effectively, and hypotheses have been created speculating whether these can be used on a larger scale to efficiently and safely break down polyethylene terephthalates. This solution, while known, still has not been utilized to its full potential. This project seeks to analyze this reaction by testing it in a controlled environment. Multiple types of plastic will be tested as well, to see which plastic type the Pestalotiopsis is most efficient at breaking down. The hypothesis is that Pestalotiopsis microspora will use the plastic enzymes to grow its culture, essentially consuming the plastic and neutralizing its environmental impact, but the exact details are not yet known about which plastic the fungi is most effective at growing off of. Project is still in progress, complete results and conclusions to be presented on the fair day.*

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5402 - Senior (Grades 11-12) - Earth and Environmental Sciences

### The Effects of Saltwater on Freshwater Plants

By: Leah Ferguson

*This project is a test to see how road salt affects our freshwater plants. Canada has just had one of the most intense winters in a decade, so communities had to salt their roads to ensure safe driving, but what kind of effects could this have on the environment and our freshwater plants. The hypothesis is that the roadsalt will cause weakness in the plants, lowering growth rate, and the salt in the water will actually dehydrate the samples by pulling out the water, then causing wilting. To prove this theory, using ten field corn samples (which are widely grown across Canada) and then watering them with five different levels of salinity starting at zero and increasing the level of salinity by five for each sample (doing two of each sample to make sure there are no errors), this experiment should take about four weeks. In order to make sure that the effects are very easily observable, the samples will first be grown till they have started to sprout, about one week after planting, so that the effect can be easily spotted. During this time, observe any changes to growth rate and leaf color. This experiment should highlight the osmosis stress within the plants, which is the drawing of the water out of the cell, causing the plant to die from dehydration. The results of the project are still in progress; complete results and conclusions will be presented on the fair day.*

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5403 - Senior (Grades 11-12) - Earth and Environmental Sciences

## Removal of Aquatic Microbial Biocontaminants with Ozonide: An Assessment of Apoptosis in

### Wildtype and CRISPR-Cas9 iPT Homozygous Knockout Cell Lines

By: Ella Sehn

*Microbial blooms biocontaminate the drinking-water sources relied on by over 100 million people worldwide. The removal of these water biocontaminants could substantially improve global health. Recent microbial studies have identified an indirect connection between the gene iPT and cell stress-tolerance, but its implication in regulating cell survival remains incompletely understood. Ozonide is a chemical capable of lysing cell membranes through depolymerization. The objectives of this research were twofold: first, to determine the functional implications of iPT in regulating cell survival, and second, to determine the capacity of ozonide to induce apoptosis (cell death) in microbial cells. iPT was deleted from the Euglena Gracilis genome using CRISPR-Cas9 to create a line of homozygous iPT knockout cells (-/-). Apoptosis was assessed in these knockouts in comparison to wildtype cells (+/+). Second, the capacity of ozonide to induce apoptosis in both cell lines was assessed by its application in concentrations of 10, 100 and 1000 µg/mL. To quantify apoptosis, four assays were employed: DNA and RNA electrophoresis, cell viability and RT-qPCR for Metacaspase gene expression. The -/- cells showed far lower viability and higher expression of the Metacaspase genes. Further, the application of ozonide resulted in a substantial increase in apoptosis, as shown by hallmark ladder-patterns in the DNA and RNA electrophoresis, low cell viability and upregulation of the Metacaspase genes. Statistical analyses are currently ongoing. These results revealed a novel function of iPT in regulating cell survival. Additionally, ozonide was identified as a novel treatment for microbial blooms with potential to benefit global health.*

## Senior (grades 11-12): Health and Life Sciences

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5501 - Senior (Grades 11-12) - Health and Life Sciences

### Nourishing the Mind: Diet's Impact on Alzheimer's Biochemistry

By: Zena Muhandes

*Alzheimer's disease is a progressive neurodegenerative disorder that is characterized by gradual neuron death, behavioral change and physical disabilities. Unfortunately, it is incurable; research and clinical trials suggest that diet and nutrition play an important role in supporting brain health and reducing neuron damage. This project aims to investigate how food rich in antioxidants and enzymes may help reduce the progression and symptoms of Alzheimer's disease. By testing oxidative stress, protein aggregation and plaque formation, it can portray the effects of them on the brain. The purpose of this study is to examine if specific dietary components could help reduce neuron damage that occurs with Alzheimer's disease. Three experiments were conducted to model such effects. The first experiments examined oxidation using apple browning as a visual of oxidative stress; it also demonstrated how antioxidants like lemon juice can slow oxidation. The second experiment modeled abnormal protein aggregation using egg white to compare the effects of antioxidant-rich foods like blueberries, turmeric and green tea to acidic conditions. The third experiment tested enzymatic activity by observing how fresh and canned pineapple juice affected gelatin breakdown using an enzyme called bromelain, representing protein plaques. The results showed that antioxidant-rich food significantly reduced oxidation and protein compared to the control samples. Turmeric and green tea demonstrated the strongest effects against aggregation. Whole*

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*fresh pineapples show the highest enzymatic activity. These findings support the hypothesis that antioxidants and enzymes are a crucial part of protecting the brain, limiting harmful protein buildup and reducing oxidative damage. While this study does not aim to cure Alzheimer's disease, it shows the important role diet plays in managing symptoms and supporting brain health. The finding supports the pre-conducted finding that dietary approaches like the mediterranean and MIND diets, which contain fruits, vegetables, and healthy and lean proteins are the best to support those with Alzheimer's.*

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5502 - Senior (Grades 11-12) - Health and Life Sciences

### **A Scald-Faced Lie: Never Burn Your Mouth Again**

By: Noah Nowak

*A Scald-Faced Lie: Never Burn Your Mouth Again is a science fair project that explores how thermochromic technology can be used to prevent burns from hot beverages. People often rely on guesswork to decide when a drink is safe, which can lead to painful oral scalds and burns. This project aims to provide a simple, visual warning system by using wooden stir sticks, carefully coated with layers of 100% safe thermochromic paint that changes color at specific temperatures to indicate potential danger. Thermochromic materials are designed to react at precise temperature thresholds. In this experiment, paints with different activation points are applied to stir sticks and tested in hot liquids such as coffee or tea. When the liquid is above a certain temperature, the paint displays a warning color; as it cools, the color changes to signal that it has become safe to drink. The project evaluates how clearly and consistently these changes occur, as well as how easy they are for users to interpret. An important aspect of this design is sustainability, practicality and price. The coated sticks still function as normal stir sticks (and sometimes even spill-sticks), meaning no extra materials are wasted for the sake of the indicator. This project combines chemistry and health science to create a low-cost, reusable tool that WILL help reduce everyday burn injuries in a simple and effective way.*

## **Senior (grades 11-12): Computer and Engineering Sciences**

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5601 - Senior (Grades 11-12) - Computer and Engineering Sciences

### **Designing and Testing a Magnetic Levitation System to Reduce Friction in Transportation**

By: Phoenix Fleming and Ryerson McBride

*This project investigates how magnetic levitation can reduce friction and improve motion compared to traditional wheeled systems. This topic was chosen to explore how modern transportation technologies, such as maglev trains, achieve high speeds and efficiency. It is hypothesized that a magnetically levitated model will experience less friction and travel more efficiently than a wheeled model, resulting in increased distance or smoother motion. In this experiment, a small-scale magnetic levitation track will be designed using magnets and lightweight materials to simulate a maglev system. A comparable wheeled model will also be constructed. Both models will be tested under controlled conditions, and variables such as distance travelled, speed, and smoothness of motion will be measured and compared across multiple trials. The results will be analyzed to determine whether magnetic levitation significantly reduces friction and improves performance. This project aims to demonstrate how magnetic forces can be applied to real-world transportation systems to increase efficiency and reduce mechanical wear. Experiment is still on-going. Results will be shared on the fair day.*

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5602 - Senior (Grades 11-12) - Computer and Engineering Sciences

### **Firebird: Autonomous UAV Detection and Monitoring of Wildfires**

By: Isaiah Jalsevac

*Wildfires are an increasing concern as climate change decreases precipitation, causes earlier snow melt, and increases the likelihood of fires. They can cause undue harm to wildlife if left unchecked, cause people to have to evacuate, and cause vast smoke clouds to cover huge tracts of land. Also, wildfires are a huge factor in greenhouse gas emission, releasing massive amounts of CO<sub>2</sub> into the atmosphere. In 2023 more CO<sub>2</sub> was released into the atmosphere from wildfires than from all other sources in Canada combined. Early detection is the most effective method for limiting wildfire damage - a small fire is easy to put out, a raging fire that has been burning for days is not. This project seeks to address gaps in the current detection methods by creating a long range, autonomous UAV, capable of flying for hundreds of kilometers and detecting wildfires from their thermal signatures. This project focuses on three main areas: iterative simulations to design the optimal air-frame for a long range UAV, designed specifically for detecting wildfires; different detection algorithms and their accuracy at detecting wildfires; and different approaches to optimally deploy these UAVs and maximize detection coverage.*

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5603 - Senior (Grades 11-12) - Computer and Engineering Sciences

### **Effect of Different-Shaped Nozzles On Pulse Jet Engines**

By: Bazeltine McGriskin

*This project is an analysis of how the concept of pulse jet engine thrust acts under different circumstances and nozzle types, and aims towards redesigning the usual bell nozzles for jet aircraft. We will be creating a miniature scale engine; the engine itself will be running on basic propane. The criteria for the experiment are thrust force using an anemometer and calculating the exhaust speed of the engine, and pulse speed, using a recording device. The pulse jet engine will be around a foot in length, with the nozzle occupying a total of 8 inches, the combustion chamber and intake taking up a total of 6 inches. The engine will be placed on a mount for safety. We will be seeing if the nozzle of the engine will increase or decrease the total speed of the air behind the engine. A bell nozzle and a small diameter nozzle will be tested to see if the gases expanding outwards give more thrust or if small holes will increase thrust. I hypothesize that the pulse jet engine will be stronger with a tighter nozzle due to the concept of orifice flow; the propane should speed up with it being forced through a smaller gap, which should produce more thrust; nozzles could be changed to offer better thrust based on this data. Experiment still ongoing, Results on fair day*