
Chemistry for the Logic Stage at the Well-Trained Mind Academy

INSIDE

Science Fair Project Abstracts

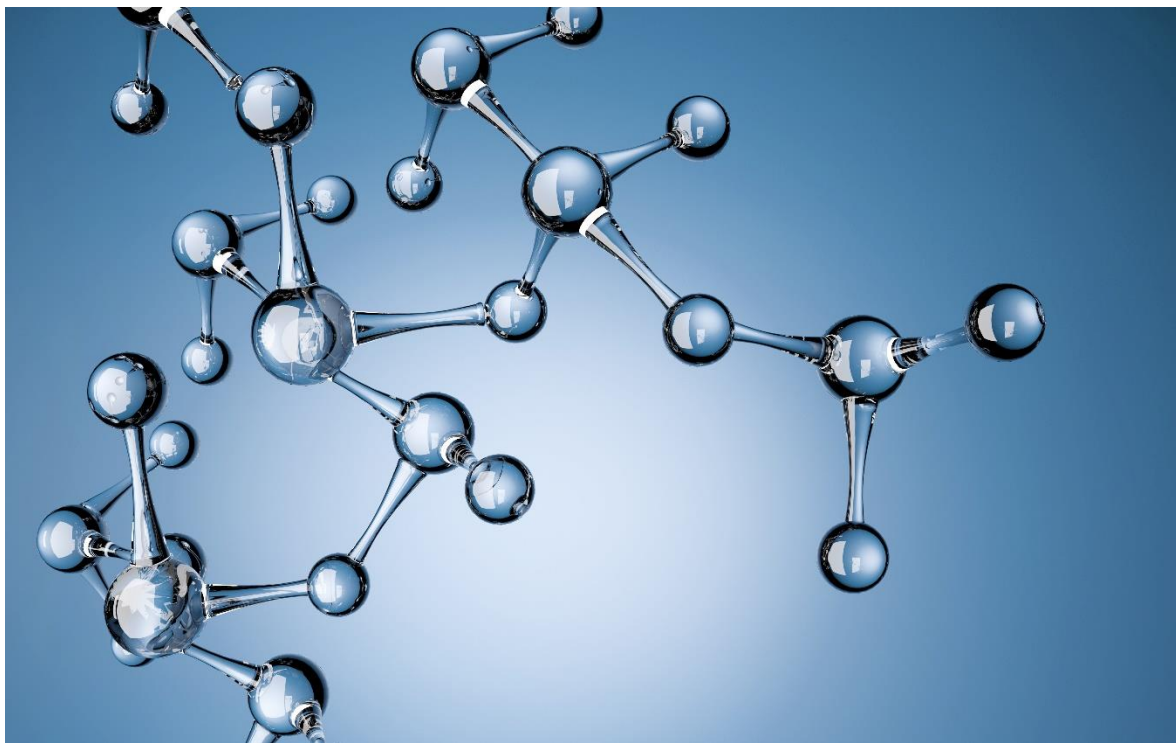
Listed in alphabetical order by student last name

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Complete the States of Matter crossword puzzle

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Find a chemistry cryptogram to decode



Fun Times in Chemistry

by Dr. Furtado

We have learned so much this year in my Chemistry for the Logic Stage class. From understanding the scientific method to learning about nuclear reactions, my class has traveled far in the pursuit of knowledge.

As an end of the year project, students were asked to choose any scientific topic that interested them and apply the scientific method to answer a question related to their topic. They performed their experiments at home with help from their families. I am in awe of the caliber of the research projects they chose, and I am so proud of each one of them.

The following newsletter includes abstracts my students submitted summarizing their science fair projects. I wish I could include the wonderful research presentations they gave in this newsletter! I hope you enjoy reading about these exciting research projects. I'm sure we will see many of these same students published in peer-reviewed scientific journals in years to come.

Students, have a wonderful summer vacation and never stop learning! 🧪



Is Our Air Really Fresh?

By Shalom Arhegan

“Ah, a breath of fresh air!” people say, but now, if we look at it, people are suffering from asthma and lung cancer, so is our air really fresh? In this project, I will be measuring the air quality and the particulate matter in four different locations. I cut eight pieces of an empty milk carton and then pasted them with petroleum jelly, then hung them in four different locations and waited for 3 days to see my results. My hypothesis was that if the traffic (near the park) is similar to the traffic in a high traffic area (near Walmart), then the park would produce more particulate matter because of the addition of pollen, animal dirt, dust, and Volatile Organic Compounds. My hypothesis was rejected and supported, because when I checked my milk carton at the high traffic area, there were more and much thicker particulate matter than the milk carton at the park, also my hypothesis was supported because there was a lot of dust on the milk carton at the park. This experiment is a safe way to measure how good our air quality is and how much particulate matter is in our environment.

Fan-tastic Ice Melting and Cooling

By Abdullah Ahmed

People need to find which way is the most effective for cooling. My hypothesis is that the more powerful the fan is, or the amount of ice the cooler the airflow will be; if Laminar airflow is being used, the water will be better cooled. In my procedure, I first put the bottle and fan together using a soldering and glue gun, I then put the ice inside the bottle and put the tray with water in front; I started my fan. The water cooled differently as the time progressed, but only in small margins. My hypothesis was supported and Laminar was effective, even though the temperature slightly differed at first, it increased over time.





Measuring Specific Heat Capacity

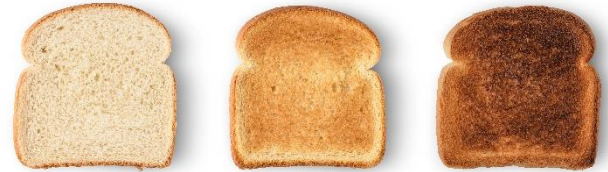
By Gabriel Bast

When I looked to see how much energy is required to heat different liquids such as water, I got varying answers from different books and websites, which was very misleading; the purpose of my experiment is to see how much energy is required to heat one gram of water, (and other liquids) a certain amount. This is extremely important because it is one of the most critical things to know in chemistry, especially for water, and if in the future I need to know how much energy is required to raise one gram of water one degree, or other liquids, I will be able to look back at this, and it could save me many hours of work and help me work more efficiently and precisely. For my experiment, I was able to use the voltage and the temperature increase of the liquids to see the amount of energy required to heat the liquids. Unfortunately, the results I gathered varied significantly each time, so I will need to take the results and calculate the average for them, which will take some time. At the end of the experiment, the results are all over the place, so I'm not sure how accurate they are, however this was expected by me, as there are so many small variables that could have affected the experiment in so many ways, which I will go into depth on later; it has been a valuable learning experience for me, and I now know how to find out amount of energy required to heat a liquid a certain amount.

Rust Removal

by Charles Bea

For my science fair project, I will be seeing what liquid best removes rust. My hypothesis is that Coca-Cola will remove the rust the best. To test it I will let the liquids soak in half of a piece of rust for about 12 hours. The results were that vinegar did the best almost removing all the rust in the process. Overall, my hypothesis wasn't correct but I'm glad I did this experiment.



French Toast and the Maillard Reaction

by James Blevins

Most people just cook French Toast and eat it without thinking about anything but did you know that there is a reaction called the Maillard Reaction when you cook French toast? It makes French toast turns golden brown and for this project, I am going to find out what temperature the Maillard Reaction needs to begin to turn the toast to golden brown and you should learn this so you can make a perfect French toast meal. My hypothesis is if the temperature is set to 250 Degrees Fahrenheit, then the Maillard Reaction will begin. Before the Maillard reaction was discovered, a piece of steak was cooked to about 350 degrees and then it changed. The 2nd pan was set to 5 and the temperature was approximately 350 °F, causing the toast to turn golden brown and giving it an artificial taste.

Boiling Point Changes upon Dissolution

by Gwyneth Borchardt

Do you know how the boiling point of water changes when something is dissolved in it? I investigate if adding substances to water will change the boiling point which will help us understand water better. To do this I measured the boiling point of water as well as water with salt, baking soda, and sugar in it. All of these things I put into seemed to raise the temperature. This helps us understand the fastest way to boil water is not adding anything to it

Battle of the Toothpastes, A Continuation

by Ronan Brooks

My science fair project was about whether switching between multiple toothpastes, or using a singular toothpaste would be more effective. My hypothesis was that it would be more effective to use multiple toothpastes, switching every 12 hours. I placed down six cups, and filled those cups with liquids, and then I placed the eggs, covered in toothpaste, into the cups. Overall, I believe my hypothesis was correct, as the eggs that were switched with multiple toothpastes did the best. I think these results imply that you should use multiple different toothpastes every day for better results.



Sea Stars and Acetic Acid

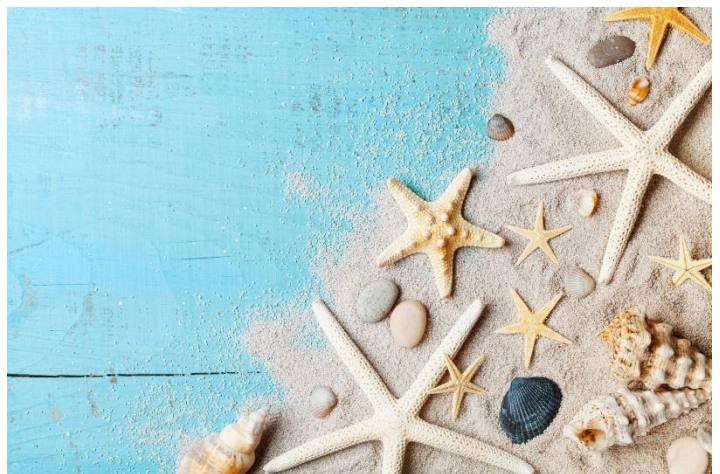
by Sydney Davis

Scientists have resorted to injecting the overpopulated Crown of Thorns Sea Stars with vinegar, an acetic acid, to melt the sea star's body, which is made of calcium carbonate. For this experiment, I tested many acetic acids to see which would dissolve sea stars the fastest. I placed sea stars into glasses filled with different acids, apple cider vinegar, distilled white vinegar, lemon juice, bleach, and finally water for my control. Then I left them undisturbed for four days, taking photos periodically. As a result, the sea stars in water remind the same, while the lemon juice, apple cider vinegar, and distilled white vinegar made the sea stars much more flexible but they did not fully dissolve. But the bleach completely dissolved the sea stars soaking in it and did it within a few hours.

Investigating the 5 Second Rule

by Bronwyn Burnside

People are always talking about the "5 second rule" and how it works, but does it really work? This experiment was to see if the rule is fake or not. In this experiment, I put 6 apples under varying times when dropped on the ground. One was not dropped, one was dropped for 5 seconds, one was dropped for 10 seconds. The other three were dropped on the ground with raw fish rubbed on it. One was touched to the ground, one was dropped for 5 seconds, and one was dropped for 10 seconds. The results were nothing I expected, the one dropped for 5 seconds was the one most harmed. The only other things that grew were a little dark spot on raw fish touched and raw fish 5 seconds. So, my experiment only half fulfilled my expectations, with 5 seconds growing worse bacteria than 10 seconds on both raw fish and normal.



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States of Matter Crossword Puzzle

Saturated	Motion	Liquid
Solvent	Solution	Condensation
Evaporation	Solid	Kinetic
Boiling	Sublimation	Diffusion

Fight the Fizz: Bath Bombs

by Karen Franco

Bath bombs are relaxing and could be used in a nice bath. The problem is, what makes bath bombs fizz and what if you add more baking soda? My hypothesis is "If I add more baking soda, then the bath bombs will fizz less because citric acid and sodium bicarbonate are the ingredients that make the bath bombs fizz." The procedure would be like making a normal bath bomb, but this time you are adding your experimental amounts of baking soda. In the end, it was the experimental group that dissolved faster because of the amount of baking soda I added, which was one cup more than normal, which is two cups. However, these results came out also due to a mistake I had made when I accidentally added too much water.

Using Batteries to Start Fires

by Cooper Ervin

This experiment is for learning how to correctly light paper on fire with two batteries and what causes it to combust. It'll be very interesting to watch, and the results will be just as interesting even though it's just for entertainment and learning, it'll be a very exciting paper. The most likely outcome is paper slightly light on fire with some sparks although I wish it lit the whole piece of paper on fire and burned it to a crisp. The procedure goes like this I take a piece of tinfoil then fold it into a triangle shape and cut it to be very small in the middle of the tinfoil. I proceed to put one end of the tinfoil on the end of the batterie and put the other end on the other side as it gets very hot, I recommend wearing gloves or using a small stick-like thing to touch the tin foil on the ends. Because of that the tiny strip of tinfoil around the middle of the batterie gets very hot and lights on fire but if it's too thin it will immediately break so you must make very precise cuts in the tinfoil. If you touch the middle of the tinfoil to something flammable for a few seconds, it should easily light on fire and start burning.

Cleaning Thermal Paste from CPUs

by David Gietzen

Thermally conductive paste is a critical component of every computer, but a buildup of residue from previous applications can be catastrophic to a device's speed and life expectancy. These grey remnants are notoriously difficult to clean. Most sources promote the usage of a solution of 90% Isopropyl Alcohol, but the effectiveness of that is limited when dealing with several-year-old applications. In this experiment, several solvents were applied to their respective CPU's and let sit for an hour. Afterwards, the residue was wiped off, and the effort required to do so was charted. Going into this experiment, I had hypothesized that the solution of 30% Hydrogen Peroxide would create the most favorable results. That was reinforced by the results of the experiment, which showed the Acetone (100% C₃H₆O) as a close second. This research highlights a much more powerful solvent to save time, energy, and insure the well-being of your system.

What Prevents Apples and Bananas from Browning?



by Abigail Goggin

If you've ever left a cut apple or banana out on the counter for a few hours, you know that while it might taste okay, it looks weird, mushy, and brown. In my science fair project, I tested out different ways to keep your apples and bananas looking great for days at a time! I tested my hypothesis, that lemon juice would work best, by taking five slices of each fruit and pouring a teaspoon of different liquids (and a couple of solids dissolved in water) and watching how brown each slice of fruit was after 48 hours. For my results, I rated the level of browning on a scale of one to ten and saw that salt water actually worked the best—on both apple and banana—and that honey-water on banana and vinegar on apple are not the solution to browning. Now when I want to bring some pre-sliced apple with me when I go out of the house, I know exactly what to do!

Sodas and Dental Health

by Alden Hall

The purpose for my experiment is to find the healthiest soda on the market and compare its effects to other healthier sodas. Sugary drinks are very unhealthy, and wreak havoc on your teeth, causing cavities, weakening tooth enamel, and allowing more bacteria to grow. Two teeth were put in two glasses, one glass filled with 250 milliliters of sprite, the other with 250 milliliters of coke. After 48 hours, the coke tooth clearly had more damage and discoloring than the sprite tooth, proving my hypothesis. In conclusion, sprite is the healthier and safer soda to drink, while coke will pose a much larger treat to your dental health.

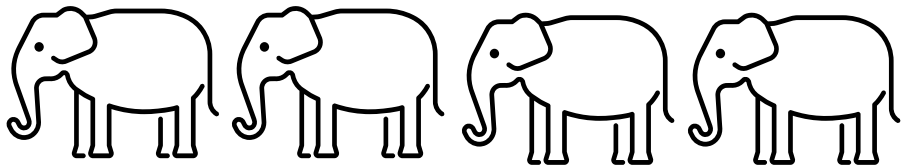
ZnO vs Mineral Sunscreens

by Spike Jones Stedman

People are always saying that certain types of sunscreens are more protective than others. In this case, we will be testing which sunscreen is more protective, between Zinc and Mineral sunscreen, in broad daylight. I will be testing the sunscreens on UV beads, which change color when exposed to UV rays. There will be a control bead (no sunscreen) a zinc covered bead and a mineral bead. My hypothesis was that if the zinc bead and the mineral bead are in the sun for the same amount of time, the mineral bead will be a lighter color than the zinc bead suggesting the mineral sunscreen is stronger and therefore better. However, my results did not support my hypothesis, because the zinc bead was lighter than the mineral bead.

Elephant Toothpaste

by Wania Khan



Have you ever wondered if a higher or lower concentration of hydrogen peroxide affects its rate and speed? And does it impact the process of its breakdown? This experiment of Elephant Toothpaste tested these differences between 3% and 6% hydrogen peroxide. The procedure used the same amount of both concentrations, and some dry yeast, water, and liquid dish soap was poured in both the bottles containing the hydrogen peroxide. My hypothesis was that the 6% hydrogen peroxide will produce more foam (aka. elephant toothpaste) in a shorter amount of time, due to its high concentration. The results showed that the data was supported by my hypothesis! So, a higher concentration impacts the process of breakdown and affects the rate and speed of the reaction.



How Fast can we Grow Grass?

by Anna Hubschman Slepakoff

A lot of people want backyards full of lush green grass; is water the best option or is there something better we can use? In this experiment, I looked at if watering grass with different liquids has a positive or negative effect on how fast grass grows. My procedure for this experiment was I watered plants with different liquids and monitored them for almost 4 weeks. My independent variable was the liquid that I watered the plants with, and my dependent variable was how many seeds grew and how healthy the plants were. The results of my experiment were that the seeds watered with coffee and water appeared first. However, the seeds watered with water grew more sprouts than the seeds watered with coffee. The purpose of this experiment was to see if it's possible to make plants grow faster if they are watered with a different liquid than water.

Household Cleaners: How they Effect Bacterial Growth

by Zoe Kyler

There are a various number of disinfectants out there, but which ones work best? This experiment can help prevent someone from getting sick by using proper cleaners. Sterile cotton swabs were used to swab different sections of the floor and then let the bacteria grow in ten identical agar petri dishes, each with a different cleaner, which was the independent variable; then, the amount of bacteria were measured (the dependent variable). My hypothesis is that if I use cleaners, then the bacteria will die. Ultimately, the lemon juice had the most, with nearly six square inches of streaky bacteria. This experiment showed the importance of using the right cleaners and met the initial objectives for the design.

The Effects of Soaking Wood

by Johnny Matteucci

For my Science Project, I chose to see if the weight of wood is affected by soaking in certain liquids after it's been dried. My hypothesis was that "If liquid affects the weight of wood after it's been dried, then the piece that was soaked in alkaline will be heavier than the pieces that were soaked in acid or neutral.". For the procedure, I soaked three pieces of wood in different liquids (Citric acid, baking soda and water, and water), and weighed them before and afterwards. All of the pieces of wood started at 1 $\frac{3}{4}$ ounces, and both the acid and alkaline pieces ended at 1 $\frac{5}{8}$, with the neutral staying the same. It can be logically drawn, then, that both acids and bases have a negative effect on wood, at least in the weight category, and that my original hypothesis was wrong; alkaline lost just as much weight as acid did.



What Type of Food do Ants Prefer?

by Santiago Lopez Carman

This science fair project is to see what type of foods ants prefer. In this project, there will be various foods put out for ants, and see which foods they will choose out of most. My hypothesis for this science project is: If the foods have more sugar (natural and artificial) then the ants will like them more. Basically, what the hypothesis is saying, is that ants will go for the foods with sugar. This project could be important so that people could know which foods would be safer put away or left out. This could come in handy on certain occasions where you don't have a fridge. Example: On hikes or camping trips. To understand this experiment, the plates should be visited and observed frequently, as to not miss any activity. The food with most ants will obviously mean that the ants are most attracted to that particular food. To do this experiment, place the different foods on plates, place the plates where ants can get them, and monitor ant activity. After running the experiment, the results were that honey got the most, with 45.26% of ants. So, after taking the results into consideration, it is mostly recommended that you put your food away during camping and hikes.

Can Plant Roots Prevent Erosion?

by Mio Moser

Soil erosion is a serious problem in many agricultural areas worldwide, which leads to lower crop yields, loss of soil and fertilizer, and water pollution. This science fair project explores whether plant roots can prevent erosion by stabilizing the soil. My hypothesis is that plant roots will be able to prevent soil erosion to an extent, due to the plant's roots being able to stop runoff. Three plastic bottles were halved and filled with soil, one of which contained grass seeds, the second of which contained leaves, and the third of which contained just soil. After the grass had grown, water was added to each bottle and allowed to drain through the cap. This experiment shows that soil runoff was significant in the bottles with soil and leaves, while the grass bottle was successful in preventing nearly all erosion. This science fair project suggests that grasses, if applied appropriately, could help prevent massive amounts of agricultural runoff from entering ecosystems, indicating a potential solution to the significant problem of soil erosion.

Dissolving Eggs using Acetic Acid

by Reese Mixer

The goal of this project is to see how long it takes for an eggshell to completely dissolve in distilled 6% acidity white vinegar. I researched similar projects and found projects that used distilled 5% acidity white vinegar, and it took about 36 hours for the eggshell to dissolve, so my hypothesis was that it would take about 24 hours for the eggshell to dissolve. In order to perform this experiment, first place one raw organic brown egg in bowl, fill the bowl that has the egg with 2.5 cups of distilled 6% acidity white vinegar, check eggshell every three hours and check one final time at 9:00 p.m. until 8:00 a.m. the next day, then continue checking every two hours until noticing significant change, then check every hour until eggshell has dissolved. My hypothesis was incorrect because it took at most 16 hours and 45 minutes for the eggshell to dissolve in the distilled 6% acidity white vinegar.

The Physics of Diving

by Anabelle Muir

My science fair project is about finding out how high an object will go if placed on a small homemade diving board, where the part of the board that hangs off a table varies, using an equation found on the internet. If the diving board is made from a meter-long ruler and a clamp, then putting the ruler at different lengths hanging off the table will be like putting the fulcrum at different settings on a diving board. My hypothesis is that if an object is placed on a wooden ruler that is clamped and hanging off a desk then, the heavier the object is the more the ruler will be depressed, and how much the ruler hangs off the desk will also change the depression because the spring constant, k , is equal to the weight of the object times the gravitational pull of the earth (9.8 m/s^2). I first set up my "diving board" and put three objects on the board at the three pre-determined distances off the table measuring how much the board was pushed down as I went. Using the information gathered, I put it into my equation and got my results. My hypothesis was supported, the heavier objects pushed the board down more which gained greater numbers using the equation. However, my results do not account for how the diver feels about having to "wait" for the board as it oscillates more at higher fulcrum settings.



Making Plastic from Milk

by Madeline Perry

Plastic has been an ongoing problem in worldwide pollution, harming water sources, animals, humans and just the earth in general. By creating a biodegradable plastic out of milk, the globe can reduce milk waste and lower the production of greenhouse gasses. Casein plastic has been used to make buttons on clothing since the twentieth century, making me believe that this plastic can withstand different temperatures and pHs. I tested the casein plastic in bases, acids, neutral solutions, and at different temperatures. I used the oven, and freezer to mimic different temperatures that one would see in a hot car, or in a cold climate. After an hour, I recorded my observations, and weighed the casein plastic, repeating this step again after 24 hours. The experimental results supported my hypothesis after 1 hour, but not completely after 24 hours. After one hour, the casein in the solutions became slimy; but they did not melt, crack, or dissolve. But after 24 hours, the casein plastic had begun to dissolve in the base and had also become far more slimy. Overall, my results supported my hypothesis, but maybe instead of using raw extracted casein plastic, I could add a material or solution to strengthen the casein.

Battle of the Batteries

by Enso Reese

Batteries, one of the most commonly used sources of electricity, are non recyclable, and when improperly disposed, contribute to water and air pollution. In this project, I will tackle said issues by creating environmentally friendly batteries using a potato and lemon, comparing the voltage of each. My hypothesis is if a lemon contains more acid than a potato, then it will likely produce more ions, transmitting electrodes more efficiently. I began by inserting a copper coin and galvanized nail into both potato and lemon, measuring the voltage of each. My hypothesis was supported as the lemon produced a higher voltage than the potato.

Rocket Roller Skates

by Malcolm Russell

This science fair is for knowing the most powerful ratios of vinegar and baking soda so we can make rocket skates and/or rockets with ants in them. If we can create rocket roller skates that only use vinegar and baking soda, then it will not heat up someone's feet during use, it also doesn't use any actual rocket fuel which makes it use less valuable stuff and it isn't likely to blow up the person. I put vinegar into a bottle and then put on a balloon with baking soda inside, tip the balloon and then measure how long the reaction took and the diameter of the balloon. My hypothesis was that more baking soda and less vinegar made bigger reactions, but the balloons could only hold so much baking soda, 2 tbsp to be exact, so that means I couldn't see if my hypothesis is correct.

Acidity and Electrical Conductivity in Fruit

by Derek Tang

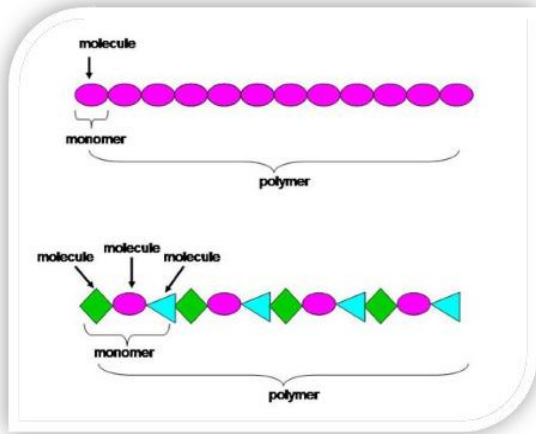
In the 21st century, humans rely heavily on electricity. A material's ability to conduct electricity can be affected by different types of metals and even produce. In my science fair project, I used apples, lemons, and pennies made before and after 1982 with the pennies being an independent variable and the type of produce being the other variable. My hypothesis was that the higher the acidity, the better it conducted, and the pennies made before 1982 would do better than the ones made after 1982. After I recorded the results, I found that the lemons were better at conducting electricity than apples by approximately 200 uA and that pennies made before 1982 were more conductive than the ones made after 1982 by around 20 uA. The science fair project that followed the procedure helped me understand how conductivity works.

Chemistry Cryptogram Fun

Answer on page 11

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Making Casein Plastic

by Katie Thompson

Since the invention of plastic during the space program of the 20th century, many different types of plastic have been created for use in everything from spaceships to packaging materials of everyday items. By researching the process of making casein plastic from milk, acid, and heat, we might be able to learn how to make new plastics or to improve the way we make other plastics today. Given my research, I believe that if I heat milk and then wash it with an acid then it will form casein plastic. First, I heated up milk and then added the acids, stirred them together, let them sit, and then squeezed out any liquid. This rearranged the molecules in the milk to create a polymer (AKA casein plastic). The results proved my hypothesis correct, mixing acids with heated milk does indeed form casein plastic.

Using Chat GPT: Detecting AI Writing

by Lucas Tober Frimel

Detecting ai writing, it a key portion of our future and must be studied to ensure honesty and accuracy. The problem was determining how far we have to go to make sure people can accurately detect the nature of a passage of writing. My initial belief was that humans would be fairly inaccurate however, my results showed that the accuracy was approximately twice the predicted 25% at 57%. In order to gather my data, I gathered a group of subjects and gave them a google document with 10 passages and asked them to identify them. I then recorded results and compiled them and then calculated the average. While the results were better than expected, it still proves that we have a long way to go before we are truly solid in our assessments. Even then, 57% is better than 25%.

Can Liquids with Different pH Levels Properly Grow Scallions?

by Sofia Travaglione

Everyone knows that plants can grow with water, but what about other liquids with higher pH levels? I tested milk, ginger ale, water, sugar water, and baking soda water, to see which liquids did the best with their ph. My hypothesis was that the ginger ale and water would grow well and that the others wouldn't. I placed all the scallion roots in shots glasses and added the proper liquids in each one. My hypothesis was right. The ginger ale did better than the water, and the baking root did well. The milk curdled, and the sugar crusted around the glass and made the root peel off a layer. So, I cut up each root and tested the liquid that came out. The water had a 9.0 pH level, baking soda had an 8.5 pH level, milk had a 5.75 pH level, sugar water had a 6.0 pH level, and ginger ale had a 4.5 pH level. So, even though water can properly grow scallions with a much higher pH than ginger ale, the ginger ale scallion grew better. This is probably because ginger ale has high sugar levels. Conclusion: Scallions grow better with liquids that have a 4.5 pH level.

Effects of Cigarettes on the Environment

by Elizabeth Washecka

For many years, scientists have known that substances (such as nicotine) found in cigarettes are harmful to the human body. In my project, I have examined the differences between tomato plants exposed to cigarette smoke, tomato plants exposed to CBD smoke, and those exposed to no smoke to determine if smoke is harmful to the environment. I got 3 different greenhouses, placed three plants in each, and then built a machine that would smoke the plants; then I smoked 3 cigarettes each day for two weeks. The result of this was that the plants exposed to cigarettes smoke ended up being the least healthy, the plants exposed to CBD were the second-most healthy, and the control group was the healthiest. The conclusion that can be drawn from this is that Cigarette smoke is generally worse for the environment than CBD because there are many more harmful substances in cigarettes than there are in CBD cigarettes.

The Effects of Sugar and Acid on Aluminum Foil

by Edward Wozniak

This experiment was inspired by the "Battle of the Toothpastes" lab assignment. In this assignment, we observed the effect of sugars and acids on eggshells treated with toothpaste. After reading about possible health threats concerning cooking with aluminum foil, the question arose: would aluminum foil react to sugars and acids in foods, just like the eggs to the toothpaste? This experiment tested how milk, vinegar, tomato, apple, and lemon juice affected strips of Aluminum foil over a period of four to five days.

Cryptogram Answer:

Chemical compounds are formed when two or more elements join together. For example water is a compound of hydrogen and oxygen.

Road Salt and Possible Alternatives

by James Zagorski

Snow removal companies frequently use road salt because of its low cost as well as its effectiveness at keeping snow and ice a liquid. While this is true, it is also very corrosive to cars, roads, and buildings. This is why many people have searched for alternatives, such as Magnesium and beet juice. However, are these alternatives actually effective? My hypothesis was that the Magnesium blend would be more effective at keeping the water in a liquid state than the beet juice or road salt. My three materials, Beet juice, Road Salt, and a Magnesium blend were each placed in a bowl of water which was then placed in the freezer. Every ten minutes I checked on my three materials, recorded the temperature and wrote down observations. My hypothesis was neither correct nor incorrect. My experiment suggested that beet juice was the least effective, it started to freeze 30 minutes into the experiment, but road salt and the magnesium blend were significantly more effective because neither of them froze. Additional experiments involving colder temperatures and more research would be necessary to further investigate this matter.

Use the atomic numbers on your periodic table to decode my message below:

1 A 15 15 39 23 89 85 53 8 7!
 _ A _ _ _ _ _ _ _ _ !

16 73 39 6 92 R 53 8 92 16 A 60
 _ _ _ _ _ R _ _ _ A _

19 EE 15 49 T 8 92 6 1!
 _ EE _ _ T _ _ _ _ !