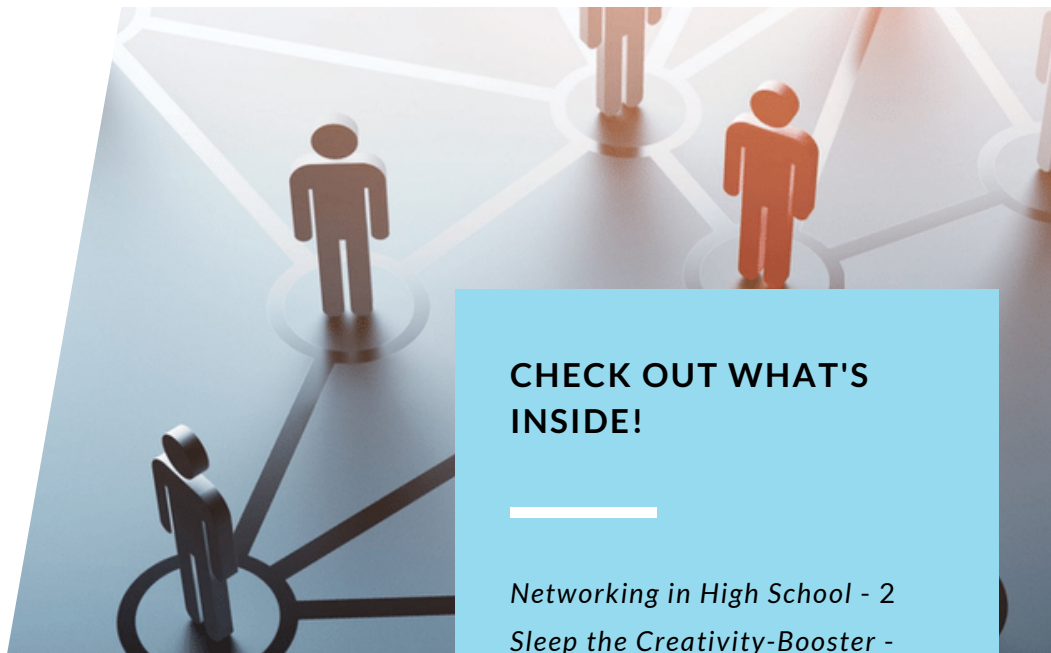


THE SOUTH JERSEY STEM NEWSLETTER



The newsletter for all things STEM!



CHECK OUT WHAT'S INSIDE!

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NETWORKING IN HIGH SCHOOL

THE ISEF EXPERIENCE

Written by Maya Butani

Last month, I attended the International Science and Engineering Fair in Atlanta. Though cliché, it was truly a once in a lifetime experience. There, I met students from all over the world who hope to one day lead the cutting edge of science. As a result, I began to think about networking. At the fair, I made many friends, but does that truly count as networking? According to [career resources at Columbia](#), networking is “the process of making connections and building relationships.” Therefore, at its most basic level, networking also includes social life and forming friendships. Perhaps networking is not as intimidating or inaccessible as it seems!

Though our society is now more technologically-based, there is still enduring value to personal connections. These relationships can help with career decisions and may reveal unadvertised [opportunities](#). Additionally, networking can help boost creativity through idea exchange. Even the process itself is beneficial. Networking contributes to improved social well-being and increased personal confidence. Because this skill provides so many benefits, it is certainly valuable, **but how does one develop it?**

Personally, I struggled with confidence when I was younger. As a consequence, I was hesitant to approach others since I feared judgment. Unfortunately, faking it until you make it is not always the best strategy, so [Forbes](#) recommends some other ways to develop social confidence for networking. When approaching a nerve-racking situation, recall a time when you felt confident and successful. Remember that time, and assume that attitude to approach stressors with positivity and grace. Oftentimes, initial introductions may be the most anxiety-inducing but also most important aspect of establishing new relationships. “Cold emails”, or messages sent without any prior relationship to the recipient, are a typical method of fostering a virtual first impression. If constructed properly, these emails can create promising career opportunities. [Harvard Business Review](#) recommends many techniques in writing these emails. However, above all, be genuine and personal in your communication. Clearly express why you have reached out to this person above all others, and remember to consider the perspective of your recipient. If the email contains gratitude and a personal touch, it is more likely to succeed. These same ideas should be applied to in-person communication. In all forms of networking, maintain your own integrity and manners. The best introductions for networking are clear, concise, and considerate. Additionally, try to foster as many relationships as you can. Introduce yourself to those around you, and continue to nurture the interactions that you truly enjoy. One day, the perspective of these individuals may be valuable to you, but even if not, these interactions can establish a friendship or partnership. I would be remiss to ignore that rejection can occur. Opportunities may not always pan out, and others may not be interested in speaking with you. Do not take these experiences personally. Especially in the professional world, people are often busy, and they simply may not have the time to answer your request. Above all, do not be afraid of failure. There are millions of people in the world to learn from. If one potential connection is not viable, there are thousands of others to pursue.

Your Path to Success

Even the most reserved people can learn to make connections! Fostering a promising goal or idea is essential to the progression of one's own path to success but it often cannot be completed alone. Reach out to people!

So what are you waiting for? There's a wonderful world of people to meet, and I promise that the process only gets easier. Begin to put yourself out there, and develop the confidence for networking. If you start in high school, you will be able to hone your skills for both professional and social development in the future. Additionally, your network will be [better-established](#) for the future. You never know which one of your friends may end up as the next top scientist! If you have a desire to start networking right away, I'll give you a place to start! Email me at mbutani718@gmail.com! I'd love to discuss anything from academic, professional, and even social goals! Or, feel free to send me a really good joke. Networking is a universal skill with far-reaching benefits. The sooner you begin, the better! Have confidence in yourself and your value, and approach all your interactions with that attitude. Happy Networking!



SLEEP THE CREATIVITY-BOOSTER

Written by Sonia Leo



Thomas Edison was an American inventor who is considered one of America's leading businessmen and innovators. He is most well-known for his invention of the lightbulb in 1879. Oftentimes, people who study his inventions, as well as other scientists' inventions, ponder how he was able to devise such a necessary invention that we still use today. Interestingly, one of the factors that contributed to his creativity and innovation involved sleep. Thomas Edison completely opposed sleep - that is, at night. This ever-energetic inventor of the lightbulb claimed he never slept more than [four hours a night](#). Sleep was, he thought, a waste of time.

Yet, Edison had completely relied on slumbers and naps during his days to boost his creativity. He was believed to have napped with an orb in each hand. So, when he dozed off, he would immediately wake up again to the sound of the crashing objects on the ground. This way, as he began to doze off, all sorts of thoughts would pop back into Edison's brain. These thoughts are those that we often do not recall when we actually go to sleep. Until Edison's lightbulb invention was exposed to the whole world, he was often perceived as a mindless oaf, who would not sleep properly during the night when he was supposed to.

Despite Edison's crazy beliefs, sleep researchers now suggest that he may have been on to something. A study in *Science Advances* reports that we have a [brief period of creativity and insight](#) as we are dozing off. [REM and non-REM sleep](#) are important for creativity. First, in non-REM sleep, the brain replays memories, consolidating these short-term memories into long-term memories through neural stimulation. However, in REM sleep, these insightful thoughts vanish and cannot be remembered by the sleeper.





SLEEP THE CREATIVITY-BOOSTER (CONT.)

Written by Sonia Leo

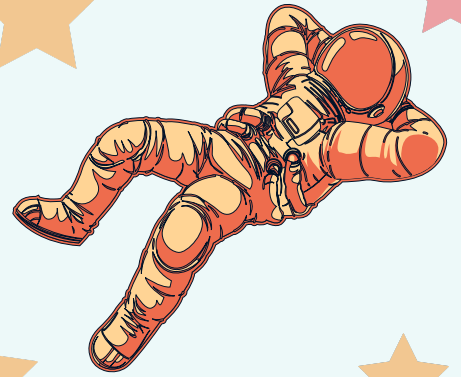
Inspired by Edison, researcher of the Paris Brain Institute Delphine Oudiette desired to produce [an experiment](#) questioning whether creativity can actually be boosted by sleep. As a result, the scientists presented 103 participants with a mathematical problem that had a hidden shortcut that allowed for them to be solved much faster.



The few people who had cracked the problems immediately were excluded from the experiment. The rest of the participants were placed in a relaxed room and were asked to sit in a reclined chair while holding a glass in their hand. If they began to doze off and the glass crashed to the ground, they were then asked to report when they had been pondering before letting go. The participants also underwent [polysomnography](#), a technology that monitors brain, eye, and muscle activity to assess how awake a person is. This technology also had the potential to tell the difference between participants' stages of sleep (REM sleep and non-REM sleep). When the researchers gathered all of the participants in front of the mathematical problem, those who had undergone REM sleep rather than non-REM sleep were three times more likely to crack the solution.

Oudiette had only tested one hundred people in only one experiment, so the results are limited at this point. The inspired researcher not only hopes to confirm her findings in future research labs and experiments but also wants to determine if REM sleep may actually help solve real-world tasks and problems. To conclude, Oudiette was particularly intrigued by Edison's method of boosting creativity, which eventually led to her prominent experiment. She now desires to investigate if it actually contributes to intelligent thinking.

Fun Facts!



The probability of someone having the same fingerprint as you is 1 in 64 trillion.

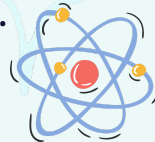
Eating cheese at the end of a meal can help reduce the chances of tooth decay (pH balance is also restored).



Just one teaspoon of good soil can comprise millions of bacteria!

The Earth is only almost a sphere!
The poles are slightly flattened!

The atoms of our bodies contain elements only forged in the center of stars.



Hawaii is moving closer to Alaska by 7.5cm every year.



Some metals are so reactive that they explode on contact with water.

The fastest gust of wind ever recorded on Earth was 253 miles per hour!



20% of Earth's oxygen is produced by the Amazon rainforest.

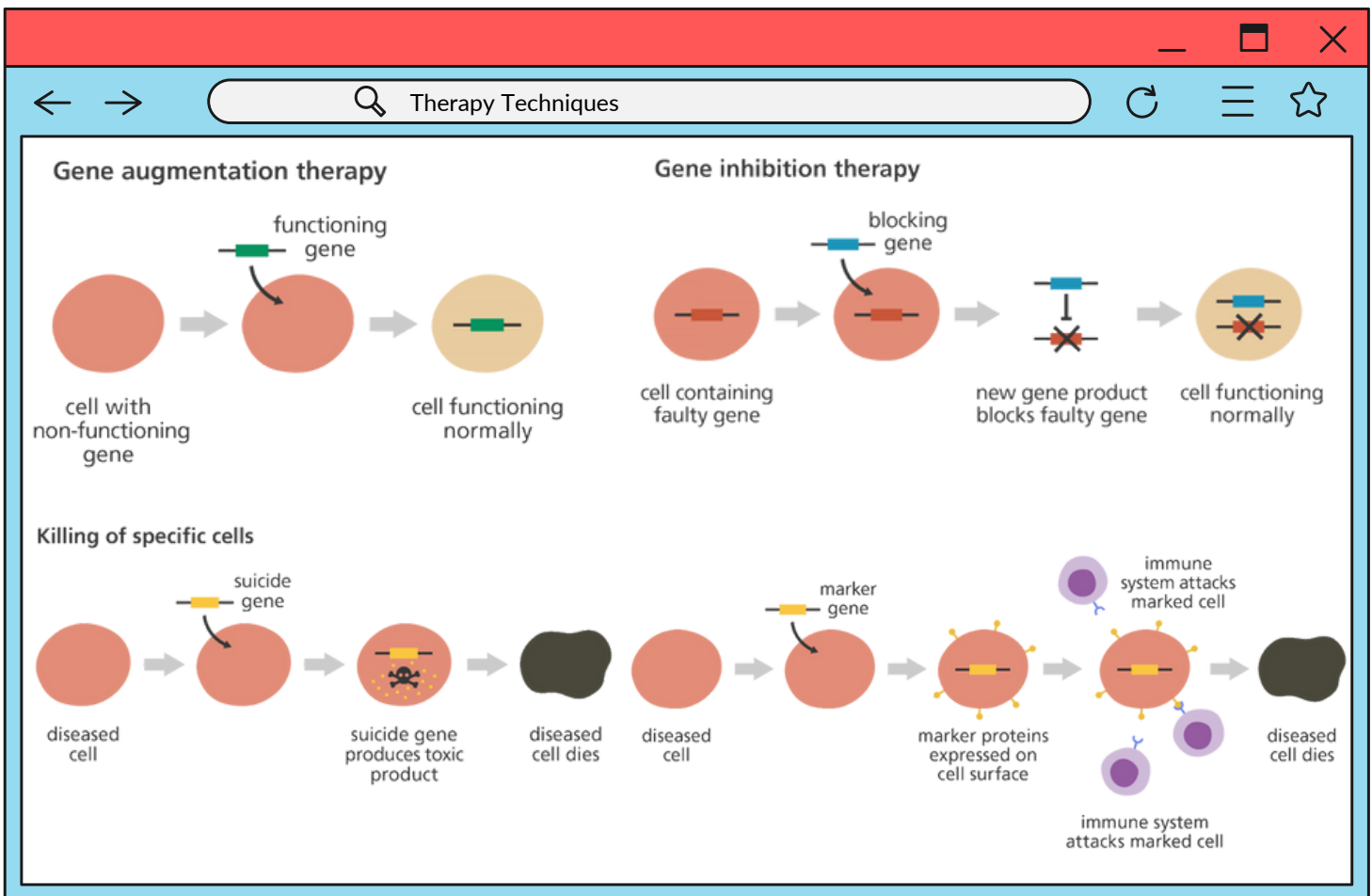
GENETIC ENGINEERING MEETS MEDICINE

Written by Isabella Moccia

Did you know that there's a way to change an organism's genetic makeup? Have you ever marveled at victories in the medical field but wanted to understand how those cures and treatments actually worked? Much of this can be explained through the concepts of gene therapy and genetic engineering, both of which make up genetic manipulation/alteration. While genetic manipulation is a relatively novel concept in medicine, it has proved to be highly useful both in patient care and scientific research.

Gene Therapy:

Gene therapy is the idea of replacing or altering components of genes to improve cellular functions and responses to treatment. Essentially, its goal is to minimize human suffering and disease. Currently, research is utilizing gene therapy for both genetic diseases, such as hemophilia, cystic fibrosis, and sickle cell anemia, as well as acquired diseases like cancer and AIDS. There are several methods of gene therapy that are dependent on the types of cells involved. There are somatic cells, which are typical cells anywhere in the body, and there are germline cells of the reproductive system that allow edited genes to be passed onto offspring. As for specific types of gene therapies, there is gene augmentation, gene inhibition, and the killing of certain cells. (See the infographic on the side!) On the whole, gene therapy is usually supported widely by the scientific and medical community for its ability to cure and even prevent diseases across generations (i.e. modifying reproductive cells to keep genetic diseases from being passed down).



GENETIC ENGINEERING MEETS MEDICINE (CONT.)

Written by Isabella Moccia



Genetic Engineering:

On the other hand, the more controversial genetic engineering, which involves modifying DNA's characteristics and traits entirely, is prominent for the purpose of medical advancement as a whole. (It's also very popularized in agriculture with genetically modified organisms (GMOs)). The actual process of genetic alteration includes replacing DNA, mutating genes, and adding or removing them. Genetic engineering has been extremely useful in medicine; bacteria and microorganisms can be genetically engineered to produce insulin, growth hormones, and other proteins and pharmaceuticals. However, contrary to gene therapy, genetic engineering does come with more risks and unpopuliarities, the first being that this field is relatively new and contains lots of unknown drawbacks/implications.

Moral/Ethical Concerns:

Furthermore, there are several ethical concerns associated with genetic engineering. Those against it maintain that it goes against natural evolution (alters genes as opposed to maintaining naturally-produced ones), is inhumane (those with altered genomes may feel alienated from society), and is a form of eugenics, which involves immoral practices such as selective breeding and forced sterilization to improve the genetics of the human race. More specifically, the techniques of selective breeding and sterilization starkly resemble the eugenics movement in Nazi Germany that aimed at ridding the world of humans with "undesirable" genetic characteristics. Overall, it's important to remember that although techniques of gene therapy and genetic engineering have improved, there are always risks associated with them that could even carry over through multiple generations.

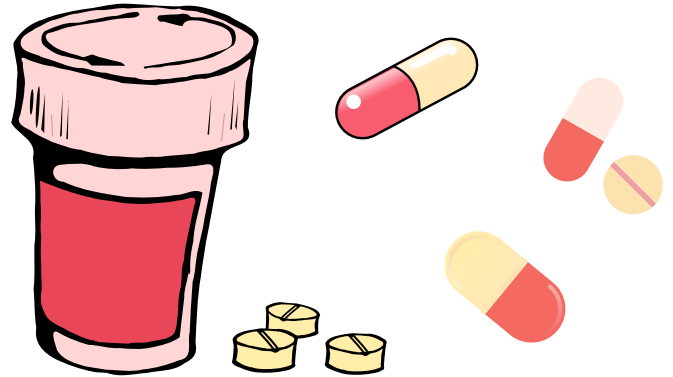
Moreover, genetic alteration is an incredibly powerful technique that must be used responsibly. While it can do extraordinary things in the right hands, this science can also be incredibly destructive when those performing it have ill intentions. Despite this, ultimately, throughout decades of medical advancements, genetic engineering and gene therapy have not only been hallmarks of scientific progress but indicators of many successes to come in the future.



TEENAGE SUBSTANCE USE IN HIGH SCHOOL

Written by Kejal Shah

In some schools, it's an unspoken rule that students should not go to the bathroom during lunch. Why? It sometimes feels like the inside of a fog machine; there are students vaping in the bathroom at 10 am! Teenage substance use is not uncommon for youth in America. 50% of teenagers have misused a drug at [least once](#). Teenage substance use is so normalized that oftentimes it barely seems illegal!



What exactly counts as teenage substance use? Teenage substance use is most common with alcohol, tobacco, and marijuana. However, that is not all it is limited to. According to National Survey on Drug Use and Health (NSDUH) data on youth and young adults, [more than 5,700 youth](#) in 2014 reported misusing prescription pain relievers without having a current prescription. Substance use alters the user's mind and permits reckless decision-making. The caveat with teenage substance use is that it can lead to teenage substance abuse. This could cause unintentional overdoses or addiction. But, what exactly leads to teenage substance use?

There are so many causes of teenage substance use. Every single teenager's life is different, none of which is perfect. In some ways, drugs or alcohol may seem like an escape to teenagers. It's something they can turn to when they can't turn to anything else. Teenage substance use can erupt from a multitude of stressors such as wanting to feel grown up, using it as an escape, experimentation, or performance improvement in athletics. According to the 2019 [Monitoring the Future Survey](#), around 61% of teens whom vape do it "to experiment," 42% because they like the taste, 38% to have a good time, 37% to relieve tension, and 29% to feel good or get high. Many teenagers that have completed this survey report multiple reasons. But, there are two reasons that are the most common in teenage substance users.

Firstly, their mental health. If teenagers have poor mental health due to stressors in their lives, they are more likely to become teenage substance users. One recent stressor could have been COVID-19. [The COVID-19 Pandemic](#) triggered a 25% increase in anxiety and depression worldwide. The second reason that is the most common in teenage substance users is peer pressure. There is a lot of stigma around peer pressure as people believe that it can go away with just a little willpower. However, this is not always the case. Because peer pressure can be long-lasting, it can cause children to eventually give in. Approximately, [90% of teenagers](#) report having been held under substance use peer pressure. Evidently, teenage substance use is a large issue, so what are we doing to help stop it?



TEENAGE SUBSTANCE USE IN HIGH SCHOOL (CONT.)

Written by Kejal Shah

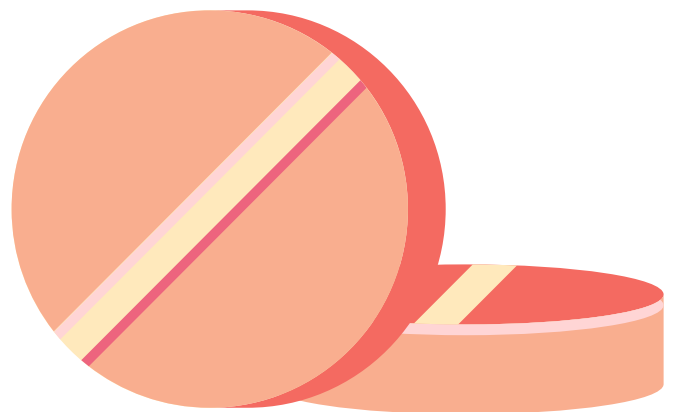
There are so many programs and organizations in place to help educate the youth and the community about substance use as well as helping those who are impacted by it. For example, [SAMHSA](#), the [CDC](#), and the [National Institute on Drug Abuse](#) all are helping create prevention policies in order to reduce the amount of teenage substance users such as the [Affordable Care Act](#) passed by President Obama in 2010 which provides new insurance options to individuals struggling with mental health or drug-related mental-health disorders. There are currently 35 million people enrolled with this act.

Additionally, the [Mental Health Parity Act of 1996](#) and [Addiction Equity Act of 2013](#) requires insurance companies that provide mental health and addiction treatment to offer services that are financially equivalent to their medical services. Unfortunately, only 4% of the American population knows about the Mental Health Parity Act, but 7.1 million people are protected under the Addiction Equity Act of 2013. Before this was put into law, [1 in 4 Americans](#) had to choose between mental health care and drug-use disorder treatment or paying for daily necessities. Though there are tons of organizations and policies being set up, the numbers continued to increase after these were enacted. Sometimes prevention also begins in the home or in the community. Some signs that teenagers have started taking substances include missing school, drops in grades or performance in school, pulling back from activities they used to enjoy, disinterest in spending time with friends or family, or drastic changes in behavior during isolation. It's important that the government and schools provide education for the community in order to reduce the amount of teenage substance users.

However, everyone is wondering whether they will even have to worry about teenage substance use after the dramatic decrease due to COVID-19.

As there was a decrease in the availability of substances for teenagers to purchase during the pandemic, the declines are unmatched. These programs are working on keeping these trends down in order to continue the reduction of teenage substance users. The only reason this may not be feasible is because of the high teenage substance use trends before the pandemic hit.

Using the Monitoring The Future Survey made by Dr. Lloyd Johnston, one is able to compare past teenage drug use statistics with current ones. In 2016, there was a promising decline in teenage substance use of all kinds, but then in 2017, vaping became more prevalent in teenagers and teenage substance use numbers began to rise again. This continued for the next 3 years. In 2018, the number of teenagers vaping nearly tripled in numbers from 2017, and in 2019, the number of teenagers using marijuana doubled from 2017 as well as the number of vapers. Well, that was until the COVID-19 pandemic.

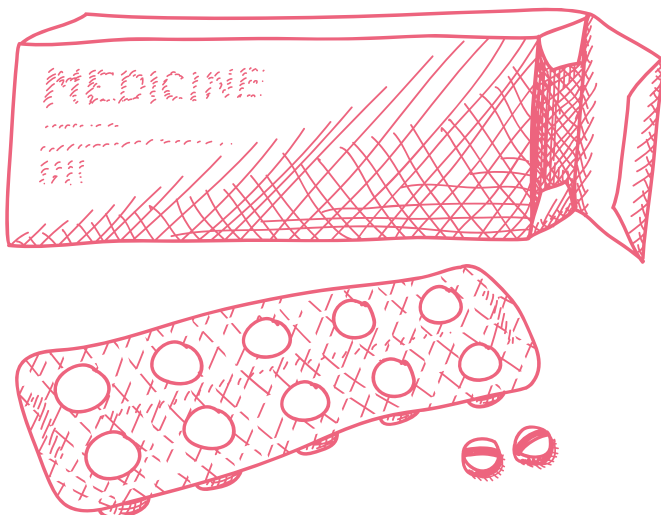


TEENAGE SUBSTANCE USE IN HIGH SCHOOL (CONT.)

Written by Kejal Shah

The pandemic lowered the numbers significantly. [The largest single-year decline in illicit drug use](#) in teenagers was in 2020 with 5% in 8th and 10th graders and 12% in 12th graders. In 2021 and 2022, these numbers have seen very small changes and continue to be some of the lowest in history. However, the National Institute on Drug Abuse claims that this is still because of the COVID-19 Pandemic. Another survey taken says that among 12th graders, even the decline of availability during the pandemic did not change their drug use trends.

Regardless of how it has changed over the years, one thing remains the same. Teenage substance use is a large issue that will affect teenagers in a multitude of ways. Whether it be through more mental problems, problems in school or work, or even their personal relationships, substance use can destroy all parts of one's life. It is important to know the facts and the truth behind any substances before making the rash decision to consume them. Though there is much being done to help teenage substance users already, it is important to get teenagers to accept the help that they may need in terms of substance use. Teenage substance use is an epidemic that causes more problems than it could ever solve. With the spread of education on the topic, there is hope that the future could have much fewer teenage substance users.



HOW DO HEADACHES AFFECT A STUDENT'S LIFE?

Written by Ashley Kim

All of us have experienced the feeling of pure pain creeping up our necks and rapidly spreading throughout our heads. Sometimes, the pain gets to be too much and it seems impossible to find relief in a Tylenol or even sleep. A tiring day of school and an even more exhausting night full of homework and extracurriculars is the perfect formula for a headache. The varying effects of headaches can be felt depending on stress level as well as the amount of sleep. Due to high stress and the little sleep of high school students, headaches and migraines are the most common and most painful conditions of an average student. Many researchers, concerned with the effect of these severe headaches, have conducted research projects and have gathered data to aid struggling students.

57-82% of teens report frequent headaches by the age of 15 while 83% of high school students complained of headaches in a study. The most common type of headache is called a Tension-type headache. These types of headaches start during the early teenage years of a human and affect women more frequently than men. This headache is described as heavy pressure around the band of the head. Symptoms include: dull, aching pain, sensitivity to light or noise, trouble focusing, and muscle aches. Doctors and scientists used to think heightened emotions as well as stress were the sole root and while they are still associated with the headaches, scientists credit hyperexcitable peripheral afferent neurons as a possible cause. The sudden activation of these neurons in the head and neck can cause extreme pain that is felt in a Tension-type headache. Scientists also linked pain processing problems as well as genetics to more severe or episodic headaches. This new research is still up for debate as it is relatively new and some scientists are still skeptical, but there is no doubt that stress is a big component and is strongly correlated with the cause.

The second most common type is called a Migraine. Migraine headaches are infamous because they can cause pain everywhere. Not only is there a throbbing pain in your head, it can be felt in certain areas of your face as well as your neck. Symptoms of these headaches are similar to tension-type headaches, however they are more severe. People can experience symptoms like sensitivity to light and noise, nausea, vomiting, abdominal pain, and nasal congestion. 25% of patients also experience an aura which is a neurological condition that precedes the beginnings of a migraine. Symptoms range from visual disturbances (blind spots or zigzag vision) to confusion, trouble speaking, and vertigo.

In a recent study, 92% of the students surveyed were not able to concentrate on the lessons taught in school or participate in exercise or physical activity due to the severity of the headache. They credited fatigue, sleep deprivation, and emotional stress as their main triggers. In another study conducted on university students, the disparity between migraines and tension-type headaches were clearly highlighted. 62.7% of students who reported a migraine felt a clear and negative impact on their school performance while 24.4% of students with tension-type headaches reported a decrease in their performance. Although a significant amount of students were affected by both types, the more severe characteristics and symptoms of a migraine are evident.

The overarching cause can be traced back to stress. Stress is something that everyone deals with more or less during their lifetime. Although it is not easy, there are several ways that someone can reduce and manage stress levels. The idea of stress is especially prominent around students and it has a domino effect that can turn into an endless cycle. Stress leads to lack of sleep which leads to headaches/migraines which leads to a decline in school performance and that process repeats over and over again. The American Headache Society came up with an important guide to remember when attempting to alleviate a headache. However cliché this may be, the S.M.A.R.T tips (sleep, meals, activity, relaxation, and triggers) can and do lead to decreased stress levels in students. Sleep is especially important and it is imperative to get at least 8 hours (which is difficult, especially for students), but if not, consistent sleep. Lack of sleep diminishes brain function and only makes the problem worse. Secondly, your body needs adequate food and water to nourish the brain as well as other organs. Additionally, moving your body and getting active exercise for at least 30 minutes a day is crucial. Make sure to relax and give your brain a chance to refresh and rest. This will significantly decrease the chances of a pounding headache. Lastly, if your headaches are episodic, identify the trigger or triggers and minimize your interactions with them. Students feel a lot of pressure from grades, tests, sports, and other extracurriculars, but don't let the stress snowball into a bigger problem to deal with later on. Prioritize your health and always remember that it is okay to take a break and relax!



Ouch! 57-82% of teens report frequent headaches by the age of 15

THE SCHOLARSHIP SEARCH -SUCH A THING AS "FREE MONEY"?

Written by Olawale Osinowo

Congrats! You have been accepted to the college of your dreams! All would be good if not for nightmarish college.

However, all is not lost! There are options to help you make attending the college of your dreams a reality, and scholarships are one of them.

What are Scholarships?

Scholarships are a form of financial aid to help students pay for an education, oftentimes a college tuition. Scholarship money can either be renewable and handed out on a consistent basis, or can be a one-time financial gift. Therefore, you don't have to pay them back. They are effectively "free money" towards college

There are several types of scholarships but they can be separated into the two broad categories of need or merit based. Need based scholarships (sometimes called grants), are a form of financial aid whose likelihood of you receiving them depend on the extent of your need for financial assistance. Things like salary play into this. On the other hand, merit-based scholarships are scholarships whose likelihood of you winning them depends on your achievements or "merit."

How do I get one?

The application process will differ between scholarships, as some will be 500 page essays, while others will be basic application forms asking you to fill out personal information like your email and name. There are scholarships for virtually everyone, with awards being handed out for reasons ranging from creating scientific advances to being left handed. You can start by searching up scholarships for people of your demographic (ex: high school junior or senior,) and exploring your options from there. As long as you meet the eligibility requirements, you have a chance at winning them. It is recommended that you apply to as many as possible, rarely will you ever have "too many" scholarships. The more you apply to, the more likely you are to get accepted to at least one.

Over time, after applying for scholarships you will begin to get better at crafting your essays and a personal story or biography of yourself you can present in your applications. By doing this, you will slowly but surely become a more competitive applicant, and this process isn't exclusive to only scholarships. Improved writing skills and a refined resume can be applied to other things like college applications or internships.

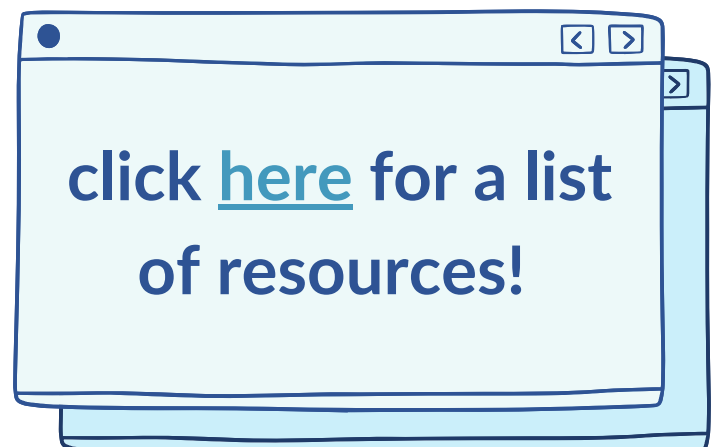
Tips for Success

To find these scholarships, scholarship search engines can be used. These are collections of scholarships that students can use to find scholarships that they are eligible for. A few of these scholarship engines can be found in the scholarship resources portion of this paper.

When it comes to actually applying for these scholarships, don't hesitate to start. There are loads to find, and more can be found every day. Even if you currently aren't eligible for the scholarship, you can set eligibility for the scholarship as a goal, and work towards it. Whether that means starting an initiative at your school, learning a new hobby, or even just growing older, applying to scholarships should be done when possible, and if not, made into an achievable goal. This means, start applying now ;)

If you haven't already, it is good practice to have people in your life who can check important papers and documents such as college essays or job applications. Scholarships are no exception, it can greatly help the quality of your scholarship application if there is someone like a teacher or friend who can reliably check your applications and offer feedback.

Finally, it is good practice to keep a list of all scholarships you have applied to. This can take the form of an excel spreadsheet, a list on google notes or even a sticky note. The important thing is that a list of scholarships you are interested in and have applied to are kept somewhere. By doing this it will help you stay on top of upcoming scholarship deadlines and remember which scholarships to follow up on after submitting them.



Crystal Rock Candy!

Written by Isabella Moccia

To learn about saturated solutions, we can create crystallized rock candy! By making highly concentrated sugar-water, we can create skewers of sugar crystals. With a little food coloring and flavoring, you'll have homemade candy and a science lesson! Be sure to try out this experiment at home!

Ingredients: 2-3 cups of sugar, 1 cup of water, food coloring, flavoring (optional)

Materials: skewers, a jar/glass, a large saucepan, clothespins

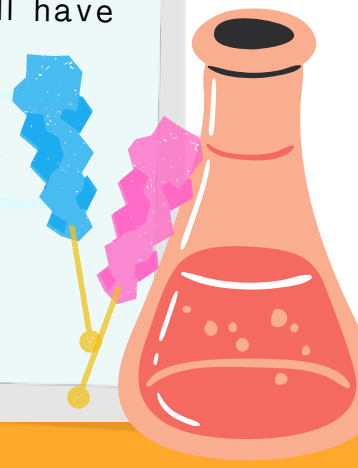
Fun fact:
The finished rock candy will contain a quadrillion molecules on the skewer!

Procedure

1. Combine equal parts of sugar and water in a large saucepan. Heat until all the sugar is dissolved.
2. Slowly add more sugar, mixing until the additional sugar can't dissolve anymore. The water should look slightly cloudy with a 3:1 ratio of sugar to water.
3. Add flavoring if desired.
4. Heat the water mixture until it simmers.
5. Remove the sugar-water from the heat, allowing the mixture to cool.
6. Cut the skewers to match the height of the jars
7. Dip the skewers in water and roll them in sugar. Set the sticks aside to dry.
8. Once the sugar-water is cool, pour it into jars with different colors.
9. Place the coated skewers into the jars. Make sure they are completely dry so that it won't dissolve. Make sure they don't touch the bottom of the jar either!
10. Leave the skewers in the jar for a week. Then you'll have rock candy that's ready to be enjoyed!

How it works...

When we dissolved sugar into water over heat until the sugar could no longer dissolve, we created a supersaturated solution. The solution was unstable as a liquid since there was more solute (sugar) than solvent (water). Because of this, the sugar solidified in what is known as precipitation. While we left the sugar-coated skewers in water, the water evaporated over time which further saturated the solution and precipitated more sugar on the skewers!





**James Webb
Telescope**



Carina Nebula



Stephan's Quintet



CURRENT EVENT IN STEM: JAMES WEBB TELESCOPE PART TWO!

Written by Isabella Moccia

After being launched last December, the James Webb telescope's first satellite images were released by NASA on July 12th! Check out NASA's findings below!

Among them include:

- **Carina Nebula**- an infrared image of the "Cosmic Cliffs" showing star birth.
- **Stephan's Quintet**- shows five galaxies and various stars connected through galactic interactions.
- **Southern Ring Nebula**- this high resolution image shows nebula, which are stars sending out rings of dust and gas.



Southern Ring Nebula



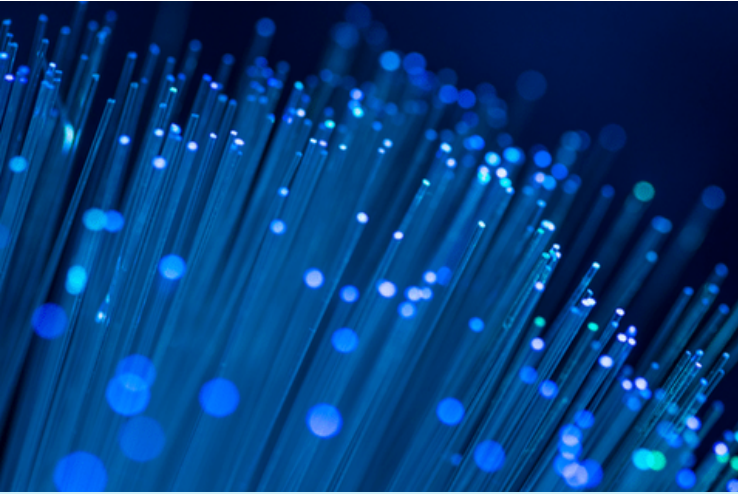
SMACS 07-23



Jupiter and its Moon

FIBER OPTICS IN MEDICINE (CONT.)

Written by Leila Quatorze



Fiber optics is the use of an optical fiber that utilizes lasers to transfer information and data! An optical fiber is a fiber that is made from glass that is used for fiber optics. In simple terms, a laser bounces off glass and sends information at the speed of light. Fiber optics allows you to send a text message or upload an image to the world wide web in a matter of seconds. Common uses of fiber optics include the internet, television, and telephones.

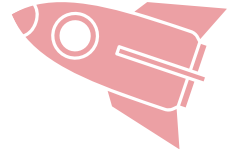
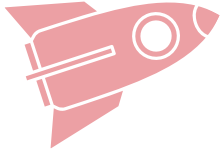
Fiber optic technology can be used to remove diseased tissues, pinpoint a tumor, and allow surgeons to repair organs. As a result, scientific scholars can discover new methods of healing and regenerating the body with fiber optics. They may also minimize the risks and fatalities for life-risking surgeries. Nonetheless, examples of fiber optics being utilized in the medical field are spectrophotometry, and pressure and position sensing. To add on pressure point is a medical method that is used in a plethora of medical devices such as ventilators, monitoring oxygen effectiveness, and hyperbaric therapy. Hyperbaric therapy is a treatment used to treat patients with skin grafts and burn trauma; it is also used to treat carbon monoxide poisoning. The invention of spectrophotometry allows biomedical engineers to quantify and analyze the components of DNA and proteins.

Though fiber optics has already made an impact in medicine, developments with this technology may provide new treatments and cures. Fiber optic technologies could be lined into cells. Then, code written into the technology could control the rate of cell growth and the ultimate size of a tissue structure. Imagine this: if the entire human body was lined with fiber optics, it could alert a device of nutrient deficiency or growing tumors in any part of the body..

Additionally, a device monitoring nutrients could explain what activities and foods are necessary for your body to thrive.

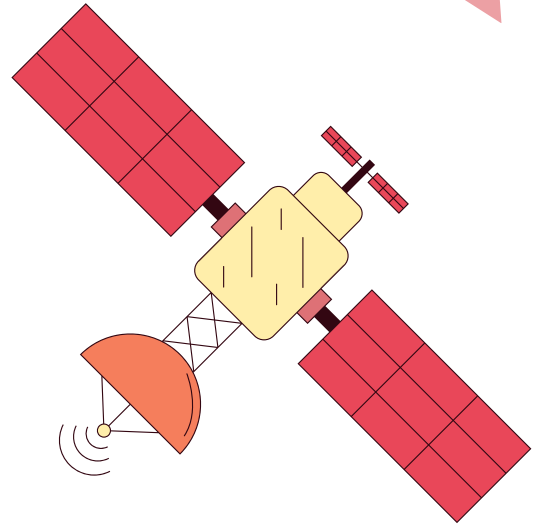
As demonstrated when taking the use of fiber optics into account, not only can fiber optics be updated to furthermore improve the use of communications, but it can be used to pioneer the medical field. Instead of separating the breakthrough in communications and medicine differently, why not combine the two to truly transcend innovation?

BOEING'S STARLINER SUCCESSFULLY DOCKS WITH SPACE STATION



Written by Rachana Raja

[Boeing's Starliner spacecraft](#) reached an incredible milestone earlier in May. Their Starliner vehicle reached the space station on Friday, May 20, and returned to Earth the following Wednesday. This new development from Boeing for NASA provides them with a different transportation system for taking astronauts to space. Before landing at the White Sands Missile Range in New Mexico, the Starliner did face some issues. During its landing, the spacecraft's communication with global position satellites dropped for a moment and one of its capsule's thrusters malfunctioned. Aside from those few glitches, the spacecraft had a nearly textbook landing.

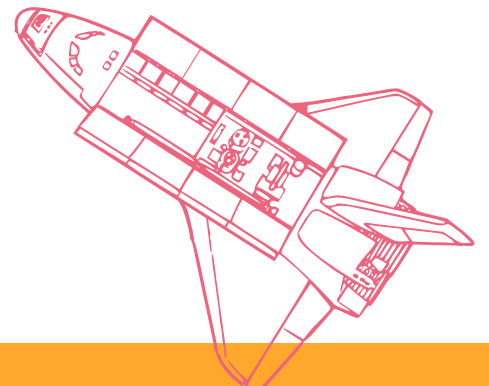


Before returning to space, astronauts at the International Space Station filled the Starliner capsule with nearly 600 pounds of cargo. The spacecraft took off around 2:36 Eastern time that Wednesday and within 20 minutes was 300 feet from the space station.

Though a very successful landing for Boeing's new spacecraft, it did face a couple of issues on its way up to the International Space Station. During its launch, 2 of the Starliner's thrusters failed, and prepared for a situation like this, backup thrusters began to work immediately. The Starliner's mission managers used the time the capsule traveled through space to fix the thrusters issues remotely.

As the spacecraft edged closer to Earth, it abandoned its service module, which is the part underneath the cone-shaped capsule where most of its propulsion and power systems are located. Even with a few mishaps, the Starliner avoided any major setbacks during its first attempt in December 2019. During its first attempt, the starliner ended up in the wrong orbit. The Starliner was ready to takeoff in August of 2021 for its second attempt, but it faced issues during the countdown. After months of investigation and remodeling, Boeing's Starliner successfully traveled to and from space. The manager of NASA's commercial crew program confidently stated, "When I look at what happened in the flight and the kind of things we'll need to work through over the next few months, I don't see any reason why we can't proceed toward the crewed flight test next."

Want more information? Visit Boeing's [website](#)!



THE MOVIE THEATER



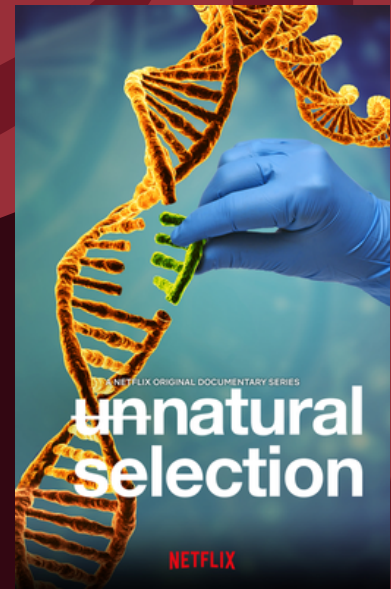
Looking for something to watch? You've come to the right place! From insightful analyses to lighter entertainment, here, we include our top selections for movies, TV shows, documentaries and more. With some relation to science, these other forms of media are a great way to learn about something new while passing the time!

Unnatural Selection - 62-70m, 4 episode

docuseries

Pioneers in gene-editing techniques and artificial intelligence confront ethical and technological challenges unlike what humanity has faced before.

Available on:



Behind the Curve- 1h 36m, documentary

The internet has revived the conspiracy theory that the earth is flat, and America's flat-Earth movement appears to be growing despite hundreds of years' of scientific evidence disproving the idea.

Available on:



SELF EXPRESSION--LET'S TALK FASHION

Written by Anya Patel



There are many forms of self expression, and often people find it difficult to express themselves verbally. Therefore, they may seek alternatives to feel more like oneself. The first step is always to be mindful of emotions while learning to accept and acknowledge them. For many individuals, this is likely the hardest step. Nevertheless, self-acceptance is critical for connecting with other people. Fortunately, finding a good outlet to express yourself really helps with staying in touch with your inner emotions!

One of my favorite ways to express myself is through fashion. When I feel happy, I love communicating that to the world! I also empathize with those who struggle with self identity, and I am often unsure of who I am versus who I want to be. Everyone is completely unique so there is no one category to fit into which makes it all the more trickier.

Experimenting with different styles can be very useful! There are no real rules of art, so it's very much possible to feel comfortable in an array of trends. I also deeply understand those who felt burnt out this school year and let their minds drift to auto-pilot. It's certainly exhausting so remember to give yourself forgiveness when you feel like you can't put your best self out there. Researching is definitely a key component as understanding the fundamentals of a style you like can help you branch out and make it original. To understand yourself and to be able to express it through various means truly is a virtue that will take time, so be patient and have fun!



Thank you to Leila, Maya, and my sister Anjali for the outfits!



STEM OPPORTUNITIES

Science is a broad field that is best enjoyed with hands-on opportunities. However, we at South Jersey STEM know that summer camps, competitions, and other events can be hard to find. Therefore, we've compiled a list for you to use below. From math to programming to team competitions and more, we have it all, and everyone will be able to find something. Enjoy, and happy learning!

Coriell Science Fair - Camden County regional fair

Registration Deadline: Feb. 21, but students do research year round

*Visit [here](#) to find other county fairs

Junior Science and Humanities Symposium - science fair opportunity

Registration Deadline: Varies from Jan. - Feb. (based on your region, find it [here](#))

First Lego League - Team Robotics Competition

A team robotics competition comprised of different leagues. Find yours [here](#).

USA Biology Olympiad, US National Chemistry Olympiad, Mathematical Association of America, US Physics Team, US Medicine Olympiad, USA Computing Olympiad

These competitions consist of different levels of qualifying tests, and often feed into prestigious international olympiads. The deadlines for each vary and can be found at their websites.

High School Hackathons - 24 hour event for programmers to complete a task together.

The given link provides all the upcoming hackathons! Many require no programming experience, but it varies between each event.

TEDx Events - An independent branch, these events are a great chance to learn new ideas!

The link given will allow you to find upcoming events near you!

Maker Faire - Opportunity to present your creations and see others!

Find your closest Maker Faire [here](#)

National Science Bowl - Science quiz bowl for teams of 4-5

Find your region [here](#)

*This competition is through the schools, information about starting a chapter is also on the website

Pathway to Science.org - Science program resource

This website is constantly updated with different scholarships, camps and science opportunities!



STEM CAMP OPPORTUNITIES

One of the best times to pursue STEM-based opportunities is in the summer, so below, we have compiled a list of some of the best camps and opportunities that we have come across. These programs vary in subject matter and length of time, so there is something for everyone! The dates in the boxes are the current deadline for application to the programs. For boxes without dates, either the application hasn't opened, or the deadline is not published. Visit the links in each box for more information!

Lavner IT Academy Camp - three-week program starting June 20 for students to explore careers in the growing industry.

Computer Engineering 201 - 1 week paid program (\$450/week) starting June 27 for teaching students programming.

Eureka! - (8th grade start)
5-year magnet program with opportunities ranging from mentorship to internships.

Futures Matter Program - 8-week program starting June 13 for HS students to gain hands-on science experience.

The STREAMS Program- 7-week program to introduce youth to a multitude of activities that integrate Science, Technology, etc.

Joaquin Bustoz Math-Science Honors Program - 8-week paid program intended for students interested in STEM careers.

Bethel College Summer Science Institute- June 12-17, remote opportunity to learn how to do research in a faculty.

BEAM Pathway Program for 7th Graders - year-long camp for students to learn about math on a college campus.

The Cooper Union Summer STEM Program- three-week for students to explore, design, engineer, and research in a college setting.

Girls Who Code Summer Immersion Program- 2 week opportunity to prepare female students for a career in technology.

iD Tech Camps for Kids and Teens- Students can explore a prestigious campus and make friends as they master new STEM skills.

Waksman Student Scholars Program- A year long opportunity begins in the summer as a project in molecular biology

Air Force Research Laboratory (AFRL) Scholars Program - paid summer opportunities to students pursuing STEM careers

Hutton Junior Fisheries Biology Program - provides hands-on activities that increase awareness of conservation issues.

Note: At this point, most applications for summer programs are closed, so these may be options for next year instead. Typically, the process of applying to summer programs should begin around the fall to winter.



Meet the Authors!



Maya Butani - Founder/President of South Jersey STEM

Articles: Networking in High School: The ISEF Experience

Maya has competed in many science fairs for her biomedical engineering research which she pursues at Rowan University in the Vega Lab. She founded South Jersey STEM after recognizing the value of experiential learning in science education and truly believes in the power of science to better society. mbutani718@gmail.com



Olawale Osinowo -

Articles: The Scholarship Search - Such A Thing As "free money?"

Olawale is a high school junior. Creative projects are a passion, and learning Spanish is a current interest of his. As a child of immigrants, he enjoys working with those new to English, and looks to tutor other students struggling with the language and hopes to introduce them to the wonders of the STEM field!

olawaleosinowo1234@gmail.com



Leila Quatorze -

Articles: Fiber Optics in Medicine

Leila loves all things science and engineering. She is very interested in environmental, biomedical, and industrial engineering. She is currently researching photo patterning and cell morphology at Rowan university and hopes to share her knowledge while also making environmental science more accessible to students in her community! lquatorze100@gmail.com



Rachana Raja -

Articles: Boeing's Starliner Successfully Docks With Space Station

Rachana is a junior who's passionate about Neuroscience. She loves all things science and hopes to pursue higher-level research in the medical field. She's excited to have the opportunity to teach people about STEM!

golffff23@gmail.com

Meet the Authors!



Kejal Shah -

Articles: Teenage Substance Use in High School

Kejal is very passionate about environmental science and engineering. She takes part in her school's robotics and environmental club, and she enjoys giving back to her community. In the future, Kejal hopes to be able to learn more about science and share what she knows with others!

kejalshah2024@eccrsd.us



Anya Patel -

Articles: Self Expressionism: Let's Talk Fashion

Anya loves everything about creativity. Working to blur the lines between STEM and art, she hopes to create a unique environment to make the field a little more fascinating and exciting than it already is! She's happy to be working with such accomplished girls and is excited to blend ideas with people with different STEM backgrounds.

anyap296@gmail.com



Isabella Moccia -

Articles: Genetic Engineering Meets Medicine, Current Event: James Webb Telescope Part Two, Crystal Rock Candy

Bella loves all things science! With a particular interest in biochemistry and neuroscience, she is looking to pursue higher-level research and learning opportunities within the medical field. Bella is very excited to share her passion for medicine and gain valuable experiences in STEM with girls of all different backgrounds and interests!

isabellamoccia7185@gmail.com

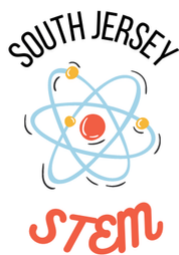


Sonia Leo -

Articles: Sleep the Creativity-Booster

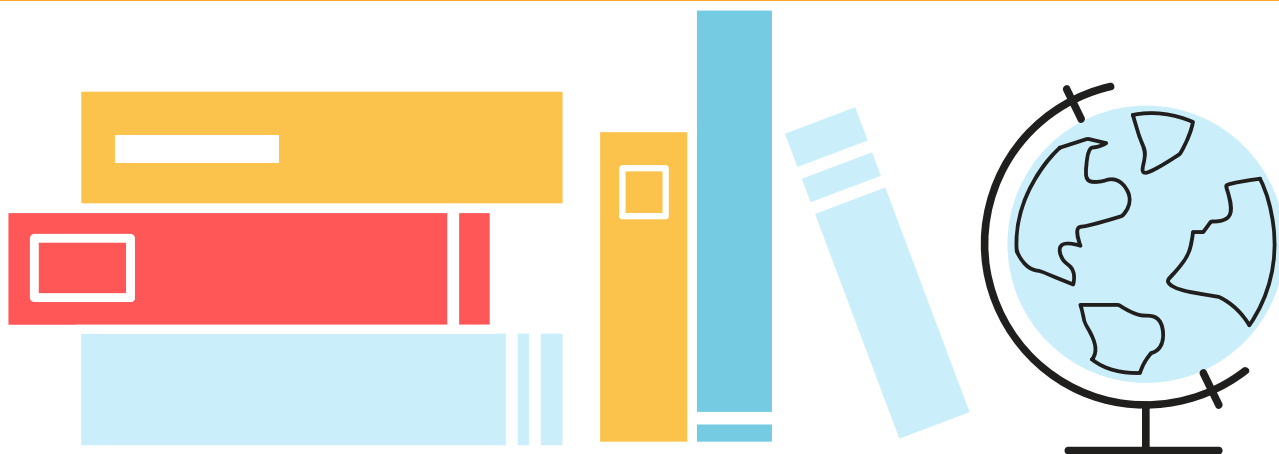
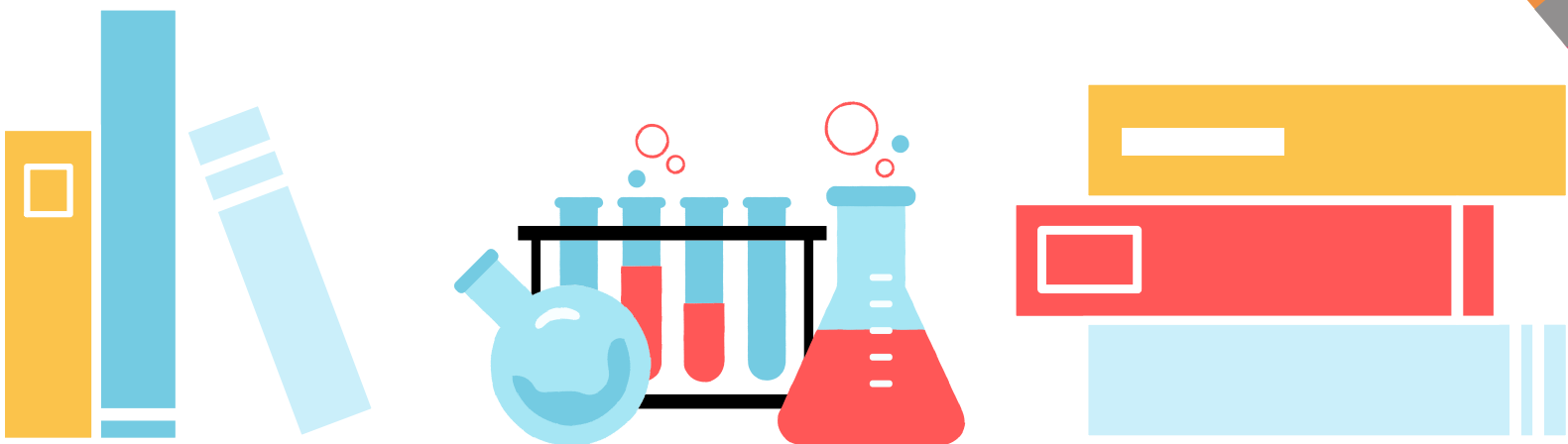
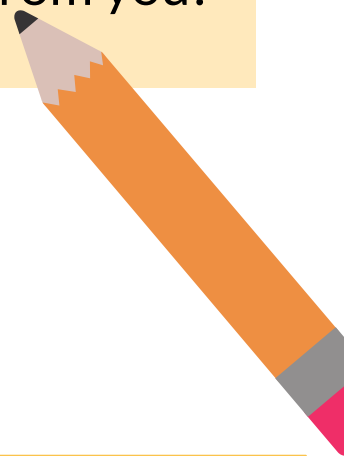
Sonia loves everything about science and math. She cares deeply about educational equity and is a strong advocate for STEM education, especially for girls and low-income students. She wishes to use her experiences with this club to create more opportunities for elementary and middle school girls in STEM!

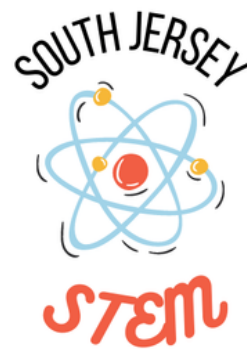
sonialeo777@gmail.com



Want to see your name here?

If you have an interest in STEM and want to share your experiences or passions contact us at sjstem.newsletter@gmail.com! We'd love to hear from you!





Thank you!

For all of your support! We wish you the best in the 2022-2023 school year!

If you can, please leave feedback for us [here](#)! We want to keep improving for future editions. And if you liked us, please spread the word! If you want to get involved, visit us [here](#) or email sjstem.newsletter@gmail.com!

Next Edition:
Late October

