News From
STEMVision Inc.
Empowering the Next Generation in STEM

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End of Year Reflection

The end of the year is a time of excitement and reflection. We all are eager to start a new chapter and make a fresh start. It is time to review the past twelve months on what went well and what did not go so well—in addition, significantly, contemplating what we could do better.

I am not very good at making resolutions, but once I figure out what I want to improve, I decide to set new goals to achieve them for the following year.

2021 has been a good year for me as I went back to the brick & mortar school for my senior year. It is a bittersweet feeling as we are wrapping up our first semester for the senior year and only a few months left before we all are scattered around the nation in different colleges.

It is crunch time for me as I write college essays and applications. My high school has prepared me for the future with the passion, connections, and credentials to change the world. I want my college experience to advance those traits: academic preparation, self-discovery, and learning from a diverse community of educators.

In March of 2020, Aarush and I created STEMVision Inc. with a philosophy to empower our next generation with the skills to succeed and adapt to this increasingly complex, changing technological world. Further, as I progress, I understand how vital education as a whole and perhaps STEM education (for me) is critical to steer the innovation to sustain our future.

Math literacy is built on a solid base, and its passion has to be cultivated early in our education. I am grateful to my teachers and parents, who created that fire to appreciate academics. Nevertheless, unfortunately, there are so many distractions that we often find it hard to focus on what we want our future to be – our personal growth and as the caretakers of the planet.

As our STEMVision classes in Science, Technology, and Mathematics grew in diversity and population, so did our STEMVision crew. Our team now has a robust global identity. Camille and Yacob enriched our team with their French insight by teaching French lessons for our US audience during the entire summer. Anika connected with young kids and engaged them in Science and Math. Megha, David, Kunaal, and Aayudesh were enthusiastic about delivering Chemistry, Biology, Mathematics, and Physics. I focused on Calculator workshops, Python, and Math classes.

Our Impact to Community Success

- **Total Number of Courses: 38**
- **Total Number of Participants: 2,572**
- **Website Visitors: 12,115**
- **Facebook Friends: 2,499**
- **Facebook Likes: 446**
- **Facebook Followers: 456**

Our Team (as of December 2021)

Anika Prasad, Megha Manoj, Jon Santmyer, Aruna Harpalani, Nandini Iyer, Isha Kapoor, Emily Baker, Camille Frank, Yacob Zitouni, Ayyash Gupta, Devanshu Gupta, Swarnima Prasad, Abhishil Prasad, Arko Ghosh, & Aarush Prasad
Kunaal Prashar & Aayudesh Kaparthi (guest tutors)

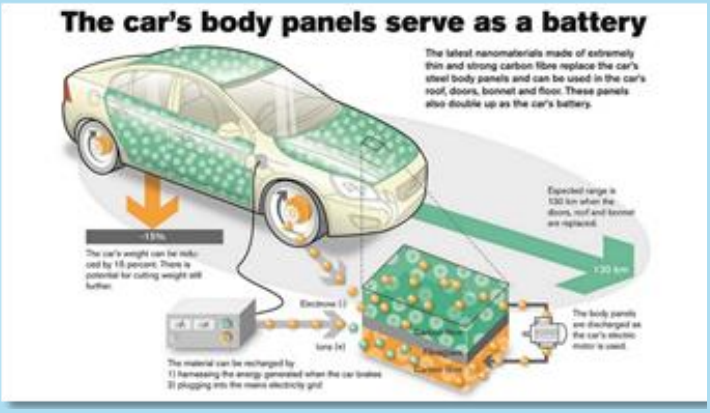
Season's Greetings

Happy holidays and a happy new year to everyone! Hope everyone has a great 2022! ~from the STEMVision team

An Article for Everyone

The Batteries of the Future - Weightless and Invisible

There is a renaissance underway in structural battery research, which aims to build energy storage into the devices and vehicles they power.



A lithium-ion battery inside a phone or EV battery pack has four main components: the cathode, anode, electrolyte, and separator. Lithium ions flow through the electrolyte from the negative anode to the positive cathode when a battery is discharged. A permeable separator is partitioned to prevent a short circuit. In a conventional battery, these elements are either stacked or wound around into a small volume.

The battery of the future is the Structural battery that looks like an airplane wing, car body, or phone case. Emile Greenhalgh at Imperial College London and the Royal Academy of Engineering Chair in Emerging Technologies is working on structural batteries that are invisible. The electrical storage happens in the thin layers of composite materials that make up the car's frame. In a sense, they are weightless because the vehicle is the battery.

Greenhalgh also developed a structural supercapacitor used as a trunk lid for an experimental Volvo. A supercapacitor is similar to a battery but stores energy as an electrostatic charge rather than a chemical reaction. Supercapacitors do not hold nearly as much energy as a battery, but they are great at rapidly delivering small amounts of electric charge.

The future: Airbus and Boeing have been working on electrifying passenger aircraft for years. The problem is that packing a plane full of conventional cells can have a short circuit in a large battery pack causing disastrous fire or explosion. Emerging battery chemistries, including solid electrolytes, could lower the risk, but meeting the massive energy requirements of a passenger jet is still a significant challenge.

Reference - Oberhaus, D. (2020, November 6). The batteries of the future are weightless and invisible. Wired. https://www.wired.com/story/the-batteries-of-the-future-are-weightless-and-invisible/

Snap! Crackle! Brainteaser!

What is the largest number you can write by using only 3 numbers?

Answer: $9^{9^9} = \infty$