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CONTACT: Kate Strauss
Community Relations
Buena Park School District
714-514-0523
kstrauss@bpsd.us

PARTNERSHIP WITH HYUNDAI INTRODUCES ROBOTICS STUDENTS TO CLEAN MOBILITY AND THE POWER OF HYDROGEN

Beatty Middle School students build and race their own hydrogen fuel cell e-vehicles and learn that green energy does not have to depend on the weather

Buena Park, CA — The students in Ms. Holman's Advanced Robotics class at Beatty Middle School sit in groups of four around tables with pre-bagged sets of wheels, tubing, battery packs, and tiny screwdrivers in front of each chair. The Corporate Social Responsibility (CSR) team from Hyundai Motor America has come to spend this two-hour block with the students and teach them a little something about hydrogen vehicles. Brandon Ramirez, Hyundai CSR director, begins the lesson with a question. "What is renewable energy?" he posits. A student's hand shoots up: "Something that you don't have to mine or drill," she says. "Something that doesn't run out," adds her tablemate. "That's right," Ramirez says. "Renewable energy can be renewed forever with minimal consequences to the environment – things like sun, wind, and water." The students soon learn that the weather can challenge the reliability of renewables. "We use the sun for farming when we have the sun available. We use the wind for sailing – but the wind can stop," he says. Water, however, is completely clean and reliable. Enter the hydrogen car.

With an overhead camera trained on the workspace in front of her and projecting her actions up onto the wall, Nicola Weiss asks the students to open their kits of hardware and supplies, and then she models each of the steps involved in assembling the tiny hydrogen cars from scratch. Weiss works for Horizon Educational, which is Hyundai's partner for educational outreach programs such as this one. Little by little, the students put together the chassis, the axles and wheels, and the batteries. A little blue box acts as the "brain," splitting the distilled water into hydrogen and oxygen when it is injected with a syringe into the tubing.

As the students build, the lesson continues. Students learn that "clean mobility" is a general term that refers to cars that run on renewable energy. "We do have electric vehicles, but they store their electricity in batteries, and batteries weigh a lot – plus, they degrade over time," explains Weiss. "Hydrogen is a next-gen technology because it comes from water – the 'H' of 'H2O' – and there is a lot of

water in the universe." So, a driver can fuel up at a hydrogen station, which takes all of five minutes, and then drive 380 miles before refueling. That's good "power density," as they say in the biz, partly because a hydrogen car makes energy as needed with its own on-board powerplant by using a fuel cell. There's no need to pre-load the energy the way an electric vehicle must. "And what do you think comes out of the tailpipe of a hydrogen car?" asks Weiss. Turns out, just a little water.

The first to finish a car and head to the mini classroom raceway is Dr. Yvette Cantu, Interim Superintendent, who stopped by to see the lesson and stayed to build a car. After a couple of false starts, her hydrogen car heads down the track and successfully crosses the finish line. Dr. Cantu is thrilled. "This program offers an incredible opportunity for our students to see first-hand the applications to this robotics class and the way today's interest can become tomorrow's career," she says.

Dr. Joaquin Valdez, Principal at Beatty, first met Brandon Ramirez at the OC Hispanic Chamber of Commerce event when Ramirez was in attendance as a Hyundai representative. When their conversation came around to the topic of hydrogen-fueled cars, Ramirez offered to spend the day at Beatty with his team. "I knew this would be a perfect fit for our Project Lead the Way robotics program," recalls Valdez. "Through this partnership with Hyundai, our students were able not only to assemble a hydrogen-fueled car, but also to learn about the different properties that make the car function and the opportunity to race it. We want our students to have firsthand experiences like these that support growth and creativity as they promote from Beatty Middle School and pursue STEM courses at the high school level." Dr. Valdez has hopes of continuing this partnership, and based on the enthusiastic reaction from the students, it seems like a renewable match made in heaven.

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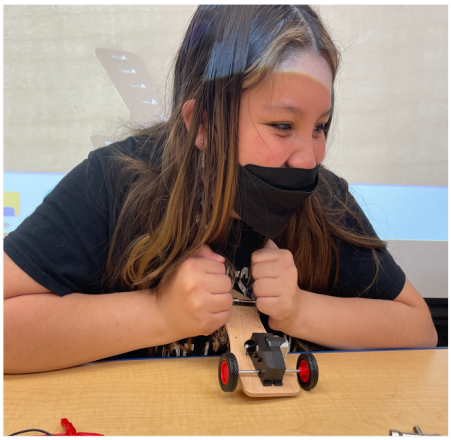
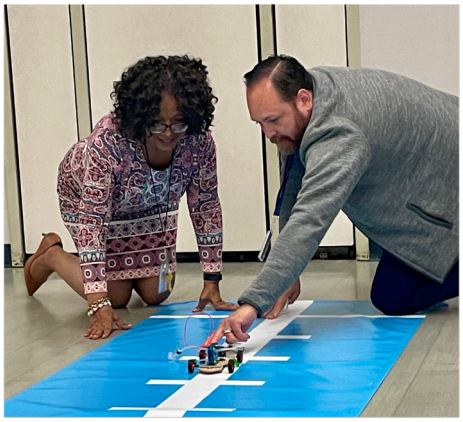


Isabella attaches her wheels to the axle.

Albert tightens the hardware for the “brain” of his car.

Daniel and Kevin work together to secure the battery.



Dr. Cantu and Dr. Valdez try out the hydrogen car on the racetrack.