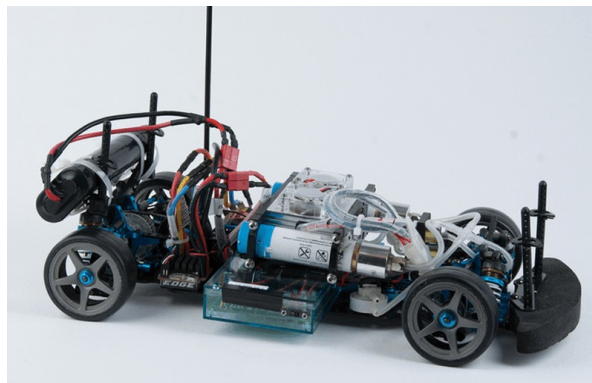


Hydrogen Horizon Automotive Challenge (H2AC)

The Hydrogen Horizon Automotive Challenge (H2AC) is an engineering project that gives high school students a hands-on design and performance-based experience that addresses one of the pressing energy concerns facing our world—the need for clean transportation. Students utilize STEAM skills to build, test and race a hydrogen fuel cell/battery hybrid, R/C car, that is then put to the test in a four hour endurance race.



The culminating H2AC event, a four hour race, is designed to showcase the technical development the students have undergone throughout the project. The race will test the durability of the students' design as well as showcase the reality of hybrid fuel cell/electric technology as a reliable, powerful alternative for automobiles. The R/C car's fuel cell system, a 30-watt fuel cell with two metal-hydride canisters, stores hydrogen in solid form in a low-pressure, non-compressed compartment and charges the battery while the car is driving. During the race the teams must execute pit stops to change out the canisters, check out the vehicle, and repair any damage sustained during the race. Teams need to make quick repairs in order to be competitive.

The design, building and racing of the H2AC vehicle fosters teamwork, critical thinking, and 21st century STEAM skills. Coaching an H2AC team is a high-tech, fast-paced alternative to robotics, and building mini race cars is fun!

The H2AC is a multi-national event, with competitions held in Europe and Australia as well as the U.S. The Southeast regional event is hosted annually, in late spring, by the Florida Solar Energy Center.

Appropriate Grade Level: 9 - 12

Difficulty: While constructing the vehicle, designing the chassis, and testing and modifying both, are challenging (and rewarding!), it is within the capabilities of all motivated students. Along the way, students will learn the physics of motion and materials, automotive design, DC electricity, and hydrogen fuel cell technology.

Cost: During the first year of the program, the school will need to purchase the parts required to build the vehicle (\$1000 - 1500). During subsequent years the school will only need to purchase parts that need upgraded or replaced due to damage or wear. It is expected that the fuel cell and hydrogen system will last many years, so replacement should be limited

to relatively easy to obtain (and relatively inexpensive) R/C car parts. Teams may want to pursue local sponsorship for additional items such as team t-shirts or travel expenses.

Internet Sites

<http://hydrogenhorizon.org/>

Hydrogen Horizon Automotive Challenge

<https://www.youtube.com/watch?v=m-KV2IwkoDU>

Video of the 2017 California H2AC race at the NSTA conference.

<https://www.youtube.com/channel/UC1LA29phavQZJIMCEQGyrxg>

Horizon Hydrogen You Tube channel, includes videos of H2AC events from all over the world.

<http://www.fsec.ucf.edu/en/education/k-12/horizon/index.htm>

Florida Solar Energy Center's H2AC competition page.