

KSBA PEAK Award Nomination Fall 2019
Henry County High School Engineering Program

Submitted by: Henry County Public Schools

Contact: Melissa Blankenship, Director of Communications, 502.845.8600

As part of its Career and Technical Education (CTE) offerings, Henry County High School (HCHS) provides a series of engineering courses coupled with participation in the Technology Student Association (TSA). Due to the relevance, rigor and instructional style with which the courses are delivered, students experience increased levels of success, not only in the classroom, but with becoming college or career ready, and in their lives after high school either in college, the workplace or the military.

Objectives of the Program

Primary objectives include content mastery, earning industry certifications and receiving the designation of college or career ready upon completion of this CTE program. Students also gain the attributes of our graduate profile: to be a collaborative team member, effective communicator, an innovator and a compassionate citizen who are above all else, critical thinkers and problem solvers.

Students in the program are exposed to a variety of engineering-related career fields. All units are 100% hands-on project-based learning opportunities individualized to each learner. Students are encouraged to try, and if they succeed, their successes are celebrated and discussed by the class to determine why they succeeded. If they fail, students are encouraged to try again after discussing possible solutions or modifications to their work as a class.

In direct conflict to the student lament of, 'When are we ever going to use this,' the goal of this program is to equip students with proverbial "tools" in their "toolbox" they can use after high school either in college, the workplace, and military or in their daily lives. The hope is that students will use EVERYTHING they learn in this program at some point in their lives. The program provides a foundational basis in the field of engineering to enable students to pursue whatever life goals they choose.

Scope of the Program

HCHS offers its selection of engineering classes to all students in grades nine through twelve. On average, 160-175 students per year choose to enroll in one or more engineering classes and/or participate in TSA, which are all led by one instructor, Andrew Shearer.

Courses include mechanical and technical design, engineering design, fundamentals of engineering, and fundamentals of architecture and civil engineering. Students are also encouraged to participate in TSA.

Shearer has often been called upon to conduct statewide trainings on CTE curriculum and instruction, is a 19-year veteran teacher and has spent the last 13 years of his career building the engineering program at HCHS.

Uniqueness of the Program

This isn't your daddy's shop class! Much like technology itself, the engineering program at HCHS continually evolves and adjusts to fit the changing needs of students, post-secondary education and today's workplaces.

“My objectives are forever changing,” Shearer said “I am continually trying to prepare my students for tomorrow’s workforce, not yesterday’s.”

The program has added computer software, equipment and advanced machinery to mirror the actual trends in the field of engineering and the workplace. When 3D printers were all the rage, HCHS’ engineering classes purchased a 3D printer and learned how to effectively use it. A laser engraver was installed, students learned the capabilities of the machine, then began creating marketable products to sell to raise funds for the next piece of equipment. As industry standards change, so does this engineering program that strives to maintain relevance by knowing and then teaching the most current and prevalent software programs used in the field.

All units are 100% hands-on project-based learning opportunities individualized to each learner through a process of “Voice and Choice,” in which students determine their topics and the instructor caters lesson plans and units to fit their interests to increase engagement. Students are typically working on more than one project at a time and can make choices about prioritizing their workload.

“Some schools have smaller programs and they end up specializing in one thing, such as VEX robotics. While their students master a specific content, it’s hard for them to branch out and do anything else,” Shearer said. “I can teach my standards to pretty much any topic by being creative, and if the students have the opportunity to choose their interests to work with, they have ownership in their learning and they will be more successful in showing mastery of the content.”

Many of the projects in the engineering program center on solving a real-world problem using limited resources. Most projects involve using extraordinarily weak materials and finding ways to harness their strengths. Students design and build catapults, paper towers, hydraulic robotic arms, pasta bridges, cardboard chairs, CO2 cars and more. There is an assistive technology unit in which students must identify an individual they know with a need or an issue and design a solution, build a prototype and prepare a presentation.

If the end result of a unit is not as successful as the student had hoped, and the student can identify how to improve his or her design, that student can have a second chance. Failure is not the end in HCHS’ engineering classes, it is an opportunity to succeed next time.

“In the testing phase, I let them fail, reflect, and try again. If we don’t learn from our failures, failure will likely occur again next time,” Shearer said. “Your summative evaluation turns into formative – it’s continual learning. Many times, students will complete a project then determine that they could have done it better. They met the deadline, but they want to learn more or exceed their initial effort. That’s a sign of growth and to have a student take his learning into his own hands is definitely a win-win.”

Involvement in TSA serves as an extension of the learning that takes place in the classroom, allowing students to demonstrate what they have learned in their engineering classes in very creative ways. The members have won numerous awards at both local and state competitions.

Costs and Funding Source for the Program

Primary costs for the program include equipment, software licenses, supplies and materials and training. Over the years, tens of thousands of dollars have been spent on building the program, most of which were a combination of federal, district and school monies.

Annually, program costs are about \$8,000, half of which are provided by federal funds, but with restricted use. Some materials and supplies are donated by local businesses or sold to the program at a reduced cost, while other supplies and maintenance of the equipment is paid for by fundraisers – sales of products designed and produced by the students in the program like apparel and home décor using a laser cutter, 3D printer and vinyl cutter, which the students learn to program and operate.

Students are currently fundraising with a goal of \$10,000 to purchase a Computer Numerical Control (CNC) machine having tested the relevance of the device using a small desktop version this past year. There is currently a demand for CNC operators in the immediate area, and HCHS' engineering program wants to aid students in meeting that demand.

Degree of School Board Involvement

The Henry County Public Schools Board of Education has been supportive of the HCHS engineering programs for several years as its offerings have expanded and increased, been updated and modernized, and adjusted to better fit what today's workplace expects of its employees.

The board has long been financially supportive of the program, designating tens of thousands of dollars toward the purchase of equipment and for professional development so the instructor can maintain program relevance as technology changes. Costs of about \$5,500 annually for industry certifications are provided by the district, with full board approval. The board also supports students in the program's TSA by providing transportation and registration costs to attend annual conferences.

Board members also value the essential skills taught in this program – some of which will be applied to college, but many that will be applied in careers and in real life application beyond high school. The goals of the program succinctly fit into HCPS' newly board-adopted graduate profile that states we will produce collaborative team members, effective communicators, innovators and compassionate citizens who are, above all else, critical thinkers and problem solvers. Having equitable interest in post-secondary education as well as technical training produces well-rounded citizens who will contribute positively to society.

Offering this program also solidifies the Board's commitment to collaborate with our county government to maintain its Work Ready status, producing a skilled and qualified local workforce.

Assessment of the Progress of the Program Toward those Stated Goals

HCHS' engineering classes enjoy a near 98% passing rate on its students' industry certifications, and those certifications enable students to walk into a job interview with an advantage over their competitors. Completion of this CTE also qualifies a student as career ready. Engineering students also frequently fill leadership roles outside of class in extra-curricular and club activities.

Participation in internships and cooperative learning opportunities, coupled with attending workshops and competitions sponsored by TSA, demand that students exhibit the essential skills they will need to be successful in the workplace: attention to detail, effective communication skills, time management, resilience, ability to meet deadlines, capability to work independently and/or collaboratively, proficiency in problem solving and troubleshooting, an aptitude for creative thinking, the ability to multi-task, etc.

Just this past year, several engineering program students attended and competed at the state TSA conference, bringing home two first place finishes in the categories of animatronics and board game design. Students apply what they have learned in HCHS' engineering classes to be successful at TSA.

Graduates of this program also experience success after high school. Five students have enrolled in and successfully completed the KY FAME program, two are supervisors of electrical work crews, one is employed in elevator maintenance (making a higher salary than his high school engineering teacher!), another has become one of the area's biggest contractors, two are completing internships with an energy production company and another is the lead engineer of a well-known engineering firm in South Carolina. Just to name a few.

"I know I am successful when my students are successful outside of high school," Shearer said.

Henry County High School

1120 Eminence Road, New Castle, Kentucky 40050

Phone (502) 845-8670 Fax (502) 845-8671

Shannon Sageser
PRINCIPAL

To whom it may concern,

Kevin Webster
ASSISTANT
PRINCIPAL

It is with great honor that I write this letter describing the impact of our engineering program here at Henry County High School (HCHS). As the sole instructor in the program I am excited to be able to describe the what, the why and the how of what I do as well as shed light on the success stories of students who have been through my program.

Richie Robbins
DIRECTOR OF
BEHAVIOR
INTERVENTION

My students will openly tell you that I do not like the title of "teacher", rather I want to be a "learning assistant". When I think "teacher" I envision a very cookie cutter program. My approach is anything but "cookie cutter". Coming from industry, I am able to see the current and future needs of the business world outside of our walls. I am able to keep up with trends and demands of future employers and help prepare our students for success in a wide variety of areas. Students do not deserve to be looked upon as a pattern piece, but rather as an individual with different strengths and weaknesses. My program's design is to allow students to choose a topic they feel strongly but cater my lessons to their interest area. The outcome will be the same, but their ownership provides a much greater personal drive for them.

Kelly Jo Bryant
COUNSELOR

Chad Rose
COUNSELOR

Several of my students have struggled in content areas, especially math. I understand that struggle as I am a very hands on person and too often math instructors struggle to bring relevance to their topics (by no fault of their own). I teach a lot of math, but I change the way in which it is presented. For example, my wife, a math teacher, discussed how her students struggled with slope in her class because they would never use it in life. She was shocked when they came to my class and excitedly figured the pitch of a dream house they were designing for themselves. Same content, different approach, different results.

Jon Kasten
ATHLETIC
DIRECTOR

Bobbie Zaring
REGISTRAR

As a prior contractor, I tell my students that my goal is to treat them as I would an employee. I will pay them with their grades. I enforce ethics, communication, teamwork and problem solving as these are the qualities I looked for in the workplace and are still the qualities industry partners look for today. I have assisted several students with job shadowing opportunities and co-op positions in areas that they show the greatest interest in pursuing. The outcomes have been very powerful learning experiences for the students and myself. As they report to me, I learn of where they may need more instruction introduced and perhaps areas that are not as necessary. For example, a student accepted into the KYFAME program expressed concern on his/her lack of hydraulics knowledge. I looked into the demand and realized I had missed a vital area of need for several local employers. I now have a full unit of hydraulic robotic arms that need to articulate in a controlled fashion and complete a task. These arms are designed from scratch, completed in CAD and then constructed and tested. As they test, they likely experience failures. Failure and growth from experiences like this is an area that I feel my students excel. They study the failure and as teams, brainstorm ways to overcome that setback and try again.

April Miskell
BOOKKEEPER

Tina Blevins
SECRETARY

Alecia McAllister
GUIDANCE CLERK

Henry County High School

1120 Eminence Road, New Castle, Kentucky 40050

Phone (502) 845-8670 Fax (502) 845-8671

Shannon Sageser
PRINCIPAL

Kevin Webster
ASSISTANT
PRINCIPAL

Richie Robbins
DIRECTOR OF
BEHAVIOR
INTERVENTION

Kelly Jo Bryant
COUNSELOR

Chad Rose
COUNSELOR

Jon Kasten
ATHLETIC
DIRECTOR

Bobbie Zaring
REGISTRAR

April Miskell
BOOKKEEPER

Tina Blevins
SECRETARY

Alecia McAllister
GUIDANCE CLERK

The overall success of my program can be measured by the number of students that have been accepted into KYFAME, the percentage that are leaving our walls holding an industry certification in Autodesk and the number that are successful in colleges following an engineering related field. I am lucky to be able to alter my units to meet emerging needs of a society outside of education. These alterations have helped my students find success in areas from manufacturing, to engineering design team members and in contracting. It will forever be a fluid program, changing with the demands of current and future developments in the global world in which my students will be actively engaged. While it can sometimes be hard to keep up with staying ahead of the curve, witnessing my students, current and former, excel in the workplace makes every moment well worth the time and effort I put in. I love my job and can't wait to see what changes I make in the program in the future to continue the growth of a future generation.

Sincerely,



Andrew Shearer
Henry County High School
Engineering Technology Teacher

Kristin Ricketts
2179 Wolfpen Rd
Pendleton KY 40055
krislrr25@gmail.com

September 12, 2019

Kentucky School Board Association
PEAK Award Judging Panel
260 Democrat Drive
Frankfort KY 40601

Dear PEAK Award Judging Panel,

“Some teachers taught the curriculum today. Other teachers taught students today. And there’s a big difference.” Andrew Shearer is that difference.

I first got to know Mr Shearer almost six years ago while registering my son for High School classes his Freshman year. Engineering was always something my son wanted to explore, so it was an easy choice for his career pathway. At the time, I didn’t realize what an impact those classes would have on my son, academically and in life. I truly believe Mr Shearer is one of the reasons my son is a successful student at the University of Kentucky.

Last year my daughter entered High School and is currently taking her second year of Engineering classes as one of only two girls in her specific class. She successfully passed one of her industry certifications last year as a Freshman. While she has not enjoyed the “building” aspect of Engineering, Mr Shearer has helped her find her niche in design, which speaks to the artist in her.

Each of my children found a love of Engineering but in completely different ways. And while they didn’t share a love of the same branches of Engineering they both gained some of the same benefits from having the same teacher. Critical thinking, problem solving, and communication being just a few. Although my daughter would say that communication is a little more difficult for her, given her project partners are always boys!

Mr Shearer uses each of their projects not only as assignments but as life lessons. How will this apply to something you may deal with in the future? How does this help you work through a problem? Learning how to overcome and deal with everyday issues is a must-have tool for life. It can be applied everyday in every situation. These tools for life are something that many students lack.

We often judge success in teaching by grades, scores, tangible documented accomplishments of students but often forget the person inside. We forget to look for the uniqueness and individuality that each student possess. What helps that student succeed may be far different from the student sitting right next to them. Mr Shearer looks for those differences. He finds the places they shine and supports those endeavors and even more importantly, discovers where they struggle and works with them to overcome those obstacles.

Henry County High School is blessed to have such a dedicated teacher. Not only does he strive to make each student academically successful but he also makes his students feel important; they matter. He has a love for his students, his school and Engineering. That love is tangible.

“A teacher affects eternity; he can never tell where his influence stops.”

Sincerely,

A handwritten signature in black ink that reads "Kristin L Ricketts". The signature is written in a cursive style with a large, prominent initial "K".

Kristin L Ricketts

326 SOUTH MAIN STREET
NEW CASTLE, KENTUCKY 40050



HENRY COUNTY
PUBLIC SCHOOLS

TELEPHONE (502) 845 - 8600
FAX (502) 845 - 8601

Kentucky School Board Association
Attn: PEAK Award Nomination
260 Democrat Drive
Frankfort, Ky. 40601

To Whom It May Concern:

On behalf of the Henry County Public Schools Board of Education, it is my pleasure to endorse the engineering courses at Henry County High School (HCHS) as a nominee for your PEAK Award. I believe you'll find that this program indeed excels in its ability to improve academic achievement and promote the positive impact of public education in the state of Kentucky.

A well-established career and technical education program at HCHS, the engineering courses there are an integral element in our mission to "empower leaders and lifelong learners for an ever-changing world." They also serve to bolster our commitment to actively contribute to the number of qualified and skills workers in our Work Ready county in partnership with our county government.

The engineering courses at HCHS focus on mastery of content, as exhibited by its 98% passing rate of industry certifications, but in these classes, students truly become more career and/or college ready through the instruction they receive.

They are introduced to a variety of career options in the engineering field – some that would require college education, some that require additional technical education after high school, and some fields that students could begin after graduating high school. Because of the style of hands-on instruction that provides a student-driven curriculum where kids choose their interests/projects, students perform at higher levels and have a stronger desire to learn.

The program also stays current and relevant, up-to-date on technology in terms of computer software and programs students need to be familiar with as well as machinery they should be able to operate, and presents opportunities to students for regional internships, continued studies or jobs. Through their instruction, students are also intentionally taught the essential skills employers expect - critical thinking, problem solving, resilience, communication, collaboration, and more. Skills that will also serve them well in college and throughout their lives and productive members of society.

As a Board, we feel very fortunate to offer this program at HCHS as it has reaped real and tangible rewards in terms of student success. Five of our previous students have entered and successfully completed the KY FAME program on the heels of our engineering courses.

326 SOUTH MAIN STREET
NEW CASTLE, KENTUCKY 40050



HENRY COUNTY
PUBLIC SCHOOLS

TELEPHONE (502) 845 - 8600
FAX (502) 845 - 8601

Several previous students now have careers in related fields such as contracting and electrical work, often taking on leadership roles earlier than others, and one student is the lead engineer at an engineering firm.

We're proud of the learning that takes place in HCHS' engineering courses, and we're proud of the incredibly positive results these courses have had on our graduates – whether they have applied that learning in college, on the job or in their lives. Your organization would be well served by choosing the engineering courses at Henry County High School as your next PEAK award winner.

If I can be of further assistance or answer any questions for you, please do not hesitate to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Tony Whaley". The signature is written in a dark ink and is positioned above the typed name.

Tony Whaley
Board Member
Henry County Board of Education
(502) 8454-4121
tony@tonywhaley.com