

# LAUNCHING A STEM STORY FOR EVERY STUDENT



PLTW

Administrators at the PreK-12 school district in Grenada, Mississippi were looking to break the mold by integrating science, technology, engineering, and math (STEM) education into every grade level. And in 2016, the district began its implementation of Project Lead The Way (PLTW) curricula into all grades, from PreK-12 and serving approximately 4,000 students — a decision the district believes has contributed to improvements in students' academic skills and career readiness.

Grenada School District's educators didn't want to limit students; they knew students needed exposure to engineering and science fields from as early an age as possible. "Traditional teaching approaches were not working, so we knew that wasn't the way we wanted to go," recalled Carol Tharpe, Principal of Grenada Elementary 4-5. Since implementing PLTW in 2016-17, Grenada School District has elevated its district rating from C to A and is now in the top 20% of all districts in the state on the 2023 Mississippi Statewide Accountability System.

"As an educator, I believe in the benefits of having PLTW at all levels. These programs offer numerous advantages for our students in their educational development and their future prospects. They introduce students to STEM at an early age by integrating hands-on learning experiences. These programs foster a strong foundation in critical thinking, problem solving, and team working. Students are encouraged and guided on a path to think creatively. This not only can enhance their academic abilities but prepare them for the demands of the modern-day workforce."

*Sydney Samples, Grenada High School  
PLTW Biomedical Science Teacher*

While it is not possible to identify a single district initiative or program as the sole contributing factor of this success, PLTW has been a major component of the district's strategy. Research supports Grenada's experience: Studies indicate that PLTW participation is associated with increased student engagement (One8 Foundation & Papay, 2019) and academic achievement (One8 Foundation & Papay, 2019; Rethwisch et. al., 2012; UMKC et. al., 2022).

## LAUNCHING STEM SUCCESS FROM AN EARLY AGE

In the 2022-23 school year, Grenada Elementary ranked in the top 6% of all elementary and middle schools scored on the Mississippi Statewide Accountability System.

### 3rd Grade

Top 5 in math performance since 2021

### 4th Grade

Top 5 in math achievement in 2022-23 school year

### 5th Grade

Ranked 2<sup>nd</sup> in science statewide in 2022-23 school year



## Strengthening STEM Curriculum

“When we were first introduced to PLTW, we sat in a meeting room and charted out a course of how we could introduce PLTW as early as possible in the K-3 program and then build up to get students interested in engineering and biomedical [science]. We wanted to provide students with exposure to those fields and felt that PLTW would do that for our students as early as possible,” explained Dr. Ezzard Beane, the district’s PLTW Program Coordinator and Principal for the ninth grade. The district began by offering PLTW Launch curriculum in elementary grades, along with two PLTW Gateway middle school units, and high school-level PLTW Biomedical Science and PLTW Engineering courses.

Grenada has set itself apart from other districts by being the first in Mississippi to implement PLTW in every school; offering PLTW courses to PreK-12th grade students has helped Grenada maintain its status as a Mississippi District of Innovation. Since that initial meeting about implementing the curriculum, the district has now added a high school-level pathway for

## Grenada’s PLTW Course Implementation Timeline

**2016-17**

PLTW Launch  
PLTW Gateway: Science of Technology  
PLTW Gateway: Design & Modelling  
PLTW Principles of Biomedical Science  
PLTW Introduction to Engineering Design



**2017-18**

PLTW Gateway: Automation & Robotics  
PLTW Gateway: Medical Detectives



**2018-19**

PLTW Human Body Systems



**2019-20**

PLTW Principles of Engineering



**2020-21**

PLTW Aerospace Engineering



**2021-22**

PLTW Computer Science Principles



**2022-23**

PLTW Cybersecurity  
PLTW Computer Science Essentials

computer science, along with additional courses in PLTW Gateway, PLTW Engineering, and PLTW Biomedical Science.

## Student Pathways to Success

As students move from grade to grade, they have ample opportunity to engage with curriculum built for a STEM-centered world. Throughout the academic year, teachers at Grenada Elementary School integrate PLTW Launch modules into lessons that align to the material they are covering in their PreK through third-grade classrooms.

The district’s gifted program also utilizes PLTW Launch as part of its curriculum. When students move into fourth and fifth grade, they begin attending the Discovery Lab once per week. The Discovery Lab is an exploratory learning space that fosters transportable skills, such as problem solving, communication, and critical thinking, by incorporating PLTW curriculum into its lessons.

“PLTW basically taught me all the basics of engineering... It enhanced my abilities to do better in robotics and helped develop my interest in engineering in general. I came here to college, got on the EcoCAR<sup>1</sup> team, and as they were showing us all the programming, all the software and CAD<sup>2</sup> they were doing, I was not intimidated at all... I wanted to do more and dive in headfirst.”

*Connor Kangheng,  
Former PLTW Student. Currently  
studying Mechanical Engineering at  
Mississippi State University.*



Devon Tipton, the Discovery Lab Instructor, describes the space as “a large room in the center of the building with science tables, a large smart TV, microscopes, robots, and lots of technology where students are challenged to collaborate and complete STEM projects.”

Students who pass through the elementary programs are familiar with many of the PLTW concepts they will encounter in middle school. One eighth-grade student described her PLTW Launch experience as the “starter” classes that “helped propel” her into the PLTW Gateway material. Students at Grenada Middle School may participate in a variety of PLTW courses. For example, PLTW Science of Technology (ST) is blended into a sixth-grade science class while PLTW Automation and Robotics (AR) is available to eighth graders at the district’s Career and Technical Center—a location that allows students to observe and experience advanced technologies that await them in high school. The middle school also offers additional PLTW Gateway units, including PLTW Design and Modeling (DM) and PLTW Medical Detectives (MD).



After building their awareness of computer science, engineering, and biomedical science in middle school, students can explore these topics further at Grenada High School, which offers courses in all three PLTW pathways. Students in the PLTW Biomedical Science program take Principles of Biomedical Science (PBS) and Human Body Systems (HBS). The PLTW Engineering program offers Introduction to Engineering Design (IED), Principles of Engineering (POE), and Aerospace Engineering (AE), while the PLTW Computer Science program consists of Computer Science Principles (CSP), Computer Science Essentials (CSE) and Cybersecurity (CS).

Student interest and engagement were key drivers of the decision to add more PLTW courses. After observing a growing student interest in engineering and robotics coming from the middle school, Grenada High School formed the [Navy Junior Reserved Officer Training Corps] NJROTC cybersecurity team. By offering a wide-ranging PLTW program, the Grenada School District is building excitement around STEM and providing opportunities for students across grade levels to explore biomedical science, engineering, and computer science.

“Without the eighth grade PLTW class, I don’t know what I would be doing right now... when I took that class my eighth-grade year, I got really interested in science and prosthetics.”

*Shelby Boyett, Former PLTW Student. Currently studying biomedical engineering as an undergraduate at the University of Mississippi and hoping to earn a PhD focused on pediatric prosthetics.*





## Building Core Skills in Early Grades

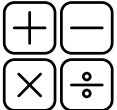
### Third Grade Math and ELA

Grenada has found that intentionally embedding PLTW throughout students' academic experiences promotes well-rounded learners—and its academic growth exemplifies that in its elementary grades, where PLTW curricula helps provide students a strong foundation for future success in math, English Language Arts (ELA), and science.

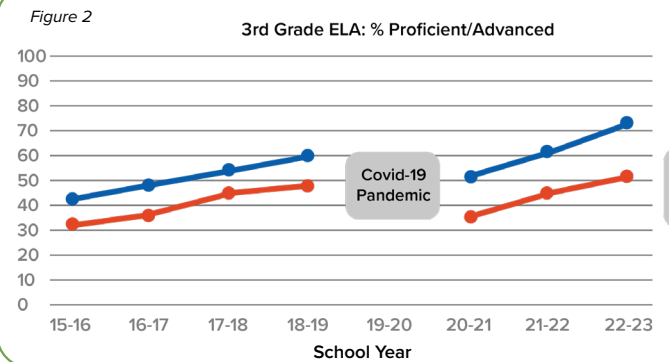
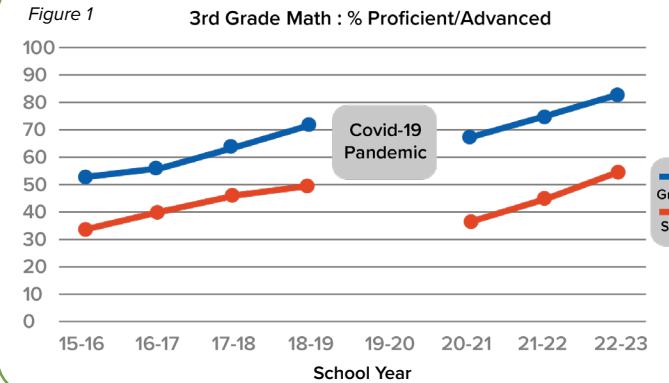
“We were able to recruit students into ROTC based on the robotics and engineering programs they offered, so we decided it would also be a good idea to offer cybersecurity to students who were not in ROTC but in the general student body.”

*Dr. Ezzard Beane, Principal of Grenada High School, 9th Grade / PLTW Program Coordinator*

**80% ACHIEVED  
PROFICIENT OR  
ADVANCED**


 3rd Grade Math  
 2023 State Exam

As shown in Figure 1, over 80% of Grenada third-grade students tested proficient or advanced on the 2023 statewide math assessment. Furthermore, district third graders have ranked in the state's top five for math performance since 2021. The district has also increased third-grade ELA proficiency rates from 41% to 73% since 2016 (Figure 2). “Teachers use PLTW to integrate standards,” said Cole Surrell, Principal of Grenada Elementary PreK-3. “We’re seeing more and more students go from basic to proficient and advanced... I think that PLTW helps to bring that out of them and take them to a higher level.” Research supports this with studies showing that integrated science instruction benefits students’ literacy (Cervetti et al., 2012) and math skills (Aguirre-Muñoz, et al., 2022).

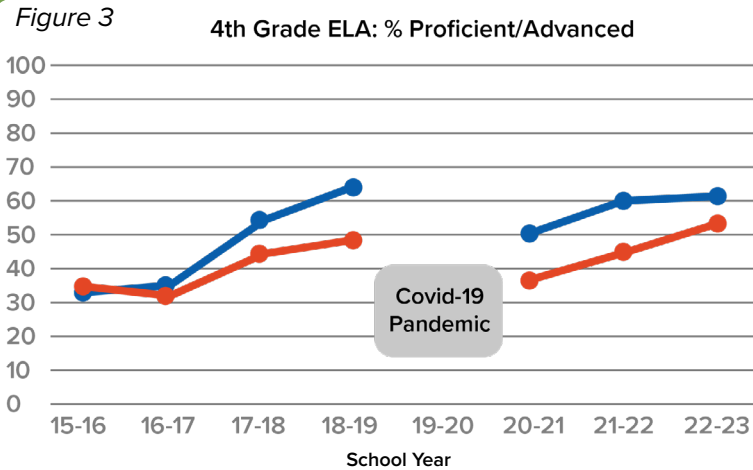


## Fourth Grade Math and ELA

During the 2022-23 academic year, Grenada ranked in Mississippi's top five for fourth-grade math achievement. Moreover, as shown in Figure 3, fourth-grade ELA proficiency rates have increased 30 percentage points since 2016. Tipton indicated, "Recently, our assistant principal implemented a cross curricular collaboration where students read text in their ELA classes that coordinate with the PLTW modules we're working on, and sometimes their ELA classes will read some of the texts that are in the modules. I think it gives a well-rounded approach to learning for every student."

Since 2016, 4th grade ELA proficiency rates have

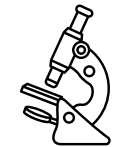
**INCREASED  
BY 30%**



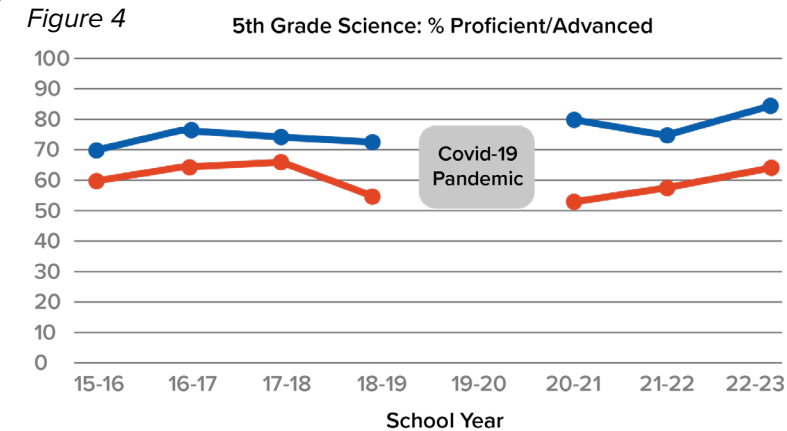
## Fifth Grade Science

As shown in Figure 4, Grenada Elementary School has also experienced notable improvement in students' science achievement with nearly 85 percent of fifth-grade students achieving proficient or advanced performance on Mississippi's statewide science achievement assessment in 2023. The district currently ranks 2nd in the state for fifth-grade science performance—moving up roughly 32 positions since 2015-16. And, despite state-level trends showing proficiency declines following the COVID-19 pandemic, Grenada students demonstrated significant gains in fifth-grade science proficiency in the 2020-21 academic year. Principal Tarpe credits PLTW with having a "profound effect" on science performance.

**85% SCORED  
PROFICIENT OR  
ADVANCED**



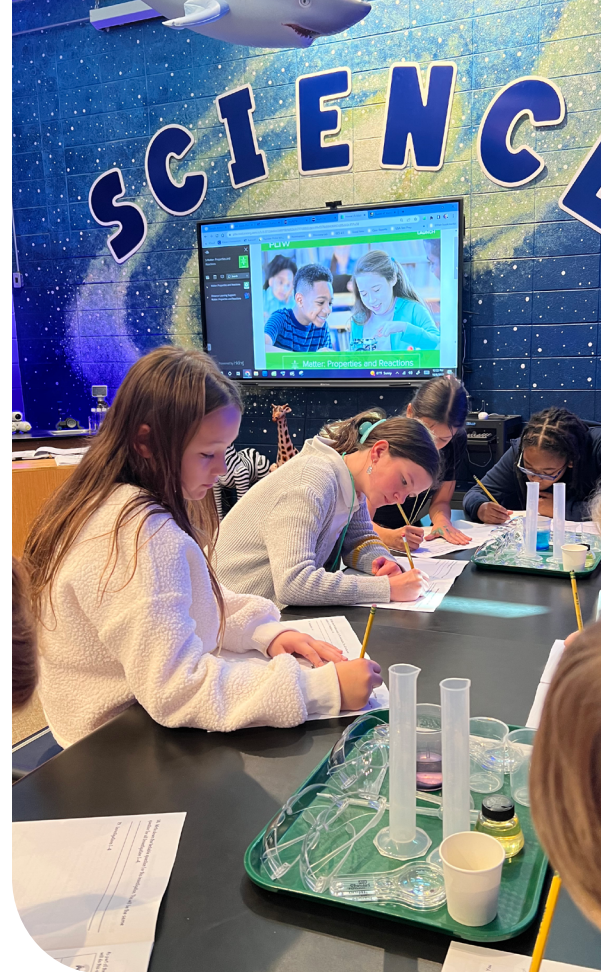
5th Grade  
Science 2023  
State Exam



## Connecting Knowledge across Subjects

As Dr. David Daigneault, Grenada Superintendent, noted, “the PLTW method of instruction engages our students and makes learning fun!” Beyond science, students have also noticed the impact of PLTW on their academic skills. One fifth-grade student shared how PLTW lessons from second and third grade helped build skills for “the different types of things we would be doing in fourth and fifth grade” and said, “it helped with organizing skills and task lists to complete things step by step.”

At the secondary level, Grenada students report that their PLTW classes have strengthened their ability to analyze and organize information—even improving their ability to budget. A tenth grade PLTW student noted, “[In PLTW] we learn a lot about budgeting too, which is something I haven’t learned in any of my other classes. We had to build bridges and determine whether they could withstand the force of the truck we were experimenting with. Even if our bridge could



support it, if it extended over a million dollars, it wasn’t plausible. We had to make sure that our bridges were both functional and affordable.”

Also at the secondary level, Sidney Samples, a PLTW Biomedical Science teacher, shared that her students use MLA and APA citation formats when writing papers. Additionally, she collaborated with the sophomore English classes on a project where students interviewed professionals about their research on body decomposition. In her PLTW courses, she aims “to incorporate more interdisciplinary connections by integrating concepts from other subjects like arts, language arts, and social sciences to try to provide a comprehensive, well-rounded learning experience to help students understand the interconnectedness of the various disciplines.”

“[PLTW] really helps when I’m in math because I know how to do liquid volume. I used to struggle with that. Now I understand it more.”

“It also helps with reading because you have to read passages and articles.”

“The things I did [in PLTW] back in third grade and second grade helped me prepare for the different types of things we would be doing in fourth and fifth grade, ... It helped with organizing skills and task lists to complete things step by step.”

*Grenada Elementary Students, PLTW Launch*

“We have design briefs that we have to write [in PLTW]. Learning how to order those definitely helped me with writing essays.”

*Grenada 10th Grade Student,  
PLTW Engineering*



## Empowering Students' Futures

Grenada School District's comprehensive PreK-12 PLTW program doesn't just impact students' performance in the classroom, it also prepares them for success in their chosen career path. Teachers at Grenada High School tell stories of former students who reported back on experiences in which their PLTW training helped in college and career. "I remember this one previous student who told me, 'I felt like the top dog in the room' because she already knew how to do the lab. She remembered doing it. She was able to be the leader of the lab," shared Andrea Jackson, PLTW Biomedical Science Teacher.

**\$3 Million**  
in scholarships  
Grenada High  
School, Class of  
2023

"PLTW had a big part in this."



*Dr. David Daigneault,  
Grenada Superintendent*

"I've had so many students successfully continue with the medical field that were inspired by PLTW. I have old students who are now CNAs<sup>3</sup>, LPNs<sup>4</sup>, EMTs<sup>5</sup>, and paramedics. I even have one who is studying forensic science. There are so many, and it's due to the exposure of PLTW."

*Andrea Jackson  
PLTW Biomedical Science Teacher*

Even when students take a different path from the PLTW courses they completed, the impact of their transportable skills persists. Charles Pheng is a master's student at the University of Tennessee studying aerospace engineering, but he participated in the PLTW Biomedical Science program at Grenada High School. Despite choosing to pursue aerospace engineering rather than biomedical science, Pheng identified teamwork as a valuable skill that he carries forward in his current field.

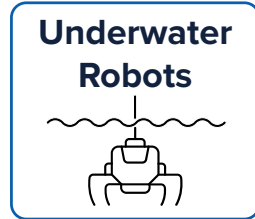
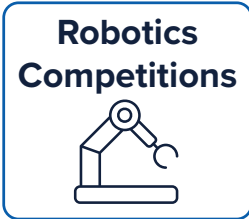


"As a continuous Improvement Specialist [at Novipax], I'm always looking at processes and how I can make them more efficient... So, it takes me back to my engineering days at PLTW. I have to look at it step by step, plan it out, draw it out, and maybe make a model to determine how I can be successful with the project."

*Sydney Dickson, Former PLTW Student*

Dickson's current role at Novipax is a full-circle PLTW moment. Novipax was a portfolio company of Atlas Holdings, which first partnered with PLTW via the Atlas Foundation in 2016. Through their partnership, Novipax supported Grenada's PLTW Engineering program via grants, classroom visits, and internship opportunities. Dickson had the opportunity to intern at Novipax at the end of her senior year in high school. After interning at the company for four summers, she was offered a job.

Grenada’s fully embedded PLTW program is having the impact that the district had hoped for back when the program was first implemented in 2016. “Prior to PLTW being at the high school, we did not have students participating in robotics or coding competitions,” said the district’s PLTW Program Coordinator Dr. Beane. “Now we see the growth in our NJROTC program where we have students who, even if they aren’t in PLTW classes, are participating in cybersecurity competitions and robotics competitions. We’ve also started a drone team and a SeaPerch team where students compete with underwater robots. That interest was generated and started with PLTW in elementary and middle school and has transferred not only to our PLTW classes, but also to our clubs and activities.”



Students in PreK-12 are expanding their horizons and achieving academic success, while graduates of the program are successfully pursuing passions that were ignited while participating in PLTW programs. By continually expanding access to PLTW for students throughout the Grenada School District, the possibilities for students are endless.

“PLTW builds on the strengths of kids. It gives every kid an avenue to be successful in what they are doing. It gives kids the opportunity to demonstrate what they are good at. ... It might be basic leadership skills, not necessarily a standard that’s being taught.”

*Cole Surrell, Grenada PreK-3 Principal*



Learn more about our approach



Explore the impact of PLTW



Find a nearby PLTW school

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## Footnotes

1. A student-led automotive engineering team
2. Computer-aided Design
3. Certified Nursing Assistant
4. Licensed Practical Nurse
5. Emergency Medical Technicians





[pltw.org](https://pltw.org)

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