

CASE STUDY

NATIONAL
INSTITUTE
for
STEM
EDUCATION

HOLY GHOST CATHOLIC SCHOOL LEADS IN STEM EXCELLENCE WITH EVIDENCE-BASED PRACTICES THAT ENHANCE INSTRUCTION ACROSS ALL CONTENT AREAS

Holy Ghost Catholic School
Albuquerque, New Mexico

Holy Ghost is the first school in New Mexico—and one of the first Catholic schools in the nation—to earn the National Certificate for STEM Excellence

NEW MEXICO

School

PRE K-8
200 STUDENTS

Students

1% AFRICAN AMERICAN
7% AMERICAN INDIAN/ALASKA NATIVE
59% HISPANIC
4% ASIAN/PACIFIC ISLANDER
427% WHITE
3% TWO OR MORE RACES

32.2% ECONOMICALLY DISADVANTAGED
16.5% ENGLISH LANGUAGE LEARNERS
11% SPECIAL EDUCATION

Holy Ghost Catholic School is a small school in southeast Albuquerque that draws students from all over the city, surrounding counties, and nearby Native American reservations. In 2009, it became the first Catholic school in New Mexico to be recognized as a US Department of Education Blue Ribbon School of Excellence.

In 2019, Holy Ghost made history again when it became the first school in New Mexico—and one of the first Catholic schools in the nation—to earn the National Certificate for STEM Excellence (NCSE) from the National Institute for STEM Education (NISE).

“To attract and retain students, we have to be the best school possible and offer the best education,” said Dr. Noreen Duffy Copeland, who served as principal of Holy Ghost from 1993 through the end of the 2018-19 school year. “Over the last several years, we have worked diligently to create systemic change in our school and implement research-based practices, and we’re constantly working to deliver instruction more effectively. When I looked at NISE and saw how much it aligned with what we were already doing, it made perfect sense that STEM certification would be our next direction.”

EARNING NATIONAL STEM CERTIFICATION

Copeland initiated a partnership with NISE in 2018. NISE certifies teachers and campuses in STEM teaching, culminating in the National Certificate for STEM Teaching (NCST) and the NCSE–Campus Certificate. The NISE program integrates the most recent research and best practices in STEM with professional development that is research-based, personalized, and immediately applicable in the classroom. It provides an evidence-based framework for defining and understanding STEM, and focuses on high-impact STEM instructional strategies that work synergistically across content areas in preK-12 classrooms.

“Becoming a STEM-certified campus was a major undertaking and proved once again the commitment of the Holy Ghost teachers,” said Assistant Principal Shawnda Osborn. “Our journey began the first week of summer break in 2018, when our STEM leadership coach with NISE had his first contact with our staff. He took our teachers out of the conference room and into the central courtyard of our school and turned us loose as students. We were looking for anything that caught our attention. We engaged with nature, thought like scientists, and learned by discussing with our peers. This was our first experience with a 3-D classroom, and it became our foundation of how we wanted to engage our students when they came back in the fall.

“3-D teaching helped us analyze how to integrate three distinct dimensions of teaching: Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts. The realization was that this approach didn’t have to stay in the math and science classroom. These best practices could be applied to any and all subjects. We saw that STEM wasn’t about what we were teaching; it is about how to teach, no matter the curriculum. This is why we had our art teacher, literature teacher, and pre-K teacher become STEM certified teachers, too. We were also the first to use these best practices in our religion classes.”

“A common misconception in many schools is that STEM is only about science, technology, engineering, and math content, or that it’s about adding a makerspace or robotics program,” said Copeland. “STEM is actually about implementing rigorous instructional strategies that can be applied in any content area. It’s about effective teaching.”

“We wanted our students to experience instruction based on the ways people learn best,” said Osborn. “We could invite learners to explore by starting with broad questions, create safe learning environments where they feel comfortable taking risks, focus on topics that they have an interest in, allow them to select the materials, and then encourage them to make sense of their new thinking by collaborating with a partner.”

During the 2018-19 school year, 10 teachers completed the NCST, an online, competency-based professional development program for K-12 teachers. With the support

of their virtual STEM coach, teachers developed digital portfolios demonstrating their understanding of 15 STEM Teacher Actions across three domains. These domains, essential for effective STEM teaching, are Creating an Environment for Learning, Building Scientific Understanding, and Engaging Students in Science and Engineering Practices. At the same time, the school completed its requirements for the NCSE–Campus Certificate, developing a digital portfolio demonstrating the application of the 15 STEM Teacher Actions.

“I was impressed with the support our school received,” said Osborn. “To certify our campus, our STEM leadership team met weekly at 7 a.m. to work through our questions, reflect on data we had gathered, develop materials to support our teachers and students, and narrate our process with our STEM coach. Our coach would take my calls prior to our Zoom meetings as we worked through the next steps for the team.

“Certifying our campus and 10 of our teachers in a single year was no small accomplishment. The collaboration I saw from our teachers as they submitted and resubmitted indicators brought us closer together as a community. I would walk by classrooms and see other teachers taking notes and photos while the teacher was working with students. Later that day I would see these teachers working together to choose the best evidence to submit to our STEM coach. This process became part of our culture, and finding ways to document our progress created a sense of accomplishment. As we moved into spring of 2019 and teachers had submitted their 38 Indicators and waited for notice that they had completed the program, they became cheerleaders for those who were still in process.”

MOVING TO THE NEXT LEVEL OF EXCELLENCE

“Working with NISE has moved our school to the next level of excellence. It has focused our efforts to provide the best instructional practices in every classroom,” said Copeland. “For us, STEM is a means to support our mission statement, which is to prepare students for the 21st century by providing opportunities for creating, communicating, collaborating, and critical thinking—the four Cs.”

“The NISE certification process has been beneficial to my teaching and I really enjoyed it,” said pre-kindergarten teacher Gretta Valenzuela. “It showed me what was working and what I needed to do to grow as a teacher. I now have a new appreciation for and understanding of STEM, and my students do, too. STEM isn’t just about science or math; STEM works through every subject throughout the school day.”

“The NISE certification process helped me reflect on my teaching,” said fifth grade teacher Holly Rivera. “It helped me focus on specific elements and what I could do to move from ‘proficient’ to ‘role model.’ It also made me more intentional and helped me elevate my teaching to increase student engagement and allow for more problem-solving activities and student-driven exploration.”

INCREASING STUDENT OWNERSHIP OF LEARNING

“One of the biggest things that changed for me was shifting my mindset to have students take more ownership of their learning,” said Rivera. “We were doing that before, but the STEM certification process provided the structure to take it to a much higher level.”

“That was a huge change for me, too,” said Valenzuela. “Because my students are so young, I used to feel like I needed to do more directing, like in choosing materials for STEM activities. What I learned is that I need to train my students so they can do those things on their own. This has not only helped me, but it has helped my students become more responsible. They like choosing materials and working together to come up with different solutions to problems. They even ask to try again if things don’t work the first time. It’s exciting. Parents, too, are seeing the changes and how we’re helping their children become more responsible for their learning.”

ADDRESSING THE NGSS WITH HANDS-ON, INQUIRY-BASED LEARNING

Holy Ghost teachers also use online tools to support the 4Cs and hands-on learning in all grades. For example, the school implements STEMscopes NGSS as its core science curriculum in grades K-8. STEMscopes NGSS is built from the ground up to address the Next Generation Science Standards (NGSS). It combines a comprehensive digital STEM curriculum, supplemental print materials, and hands-on exploration kits with embedded professional development to support student and teacher success.

“STEMscopes answered our question of how to implement the NGSS. It also appealed to us because it’s online and provides opportunities for the four Cs,” said Copeland.

Each STEMscopes unit is developed around the 5E (Engage, Explore, Explain, Elaborate, Evaluate) model of instruction, with additional phases for Intervention and Acceleration.

“I like that STEMscopes was created by teachers, and that it provides opportunities for hands-on inquiry,” said Rivera. “The 5E model is great and it engages students throughout the process.”

At the pre-kindergarten level, Holy Ghost uses STEMscopes Early Explorer. STEMscopes Early Explorer is built from the ground up to Head Start and state and national pre-kindergarten and kindergarten guidelines, and is scaffolded to prepare students for NGSS kindergarten standards. With 16 centers, Big Books, hands-on kits, sustained inquiry, and engaging activities, it integrates STEM content with literacy, creative arts, and physical and social development to promote academic and social skills across multiple domains of school readiness.

“We absolutely love STEMscopes Early Explorer. There’s so much to the program,

and it's all well organized and paced," said Valenzuela. "My students love the experiments. They come in asking, 'What is our experiment? What are we doing today?' They're excited to learn."

PREPARING STUDENTS FOR THE FUTURE

"Thanks to the NISE certification process and tools like STEMscopes, we're now more intentional across all subjects. We're encouraging students to engage in the four Cs, and they enjoy that," said Valenzuela. "Even in pre-kindergarten, students are thinking about STEM because STEM is everywhere. It has made learning so much fun. Our students are as excited about learning as I am about teaching."

"Thanks to all of our efforts, including earning our national STEM certification through NISE, we're preparing students for their futures. Even the feeder high school tells us they love the students from Holy Ghost because they're so well prepared for high school," said Copeland.

ENCOURAGING CONTINUOUS IMPROVEMENT

Moving forward, Holy Ghost leaders and teachers plan to continue building upon their STEM leadership. "Teachers at Holy Ghost are engaged in a continuous cycle of professional development. It's not like we got STEM certified and it's done. STEM certification built upon the work we'd been doing for years and we will continue to build upon that into the future," said Copeland.

Douglas Wine, who became principal of the school in fall 2019, said that he was drawn to Holy Ghost in part because of its work with NISE. "Teachers show a real dedication to 21st-century learning and want to look at more ways to engage students and help them become partners in learning," he said. "This year, we are working with more teachers who want to become certified. They can see the change in students who were in the classrooms of STEM-certified teachers and want to continue the momentum."

During the 2019-20 school year, four additional Holy Ghost teachers will participate in the NCST certification process with NISE.

"In many schools, classrooms and teachers are still like they were in the 1950s," said Copeland. "We live in an age where information is exploding. How are we preparing students to make decisions about what's best for them, their communities, and our country? How are we preparing them to be good citizens and members of the global community? Making this shift is not something that occurs overnight; it's something that becomes embedded in the culture of your school. You can't suddenly say, 'We're going to start STEM instruction today.' It's a process of learning and understanding what effective instruction looks like in today's classrooms across all disciplines, not

just science, technology, engineering, and math. It's about putting the best teachers in every classroom so they can reach every child to develop the skills needed in the workforce, their communities, and beyond."

"As a school leader, I see two challenges that STEM instruction presents," said Wine. "The first is that we need to offer students increased opportunities to explore and discover learning, and face the social-emotional issues that result from uncertainty and discovery. The second is the need for the school to update its technological infrastructure and devices to help students explore the world as they will into the second fifth of the 21st century. It's exciting and daunting at the same time—a great reason to wake up every day."

