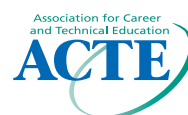


# TAKING BUSINESS TO SCHOOL:

## GRAND FORKS PUBLIC SCHOOLS AND NORTHROP GRUMMAN



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### Partnership Catalyst

Northrop Grumman has a strong commitment to supporting education initiatives that foster students' interest in science, technology, engineering, and math (STEM). The company partners with educational institutions to offer "engineering- and technology-based programs and initiatives that excite, engage, and educate students." (Northrop Grumman, 2021). Northrop Grumman prioritizes sponsoring STEM education initiatives in communities where it has a physical presence and employee base to both invest in its communities and partner to develop local talent.

In 2017, Northrop Grumman opened a new facility near Grand Forks, North Dakota, to support development and operation of unmanned aerial systems (UAS), an emerging technology in the aviation field. The Grand Sky Unmanned Aerial Systems Business and Aviation Park is the nation's first commercial UAS business park; the facility was developed in partnership with the United States Air Force and leverages the infrastructure of the Grand Forks Air Force Base for its operations. (Northrop Grumman, 2017). The Air Force flies a group of Global Hawk autonomous aircraft from the air base, and the development of the Grand Sky facility meant that Grand Forks was becoming a hub for the UAS industry.

As the Grand Sky facility was being developed, Northrop Grumman also began developing its partnership with the region's academic institutions to support STEM education in the community and collaborate to develop a local workforce with skills needed for the UAS field. Northrop Grumman's Grand Sky site director Mike Fridolfs said, "Northrop Grumman built a state-of-the-art facility at Grand Sky because of the ability to work closely with our customers and because of the region's strong academic institutions and commitment to supporting the autonomous systems industry." (Grand Forks Region Economic Development, 2020). Early on, Northrop Grumman reached out to the region's secondary and postsecondary education institutions to get to know local education leaders and begin identifying STEM education partnership opportunities. Northrop Grumman initially supported STEM education in Grand Forks through a state matching grant program and invested in STEM education at the pre-K level. Once the Grand Sky facility opened in 2017 and Northrop Grumman employees were working in the Grand Forks community, the



partnership expanded to include more direct engagement between Northrop Grumman employees and Grand Forks students. Students enrolled in Grand Forks Public Schools now have the opportunity to participate in several of Northrop Grumman's nationwide STEM education initiatives, including the VEX Robotics program and a high school mentoring program.

### Program Overview

Grand Forks Public Schools has established a highly successful and globally competitive robotics engineering program over the last several years. Robotics program students participate in the VEX Robotics game-based engineering challenge. Students build their own robots capable of completing a certain set of tasks spec-

#### Creating Strong Business Partnerships

For more information on creating strong business partnerships, see the "Business and Community Partnerships" element of ACTE's *Quality CTE Program of Study Framework* at <https://www.acteonline.org/professional-development/high-quality-cte-tools/>.



ified each year by VEX Robotics; each team of students brings their robots to compete with and against other teams at the state, national and international levels. Students work on building their robots after school and on weekends and participate in competition events throughout the year.

The Grand Forks CTE program was initially interested in developing a robotics engineering program because it would enhance the existing engineering curriculum, and because robotics students could develop skills and knowledge that would prepare them for the region's growing UAS industry. In addition, the Northrop Grumman Foundation is the presenting sponsor of the annual VEX Robotics World Championship event, which presented opportunities for local Northrop Grumman employees to get involved in the Grand Forks robotics program and engage directly with students.

The robotics program at Red River High School in Grand Forks launched in 2016. The program has grown from 10 students in the first year, to 35 students participating in the 2021-2022 school year. Grand Forks Public Schools has also expanded the robotics program to its middle schools and elementary schools. Grand Forks CTE Director Eric Ripley explained, "We're really trying to provide a scope and sequence for students that are interested in [STEM] that they can get involved in early age and work their way all the way up. It's not about how many banners or trophies a person wins, it's how many kids can we get involved and have a positive experience."

Through the robotics program, students develop valuable real-world skills, regardless of whether they plan to pursue STEM careers. As students design and build a robot that meets the annual challenge specifications, they learn technical skills such as engineering design, fabrication, and coding. Students also learn foundational skills including teamwork, communication, and problem solving as they work in small teams to build their robot. And at the competition events, small teams get paired up and must work together to complete the challenges; students are often paired with teams from other schools or even other countries, requiring them to collaborate and strategize with other students on the spot. Grand Forks robotics program coach Joseph Ostgarden believes that the program helps students develop a diverse and well-rounded skillset, beyond technical skills, that is required for success in many careers. Ostgarden explained that "A great robot can only take you so far; the competition is about so much more."

Northrop Grumman supports the VEX Robotics competition in several different ways. In addition to corporate-level support for VEX

## VOICES FROM THE FIELD

Joseph Ostgarden is a science teacher at Red River High School in Grand Forks, but his passion is coaching the school's competitive robotics program. Ostgarden has served as the robotics coach since its beginning in 2016; he led the program's development and growth from a small high school club to a continuum of robotics programs in many of the district's elementary, middle, and high schools. Today he works with 35 high school students after school and on weekends as they design and build robots and participate in a variety of competitions.

In the robotics program's first year, a team had the opportunity to attend the VEX Robotics World Championship event. Ostgarden had been part of developing the STEM education partnership between Grand Forks Public Schools and Northrop Grumman, so he reached out to Northrop Grumman's Grand Sky facility to discuss the possibility of covering a portion of the students' registration and travel costs. Since then, Northrop Grumman has continued to support the Red River High School robotics teams' travel to out-of-town competitions.

In addition, Ostgarden has worked with Northrop Grumman to provide additional forms of support for students participating in the robotics program. Ostgarden has organized tours for robotics program students to visit the Grand Sky facility and learn more about what the Northrop Grumman engineers work on. When Grand Forks hosts state robotics competitions, Northrop Grumman engineers often volunteer as judges for the event. And Ostgarden is part of a small group of Grand Forks teachers who recommend students for Northrop Grumman's high school mentoring program.

Through the strong relationship between Grand Forks Public Schools and Northrop Grumman, Ostgarden has learned that the most important part of business-education partnerships is for CTE programs to simply reach out to local businesses. Ostgarden said, "The relationships that I've made and the good connections that I've had with businesses come just from being willing to have the conversation with them. They want to talk to your kids, and they've got a lot of their own experiences and their own advice they can give that is completely valuable." In Ostgarden's experience, most local employers are very interested in talking to students—they just need the opportunity to do so. "Just do it," emphasized Ostgarden. "You will absolutely not regret those conversations you have and the good that will come from those."

Robotics, Grand Sky engineers volunteer as judges for the North Dakota state robotics competition and serve as mentors for students in the Grand Forks robotics program. Northrop Grumman's Grand Sky facility also assists the Grand Forks robotics program with the purchase of additional equipment and covering a portion of students' registration and travel costs to attend out-of-state competitions.

Grand Forks Public Schools also partners with Northrop Grumman to offer a mentoring program for students interested in pursuing STEM career pathways. The High School Involvement Partnership (HIP) mentoring program is a two-year program for high school juniors and seniors. The HIP program is designed to inspire and prepare

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Development Through CTE*,  
which is addressing the skills gap challenge,  
at <https://www.acteonline.org/partners/wfd-cte/>.





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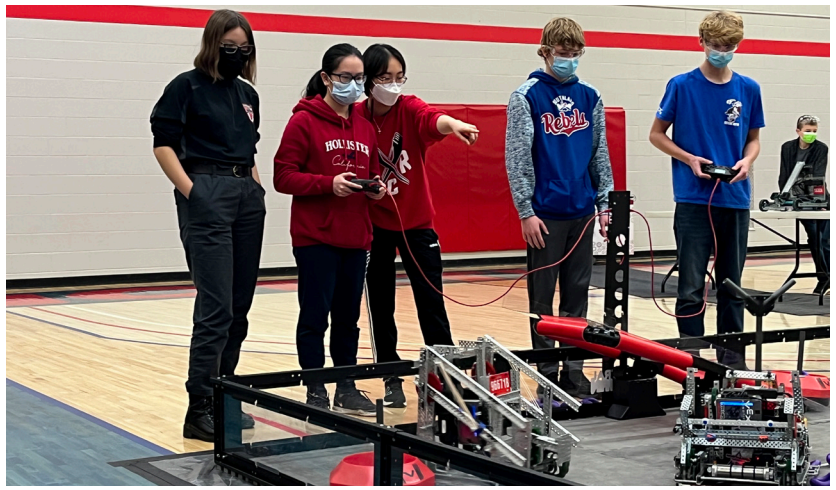
high school students for STEM careers; students develop critical knowledge and skills, receive mentoring and support from Northrop Grumman employees, and gain exposure to Northrop Grumman's products and business lines. Northrop Grumman currently offers the HIP program in 20 communities in nine states, and students participate in many activities as a cohort with their fellow HIP students across the country. Grand Forks became a HIP program site in 2019, and two to four Grand Forks students have participated in the HIP program each year since then. Despite the small size of the program in Grand Forks, the program has a big impact—participating students gain invaluable hands-on experience they can build on as they plan their future career paths.

Students in their first year of the HIP program participate in virtual and in-person sessions as a cohort to develop STEM content knowledge, explore careers, and learn about Northrop Grumman technologies and products. In the second year, students complete a capstone project and receive mentoring from Northrop Grumman employees in their community. A recent capstone project for Grand Forks HIP program students was to design and build an unmanned aerial aircraft that could carry a payload and complete specific tasks. The two Grand Forks HIP program students demonstrated the capabilities of their drone onsite at the Grand Sky facility, presenting their work to a team of Northrop Grumman engineers and other students in their nationwide HIP program cohort.

Northrop Grumman's support for STEM education activities in Grand Forks helps students explore STEM careers and gain valuable hands-on experience before they even graduate high school, setting them up for long-term success. Broden Diederich, a 2021 graduate of Red River High School, is currently a first-year aerospace engineering student at the University of Minnesota. Diederich became interested in space exploration and engineering in middle school, and he explored these interests through several hands-on STEM education activities sponsored by Northrop Grumman. He participated in the robotics program for four years and was selected for the HIP mentoring program in his junior and senior years. Diederich was then offered a summer internship at Northrop Grumman following his high school graduation. Most students in his college engineering program complete internships in their junior or senior year, so Diederich's early work experience sets him apart from his peers. Diederich encourages CTE instructors to find ways to "relate different skills [students are] learning to how they can actually be applied in the real world, and even give opportunities for using those skills in the real world," citing his experiences in the robotics and HIP programs as critical in how he learned to apply engineering concepts to real-world situations.

## Elements of Program Success

- **Involve Employer Partners in CTSO and Cocurricular Activities:** Activities offered through CTSOs and similar cocurricular activities provide strong opportunities for students' extended learning



and application of theoretical concepts, and these activities provide great ways to involve employer partners. Invite employer partners to judge competitions, engage with students through CTSO meetings, or host tours for CTSO groups.

- **Identify Tangible Ways for Industry to Contribute:** Employer partners can make a variety of tangible contributions to CTE programs, including purchasing or donating equipment for a CTSO or program of study, or covering a portion of students' travel costs to out-of-town events.
- **Partner to Provide Mentoring Opportunities for Students:** Serving as a mentor to students provides another excellent opportunity to involve businesses in your CTE program. Employees can mentor students through a CTSO or through a more structured, longer-term component of a program of study. CTE instructors can recommend students for mentoring opportunities to identify students who will receive strong benefits from these relationships.

## Learn More

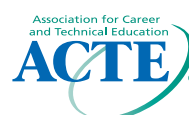
- Grand Forks Public Schools: <https://www.gfschools.org/>
- Red River High School Robotics Program: <https://sites.google.com/mygfschools.org/rrhsrobotics/home>
- Northrop Grumman: <https://www.northropgrumman.com/>
- Northrop Grumman HIP Program: <https://www.northrop-grumman.com/corporate-responsibility/corporate-citizenship/hip-high-school-involvement-partnership-mentoring-program/>
- VEX Robotics: <https://www.vexrobotics.com/>

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