



CASE STUDY

Bakersfield City School District–Extended Learning Program
Bakersfield, California

SUMMARY

In the Extended Learning Program (ELP) in the middle schools of Bakersfield City School District (BCSD) student attendance is improving and disciplinary situations have decreased. What is sparking students' interest in after-school opportunities? Engineering—with plenty of inquiry-based, hands-on educational experiences that encourage exploration and inspire ingenuity. With STEMscopes™ DIVE-in Engineering, ELP site coordinators now have an age-appropriate curriculum and resources to teach the engineering design process and help students become creative makerspace engineers.

After-school Program for Middle Schools Improves Student Attendance, Behavior, and Engagement with DIVE-in Engineering

In BCSD, like many districts across the country, many children are unsupervised at home after school while their parents are at work. Research shows that when children don't have a place to go when the school day is over, juvenile crime and victimization peak, and students miss out on valuable learning opportunities. For this reason the district launched an Extended Learning Program (ELP) in 2000 to provide a safe after-school education, enrichment, and youth development program for students in grades 1–8.

The ELP now serves 6,500 students across 32 elementary schools and seven middle schools. It is led by administrative staff at the district level and a site coordinator at each school. The program's main goals are to improve students' academic achievement, increase positive behavior, and enhance attendance.

District

44 Schools
Grades K–12
30,700 students

Students

African American 8%
Hispanic 79%
White 9%
Other 4%

90% Economically disadvantaged
30% English language learners (ELLs)

CHALLENGES

While STEAM—science, technology, engineering, art, and math—is a key component of the ELP, the district had struggled to find engineering curriculum materials that could effectively engage and challenge middle school students.

“My students really like STEM, but they said that our previous engineering curriculum was too easy,” said Felicia Kent, site coordinator at Sequoia Middle School. “They'd finish an activity within 15 or 20 minutes and then ask, ‘What are we doing next?’”

“We want to help our students develop a better understanding of what engineering is,” said Pedro Garcia, who serves as the instructional specialist for the ELP district-wide. “We have students who come from very low-income homes. Many of their parents don't have a high school diploma, and many work in the fields. We want to provide students with tools to show them that there are numerous opportunities out there for them. We had utilized engineering programs after school before, but they didn't give our middle school students the opportunity to explore or be creative or think outside the box. We were looking for a program that would be more hands-on and engaging for them. At the same time, we wanted to find ways to improve student attendance and discipline. We thought if we could shift students' mindsets and get them more involved, then that would alleviate the issues we were seeing—and that's exactly what DIVE-in Engineering has done.”

SOLUTION

BCSD began using STEMscopes DIVE-in Engineering in the ELP in its middle schools in the fall of 2018. DIVE-in Engineering is a comprehensive online, hands-on engineering curriculum. Available in bundles for grades 3–5 and 6–8, the DIVE-in Engineering kits contain all the materials students need to become creative makerspace engineers and build projects. BCSD purchased the 6–8th Grade bundles, which allow students to explore nine different engineering solutions across three units: On the Move, Around the House, and Eyes, Ears, and Hands.

DIVE-in Engineering 6–8th Grade Bundles

On the Move Kit	Motor Boat	Motor Car	Hovercraft
Around the House Kit	3-Way Switch	Door Knob	Air Conditioner
Eyes, Ears, and Hands Kit	Robot Arm	Slide Projector	Speaker

Each kit provides practical, inquiry-based educational experiences that encourage students to do what real-world engineers do: Deconstruct, Innovate, Vary, and Explore. Using the DIVE method, students:

- Take apart and examine a working prototype—recording measurements, making diagrams, and taking notes (Deconstruct).
- Reverse engineer the prototype and make their own version based on what they learned (Imitate).
- Analyze what they created and brainstorm ways to make it different (Vary).
- Use the knowledge and skills they gained in the previous steps to solve the original problem in a new way or apply their solution to a new problem (Explore).

DIVE-in Engineering also offers a variety of teacher resources, including guides with step-by-step instructions, rubrics, and teacher toolkits.



Here's what the ELP site coordinators have to say about their students' experiences:

Amber Juarez – Sierra Middle School

“Think like an engineer”

“At my school, DIVE-in Engineering definitely is a step up. In the past, it was difficult to find an engineering curriculum up with a difficulty level appropriate for 12- and 13-year-olds. The ‘middle school’ programs seemed more like they were aimed toward fifth or sixth graders, so they weren’t challenging students’ minds. But with the DIVE-in Engineering kits, we say, ‘Think like an engineer.’ Students like that they are able to try again and again as they figure out how to design and build and create something that actually works, like a speaker they can plug into their computers. We like the curriculum because it shows students that ‘failures’ aren’t actually failures. These experiences give them a chance to be creative and push themselves. They understand that it’s their project and they’re the engineer, so they really enjoy that.”

Making lesson planning and teaching easier

“I also like all the teacher resources in DIVE-in Engineering and I know that my staff do as well. DIVE-in provides step-by-step instructions, which makes lesson planning easier. It gives us options for how to take on a project, what questions to ask students, and how to nudge them in the right direction — without giving them specific instructions that take away from the ‘think like an engineer’ process.”

Felicia Kent – Sequoia Middle School

Showing parents — and the community — what students can do

“The difficulty level of DIVE-in Engineering is on par with my students’ needs. They like working with the kits here and they like taking their projects home, which gives parents a chance to see what their kids are doing. These projects show parents and the community that kids are actually learning something. Parents have been really impressed with the DIVE-in curriculum and appreciate that the district has provided it for us.”

Opening students’ and parents’ minds

“DIVE-in Engineering is also opening students’ and parents’ eyes to new opportunities. Our students are at that age where they’re starting to think about if they want to go college or go straight into a career, and that’s something that we talk about in our program. With these engineering projects, we’re expanding kids’ minds. We’re showing them and their parents that there is more to life outside their neighborhood and that opportunities are endless as long as they stay open-minded. Now parents are starting to talk with me about colleges and what their children will need to have when they apply, like community service experience. They’re helping their kids move toward the future.”

Broadening girls’ horizons in STEM

“Another thing I’ve noticed is that DIVE-in Engineering is broadening the horizons of my female students and getting them thinking more about careers in science and engineering. There’s one student who wants to be a lawyer who now says she’d like to do something in an area of law that involves science, so she’s working on building that knowledge. DIVE-in Engineering is giving students an outlet to explore and think about what they might want to do in the future.”

Maria Tinoco – Stiern Middle School

Making positive behavior choices

“I’ve noticed a change in students’ behavior since we began using DIVE-in Engineering. Once they started doing the kits, they wanted to focus on their projects. They put more effort into their work.”

Building student ownership

“Students also like that we give them the opportunity to decorate their projects. Whether they’re building a door knob or a motor boat, when we let them decorate it, they feel more ownership. Now they don’t want to go home; they want to stay and explore more. Parents, too, have noticed a positive change. It’s a good feeling knowing that kids are going home and talking about the work they’re doing and wanting to come back and do more.”

Engaging students

“DIVE-in Engineering is fun and engaging, and it gives students a different way to learn. They want to participate and learn and engage. Both our staff and students really look forward to engineering now, and the projects go hand-in-hand with the science, technology, engineering, and math behind them. We also like to do things such as racing the motor cars or motor boats students have built.”

Creating fun instead of looking for trouble

“Sometimes when students are finished building, there are leftover materials like cardboard, so we tell them they’re welcome to take those materials and see what they can create. It’s great to see them not just focusing on what they’re supposed to do, but seeing what more they can come up with and create instead of looking for trouble. They actually want to stay and work together and see what they can create as a team.”

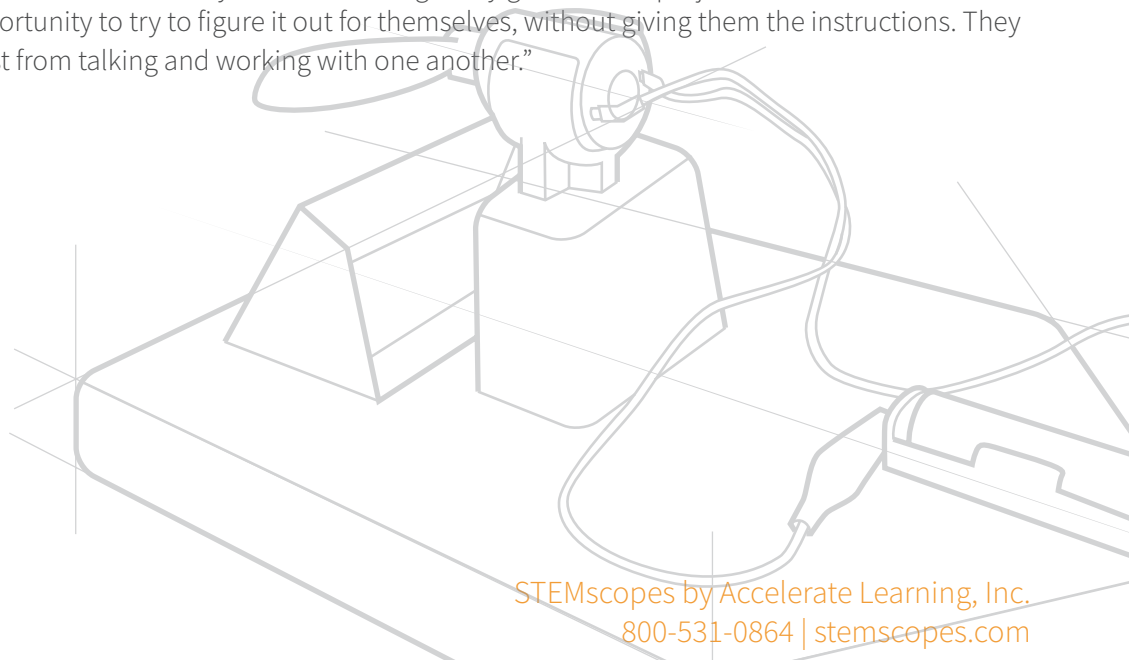
Working as a team

“We have a few students who entered our program as sixth graders who are now eighth graders. In past years, they didn’t have the opportunity to do something as hands-on as DIVE-in Engineering. Now that they have these projects and this curriculum, they enjoy our program so much more. They like moving around, working together as a team, and building relationships with each other. It’s very inspiring to see the kids enjoy engineering as much as we do.”

Sherri Hampton – Compton Junior High

Enjoying the challenge

“My students really enjoy the DIVE method because they like the challenge they get from the projects. When we introduce a project, we like to give them the opportunity to try to figure it out for themselves, without giving them the instructions. They like being able to work things out just from talking and working with one another.”



Sarah Ramirez – Washington Middle School

Discovering new capabilities

“Many of my students didn’t realize what they were capable of, but when they began working with DIVE-in Engineering, they realized they can actually make things that work. I’ve had parents come in and say their children went home and took apart a door knob to see if they could put it back together. That means they’re taking those lessons home and getting their parents involved, too.”

Looking forward to learning

“Our STEAM Club meets on Wednesdays and Fridays; students look forward to those days and they don’t want to do anything but the DIVE-in Engineering kits. As soon as one DIVE-in project is done, they want to move to the next one. I leave it up to them to decide which kit they will do next. They’re super-excited to get to choose.”

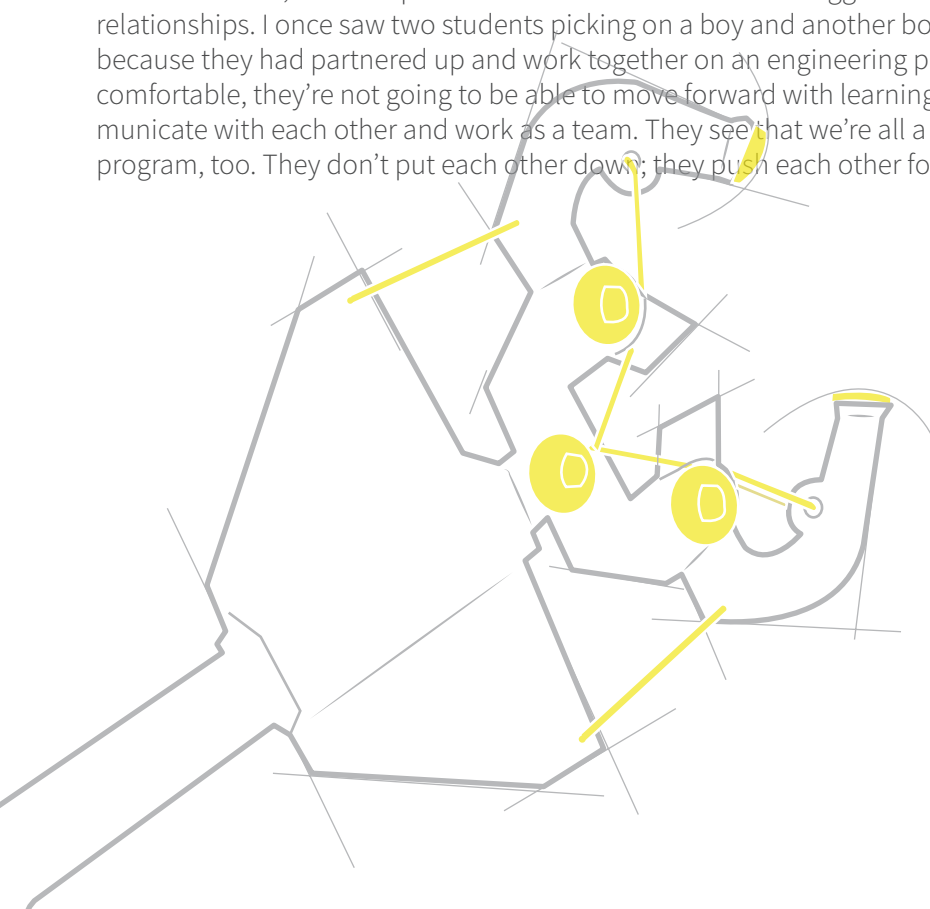
Offering options after school

“Many of my students are not into sports. DIVE-in Engineering gives them something to look forward to after school. If they can’t play soccer, they can do the engineering kits. Students who are autistic or who don’t like to be put on the spot also really like the kits because they’re self-explanatory and they can move at their own pace. It opens their eyes to something they’re good at, which excites them. I like seeing the expressions on their faces when they really understand something or when they put something together themselves. It’s inspiring.”

Melissa Ramos – Cato Middle School

Preventing bullying and pushing each other forward

“In our program, we have athletes, bookworms, and computer wizards. Some students have a harder time understanding the math or science behind a DIVE-in project, but they all partner up and work together. This not only helps them learn from each other, but it helps them communicate better. The bigger thing that I see is that this can help improve student relationships. I once saw two students picking on a boy and another boy stepped up and said, “Hey, leave him alone,” just because they had partnered up and work together on an engineering project. That’s so important. If students don’t feel comfortable, they’re not going to be able to move forward with learning. The DIVE-in projects teach them how to communicate with each other and work as a team. They see that we’re all a family, so they protect each other outside of the program, too. They don’t put each other down; they push each other forward.”



RESULTS

Improving attendance and reducing discipline issues

“Attendance and discipline have most definitely improved this school year since we introduced DIVE-in Engineering,” said Garcia. “Recently, one of our students had an incident and his mom was called to the school. She was shocked to hear that her son was in trouble. This is a student who used to get in trouble a lot, but once he started DIVE-in Engineering, that stopped. We discovered is that he really enjoys building and creating things. Even his parents didn’t know that before. So, we told him that if there was another incident, then he wouldn’t be able to participate in the STEM Carnival and show his engineering project. He was so bummed to hear that, so he agreed to our terms. In the end, he was able to go. That’s something we like to see—students who want to be at school because they want to learn and create and be involved. They don’t want to be out looking for trouble. His mom was also really happy to see that he wanted to be part of something and that he took responsibility for his actions and understood the consequences if he didn’t improve. He was so excited to participate in the STEM Carnival and show his friends and his parents what he had designed and built all on his own, without a book or instructions. His parents are so thankful. They say that now all he talks about is building and creating, and how he wants to be at school so he can do that. That’s a huge change in behavior.”

Building STEM and 21st-century skills

“In the Extended Learning Program, we want students to build relationships within their groups, and learn how to communicate, collaborate, and problem-solve. DIVE-in Engineering has provided all of that,” said Garcia. “Before we introduced DIVE-in, we spoke with a couple of eighth graders and they said the first thing that came to mind when they heard the word ‘engineering’ was math. They said, ‘Ugh, you’re going to bring in math. It’s going to really hard. It’s not going to be any fun.’ But once they saw DIVE-in Engineering and that it was engaging and hands-on, they changed their minds and changed the way they thought about engineering.”

Getting more kids involved

“We all enjoy having DIVE-in Engineering in the Extended Learning Program. It’s even more exciting to hear kids tell their friends, ‘You have to join the after-school program because we’re doing this!’ At my site, I have a waiting list of kids who want to come into our program because they see what we’re doing. It’s amazing to see more kids wanting to become involved,” said Tinoco.

