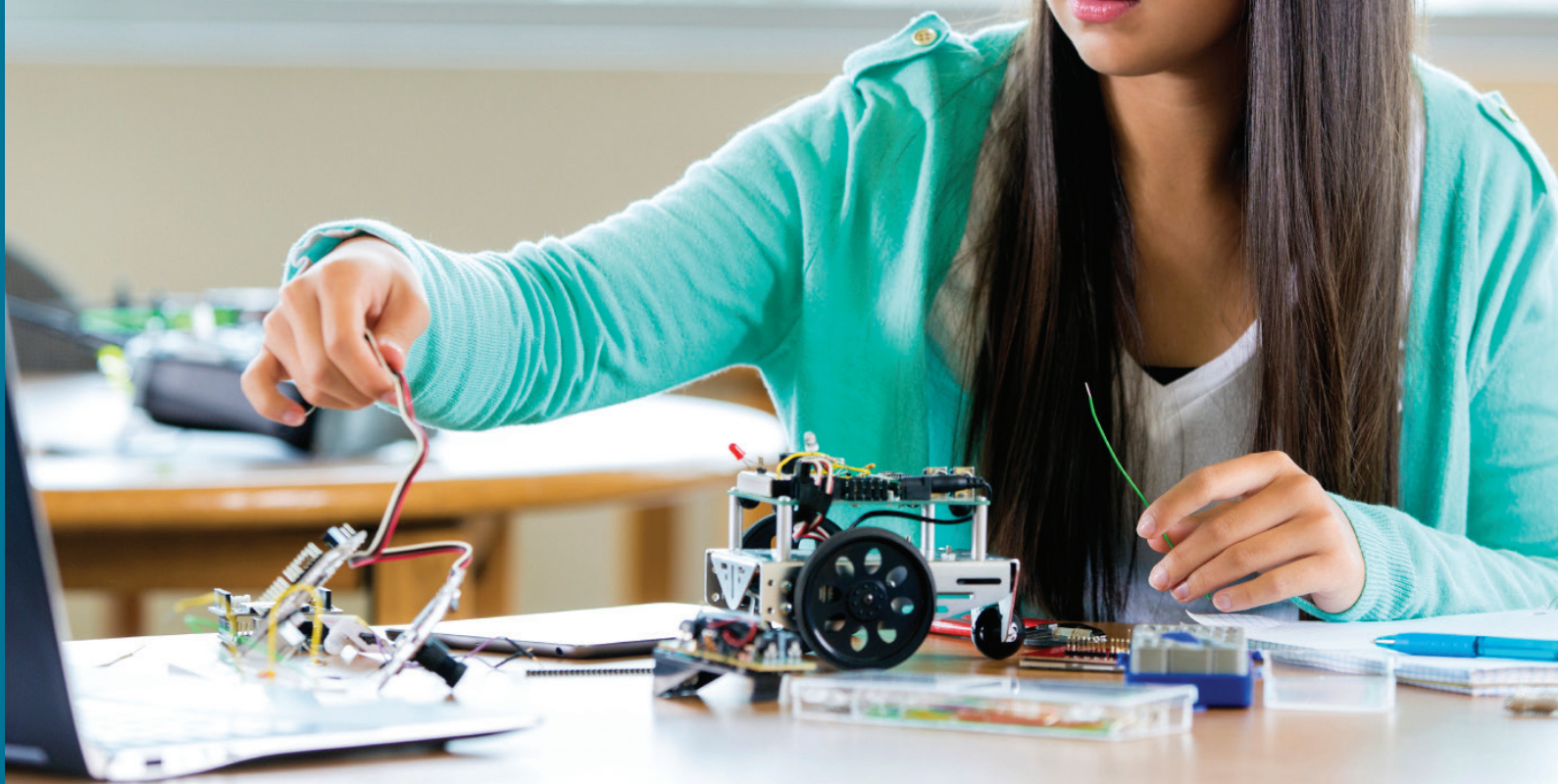


Middle Grades STEM Projects



Spark discovery with STEM projects for middle grades students of *all* ability levels



Science, technology, engineering and math skills are essential to many of today's most exciting careers, but many students lack opportunities to explore these careers and understand the skills, credentials and degrees needed to secure them.

Early learning experiences are key to introducing students to rewarding STEM careers. SREB's **Middle Grades STEM projects** provide the spark middle grades students need to pursue and prepare for high school and postsecondary career pathway programs. What's more, districts can use the projects to attract girls and students of color to STEM fields, promote diversity and close gender and racial gaps in the STEM workforce.

Each Middle Grades STEM project presents students with a challenging real-world problem that cultivates their academic, technical, technological, cognitive and personal skills. Students work in teams to conduct research on a complex problem, develop, test and troubleshoot prototypes, analyze data and make presentations to authentic audiences — skills that lead to success in college and the workplace.

Flexible Implementation

Middle Grades STEM projects can be implemented in a typical middle grades classroom — ***no special lab required*** — and completed in about 35 hours of instruction. Schools can:

- Adopt a STEM elective option in which students rotate through a different quarter-long project at each grade level
- Offer projects in co-curricular, after school or summer enrichment programs or clubs
- Embed an interdisciplinary grade-level project in multiple content-area classes
- Combine multiple projects to form a semester- or year-long STEM course

Middle Grades STEM Projects

All Middle Grades STEM projects help students understand the intersection of science, technology, engineering, math and literacy and develop a deeper understanding of scientific inquiry. Charged with a variety of intriguing problems, student teams apply the engineering design process and use tech tools to explore design, scale, form and function.

Each Middle Grades STEM Project Includes:

- A career-based problem drawn from real workplace challenges
- Embedded math and literacy lessons that help students build skills
- A rich, complex writing assignment and presentation of findings
- 30 days' worth of instructional material for teaching and reinforcing skills
- Access to Middle Grades STEM literacy resources, including over 50 mini-lessons on vocabulary development, reading comprehension, discussion, research, note-taking, writing for learning or publication, peer editing and feedback

Explore the Projects

Bridging the Gap

Students become civil engineers as they design a new bike path with a bridge that crosses a stream. Student teams research bridge types, discuss the load the bridge will need to support, and use the engineering design process to design, model and test a scaled prototype. (\$\$)

Costs for Middle Grades STEM projects are very reasonable. Price ranges below are costs per pupil per project.

\$ - < \$10

\$\$ - \$10 - \$50

\$\$\$ - \$50 - \$100

\$\$\$\$ - \$100 - \$200



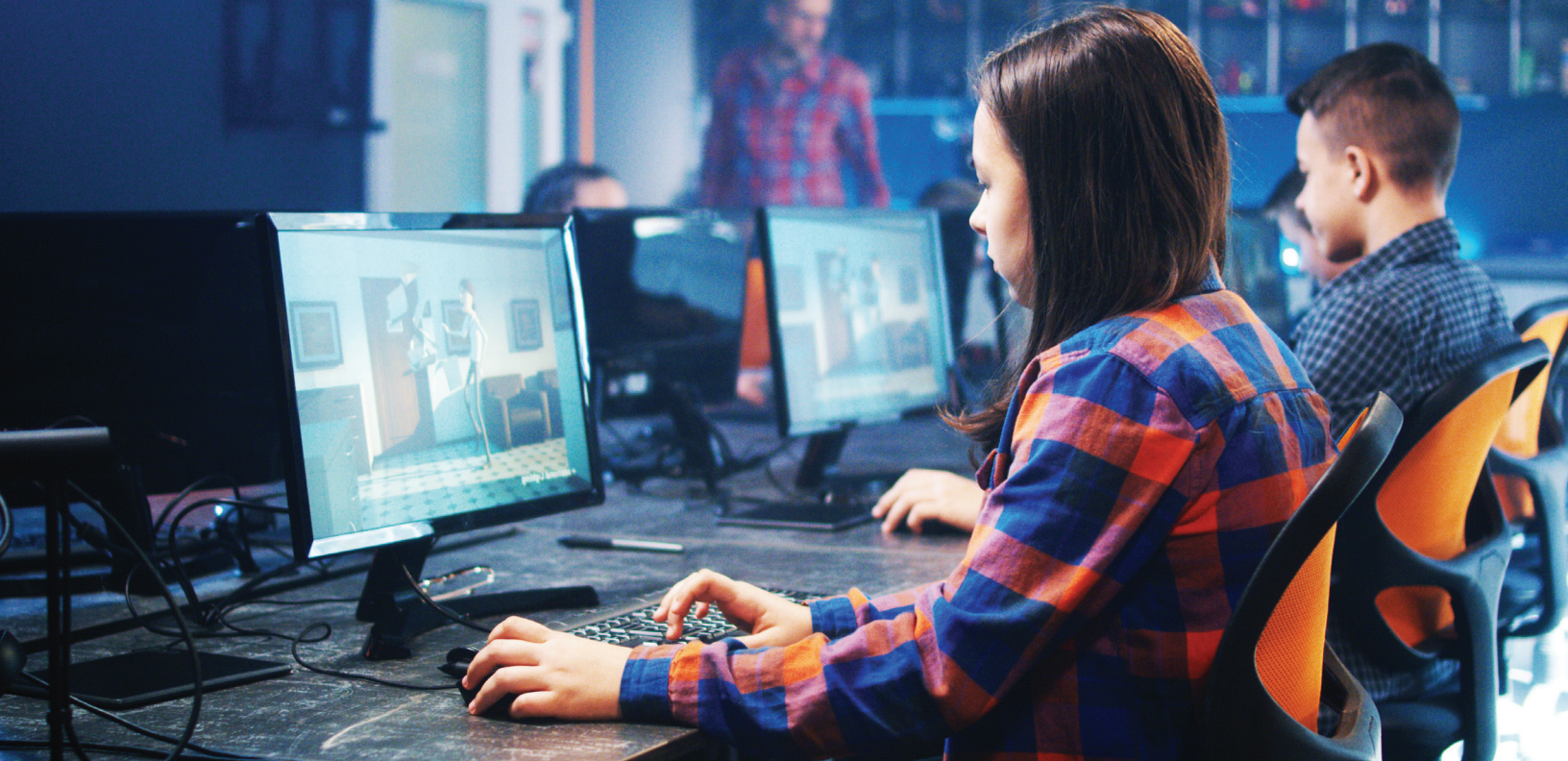
Reverse Engineering

As packaging engineers, students take on the challenge of designing environmentally friendly packaging. Using reverse engineering principles, students redesign a molded packaging product to be made from compostable flat-stock materials but maintain the same functionality. (\$)

Rapid Prototyping

Working for the U.S. Mint, student teams develop a new coin with social or historical significance. Students learn about metals and how density affects whether their coin fits mass constraints. Using rapid prototyping, students test their coin and the dies used to manufacture it. (\$\$\$\$)





Coding for Fun

As videogame designers, students research what make games fun for their peers, learn coding basics and design, create and test a new game using online game development software. (\$)

Sound the Alarm

Students examine their local government's current emergency response plans. Armed with an understanding of logistics, students propose improvements or create new plans for safely and quickly moving people, goods and services in and out of affected locations. (\$)



Take a Tour of my Community

As Chamber of Commerce employees, students develop a guide to the city and region for tourists or companies and families seeking to relocate. Teams use Geographic Information Systems, Global Positioning Systems and ArcGIS to design an online story map tour. (\$)

Harnessing the Wind

Students work for a research company that is developing improved blades for wind turbines in different geographical areas. After researching and investigating the elements of turbine blades, students use the technical data they collect to propose innovative new designs. (\$\$\$\$)

Healthy by Design

As dieticians at a snack food company, students learn about macro and micronutrients in foods and factors that affect health for children and adolescents. Teams develop a healthy and tasty snack that replaces other unhealthy options. (\$\$\$\$)





Outbreak

As investigators for the Centers for Disease Control and Prevention, students study a suspected pathogen outbreak in a rural area and research, develop and test an effective containment plan. (\$\$)

Growing a Better Plant

As plant scientists, students learn about plant growth, development and propagation as they seek to develop a hardier and larger mustard plant for the market. (\$\$)

Need to Know Information

SREB helps middle grades schools align their projects with career pathways at receiving high schools. Schools that adopt Middle Grades STEM projects:

- Purchase Middle Grades STEM project instructional materials
- Obtain required [classroom equipment and supplies](#) for their selected projects. Visit bit.ly/MGSTEMmaterials for an updated list of project costs.

- Secure initial professional development and coaching for teachers and leaders
- Can build on the Middle Grades STEM projects with professional learning that helps middle grades teachers develop project-based units of study in all content areas

Learn More and Get Started

Contact: mmgw@sreb.org

sreb.org/middle-grades-stem