A hands-on, project-based STEM education brings together the skills and knowledge of Science, Technology, Engineering, and Mathematics—allied disciplines that are essential for student success as well as career fields that are deeply intertwined in the work world. In Gwinnett, we’re adding an “A”—the Arts—to that familiar acronym, providing a STEAM focus that expands learning for students.

Across the county, GCPS students take part in rigorous math and science instruction, benefitting from many of the elements of a world-class STEM/STEAM education. In some schools, an expanded STEM/STEAM approach is transforming how students learn.

Teachers pool their expertise so students can collaborate across disciplines, using their academic and artistic strengths. Lessons with a real-world context boost interest, and connect students with issues that make a difference in their lives. Working with peers on assigned projects mirrors workplace teams. The inclusion of business partners and community members provides an added dimension to the learning experience as students benefit from authentic, relevant connections.

“A STEAM education balances the technical aspects of modern life with our human needs,” says Dr. Jonathon Wetherington, GCPS director of science. “A focus on both form and function helps students connect with real-world problems in a more meaningful way.”

For instance, it’s not just about designing a park that meets technical specifications, but designing a safe and attractive park that meets the needs of the community. Apply that same approach to designing new products, conducting market research, or developing technical effects for a movie or game. In other words, real-world meets real people. That’s STEAM.

“STEM/STEAM learning stretches our students in a totally different way,” says Dr. Wetherington “Our goal is to spark creativity and innovation, paving the way for the next generation of engineers, video game designers, architects, physicians, and other leaders.”

STEM/STEAM in Action
Harbins Elementary School recently hosted an eCLASS site visit, and featured a number of STEM/STEAM classroom activities for educators visiting from across the school district. Kindergarten students in Bob Stone’s classroom, shown left, strengthened reading skills on tablets, using applications and activities in eCLASS. In Trisha Connor’s STEM special, 4th and 5th grade students engaged in hands-on learning about simple machines and building circuits, respectively. Shelley Everett’s 4th and 5th grade art students worked with the basics of creating apps and stop-motion animation. In the Media Center, Harbins 5th graders participated in a Mystery Skype call with a class of 5th graders in Missouri.
Crews Kinetic Art
What do you get when you combine art, technical specifications, and some inspiration from Harry Potter? Meet Hedwig, the kinetic art sculpture, as designed by a team of 8th graders taught by Ashlyn Bennett (STEAM), Anna Murphy (Art), and Emily Dent (TechEd Connection) at Crews Middle School. Starting with sketches and then a LEGO prototype, the students planned the mechanics of building a simple machine that would successfully power Hedwig’s wings.

More schools seeking STEM certification
In 2013, Gwinnett School of Mathematics, Science, and Technology was the first Georgia high school to earn state STEM certification. The Center for Design at Technology (CDAT) at Lanier High School earned program certification the following year. Peachtree Ridge High School holds STEM certification through AdvancED, an education accrediting agency. Peachtree Ridge also is pursuing the state STEM designation as are Harbins Elementary and White Oaks Elementary.

Whale of a design
Alex, a 6th grader in a TechEd Connections class at Crews Middle School, shows his tangrams sketch of a whale and its digital representation designed with AutoCAD (Computer Aided Design) software. The software also was used to create this sea-inspired snowflake (right), produced on a 3-D printer.
From pitching entrepreneurial restaurant concepts to developing study games for their peers, Lanier Middle School students are experiencing academic success through project-based learning (PBL). The school’s Teamwork With Innovative Skills and Technology (TWIST) program provides STEAM instruction with a PBL focus. The students complete three to four major projects each semester, guided by the combined efforts of their science and language arts teachers.

“These projects promote collaboration, inquiry, and design,” says Assistant Principal Brittany Haddock, noting that students choose to demonstrate their mastery of academic standards in a variety of ways... all involving some sort of finished product, presentation, report, or culminating activity.

With the students’ restaurant projects, they created and researched everything from their concept ideas to full menus, logos, marketing ideas, interior design, and even nutritional information.

Students in Michelle Langhans’ classroom worked together on study aids to help 6th grade students prepare for upcoming tests in language arts. The students produced a variety of projects, including carefully planned board games, digital question-and-answer flashcards, and an innovative “Cardboard Flip” game that rewarded correct responses to study questions with the chance to flip a cardboard target.

“Student reactions are fun to watch,” Ms. Langhans says of the students as they design solutions to the real-world problems assigned. “They get excited when they understand something new or when they have struggled through a topic or project and it finally clicks.”

Peachtree Ridge High School students (below) researched, designed, manufactured, programmed, and tested autonomous vehicle prototypes using LEGO EV3s. Through five different rounds of exploration stations, students learned to program their vehicles to move while collecting motion data. Charged with the well-being of an egg that rode along as a passenger, students concentrated their designs on safety to prevent “injuries.”
Infinite Energy and GCPS Foundation support school robotics teams

The Gwinnett County Public Schools Foundation recently surprised 48 schools with additional funds to support robotics programs. The 71 teams received a check for $500 each—a $35,500 donation—courtesy of the Infinite Energy $5 Giveback Program. The company provides the school district with an annual gift of $5 for each natural gas customer served in Gwinnett County. Thank you to Infinite Energy and the GCPS Foundation for their support of Gwinnett students and STEM initiatives!

Elementary Schools:  Middle Schools:  High Schools:
Beaver Ridge  Couch  Archer
Dyer  Creekland  Brookwood
Cooper  Five Forks  Collins Hill
Ferguson  Grace Snell  Duluth
Graves  Hull  GSMST
Gwin Oaks  Lanier  Lanier
Head  Lilburn  Meadowcreek
Jackson  McConnell  Mill Creek
Lilburn  Moore  Norcross
Mason  North Gwinnett  North Gwinnett
Meadowcreek  Osborne  Parkview
Nesbit  Pinckneyville  Peachtree Ridge
Peachtree  Radloff  Shiloh
Puckett’s Mill  Snellville  South Gwinnett
Roberts  Sweetwater  
Rockbridge  Twin Rivers  
Sycamore  
Walnut Grove  

In August of 2016, Gwinnett County Public Schools will open Coleman Middle School, the district’s signature STEAM middle school. The school, opening in the Duluth Cluster, will offer a rigorous, integrated academic environment with a focus on technology and project-based learning. Students will have the opportunity to earn multiple Carnegie units toward high school graduation while still in middle school. The “A” in the school’s STEAM focus will come from a unique fine arts experience, including the district’s first middle school dance program.

Wonder(ful) win for Head team!

The conditions were perfect for Head Elementary’s robotics team, the Unconditionals, to be named Grand Prize Winner of the national Wonder League Robotics competition. The national competition requires contestants to use coding to complete various challenges. Teams also are required to submit a video that demonstrates the solutions to the challenge. The young coders from Head earned an all-expenses-paid trip to Universal Studios and Google headquarters, and a chance to meet top engineers, game designers, and animators from Silicon Valley. The team also earned Best Picture recognition for its video submission.