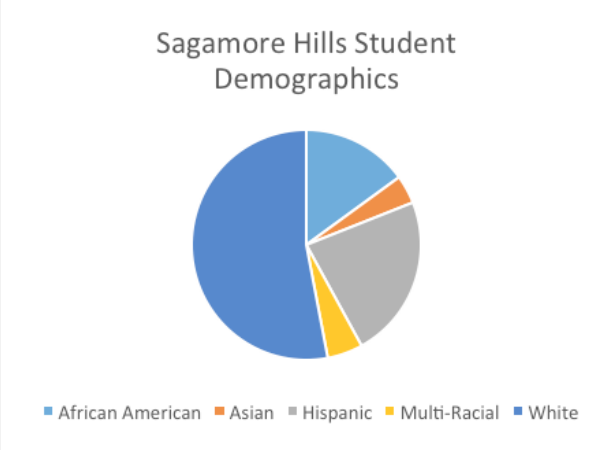
AdvancED STEM Certification

Executive Summary

1. **Provide a general description of the learning experiences in which the STEM students were most successful. Additionally, generally describe the learning experiences that need improvement for greater student success.**

Sagamore Hills is a wonderfully diverse elementary school of 388 students located in Atlanta, Georgia. We provide a traditional education for Pre-kindergarten students through 5th grade. Sagamore Hills is also a regional site for two special education programs, Pre-kindergarten three and four year old students, and a program for Moderately Intellectually Disabled students. Within the total school population, 15% are African American, 23% are Hispanic, 4% are Asian, 5% are Multi-Racial, and 53% are White. 33 % of our students participate in the free and reduced lunch program, 15% are identified as students with disabilities, 13% are English Language Learners, and 21 % are identified as gifted. 49% of the school population is female and 51% are male students.



The demographics of Sagamore Hills Elementary School illustrate that over half of the student body are students who are traditionally underrepresented in STEM careers. As a school community, we are committed to sparking an interest in Science and STEM subjects at an early age to narrow the gap between the number of students currently pursuing STEM careers and the number of students needed in the future to pursue STEM related career paths.

The rationale to transform the teaching and learning focus at Sagamore Hills Elementary to a STEM integrated program developed during the 2012-2013 school year. The decision to become a STEM school was a natural fit for our learning community; many of the school activities supported the STEM disciplines. We hosted an annual Math tournament for the elementary schools in our region. We hosted an annual Science night for our school community. Technology integration

had been a priority at Sagamore Hills for several years. We had been building the infrastructure to support effective instructional technology with a Mac Lab, iPads, laptops, InterActive Boards, and other technology resources for our teachers and students to use. Our parent, community, and industry partnerships had been building for years with scientists and engineers supporting our instructional program. Scientists from Emory, Georgia Tech, Georgia State University, Mercer University, and the CDC were often working with our teachers and students in large part because of the many affiliations our parents and community members have with these organizations.

Building a strong and sustainable STEM program requires the commitment of the entire school community; the faculty and staff, students, parents, our larger community including local industry. Since 2012 our instructional focus has been to build a strong and sustainable STEM program. The following attributes are characteristics of the Sagamore Hills Elementary School STEM program.

- Strong teacher leadership for STEM implementation is prevalent. Sagamore Hills teachers are committed to implementing a rigorous, standards-based curriculum. Students experience project-based learning that is interdisciplinary. Student-centered learning is the norm at Sagamore Hills Elementary.
- The faculty is committed to building capacity through professional learning. For the past four years the majority of our professional learning has focused on STEM instructional practices related to technology integration, project-based learning, and integrating STEM disciplines.
- At Sagamore Hills Elementary there is an emphasis on bridging in-school and after school STEM learning opportunities. Multiple after school STEM activities are offered that are free and inclusive opportunities for all students. Hundreds of students participate in after school STEM Clubs; the STEM Club, Garden Club, LEGO Robotics, Jr. LEGO Robotics, Science Olympiad, Odyssey of the Mind, SeaPerch, STEM Stars, and SciQuest.
- Sagamore Hills Elementary School has strong and supportive parent and community partnerships. Our school community works tirelessly to ensure the school is equipped with the essential tools, equipment, and resources needed to provide a quality STEM program for all students.
- Sagamore Hills Elementary School has established strong industry partnerships. Our industry partners support Sagamore Hills' teachers and students with their knowledge, expertise, and access to resources. These partnerships include the Atlanta Botanical Garden, the Captain Planet

Foundation, Mercer University, HATponics, and Bennett & Pless Structural Engineers.

Sagamore Hills Elementary School is in the fourth year of implementing a STEM education program. An emphasis on the engineering design process and problem solving in every classroom allows students to use cross-disciplinary tools for discovery and developing solutions to problems. The STEM program at Sagamore Hills provides our students with the integrative tools of investigation and analysis and gives students an understanding of the relationships of STEM disciplines. The framework of our STEM program requires students to apply the design process to a variety of problems in a variety of settings. Students continuously design, model, and test solutions. They analyze data and report their findings to others in their class, to others in the school, and often times beyond to our community. STEM education has transformed teaching and learning at Sagamore Hills. However, there are learning experiences that need improvement for greater student success:

- Continue to build a solid foundation in the content and methods of STEM through professional learning for our teachers and staff.
- Increase our collaboration with industry partners and post-secondary institutions to improve the teaching of STEM materials.
- Continue to build our curriculum units to fully integrate STEM instructional strategies with the Georgia Standards for Excellence curriculum standards.
- Develop measurable benchmark goals for STEM proficiency for our students. Create a qualitative and quantitative progress-monitoring tool such as common portfolio assessments. Current standardized test score data utilized to measure growth in math and science includes the Iowa Test of Basic Skill, the Georgia Milestones end of grade assessment, and STAR Math pre and post assessment probes.

Sagamore Hills Elementary School
End of Grade Assessment Data
2011 – 2015

	2011-2012 Georgia Criterion-Referenced Competency Test	2012-2013 Georgia Criterion-Referenced Competency Test	2013-2014 Georgia Criterion-Referenced Competency Test	2014-2015 Georgia Milestones Assessment
	% Meets and Exceeds All 3rd – 5th	% Meets and Exceeds All 3rd – 5th	% Meets and Exceeds All 3rd – 5th	% Developing, Proficient, Distinguished All 3rd – 5th
Reading/ELA	92.9	94.3	93.1	84
Mathematics	79.8	83.5	90.5	83
Science	83.8	84.0	83.6	80
Social Studies	77.8	85.4	91.9	89

2. **Provide examples of how STEM educators and facilitators implement and sustain the core tenets of an effective and age-appropriate STEM curriculum.**

The comprehensive STEM program at Sagamore Hills Elementary School includes; integration though curricular units, engaging in the STEM process across grade levels, school-wide STEM days, and after school opportunities. Sagamore Hills teachers implement interdisciplinary STEM units one-two times per semester. These project-based learning units last between 3-5 weeks and correlate to grade level curriculum standards. These units use a field of engineering as a unifying theme and connect to real-world issues. These STEM units provide students opportunities for collaborative learning and teamwork. Students are required to communicate their learning by speaking, writing, drawing, and building. Each STEM unit has a design challenge component that engages students in inquiry. Students research, design, build, test, collect data, analyze their data, redesign, and communicate their results. All STEM units integrate technology.

A recent example of a STEM unit implemented at Sagamore Hills was with our fourth grade students. This unit correlated to the fourth grade Earth Science standard about the water cycle. Students explored the real-world issue of importance of clean and safe water around the globe and the roles of environmental engineers in this issue. The students then expanded the concept to water conservation. Through the engineering field of mechanical engineering, the students were given the design challenge to design a low-flow showerhead. The students integrated the technology tool Tinkercad to design the showerhead and create a prototype using the 3-D printer.

Additional in-school STEM activities are implemented throughout the school year. Teachers plan for students to work with others across grade levels through the STEM Buddies program. Students in different grades (upper and lower) are paired together for in class STEM activities. Students have utilized the STEM Learning Garden and the aquaponics system for STEM Buddy projects. Each month every Sagamore Hills student participates in a STEM Day activity. STEM Days may be school-wide design challenge activities such as the egg drop competition or the sleigh design competition. STEM Days are also implemented as grade level design challenges correlated to grade level curriculum standards.

STEM after school activities are an important component of our STEM program. Sagamore Hills is committed to motivating our students and cultivating student interest in STEM subjects, particularly among underrepresented groups. After school STEM activities are free and inclusive of all Sagamore Hills students. Over one hundred students participate in bi-weekly garden club activities. Over one hundred students participate in monthly STEM club activities. Other STEM after school activities include the LEGO Robotics, Science Olympiad, STEM Stars, Family STEM Night, and a summer week-long STEM camp, SciQuest.

This comprehensive approach to STEM education at Sagamore Hills Elementary School represents the core

tenets of an effective, sustainable, and age-appropriate STEM curriculum.