Empowering Students to Achieve Their Potential in
Science, Technology, Engineering, Arts and Mathematics

Chesterfield County Public Schools
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CHESTERFIELD COUNTY PUBLIC SCHOOLS
Educating Students for Life

Science

Technology

Engineering
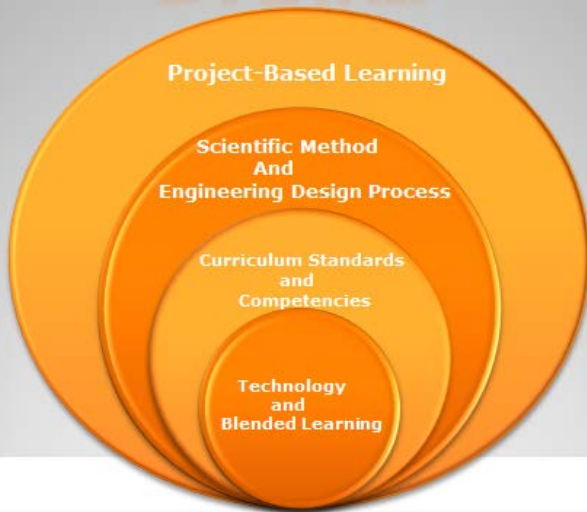
Arts

Mathematics

What is STEAM in Chesterfield County Public Schools?

- Intentionally integrated science, technology, engineering, arts and mathematics learning opportunities for each and every student

- Prekindergarten-16 pipeline focused on*
    - > 21st-century skills
    - > STEAM literacy
    - > Rigor, Relevance and Relationship framework
    - > The ability to compete in a STEAM-centric workforce
    - > Preparation to pursue advanced STEAM degrees

*Chesterfield County Public Schools offers dual enrollment and AP college level courses that implement STEAM principles

CCPS STEAM Model

- Project-Based Learning
- Scientific Method And Engineering Design Process
- Curriculum Standards and Competencies
- Technology and Blended Learning

Chesterfield's STEAM plan uses

- project-based learning as its **vehicle**
- engineering design/scientific method as its **engine**
- technology, especially blended learning, as its **tool kit**
- students as **drivers**

in student-centered, inquiry-based instruction and learning across all content areas.

3 Characteristics of STEAM

Increases Student Abilities

- Demonstrate STEAM-related knowledge and practices
- Demonstrate STEAM-related attitudes and dispositions
- Apply STEAM concepts and practices in approaching real-world problems
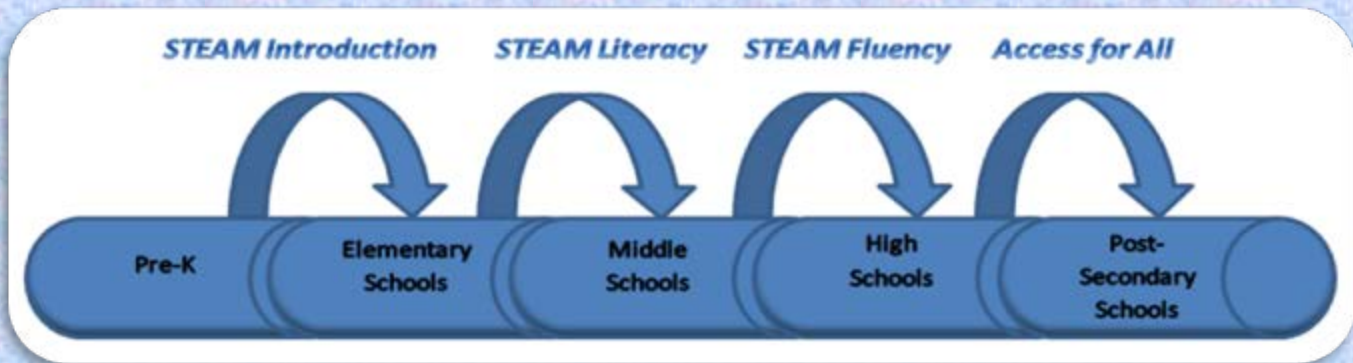
Involves Everyone

- Opportunities for all
- Regularly implemented by one or more teachers per grade level
- Before- and after-school opportunities
- Implemented across all grades (prekindergarten-12th grade)

Employs Proven Methods

- Uses accepted principles and methodologies
- Uses several approaches across disciplines
- Encourages students to take responsibility for their own learning
- Assesses students' application of STEAM concepts
- Differentiates approach to STEAM with consideration to cognitive and affective skills and abilities

Building the pipeline

STEAM Introduction · **STEAM Literacy** · **STEAM Fluency** · **Access for All**

Pre-K | Elementary Schools | Middle Schools | High Schools | Post-Secondary Schools

STEAM Introduction

Students develop an understanding of

- Characteristics of technology
- Basic engineering design briefs
- Creative design processes

Art by Corrine Foster, Swift Creek Elementary student

STEAM Literacy

Students develop an understanding of

- Characteristics, scope, and core concepts of technology
- Engineering design process and attributes
- Relationships among technologies and between technology and other fields of study
- Cultural, social, economic, environmental and political effects of technology
- Role of society in development and use of technology
- Influence of technology on history
- Roles of troubleshooting, research and development, invention and innovation, and experimentation
- Engineering fields and experiences

STEAM Fluency

Students develop an understanding of and become able to select and use

- Agricultural and related biotechnologies
- Medical, energy and power, information and communication, transportation, manufacturing, and construction technologies
- Technological products and systems
- Information to assess the impact of products and systems

Access for All

- Associate of Applied Science degrees (science, arts, applied science, applied arts)
- Bachelor degrees
- Advanced degrees

Timeline showing three phases: (2012-2013) STEAM TEAM Committee — Researching, Visioning and Planning; (2013-2016) Communication and Integration — Raise awareness among stakeholders, Integrate efforts with PBL, Develop community partnerships and enrichment opportunities; (2016-2020) Implementation and Evaluation — Sustain implementation and showcasing of STEAM centered PBL units, Ongoing evaluation of STEAM efforts

Key Steps

- Communicate the strategic STEAM plan to all stakeholders of Chesterfield County Public Schools

- Integrate STEAM opportunities and approach throughout the K-12 curriculum through project-based learning

- Work closely with teachers in project-based learning early adoption schools to build rich STEAM projects

- Develop community partnerships, school organizations and enrichment activities that promote STEAM

- Share STEAM success stories

Chesterfield County Public Schools
Design for Excellence 2020 strategic plan

Goal 1. All learners will acquire, analyze, synthesize and evaluate information to solve meaningful problems and to achieve success as productive, thriving global citizens. Students will learn through active engagement, collaboration and exploration of personal interests, talents and ambitions across disciplines. Student learning and achievement will be measured and reported using clearly defined standards and performance assessments that measure student progress toward personalized learning goals.

Goal 2. All learners will demonstrate the 21st-century learning and technology skills and knowledge that will prepare them for success in school, postsecondary education, work and life in a global society.

Goal 3. Working in partnership with school and family, all learners will understand, model and embrace the important attitudes and attributes necessary to be responsible global citizens.

Vision

Chesterfield County Public Schools will provide an engaging and relevant education that prepares every student to adapt and thrive in a rapidly changing world.

Mission

Chesterfield County Public Schools, in partnership with students, families and communities, emphasizes and supports high levels of achievement through a global education for all, with options and opportunities to meet the diverse needs and interests of individual students.

Core values

Respect, responsibility, honesty and accountability are the core values of Chesterfield County Public Schools.

Nondiscrimination

Chesterfield County Public Schools does not unlawfully discriminate on the basis of sex, race, color, age, religion, disability or national origin in employment or in its programs and activities.

Chesterfield County Public Schools STEAM Team

- Donna Dalton, Chief Academic Officer
- Dr. Juliette B. Myers, Director of Curriculum and Instruction
- Ernest Longworth, Assistant Director of Curriculum and Instruction
- Dr. Melanie Haimes-Bartolf, Science Specialist and STEAM Team Leader
- Melody Bushley, Mathematics Specialist
- Michael Gettings, Visual Arts Specialist
- Barb Hancock-Henley, Career Development Program Manager
- Dr. William Fiege, Vice President of Academic Affairs, John Tyler Community College
- Col. James White, Air Force Association

Lindsey Jackson, a student in the Governor's Academy for Engineering Studies at Bird High, designed the STEAM logo. Teacher Consultant Cathy Beaty Surowka took the photos during the 2013 STEAM Fair.