

STEM Education Definition

STEM education is an approach to teaching and learning that integrates the content and skills of science, technology, engineering, and mathematics. STEM Standards of Practice guide STEM instruction by defining the combination of behaviors, integrated with STEM content, which is expected of a proficient STEM student. These behaviors include engagement in inquiry, logical reasoning, collaboration, and investigation. The goal of STEM education is to prepare students for post-secondary study and the 21st century workforce.

Maryland State STEM Standards of Practice

1. Learn and Apply Rigorous Science, Technology, Engineering, and Mathematics Content

STEM proficient students will learn and apply rigorous content within science, technology, engineering, and mathematics disciplines to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.

- A. Demonstrate an understanding of science, technology, engineering, and mathematics content.
- B. Apply science, technology, engineering, or mathematics content to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.

2. Integrate Science, Technology, Engineering, and Mathematics Content

STEM proficient students will integrate content from science, technology, engineering, and mathematics disciplines as appropriate to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.

- A. Analyze interdisciplinary connections that exist within science, technology, engineering, and mathematics disciplines and other disciplines.
- B. Apply integrated science, technology, engineering, mathematics content, and other content as appropriate to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.

3. Interpret and Communicate Information from Science, Technology, Engineering, and Mathematics

STEM proficient students will interpret and communicate information from science, technology, engineering, and mathematics to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.

- A. Identify, analyze, and synthesize appropriate science, technology, engineering, and mathematics information (text, visual, audio, etc.).
- B. Apply appropriate domain-specific vocabulary when communicating science, technology, engineering, and mathematics content.
- C. Engage in critical reading and writing of technical information.
- D. Evaluate and integrate multiple sources of information (e.g.: quantitative data, video and multimedia) presented in diverse formats.
- E. Develop an evidence-based opinion or argument.
- F. Communicate effectively and precisely with others.

4. Engage in Inquiry

STEM proficient students will engage in inquiry to investigate global issues, challenges, and real world problems.

- A. Ask questions to identify and define global issues, challenges, and real world problems.
- B. Conduct research to refine questions and develop new questions.

5. Engage in Logical Reasoning

STEM proficient students will engage in logical reasoning to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.

- A. Engage in critical thinking.
- B. Evaluate, select, and apply appropriate systematic approaches (scientific and engineering practices, engineering design process, and/or mathematical practices).
- C. Apply science, technology, engineering, and mathematics content to construct creative and innovative ideas.
- D. Analyze the impact of global issues and real world problems at the local, state, national, and international levels.

6. Collaborate as a STEM Team

STEM proficient students will collaborate as a STEM team to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.

- A. Identify, analyze, and perform a STEM specific subject matter expert (SME) role.
- B. Share ideas and work effectively with a STEM focused multidisciplinary team to achieve a common goal.
- C. Listen and be receptive to ideas of others.
- D. Analyze career opportunities that exist in a variety of STEM fields relevant to the STEM focused multidisciplinary team's goal.

7. Apply Technology Strategically

STEM proficient students will apply technology appropriately to answer complex questions, to investigate global issues, and to develop solutions for challenges and real world problems.

- A. Identify and understand technologies needed to develop solutions to problems or construct answers to complex questions.
- B. Analyze the limits, risks, and impacts of technology.
- C. Engage in responsible/ethical use of technology.
- D. Improve or create new technologies that extend human capability.