

SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) INTEGRATION



For a number of years, not only educators, but also political, civic, and industry leaders have pushed for a greater emphasis on STEM education in schools. It is globally recognized that in order for any nation to be competitive, future generations must develop competency in the 21st century skills afforded through STEM fields. TSA promotes a vision of students literate in these fields and believes its competitions and programs help make that vision a reality.

STEM education is not just an isolated and discreet acquisition of STEM knowledge and skills. Rather, STEM education demands the interdisciplinary application of these academic fields to improve outcomes in comprehension, communication, and problem solving. It is commonly accepted that the correlation between STEM disciplines is interdependent. In order to develop a deep comprehension of one STEM area, one must simultaneously have an encompassing knowledge of another. For example, to design and engineer with any degree of complexity, one also must be familiar with technology, mathematics, and science. To practice science, one must have a firm knowledge of mathematics and technology.

Beyond necessity, there is another reason for STEM education in schools and why the TSA program of activities inherently aligns with STEM goals. This reason revolves around teaching, learning, and what motivates our 21st century learners.

When students participate in TSA competitions, they find they must not only embrace the value of design when they compete, but they also must conceptualize, assess, and materialize that vision. Students may choose to work collaboratively, depending upon the requirements of an event, or they may choose to work independently.

Irrespective of this choice, students develop the essential leadership and critical thinking skills to execute their strategy and align their intention with the STEM objectives in a competition. STEM education is intrinsically exciting, rewarding, and meaningful for instructors and students alike. Using TSA competitive events, instructors challenge students to solve real-world problems through project-based learning and reflective experiences. This rigorous process supplements and complements classroom objectives by asking students to critically evaluate all aspects of their thought processes—from design, to communication, to execution.

Deserving of mention are three other essential areas embedded in most of TSA's competitive events—creativity, innovation, and ethics. Teaching students to think outside the box while considering the ethical consequences provides a global perspective essential to the success of our society.

Essentially, in TSA competitions students are asked to embrace STEM concepts and design creatively, while assessing the effects and impacts of what they develop.

TSA competitions align with commonly accepted national standards for the areas of science, technology, and mathematics, as well as the Accreditation Board for Engineering and Technology (ABET, Inc.) criteria for accrediting higher education engineering programs.