TeachME Professional Development

Innovation in STEM Education

Executive Summary

1. The learning of and participation in science, technology, engineering, and mathematics (STEM) helps prepare students for the complexity of the world by developing knowledge and skills to solve difficult problems, gathering and evaluating evidence, and:

A. Mastering core material that promotes an academic mindset
B. Thinking critically and comprehending intricacies
C. Making sense of information received from print and digital media
D. Working collaboratively and communicating effectively

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2. The STEM vision calls for the promotion of educational experiences that include specialized approaches to solving “exemplary dilemmas.”

A. True
B. False

Introduction-Understanding the Need for a Bold Vision in Science, Technology, Engineering, and Mathematics (STEM) Education for Lifelong Learning

3. One difficulty in utilizing the innovative approaches to teaching and learning through Science, Technology, Engineering, and Mathematics (STEM) education is the assumption that technology and engineering experiences should be available only for those who are “naturally gifted in STEM subjects.”

A. True
B. False

The STEM 2026 Vision

4. Which is NOT a component of STEM 2026?

A. Societal and cultural images and environments that promote diversity and

opportunity in STEM
B. Intransigent and exclusive learning spaces supported by innovative technologies
C. Accessible learning activities that invite intentional play and risk
D. Innovative and accessible measures of learning

Engaged and Networked Communities of Practice

5. According to this report, formal and informal educators harness one of the greatest assets in transforming STEM education, which is children's:

A. Enthusiasm
B. Community
C. Curiosity
D. Ingenuiity

Accessible Learning Activities That Invite Intentional Play and Risk

6. Which is NOT a true statement about intentional play activities for students?

A. These activities have guidelines and rules
B. These activities can help legitimize behaviors that are core to the practice of science and engineering, including "not knowing"
C. Setbacks or failures are discouraged in these kinds of activities
D. When children are allowed opportunities to explore the content in addition to direct instruction, they learn additional skills such as creativity and problem solving

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7. STEM experts are interested in extending the philosophies and principles of constructing knowledge from experience that occur more typically in early childhood, elementary, and out-of-school and informal learning settings to all stages of the education continuum.

A. True
B. False

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8. Professor of Mathematics Education at Stanford University, Jo Boaler, emphasizes that students' beliefs about their teachers are paramount to students' learning and their abilities to overcome setbacks and achieve their goals.

A. True
B. False

Educational Experiences That Include Interdisciplinary Approaches to

Solving “Grand Challenges”

9. Integrated STEM teaching and learning experiences may occur in which of the following?

A. Throughout a curriculum or in a single course
B. In various school settings
C. In an out-of-school program or activity
D. All of the above

Flexible and Inclusive Learning Spaces

10. STEM education encourages the use of online videos outside the school day, simulation-based games, mobile devices, and virtual environments.

A. True
B. False

TEXT BOX 3. INTELLIGENT TUTORING SYSYEMS

11. What do intelligent tutoring systems do?

A. They are designed to simulate a human tutor’s behavior and guidance and aim to provide immediate and personalized feedback to the learner
B. They engage middle school students in an immersive computer environment designed to teach youth to reason about causal complexity in environmental science
C. They allow high school students to complete internships in real workplaces
D. All of the above

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12. One consideration in moving STEM 2026 forward is that planning for interactive platforms and the wider use of tools that use big data analytics requires attention to the challenges related to complying with data privacy requirements.

A. True
B. False

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13. The Illinois Pathways initiative, which builds local-level public-private education partnerships, includes each of the following components EXCEPT:

A. It provides on-the-job learning experiences and training
B. Comprised of a network of education partners, businesses, industry associations,

labor organizations, and other organizations
C. Students in pathway courses are provided access to work-based learning experiences in the STEM Learning Exchange Industry in which they are participating
D. Learning games designed to introduce middle school students to scientific concepts using multiple means of representation

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Innovative and Accessible Measures of Learning

14. STEM 2026 envisions an approach to understanding students' development of skills that promote STEM educational pathways and lifelong learning that is uniform and circumscribed.

A. True
B. False

Societal and Cultural Images and Environments That Promote Diversity in STEM Opportunities and Careers

15. In propelling the STEM 2026 vision forward, concerted attention will need to be paid to make popular media and retail a vehicle for encouraging and ensuring inclusion of all members of society, encompassing students of color, ELs, students with disabilities, girls and boys, and individuals from all rural, suburban, and urban neighborhoods.

A. True
B. False

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16. Little Discoverers: Big Fun with Science, Math and More is a digital destination that features STEM-focused games, videos, and hands-on activities that encourage children and families to investigate and explore scientific concepts. This demonstrates to young children that they are STEM learners and doers and helps them understand challenging concepts and develop STEM:

A. Investigation skills
B. Vocabulary
C. Acuity
D. Intensity

Achieving the Vision/Challenge 1: Promoting equitable access to the STEM teaching and Learning Experiences envisioned in STEM 2026

17. One challenge this nation faces with STEM education is promoting equitable access to the everyday teaching and learning experiences that open the doors to the STEM pathways.

A. True
B. False

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18. Which is NOT one of the goals of the ConnectED initiative?

A. To provide extended services, such as job placement follow-up, counseling, and training
B. To obtain federal funds and commitments from organizations like the Federal Communications Commission, Apple, Microsoft, and Verizon
C. To support and help connect all of America's students to next generation broad-band and high-speed wireless in schools and libraries
D. To close the digital divide and promote greater equity in the effective use of technology to enable learning pathways for all students

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19. For Inspiration and Recognition of Science and Technology (FIRST) is gaining substantial ground in making _____ an official sport in some states.

A. Physics Olympics
B. Robotics
C. Computer graphics
D. Video gaming

Challenge 3: Redesigning Lesson Activities to Promote Intentional Play and Risk

20. STEM 2026 discourages finding value in failure during the the learning process, as the goal is to focus primarily on the correct or well-reasoned answer, rather than the process.

A. True
B. False

Challenge 5: Reducing stovepipes between STEM topics (and non-STEM topics)

21. The Dream Factory is a collaborative work space that brings together computer

science, technology and _____education, with the aim allowing “students to better connect the subjects and understand how the concepts they learn overlap."

A. Physical
B. Arts
C. Literacy
D. Social science

Challenge 6: Re-Envisioning the Learning Space

22. Zspace is a software program that provides students with:

A. Smithsonian Museum opportunities for personal encounters with scientists
B. An alternate education and learning model for STEM that encourages the full ecosystem of partners in a student’s education by using the natural world as the classroom
C. 3-D glasses and a stylus to work “in the field” to investigate places and objects schools would not be able to access or afford
D. Opportunities to take steps to “correct the balance” in test taking in their schools

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23. The Geena Davis Institute on Gender in Media makes an effort to generate and share more research on reversing gender stereotypes in STEM, and encourages the creation of more diverse female characters in entertainment, especially media that targets children under age 12.

A. True
B. False

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24. The firm Era of an Engineer highlights STEM professions in the music industry, such as audio engineering, and offers workshops and seminars for students to develop technology-based problem solving and critical thinking.

A. True
B. False

Conclusion

25. Students should be introduced to positive and authentic STEM learning experiences early in their education, in learning settings that are:

A. Traditional and non-traditional
B. Autonomous and integrated

C. Formal and informal
D. Creative and analytical
