UNIVERSITY OF NOTRE DAME

Center *for* STEM Education

STEM Indicators

The eleven (11) areas elaborated below are indicators for high-quality and rigorous learning programs in the science, technology, engineering, and mathematics (S-T-E-M) disciplines. They have been adapted from the evaluation criteria for AdvancED (Cognia) STEM Certification.

1. School supports increased participation in S-T-E-M learning, including groups often underrepresented in S-T-E-M fields of work and study, through outreach and support for S-T-E-M program areas.
Concept 1 Has outreach plan to increase participation of all learners, including learners from groups often underrepresented in S-T-E-M fields of work and study.
Concept 2 Conducts outreach activities for the purpose of increasing learner participation in S-T-E-M learning experiences, including recruiting and supporting learners from groups often underrepresented in S-T-E-M fields of work and study.

2. Learners work independently and collaboratively in an inquiry-based learning environment that encourages finding creative solutions to authentic and complex problems.
Concept 1 Facilitate inquiry-based learning experiences.
Concept 2 Promote creative problem solving.
Concept 3 Facilitate learner collaboration and development of learner independence.

3. Learners are empowered to personalize and self-direct their S-T-E-M learning experiences supported by S-T-E-M educators who facilitate their learning.
Concept 1 Learners have frequent, ongoing opportunities to personalize and self- direct their S-T-E-M learning experiences.
Concept 2 S-T-E-M educators primarily and consistently serve as facilitators who provide guidance and support for learners as self-directed learners.

4. Learners use technology resources to conduct research, demonstrate creative and critical thinking, and communicate and work collaboratively.
Concept 1 Promote learner use of technology during, after, and/or away from school.
Concept 2 Promote learner use of digital tools and development of skills for higher order purposes.

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5. Learners demonstrate their S-T-E-M learning through performance-based assessments and express their conclusions through elaborated explanations of their thinking.
Concept 1 Facilitate opportunities for learners to demonstrate understanding through performance assessment.
Concept 2 Facilitate opportunities for learners to demonstrate their learning to stakeholders.
Concept 3 Facilitate learning activities during which leaners are required to explain, defend, and justify their reasoning.

6. The problem-based curriculum includes a focus on real world applications.
Concept 1 Facilitate learning activities via curriculum and materials aligned to research- or standards-based frameworks.
Concept 2 Curriculum and activities utilized and/or created by the school/educator features integration two or more of the S-T-E-M disciplines.
Concept 3 Curriculum and activities utilized and/or created by the school/educator are structured around inquiry or problem-based learning.
Concept 4 Curriculum and activities provide experiences for learners that develop cross-cutting competencies necessary for college and career.
Concept 5 The curriculum and activities engage learners in science, technology, engineering, and mathematics processes and practices.

7. S-T-E-M educators collaborate as an interdisciplinary team to plan, implement, and improve integrated STEM learning experiences.
Concept 1 Facilitate opportunities for S-T-E-M educators to create, plan, and revise integrated STEM learning experiences.
Concept 2 Facilitate opportunities for S-T-E-M educators to review student work and artifacts.
Concept 3 Facilitate collaboration between S-T-E-M educators.

8. S-T-E-M learning outcomes demonstrate learners' S-T-E-M literacy necessary for the next level of S-T-E-M learning and for post-secondary and workforce readiness.
Concept 1 Data on learners' S-T-E-M content knowledge and skills, cross-cutting competencies, and creative and critical thinking strategies demonstrate improvement toward readiness and success at the next level of S-T-E-M learning and/or postsecondary and workforce readiness.
Concept 2 Data on learners' S-T-E-M literacy and/or postsecondary and workforce readiness are based on appropriately valid and reliable measures, including local qualitative and quantitative measures.

9. S-T-E-M educators participate in a continuous program of S-T-E-M-specific professional learning.
Concept 1 Facilitate opportunities for S-T-E-M educators to stay current about practices in the S-T-E-M world through professional learning.
Concept 2 Facilitate opportunities for S-T-E-M educators to engage in technology-specific professional learning.
Concept 3 Facilitate opportunities for S-T-E-M educators to receive professional development based on individualized needs.

10. School facilitates partner and stakeholder engagement for participation in and/or support of the S-T-E-M program.
Concept 1 Facilitate S-T-E-M community engagement among stakeholders, including S-T-E-M learners and educators.
Concept 2 Facilitate strategic planning for S-T-E-M community partner engagement.

11. Learners are supported in their S-T-E-M learning through adult-world connections and extended-day and extended-year opportunities.
Concept 1 Provide or facilitate learner engagement in S-T-E-M-specific, age appropriate, formal programs of mentorship, apprenticeships, internships, research, or job shadowing with researchers, business/industry, or other community partners.
Concept 2 Provide or facilitate extended-day and/or extended-year S-T-E-M learning opportunities for learners.