

STEM Needs Assessment

Presented by the Indiana STEM Ecosystem

Topic	Description	Scoring Categories				Score	Examples of Evidence
		Investigating	Developing	Approaching	Innovating		
		"We need significant support in this." "We're not sure or do not see how this applies to us."	"We could use some support here."	"We demonstrate this in observable ways."	"We are a leader in this."		
		0 points	1 point	2 points	3 points		
Culture & Environment							
Decision-Making	Decision-making regarding planning and implementing the STEM program is the work of a team, comprised of leadership/administrators, and instructors/teachers, and includes the opportunity for feedback throughout the program	Below 50% (of the time or staff)	50%-74% (of the time or staff)	75%-94% (of the time or staff)	95%+ (of the time or staff)		<ul style="list-style-type: none"> •Meeting schedule •Detailed meeting minutes •Meeting agenda(s) •Roster of team members identified by role i.e., Leadership/Admin, Instructor/Teacher, Volunteer, etc... •Survey results
Common Work Time	Common planning/work time is provided where instructors/teachers plan integrated STEM learning opportunities as a team	<1x per month	1x per month	2x per month or every other week	1x per week		<ul style="list-style-type: none"> •Meeting/master schedule •Roster of participants •Sample Lesson Plans/Project Plans •Detailed meeting minutes documenting the planning
Equitable Access	Students have equitable access to STEM learning. Elementary: Students participate in integrated STEM instruction/programming Middle School and High School: STEM elective enrollment, including AP/dual credit	Less than 50%	At least 50%	Elementary: At least 75% Middle School and High School: At least 25%	Elementary: 100% Middle School and High School: mirrors school demographics		<ul style="list-style-type: none"> •Curriculum maps/Instructional Plans •Course/Program offerings •Schedules •STEM enrollments with demographic breakdown (Special Ed Status, Gender, Minorities, etc...) •Description of how STEM time is "protected" •STEM programming promotion plan
Physical Space	STEM space is appropriate for STEM learning and encourages youth/students to discover, explore, experiment and take learning risks.	No	Yes for some, but less than 50%	Yes for 50% or more	Yes for 75% or more		The space can be rearranged to meet the needs of the activity or there is other space accessible that will meet the needs. The space encourages the development of an interest in STEM (e.g., scientific tools, visible posters or other visual displays) and are representative of the student
Resources, Equipment & Supplies	Staff and youth have access to resources, equipment and supplies that support STEM learning includig a dedicated budget and storage.	No resources, equipment, or budget.	Minimal resources and equipment due to no dedicated budget or a very minimal budget. No storage needed due to lack of supplies, or no storage available.	Moderate resources and equipment due to a minimal budget that is not guaranteed annually. Some storage available, but may not be enough or easily accessible.	Dedicated annual budget that allows for purchasing and maintainance of all needed resources and equipment. Adequate and accessible storage.	1	<ul style="list-style-type: none"> • The program budget has a designated line for STEM related supplies and equipment • Storage spaces for STEM equipment and supplies is near the STEM space and easily accessible by staff and children/youth
Curriculum & Program Focus							
Curriculum Integration	Does not yet meet minimum indicators for developing	<10% of planned, integrated STEM curriculum is evidence-based	At least 10 percent of planned, integrated STEM curriculum is evidence-based	At least 25 percent of planned, integrated STEM curriculum is evidence-based	At least 50 percent of planned, integrated STEM curriculum is evidence-based		<ul style="list-style-type: none"> •Curriculum from IDOE approved list •Description of model that is basis for teacher-created units and/or other providers i.e., 5-E, PBL Gold Standard, etc...
Computer Science	Standards based computer science is integrated into the instructional plan	A computer science (CS) plan has been developed but does not meet the requirements, or there is no CS plan.	A computer science implementation plan has been developed that complies with IC 20-30-5-23	Elementary and Middle School: Standards-based computer science content is incorporated into the school curriculum for at least 50 percent of students High School: One computer science course is available to all students	Elementary and Middle School: Standards-based computer science content is incorporated into the school curriculum for 100 percent of students High School: Multiple computer science courses are available to all students		<ul style="list-style-type: none"> •Implementation plan •Course list/guide

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Continuity of Learning	Learning plans include: 1) Integrated STEM lessons in the context of solving a real world problem or challenge 2) Students/Participants work in teams either synchronously or asynchronously 3) A variety of methods are used to assess student/participant STEM learning	Includes no components	Includes one component	Includes two components	Includes all components		<ul style="list-style-type: none"> School's Continuous Learning Plan School's Continuity of Learning Plan
Sustainability Plan	There is a STEM certification sustainability plan in place identifying funding sources for both technology and STEM curriculum and training needs due to staff turnover	No plan in place	2 year plan in place	3 year plan in place	5 year plan in place		<ul style="list-style-type: none"> Technology plan Curriculum funding plan <p>(STEM School Certification is valid for 5 years, documentation should indicate a plan to sustain programming/equipment/training through all 5 years)</p>
Measurement of Students' Attitudes/Interests	Formal measurement of students' attitudes toward STEM and/or interest in STEM classes/career pathways are measured and the program is revised, as needed, based upon analysis of this data	No methods of measurement used	Informal methods used only	Annually	At least 2x per year		<ul style="list-style-type: none"> Course/program enrollment/participation trends Student Attitudes toward STEM (S-STEM) Survey STEM Semantics Survey Career Interest Questionnaire Test of Science Related Attitudes (TOSRA) Locally created survey Description of revisions based upon data analysis
Student/Parent Feedback Data	There is a formal collection of student and parent feedback regarding STEM integration on an annual basis and the school's STEM program is revised, as needed, based upon analysis of this data	Informal or no collection and data may or may not be used	Informal collection only	Formal collection and data is used	Formal collection and data is used		<ul style="list-style-type: none"> Copy of survey(s) Summary of data Description of revisions based upon data analysis
STEM Instructional Feedback	The following indicators are documented: 1) Evaluation indicators have been determined, in the current local evaluation instrument or through modifying the local evaluation instrument, for identifying targeted STEM instructional practices 2) All evaluators are trained in observing targeted STEM instructional practices, using the local evaluation instrument 3) Evaluators incorporate feedback on targeted STEM instructional practices in formative and summative evaluations, using the local evaluation instrument	Does not yet meet minimum indicators for developing	One indicator is documented	Two indicators are documented	All indicators are documented		<ul style="list-style-type: none"> Training documentation for evaluators i.e., training specific to assessing STEM instructional practices, training in school's STEM curriculum, book study, etc.. Samples of feedback provided to teachers List of identified indicators targeted to STEM instructional practices from local evaluation instrument
Instructional Support	Teachers experience instructional supports, related to STEM instruction, via: 1) peer observation 2) lesson study 3) critical feedback 4) coaching 5) modeling 6) action research 7) mentoring 8) targeted professional development sessions 9) curriculum training	Less than 75% annually	At least 75% annually	At least 75% bi-annually	At least 75% quarterly		<ul style="list-style-type: none"> Summary of supports provided using teacher roster Sample of teacher reflections (journaling) based on provided supports Summary of survey responses based upon provided supports

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STEM Communications	Communication tools (e.g., website, newsletters, social media, webinars, meetings, etc.) are used to communicate about STEM education.	None are used	Two-three times per year	Eight-ten times per year	Ten+ times per year	<ul style="list-style-type: none"> •Links to communications •Calendar of communications •Samples of social media posts (Choose one month to document) 	
Collaboration among STEM programs	The program/school collaborates with other programs/schools to share STEM resources and expertise	No	Minimally	Moderately	Maximized	<ul style="list-style-type: none"> • Program administrators work with school principals or other school leaders to develop opportunities for the program to utilize school facilities or equipment for STEM related activities • A written agreement between the school and the program details terms and conditions of the use of school resources • Staff have reviewed appropriate school documents such as curriculum maps, standards, etc., in order to coordinate activities with school curriculum • Staff are provided the opportunity to attend STEM related training that is offered to school personnel • STEM family nights are encouraged and promoted through program communications • Guest speakers from the community are encouraged to attend lessons and provide leadership 	
Leveraging STEM Institutions	The program/school partners and connects with STEM-rich institutions (e.g. museums, libraries, science centers, and STEM education organizations).	No	Minimally	Moderately	Maximized	<ul style="list-style-type: none"> • Literature, posters, etc. related to upcoming, STEM related events in the community are posted in a designated area • Staff highlight upcoming STEM related activities in the community and encourage children/youth to attend • Staff from STEM-rich institutions visit the program to lead an activity or make a presentation • Staff provide opportunities for children/youth to visit appropriate, STEM-rich institutions in the community • Staff attend training sponsored by STEM-rich institutions 	
Staff Training	STEM is integrated into existing trainings and broader program goals	No	Minimally	Moderately	Maximized	<ul style="list-style-type: none"> • The staff handbook contains a section describing how STEM is an integrated component of the overall program and the goals and purposes of STEM • Staff can describe what STEM is, why it is a part of the overall program, and its purpose • STEM related goals are clearly embedded within annual program goals 	
	Staff development focuses on youth development and STEM learning. Staff are exposed to interesting, easy to implement STEM content and curricula.	No	Minimally	Moderately	Maximized	<ul style="list-style-type: none"> • Training sessions are based on best practices and current research in child/youth development and are provided by trained, youth professionals • A portion of the annual, internal training for staff is devoted to STEM learning • A staff needs assessment, completed annually to determine perceived training needs, includes question(s)/item(s) specific to STEM needs 	

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	Program staff/instructors/teachers learn real world applications of STEM & how to use the inquiry process and other methods for teaching informal STEM	No	At least 50%	At least 75%	100%		<ul style="list-style-type: none"> Staff can name workforce needs and skills needed in the workforce, in order to incorporate skill building (i.e. problem solving, collaboration, 21st Century Skills etc.) into activities Staff can describe how a STEM activity applies to a real world situation Activities are designed to align with real world applications (e.g. service learning projects, water conservation) Children/youth can transfer knowledge and describe how a STEM activity relates to a real world situation
Data Collection	The STEM program collects data from staff, students, parents, and community partners to demonstrate STEM learning & make adjustments	Never	Sometimes collects data, but does not use it	Regularly collects data but rarely uses it	Regularly collects and uses data		<ul style="list-style-type: none"> Program stakeholders complete a survey based on program goals and outcomes Data routinely collected for the overall program evaluation includes items reflecting STEM related principles and goals An external evaluator assess program efficiency and quality
Informing Stakeholders	The STEM program shares the progress and outcomes with key stakeholders	Never	Annually	Bi-Annually	Quarterly or more		<ul style="list-style-type: none"> Program administrators meet with stakeholders to review the program evaluation report Stakeholders and administrators discuss evaluation results and identify areas in need of improvement
Instruction							
Instructional Work Groups	Students work in groups as follows: 1) Students collaborate with peers based upon project/intended outcomes 2) Each group member has at least one assigned role that is critical to successful project/goal completion 3) Accountability is measured and recorded for each individual as well as the entire group	1x per month or less and in 50% or less of the classes/programas	At least 2x per month and in at least 50% of classes/programs	At least 1x week and in at least 50 % of classes/programs	At least 2x week and in at least 50 % of classes/programs		<ul style="list-style-type: none"> Group assignment processes Defined roles/responsibilities plans Accountability plans Samples of unit/lesson plans Samples of rubrics
STEM Integration	Instructors/teachers are implementing the planned integrated STEM learning opportunities on a planned and regular basis.	<10%	At least 10 %	At least 25%	At least 50%		<ul style="list-style-type: none"> Samples of unit/lesson plans Samples of student products
Employability Skills	Employability Skills Standards, based upon the appropriate grade band, are integrated into the curriculum.	< 50%	At least 50%	Atleast 75%	100%		<ul style="list-style-type: none"> Curriculum/program summary Samples of unit/lesson plans Samples of student products Samples of rubrics
Equity	General education teachers are connected with appropriate special education teachers and support services teachers (ENL, Interpreters, etc...) for necessary material development and refinement for diverse learners based upon their understanding of students' academic needs.	Special materials are not created for diverse learners.	Materials for diverse learners are created by general education teacher or instructors with no guidance from appropriate support from trained professionals.	Accomodations are provided by trained professionals for teachers/instructors of diverse learners.	Materials are developed collaboratively by the general education teacher/instructor and trained professional (ENL, Interpreters, etc...).		<ul style="list-style-type: none"> Samples of lesson plans with planned supports Meeting agenda(s) Guidance documents

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Assessments	A variety of assessment methods are used by teachers/instructors for students/participants to demonstrate STEM learning are used.	< 25% of teachers/instructors	At least 25%	At least 50%	At least 75%		<ul style="list-style-type: none"> •Samples of assessments •Samples of feedback provided to students •Samples of student products •Samples of rubrics
STEM Instructional Approach Training	Teachers/Instructors have been trained in implementing a STEM instructional approach in the context of solving a real-world problem or challenge.	< 10%	At least 10%	At least 25%	At least 50%		<ul style="list-style-type: none"> •PD/training plan for PBL and/or IBL •Agenda(s) from PD/training session(s) •Roster of participants
STEM Instructional Approach Implementation	Teachers/Instructors use a STEM instructional approach in the context of solving a real-world problem or challenge	< 10%	At least 10 %	At least 25 %	At least 50 %		<ul style="list-style-type: none"> •Samples of unit/lesson plans •Samples of student products
Technology in Instruction	Students use a variety of technologies to enhance their learning in investigations and problem solving e.g., data collection/analysis, design, creation, virtual simulations, research and communication	< 10% of the time	At least 10% of the time	At least 25% of the time	At least 50% of the time		<ul style="list-style-type: none"> •Samples of unit/lesson plans •Samples of student products
Applying scientific reasoning	Youth have opportunities to apply scientific reasoning (e.g. manipulating, testing, investigating, predicting, questioning, and observing)	No	Minimally	Moderately	Maximized		<ul style="list-style-type: none"> • Products resulting from projects are on display • Staff have received training in project based and cooperative learning • Children/youth work on service learning projects
Partnerships & Engagement							
Community Partner Input	Community partners from various sectors provide feedback on the STEM programming offered.	No community partners provide input	At least one community partner provides input.	At least two community partners provide input.	At least three community partners provide input.		<ul style="list-style-type: none"> •Detailed meeting minutes •Agenda(s) •Roster of participants •Copy of survey(s) •Summary of data <p><i>(This element is about planning support)</i></p>
Community Engagement	Community partners are actively engaged in the STEM program.	0 partners	1-2 partners	2-4 partners	5 or more partners		<ul style="list-style-type: none"> •List of partners with description of participation/support provided by each partner <p><i>(This element is about implementation of supports)</i></p>
Sharing of Resources for Family Engagement	The program engages families in a variety of ways (e.g. family science nights, sending home materials that support STEM at home)	< 50% of families receive this information & participate	At least 50% of families receive this information & participate .	At least 75% of families receive this information & participate	> 75% of families receive this information & participate		<ul style="list-style-type: none"> • Evidence of regular communications between the program and home regarding STEM related activities that can happen at home, and about upcoming community opportunities open to children/youth and their families • Weekly themes, activities, and suggestions for home/community activities or opportunities are posted in the program re parents can see them
STEM Career Exploration	Elementary and Middle School: STEM units have career exploration/information as a part of the curriculum High School: Direct experiences with STEM professionals and/or professional STEM work environments are available	<10%	At least 10%	At least 25%	At least 50%		<ul style="list-style-type: none"> •Curriculum summary •Samples of unit/lesson plans •Samples of student products •Documentation of participation

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Extended Learning	STEM activities such as robotics and engineering clubs, internships, and apprenticeships are available and accessible on an on-going basis.	No activities	At least 10% of students/participants have access	At least 25% of students/participants have access	At least 50% of students/participants have access		<ul style="list-style-type: none"> •Summary of opportunities •Calendar of events •Transportation options •Latchkey options
Equity	Provides opportunities/modes to inspire and inform under-represented students/participants about careers in STEM fields	No opportunities	At least 1 opportunity	At least 2 opportunities	At least 3 opportunities		<ul style="list-style-type: none"> •Summary of opportunities •School-wide interaction with STEM professionals from under-represented groups •Pictures of displays/posters in school common areas depicting under-represented groups
					Total Score	1	
					Becoming Aware & Interested		
					Feeling Inspired and Supported		
					Gaining Knowledge & Confidence		
					Acquiring STEM skills & Competency		
					Achieving Career Access & Success		