The STEM Immersion Guide

A collaboration of the Arizona STEM Network led by Science Foundation Arizona and Office of the Maricopa County School Superintendent



Office of the Maricopa County School Superintendent

The STEM Immersion Guide for Schools and Districts				
A Collaboration	A Collaboration of Arizona STEM Network Led by SFAz and Maricopa County Education Service Agency			
	Updated D	ecember 9, 2014		
Exploratory Model	Introductory Model	Partial Immersion Model	Full Immersion Model	
The Exploratory Model describes a regular school day experience, with STEM-related EXTRA CURRICULAR opportunities offered to students in addition to the regular school day. These experiences may include, but are not limited to; after school clubs, summer programs, science fairs, robotics clubs, video production clubs, etc.	The Introductory Model describes a regular school day experience, with STEM-related experiences offered in addition to the current curriculum. These experiences may include, but are not limited to; integrated STEM units delivered once the state testing is complete, supplementary stand-alone learning units offered through industry or non-profit partnerships, etc.	The Partial Immersion Model describes a non-traditional school experience where STEM-related experiences are integrated into the curriculum. These experiences may include, but are not limited to; teaching to a school-wide STEM theme, teaching year-long integrated problem/project-based learning units, teaching dual- enrollment programs, teaching in a "school within a school" model, etc.	The Full Immersion Model describes a non-traditional school experience where STEM-related experiences determine the school's curriculum. Full Immersion schools look more like 21st Century work-place environments rather 20th century K- 12 school environments. Problem- based learning drives the curriculum and instruction. Students constantly collaborate to solve authentic problems, propose solutions, and contribute ideas to the larger community.	
A 1.Exploratory Model Descriptors: •School or district has defined STEM as a priority •STEM programs are traditionally "stand alone" •Programs are conducted outside the regularly scheduled school day •Programs are assigned to staff as additional duties •Programs are optional •Includes a basic level of family engagement and outreach programs (i.e. math and science	 A 2. Introductory Model Descriptors: Implementation in addition to the regular school curriculum during the school-day Opportunities are provided for student participation in problemsolving and project-based instruction with integrated content across STEM subjects Results in teaching through product development (school/parent presentations, science fairs, evening STEM nights, etc.) Initial collaboration with one or 	 A 3. Partial Immersion Model Descriptors: Integration of problem/project- based learning into the regular curriculum through STEM signature programs Opportunities are provided for student participation in problem- solving and project-based instruction with integrated content across STEM subjects Interdisciplinary instruction Some inter-grade level planning Emphasis on product development Several collaborations with 	 A 4. Full Immersion Model Descriptors: •Whole school approach to teaching STEM education through a global mission and vision •Participation by all schools staff, classroom and special area teachers •STEM lessons are planned and aligned by all grade levels and special area classes to be integrated, spiraling in increased complexity and rigor, and constructivist in nature •Provides an opportunity for student participation in problem/project- based instruction with an end result of teaching through product 	



family nights)	more business partners, mentors,	business and industry partners in	development
• Students explore various facets	and/or STEM advocates	the geographical area occurs, along	•Several collaborations with business
of STEM from project-based	•Includes <i>multiple points of contact</i>	with mentors and STEM advocates	and industry partners in the
investigations to possible career	with the families of STEM	 Collaborations and partnerships 	geographical area occurs, along with
pathways	participants, and at least one family	with Higher Education are	mentors and STEM advocates
•Initial collaboration with one or	integration activity	established	•Collaborations and partnerships with
more business partners,		•Includes <i>multiple points of contact</i>	Higher Education
mentors, and/or STEM		with families of STEM participants,	•Includes <i>multiple and on going points</i>
advocates		and a minimum of three family	of contact with families of STEM
		integration activities	participants including several family
			integration activities



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	LE	CADING	
Leading within the Exploratory Model involves supporting teachers in the creation of <i>extra-</i> <i>curricular, after-school</i> STEM- related experiences (programs) for students that <i>choose</i> to participate. Leaders must embrace a mindset that includes; leading by example, creating an environment of high expectations, taking responsibility for sparking a passion for learning, be excited to prepare students both academically and socially for their future careers, and creates and communicates a "shared vision" of purpose and process.	Leading within the Introductory Model involves supporting teachers in the planning and implementing of STEM-related experiences that are <i>in addition to the regular</i> <i>curriculum</i> and taught to students during the school day. Leaders arrange schedules so that teachers may plan units as a grade- level or content-area team. Leaders support structures for teachers including common planning time within the school day to support data-driven collaboration and professional learning (e.g. Grade level team). Leaders must embrace a mindset that includes; leading by example, creating an environment of high expectations, taking responsibility for sparking a passion for learning, be excited to prepare students both academically and socially for their future careers, and creates and communicates a "shared vision" of purpose and process.	Leading within the Partial Immersion Model involves setting the expectation that all staff plan and implement STEM-related experiences that are <i>integrated into</i> <i>the regular curriculum</i> . Leaders arrange schedules and set the expectation that teachers plan integrated yearlong units as a <i>grade-level or content-area team</i> . Leaders set the expectation that teachers <i>take on more of a</i> <i>facilitator role</i> in guiding student learning through inquiry. Leaders support structures for teachers including common planning time within the school day to support data-driven collaboration and professional learning (e.g. school within a school model). Leaders must embrace a mindset that includes; leading by example, creating an environment of high expectations, taking responsibility for sparking a passion for learning, be excited to prepare students both academically and socially for their future careers, and creates and communicates a "shared vision" of purpose and process.	Leading within the Full Immersion Model involves setting the expectation that all staff plan and implement STEM-related experiences that are the main curriculum. Leaders arrange the schedule and set the expectation that all teachers plan integrated yearlong units as a collaborative school team. Leaders set the expectation that teachers act as facilitators in guiding student learning through inquiry. Leaders support structures for teachers including common planning time within the school day to support data-driven cross-curricular collaboration and professional learning (e.g. whole school model). Leaders must embrace a mindset that includes; leading by example, creating an environment of high expectations, taking responsibility for sparking a passion for learning, be excited to prepare students both academically and socially for their future careers, and creates and communicates a "shared vision" of purpose and process.



B 1. Administrative Leadership	B 2. Administrative Leadership	B 3. Administrative Leadership	B 4. Administrative Leadership
provides:	provides:	provides:	provides:
Decide program	Decide program	• Develops a shared mission and	Develops a <i>shared mission and</i>
		A	
purpose/content/curriculum	purpose/content/curriculum	vision and program	<i>vision</i> and program purpose/content
• Support structures for students	• Support structures for students	purpose/content	• Establishment of an <i>advisory</i>
Select target audience	• Solo to collaborative, or shared	• Establishment of an <i>advisory</i>	committee for ongoing monitoring
Resource allocation	decision making	committee for ongoing monitoring	of mission, vision, scope of project
(materials/supplies)	 Professional development plan 	of mission, vision, scope of project	that includes representatives from
Program location/work space	 Program location/work space 	that includes representatives from	school, district, school board,
 Implementation 	 Resource allocation 	school, district, school board,	community, higher education
timelines/calendars	(materials/supplies)	community, higher education	institutions, STEM industry
 Communication strategies 	 Implementation 	institutions, STEM industry	 Establishment of a leadership cadre
Professional development plan	timelines/calendars	 Establishment of a leadership 	for collaborative decision making
for teachers/staff	 Communication strategies 	cadre for collaborative decision	with defined roles and responsibilities
• Budget development/oversight	 Budget development/oversight 	making	matched to program goals
Program evaluation protocols	Program evaluation protocols	Support structures for students	• Support structures for students
Advocacy and marketing for	• Establish mentorships, both face	including a non-graded advisory	including a non-graded advisory
program	to face and virtually	(guidance) program that focuses on	(guidance) program that focuses on
Strategies for sustainability	 Strategies for sustainability 	setting and monitoring student	setting and monitoring student goals
Outreach to business and	 Advocacy and marketing for 	goals and personalizing the student	and personalizing the student
industry	program	experience	experience
,	• Outreach to business and	Program evaluation	Collaboration with parents and
	industry	• Establishment of end of	families
		course/program goals	 Selection of grade level participation
		Resource allocation	• Establishes program review and
		(materials/supplies)	evaluation that <i>measures attainment</i>
		Program location/work space	of program goals and <i>includes</i>
		Facilitation support with classified	<i>metrics</i> such as student achievement,
		staff	perceptual data, attendance, and
		Implementation	demographics
		timelines/calendars	Establishment of end of
		Communication strategies	course/program goals
		Professional development plan	Resource allocation
		 Budget development/oversight 	(materials/supplies)
		• Evaluation protocols	Program location/work space Facilitation and a second se
		 Advocacy and marketing for 	 Facilitation support with classified



program • Strategies for program sustainability • Outreach to higher education • Outreach to business and industry	staff • Implementation timelines/calendars • Communication strategies • Professional development plan • Budget development/oversight
• Outreach to business and industry	 Budget development/oversight Outreach to Business and Industry Higher education partnerships Ongoing strategies for advocacy and
	marketing • Strategies for sustaining program



The STEM Immersion Guide for Schools and Districts			
Exploratory Model	Introductory Model	Partial Immersion Model	Full Immersion Model
	TE	ACHING	
Teaching within the Exploratory Model involves sponsoring or leading <i>extra-curricular, after-</i> <i>school</i> STEM-related experiences (programs) for students that <i>choose</i> to participate.	Teaching within the Introductory Model involves planning and implementing STEM-related experiences that are in addition to the regular curriculum and taught to selected students (i.e. grade level band) <i>during the school day</i> . Teachers may plan units as a grade- level or content-area team.	Teaching within the Partial Immersion Model involves planning and implementing STEM-related experiences that are <i>integrated into</i> <i>the regular curriculum.</i> Teachers plan integrated yearlong units as a grade-level or content-area team. The teacher takes on <i>more of a</i> <i>facilitator role</i> in guiding student learning through inquiry.	Teaching within the Full Immersion Model involves planning and implementing STEM-related experiences that <i>are the curriculum</i> . Teachers plan integrated yearlong units as a school team. The teacher <i>acts as a facilitator</i> in guiding student learning through inquiry.
 C 1. The teacher: Takes the lead role in planning and facilitating the in club or after school program Provides direct instruction while leading students through guided inquiry investigations Provides authentic, real world experiences with technology integration Connects business/industry skills to instruction 	 C 2. The teacher: Provides direct instruction while leading students through guided inquiry investigations Provides an opportunity for students to participate in guided inquiry and problem-solving Selects cross-curricular STEM content Provides authentic, real world problems within STEM content with technology integration 	<i>C 3. The teacher:</i> • <i>Encourages</i> student participation in identification of problem/project •Provides <i>limited direct instruction</i> while facilitating students moving through open-ended STEM investigations •Provides an opportunity for students to participate in guided and open-ended inquiry and problem- solving •Assists in selection of cross-	 C 4. The teacher: Facilitates student participation in identification of problem/project Provides a <i>facilitative role</i> while students move through open-ended STEM investigations Provides an opportunity for students to participate in <i>open-ended</i> inquiry and problem-solving Assists in selection of <i>rigorous</i> cross- curricular STEM content as <i>the focus</i> of the school curriculum
 Provides connections to outreach/service learning projects for students Fosters collaboration, communication and social skills within the learning environment Commits to on-going professional development in 	 Connects business/industry skills to classroom instruction Involvement in Professional Learning Communities (PLC) with other instructors at their grade level in their school, or across their district Commits to on-going professional 	 Assists in selection of cross- curricular content that is <i>embedded</i> into the traditional curriculum Provides authentic, real world problems within STEM content <i>Provides instruction</i> with the outcome of product development, i.e. models, proto-types, etc. Connects business/industry skills 	 Provides authentic, real world problems within STEM content <i>Facilitates instruction</i> with the outcome of product development, i.e. models, proto-types, etc. Connects business/industry skills to classroom instruction Fosters collaboration,



pedagogy	•Fosters collaboration,	within the learning environment
•Provides service learning	communication and social skills	•Involvement in Professional Learning
0		8
<i>projects</i> for students	within the learning environment	Communities (PLC) with other
•Fosters collaboration,	•Involved in Professional Learning	instructors at their grade level and
communication and social skills	Communities (PLC) with other	additional grade levels, in their school.
within the learning environment	instructors at their grade level and	•Commits to on-going professional
•Embeds a variety of technology in	additional grade levels, in their	development in STEM content and
the instructional process, including	school or across their district	pedagogy
presentation tools, i.e. Power	 Commits to on-going professional 	 Provides opportunities and protocols
Points, smart boards, multi-media,	development in STEM content and	for students to research and
Prezi, etc.	pedagogy	participate in outreach/service
	 Provides opportunities and 	learning projects
	protocols for students to research	 Provides opportunities for students
	and participate in outreach/service	to conduct research in STEM-based
	learning projects	content with links to university/
	•Embeds a variety of technology in	college labs
	the instructional process, including	•Embeds a variety of technology in the
	using technology as a <i>facilitation</i> of	instructional process, including using
	student learning in investigations	technology as a facilitation of student
	and problem-solving, i.e. data	learning in a transformative
	analysis, research, creation of multi-	instructional manner, i.e. using
	media	technology tools such as
	Incula	spectrometers, PCR machines, digital
		microscopes, robots, etc.



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	LE.	ARNING	
Learning within the Exploratory Model involves engaging in a provided question or problem through an <i>extra-curricular or</i> <i>after-school STEM-related</i> <i>experience that may or may</i> <i>not be related to the school</i> <i>curriculum.</i> The learning is collaborative and engaging but may not be relevant or applied.	Learning within the Introductory Model involves engaging in a provided question or problem through STEM-related experiences that are in addition to the regular curriculum and <i>taught to all</i> <i>students during the school day</i> . The learning is collaborative and engaging and may be relevant and applied in a local context.	Learning within the Partial Immersion Model involves engaging in selected or negotiated questions or problems through STEM-related experiences that are <i>integrated into</i> <i>the regular curriculum</i> . Learning is collaborative, engaging, and is relevant and applied, with connections to local issues and/or industry.	Learning within the Full Immersion Model involves engaging in a student posed or negotiated question or problem through STEM-related experiences that are the curriculum . Learning is collaborative, engaging, and is relevant and applied, with connections to local issues and/or industry.
 D 1. The student: Engages in STEM content in an "out of the traditional classroom" experience, i.e. after school club, summer program Engages in problem-based, teacher directed <i>investigations</i> that may result in solution or product creation Collaborates in predetermined groups 	 D 2. The student: Engages in <i>integrated STEM</i> content as an addition to the school curriculum Engages in problem-based, teacher directed guided inquiry that may result in solution or product creation Collaborates with peers in groups determined by teacher Engages in relevant and authentic 	 D 3. The student: Engages in integrated STEM content as part of the school curriculum Experiences the STEM content from cross-curricular, inter- disciplinary to trans-disciplinary Engages in problem-based, student and teacher directed guided inquiry that results in solution creation or product development 	 D 4. The student: Engages in interdisciplinary STEM content as the focus of the school curriculum Engages in problem-based, student directed open inquiry that results in solution creation or product development Collaborates with peers in groups determined by project and intended outcomes
 Engages in relevant and authentic learning experiences that may be connected at least in part to local context Uses a variety of technology in the investigative process including virtual, computer- based, mobile, and data collection devices Participates in a level of self- 	 learning experiences that may be connected at least in part to local context Engages in critical thinking, problem solving, and in depth learning while exploring STEM topics/projects/careers Learns in the context of real-world connections with business/industry 	 Collaborates with peers in <i>groups</i> determined by teacher and/or project and intended outcomes Engages in relevant and authentic learning experiences that are connected at least in part to local context Engages in critical thinking, problem solving, and in depth learning while exploring STEM 	 Participates in collaborative groups that foster innovation and risk in solutions creation and product/project development Engages in relevant and authentic learning experiences that are driven at least in part by local context Engages in critical thinking, problem solving, and in depth learning while exploring STEM



evaluation	•Uses a variety of technology in the	topics/projects/careers	topics/projects/careers
•Multiple in and out of school	investigative process including	•Learns in the context of real-world	 Learns in the context of real-world
opportunities to inspire and	virtual, computer-based, mobile,	connections with business/industry	connections with business/industry
inform under-represented and	and data collection devices	with possible opportunities to	with opportunity to contribute to the
struggling students about	•Participates in outreach/service	contribute to the knowledge base	knowledge base
careers in STEM fields	learning projects within the school	 Engages in opportunities to 	•Engages in opportunities to conduct
 Engages in critical thinking, 	or community	conduct research in STEM based	research in STEM based content with
problem solving, and in depth	•Participates in multiple points of	content with links to	links to university/college labs and
learning while exploring STEM	contact with the families of the	university/college labs and possible	opportunities to contribute to
topics/projects/careers	STEM participants, and at least	opportunities to contribute to	knowledge base
•May engage in opportunities to	three family integration activities	knowledge base	•Uses a variety of technology in the
conduct research in STEM based	•Multiple in and out of school	•Uses a variety of technology in the	investigative process including;
content with links to	opportunities to inspire and inform	investigative process including;	virtual, computer-based, mobile, and
university/college labs	under-represented and struggling	virtual, computer-based, mobile, and	data collection devices, web-based
 May engage in real-world 	students about careers in STEM	data collection devices, web-based	lessons, computer applications,
connections with	fields	lessons, computer applications,	researching, and reporting -
business/industry	•May participate in a level of self-	researching, and reporting	communicate, collaborate and create
•May have an opportunity to	evaluation	 Participates in outreach/service 	in ways not possible without the
participate in service learning	•May engage in opportunities to	learning projects within the school	technology
projects	conduct research in STEM based	or community	 Participates in opportunities to
	content with links to	 Participates in multiple points of 	establish protocols for research and
	university/college labs	contact with the families of the	participation in outreach/service
		STEM participants, and at least three	learning projects
		family integration activities	 Participates in multiple points of
		 Multiple in and out of school 	contact with the families of the STEM
		opportunities to inspire and inform	participants, and at least three family
		under-represented and struggling	integration activities
		students about careers in STEM	 Multiple in and out of school
		fields	opportunities to inspire and inform
		 Participates in a level of self- 	under-represented and struggling
		evaluation	students about careers in STEM fields
			 Participates in a level of self-
			evaluation used for goal setting



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	EVA	LUATING	
Evaluating within the Exploratory Model involves <i>informal feedback on program</i> <i>success</i> that may include measures of self-efficacy, attitudes, interest, and motivation to pursue additional STEM related classes/experiences.	Evaluating within the Introductory Model involves <i>formal feedback on</i> <i>program success</i> , which includes student assessment data as well as measures of self-efficacy, attitudes, interest, and motivation to pursue additional STEM related classes/experiences.	Evaluating within the Partial Immersion Model involves program review that includes <i>qualitative</i> <i>and quantitative data</i> . Measures should include student achievement data as well as measures of self- efficacy, attitudes, interest, and motivation to pursue additional STEM related classes/experiences.	Evaluating within the Full Immersion Model involves comprehensive program review that includes <i>multiple measures both</i> <i>quantitative and qualitative in</i> <i>nature.</i> This would include data related to student achievement, classroom observations, attendance, and surveys at the student, teacher, administrator, parent, and community levels. Data is used to gauge achievement of program goals and inform design and implementation decisions.
E 1. The Evaluative Process includes:	E 2. The Evaluative Process includes:	E 3. The Evaluative Process includes:	E 4. The Evaluative Process includes:
•Teach- assess-adjust, then re-	•Alignment of program to internationally benchmarked	•Alignment of program to internationally benchmarked	•Alignment of program to internationally benchmarked
teach-assess-adjust	Common Standards	Common Standards	Common Standards
•Invite industry	•Pre and post student assessment	•Development of curriculum	•Development of curriculum support
experts/mentors to evaluate program	surveys in interest, content, and attitudes	support materials such as scope and sequence and pacing guides for a	materials such as scope and sequence and pacing guide for a vertically and
Provide professional	•Participant and parent feedback	vertically and horizontally aligned	horizontally aligned curriculum
development for teachers in the	surveys	curriculum centered on the state's	centered on the state's adopted
evaluative process and	•Peer observation and dialogue	adopted rigorous standards, e.g.	rigorous standards, e.g. Next
interpreting data	included in quality assessment	Next Generation Science Standards,	Generation Science Standards, 21st
•All teachers and students are	•Survey data used to inform	21st Century skills, and STEM	Century skills, and STEM integration
immersed in a student-centered	program decisions	integration (Engineering and	(Engineering and Technology
environment that supports the	•Research-based authentic and	Technology standards)	standards)
use of multiple indicators of	integrated assessments	 Pre and post student assessment 	•Pre and post student assessment
success, such as performance,	•Invite industry experts/mentors	surveys in interest, content, and	surveys in interest, content, and
project-based and portfolio	to evaluate program	attitudes	attitudes



 Pre ad post student assessment surveys in interest include in interpreting data Include informal feedback (surveys) Peer observation and dialogue included in quality assessment Survey data used to inform program decisions Per observation and dialogue included in quality assessments Survey data used to inform program decisions Performance, project-based and 21st Century skills Performance assessments that allow students to demonstrate their and 21st Century skills Performance assessments Obvelopment of an assessment and intervention plan to address gaps in student achievement and areas for extension Obvelopment and implementation of student success at the post- secondary level Include industry experts/mentors to evaluate program decisions Obvelopment and implementation of student success at the post- secondary level Include industry experts/mentors to evaluate program decisions Obvelopment and implementation of student success at the post- secondary level Include industry experts/mentors to evaluate program decisions Obvelopment and implementation of student success at the evaluative program decisions Obvelopment and implementation of student success at the post- secondary level Include industry experts/mentors to evaluate program (Advisory Board) Provide professional development for teachers and student-centered environment that supports the use of multiple indicators of success, such as performance, project-based Obvelopment related to industry expectations On-going evaluation sof autentic student tearning and skill development related to industry expectations Obvelopment related to industry expectations On-going evaluations of autentic student tearning and skill development related to industry expectati	assessments	Provide professional development	•Participant and parent feedback	•Participant and parent feedback
assessment surveys in interest, content, and attiludesprocess and interpreting data •All teachers and students are included in quality assessment •All teachers and students centered environment that supports the use of an portfolio assessments •Dever observation and dialogue included in quality assessment •Survey data used to inform program decisions•Peer observation and dialogue included in quality assessment •Survey data used to inform program decisions•Peer observation and dialogue included in quality assessment •Survey data used to inform program decisions•Peer observation and dialogue included in quality assessments •Goal setting and monitoring driven by data•Peer observation and dialogue include students of an assessments •Goal setting and monitoring driven by data•Peer observation and dialogue include students of an assessment and integrated assessment •Joal setting and monitoring driven by data•Peer observation and dialogue include student input ·Beatodimeters gaps in student achievement and areas for extension•Peer observation and dialogue include student input ·Beatodimeters gaps in student achievement and areas for extension•Peer observation and dialogue integrated assessment and integrated assessment and intervention plan to address gaps in student achievement and areas for extension•Peer observation and integrated assessment and intervention plan to address gaps in student achievement and areas for extension•Peer observation and integrated assessment and intervention plan to address gaps in student achievement and areas for extension•Peer observation and intervention plan to address gaps in student achievement and intervention plan to address gaps in student achievement and re				· ·
content, and attitudes•All teachers and students are immersed in a student centered of multiple indicators of success, included in quality assessment •Deer observation and dialogue included in quality assessment •Deer observation and dialogue and portfolio assessments that understandings of STEM content and 21st Century skillsincluded in quality assessment •Coal setting and monitoring driven by dataincluded in quality assessments •Research-based authentic and integrated assessments •Goal setting and monitoring driven by dataeResearch-based authentic and elsesten-based authentic and integrated assessments •Goal setting and monitoring driven by dataeResearch-based authentic and elsesten-based authentic and integrated assessments •Goal setting and monitoring driven by dataeResearch-based authentic and elsestenets •Goal setting and monitoring driven by data•Survey data used to inform program decisions•Performance assessments that and 21st Century skills·Poevlopment of an assessment and intervention plan to address gaps in student achievement and integrated and collaboration with leadership team to use the data to inform program decisions·Development of and/essessment •Development and implementation of student success at the post- secondary level •High Schools: Develops and lad envice professional development of student success at the post- secondary level •Development of a process for program review that includes atted.acc, demographics and student achievement for teachers in the evaluative envicement that student-centered environment that supports the use of multiple indicators of success, such as performance, project-based and collaboration with leadership team and advisory team to use the da			5	5
 Include informal and formal feedback (i.e. participant and parent feedback survey) and tailogue parent feedback survey) of an ultiple indicators of success and portfolio assessments that allow students to demonstrate their understandings of STEM content and 21st Century skills Performance assessments that allow students to demonstrate their understandings of STEM content and 21st Century skills Performance assessments that allow students to demonstrate their understandings of STEM content and 21st Century skills Performance assessments that allow students to demonstrate their understandings of STEM content and 21st Century skills Performance assessments that allow students to demonstrate their understandings of STEM content and 21st Century skills Performance assessments that allow students to demonstrate their understandings of STEM content and 21st Century skills Performance assessments that allow students to demonstrate their understandings of STEM content and 21st Century skills Performance assessments that allow students are intervention plant to address gaps in student achievement and areas for extension Plan for analysis of evaluation data and collaboration with leadership team to use the data to inform program decisions Pligh Schools: Development and implementation of student success at the post-secondary level Include industry experts/mentors to evaluate program (Advisory Board) Provide professional development for a process for program review that includes attendance, demographics and skill development that supports the use of multiple indicators of success, such as performance, project-based and portolio assessments 			5	ē
feedback (i.e. participant and parent feedback surveys) -Peer observation and dialogue included in quality assessment •Survey data used to inform program decisions *Research-based authentic and integrated assessments •Ocal setting and monitoring driven by data •Development of an assessment and intervention plan to address gaps in student achievement and areas for extension •Development and implementation of student self-assessment •Plan for analysis of evaluation data and collaboration with leadership team to use the data to inform program decisions •Plevelopment of an assessment and intervention plan to address gaps in student achievement and areas for extension •Development and implementation of student self-assessment •Plan for analysis of evaluation data and collaboration with leadership team to use the data to inform program decisions •High Schools: Develops a plan for student success at the post- secondary level •Include industry experts/mentors to evaluate program (Advisory Board) •Development of an assessment •Plan for analysis of evaluation data and collaboration with leadership team to use the data to inform program decisions •High Schools: Develops a plan for student success at the post- secondary level •Include industry experts/mentors to evaluate program (Advisory Board) •Development of a process for program review that includes attendance, demographics and student achievement •Droging evaluations of authentic student chervier practice is employed				
parent feedback surveys) • Peer observation and dialogue included in quality assessments • Performance assessments that allow students to demonstrate their and 21st Century skills• Research-based authentic and integrated assessments of oal setting and monitoring driven by data • Development of an assessment and intervention plan to address gaps in student achievement and areas for extension• Research-based authentic and integrated assessments • Development of an assessment and intervention plan to address gaps in student achievement and areas for extension• Research-based authentic and integrated assessments • Development of an assessment and intervention plan to address gaps in student achievement and areas for extension• Development of an assessment and intervention plan to address gaps in student achievement and areas for extension• Plan for analysis of evaluation with leadership team to use the data to inform program decisions• Development of an assessment • Development of an assessment • Plan for analysis of evaluation data and collaboration with leadership team to use the data to inform program decisions • Systematic collection of feedback • Plan for analysis of evaluation data and collaboration with leadership team to use the grogam (Advisory Board)• Development of a process for • Systematic collection of feedback • Development of a process for • Development of a student achievement • Development of a process for • Development of a student achievement • Development of a process for • Development of a student cancerd • Drovide professional development for teachers and students are immersed in a student-centerd environment that supports to use of multiple indicators of success, such as performance, project-based evaluation				
 •Peer observation and dialogue included in quality assessment •Survey data used to inform program decisions •Performance assessments that allow students to demonstrate their understandings of STEM content and 21st Century skills •Development of an assessment and intervention plan to address gaps in student achievement and areas for extension •Development of an assessment and intervention vith leadership team to use the data to inform program decisions •High Schools: Develops a plan for student such success at the post-secondary level •Include student control of a process for program (Advisory Board) •Provide professional development of a process for program review that includes •Development and students are simmers to evaluative process and interpreting dat •All teachers and students are simmers di na student sare immersed in a student scretter environment that supports the use of multicators of success, such as performance, project-based and portfolio assessments 				
 included in quality assessment Survey data used to inform program decisions and portfolio assessments that allow students to demonstrate their understandings of STEM content and 21st Century skills Goal setting and monitoring driven by data Development of an assessment and intervention plan to address gaps in student achievement and areas for extension Development and implementation of student self-assessment Plan for analysis of evaluation data and collaboration with leadership team to use the data to inform program decisions High Schools: Develops a plan for student success at the post- secondary level Include industry experts/mentors to evaluate program (Advisory Board) Provide professional development for teachers and student-centered environment that supports the use of multiple indicators of success, such as performance, project-based and oprtfolio assessments Best /effective practice is employed 	1	A		
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and portfolio assessments •Best /effective practice is employed				
• Performance assessments that I for engagement, alignment and rigor			•Performance assessments that	for engagement, alignment and rigor



allow students to demonstrate their	for instructional improvement
	-
understandings of STEM content	•Demonstrate competencies in state
and 21st Century skills	high stakes assessments and college
	and career readiness (ex: ACT, SAT,
	TIMSS, PISA, PIAAC)
	 High Schools: Develops a plan for
	student success on the post-
	secondary level
	 Provide professional development
	for teachers in the evaluative process
	and interpreting data
	•Performance assessments that allow
	students to demonstrate their
	understandings of STEM content and
	21st Century skills



The STEM Immersion Guide for Schools and Districts						
Exploratory Model	Introductory Model	Partial Immersion Model	Full Immersion Model			
BUDGETING						
Budgeting in the Exploratory Model involves identifying costs related to personnel, facilities, equipment and supplies.	Budgeting in the Introductory Model involves identifying costs related to personnel, facilities, equipment and supplies.	Budgeting in the Partial Immersion Model involves identifying costs related to personnel, facilities, equipment and supplies. Special consideration may be necessary for professional development, travel, and program marketing.	Budgeting in the Full Immersion Model involves identifying costs related to personnel, facilities, equipment and supplies. Special consideration may be necessary for professional development, travel, and program marketing.			
 F 1. Budget considerations include: Lead facilitator Support staff Materials and supplies (dependent on labs and planned activities) Location space (if necessary) Determine if you will charge participants a registration fee, apply for grants, donations, or outside funding Travel costs (if necessary) Discretionary funds and other resources are allocated to 	 F 2. Budget considerations include: Lead facilitator at each site Support staff Materials and supplies (dependent on labs and planned activities). District wide programs can save by buying materials in bulk. Location space (if necessary) Determine if needed funding support from business connections, apply for grants, donations, or additional outside funding Travel costs (if necessary) Discretionary funds and other resources are allocated to advance 	 F 3. Budget considerations include: Personnel (all teachers salaries and benefits) Support staff (salaries and benefits) Equipment (furnishings/hardware) Materials and supplies (dependent on labs and planned activities) Custodial services Location space (if necessary) including architectural and plan review and permit fees Construction costs (if necessary) Design a strategic plan to apply and 	 F 4. Budget considerations include: School/program administrator (including benefits) School/program curriculum specialist (including benefits) Personnel (all teachers salaries and benefits) Support staff (salaries and benefits) Equipment (furnishings/ hardware) Materials and supplies (dependent on labs and planned activities) Custodial services Location space (if necessary) including architectural and plan Review and permit fees 			
advance implementation of all the STEM strategies outlined in the program plan •Specific budgets for canned programs are also available from Community Education Centers,	 implementation of all the STEM strategies outlined in the program plan Specific budgets for canned programs are also available from Community Education Centers, 	 manage grants, donations, or outside funding Discretionary funds and other resources are allocated to advance implementation of all the STEM strategies outlined in the program 	 Construction costs (if necessary) Design a strategic plan to apply and manage grants, donations, or outside funding Travel costs (if necessary) for researching programs, and 			



outside vendors as well as a	outside vendors as well as a variety	plan	marketing/ recruiting.
variety of grant programs	of grant programs	 Travel costs (if necessary) for 	•Discretionary funds and other
 Research and applying for a 	 Research and applying for a 	researching programs, and	resources are allocated to advance
variety of local, state, and	variety of local, state, and national	marketing/ recruiting.	implementation of all the STEM
national grants	grants	 Specific budgets for canned 	strategies outlined in the program
 Research and inquire about 	 Research and inquire about 	programs are also available from	plan
business community funding	business community funding and	Community Education Centers,	 Specific budgets for canned
and partnerships	partnerships	outside vendors as well as a variety	programs are also available from
		of grant programs	Community Education Centers, outside
		•Research and applying for a variety	vendors as well as a variety of grant
		of local, state, and national grants	programs
		 Research and inquire about 	•Research and applying for a variety
		business community funding and	of local, state, and national grants
		partnerships	•Research and inquire about business
			community funding and partnerships



The STEM Immersion Guide for Schools and Districts					
Exploratory Model	Introductory Model	Partial Immersion Model	Full Immersion Model		
SUSTAINING					
Sustaining at the Exploratory Level involves program development with an initial "start up" focus. By creating ongoing program evaluation and gathering reliable data, the goal is to <i>build the initial program</i> <i>into the more comprehensive</i> <i>levels.</i>	Sustaining at the Introductory Level involves program development with a long-term focus, ongoing program evaluation, consistent policies, reliable data and community interest and support.	Sustaining at the Partial Immersion Level involves program development with a long-term focus , ongoing program evaluation, consistent policies, reliable data and community interest and support.	Sustaining at the Full Immersion Level involves program development with a long-term focus , ongoing program evaluation, consistent policies, reliable data and community interest and support.		
 G 1. Sustaining: Establishes leadership and support through common goals and mission Establishes collaborative team to provide feedback based on assessments and evaluations Establishes plan for materials replenishment Builds capacity Collects feedback and refines program implementation from students, teachers and parents Establishes a <i>two year fiscally</i> <i>responsible budget plan to</i> <i>assure sustainability of</i> <i>school/program</i> 	 G 2. Sustaining: Establishes leadership and support through common goals and mission Establishes collaborative team to provide feedback based on assessments and evaluations Ensures that strategic plan and annual action plan addresses investment in professional development for personnel Establishes plan for materials replenishment Builds capacity Collects feedback and refines program implementation from students, teachers and parents 	 G 3. Sustaining: Establishes leadership and support through common goals and mission Establishes collaborative team to provide feedback based on assessments and evaluations Ensures that strategic plan and annual action plan addresses investment in professional development for personnel Establishes plan for materials replenishment Builds capacity Collects feedback and refines program implementation from students, teachers and parents Establishes a <i>three to five year</i> 	 G 4. Sustaining: Establishes leadership and support through common goals and mission Establishes collaborative team to provide feedback based on assessments and evaluations Ensures that strategic plan and annual action plan addresses investment in professional development for personnel Establishes plan for materials replenishment Builds capacity Collects feedback and refines program implementation from students, teachers and parents Establishes a <i>five to seven year</i> 		



businesses and industry	responsible budget plan to assure	assure sustainability of	assure sustainability of
representatives with emphasis	sustainability of school/program	school/program	school/program
on work place competencies	 Establishes connections to 	 Establishes sustained connections 	•Establish sustained connections to
 Provides project/product 	businesses and industry	to businesses and industry	businesses and industry
development protocols to assess	representatives with emphasis on	representatives with emphasis on	representatives with emphasis on
student success in the STEM	work place competencies	student mentor/internships, career	student mentor/internships, career
program	 Provides project/product 	counseling and work place	counseling and work place
•Develops grant writing	development protocols to assess	competency skills	competency skills.
initiatives with business,	student success in the STEM	 Provides project/product 	 Provides project/product
industries and university	program	development protocols to assess	development protocols to assess
partners to fund, expand, or	 Develops grant writing initiatives 	student success in the STEM	student success in the STEM program,
supplement the program	with business, industries and	program, shadowing and internships	shadowing and internships
•Assists in the development of a	university partners to fund, expand	 Develops grant writing initiatives 	 Develops grant writing initiatives
K-12 STEM pipeline with an end	or supplement the program	with business, industries and	with business, industries and
in mind to determine whom the	 Assist in the development of a K- 	university partners to fund, expand	university partners to fund, expand or
students are and where they will	12 STEM pipeline with an end in	or supplement the program	supplement the program
be going	mind to determine whom the	 Assists in the development of a K- 	•Assist in the development of a K-12
•Strives to be "future focused"	students are and where they will	12 STEM pipeline with an end in	STEM pipeline with an end in mind to
	be going.	mind to determine whom the	determine whom the students are and
	•Works with State's STEM Network	students are and where they will be	where they will be going.
	(i.e. Arizona STEM Network),	going.	•Works with State's STEM Network
	Higher Education and others to	 Works with State's STEM Network 	(i.e. Arizona STEM Network), Higher
	validate effectiveness of schools	(i.e. Arizona STEM Network), Higher	Education and others to validate
	innovative curriculum, instruction	Education and others to validate	effectiveness of schools innovative
	and assessment as evidenced by	effectiveness of schools innovative	curriculum, instruction and
	student achievement and readiness	curriculum, instruction and	assessment as evidenced by student
	for college, career and STEM	assessment as evidenced by student	achievement and readiness for college,
	industry	achievement and readiness for	career and STEM industry
		college, career and STEM industry	

