

## AZ STEM Network: STEM Immersion Guide

The **STEM Immersion Guide** was created as a tool to help educators establish and implement a vision for 21<sup>st</sup> century schools and classrooms in Arizona. It is written as an over-arching framework to help chart a course for integrating STEM education in Arizona schools and districts. The STEM Immersion Guide contains key design elements that support project-based, interdisciplinary STEM instruction by providing practical tools and information to enable teachers, schools and districts, and administrators that want to improve student outcomes by integrating STEM.

**Beginning the Process:** The key to successful implementation lies with a defined *mission, vision and community commitment to STEM education*; this starts with the administration and filters to teachers, staff, students, parents and the local community. The STEM Immersion Guide requires users to identify their particular level of STEM activity as a starting point (with the potential for future growth and greater integration of STEM). They then can use the framework to guide their questions for steering the process of local planning, decision-making (school boards/ schools/ parents) and community collaboration (community and business leaders and government officials) necessary to make the educational and cultural shift in how STEM programs are offered.

**Facilitation of the STEM Immersion Guide:** The over-arching matrix is based on four descriptive models of “immersion” (see below). Each model can be utilized as a *stand-alone guide to implementation*, or can be used in conjunction with adjoining immersion models to move schools into *greater levels of STEM integration*. The STEM Immersion Guide can be utilized in a variety of formats, from providing options to schools for creating their own new STEM programs designed around locally generated goals and objectives, to schools that wish to expand or enhance an existing program. The Guide provides a road map for schools and districts to identify a comprehensive mission, vision and implementation plan based on Leading, Learning, Teaching, Evaluating, Budgeting and Sustaining. Each model within the Guide provides STEM strategies for “blurring the lines” between the individual content areas of STEM to include through project/problem based instruction, 21<sup>st</sup> century work place competency skills and critical thinking.

The STEM Immersion Guide includes the following models:

| Category | Exploratory   | Introductory   | Partial Immersion   | Full Immersion  |
|----------|---|--|---|---|
|          | The Exploratory Level describes a traditional school 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 Level describes a traditional school day 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 Level describes a non-traditional school experience where STEM-related opportunities 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 Level describes a non-traditional school where STEM-related experiences determine the curriculum. Full Immersion schools look more like 21st Century workplace environments rather 20th century K12 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. |

Each model of the Guide has accompanying strategies and steps for development of: foundations, leadership, teaching, learning, budgeting, sustainability and evaluating. In addition, a “how-to” roadmap for implementation (STEM Implementation Guide) has been tailored to each model.

#### **BACKGROUND:**

The full involvement of STEM is much more than introducing a program—it can transform the direction of a school or district. This requires establishing a common local agenda to significantly improve student performance, and enlisting the active engagement at all levels of education and the community. Its success depends on prioritizing STEM and putting in place effective models that best meet student needs. The STEM Immersion Guide contains not only the original matrix document, but more importantly, defines the components that are necessary and present in the best models across Arizona and the Country.

The STEM School Immersion concept was developed in response to multiple requests for assistance in implementation of STEM into schools and districts received during our Outreach Meetings and town hall-style Forums held throughout the due diligence phase of creating the AZ STEM Network Plan. Input from more than 1,500 educators, business and community leaders and other stakeholders—combined with survey responses from these participants—articulated the need for a structured framework to assist districts and schools with the process of embedding STEM to improve student outcomes.

The Arizona STEM Network and Maricopa County Education Services Agency (MCESA) collaborated on the research, design and implementation model for embedding STEM in schools. The research was based on interviewing local school districts currently offering a variety of established STEM programs, as well as interviewing STEM school stakeholders from other states. A list of critical STEM school components emerged from these interviews, as well as the realization that there is not a singular model for STEM schools, but rather **common elements** of successful schools. As a result of this research, the **STEM Immersion Guide** was created and written as an over-arching framework to chart a course for STEM integration for schools and districts statewide. The STEM Immersion Guide is currently being utilized over a three-year grant funded period by seven Arizona school districts, each developing their own model of STEM within their communities. The Guide is being evaluated and revised based on the research and response from this team as well as the hundreds of other educators and state leaders of STEM currently using the STEM Immersion Guide across the state and nation.

The STEM Immersion Guide captures the design elements needed to create a blueprint for incorporating project-based, interdisciplinary STEM instruction, developing STEM leadership and building community support. Principals, superintendents and teachers will be led through a mapping process to assess their STEM readiness and identify and implement models that best advance their students. Over 50 K-20 educators throughout the state provided input and feedback during the initial vetting **process**. We are currently conducting a three year research and implementation study on this tool and the accompanying resources.

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