NIU STEAM programming is offered within a conceptual framework that is robust, comprehensive and research-based. There are six content components of this framework called catalysts, and these catalysts are used to generate three tiers of impact. Each catalyst is identified in research and our practice as essential to effective systemic program improvement and successful development of a STEAM (Science, Technology, Engineering, Arts, Mathematics) culture. While identified individually, we know that all elements of a system are unavoidably interconnected. Our commitment is to work together to change the lived experience of members of your program and community.
NIU STEAM Research-based Content Through Our Catalysts

**Catalyst 1: Problem (Project)-based Learning.** Effective STEAM education focuses on increased learning through engagement with a meaningful, real-world problem.

**Catalyst 2: STEAM Concepts and Content.** Effective STEAM education increases learner understanding of the educational concepts and content being explored.

**Catalyst 3: 21st Century Skills.** Effective STEAM education positively impacts learner outcomes of collaboration, communication, critical thinking and creativity.

**Catalyst 4: Growth and Persistence.** STEAM education positively impacts students’ engagement in productive struggle and their focus on growth rather than on a fixed perception of their academic ability.

**Catalyst 5: Career Connections.** Effective STEAM education fosters persistence in pursuit of STEM/STEAM degrees and careers, responding to and helping to shape the future of local communities and their economic development.

**Catalyst 6: Trans-disciplinary Approaches.** Effective STEAM education engages learners with meaningful, real-world problems (see Catalyst 1) in a manner that empowers them as researchers and co-directors of their own learning, encouraging them to discover the roots of the issues they are exploring across myriad disciplines instead of a limited number of pre-identified choices.

NIU STEAM Differentiated Impact

**Tier 1 Impact—Inspiration.** Sparking curiosity, interest and imagination through amazing and interactive NIU STEAM activities. Sample Tier 1 outcomes:
- Enhanced awareness of the interconnectedness of different subjects with each other and with phenomena encountered in the world.
- Increased interest in a variety of academic subjects.
- Expanded recognition of the connection between academic subjects and professional occupations.
- Accelerated interest from faculty/instructional staff in curricular collaboration.

**Tier 2 Impact—Amplification.** Building organizational capacity and skills through deeper engagement with NIU STEAM strategies. Sample Tier 2 outcomes:
- Augmentation of problem-based and cooperative learning techniques.
- Acceleration of lesson development or design/redesign.
- Expansion of efforts toward collaborative teaching.

**Tier 3 Impact—Transformation.** Cultivating systemic change across an organization with sustained NIU STEAM engagement. Sample Tier 3 outcomes:
- Partial or systemic curriculum design to fully incorporate all six catalysts in the school or program instruction and assessment.
- Development and deployment of districtwide events and initiatives.
- Conversion of one or more schools to STEAM schools or STEAM programming resulting in a transformation across the entire school or program.
- Creating STEM/STEAM career pathways that result in endorsements on high school diplomas and/or dual credit for acceleration in postsecondary degrees or credentials.