STEM FOUNDATIONS:
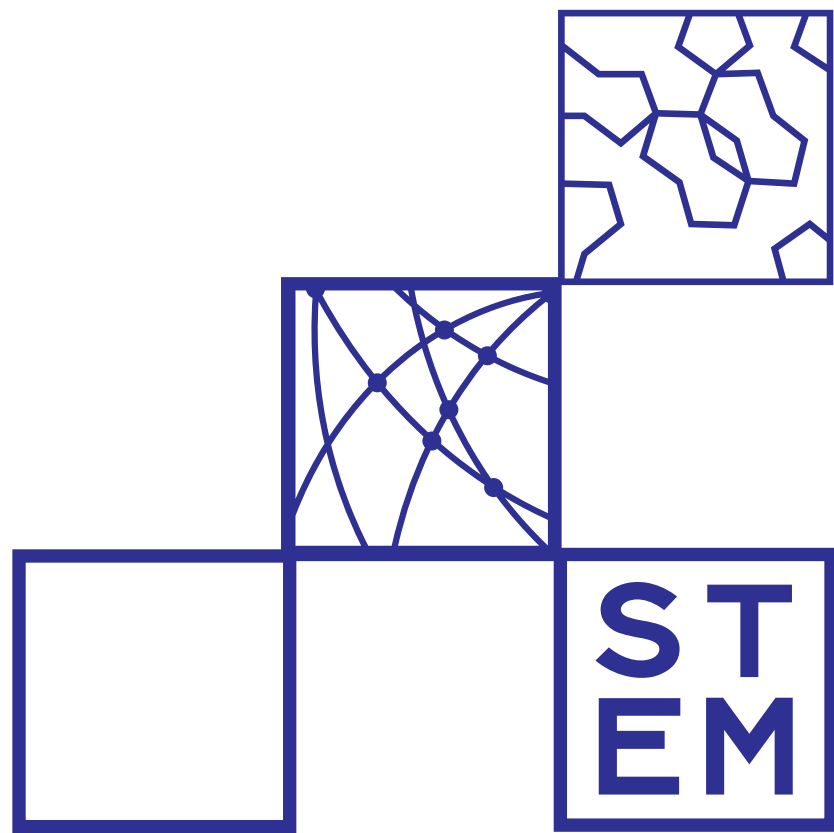# A BLUEPRINT FOR BUILDING A STEM PROGRAM

tinyurl.com/stemifylearning
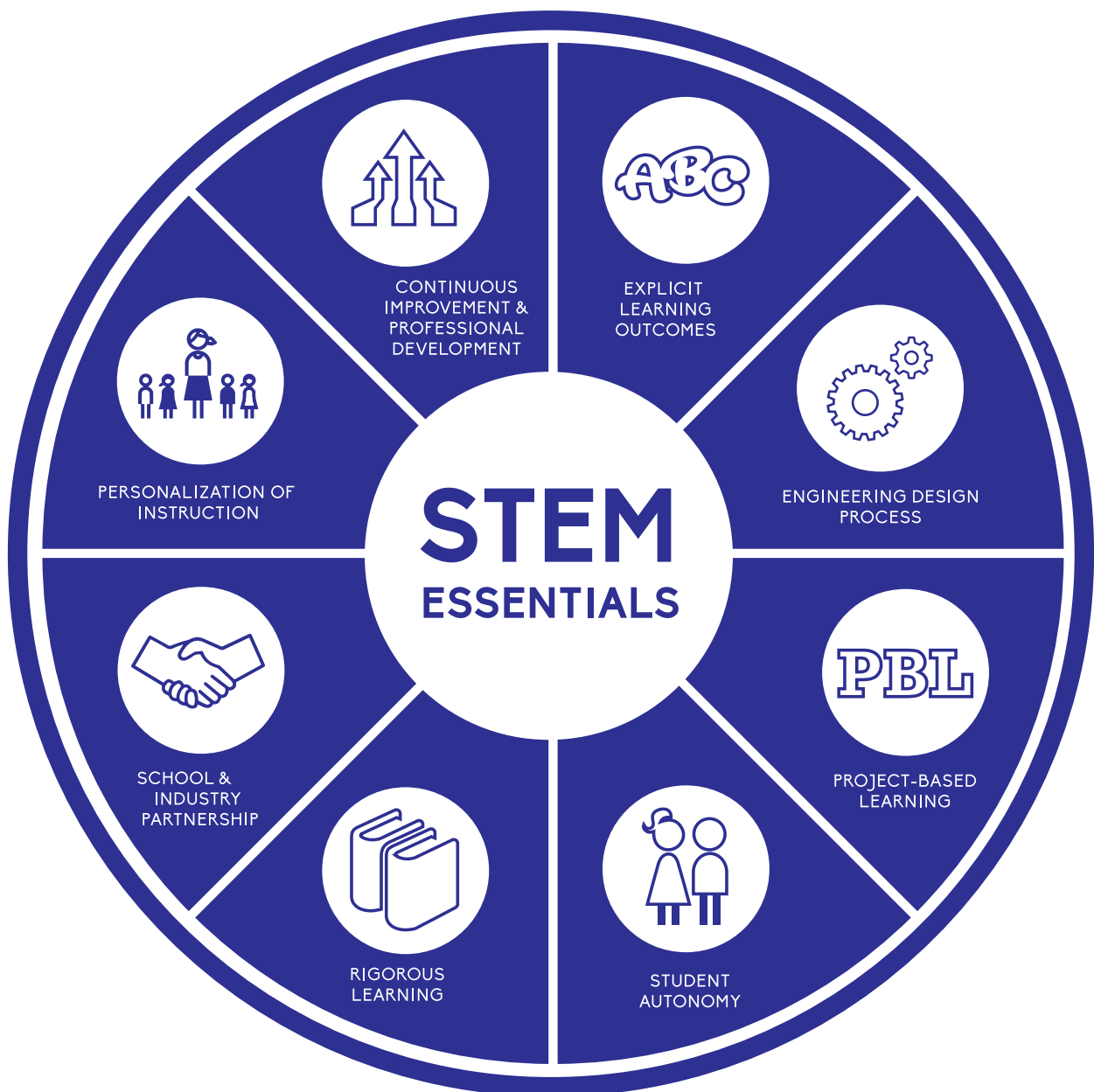
STEM LEADERSHIP & VISIONING PROCESS

PRE-IMPLEMENTATION

INITIAL PLANNING WITH CAMPUS & DISTRICT ADMINISTRATORS

- Self-assess, study STEM background information and research
- Outline desired outcomes, scope, and challenges
- Plan for resource allocation and create general time line for STEM implementation
- Create strategic planning team and designate leaders

FACILITATED STRATEGIC PLANNING STEM COMMITTEE

- Solidify vision, mission, and culture and incorporate into district improvement plans
- Collaboratively address key areas of STEM implementation:
  - Parent and community alliances, public relations
  - Curriculum and instruction, benchmarks, and progress monitoring
  - STEM hiring, selection of leaders and consultants, professional development
    (See and example of a STEM professional development pathway on page 71)

IMPLEMENTATION

ALLOCATION OF RESOURCES & PERSONNEL

- Create campus site teams and coordinate professional development
- Recruit and train STEM coaches, facilitators, consultants
- Procure and distribute technology equipment and/or allocate funds

CAMPUS-LEVEL IMPLEMENTATION

- Create campus STEM site team, designate STEM leaders/coaches
- Facilitate STEM lesson design, interdisciplinary planning, and vertical alignment
- Conduct needs-based STEM professional development and technology-specific trainings

SUSTAINABILITY & CONTINUOUS IMPROVEMENT

- Ongoing progress monitoring and self-assessments
- Adjustments according to time line
- Professional development support

LEADERSHIP & VISIONING IN ACTION

STEM ESSENTIALS

Integrating STEM into your education program begins with organizing and delivering learning experiences in a way that lets students understand the connections within and between content areas, see relevance in their learning, and build capacity through authentic utilization of 21st century skills. The STEM Essentials provide the platform from which educators can STEMify student learning using a variety of delivery approaches.

CONTINUOUS IMPROVEMENT & PROFESSIONAL DEVELOPMENT

EXPLICIT LEARNING OUTCOMES

PERSONALIZATION OF INSTRUCTION

ENGINEERING DESIGN PROCESS

STEM ESSENTIALS

SCHOOL & INDUSTRY PARTNERSHIP

PROJECT-BASED LEARNING

RIGOROUS LEARNING

STUDENT AUTONOMY

STEM FOUNDATIONS
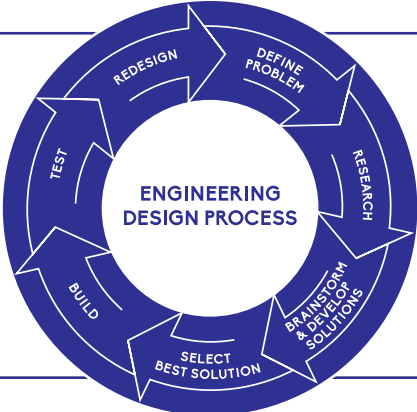
STEM LESSON DESIGN PROCESS OVERVIEW

The STEM Lesson Design Process is a five-step format with STEM Essentials and technology being embedded in each of the steps. Although you will practice going through the process in sequential order, it is designed to be fluid. Teachers may intuitively map out one or more of steps before fully designing a STEM learning experience. The flexibility of this model allows for creativity and innovation, which will potentially inspire future lessons.

INCORPORATE STEM LESSONS & TECHNOLOGY

1. Select content-area learning objectives

2. Select a relevant real-world challenge and plan launch

3. Define deliverables, constraints, and success criteria

4. Set project time line and allocate resources

5. Outline student learning through the engineering design process

STEMIFY THE CLASSROOM

TEACHER DESIGN BRIEF

DESIGN BRIEF	
LEARNING OBJECTIVES: Student Friendly Language	**EVALUATION:** What evidence will be used to ultimately determine the level of learning for a student?

LAUNCH EVENT:
Students will complete this phase during and following the project Launch

I saw…

I heard…

I said…

I thought...

CHALLENGE:
Clearly state the challenge that students will solve in order to apply and learn the content area objectives

DELIVERABLES: Identify exactly what is due upon completion of the challenge (e.g., product, notebook, sketches, presentation)	**CRITERIA:** Detail how the students' deliverables and work will be judged; a rubric is recommended
CONSTRAINTS: List the boundaries, such as time, size, materials and resources, that the students will work within	**RESOURCES:** What equipment and resources are available (or required) for students to successfully complete the challenge?

CONTENT KNOWLEDGE:
What content area knowledge will students need in order to solve the challenge? How can kids learn this information (e.g., teacher-led workshops or student research)

ENGINEERING DESIGN PROCESS — REDESIGN, DEFINE PROBLEM, RESEARCH, BRAINSTORM & DEVELOP SOLUTIONS, SELECT BEST SOLUTION, BUILD, TEST

STEMIFY THE CLASSROOM

STUDENT DESIGN BRIEF

DESIGN BRIEF	
LEARNING OBJECTIVES: What I need to know	**EVALUATION:** What evidence will be used?

LAUNCH EVENT:

I saw…

I heard…

I said…

I thought...

CHALLENGE:

DELIVERABLES: What is due upon completion of the challenge (e.g., product, notebook, sketches, presentation)	**CRITERIA:** Rubric
CONSTRAINTS: Boundaries, such as time, size, materials and resources	**RESOURCES:** What equipment and resources are available?

CONTENT KNOWLEDGE:
What information will I need to be successful in this challenge?
Where can I go to find this information?

ENGINEERING DESIGN PROCESS

REDESIGN • DEFINE PROBLEM • RESEARCH • BRAINSTORM & DEVELOP SOLUTIONS • SELECT BEST SOLUTION • BUILD • TEST

STEMIFY THE CLASSROOM