The specific standards to support the basic problem solving skills in learners are: the engineering design process of NGSS, including cross cutting concepts and practices (k-2 ETS.1.1-ETS1.3). These standards include: asking questions, making observations; gathering information; developing a sketch drawing or models; analyzing data to test pros and cons of an idea. Also, the engineering design process of NGSS, including cross cutting concepts and practices (3-5 ETS1.1-1.3) include: define a problem and consider constraints on materials, time, money, or cost; comparing solutions and pros and cons; and testing variables. The Mathematical Practices and the Tech and Engineering Education Practices offer another level of problem solving skills to learners. All of these standards can easily be incorporated into strong skill based lessons to support any problem solving and critical thinking.

Comparing the three sets of standards: technology education, mathematics, and science, one will observe a similar framework of at least two dimensions. All three offer the **core content** standards, while also having a subset of practices that integrate the **skills** for success. The standards cover content to create the foundation of academic essential understandings (conceptual understandings).

The practices are the strategic skills and ways of problem solving (procedural fluency). The CCSS mathematical practices align well for engineering design and problem solving while easily integrated with both NGSS and Technology Engineering practices. All three are similar in that they each have eight practices. The practices use many of the same verbs and offer the foundational skills to problem solving.

While both CCSS Math and Tech and Engineer Education are two dimensional in framework, NGSS offers a third dimension within its framework. The cross cutting concepts integrate the content and skills through larger observable characteristics such as: cause and effect; structure and function; systems and models, scale proportion and quantity; stability and change; energy and matter; and patterns.

All these cross cutting concepts help the learner to categorize these practices and standards by thinking about relationships in the world and process of any kind of design. These concepts are strongly related to math and the conceptual understanding strategies used behind many of the domains of the CCSS. When people say "they don't like common core math" it's usually the conceptual understanding they don't get- easy to understand memorized procedures giving fluency, but often without fully understanding the actual essential math behind the problem. Emphasis on the cross cutting concepts and relationships between each domain of the CCSS.

CCSS math practices	**NGSS Practices**	**TEP Practices**
making sense of problems and persevere in solving them	Asking Questions.	Systems Thinking
reasoning abstractly and quantitatively	Developing and Using Models.	Creativity
constructing viable arguments and critique the reasoning of others	Planning and Carrying Out Investigations.	Making and Doing
model with mathematics	Analyzing and Interpreting Data.	Critical Thinking
use appropriate tools strategically	Using Mathematics and Computational Thinking	Optimism
attending to precision.	Constructing Explanations	Collaboration
Look for and make use of structure	Engaging in Argument from Evidence	Communication
Look for and express regularity in repeated reasoning.	Obtaining, Evaluating, and Communicating Information	Attention to Ethics

Cross cutting concepts NGSS	**Domains of CCSS**
Cause and effect	Counting and cardinality
Structure and function	Operations and algebraic thinking
System and system model	Number and operations in base ten
Scale proportion quantity	Number and Operations in Fractions
Stability change	Measurement and data
Energy and matter	Geometry
Patterns	Ratios and Proportional relationships
	The Number system
	Expressions and equations
	functions
	Statistics and probability