# Foundations of Engineering Unit 3: Career Challenge

## Unit Focus

In this culminating experience, students will be asked to apply the Engineering Design Process in solving a challenge. This solution will act as an all encompassing PBA and final exam for the entire course. Students will get the opportunity to research engineering careers and find out through several tests what kind of engineering they could be based on how they answered the questions within the test. The PBA will ask students to create a solution to a problem through the lens of their selected career within the field of engineering.

## Stage 1: Desired Results - Key Understandings

### Standard(s)

**Connecticut Goals and Standards**

*Pre-Engineering Technology: 12*
- Brainstorm possible solutions. *ENG.02.05*
- Describe the process for researching known, relevant information, constraints and limitations. *ENG.02.03*
- Develop details of a solution. *ENG.02.07*
- Identify the functions of an engineer. *ENG.01.02*

*Technology Education (CTE)*
- Describe the following engineering fields: mechanical, chemical, civil, and electrical. *TE.ET.A.1*
- Identify the following job functions and responsibilities: research and development, design, production, supervision, management, testing, and analysis in mechanical, chemical, civil, and electrical engineering. *TE.ET.A.2*
- Design Process: Describe and apply the design process to identify and solve a problem. *TE.ET.H*

**ITEEA - Standards for Technological Literacy**

*Technological Literacy: K-12*
- Students will develop an understanding of the attributes of design. (8)
- Students will develop an understanding of engineering design. (9)
- Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving. (10)
- Students will develop the abilities to use and maintain technological products and systems. (12)

**NGSS/NSTA Science & Engineering Practices**

### Transfer

*Students will be able to independently use their learning to...*
**T1** Develop a product/solution that adheres to key parameters (e.g., cost, timeline, restrictions, available resources and audience).
**T2** Communicate effectively based on purpose, task, and audience using appropriate vocabulary.

### Meaning

#### Understanding(s)

*Students will understand that...*
**U1** Assessing ones personality and intelligence can help make ones career choices.
**U2** Awareness of your interests and aptitudes helps make informed career decisions and post-secondary plans.
**U3** Self-awareness provides self-reflection and leads to communication of personal strengths and weaknesses.
**U4** Engineers make proposals on how to solve a problem to secure funding.

#### Essential Question(s)

*Students will keep considering...*
**Q1** How can I use self-awareness to make appropriate career choices?
**Q2** How do I create a solution based on a given problem?

### Acquisition of Knowledge and Skill

#### Knowledge

*Students will know...*
**K1** 8 step Engineering Design Process
**K2** Myers-Briggs Personality test, Online personality test
**K3** What kind of Engineer should you be?
**K4** Engineering proposal format
**K5** Grand Challenges in Engineering & Summary

#### Skill(s)

*Students will be skilled at...*
**S1** Use 8 step Engineering Design Process to propose a solution in solving a given problem
**S2** Develop an engineering proposal.

| Stage 1: Desired Results - Key Understandings | | |
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| *NGSS Science & Engineering Practices: 9-12*<br>• Ask questions to clarify and refine a model, an explanation, or an engineering problem. (SE.9-12.1.4)<br>• Define a design problem that involves the development of a process or system with interacting components and criteria and constraints that may include social, technical and/or environmental considerations. (SE. 9-12.1.8)<br>• Select appropriate tools to collect, record, analyze, and evaluate data. (SE.9-12.3.4)<br>• Analyze data using tools, technologies, and/ or models (e.g., computational, mathematical) in order to make valid and reliable scientific claims or determine an optimal design solution. (SE.9-12.4.1)<br>• Analyze data to identify design features or characteristics of the components of a proposed process or system to optimize it relative to criteria for success. (SE.9-12.4.6)<br><br>**Madison Public Schools Profile of a Graduate**<br>• Analyzing: Examining information/data/evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)<br>• Idea Generation: Studying a problem, need or model (mentor text, political piece, documents, art work, etc.) to consider limitations and imagine new solutions/transformations. (POG.2.1) | | |