

Curriculum Map: 8th Grade STEM

Course: BLDG CONST Sub-topic: Uncategorized

Grade(s): 8

Course Description: The purpose of this course is to teach students problem solving skills by using the Engineering Design Process. Students work in small groups to complete a series of projects/challenges that will challenge their problem solving skills.

Unit: Project 1: Introduction to the Engineering Design Process

Timeline: Week 1 to 2

Unit Description: Students are introduced to the Engineering Design Process and various problem solving methods used by engineers.

Unit Essential Questions: How can we use the Engineering Design Process to create and improve a solution to a problem

Unit Big Ideas: Engineers use the Engineering Design Process as a problem solving road map.

Unit Key Terminology & Definitions : The Engineering Design Process

Prototype

Research

Specifications

Limitations

STANDARDS: STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.8.A3 \(Advanced\)](#) Compare how a product, system, or environment developed for one setting may be applied to another setting. Compare how a product, system, or environment developed for one setting may be applied to another setting.

[3.4.8.C1 \(Advanced\)](#) Evaluate the criteria and constraints of a design.

[3.4.8.C2 \(Advanced\)](#) Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.

[3.4.8.C3 \(Advanced\)](#) Analyze how a multidisciplinary (STEM) approach to problem solving will yield greater results.

[3.4.8.D1 \(Advanced\)](#) Test and evaluate the solutions for a design problem.

(* standards consolidated from Topic level)

Topic: 1.1 Ask

Minutes for Topic: 44

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.8.C1 \(Advanced\)](#) Evaluate the criteria and constraints of a design.

Topic: 1.2 Imagine and Plan

Minutes for Topic: 88

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.8.C2 \(Advanced\)](#) Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.

Topic: 1.3 Create

Minutes for Topic: 220

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

- [3.4.8.A3 \(Advanced\)](#) Compare how a product, system, or environment developed for one setting may be applied to another setting. Compare how a product, system, or environment developed for one setting may be applied to another setting.
- [3.4.8.C2 \(Advanced\)](#) Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.
- [3.4.8.C3 \(Advanced\)](#) Analyze how a multidisciplinary (STEM) approach to problem solving will yield greater results.

Topic: 1.4 Improve

Minutes for Topic: 88

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

- [3.4.8.D1 \(Advanced\)](#) Test and evaluate the solutions for a design problem.

Unit: Project 2: A closer look at problem solving.

Timeline: Week 3 to 4

Unit

Description: Students take a closer look at problem solving using the engineering design process.

Unit Essential Questions: How can we use the Engineering Design Process to create and improve a solution to a problem

Unit Big Ideas: Engineers use the Engineering Design Process as a problem solving road map.

Unit Key Terminology & Definitions : The Engineering Design Process

Prototype

Research

Specifications

Limitations

STANDARDS: STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

- [3.4.8.A3 \(Advanced\)](#) Compare how a product, system, or environment developed for one setting may be applied to another setting. Compare how a product, system, or environment developed for one setting may be applied to another setting.
- [3.4.8.C1 \(Advanced\)](#) Evaluate the criteria and constraints of a design.
- [3.4.8.C2 \(Advanced\)](#) Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.
- [3.4.8.C3 \(Advanced\)](#) Analyze how a multidisciplinary (STEM) approach to problem solving will yield greater results.
- [3.4.8.D1 \(Advanced\)](#) Test and evaluate the solutions for a design problem.

(* standards consolidated from Topic level)

Topic: 1.1 Ask

Minutes for Topic: 44

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

- [3.4.8.C1 \(Advanced\)](#) Evaluate the criteria and constraints of a design.

Topic: 1.2 Imagine and Plan

Minutes for Topic: 88

STANDARDSSTATE: [Pennsylvania SAS Academic Standards \(2009-2013\)](#)[3.4.8.C2 \(Advanced\)](#)

Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.

Topic: 1.3 Create

Minutes for Topic: 220

STANDARDSSTATE: [Pennsylvania SAS Academic Standards \(2009-2013\)](#)[3.4.8.A3 \(Advanced\)](#)

Compare how a product, system, or environment developed for one setting may be applied to another setting. Compare how a product, system, or environment developed for one setting may be applied to another setting.

[3.4.8.C2 \(Advanced\)](#)

Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.

[3.4.8.C3 \(Advanced\)](#)

Analyze how a multidisciplinary (STEM) approach to problem solving will yield greater results.

Topic: 1.4 Improve

Minutes for Topic: 88

STANDARDSSTATE: [Pennsylvania SAS Academic Standards \(2009-2013\)](#)[3.4.8.D1 \(Advanced\)](#)

Test and evaluate the solutions for a design problem.

Unit: Project 3: Advanced Problem Solving

Timeline: Week 5 to 6

Unit**Description:** Students use the engineering design process to solve more advanced problems.**Unit Essential****Questions:** How can we use the Engineering Design Process to create and improve a solution to a problem**Unit Big Ideas:** Engineers use the Engineering Design Process as a problem solving road map.**Unit Key**

The Engineering Design Process

Terminology &**Definitions :**

Prototype

Research

Specifications

Limitations

STANDARDS: STANDARDSSTATE: [Pennsylvania SAS Academic Standards \(2009-2013\)](#)[3.4.8.A3 \(Advanced\)](#)

Compare how a product, system, or environment developed for one setting may be applied to another setting. Compare how a product, system, or environment developed for one setting may be applied to another setting.

[3.4.8.C1 \(Advanced\)](#)

Evaluate the criteria and constraints of a design.

[3.4.8.C2 \(Advanced\)](#)

Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.

[3.4.8.C3 \(Advanced\)](#)

Analyze how a multidisciplinary (STEM) approach to problem solving will yield greater results.

[3.4.8.D1 \(Advanced\)](#)

Test and evaluate the solutions for a design problem.

(* standards consolidated from Topic level)

Topic: 1.1 Ask

Minutes for Topic: 44

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.8.C1 \(Advanced\)](#) Evaluate the criteria and constraints of a design.**Topic: 1.2 Imagine and Plan**

Minutes for Topic: 88

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.8.C2 \(Advanced\)](#) Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.**Topic: 1.3 Create**

Minutes for Topic: 220

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Minutes for Topic: 88

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

[3.4.8.D1 \(Advanced\)](#) Test and evaluate the solutions for a design problem.**Unit: Project 4: Advanced Problem Solving**

Timeline: Week 5 to 7

Unit**Description:** Students use the engineering design process to solve more advanced problems.**Unit Essential Questions:** How can we use the Engineering Design Process to create and improve a solution to a problem**Unit Big Ideas:** Engineers use the Engineering Design Process as a problem solving road map.**Unit Key Terminology & Definitions :** The Engineering Design Process

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Specifications

Limitations

STANDARDS: STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

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- setting may be applied to another setting.
- [3.4.8.C1 \(Advanced\)](#) Evaluate the criteria and constraints of a design.
- [3.4.8.C2 \(Advanced\)](#) Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.
- [3.4.8.C3 \(Advanced\)](#) Analyze how a multidisciplinary (STEM) approach to problem solving will yield greater results.
- [3.4.8.D1 \(Advanced\)](#) Test and evaluate the solutions for a design problem.

(* standards consolidated from Topic level)

Topic: 1.1 Ask

Minutes for Topic: 44

STANDARDS

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- [3.4.8.C1 \(Advanced\)](#) Evaluate the criteria and constraints of a design.

Topic: 1.2 Imagine and Plan

Minutes for Topic: 88

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

- [3.4.8.C2 \(Advanced\)](#) Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.

Topic: 1.3 Create

Minutes for Topic: 220

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

- [3.4.8.A3 \(Advanced\)](#) Compare how a product, system, or environment developed for one setting may be applied to another setting. Compare how a product, system, or environment developed for one setting may be applied to another setting.
- [3.4.8.C2 \(Advanced\)](#) Explore the design process as a collaborative endeavor in which each person in the group presents his or her ideas in an open forum.
- [3.4.8.C3 \(Advanced\)](#) Analyze how a multidisciplinary (STEM) approach to problem solving will yield greater results.

Topic: 1.4 Improve

Minutes for Topic: 88

STANDARDS

STATE: Pennsylvania SAS Academic Standards (2009-2013)

- [3.4.8.D1 \(Advanced\)](#) Test and evaluate the solutions for a design problem.