



Park Hill School District

Building Successful Futures • Each Student • Every Day

High School Design Thinking Curriculum

Course Description: The Design thinking course is meant to help students develop an ideology and mindset that can be used as a process to approach learning, problem solving, innovation, and creative works in realistic ways. It is centered around the process of: Empathy, Definition, Ideation, Prototyping, Testing, Implementing, and Reflection. The goal of the course is to teach students this process and to use it in their coursework, to help solve problems, in their creative endeavors, and in their everyday lives.

Course Standards: Stanford Center for Assessment, Learning, and Equity - Cognitive Skills

Scope and Sequence:

Timeframe	Unit	Instructional Topics
14 Days	<u>Unit 1 - Surprise Vacation</u>	<u>Topic 1:</u> Empathize <u>Topic 2:</u> Define <u>Topic 3:</u> Ideate <u>Topic 4:</u> Prototype <u>Topic 5:</u> Test & Iterate
13 Days	<u>Unit 2 - Product Redesign</u>	<u>Topic 1:</u> Empathize <u>Topic 2:</u> Define <u>Topic 3:</u> Ideate <u>Topic 4:</u> Prototype and Test
25 Days	<u>Unit 3 - Mini Golf Course</u>	<u>Topic 1:</u> Non-Profit Research <u>Topic 2:</u> Weekly Progress Reporting
19 Days	<u>Unit 4 - Passion Project</u>	<u>Topic 1:</u> Empathize <u>Topic 2:</u> Define <u>Topic 3:</u> Ideate <u>Topic 4:</u> Prototype <u>Topic 5:</u> Test

Curriculum Revision Tracking

Fall 2025

- Curriculum Revised
- ISTE & Teaching Tolerance standards removed where relevant
- Learning Targets added
- Stanford Cognitive Skills added

Spring 2017

- Curriculum Written

Unit 1: Surprise Vacation

Subject: Design Thinking

Grade: 9

Name of Unit: Surprise Vacation Design Project

Length of Unit: 14 Days

Overview of Unit: Students will follow the design process phases of empathize, define, ideate, prototype, and test to develop a surprise vacation for a partner. They will create a reveal letter, an itinerary for the trip, and a highlight slideshow to immerse their partner in the visual experience of their trip design.

Priority Standards for unit:

- Asking Questions - Developing focused, answerable inquiry and research questions.
- Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.
- Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.
- Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.
- Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Supporting Standards for unit:

- 9-12.ETS1.A.2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- 9-12.ETS1.B.1 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Essential Questions:

1. What is Design Thinking?
2. How can you use the Design Thinking process to solve problems in all aspects of life?

Enduring Understanding/Big Ideas:

1. "Design Thinking is the confidence that everyone can be part of creating a more desirable future, and a process to take action when faced with a difficult challenge."
2. Design thinking is a mindset, skillset, and process that is a structured approach to generating and evaluating ideas to solve problems. Design thinking includes the steps of empathize, define, ideate, prototype, and test.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Solution Interview Concept Map Descriptive Summary	Empathize Define Ideate Prototype Test Iterate Empathy Map Excursion Itinerary

Unwrapped Priority Standards:

Priority Standard: Asking Questions - Developing focused, answerable inquiry and research questions.	
Learning Targets	Webb's DOK Level
	Bloom's Level
I can generate open-ended questions that deepen understanding of a problem or challenge.	2
	Apply
I can refine and narrow my questions to be researchable, relevant, and focused on solving a specific need.	3
	Evaluate

Priority Standard: Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.

Learning Targets	Webb's DOK Level
	Bloom's Level
I can clearly describe the problem to be solved, including who it affects and why it matters.	2
	Analyze

I can define criteria for success and identify realistic constraints that shape my solution.	3
	Evaluate

Priority Standard: Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.

Learning Targets	Webb's DOK Level
	Bloom's Level
I can design and justify a solution that meets the defined criteria and constraints using evidence and reasoning.	3
	Evaluate
I can test, analyze, and refine my design based on feedback and data to improve how well it meets user needs.	4
	Create

Priority Standard: Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.

Learning Targets	Webb's DOK Level
	Bloom's Level
I can compare multiple design ideas or prototypes using agreed-upon criteria and constraints.	3
	Evaluate
I can use data and evidence from testing to justify which solution best meets the needs of the problem.	3
	Evaluate

Priority Standard: Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Learning Targets	Webb's DOK Level
	Bloom's Level
I can use appropriate vocabulary, visuals, and conventions to clearly explain my design process and results.	2
	Apply
I can adapt my communication (e.g., different formats, audiences, etc) while maintaining accuracy and precision.	3
	Evaluate

Engaging Scenario

Engaging Scenario

Students will learn each stage of the design thinking process through collaborative activities, highlighting some of the individual stages of the process, and a surprise vacation design project that goes through all five steps of the design process. The final product will be to create a reveal letter and highlight video for your client's surprise vacation using all five stages of the design process to meet their needs.

Rubric for Engaging Scenario:

Asking Questions - Developing focused, answerable inquiry and research questions.			
1 - Questions are relevant to a specific topic.	2 - Questions are relevant to a specific topic, are testable or researchable, and build on prior knowledge about the topic.	4 - Questions are valid, testable or researchable, and based on observed patterns and/or research.	5 - Questions are valid, precise, testable or researchable, based on patterns/ observations, specific evidence from current research and/or a specific model or theory, and push standard thinking on a given topic or in a particular discipline.
Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.			
1 -Begins to define a simple design problem with incomplete description of criteria or constraints.	2 - Definition of a simple design problem is mostly complete. Representation of criteria for success and constraints is general.	4 - Definition of the problem or design statement is complete. Identifies relevant criteria and constraints.	5 - Definition of the problem or design statement is complete and includes rationale. Addresses multiple criteria and constraints relevant to the problem.
Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.			
1 - Designs a solution to address a problem with little or no connection to criteria or constraints.	2 - Designs a solution that meets one or more criteria and constraints of the problem. Evaluation of the solution and the refined solution reflect minimal attention to empirical evidence	4 -Designs a solution that refers to and applies a relevant scientific idea and meets core and additional specific criteria and constraints. Evaluation of the solution and the refined solution refer to and are consistent with empirical evidence.	5 - Designs a solution that refers to and accurately applies relevant scientific idea(s) and makes trade-offs to satisfy prioritized criteria and meet constraints. Evaluation of the solution and the refined solution reflect analysis of empirical evidence.
Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.			
1 - Makes a claim about the merit of a solution to a	2 - Makes a claim about the merit of a solution to a problem by discussing	4 - Makes a claim that compares and evaluates competing design	5 - Makes a claim that compares and evaluates competing design

problem by discussing generally how it meets the criteria or constraints of the problem, with minimal reference to evidence.	how it meets specific criteria and constraints of the problem, with some reference to evidence.	solutions to a real-world problem based on empirical evidence and scientific reasoning or analysis.	solutions to a real-world problem based on empirical evidence and scientific reasoning or analysis. For the selected design solution, explains whether empirical evidence satisfies design criteria and constraints.
Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.			
1 - Not yet meeting expectations	2 - Partially meeting expectations	4 - Mostly meeting expectations	5 - Fully meeting expectations

Topic 1: Empathize

Engaging Experience 1

Title: Empathy Interview

Suggested Length of Time: 2 Days

Standards Addressed

Priority: Asking Questions - Developing focused, answerable inquiry and research questions.

Supporting: Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Detailed Description/Instructions: Students will create questions for, and conduct, an empathy interview to learn about your partner on a deeper level. The goal for this checkpoint is to ask good questions and take comprehensive notes as you interview your client in the design process.

Bloom's Levels: Evaluate

Webb's DOK: 3

Topic 2: Define

Engaging Experience 1

Title: Empathy Map and Problem Statement

Suggested Length of Time: 1 Days

Standards Addressed

Priority: Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.

Supporting: 9-12.ETS1.A.2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Detailed Description/Instructions: Students will create an empathy map for their client. The empathy map must include the name of the client and what the client says, does, thinks, and feels during the empathy interview, in addition to other observations of their client. Once students have an understanding of their client on a deeper level, they will create a needs statement to guide their research and ideation for the surprise vacation.

Bloom's Levels: Evaluate

Webb's DOK: 3

Topic 3: Ideate

Engaging Experience 1

Title: Ideation Concept Map

Suggested Length of Time: 2 Days

Standards Addressed

Priority: Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.

- Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.

Supporting: 9-12.ETS1.B.1 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Detailed Description/Instructions: Students will create a concept map digitally or on paper to organize their ideas collected from researching different destinations/cities, lodging, transportation, experiences, food & restaurants, and any other needs determined in their previous checkpoint.

Bloom's Levels: Create

Webb's DOK: 4

Topic 4: Prototype

Engaging Experience 1

Title: Vacation Design Prototypes

Suggested Length of Time: 4 Days

Standards Addressed

Priority: Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.

Supporting:

Detailed Description/Instructions: Students will create 2 different vacation design prototypes. Each itinerary prototype will include a descriptive summary that includes the date and location of the vacation, transportation to and from the destination, lodging plans, food, experiences, and other important information about the design. The descriptive summary will use language that would help the client get a sense of the vacation experience.

Bloom's Levels: Create

Webb's DOK: 4

Topic 5: Test and Iterate

Engaging Experience 1

Title: Testing and Revising Vacation Design Prototype

Suggested Length of Time: 2 Days

Standards Addressed

Priority: Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.

- Asking Questions - Developing focused, answerable inquiry and research questions.
- Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.
- Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Supporting:

Detailed Description/Instructions: Students will meet with their client and give them the itinerary prototype they created to read and review. They will also take detailed notes on the verbal feedback received so they can make adjustments to the final itinerary.

Bloom's Levels: Create

Webb's DOK: 4

Summary of Engaging Learning Experiences for Topics

Topic	Engaging Experience Title	Description	Suggested Length of Time
Empathize	Empathy Interview	Students will create questions for, and conduct, an empathy interview to learn about your partner on a deeper level. The goal for this checkpoint is to ask good questions and take comprehensive notes as you interview your client in the design process.	2
Define	Empathy Map & Needs Statement	Students will create an empathy map for their client. The empathy map must include the name of the client and what the client says, does, thinks, and feels during the empathy interview, in addition to other observations of their client. Once students have an understanding of their client on a deeper level, they will create a needs statement to guide their research and ideation for the surprise vacation.	1
Ideate	Ideation Concept Map	Students will create a concept map digitally or on paper to organize their ideas collected from researching different destinations/cities, lodging, transportation, experiences, food & restaurants, and any other needs determined in their previous checkpoint.	2
Prototype	Vacation Design Prototypes	Students will create 2 different vacation design prototypes. Each itinerary prototype will include a descriptive summary that includes the date and location of the vacation, transportation to and from the destination, lodging plans, food, experiences, and other important information about the design. The descriptive summary will use language that would help the client get a sense of the vacation experience.	4
Test & Iterate	Testing & Revising Vacation Design Prototype	Students will meet with their client and give them the itinerary prototype they created to read and review. They will also take detailed notes on the verbal feedback received so they can make adjustments to the final itinerary.	2

Unit 2: Product Redesign

Subject: Design Thinking

Grade: 9

Name of Unit: Product Redesign Project

Length of Unit: 13 Days

Overview of Unit: Students will follow the design process phases of empathize, define, ideate, prototype, and test to redesign an existing product. They will create a 2 minute sales pitch of their newly redesigned, improved everyday product.

Priority Standards for unit:

- Asking Questions - Developing focused, answerable inquiry and research questions.
- Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.
- Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.
- Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.
- Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Supporting Standards for unit:

- 9-12.ETS1.A.2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- 9-12.ETS1.B.1 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Essential Questions:

1. How can you use the Design Thinking process to improve an existing everyday product?

Enduring Understanding/Big Ideas:

1. Design thinking is a mindset, skillset, and process that is a structured approach to generating and evaluating ideas to solve problems. Design thinking includes the steps of empathize, define, ideate, prototype, and test.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Sales Pitch Modeling 3D Printing Heuristics	Empathize Define Ideate Prototype Test Iterate

Unwrapped Priority Standards:

Priority Standard: Asking Questions - Developing focused, answerable inquiry and research questions.	
Learning Targets	Webb's DOK Level
	Bloom's Level
I can generate open-ended questions that deepen understanding of a problem or challenge.	2
	Apply
I can refine and narrow my questions to be researchable, relevant, and focused on solving a specific need.	3
	Evaluate

Priority Standard: Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.	
Learning Targets	Webb's DOK Level
	Bloom's Level
I can clearly describe the problem to be solved, including who it affects and why it matters.	2
	Analyze
I can define criteria for success and identify realistic constraints that shape my solution.	3
	Evaluate

Priority Standard: Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.

Learning Targets	Webb's DOK Level
	Bloom's Level
I can design and justify a solution that meets the defined criteria and constraints using evidence and reasoning.	3
	Evaluate
I can test, analyze, and refine my design based on feedback and data to improve how well it meets user needs.	4
	Create

Priority Standard: Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.

Learning Targets	Webb's DOK Level
	Bloom's Level
I can compare multiple design ideas or prototypes using agreed-upon criteria and constraints.	3
	Evaluate
I can use data and evidence from testing to justify which solution best meets the needs of the problem.	3
	Evaluate

Priority Standard: Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Learning Targets	Webb's DOK Level
	Bloom's Level
I can use appropriate vocabulary, visuals, and conventions to clearly explain my design process and results.	2
	Apply
I can adapt my communication (e.g., different formats, audiences, etc) while maintaining accuracy and precision.	3
	Evaluate

Engaging Scenario

Engaging Scenario (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

Students will apply each stage of the design thinking process to redesign (remix) an existing product. The redesigned product must meet the existing needs and wants of the end users, AND a need or want of the end users that is not being met with the current design.

Rubric for Engaging Scenario:

Asking Questions - Developing focused, answerable inquiry and research questions.			
1 - Questions are relevant to a specific topic.	2 - Questions are relevant to a specific topic, are testable or researchable, and build on prior knowledge about the topic.	4 - Questions are valid, testable or researchable, and based on observed patterns and/or research.	5 - Questions are valid, precise, testable or researchable, based on patterns/ observations, specific evidence from current research and/or a specific model or theory, and push standard thinking on a given topic or in a particular discipline.
Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.			
1 -Begins to define a simple design problem with incomplete description of criteria or constraints.	2 - Definition of a simple design problem is mostly complete. Representation of criteria for success and constraints is general.	4 - Definition of the problem or design statement is complete. Identifies relevant criteria and constraints.	5 - Definition of the problem or design statement is complete and includes rationale. Addresses multiple criteria and constraints relevant to the problem.
Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.			
1 - Designs a solution to address a problem with little or no connection to criteria or constraints.	2 - Designs a solution that meets one or more criteria and constraints of the problem. Evaluation of the solution and the refined solution reflect minimal attention to empirical evidence	4 -Designs a solution that refers to and applies a relevant scientific idea and meets core and additional specific criteria and constraints. Evaluation of the solution and the refined solution refer to and are consistent with empirical evidence.	5 - Designs a solution that refers to and accurately applies relevant scientific idea(s) and makes trade-offs to satisfy prioritized criteria and meet constraints. Evaluation of the solution and the refined solution reflect analysis of empirical evidence.
Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.			
1 - Makes a claim about the merit of a solution to a problem by	2 - Makes a claim about the merit of a solution to a problem by discussing how it meets specific	4 - Makes a claim that compares and evaluates competing design solutions to a real-world	5 - Makes a claim that compares and evaluates competing design solutions to a real-world

discussing generally how it meets the criteria or constraints of the problem, with minimal reference to evidence.	criteria and constraints of the problem, with some reference to evidence.	problem based on empirical evidence and scientific reasoning or analysis.	problem based on empirical evidence and scientific reasoning or analysis. For the selected design solution, explains whether empirical evidence satisfies design criteria and constraints.
Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.			
1 - Not yet meeting expectations	2 - Partially meeting expectations	4 - Mostly meeting expectations	5 - Fully meeting expectations

Topic 1: Empathize

Engaging Experience 1

Title: Empathize Phase

Suggested Length of Time: 2 Days

Standards Addressed

Priority: Asking Questions - Developing focused, answerable inquiry and research questions.

Supporting: Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Detailed Description/Instructions: In this checkpoint, you will question and brainstorm about a product that needs improving. The goal for this checkpoint is to create good questions and take comprehensive notes as you interview your individuals to see how others feel about a possible improvement in your design.

Bloom's Levels: Evaluate

Webb's DOK: 3

Topic 2: Define

Engaging Experience 1

Title: Define Phase

Suggested Length of Time: 1 Day

Standards Addressed

Priority: Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.

Supporting: 9-12.ETS1.A.2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Detailed Description/Instructions: In this checkpoint, you will develop a problem statement for your product and get feedback from your users.

Bloom's Levels: Evaluate

Webb's DOK: 3

Topic 3: Ideate

Engaging Experience 1

Title: Ideate Phase

Suggested Length of Time: 2 Days

Standards Addressed

Priority: Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.

Supporting: 9-12.ETS1.A.2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Detailed Description/Instructions: In this checkpoint, you will create a plan and execute the ideate phase of your product. The goal for this checkpoint is to create multiple iterations of your product to use in your testing phase.

Bloom's Levels: Create

Webb's DOK: 4

Topic 4: Prototype & Test

Engaging Experience 1

Title: Prototype & Test Phase

Suggested Length of Time: 4 Days

Standards Addressed

Priority: Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.

- Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Supporting: 9-12.ETS1.A.2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

- 9-12.ETS1.B.1 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Detailed Description/Instructions: In this checkpoint, you will plan and build a prototype of your product. After building your product, you will test your product with multiple users to receive feedback.

Bloom's Levels: Evaluate

Webb's DOK: 3

Summary of Engaging Learning Experiences for Topics

Topic	Engaging Experience Title	Description	Suggested Length of Time
Empathize	Empathize Phase	In this checkpoint, you will question and brainstorm about a product that needs improving. The goal for this checkpoint is to create good questions and take comprehensive notes as you interview your individuals to see how others feel about a possible improvement in your design.	2 Days
Define	Define Phase	In this checkpoint, you will develop a problem statement for your product and get feedback from your users.	1 Day
Ideate	Ideate Phase	In this checkpoint, you will create a plan and execute the ideate phase of your product. The goal for this checkpoint is to create multiple iterations of your product to use in your testing phase.	2 Days
Prototype & Test	Prototype & Test Phase	In this checkpoint, you will plan and build a prototype of your product. After building your product, you will test your product with multiple users to receive feedback.	4 Days

Unit 3: Mini Golf Course

Subject: Design Thinking

Grade: 9

Name of Unit: Mini Golf Course

Length of Unit: 25 days

Overview of Unit: The class will work together to design and construct a hole for our LEAD Mini-Golf Course. Each class will get to choose a non-profit partner to work with, and will choose a theme for your hole. Students will work in teams through all phases of the project to highlight the work of our community partner through the hole and an educational display that will be on display at the LEAD Spotlight night in early May.

Priority Standards for unit:

- Asking Questions - Developing focused, answerable inquiry and research questions.
- Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.
- Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.
- Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.
- Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Supporting Standards for unit:

- 9-12.ETS1.A.2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- 9-12.ETS1.B.1 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Essential Questions:

1. How can we use the design thinking process to create a meaningful and functional product that represents a community cause?
2. How can we use the design thinking process to communicate ideas and inspire others to engage with a community cause?

Enduring Understanding/Big Ideas:

1. Design thinking helps us understand user needs, define clear goals, and create solutions that are both functional and purposeful. When we apply an iterative process (empathize, define, ideate, prototype, and test) we can design products that solve real problems and make a positive impact in our community.
2. Effective design communicates meaning and connects people to a purpose. By combining creativity, evidence-based design decisions, and clear communication, we can use our designs to raise awareness, inspire action, and celebrate the work of others.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Project management Marketing User Experience Construction Artistic Design Advocate Promotion Evidence	Empathize Define Ideate Prototype Test Iterate

Unwrapped Priority Standards:

Priority Standard: Asking Questions - Developing focused, answerable inquiry and research questions.	
Learning Targets	Webb's DOK Level
	Bloom's Level
I can generate open-ended questions that deepen understanding of a problem or challenge.	2
	Apply
I can refine and narrow my questions to be researchable, relevant, and focused on solving a specific need.	3
	Evaluate

Priority Standard: Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.	
Learning Targets	Webb's DOK Level
	Bloom's Level
I can clearly describe the problem to be solved, including who it affects and why it matters.	2
	Analyze
I can define criteria for success and identify realistic constraints that shape my solution.	3
	Evaluate

Priority Standard: Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.	
Learning Targets	Webb's DOK Level
	Bloom's Level
I can design and justify a solution that meets the defined criteria and constraints using evidence and reasoning.	3
	Evaluate
I can test, analyze, and refine my design based on feedback and data to improve how well it meets user needs.	4
	Create

Priority Standard: Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.	
Learning Targets	Webb's DOK Level
	Bloom's Level
I can compare multiple design ideas or prototypes using agreed-upon criteria and constraints.	3
	Evaluate
I can use data and evidence from testing to justify which solution best meets the needs of the problem.	3
	Evaluate

Priority Standard: Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.	
Learning Targets	Webb's DOK Level
	Bloom's Level
I can use appropriate vocabulary, visuals, and conventions to clearly explain my design process and results.	2
	Apply
I can adapt my communication (e.g., different formats, audiences, etc) while maintaining accuracy and precision.	3
	Evaluate

Engaging Scenario

Engaging Scenario

The class will work together to design and construct a hole for our LEAD Mini-Golf Course. Each class will get to choose a non-profit partner to work with, and will choose a theme for your hole. Students will work in teams through all phases of the project to highlight the work of our community partner through the hole and an educational display that will be on display at the LEAD Spotlight night in early May.

Rubric for Engaging Scenario:

Asking Questions - Developing focused, answerable inquiry and research questions.			
1 - Questions are relevant to a specific topic.	2 - Questions are relevant to a specific topic, are testable or researchable, and build on prior knowledge about the topic.	4 - Questions are valid, testable or researchable, and based on observed patterns and/or research.	5 - Questions are valid, precise, testable or researchable, based on patterns/ observations, specific evidence from current research and/or a specific model or theory, and push standard thinking on a given topic or in a particular discipline.
Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.			
1 -Begins to define a simple design problem with incomplete description of criteria or constraints.	2 - Definition of a simple design problem is mostly complete. Representation of criteria for success and constraints is general.	4 - Definition of the problem or design statement is complete. Identifies relevant criteria and constraints.	5 - Definition of the problem or design statement is complete and includes rationale. Addresses multiple criteria and constraints relevant to the problem.
Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.			
1 - Designs a solution to address a problem with little or no connection to criteria or constraints.	2 - Designs a solution that meets one or more criteria and constraints of the problem. Evaluation of the solution and the refined solution reflect minimal attention to empirical evidence	4 -Designs a solution that refers to and applies a relevant scientific idea and meets core and additional specific criteria and constraints. Evaluation of the solution and the refined solution refer to and are consistent with empirical evidence.	5 - Designs a solution that refers to and accurately applies relevant scientific idea(s) and makes trade-offs to satisfy prioritized criteria and meet constraints. Evaluation of the solution and the refined solution reflect analysis of empirical evidence.
Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.			
1 - Makes a claim about the merit of a solution to a problem by discussing generally how it	2 - Makes a claim about the merit of a solution to a problem by discussing how it meets specific criteria and constraints of	4 - Makes a claim that compares and evaluates competing design solutions to a real-world problem based on empirical evidence and	5 - Makes a claim that compares and evaluates competing design solutions to a real-world problem based on empirical evidence and

meets the criteria or constraints of the problem, with minimal reference to evidence.	the problem, with some reference to evidence.	scientific reasoning or analysis.	scientific reasoning or analysis. For the selected design solution, explains whether empirical evidence satisfies design criteria and constraints.
Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.			
1 - Not yet meeting expectations	2 - Partially meeting expectations	4 - Mostly meeting expectations	5 - Fully meeting expectations

Topic 1: Non-Profit Research

Engaging Experience 1

Title: Non-Profit Research

Suggested Length of Time: 3-4 days

Standards Addressed

Priority: Asking Questions - Developing focused, answerable inquiry and research questions.

Supporting: Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Detailed Description/Instructions: After each group has chosen the non-profit organization they will be working with, students will research and gather background information about the non-profit, including information about their mission, values, programs, and volunteer opportunities. Students will also develop questions to ask the non-profit representatives when they visit the classroom.

Bloom's Levels: Evaluate

Webb's DOK: 3

Topic 2: Weekly Progress Reporting

Engaging Experience 1

Title: Weekly Progress Reporting

Suggested Length of Time: 5 weeks

Standards Addressed

Priority: Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.

- Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.
- Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.
- Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Supporting: 9-12.ETS1.A.2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

- 9-12.ETS1.B.1 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Detailed Description/Instructions: Students will be divided into the following groups for the project: artistic design and construction, non-profit advocates and marketing, user experience, and project managers. At the start of each week, groups will meet to set goals for the week. Throughout the week, they will be working to accomplish their necessary tasks. At the end of the week, groups will report their progress to the group, reflect on how they worked together, and gather evidence of how they are completing each stage in the design thinking process.

Bloom's Levels: Create

Webb's DOK: 4

Summary of Engaging Learning Experiences for Topics

Topic	Engaging Experience Title	Description	Suggested Length of Time
Non-Profit Research	Non-Profit Research	After each group has chosen the non-profit organization they will be working with, students will research and gather background information about the non-profit, including information about their mission, values, programs, and volunteer opportunities. Students will also develop questions to ask the non-profit representatives when they visit the classroom.	3-4 Days
Weekly Progress	Weekly Progress	Students will be divided into the following groups for the project: artistic design and construction, non-profit advocates and marketing, user experience, and project managers. At the start of each week, groups will meet to set goals for the week. Throughout the week, they will be working to accomplish their necessary tasks. At the end of the week, groups will report their progress to the group, reflect on how they worked together, and gather evidence of how they are completing each stage in the design thinking process.	25 Days

Unit 4: Passion Project

Subject: Design Thinking

Grade: 9

Name of Unit: Passion Project

Length of Unit: 19 days

Overview of Unit: Students will apply the design thinking process to a passion of their choosing. Students will follow and document each step of the design process, culminating in a presentation to the class about their project.

Priority Standards for unit:

- Asking Questions - Developing focused, answerable inquiry and research questions.
- Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.
- Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.
- Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.
- Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Supporting Standards for unit:

- 9-12.ETS1.A.2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.
- 9-12.ETS1.B.1 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Essential Questions:

1. How can you apply design thinking to LEAD or to one of your own passions in life?

Enduring Understanding/Big Ideas:

1. Design thinking is a practical process in many different environments.

Unit Vocabulary:

Academic Cross-Curricular Words	Content/Domain Specific
Proposal	Empathize Define Ideate Prototype Test Iterate

Unwrapped Priority Standards:

Priority Standard: Asking Questions - Developing focused, answerable inquiry and research questions.	
Learning Targets	Webb's DOK Level
	Bloom's Level
I can generate open-ended questions that deepen understanding of a problem or challenge.	2
	Apply
I can refine and narrow my questions to be researchable, relevant, and focused on solving a specific need.	3
	Evaluate

Priority Standard: Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.

Learning Targets	Webb's DOK Level
	Bloom's Level
I can clearly describe the problem to be solved, including who it affects and why it matters.	2
	Analyze
I can define criteria for success and identify realistic constraints that shape my solution.	3
	Evaluate

Priority Standard: Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.

Learning Targets	Webb's DOK Level
	Bloom's Level
I can design and justify a solution that meets the defined criteria and constraints using evidence and reasoning.	3
	Evaluate
I can test, analyze, and refine my design based on feedback and data to improve how well it meets user needs.	4
	Create

Priority Standard: Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.

Learning Targets	Webb's DOK Level
	Bloom's Level
I can compare multiple design ideas or prototypes using agreed-upon criteria and constraints.	3
	Evaluate
I can use data and evidence from testing to justify which solution best meets the needs of the problem.	3
	Evaluate

Priority Standard: Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Learning Targets	Webb's DOK Level
	Bloom's Level
I can use appropriate vocabulary, visuals, and conventions to clearly explain my design process and results.	2
	Apply
I can adapt my communication (e.g., different formats, audiences, etc) while maintaining accuracy and precision.	3
	Evaluate

Engaging Scenario

Engaging Scenario (An Engaging Scenario is a culminating activity that includes the following components: situation, challenge, specific roles, audience, product or performance.)

Students will use the design thinking process to solve a problem, create a product, or learn a new skill. Students will investigate their passions and develop a proposal for the project. Then, they will follow and document each step of the design thinking process, culminating in a presentation they deliver to the class.

Rubric for Engaging Scenario:

Asking Questions - Developing focused, answerable inquiry and research questions.			
1 - Questions are relevant to a specific topic.	2 - Questions are relevant to a specific topic, are testable or researchable, and build on prior knowledge about the topic.	4 - Questions are valid, testable or researchable, and based on observed patterns and/or research.	5 - Questions are valid, precise, testable or researchable, based on patterns/ observations, specific evidence from current research and/or a specific model or theory, and push standard thinking on a given topic or in a particular discipline.
Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.			
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Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.			
1 - Designs a solution to address a problem with little or no connection to criteria or constraints.	2 - Designs a solution that meets one or more criteria and constraints of the problem. Evaluation of the solution and the refined solution reflect minimal attention to empirical evidence	4 -Designs a solution that refers to and applies a relevant scientific idea and meets core and additional specific criteria and constraints. Evaluation of the solution and the refined solution refer to and are consistent with empirical evidence.	5 - Designs a solution that refers to and accurately applies relevant scientific idea(s) and makes trade-offs to satisfy prioritized criteria and meet constraints. Evaluation of the solution and the refined solution reflect analysis of empirical evidence.
Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.			
1 - Makes a claim about the merit of a solution to a problem by discussing generally how it	2 - Makes a claim about the merit of a solution to a problem by discussing how it meets specific criteria and constraints of	4 - Makes a claim that compares and evaluates competing design solutions to a real-world problem based on empirical evidence and	5 - Makes a claim that compares and evaluates competing design solutions to a real-world problem based on empirical evidence and

meets the criteria or constraints of the problem, with minimal reference to evidence.	the problem, with some reference to evidence.	scientific reasoning or analysis.	scientific reasoning or analysis. For the selected design solution, explains whether empirical evidence satisfies design criteria and constraints.
Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.			
1 - Not yet meeting expectations	2 - Partially meeting expectations	4 - Mostly meeting expectations	5 - Fully meeting expectations

Topic 1: Empathize

Engaging Experience 1

Title: Project Proposal and Empathy

Suggested Length of Time: 6 days

Standards Addressed

Priority: Asking Questions - Developing focused, answerable inquiry and research questions.

Supporting: Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Detailed Description/Instructions: Students will identify their own passions and put together a proposal for the project. Once approved, they will develop questions for and interview four individuals who are knowledgeable about their topic.

Bloom's Levels: Evaluate

Webb's DOK: 3

Topic 2: Define

Engaging Experience 1

Title: Research and Define

Suggested Length of Time: 3 days

Standards Addressed

Priority: Defining a Design Problem - Defining the criteria and constraints for addressing a real-world problem through engineering design.

Supporting: 9-12.ETS1.A.2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Detailed Description/Instructions: Students will start by researching their topic and developing an understanding needed to move forward. Next, they will create a problem statement for their project that incorporates what they learned in their empathy interview and research.

Bloom's Levels: Evaluate

Webb's DOK: 3

Topic 3: Ideate

Engaging Experience 1

Title: Ideate

Suggested Length of Time: 2 days

Standards Addressed

Priority: Designing a Solution - Designing a solution (e.g., an object, tool, process or system) that is supported by scientific ideas and meets criteria and constraints; evaluating and refining the solution through analysis of empirical evidence.

Supporting: 9-12.ETS1.A.2 Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.

Detailed Description/Instructions: Students will brainstorm a list of potential ideas for their project. They will get feedback from their peers and narrow their list down to one idea that they will prototype.

Bloom's Levels: Create

Webb's DOK: 4

Topic 4: Prototype

Engaging Experience 1

Title: Prototype

Suggested Length of Time: 2-3 days

Standards Addressed

Priority: Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.

Supporting: 9-12.ETS1.B.1 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Detailed Description/Instructions: Students will create a prototype based on the idea they developed in the ideate phase. This prototype will be documented and created in a way that they can test in the next phase.

Bloom's Levels: Evaluate

Webb's DOK: 3

Topic 5: Test

Engaging Experience 1

Title: Test

Suggested Length of Time: 1-2 days

Standards Addressed

Priority: Evaluating Competing Design Solutions - Evaluating competing design solutions for a relevant problem, accounting for criteria and constraints, and drawing on empirical evidence, including the student's own generated evidence.

Communicating Accurately & Precisely - Expressing, integrating, and applying specific content and/or conventions with accuracy and precision.

Supporting: 9-12.ETS1.B.1 Evaluate a solution to a complex real-world problem based on prioritized criteria and trade-offs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, and environmental impacts.

Detailed Description/Instructions: Students will deliver an information presentation and demonstration of their prototype to potential users and collect feedback. They will also reflect on possible changes they would make if they continued to develop their project.

Bloom's Levels: Evaluate

Webb's DOK: 3

Summary of Engaging Learning Experiences for Topics

Topic	Engaging Experience Title	Description	Suggested Length of Time (Days)
Empathize	Project Proposal and Empathy	Students will identify their own passions and put together a proposal for the project. Once approved, they will develop questions for and interview four individuals who are knowledgeable about their topic.	6
Define	Define	Students will start by researching their topic and developing an understanding needed to move forward. Next, they will create a problem statement for their project that incorporates what they learned in their empathy interview and research.	3
Ideate	Ideate	Students will brainstorm a list of potential ideas for their project. They will get feedback from their peers and narrow their list down to one idea that they will prototype.	2
Prototype	Prototype	Students will create a prototype based on the idea they developed in the ideate phase. This prototype will be documented and created in a way that they can test in the next phase.	2-3
Test	Test	Students will deliver an information presentation and demonstration of their prototype to potential users and collect feedback. They will also reflect on possible changes they would make if they continued to develop their project.	1-2

Unit of Study Terminology

Appendices: All Appendices and supporting material can be found in this course's shell course in the District's Learning Management System.

Assessment Leveling Guide: A tool to use when writing assessments in order to maintain the appropriate level of rigor that matches the standard.

Big Ideas/Enduring Understandings: Foundational understandings teachers want students to be able to discover and state in their own words by the end of the unit of study. These are answers to the essential questions.

Engaging Experience: Each topic is broken into a list of engaging experiences for students. These experiences are aligned to priority and supporting standards, thus stating what students should be able to do. An example of an engaging experience is provided in the description, but a teacher has the autonomy to substitute one of their own that aligns to the level of rigor stated in the standards.

Engaging Scenario: This is a culminating activity in which students are given a role, situation, challenge, audience, and a product or performance is specified. Each unit contains an example of an engaging scenario, but a teacher has the ability to substitute with the same intent in mind.

Essential Questions: Engaging, open-ended questions that teachers can use to engage students in learning.

Priority Standards: What every student should know and be able to do. These were chosen because of their necessity for success in the next course, the state assessment, and life.

Supporting Standards: Additional standards that support the learning within the unit.

Topic: These are the main teaching points for the unit. Units can have anywhere from one topic to many, depending on the depth of the unit.

Unit of Study: Series of learning experiences/related assessments based on designated priority standards and related supporting standards.

Unit Vocabulary: Words students will encounter within the unit that are essential to understanding. Academic Cross-Curricular words (also called Tier 2 words) are those that can be found in multiple content areas, not just this one. Content/Domain Specific vocabulary words are those found specifically within the content.