

01 Design Loop

Content Area: **Technology**
Course(s):
Time Period: **Full Year**
Length: **2 Week**
Status: **Published**

General Overview, Course Description or Course Philosophy

This full-year course continues to emphasize the application of integrated STEM (Science, Technology, Engineering and Mathematics) principles and the design method introduced in the 1st year technology course. This course is taught on the foundations of technology education having students invent solutions to real-world problems through robotic applications. Students will identify problems, research, design and fabricate solutions. Problem solving, critical thinking and design skills are taught through various activities. Hands-on themes include structural and robotic systems, as well as system control technology. This course provides all students with valuable skills such as: problem solving, design, creative thinking, systems thinking, teamwork, documentation, programming, and computer applications.

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

The design loop gives structure to creativity.

CONTENT AREA STANDARDS

TECH.8.2.12.C.7	Use a design process to devise a technological product or system that addresses a global problem, provide research, identify trade-offs and constraints, and document the process through drawings that include data and materials.
TECH.8.2.12.D.1	Design and create a prototype to solve a real world problem using a design process, identify constraints addressed during the creation of the prototype, identify trade-offs made, and present the solution for peer review.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.

STUDENT LEARNING TARGETS

Declarative Knowledge

Students will understand that:

- It is necessary to utilize all eleven steps of the design loop when designing a solution to a problem.
- There are negative consequences to ignoring specific steps of the design loop.
- The design loop is not linear.

Procedural Knowledge

Students will be able to:

- use a design process to devise a technological product or system that addresses a global problem, provide research, identify trade-offs and constraints, and document the process through drawings that include data and materials.
- design a prototype to solve a real world problem using a design process, identify constraints addressed during the creation of the prototype, identify trade-offs made, and present the solution for peer review.
- create a prototype to solve a real world problem using a design process, identify constraints addressed during the creation of the prototype, identify trade-offs made, and present the solution for peer review.
- Demonstrate creativity and innovation.
- Utilize critical thinking to make sense of problems and persevere in solving them
- Select the best solution when designing a prototype/problem solving.
- Test and evaluate designs/prototypes.

EVIDENCE OF LEARNING

Formative Assessments

Design Loop Quiz, Hands-on project observation, Class discussion.

Summative Assessments

Structural Design Project with Rubric

RESOURCES (Instructional, Supplemental, Intervention Materials)

Teacher Presentations available through Google Classroom/Drive.

Teacher made quiz and project rubric.

INTERDISCIPLINARY CONNECTIONS

ELA: Logbooks

Educational Technology: Use of Google resources

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

See link to Accommodations & Modifications document in course folder.