*Unit 5 Advanced Prototyping

Content Area: **Technology**
Course(s): **Capstone in Technology, Design & Engineering**
Time Period: **February**
Length: **20 blocks**
Status: **Published**

Transfer Skills

The difference between an initial prototype and a finished product has to do with the small details and addressing every aspect of the overall product including materials, processing, manufacturing, and the total logisitics involved in creating the product on a large scale.

Enduring Understandings

Prototypes are not finished products, though some may be fully functional.

Designing a finished product vs. a prototype entails a shift in focus from just design to all aspects of the product.

Finished products require the considerations of materials being used, sustainability, the manufacturing processes used and the overall ability to market and sell the product.

Effective communication of prototypes requires the use of photography techniques and written words.

Essential Questions

How does the prototyping process change as the focus is shifted to a more finished and functional product?

How can the prototyping process be communicated effectively?

What techniques can you use to defend the design of your prototype(s) when presenting them to your peers?

How do priorities shift when moving from a prototype to a more finished product?

What considerations take priority when designing a finished product?

Content

Design brief, Scientific method, Iteration, Mockup, Analysis, Technology, Design process, Proof of concept, Science, Engineering, Hypothesis, Innovation, Project map, Brainstorming, Experiment, Specifications, Possible solution, Prototype, Evaluation, Invention, Rapid Prototyping, 3D printer, Laser cutter

Skills

Develop ways to create a more finished and functional prototype that could be presented as a finished product.

Document the prototyping process through the use of images and technical reports.

Present the prototyping process to a group of peers.

Document the lifecycle of a product including materials, sustainability, manufacturing and marketing.

Resources

Desktop computers

Research database access

2D & 3D CAD systems

3D printer

Laser cutter

Color laser printers

Large format printer

Prototyping equipment (hand-held and power tools)

Prototyping materials

Prototyping furniture

Presentation device

Standards

TECH.8.1.12.A.3	Collaborate in online courses, learning communities, social networks or virtual worlds to discuss a resolution to a problem or issue.
TECH.8.1.12.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.12.C.1	Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.

TECH.8.1.12.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.12.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.12.F.CS1	Identify and define authentic problems and significant questions for investigation.
TECH.8.1.12.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.
TECH.8.1.12.F.CS4	Use multiple processes and diverse perspectives to explore alternative solutions.
TECH.8.2.12.A.1	Propose an innovation to meet future demands supported by an analysis of the potential full costs, benefits, trade-offs and risks, related to the use of the innovation.
TECH.8.2.12.B.1	Research and analyze the impact of the design constraints (specifications and limits) for a product or technology driven by a cultural, social, economic or political need and publish for review.
TECH.8.2.12.B.2	Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation and maintenance of a chosen product.
TECH.8.2.12.C.3	Analyze a product or system for factors such as safety, reliability, economic considerations, quality control, environmental concerns, manufacturability, maintenance and repair, and human factors engineering (ergonomics).
TECH.8.2.12.C.5	Create scaled engineering drawings of products both manually and digitally with materials and measurements labeled.
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.C.CS2	The application of engineering design.
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.
TECH.8.2.12.D.2	Write a feasibility study of a product to include: economic, market, technical, financial, and management factors, and provide recommendations for implementation.
TECH.8.2.12.D.3	Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
TECH.8.2.12.D.CS1	Apply the design process.
TECH.8.2.12.D.CS2	Use and maintain technological products and systems.