*Unit 4: Ergonomics & Industrial Design

Content Area: **Technology**
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Enduring Understandings

Products are often designed for a demographic, or a specific section of the population.

The human body has certain strengths and limitations that influence the design of products that require physical manipulation.

Much of ergonomics and designing products involves using measurements of the human body.

Over the lifetime of a product, it will typically become more ergonomically correct and easier to use.

As a new product is developed the priority of a designer shifts from the product's function to its appearance.

Companies can succeed by creating products that are equal in function, but more visually appealing to consumers than their competitors.

Industrial designers combine the areas of art, science and engineering to create innovative designs.

An effective industrial designer must understand how products are manufactured, shipped, stored and sold.

Essential Questions

What makes a product difficult to use?

Who are products designed for?

What is the relationship between appearance and the function of products?

How is safety integrated into ergonomics?

What makes a product innovative?

How does the relationship between form and function change over the life of a product?

What skill sets are needed to be an industrial designer?

Why can't there ever be a "best design" for a product?

What types of products are purchased simply for their looks and not necessarily their function?

Content

Vocabulary:

anthropometrics, range of motion, dexterity, ergonomics, posture, workstation, tolerance, human factors, fatigue, aesthetics, manufacturing, mass-production, materials science, industrial design

Skills

Analyze a product to determine how human factors played a role in its design.

Collect and analyze anthropometric data.

Analyze historical events to determine how the discipline of industrial design started.

Create a visual timeline of product highlighting how its aesthetics changed over its lifetime.

Formulate a design brief and identify specifications for an industrial design problem.

Brainstorm ideas and develop possible solutions for an industrial design problem.

Design and create a product that improves upon the existing design.

Resources

Desktop computers

2D & 3D CAD systems

3D printer

Laser cutter

CNC router

Prototyping equipment

Prototyping materials

Presentation device

Standards

TECH.8.1.12.F.CS3	Collect and analyze data to identify solutions and/or make informed decisions.

TECH.8.2.12.B.4	Investigate a technology used in a given period of history, e.g., stone age, industrial revolution or information age, and identify their impact and how they may have changed to meet human needs and wants.
TECH.8.2.12.C.2	Analyze a product and how it has changed or might change over time to meet human needs and wants.
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.6	Research an existing product, reverse engineer and redesign it to improve form and function.
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.CS1	The attributes of design.
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.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.CS3	Assess the impact of products and systems.