Unit 4: Making Things Move 22

Content Area: **Science**
Course(s): **Generic Course**
Time Period: **Marking Period 3**
Length: **3 weeks**
Status: **Published**

Standards

8.1.12.DA.1	Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.
8.1.12.DA.5	Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.
8.1.12.AP.5	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.
8.1.12.AP.9	Collaboratively document and present design decisions in the development of complex programs.
8.2.12.ED.1	Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
8.2.12.ED.2	Create scaled engineering drawings for a new product or system and make modification to increase optimization based on feedback.
8.2.12.ED.3	Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.
8.2.12.ED.4	Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.
8.2.12.NT.1	Explain how different groups can contribute to the overall design of a product.
8.2.12.NT.2	Redesign an existing product to improve form or function.

Enduring Understandings

Students will understand that …

- **U1 –** Reverse engineering involves disassembling and analyzing a product or system in order to understand and document the visual, functional, and/or structural aspects of its design.
- **U2 –** Visual elements and principles of design are part of an aesthetic vocabulary that is used to describe the visual characteristics of an object, the application of which can affect the visual appeal of the object and its commercial success in the marketplace.
- **U3 –** Technical professionals use the results of reverse engineering for many different purposes such as discovery, testing, forensics, improvement or redesign, and producing technical documentation of a product.
- **U3 (Unit 1)** – Technical professionals clearly and accurately document and report their work using technical writing practice in multiple forms.
- **U4 (Unit 1)** – Sketches, drawings, and images are used to record and convey specific types of information depending upon the audience and the purpose of the communication

Essential Questions

- **EQ1 –** Why are many consumer product designs not commercially successful?
- **EQ2 –** When, if ever, is it acceptable for a company to reverse engineer and reproduce a successful consumer product designed by another person/company?

Knowledge and Skills

KNOWLEDGE: Students will …

- **K1 –** Identify and describe the visual principles and elements of design apparent in a natural or man-made object.
- **K2 –** Describe the process of reverse engineering.
- **K3 –** Explain the various reasons to perform reverse engineering including discovery, documentation, investigation, and product improvement.

SKILLS: Students will …

- **S1 –** Explain how the visual elements and principles of design affect the aesthetics and commercial success of a product.
- **S2 –** Perform a functional analysis of a product in order to determine the purpose, inputs and outputs, and the operation of a product or system.
- **S3 –** Perform a structural analysis of a product in order to determine the materials used and the form of component parts as well as the configuration and interaction of component parts when assembled (if applicable).
- **S4 –** Select and utilize technology (software and hardware) to create high impact visual aids.

Resources

Key Terms.doc
Elements and Principles of Design.pptx
A 6.1a Example Visual Design Principles and Elements Matrix.doc
Simple Machines.pptx
Reverse Engineering and Functional Analysis.pptx
Product Disassembly Chart.doc
Product Disassembly Material Usage Chart.doc
Product Disassembly.pptx

Assessments

https://docs.google.com/document/d/1wR7bQF-8AQoRrt0g4C3hKja0yjwDjC9_BiAmONWbTcI/edit?usp=sharing

Modifications

https://docs.google.com/document/d/1ODqaPP69YkcFiyG72fIT8XsUIe3K1VSG7nxuc4CpCec/edit?usp=sharing