



## Engineering Virtual Learning

# HS Intro to Engineering Design Lesson #23

May 6, 2020



**Objective/Learning Target:**  
Students will use their knowledge of  
Visual Design Principles and Elements  
to Reverse Engineer a writing Pen.

# Bell-Work:

Watch these videos about reverse Engineering.

<https://www.youtube.com/watch?v=CjMAMzke7nw>

<https://www.youtube.com/watch?v=Y0h6eGrwVKQ>

Do you think Reverse Engineering is more applicable to Re-Engineering products or Taking Exams? Or both?  
(answer these questions in you engineers notebook)

# Reverse Engineering Introduction

If you have ever wondered how something works? Have thought about Reverse Engineering a product to make it better? Reverse Engineering is an important process in the redesign of products. Designers get an opportunity to breakdown and analyze each part of the product to see how they operate. The information gathered during this process can help the designer or design team determine what they can do to make the product better and optimize manufacturing potential to increase company profits.

The process of Reverse Engineering involves analyzing the products function, structure, and visual elements while documenting the design of each part.

# Learning Practice: Reverse Engineering

## ***Reverse Engineering a Writing Pen***

A pen company has decided that although sales are going well in the business community, they want to redesign a pen differently for teenagers. The company has asked you to take an existing pen and reverse engineer it, creating the part drawings and an assembly drawing for your new design.

### **Reverse Engineering Activity Steps:**

Find a common writing pen and disassemble it. Record each part in the parts list chart on the next page.

### **Annotated Hand Sketches:**

Every part should be sketched in isometric projection and orthographic projections (3 drawing multi-view)

Every sketch should be appropriately dimensioned in your engineers notebook or graph paper (see link)

### **Product Analysis**

Each student needs to describe the good and bad characteristics of the design and make suggestions for improvements.

### **Prepare a three-minute PowerPoint presentation that includes the following and answers the following questions:**

What is your product and its function?

How would you improve the part to appeal to teenagers?

Write Up of the parts current purpose and your ideas for improving the part.



# Learning Resource Links:

Reverse Engineering:

<https://www.youtube.com/watch?v=DDI0mEsPsQk> (PLTW)

<https://www.youtube.com/watch?v=TOS2cyhMjY4> (ethics)

Design Principles:

<https://www.youtube.com/watch?v=ZK86XQ1iFVs>

Design Elements:

<https://www.youtube.com/watch?v=JfViOv77pfQ> (PLTW)

[https://www.youtube.com/watch?v=JZD\\_3zp7v2A](https://www.youtube.com/watch?v=JZD_3zp7v2A)

Grid and Isometric Graph paper:

[https://www.printablepaper.net/category/isometric\\_graph](https://www.printablepaper.net/category/isometric_graph)