

Engineering Design Process:

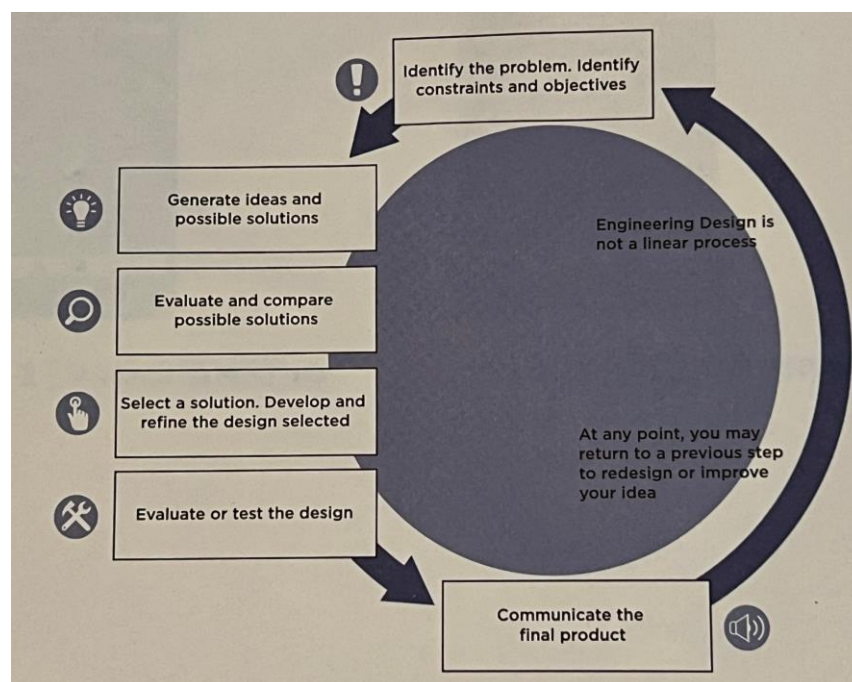
Engineering Design Process (EDP) Overview

The engineering design process is a series of steps that engineers follow to come up with a solution to a problem. Many times, the solution involves designing a product that meets certain and/or accomplishes a certain task. This process is different from the steps of the scientific method. While scientists study how nature works, engineers create new things, such as products, websites, environments, and experiences. Because engineers and scientists have different objectives, they follow different processes in their work. Scientists perform experiments using the scientific method, whereas engineers follow the creativity-based engineering design process.

It's important to note that the EDP is flexible. There are as many variations of the model as there are engineers. With WearTec, students work through all six steps, but in real life, engineers often work on just one or two steps, then pass their work to another team.

Note that the EDP is non-linear. At any point, you may return to a previous step to redesign or improve your idea. **The EDP is reliant on the iterative process.** An iterative process is a process for reaching a desired result by means of a repeated cycle of operations (steps). The cycle should come closer to the desired results as the number of iterations increase. For example, after you improve your design once, you may want to begin all over again to refine your technology. You can use the EDP again and again!

In the WearTec curriculum you will notice symbols to represent each step in the EDP. These symbols are intended to help you identify each step of the EDP and bring about the thinking associated with that step. The symbols can be used for short-hand inclusion in the engineering journal. A one-page printable format of the EDP is found at Appendix A.



EDP Journal Explanation and Use Guidelines

An engineering design process (EDP) journal is a working document. It is where ideas, sketches, and student reflections are recorded. It is a journal the students will use to document their learning and discovery through drawings, data, and record keeping. The journals should show thought behind strategy, designs, innovations, and organization. The journals are evidence of how students have grown and overcome obstacles in their designs. Each step of the engineering design process should have a corresponding journal entry.

Professional engineers use design notebooks to record their thoughts and learn from their experiences. By using a design journal, students are engineering with real-life tools and experiences important for skill and interest development.

① Problem, Constraints, Objectives

- parallel circuit w/ 3 LED's - hide
- button on
- series circuit w/ 2 LED's - hide
- switch on
- card for teacher "Thank You"
- moon & stars

① Card Design

Front

② Solutions

a) parallel = moon

turns on when card is opened

pro cool design

con switch

b) series stars

pro simple

con low volt LED - Red or Yellow

2 batteries

c) series moon

d) parallel moon

pro higher volt LED

con more copper tape

Key elements to incorporate in Engineering Journal

- Use dates
- Indicate step of engineering design process
- Write notes on inclusion or exclusion of ideas
- List pros and cons of solutions
- Describe reasoning for iterations

What You'll Need:

Supplies

- LilyPad Vibration board
- LilyPad ProtoSnap Plus
- USB Micro-B cable
- Alligator Clips
- Li-Po Battery
- Computer capable of running Arduino software
- Current Arduino Software found at www.arduino.cc