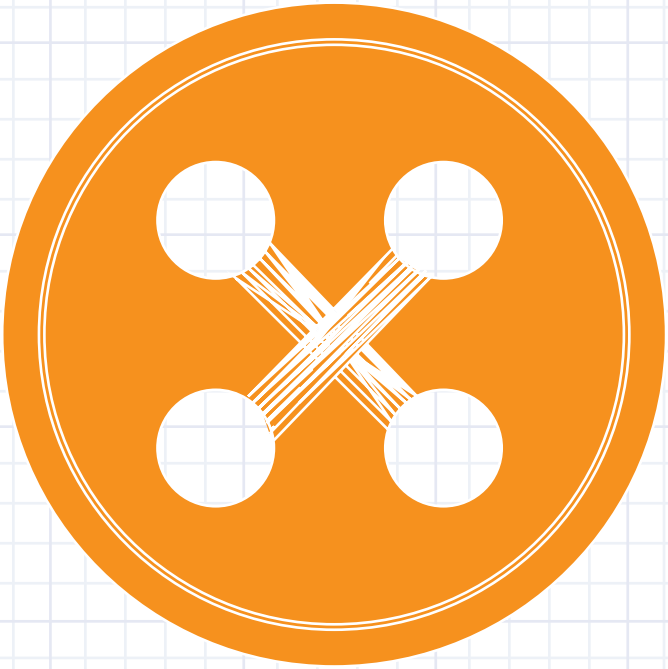
4H3025

WEAR TEC

ENGINEERING DESIGN NOTEBOOK

BOOK 2 | SEWING & MICROCONTROLLERS



NAME:

sparkfun ELECTRONICS

EXTENSION

VOCABULARY

Learning to Sew

Aida Fabric - an open weave fabric normally used for cross-stitch embroidery

battery – stores electrical energy

circuit – a path for electrical current to flow through

closed circuit – a circuit that is a continuous or complete path for electricity (a current) to flow through (electricity begins at the power source and returns to the power source)

electricity – a form of energy that is produced by the flow of electrons

LED – stands for light emitting diode, a component that produces light

negative – the negative pin or side of the battery or component is shown by using a – sign

parallel circuit - a circuit in which the loads are each in a unique circuit path (a different "partial current" flows through each one); voltage is the same across each component of the parallel circuit; the sum of the currents through each path is equal to the total current that flows from the source

positive – the positive pin or side of the battery or component is shown by using a + sign

series circuit - a circuit in which all the loads appear sequentially (they are all in the same circuit path) the voltage across the circuit is the sum of the voltages across each component

Monster

Battery – stores electrical energy

Circuit – a path for electrical current to flow through

Closed circuit – a circuit that is a continuous or complete path for electricity (a current) to flow through (electricity begins at the power source and returns to the power source)

Conductor – materials that electricity can flow through easily

Insulator – materials that electricity does not flow through easily

Electricity – a form of energy that is produced by the flow of electrons

LED – stands for light emitting diode, a component that produces light

Negative – the negative pin or side of the battery or component is shown by using a – sign

Positive – the positive pin or side of the battery or component is shown by using a + sign

Solution – a way to solve a problem

Troubleshoot – looking at a circuit to figure out why it isn't working the way you expected and then correcting the problem(s) that are found (problem-solving for circuits)

Flower

Battery – stores electrical energy

Circuit – a path for electrical current to flow through

Closed circuit – a circuit that is a continuous or complete path for electricity (a current) to flow through (electricity begins at the power source and returns to the power source)

Conductor – materials that electricity can flow through easily

Insulator – materials that electricity does not flow through easily

Electricity – a form of energy that is produced by the flow of electrons

LED – stands for light emitting diode, a component that produces light

Negative – the negative pin or side of the battery or component is shown by using a – sign

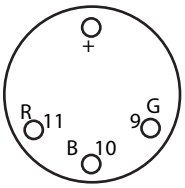
Positive – the positive pin or side of the battery or component is shown by using a + sign

Solution – a way to solve a problem

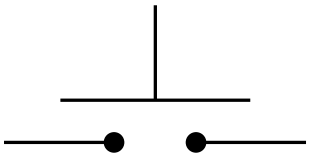
Troubleshoot – looking at a circuit to figure out why it isn't working the way you expected and then correcting the problem(s) that are found (problem-solving for circuits)

EXAMPLES

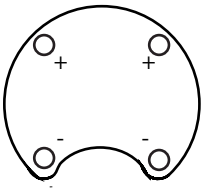
Tri-color LED:



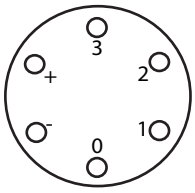
Button:



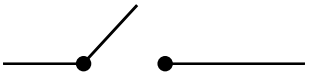
Battery Holder:



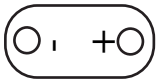
Lily Tiny:



Switch:



LED:



ENGINEERING DESIGN PROCESS KEY

Ask | What is the problem? What have others done?

Brainstorm | What are some solutions? Draw your ideas

Compare | What are the pros and cons of each idea?

Choose | Which idea do you think is best?

Create | Build my design. What works well? What needs to be improved?

Communicate | How will you share your solution with others?

ENGINEERING DESIGN PROCESS

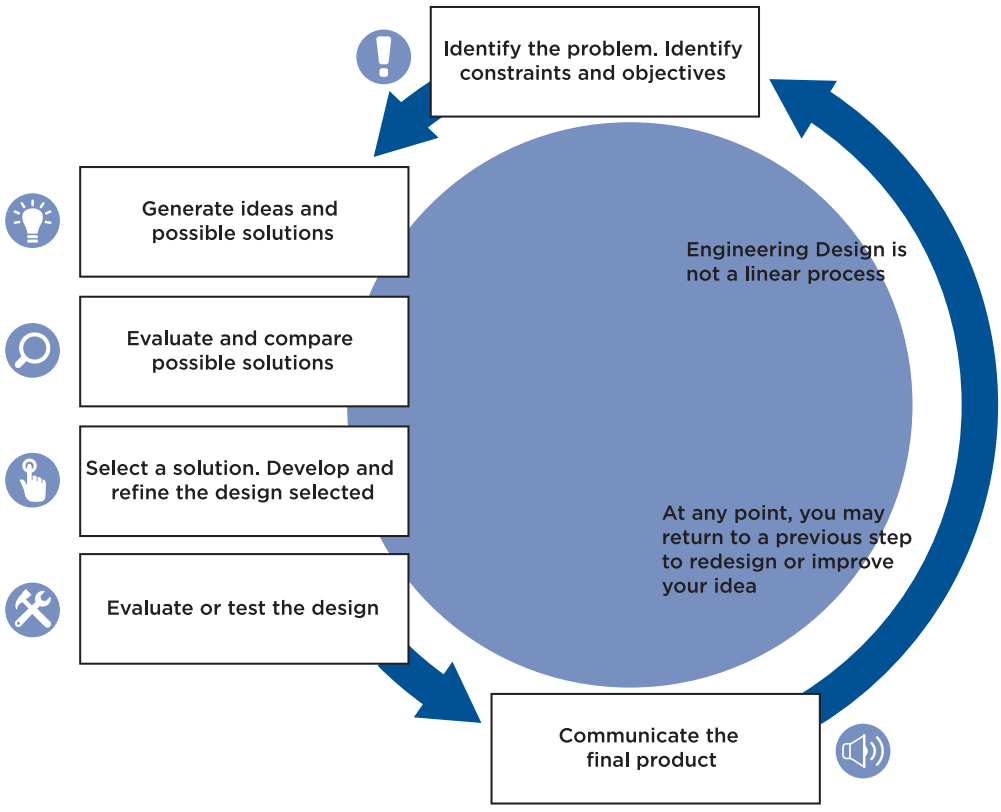
Engineering Design Process (EDP) Overview

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 criteria 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. 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 a step. These symbols are intended to help you identify the steps 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.



STUDENT INSTRUCTIONS

Engineers spend time writing and drawing daily in order to document their ideas and their work. This Engineering Design Notebook will provide you with a similar experience.

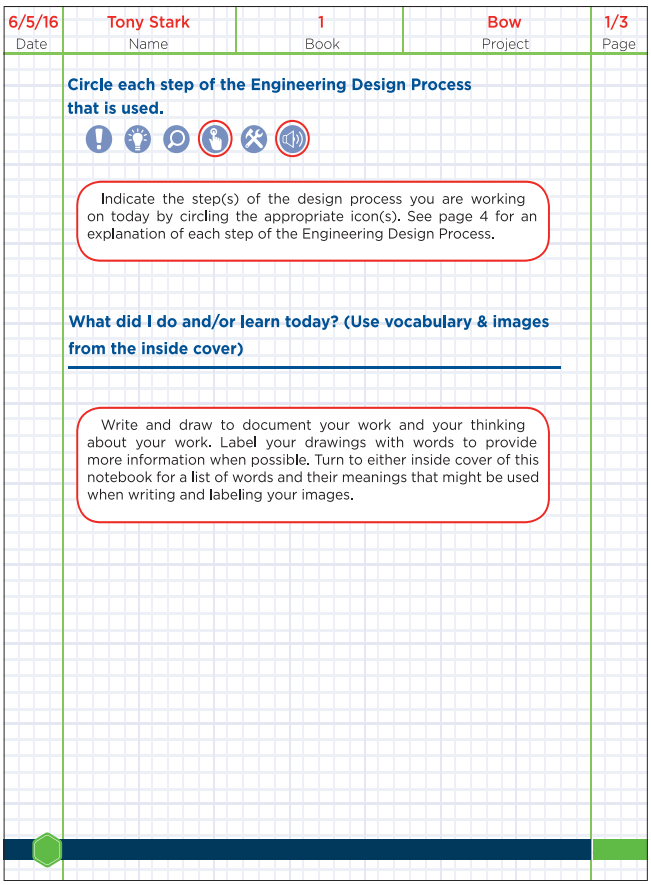
Write in this notebook daily to keep a record of your progress and next steps on WearTec projects. You, as the WearTec engineer in charge of your project, will make decisions regarding the writing and drawing that goes into this notebook.

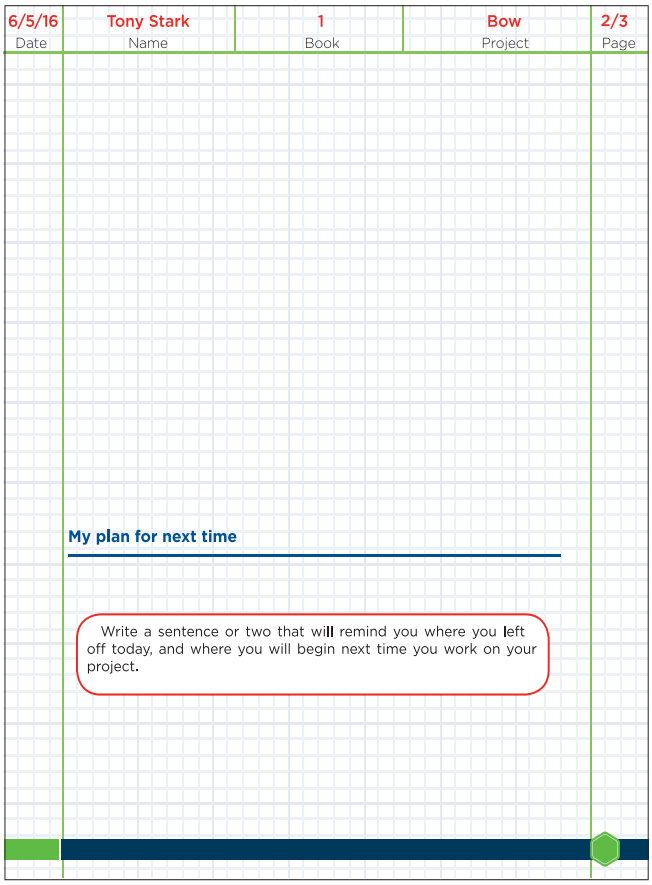
This page describes how engineers complete each page of their engineering notebooks using both words and images.

Along the top:

- Write today's date
- Write your name on each page used
- Indicate the WearTec Book number (1, 2, 3, or 4)
- Indicate the WearTec Project name
- Indicate the number of this page, out of the total number of pages used this day.

  For example, page one of three used this day would look like this: 1/3





Draw a simple circuit below.

Draw a circuit after completing the final project.

Circle each step of the Engineering Design Process that is used.

What did I do and/or learn today? (Use vocabulary & images from the inside cover)

My plan for next time: