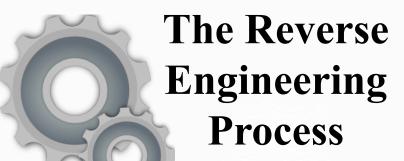
Choose and Ask Questions

- What device is being taken apart?
- ☐ Draw your device and label all visible parts.
- ☐ What does the device do when in operation? Research or use operator's manual.
- ☐ What parts do you think you will find inside? Draw a diagram to go with your description.



Share and Present

- ☐ How will present your findings and your ideas in a clear, and concise way?
- Be sure to share your notes and observations.



Disassemble and Organize

- ☐ Record the parts you see.
- ☐ What do you think the parts do?
- ☐ What parts make the whole?
- How can you organize or group the parts you see?



Redesign and Improve

- ☐ How would you improve the way this device is made?
- How could you change this device to make it work better?
- ☐ Can you redesign this device to make it function differently? How would you do this?



Analyze and Compare

- ☐ Do you see any parts that are similar/different?
- ☐ Are there any simple machines?
- ☐ What part is the largest? Smallest?
- Why are the parts necessary?
- ☐ Did any parts surprise you?
- ☐ Do the parts have the same function in different devices?







- Make connections and build background knowledge.
- Brainstorm questions to guide your research.
- Identify keywords to make a research plan.





- Present your new knowledge to an audience.
- Reflect on your research process and product.

Research Process





- Search the information landscape to locate resources.
- Evaluate sources to choose the best ones for you and your topic.





- Use the writing process to organize information and ideas.
- Use media ethically by respecting creators and copyright.
- Use media, technology, and creativity to create a research product.





Use reading strategies to develop your understanding of the topic:

- Make predictions
- Analyze text structure
- Identify main ideas and important details
- Distinguish between facts and opinions
- Make inferences and draw conclusions
- Summarize
- Use note-taking strategies and avoid plagiarism.
- Organize information as you gather.
- Collaborate with others.





Ask a Question and Research

- ☐ What are you curious about?
- What have you seen that makes you wonder?
- Research to see what has already been discovered about your topic using books, encyclopedias, the internet, etc.



Share and Present

- ☐ How will you share your findings?
- ☐ Construct a display using charts, graphs, illustrations, signs, models, and/or demonstrations of your experiment.
- Prepare an oral presentation to explain your project to others.

Scientific Method



Develop a Hypothesis

- What do you think is the answer to your question?
- Make an educated guess based on your research.
- ☐ Take your original question and turn it into an answer.



Draw Conclusions

- What were your results?
- What did you learn from your experiment?
- Is your hypothesis correct?



Conduct an Experiment

- ☐ What will you do to test your hypothesis?
- Write a step-by-step procedure to test your hypothesis
- Make a list of materials you will need.
- Record your observations and data as you carry out your plan.





Ask

- ☐ What is the problem or need?
- Who has the problem or need?
- Why is it important to solve?
- ☐ How have others approached it?
- What are your design requirements?



Improve

- What worked?
- What didn't?
- What could've been better?
- ☐ How could you modify your design to make it better?

Engineering Design Process



Imagine

- ☐ What are some solutions? Try to generate as many possible solutions as you can.
- ☐ Choose the best one. Look at whether each possible solution meets your design requirements.
- ☐ Reject solutions that do not meet the requirements.



Create

- Follow your plan and build your prototype.
- ☐ Test it out!
- ☐ Did your design solve your problem? Redesign if needed.
- ☐ If you had measurable targets for your solution, did you meet them?



<u>Plan</u>

- ☐ Communicate your best solution by drawing and labeling a diagram.
- Make a list of materials you will need to build your prototype.

