### **Activity - Research**

**Description**

What is the current state of the problem? How have others attempted to solve this problem? What do potential users want or need in a solution?

Understanding the work that others have done to address the problem is an essential step in the engineering design process. Students identify existing products (which can be reverse-engineered or modified as a potential solution) as well as regulatory, standards, and ethical issues that must be considered during the design process.

Time To Complete: 3-5 Hours

Common Core Standards

* ELA.RST.1, 3, 4, 5, 7, 9

NGSS Assessed:

* HS-ETS1-1

**I Can Statements**

* I can conduct research for my software design challenge by:
* Gathering relevant information from multiple print and digital sources, using search terms effectively (6-8.WHST.8)
* Assessing the credibility and accuracy of each source (6-8.WHST.8)
* Recording and organizing information systematically
* I will know my research is of high quality if it:
  + Provides me the opportunity to learn more about my topic
  + Challenges me to deepen my thinking about my topic by asking questions for clarity and understanding
  + Comes from multiple relevant, current, reliable, and varied sources, while favoring primary sources over secondary sources
  + Has been systematically recorded and organized to support the software design process

**Suggestions for Assessing Student Readiness to Move Forward:**

* Confer with students, asking probing questions about their research process to gauge how well their research meets the quality criteria.
* Ask students to list their sources and explain (orally or in writing) how they meet the quality criteria for high-quality research.
* Ask students to review their notes with you, briefly describing their system for recording and organizing the results of their research.
* Ask students to self-evaluate their work after completing one of the activities below.

Have students complete the first columns of a KWL/KWHLAQ chart (<http://www.flickr.com/photos/langwitches/5958295132>/). If you have a set of class resources for research, have students preview the books on their topic to frontload as a scaffold.

This protocol of brainstorming and reflecting on questions is appropriate for the upper grades and visual learners: <http://www.bcps.org/offices/lis/researchcourse/explore.html#questions>

Model for students how to take notes. You can offer students several graphic organizers for note-taking, or teach them one strategy, such as Cornell. There are some middle school level resources that could easily be modified for upper- or lower- grade students. <http://infotech.spsd.org/MS/ms_research_step4.html>

Have students conduct an I-search: <http://www.readwritethink.org/professional-development/strategy-guides/promoting-student-directed-inquiry-30783.html>[Text Editors](https://docs.google.com/document/d/15stEzGlBJHNEIU9S1urUiLZ3GMJSmCW5wL82vPJX1I4/edit?usp=sharing)

[Command-line Basics](https://docs.google.com/document/d/1EbNk3DFlExDS0sZRMQXVTDFA6AbEcnSPlil271ms3Xo/edit?usp=sharing)

[Setting Up Git](https://docs.google.com/document/d/1RhvSHZPMcWzvDwA2UUsqYlq9A8Gf6fUh4K0_Yj78mso/edit?usp=sharing)

[Introduction to Git](https://docs.google.com/document/d/1X50plzs3oL1fO2TWrXkl0k6fLKKXa4_L6iY25I8mSsE/edit?usp=sharing)

[Git Basics](https://docs.google.com/document/d/1NtokAip-4VI14kbMXvQr3PvlXuheH7MjVxD08f5Spos/edit?usp=sharing)

[Introduction to HTML and CSS](https://docs.google.com/document/d/1vOST5Du8zNK1MrXunWp9r5kC83G6yHJraI87n-PdD0c/edit?usp=sharing)

[Elements and Tags](https://docs.google.com/document/d/1lKaOAe-4ZFjwIlcL5S5SqjrkzZ_NTsH3VE3We77LrvU/edit?usp=sharing)

[HTML Boilerplate](https://docs.google.com/document/d/1isX381yJbARHCKWhk29WN3FIl3GbsBzk0Qx8pQfWvfQ/edit?usp=sharing)

[Working with Text](https://docs.google.com/document/d/1BvjsMGDzWo15ajzUNHIkJeUhc9gXxa8S3OWSwfb5qhM/edit?usp=sharing)

[Lists](https://docs.google.com/document/d/1YAq0kh9OMJfcyMBsXjHeO-7b_jXVSC4xdrb6GPeYmw0/edit?usp=sharing)

[Links and Images](https://docs.google.com/document/d/1c9swMqns9FmfC3O_0-EykclWtXu-ymNKU8wf-nGPuU8/edit?usp=sharing)