**Product Design Engineering and Engineering Directed Study Summer Assignment:**

**Submit your Project assignment no later than Sep 1,** so I have time to review them before our next class meeting.

**Onshape Portfolios**: will be due later in the fall. Summer work is encouraged. Regular practice will build your skills. The details are in the Onshape Portfolio document which is posted on the RVGS website.

**Partners**: You can work solo or in pairs on your project. I would encourage you to consider working with a partner, particularly if you know someone with a complementing skill set (one of you is good with code and the other is good with 3d modeling/fabrication). *If you work with a partner, the project should be proportionally more complex than a solo project would be* – two people should be able to make something better than you could on your own. Freeloaders are at risk of me getting on your case, getting kicked to a solo project, or both.

**Project Idea**: Brainstorm a problem that you could generate an engineered solution for. Recall the course is “Product Design Engineering” – meaning your objective would be to create a potentially marketable device, solving a real problem or meeting a consumer need. Don’t jump on the first idea you think of…generate multiple ideas before selecting one. At school you will have access to microprocessors, electric components, CAD software, 3D printers, laser cutters, and the RVGS work shop. Consider your resources when thinking of ideas. The idea is one of the most important and difficult steps of the process. There will be group discussions and critiques of ideas. Not all ideas will survive examination.

Proposal tracks

Track 1. For students already set on a project idea. If you already have a partner, only one submission is necessary, but should include contributions from both students.

Include the following:

* Name of the product and group members
* Overview: A few sentences or diagram about what the device is and what it will accomplish
* Problem: Identify the engineering project you want to solve in a few sentences; make sure to include why someone would care about solving the problem (no toilet plungers with a headlights or anything pointless)
* Preliminary parts list (If requests are reasonable, and I am given enough notice, I will purchase parts for you. You might want an Arduino mega or nano, instead of the uno you received in engineering? You might want a better quality servo, or magnetic sensors?)
* Summary/description of competing products.

Track 2. For students who are lost, undecided, or juggling ideas. This will be done individually. If you have a partner in mind, there may be some overlap. Students on this track will need to settle on a definite idea early in the school year.

Provide:

* + - If you are interested in working with a partner, and if you have someone in mind.
    - A narrative description of your skills and interests. The skills I want to hear about include coding, modeling, wiring, public speaking, but not ability to dunk or eat hot dogs quickly.
    - A list of 5 preliminary ideas for projects.

**Project Proposal submission:**

Compile the above sections into a single document. The document should be a finished product that you would turn in to a boss. That means considering the format, style, etc to put your best foot forward. A drop box will be created in Canvas once enrollment is complete. Submit your document to the dropbox no later than Sep 1.

Feel free to email Mr. Hurst at [ahurst@rvgs.k12.va.us](mailto:ahurst@rvgs.k12.va.us) with any questions.

See next page for PDE Modeling portfolio instructions

PDE Modeling portfolio.

Create a portfolio of original work in Onshape.

This assignment will be due in the fall, but Spring and Summer work are encouraged.

Suggested objects:

* + Makers Coin
  + Pinky finger
  + Car
  + Jewelry
  + Lamp
  + Hinge
  + Robot
  + Anything else that interests you.

The portfolio should include:

* only original work
* at least 3 objects
* drawings with multiple views
* screenshots of objects

The portfolio is about quality, not quantity. The portfolio should demonstrate a variety of skills and techniques. Doing tutorials, watching videos, along with **regular** practice will improve your Onshape skills. You will need a mouse. A successful portfolio will demonstrate your ability to:

* Use sketch tools including lines, circles, arcs, splines, offsets, mirrors, and patterns.
* Define entities with constraints and dimensions.
* Use feature tools including extrude, revolve, loft, and sweep functions to create objects.
* Use constraints to create assemblies of objects.
* Create drawings and screenshots that showcase your work.