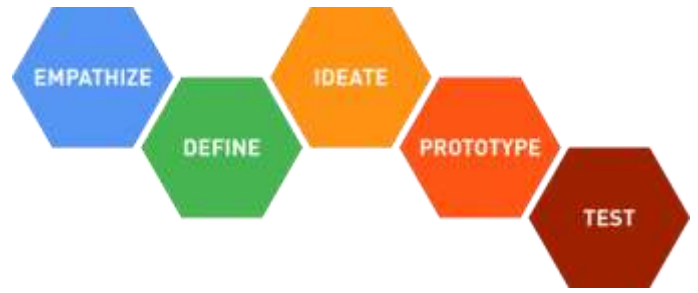


Goal: Design and fabricate a present for a classmate.  
Constraints: Make judicious use of materials in the eLab.  
Must use at least 1 of vinyl cutter, laser cutter, 3D printer, Arduino, and/or CNC. Must be completed by 12/18 (A) or 12/19 (B)  
Prototype due: 12/11 (A) 12/12 (B)  
Math requirements:



- Document 4 examples of proportional relationships being used in the design or fabrication process.

I'm making a present for \_\_\_\_\_  
\_\_\_\_\_ is making a present for me.

*In the items below, "partner" refers to the person receiving the product you will make.*

Empathize: What does your partner need? What does your partner want? What problems does your partner have that you can make a solution for?

Define: What are you going to make? How will it address your partner's needs/wants?

Ideate: What might be part of your product? How does it specifically meet your partner's needs/wants?

Prototype: How will you build your product? What changes can you make to improve your design to better meet your partner's needs/wants?

Test: How well does your prototype meet your partner's needs/wants? Which step(s) can you return to in order to make improvements?

### Helpful websites/programs

- [tinkercad.com](http://tinkercad.com) (sign in with social providers/HCDE Google account) – 3D computer-aided-drafting (CAD) software, exports file to 3D print or two-dimensional 'shadow' of workplane to laser cut
- [geogebra.org](http://geogebra.org) (sign in with Google) – software for making geometric designs which can be exported to a vector file to cut/etch
- Inkscape (Download at [bit.ly/inkscape32](http://bit.ly/inkscape32)) – free vector image editing software. Can also import bitmap images and extract vectors from it)
- [thingiverse.com](http://thingiverse.com) – depository of tons of pre-existing 3D and laser files
- [Instructables.com](http://Instructables.com) – guided tutorials for making just about anything; often includes files to cut and/or modify
- [edu.sketchup.com](http://edu.sketchup.com) (must sign-in with HCDE Google Account) – 3D modeling software similar to Tinkercad with more features
- [makezine.com](http://makezine.com) – Make magazine, lots of great ideas and tutorials
- Arduino IDE (Google search for this, download Windows zip for non-admin install) – programming environment for coding/uploading software for controlling Arduino Nano

### Safety

- The most important safety equipment in the eLab is your brain. None of the machines or tools have one and you can get extremely hurt or killed using the equipment. Use your brain.
- Always wear eye protection.
- Ask before using any powered equipment. Ask if you don't know what to do.
- Keep things clean as you work. Make the eLab cleaner when you leave than when you arrived.
- There is no room or place for horseplay or misbehavior in the eLab. Doing so will result in possibly a permanent ban.