Level 2 Overview

Power Mechanics: 4 Cycle Engines
Students will disassemble and reassemble a 4-stroke lawn mower engine using hand tools such as wrenches, sockets, and pliers. As they take it apart, they will identify the piston, crankshaft, valves, and carburetor and trace how each part moves through the intake, compression, power, and exhaust strokes. By the end, they will understand how a small engine turns fuel into motion and how to reassemble one so it runs.

Torches & Jewelry Making
Students will set a flat-backed cabochon in a copper bezel and finish it as a wearable necklace. They will cut and shape the bezel, solder it closed with a torch, and burnish the metal around the stone to lock it in place. Along the way they will get comfortable with basic jewelry tools such as a jeweler's saw, files, pliers, and a bezel pusher.

MIG Welding: Nametag
Students will cut steel pieces and weld them onto a backing plate to build their own nametag with a MIG welder. They will set voltage, wire speed, and shielding gas flow for the metal, lay down beads to join the pieces, and grind the welds clean. They will leave knowing how to dial in a welder and run a strong, tidy bead.

Woodshop Safety: LED Sign
Students will measure, cut, and assemble a wooden base to hold their LED sign. They will work on the core woodshop machines, including the miter saw, table saw, router/shaper, belt sander, and powered hand drill, and learn the safety rules for each before using it. The finished base carries into the Electronics and Soldering project.

Electronics and Soldering: LED Sign
Students will design a graphic, laser cut and engrave it into an acrylic panel, and light it with LED strips. They will solder the LED strips to a button and a battery to build a simple working circuit, then test it and fix any connections that do not light. They will mount the glowing panel onto the wooden base they built in Woodshop Safety to finish the sign.

Woodshop: Keepsake Box
Students will design and build a wooden keepsake box from rough stock using the woodshop's power tools. They will make rip and crosscuts to size the panels, miter the corners, plane each surface to thickness, and glue and clamp the box square. They will fit a lid and sand the box smooth for a finished piece they take home.

3D Printing: Toy Design
Students will build on Level 1's 2D CAD work to model an original toy of their own design in Onshape, a 3D design program. They will turn their ideas into a solid 3D part, export it for the printer, and print a physical prototype. If possible, students should bring a laptop with a registered Onshape.com student account.

Silicon Molding and Resin Casting: Toy Design
Students will use their 3D printed toy as the master pattern to make a two-part silicone mold and cast resin copies from it. They will set the master in a mold box, mix and pour silicone around it, then cut the cured mold open and remove the pattern. With the mold ready, they will mix and pour resin, let it cure, and demold finished copies of their toy.

Vacuum Forming: Toy Design
Students will design and vacuum form a clear plastic package that shows off their cast toy. They will make a mold of the toy, heat a plastic sheet until it softens, and use the vacuum former to pull it tight over the mold. Once it cools, they will trim the formed plastic into a finished blister package ready to hang on a shelf.

* Urban Workshop reserves the right to change class topics and the order the classes are taught without notice.