

### Level 3 Overview

- Welding Metal Sculpture
- Welding Manufacturing Techniques - Cube Knot
- Autodesk Fusion 360 – Reverse Engineering
- Maker Beam Bridge Challenge
- Leather Working – Key Ring
- Robotics Basics with Arduino
- Model Finishing and Painting Techniques
- Intermediate Silicone Molding – 2-Part Molds
- Woodshop Basics
- Woodshop – Hardwood Vintage Skateboard

#### **Welding Metal Sculpture (2 Classes)**

**Activity** Sample metal sculptures will be provided and then they will be shown where they can find scrap metal around the shop. Kids will forage for materials and figure out what they are going to make as they cut out and prep material for welding. Class 2 - should be primarily weld prep, welding and post weld clean up (deburring, grinding, shaping). Students will MIG and spot weld together pieces as needed to make a cool little sculpture.

**Tools used:** MIG welder, wire brush, files, snips, metal shop access to large tools, hammers, saws

#### **Welding Manufacturing Techniques – Cube Knot**

**Activity:** Students will learn to cope structural steel to make rigid square joints. Fixtures will be used to secure joints for welding while student first Tack their joints, verify accurate and then final weld. Students will make a MC Escher like design called a Cube Knot.

**Tools used:** MIG welder, wire brush, files, snips, metal shop access to large tools, hammers, saws

#### **Autodesk Fusion 360 – Reverse Engineering Techniques**

**Activity:** Students will measure existing parts and determine critical dimensions for modeling in CAD software. This will include demonstrating measuring methods, measuring tools and a refresher how to create a new part model in Fusion 360. Students will learn how parts fit together in an assembly and why tolerances are important to manufacturing.

**Tools used:** Free downloaded software from Autodesk, a laptop and overhead projector.

**Kids prep / supplies:** Kids to bring their own laptops. Please preinstall software.

#### **Maker Beam Bridge Challenge**

**Activity:** Challenge students to build a mechanically sound bridge using the 80/20 extrusions, fasteners, and laser cut joints. Test to failure to determine mode of failure and select a winning design.

**Tools used:** Maker beam kits, allen wrenches, nut drivers.

#### **Leather Working – Key Ring**

**Activity:** Layout, cut, and emboss leather to achieve vintage appearance. Emboss holes and use leather strands to create unique design features and make a decorative key ring.

**Tools used:** Scissors, punches, small ball peen hammer, Urban Workshop Leather tool kits.

### **Robotics Basics with Arduino**

**Activity:** Use Arduino controller with sensors and servo motors to control a robotic finger based on the In-Moov robot. Learn intermediate techniques using Arduino Integrated Development Environment.

**Tools used:** Assorted electronics hand tools including: wire strippers, crimpers, scissors, heat gun, soldering iron, and multi-meter.

### **Model Finishing & Painting Techniques**

**Activity:** Prep and paint plastic squirt guns using advanced painting techniques to achieve vintage appearance like the in the movies. Techniques learned apply to Cosplay and Steampunk projects.

**Tools used:** Brushes, rags, sponges, paint cups, and water cups.

### **Intermediate Silicone Molding – 2-Part Molds**

**Activity:** Students will make a two-part mold of a provided part and pour their own copy of it. Topics will include part draft, part lines, release agents and model prep, and mold box preparation for 2-part molds. Once cured they will demold and trim the part.

**Tools used:** Gram scale, scissors, mixing cups, stirrers, rags, gloves, 4" PVC pipe caps.

### **Woodshop Basics**

**Activity:** This the same class our adults take to get signed off in the Urban Workshop woodshop. Students will use all the professional woodshop machines while learning how to setup, adjust, use, and clean up. This class will give students the skills and confidence to use professional level equipment.

**Tools used:** Full size professional woodshop equipment: table saw, miter / chop saw, jointer, shaper, band saw, table router, spindle sander, horizontal oscillating belt sander, drill press and planer.

### **Woodshop – Hardwood Vintage Style Skateboard Deck (2 Classes)**

**Activity:** Use basic and powered shop tools to make a hardwood cruiser skateboard deck. Week one cut and prepare all materials and perform glue up of board. Week 2 complete assembly, perform finishing using wood shop equipment.

**Tools used:** Woodshop professional tools, powered hand router with bits, file, sand paper, hammer, clamps, brushes, polishing wheel / pads