



## Summer Camp Level 2 Overview

(Updated 6/19/2017 – SMT)

The Summer Camp activities are the same as the Fall and Spring semesters only compressed to fit into a one week schedule. The activity order may vary to ensure completion in one week.

### **Level 2 Activities**

- Basic Power Mechanics
- CAD Design concepts – Assemblies, Drafting, Drawing Creation
- Sheet Metal Fabrication – Metal Marque Star
- MIG and Spot Welding- Metal Marque Star
- DC Electronics Circuits – Metal Marque Star Wiring
- Arduino Programming Basics
- Drawing and 2D Graphics in Adobe Illustrator
- Vinyl Cutter
- Wood Shop Project – Wooden Box

### **Basic Power Mechanics**

**Activity:** Disassemble and reassemble lawn mower engine. Discuss four cycle engine operation.

**Tools required:** Assorted hand tools including: Ratchets and sockets, box wrenches, allen wrenches, screw drivers, adjustable wrench, various types of pliers

**Materials required:** 1 engine per 2 kids, rags

**Kids prep / supplies:** None

### **Autodesk Fusion 360 Software Intermediate – Assemblies, drafting and drawing creation**

**Activity:** Work in classroom with overhead projector to show them how to make a design. This will include walking thru a tutorial and doing part model development into an assembly. Students will learn top down design vs bottom up design in assembly mode as well as produce a manufacturable engineering drawing.

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

**Materials required:** None

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

### **Sheet Metal fabrication (Metal Marque Star)**

**Activity:** Use basic metal shop tools to layout, cut, fold the parts of a metal decorative star.

**Tools required:** Ruler, sharpie, sheet metal brake & shear, tin snips, file, flattening hammer

**Materials required:** 20 (.032") Gauge steel sheet metal

**Kids prep / supplies:** None

### **MIG and Spot Welding (Metal Marque Star)**

**Activity:** Review the use of Miller MIG welders and settings as well as material properties. Learn to prepare metal for welding, rod selection and weld clean up. MIG weld together tool tray assemblies fabricated in previous class. Black spray paint when done.

**Tools required:** MIG welder, Spot Welder, wire brush, files, black spray paint

**Materials required:** 20 (.032") Gauge steel sheet metal practice welding tabs

**Kids prep / supplies:** None



### **DC Electronic Circuits (Metal Marque Star Wiring)**

**Activity:** Kids will be challenged to design the circuit for the lighted start then build a working prototype using basic electronic components and hand skills. Then they build the final circuit with the correct parts and install to the metal star.

**Tools required:** Assorted electronics hand tools including: wire strippers, crimpers, scissors, heat gun, soldering iron, multi-meter (Use 1 UW premade tool box per 2 kids)

**Materials required:** 20 GA red and black wire, light bulbs, round bulkhead sockets, round bulkhead rocker switch, AAA batteries, 2 AAA battery enclosure, hot glue guns and glue, cardboard backing.

**Kids prep / supplies:** None

### **Intro to Arduino Basics**

**Activity:** A first step into the Arduino universe of physical computing. Build circuits to light an LED and control the LED with a switch and a potentiometer an analog input device. Learn how to use the Arduino Integrated Development Environment (IDE) to modify Arduino sketches.

**Tools required:** Assorted electronics hand tools including: wire strippers, crimpers, scissors, heat gun, soldering iron, multi-meter (Use 1 UW premade tool box per 2 kids)

**Materials required:** Urban Workshop Arduino kits

**Kids prep / supplies:** Bring their own PC based laptops. Pre-install Arduino software.

### **Drawing and 2D Graphics in Adobe Illustrator (or similar software)**

**Activity:** Use Illustrator software to create graphics of your own design.

**Tools required:** Adobe Illustrator software.

**Materials required:** None

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

### **Vinyl Cutter**

**Activity:** Use vinyl cutter to make personalized stickers of graphics created last week. Students will learn how to prepare files, load cutter, set head pressure, weed stickers, use application film and create multi-color stickers.

**Tools required:** Roland vinyl cutter and software.

**Materials required:** Vinyl (2 colors), application film, scissors, weeding tools, straight edge, razor blades

**Kids prep / supplies:** None.

### **Wood shop – Build Keepsake Storage Box**

**Activity:** Use basic and powered hand tools to make a small personal storage box. Week one cut and prepare all materials and start assembly. Week 2 complete assembly and add exterior designs. Start finish work and paint. Week 3 complete finish work, paint, stain and clear coat.

**Tools required:** Circular saw, powered hand drill & bits, file, sand paper, hammer, screw driver, center punch, Dremel for exterior design work

**Materials required:** 1/4" board, nails, hinge, small nails, wood putty, stain, paint, clear coat

**Kids prep / supplies:** None