

# THE FORGE

## WORKSHOPS

Below are brief descriptions of the workshops designed for The Forge. Check the website or the digital screens inside the Museum for the workshop scheduled during your visit. A limited number of guests can participate in each workshop. Sign up for workshops in person at the Guest Services desk.

### WIRE IT

Learn the basics of wiring a circuit(s) with copper tape, LEDs, batteries, stainless steel thread, breadboards or soldering irons. Electrify a notebook, jewelry and more.

#### Learn Basic Soldering: Circuitry Level I

*(Age recommendation: 11 to 111)*

Explore and enhance your basic soldering skills in this kit-based, introductory soldering workshop.

- Skills used: Soldering, basic circuitry
- Tools used: Soldering iron/solder, wires/batteries, third hand tools, magnifying glasses, needle nose pliers, flush diagonal cutters

#### Paper Speaker

*(Age recommendation: 8 to 88)*

Create and wire up a working speaker made of paper, cardboard, and a few other supplies.

- Skills used: Electronics, design, measuring, cutting
- Tools used: Wire cutters, Utility knives, scissors, copper wire, various materials

#### Light Up Greeting Card

*(Age recommendation: 8 to 88)*

Learn some circuitry and create your own light up greeting card!

- Skills used: Circuitry, design, measuring
- Tools used: LEDs, copper tape, paper, scissors, glue

#### Fun with Piezos

*(Age recommendation: 8 to 88)*

Wire up your own piezo pickup and have fun exploring sound vibrations!

- Skills used: Soldering, circuitry, listening
- Tools used: Soldering iron, solder, wires, Piezo elements

#### Robot Petting Zoo

*(Age recommendation: 8 to 88)*

Use your creativity to create a moving, sensor-responding, robotic animal using Hummingbird Robotics kits and SNAP.

- Skills used: Measuring, cutting, coding, electronics, design
- Tools used: Hummingbird robotics kits, sensors, utility knives, scissors, hot glue guns

#### Wire Up a Glowing Constellation

*(Age recommendation: 11 to 111)*

Use stainless steel thread to wire and sew a twinkling constellation.

- Skills used: Layout/design, measuring, sewing, circuitry/electronics
- Tools used: Needle and stainless steel thread, scissors, measuring tape, microcontroller

#### Create a Robotic Body Modification

*(Age recommendation: 8 - 88)*

Create an animal-adaptation-inspired body modification using robotics.

- Skills used: Design, measuring, wiring, coding, creative thinking
- Tools used: Hummingbird Robotics Kits, cardboard, utility knives





## WORKSHOPS

### STITCH IT

Explore the textile arts and sciences by using a sewing machine and learning to hand stitch. Use your design skills to create a sew-able masterpiece.

#### **Create a Journal: Bookbinding Level I**

*(Age recommendation: 8 to 88)*

Learn the basic operation of a sewing machine by binding a "maker" journal, perfect for recording your next great idea.

- Skills used: Design, measuring, cutting, sewing
- Tools used: Utility knives, scissors, sewing machines, hand sewing needles, various materials

#### **Light Up Your Journal: Bookbinding Level II**

*(Age recommendation: 8 to 88)*

Give your notebook some light-up bling by incorporating an embedded circuit.

- Skills used: Design, measuring, circuitry, sewing
- Tools used: Cooper tape, stainless steel thread, hand-sewing needles, scissors, LEDs, batteries

#### **Monkey's Fist Keychain: Knotwork Level 1**

*(Age recommendation: 11 to 111)*

Create a sweet keychain and learn to weave rope to create a classical, nautical stopper knot.

- Skills used: Measuring, weaving
- Tools used: Ruler, scissors, needle nose pliers, lighter

#### **Hat Making**

*(Age recommendation: 8 to 88)*

Use a sewing machine and basic hand stitching to craft your own, unique hat!

- Skills used: Measuring, cutting, design, sewing
- Tools used: Sewing machine, scissors, measuring tape, patterns

#### **Weave a Potholder**

*(Age recommendation: 8 to 88)*

Learn to weave by creating your own loom and potholder!

- Skills used: weaving, pattern making, patience, design
- Tools used: Handmade loom, thread/yarn, cardboard

#### **Sew Your Own Tote Bag**

*(Age recommendation: 8 to 88)*

Stitch and sew your own your own custom tote.

- Skills used: Design, measuring, sewing, embellishing
- Tools used: Sewing machine/needle and thread, measuring tape/ruler, scissors

### WIRE IT AND STITCH IT

#### **Create Glowing Jewelry: Embeddable Electronics Level I**

*(Age recommendation: 8 to 88)*

Combine sewing and stainless steel thread to create glowing jewelry masterpieces.

- Skills used: Design, sewing, circuitry
- Tools used: Needles, stainless steel thread, LEDs, batteries, various textiles/materials

#### **Embedded Microcontrollers: Embeddable Electronics Level II**

*(Age recommendation: 11 to 111)*

Level-up your circuitry and sewing skills by incorporating a microcontroller in your textile project.

- Skills used: Design, sewing, intermediate circuitry, basic to intermediate coding
- Tools used: Needles, stainless steel thread/fiber, microcontroller, LEDs, batteries, various textiles/materials





## WORKSHOPS

### PLAY IT

Build something you can play! Using design skills, creativity and a little elbow grease to create a playable object like a musical instrument or a video game controller.

#### **Build a Guitar: Diddley Bow Level I**

*(Age recommendation: 11 to 111)*

Build a one-string slide guitar that you can jam on!

- Skills used: Design, measuring, sawing, drilling, sanding/filing/rasping
- Tools used: Handsaws, drills, clamps, screwdrivers

#### **Build an Electric Guitar: Diddley Bow Level II**

*(Age recommendation: 11 to 111)*

Electrify your one string slide guitar to really turn it up to 11!

- Skills used: Design, measuring, drilling, circuitry wiring, soldering
- Tools used: Drill, clamps, soldering irons, heat guns

#### **Create a Video Game Controller**

*(Age recommendation: 8 to 88)*

Create your own video game controller with a twist, using a MakeyMakey and a variety of conductive objects.

- Skills Used: Design, measuring, understanding of conductivity
- Tools Used: Utility knives, scissors

### DESIGN IT

#### **Architectural Model Making**

*(Age recommendation: 8 to 88)*

Learn the basics of building architectural models with armature wire and paper mache techniques.

- Skills used: Design, measurement, paper manipulation
- Tools used: Needle nose pliers, wire armature, scissors, utility knives (optional)

#### **Intro to 3D Design**

*(Age recommendation: 8 to 88)*

Learn the basics of 3D design and CAD software with TinkerCaD.

- Skills used: Computer assisted design, geometry, mathematics, measuring, spatial reasoning
- Tools used: Computers, CAD software, your brain

#### **Vector Design and Cutting**

*(Age recommendation: 11 to 111)*

Learn how to design an SVG file and cut it using CNC processes.

- Skills used: Design, geometry, measuring, machine processes
- Tools used: Adobe Illustrator and other SVG software, laser cutter or CNC router, your creative brain

#### **Design a Sistrum**

*(Age recommendation: 8 to 88)*

Learn how to make an ancient Roman shaker instrument.

- Skills Used: Design, geometry, measuring, music
- Tools Used: Saws, drills, wire, pliers, twine

#### **Create a Cast of Roman Artifacts**

*(Age recommendation: 8 to 88)*

Use a modern casting method to cast an "ancient" artifact.

- Skills used: Observation, mixing, measuring, casting
- Tools used: 3D printed objects, silicone molds, plaster of paris

#### **Introduction to Silk Screen Printing**

*(Age recommendation: 8 to 88)*

Design and print your own creations using the Silk Screen printing process.

- Skills used: Layout/design, measuring, painting
- Tools used: Paper, utility knives, scissors, measuring tape, paint

#### **Laser Cut Holiday Ornaments**

*(Age recommendation: 11 to 111)*

Design and laser cut your own custom-made holiday ornament!

- Skills used: Digital layout/design, laser cutter processes, sanding
- Tools used: Adobe Illustrator/Corel Draw, laser cutter, sandpaper

#### **Field Notes Journal**

*(Age recommendation: 8 to 88)*

It's a new year with new ideas! Design and make your own Field Notes journal.

- Skills used: Design, measurement, hole-punching, cutting/trimming
- Tools used: Hammer, awl, needle, utility knife or scissors



# THE FORGE

## WORKSHOPS

### BUILD IT

Use a variety of tools, processes and your creativity to design a functional object. Explore scaling with a pantograph, modern agriculture techniques, 2D/3D CAD software and other projects.

#### **Build a One-Plant Hydroponic System: Sustainable Design Level**

*(Age recommendation: 11 to 111)*

Design a one-plant hydroponic system and gain the ability to grow your greens, tomatoes or other veggies year round.

- Skills used: Design, cutting, drilling, basic biology
- Tools used: Utility knives, drills, polyvinyl tubing, small air pump, net pot

#### **Build an Ebb and Flow Hydroponic System: Sustainable Design Level II**

*(Age recommendation: 11 to 111)*

Step your design and hydroponics knowledge up to the next level with an ebb and flow system. With this relatively simple design you can grow veggies in your house year-round!

- Skills used: Design, mathematics, cutting, drilling, basic biology, intermediate hydroponics
- Tools used: Utility knives, drills, polyvinyl tubing, small air pump, small water pump, automatic timer device, net pots

#### **Create Hand Routed Nametags: Nametag Level I**

*(Age recommendation: 11 to 111)*

Create your own wood or acrylic nametag using hand-routing techniques with a Dremel rotary tool. If time allows, add a little electronic flare to light up your name.

- Skills used: Design, measuring, hand routing/grinding, potentially electronics
- Tools used: Dremel tools, clamps, LEDs/batteries, hot glue, magnets

#### **Create Machine Routed Nametag: Nametag Level II**

*(Age recommendation: 11 to 111)*

Explore CAD software and CNC machining by creating your own file for routing or laser cutting.

- Skills used: CAD design, machine setup, electronics
- Tools used: Computers, CNC/laser, batteries/LEDs

#### **Build a Cardboard Pantograph: Pantograph Level I**

*(Age recommendation: 8 to 88)*

Build this fun drafting/scaling tool out of cardboard. After experimenting with your cardboard prototype, explore creating other pantographs out of different materials.

- Skills used: Rapid prototyping, measuring, cutting, assembly, drafting/drawing
- Tools used: Utility knives, scissors, fastening hardware

#### **Build a Wooden Pantograph: Pantograph Level II**

*(Age recommendation: 11 to 111)*

Enhance the sturdiness of your pantograph by making a more rigid, wooden version. Explore adding more fulcrum points and markers to your pantograph to draw multiple copies simultaneously.

- Skills used: Design, measuring/mathematics, cutting, assembly, drafting/drawing
- Tools used: Handsaws, clamps, drills, fastening hardware

#### **Paper Marbling**

*(Age recommendation: 8 to 88)*

Create your own marbled masterpieces and learn about chemical processes and aqueous surface design.

- Skills used: Design, pattern making, paper manipulation
- Tools used: Paper, high flow acrylics, fans, heat guns (optional)



## WORKSHOPS

### BUILD IT

#### **Make a Toolbox**

*(Age recommendation: 11 to 111)*

Learn and use basic woodworking skills to make your own toolbox.

- Skills used: Measuring, cutting, joining, design
- Tools used: Hammer, nails, clamps, saw, sandpaper/files, drill

#### **Etching/Printing**

*(Age recommendation: 8 to 88)*

Create your own drypoint etching in acrylic and explore the printing process.

- Skills used: Measuring, tracing, etching, ink blotting, pressing
- Tools used: Cast acrylic, needle tools or nails, clamps, press

#### **Build a Bat Box**

*(Age recommendation: 11 to 111)*

Build your own bat box to house and protect local bat populations!

- Skills used: Measuring, layout/design, drilling, sawing
- Tools used: Drill, saw, miter box, measuring tape/rule

#### **Build a Ceramic Pot**

*(Age recommendation: 8 to 88)*

Design and build your own handmade ceramic vessel.

- Skills Used: Observation, ceramic building techniques, ceramic finishing techniques
- Tools Used: Clay, ceramic shaping and carving tools

#### **Make a Drop Spindle**

*(Age recommendation: 8 to 88)*

Build a drop spindle and learn how to spin your own yarn.

- Skills used: Design, geometry, measuring, patience
- Tools used: Saws, drills, glue, natural fibers

#### **Peg Solitaire**

*(Age recommendation: 11 to 111)*

Create your own peg solitaire board and challenge yourself to a game!

- Skills used: Layout/design, drilling, sawing
- Tools used: Drill, miter box/saw, sandpaper

