Basic Training
BAND SAW, DRILL PRESS, GRINDER AND HAND TOOLS

The purpose of this guide is to outline some of the basic knowledge for using the tooling in the Discovery Learning Laboratory.

The outcome of this qualification process is to have a safe and intact operating environment. THIS INSTRUCTION WILL HELP YOU KEEP YOURSELF SAFE IN A HAZARDOUS ENVIRONMENT. THIS TRAINING DOES NOT MEAN YOU ARE A MACHINIST!

REQUIRED PROPER DRESS
T-shirt or short sleeved shirt, long pants, closed toed shoes, safety glasses (found in shop)

Basic Safety and Operations
Where is the first aid kit?
What is the phone number for emergencies?
Describe proper clothing requirements.
Explain the prohibition of Alcohol or Drugs.
Describe the procedure for dealing with injury.
What is the procedure for dealing with health issues such as heart attack, stroke or latex allergy?
Describe fire fighting procedures. Where are the fire extinguishers?
Describe chemical or hazmat material spill containment.
Describe how to deal with a spill of a selected material like oil or paint.
What are the proper chemical storage procedures of flammables and oils?
What are the shop hours of operations?
What is the two person rule?
What materials may be worked within the machine shop?
What are the hazards of any machining process?
Describe what shop cleanliness means.
How are the machines and the shop cleaned after use? Pixies?

Measurements and Layout
Demonstrate the proper use and care of a micrometer.
Demonstrate the proper use a care of a caliper.
Demonstrate the proper care and use of a height gage.
Demonstrate the proper use of a rule and square.
Demonstrate the proper use and care of gage blocks.

Drill Press and Threading Operations
Observe one use of the Solberg drill. Note fixture. Note drill holders.
Describe the different types of drill holders
Show how to install a chuck
Demonstrate how to install a taper drill
Demonstrate the proper selection of feed and speed.
Demonstrate how to thread a hole.
**Band Saw Operations**
Observe use of the band saw.
Show the methods of adjusting the speed of the saw.
Be able to indicate the blade welder.
Demonstrate the proper use of the band saw.
Describe how to change a blade of the saw.
Demonstrate how to properly adjust the speed of the saw for a given metal.

**Belt Sander**
Observe use of the belt sander. Note the methods of adjusting the belt.
Demonstrate the proper use of the belt sander.
Show how to turn on the dust collector.
What are the dangers of the grinding process? (sparks and dust)

**Epilog 36EXT Laser**
How does a laser work?
How does a laser engrave?
What are the proper settings for engraving a piece of wood?
How is the exhaust system set up for engraving a piece of wood?
What are the proper settings for engraving a piece of acrylic?
How is the vacuum exhaust system set up for engraving a piece of acrylic?
How does a laser cut plastic?
What kind of plastics can the laser cut?
Can the Epilog 36EXT cut metal? Engrave metal?

**Hand Tools**
What is the difference between a Phillips and Slot screwdriver?
What does a box end wrench look like?
What is a crescent wrench?
What is the hazard of a chisel?
How do you clean a file?
Where is the sandpaper kept?
Where is paint or lubricants stored?

**Technician Interactions**
What is the proper way to gain someone’s attention in a shop?
What is the proper method to utilize a machine that is obviously being used by someone?
What is etiquette for borrowing personal tools?
How do you know which tools are personal?
Training Videos from MIT

1 – Basic 1  
Duration 40:32
http://techtv.mit.edu/videos/142
Layout Techniques
Basic Tools: Drill Press, Band Saw, Belt Sander & Grinder
Locating and Drilling Holes
Tapping Holes

2- Basic 2  
Duration 57:33
http://techtv.mit.edu/videos/130
Drilling Holes
Special Drills for Plastics and Hard or Abrasive Materials
Drill Press Limitations
Band saw
Suitable Speeds, Feeds and Materials
Band saw Setup
Using the Drill Press Vise

3- Basic 3  
Duration 30:02
http://techtv.mit.edu/videos/181
Good Practice - Clean Up
Small Belt Sander Configurations
Grinder Operations and Materials
Deburring and Buffing
Finishing Techniques