

Achievement Course: Handiwork
Recommended Ages: 10-18 years of age
Approximate Completion Time Frame: 3-6 months



Saint Joseph, pray for us.

Handiwork is the basic understanding of proper tool use in the work of craftsmanship or repairing things by hand as applied to plumbing, electricity, automotive, appliances, and wood. Throughout history man has been using his hands to build or repair things around home and work. We see multiple examples in both the New and Old Testament including works from Noah, Joseph and even Jesus. Saint Joseph and Jesus, as carpenters, used their hands to carve and build things out of wood for their home and for others.

Objective: To demonstrate the use of basic tools needed to accomplish tasks, repairs, and building objects.

Overview: Handiwork involves multiple disciplines and multiple trades. This achievement course should function as an introduction to the most common trades, the tools and supplies, and the necessary safety equipment used in each. This brief introduction to each should assist the cadets and their father/male guardian in making basic household repairs.

1. Plumbing

- a. Familiarize yourself with the following interior and exterior household plumbing fixtures, paying attention to the location of the water supply, water drainage, and also to the fixtures specific to each.
 - i. Sink
 - ii. Shower
 - iii. Bathtub
 - iv. Washing machine
 - v. Hot water heater
 - vi. Toilet
 - vii. Sprinkler system
 - viii. Hose bib
- b. Familiarize yourself and be able to identify the following types of pipe and label them as metal or plastics.
 - i. Copper
 - ii. Stainless steel
 - iii. Galvanized
 - iv. Lead
 - v. Polyvinyl Chloride (PVC)
 - vi. Chlorinated Polyvinyl Chloride (CPVC)
 - vii. Crosslinked Polyethylene (PEX)
- c. Familiarize yourself with the following methods of connecting pipe and the type of pipe that utilizes that connection method.
 - i. Glue/Adhesive
 - ii. Threaded
 - iii. Solder (Sweating)
- d. Prior to performing most plumbing repairs, it is necessary to turn off the water source that supplies the plumbing under repair. Learn how to turn off the water to your home or other facility.
- e. Perform the following household repairs (or simulate them) with your father/male guardian.
 - i. Cap the end of a PVC pipe.
 - ii. Repair a crack in an underground PVC pipe (sprinkler system; as available).
 - iii. Replace a sprinkler head (as available).
 - iv. Remove, cleanout, and replace the “P trap” from beneath a household sink.
- f. Safety equipment and consideration that may be required for plumbing repairs.
 - i. Gloves
 - ii. Goggles
 - iii. Knowledge of electrical connections nearby. Water and electricity should never be mixed.

2. Electrical

- a. Familiarize yourself with the following household electrical fixtures.

- i. Plug (interior)
 - ii. Plug (exterior)
 - iii. Light switch
 - iv. Light socket
 - v. Breaker box
 - vi. Ground Fault Interrupter (GFI) plug
 - vii. Incandescent light
 - viii. Halogen light
 - ix. Light-emitting diode
 - x. Fluorescent light
 - b. Understand and identify where power enters a building (like your home) and the following equipment.
 - i. Power meter
 - ii. Household main shutoff switch
 - iii. Main breaker box
 - iv. Subpanel breaker box
 - c. Be able to describe the following electrical terminology.
 - i. Alternating current (AC)
 - ii. Direct current (DC)
 - iii. Voltage (v) – How does 110v differ from 220v?
 - iv. Amperage (Amp)
 - d. Perform the following household repairs (or simulate them) with your father/male guardian.
 - i. Turn off a breaker to a specific area of your home. Verify that there is no power. Restore power.
 - ii. Change two types of light bulbs (incandescent, fluorescent, halogen). Make sure the fixture is in the off position before attempting.
 - iii. Change both a plug and a light switch. Make sure that the breaker is off before attempting.
 - e. Safety equipment and considerations that may be required for electrical repairs.
 - i. Gloves
 - ii. Goggles
 - iii. Always use caution when dealing with electricity.
 - iv. Fire extinguisher
 - v. 9-1-1
3. Automotive
- a. Familiarize yourself with the following maintenance needs for a vehicle.
 - i. Oil
 - ii. Fuel
 - iii. Transmission fluid
 - iv. Antifreeze
 - v. Brake fluid
 - vi. Window washing fluid
 - vii. Tire pressure
 - viii. Tire rotation
 - ix. Air filter

- b. Perform the following automotive repairs (or simulate them) with your father/male guardian.
 - i. Demonstrate how to check all fluid levels on an automobile.
 - ii. Demonstrate how to add fluids to an automobile.
 - iii. Demonstrate how to change the oil and oil filter on an automobile.
 - iv. Demonstrate how to properly dispose of used oil and oil filter.
 - v. Remove and replace a tire on an automobile.
 - vi. Fill an automobile up with gasoline.
 - vii. Top off an automobile with window washing fluid.
 - c. Safety equipment and considerations that may be required for automotive maintenance and repairs:
 - i. Gloves
 - ii. Goggles
 - iii. Fire extinguisher
4. Woodworking
- a. Familiarize yourself with the following types of wood or wood products, their hardness and common uses:
 - i. Oak
 - ii. Ash
 - iii. Poplar
 - iv. Maple
 - v. Cedar
 - vi. Studs
 - vii. 2x4, 2x6, 2x8, 2x10, 2x12
 - viii. 4x4
 - ix. Laminated beam
 - x. Plywood
 - xi. Particle Board
 - xii. Medium-density fiberboard (MDF)
 - b. Familiarize yourself with the following tools and supplies utilized when building or repairing wooden structures:
 - i. Hammer
 - ii. Nails
 - iii. Screwdriver
 - iv. Screws
 - v. Wood glue
 - vi. Wood filler
 - vii. Paint
 - viii. Stain
 - ix. Lacquer and Sealant
 - c. Perform the following woodworking projects or repairs (or simulate them) with your father/male guardian:
 - i. Build a small birdhouse with wood, then paint or stain it.
 - ii. Replace a wooden fence picket.
 - iii. Repair a wobbly wooden fence picket.
 - iv. Repair a wobbly wooden chair, bookshelf, or table.
 - v. Build a wooden picture frame.

- vi. Carve a wooden picture frame.
 - vii. Carve a wooden cross (if able, add a corpus to create a crucifix).
 - viii. Safety equipment and considerations that may be required for woodworking projects and repairs:
 - 1. Gloves
 - 2. Googles
 - 3. Dust mask
 - 4. Hearing protection
5. Tool Knowledge
- a. Familiarize yourself with the following hand tools and know when they are to be used and be able to identify them (no need to use them, identification purposes only):
 - i. Phillips screwdriver
 - ii. Standard/flathead screwdriver
 - iii. Pliers
 - iv. Channel-locks
 - v. Needle-nose pliers
 - vi. Wire cutters
 - vii. Open-ended crescent wrench
 - viii. Close-ended crescent wrench
 - ix. Monkey/Pipe wrench
 - x. Lug wrench
 - xi. Socket set (metric and standard)
 - xii. Claw hammer
 - xiii. Sledge hammer
 - xiv. Rubber mallet
 - xv. Copping saw
 - xvi. Hole saw
 - xvii. Wood saw
 - xviii. Hacksaw
 - xix. Paint brush
 - xx. Paint roller
 - b. Familiarize yourself with the following power tools and know when they are to be used and be able to identify them (no need to run them, identification purposes only).
 - i. Power screwdriver
 - ii. Drill
 - iii. Circular saw
 - iv. Jig saw
 - v. Reciprocating saw
 - vi. Radial arm saw
 - vii. Chop saw
 - viii. Table saw
 - ix. Band saw
 - x. Angle grinder
 - xi. Sander
 - xii. Router

- c. Discuss the safety precautions one would take when operating both hand and power tools.
- d. Discuss how potential misuse of both hand and power tools could cause injury.
- e. Safety equipment and considerations that may be required while using hand and power tools.
 - i. Gloves
 - ii. Goggles
 - iii. Hearing protection
 - iv. Dust mask
 - v. Fire extinguisher
 - vi. Safety assistant or spotter
 - vii. 9-1-1