

METALWORK MERIT BADGE WORKBOOK

This Scoutmaster Bucky Merit Badge Workbook is based off the current *Scouts BSA Requirements*.

Consider also using the Metalwork merit badge class preparation page for clarification and expectations when participating in a Scoutmaster Bucky merit badge opportunity ([online](#) or [in-person](#)).

<https://scoutmasterbucky.com/merit-badges/metalwork/>

Scout's
Name:

REQUIREMENT 1: Read the safety rules for metalwork. Discuss how to be safe while working with metal. Discuss with your counselor the additional safety rules that apply to the metalwork option you choose for requirement 5.

REQUIREMENT 2: Define the terms native metal, malleable, metallurgy, alloy, nonferrous, and ferrous. Then do the following:

Native metal

Malleable

Metallurgy

Alloy

Nonferrous

Ferrous

REQUIREMENT 2 A: Name two nonferrous alloys used by pre-Iron Age metalworkers. Name the metals that are combined to form these alloys.

First alloy

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Second alloy

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REQUIREMENT 2 B: Name three ferrous alloys used by modern metalworkers.

First alloy

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Second alloy

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Third alloy

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REQUIREMENT 2 C: Describe how to work-harden a metal.

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REQUIREMENT 2 D: Describe how to anneal a nonferrous and a ferrous metal.

REQUIREMENT 3: Do the following:

REQUIREMENT 3 A: Work-harden a piece of 26- or 28-gauge sheet brass or sheet copper. Put a 45-degree bend in the metal, then heavily peen the area along the bend line to work-harden it. Note the amount of effort that is required to overcome the yield point in this unworked piece of metal.

Completed

Note the amount of effort that is required

REQUIREMENT 3 B: Soften the work-hardened piece from requirement 3a by annealing it, and then try to remove the 45-degree bend. Note the amount of effort that is required to overcome the yield point.

Completed

Note the amount of effort that is required

REQUIREMENT 3 C: Make a temper color index from a flat piece of steel. Using hand tools, make and temper a center punch of medium-carbon or high-carbon steel.

Completed

REQUIREMENT 4: Find out about three career opportunities in metalworking. Pick one and find out the education, training, and experience required for this profession. Discuss this with your counselor, and explain why this profession might interest you.

REQUIREMENT 5: After completing the first four requirements, complete at least ONE of the options listed below.

REQUIREMENT 5 A: Option 1—Sheet Metal Mechanic/Tinsmith

REQUIREMENT 5 A 1: Name and describe the use of the basic sheet metalworking tools.

REQUIREMENT 5 A 2: Create a sketch of two objects to make from sheet metal. Include each component's dimensions on your sketch, which need not be to scale.

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REQUIREMENT 5 A 3: Make two objects out of 24- or 26-gauge sheet metal. Use patterns either provided by your counselor or made by you and approved by your counselor. Construct these objects using a metal that is appropriate to the object's ultimate purpose, and using cutting, bending, edging, and either soldering or brazing.

Completed

REQUIREMENT 5 A 3 A: One object also must include at least one riveted component.

Completed

REQUIREMENT 5 A 3 B: If you do not make your objects from zinc-plated sheet steel or tin-plated sheet steel, preserve your work from oxidation.

Work is zinc-plated sheet steel, tin-plated sheet steel, or has been preserved from oxidation

REQUIREMENT 5 B: Option 2—Silversmith

REQUIREMENT 5 B 1: Name and describe the use of a silversmith's basic tools.

REQUIREMENT 5 B 2: Create a sketch of two objects to make from sheet silver. Include each component's dimensions on your sketch, which need not be to scale.

REQUIREMENT 5 B 3: Make two objects out of 18- or 20-gauge sheet copper. Use patterns either provided by your counselor or made by you and approved by your counselor. Both objects must include a soldered joint. If you have prior silversmithing experience, you may substitute sterling silver, nickel silver, or lead-free pewter.

Completed

REQUIREMENT 5 B 3 A: At least one object must include a sawed component you have made yourself.

Completed

REQUIREMENT 5 B 3 B: At least one object must include a sunken part you have made yourself.

Completed

REQUIREMENT 5 B 3 C: Clean and polish your objects.

Completed

REQUIREMENT 5 C: Option 3—Founder

REQUIREMENT 5 C 1: Name and describe the use of the basic parts of a two-piece mold. Name at least three different types of molds.

REQUIREMENT 5 C 2: Create a sketch of two objects to cast in metal. Include each component's dimensions on your sketch, which need not be to scale.

REQUIREMENT 5 C 3: Make two molds, one using a pattern provided by your counselor and another one you have made yourself that has been approved by your counselor. Position the pouring gate and vents yourself. Do not use copyrighted materials as patterns.

Completed

REQUIREMENT 5 C 3 A: Using lead-free pewter, make a casting using a mold provided by your counselor.

Completed

REQUIREMENT 5 C 3 B: Using lead-free pewter, make a casting using the mold that you have made.

Completed

REQUIREMENT 5 D: Option 4—Blacksmith

REQUIREMENT 5 D 1: Name and describe the use of a blacksmith's basic tools.

Blank area for writing the name and description of a blacksmith's basic tools.

REQUIREMENT 5 D 2: Make a sketch of two objects to hot-forge. Include each component's dimensions on your sketch, which need not be to scale.

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REQUIREMENT 5 D 3: Using low-carbon steel at least 1/4 inch thick, perform the following exercises:

REQUIREMENT 5 D 3 A: Draw out by forging a taper.

Completed

REQUIREMENT 5 D 3 B: Use the horn of the anvil by forging a U-shaped bend.

Completed

REQUIREMENT 5 D 3 C: Form a decorative twist in a piece of square steel.

Completed

REQUIREMENT 5 D 3 D: Use the edge of the anvil to bend metal by forging an L-shaped bend.

Completed

REQUIREMENT 5 D 4: Using low-carbon steel at least 1/4 inch thick, make the two objects you sketched that require hot-forging. Be sure you have your counselor's approval before you begin.

Completed

REQUIREMENT 5 D 4 A: Include a decorative twist on one object.

Completed

REQUIREMENT 5 D 4 B: Include a hammer-riveted joint in one object.

Completed

REQUIREMENT 5 D 4 C: Preserve your work from oxidation.

Completed