

METALWORK

Prepared by:

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Target Group:

Any Scout

Times Allotted:

Five, one-hour blocks

Pre-Requisites:

None

Materials Needed—Staff:

Forge
Anvils and pole vices
Metal tongs for forging
Coal for the entire summer's needs
Forgeable Metal for projects

Materials Needed—Scout:

None

Instructional Outcomes:

Scouts will learn proper techniques in the art of Pottery. In so doing they will several styles of pots as well as demonstrate proper safety procedure when using pottery tools, a potter's wheels, and kiln. Scouts will also demonstrate various types of knowledge with regards to the pottery industry in the US, the history of pottery, and careers in pottery

MONDAY

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.

- **Discuss possible injuries and how you would treat them**

Requirement 2

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

- Name two nonferrous alloys used by pre-Iron Age metalworkers. Name the metals that are combined to form these alloys.*
- Name three ferrous alloys used by modern metalworkers.*
- Describe how to work-harden a metal.*
- Describe how to anneal a nonferrous and a ferrous metal.*

- **Go over each of these points with the scouts**

Requirement 4

Do ONE of the following:

- Identify three career opportunities that would use skills and knowledge in metalworking. Pick one and research the training, education, certification requirements, experience, and expenses associated with entering the field. Research the prospects for employment, starting salary, advancement opportunities and career goals associated with this career. Discuss what you learned with your counselor and whether you might be interested in this career.*
- ~~*Identify how you might use the skills and knowledge in metalworking to pursue a personal hobby. Research the additional training required, expenses, and affiliation with organizations that would help you maximize the enjoyment and benefit you might gain from it. Discuss what you learned with your counselor and share what short-term and long-term goals you might have if you pursued this.*~~

- **Using many provided resources, have Scouts share their discoveries with each other**

TUESDAY

Requirement 3

Do the following:

- 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.*
- 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.*
- 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.*

- **Use the copper project provided by the Trading Post**

WEDNESDAY - FRIDAY

Requirement 5

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

(d) Option 4 - Blacksmith

1. *Name and describe the use of a blacksmith's basic tools.*
2. *Make a sketch of two objects to hot-forge. Include each component's dimensions on your sketch, which need not be to scale.*
3. *Using low-carbon steel at least 1/4 inch thick, perform the following exercises:*
 - a. *Draw out by forging a taper.*
 - b. *Use the horn of the anvil by forging a **U**-shaped bend.*
 - c. *Form a decorative twist in a piece of square steel.*
 - d. *Use the edge of the anvil to bend metal by forging an **L**-shaped bend.*
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.*
 - a. *Include a decorative twist on one object.*
 - b. *Include a hammer-riveted joint in one object.*
 - c. *Preserve your work from oxidation.*

- **Cover these points with Scouts**
- **Discuss safety before starting project work**

- **Review Tool names and uses**
- **Requirement d.3. should be done on one day**