

2. Define the terms native metal, malleable, metallurgy, alloy, nonferrous, and ferrous.

Native
Metal

Malleable,

Metallurgy,

Alloy,

Nonferrous,

Ferrous.

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.

4. Find out about three career opportunities in metalworking.

1.	
2.	
3.	

Pick one and find out the education, training, and experience required for this profession.

Career:	
Education:	
Training:	
Experience:	

3. Using low-carbon steel at least $\frac{1}{4}$ 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 $\frac{1}{4}$ 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.

When working on merit badges, Scouts and Scouters should be aware of some vital information in the current edition of the *Guide to Advancement* (BSA publication 33088). Important excerpts from that publication can be downloaded from <http://usscouts.org/advance/docs/GTA-Excerpts-meritbadges.pdf>.

You can download a complete copy of the *Guide to Advancement* from <http://www.scouting.org/filestore/pdf/33088.pdf>.