4. Lapidary Arts

Many rocks that look dull and uninspiring on the outside harbor a gem within. Lapidary arts allow you to unlock the gleaming beauty. As with any art, successfully completing a lapidary project requires planning, guidance by an experienced mentor, and practice, practice, and more hands-on practice! To start, you should read an illustrated guidebook, such as James Mitchell's *The Rockhound's Handbook* or Pansy Kraus's *Introduction to Lapidary* to learn about the various lapidary arts and to pick a project that interests you. In addition, learn about safety in the workshop. Then jump in and practice, practice, and practice some more—it's fun, and the outcome can be a thing of beauty forever!

Activity 4.1: Learning about lapidary rocks.
Different rocks have different characteristics. Some are hard, some soft. Some are uniform in color, others are banded. Still others are mottled and mixed in color. Learn the qualities of different rocks for lapidary projects, such as soft soapstone or hard agate. List several different rocks and the sorts of lapidary projects they may be good for.

Activity 4.2: Choosing a lapidary project.
Buy or borrow a book on lapidary arts and read about one or more of the arts you would like to try, be it cabbing, faceting, inlay, wirewrapping, silver smithing, beading, carving, and/or rock tumbling. Work with your youth leader to determine the materials and equipment you'll need. Then outline the steps for your project.

Activity 4.3: *Workshop safety and maintenance.*
Note: *This activity is required to earn this badge*.
Make a list of safety rules to follow in completing your lapidary project and demonstrate your knowledge of safety in a workshop.

Activity 4.4: *Completing a lapidary project.*
Note: *This activity is required to earn this badge*.
Complete your lapidary project.

Activity 4.5 Sharing your lapidary project.
A thing of beauty is a thing to be shared! You can do this in several ways. Bring your finished project to a club meeting to share with friends and explain the steps that went into its creation. Or write an article for your club newsletter describing your project and outlining the steps you took in making it. Or display your work at a club gem show.

Activity 4.6: Gemstone minerals.
Learn about the rarest, most valued of lapidary materials: the precious and semi-precious gemstones. Then write a report about your favorite gemstone for your society newsletter. If you have access to the machinery and a skilled mentor to train you, consider faceting a gemstone crystal or cabbing a star garnet, ruby, or sapphire.

4. Lapidary Arts

□ 4.1 Learning about lapidary rocks.

□ 4.2 Choosing a lapidary project.

□ 4.3 *Workshop safety and maintenance* (required to earn this badge).

□ 4.4 *Completing a lapidary project* (required to earn this badge).

□ 4.5 Sharing your lapidary project.

□ 4.6 Gemstone minerals.

To earn your Lapidary Arts badge, you need to complete at least 3 of the 6 activities. (Please note that successfully completing Activities 4.3 and 4.4 are required to earn this badge.) Check off all the activities you've completed. When you have earned your badge, sign below and have your FRA leader sign and forward this sheet to the AFMS Juniors Program chair.

_____
Date completed

_____ _____
My signature Youth leader's signature

_____
Name of my club

Leader's preferred mailing address for receiving badge:

_____

_____

_____

Back-up page 4.1: Learning about lapidary rocks.

The goal of this activity is to orient and familiarize kids with the most commonly used lapidary materials. For beginners, you should focus on the more inexpensive and commonly available forms such as agate, jasper, onyx, and soapstone.

- Agate (a hard stone that is easy to work and to polish; good for cabbing)
- Jasper (similar to agate in taking an easy polish; good for cabbing)
- Flint (good for knapping to make arrowheads and spear points, utilizing proper safety precautions; also good for cabbing)
- Petrified Wood (good for cabbing, book ends, specimens for display; one problem, though, is that petrified wood has a tendency to split or flake)
- Soapstone (a very soft rock especially good for beginners to rock carving)
- Travertine Onyx (a soft rock good for carving)
- Alabaster (another soft rock good for carving)
- Marble (a bit harder than travertine onyx or alabaster but still excellent for rock carving; takes a good polish)

Except for quartz and garnet, the following stones are much more expensive and/or require more skill to work:

- Opal
- Jade
- Lapis
- Amber
- Stones for faceting and/or cabbing: varieties of quartz (clear, rose, amethyst, smoky, citrine), topaz, tourmaline, emerald, aquamarine, peridot, garnet, corundum (ruby and sapphire), diamond

Encourage adult club members to bring in examples of finished cabs, carvings, faceted stones, and other projects they've done. They also should bring examples of the rough material from which the finished stones were crafted to show your kids "before" and "after" pieces. Give kids a good, well-rounded look at the variety of lapidary rocks, from those most readily available and relatively easy to work (agate, marble, etc.) to the most precious and expensive of stones requiring great skill on the part of the lapidary artist (rubies, sapphires, emeralds, and diamonds). Keep the focus, though, on the more common stones suitable for those just beginning in the lapidary arts. Use Activity 4.6 to take kids into the more rarified part of the hobby with precious gemstones. After presenting rocks various sorts, quiz the kids about what rocks they think might work best for different sorts of projects.

Back-up page 4.2: Choosing a lapidary project.

Types of Lapidary Projects to Choose From.

The choice of a lapidary project should be matched to the age level and abilities of your club's kids and youth. Following are some sample projects, starting from simpler ones appropriate for younger members and progressing to more difficult ones that would challenge even your adult club members:

- **Rock painting.** Paint designs or pictures on flat, smooth rocks, or transform round stones into bugs, turtles, bunnies, etc., with enamel, acrylic, or tempura paints.

- **"Pet Rocks" & "Rock Critters."** Stack and glue small stones together like snowmen to make animals and people; use tempora paints, incorporate glue-on "google" eyes, pipe cleaner arms and legs, feathers, and other ornaments, then make up a story about your pet or critter.

- **Light-catchers.** Glue tumble-polished agates or beach glass onto translucent plastic container lids and insert a wire or fishing line to hang the creation against a window using a plastic suction cup and hook sold at many craft stores.

- **Sand art.** Colored sands (available with aquarium supplies), white glue, and cardboard or small plywood sheets can be used to make sand art pictures and designs.

- **Wind chimes.** Starting with 8- to 15-inch wooden rods or driftwood limbs, space screw eyes 1- to 1.5-inches apart. Attach varying lengths of fishing line or base metal chain to each eye. Then attach agate slabs, seashells, or obsidian needles with bellcaps or glue-on leaf bails and jump rings.

- **Rock tumbling and "free-form" jewelry.** Tumble small agates and jasper and top the best pieces with bell caps and jump rings to make necklaces and dangling pieces for bracelets or key chains. You also can insert tumbled stones into "wire cages." These are pre-made oval-shaped spirals of wire (available from dealers selling findings and other jewelry supplies) into which you can slip a tumbled stone to craft a pendant in no time. Or kids can wire-wrap tumbled stone using cooper, brass, or silver-plated wire.

- **Other tumbled stone projects.** The easiest way to turn tumbled stones into art is to pile them in a bowl or glass vase to decorate a tabletop. Or glue them, along with seashells, in the shapes of flowers or other designs to the backing of a picture frame. You also can coat a flower pot with wet plaster of Paris or self-hardening clay and press tumbled stones into the plaster or clay before it sets for a mosaic or inlay effect. If you have a club member with a drill who can drill a large number of tumbled stones for you kids, you can teach them to make bead necklaces with free-form tumbled stones. The more you experiment, the wider range of projects you'll find for turning tumbled stones into lapidary art!

- **Polishing soft stones by hand.** Relatively soft stones (opals, Petoskey stones, alabaster, or travertine onyx) can be sanded and polished by hand with wet-or-dry emery sandpaper in coarse, medium, and fine grits. You can purchase 8.5X11-inch sheets of sandpaper and cut them into quarters for each child. After working through the three grits, kids coat a square of leather with a polishing compound like aluminum oxide and water to work up a final polish. This process is easier if you first cut small cabs and mount them on dop sticks for each child in your group.

- **Cabbing.** Create domed cabs for brooches, belt buckles, necklaces, and bolo ties.

- **Flat-lapping.** Create bookends or polished agates, geodes, and thunder egg halves.

- **Beading.** Craft wire-wrapped rings, bracelets, brooches, ear rings, or necklaces with natural and synthetic beads and supplies purchased from a bead store. Learn pearl knotting, proper ways of attaching clasps, and how to size a bead or cabochon.

- **Wirewrapping.** With brass or copper wire, turn fossil shark teeth into necklaces or wrap a cab to hang from a necklace.

- **Gemstone trees.** Small, polished gemstone chips from a tumbler can be transformed into leaves when glued onto tree limbs swirling out of twisted copper wires.

- **Carving and sculpting.** Soft rocks like soapstone or alabaster can be carved and shaped fairly easily with metal awls, files, and sandpaper.

- **Knapping.** Turn flint, agate, or obsidian into arrowheads and knife blades. Knapping, though, can lead to nasty cuts, so appropriate training and precautions, along with eye protection, are mandatory!

- **Scrimshaw.** Sales of ivory have been banned in the U.S., but one way to continue the long New England tradition of scrimshaw is by inscribing and inking scenes onto tagua nuts. You can also use materials such as antler or bone.

- **Intarsia, inlays, and mosaics.** This craft required much precision and patience.

- **Sphere making.** You'll need an expensive machine and a lot of saw cuts!

- **Faceting.** This requires expensive machinery and a lot of time and patience.

- **Forging glass beads.** Due to the fire hazard, this is for your oldest juniors.

- **Metal smithing.** Due to working with torches, this, too, is for your oldest juniors.

Resources to Guide You in Choosing and Practicing a Lapidary Art.

Many magazines and books provide good ideas for lapidary projects, and don't overlook your own fellow club members!

Magazines:

- *Rock & Gem*
- *Lapidary Journal Jewelry Artist*
- *Gems & Gemology*

Books:

- Ann Benson's *Beadwork Basics* (Sterling Publishing Company)
- Jack R. Cox's *Cabochon Cutting* (Gem Guides Book Company)
- Henry C. Dake's *The Art of Gem Cutting* (Gem Guides Book Company)
- Pansy D. Kraus's *Introduction to Lapidary* (Krause Publications)
- Tim McCreight's *The Complete Metalsmith* (David Publishing, Inc.)
- Jinks McGrath's *Jewelry Making* (Chartwell Books, Inc.)
- James R. Mitchell's *The Rockhound's Handbook* (Gem Guides Book Company)
- Edward J. Soukup's *Facet Cutters Handbook* (Gem Guides Book Company)
- J. Wexler's *How to Tumble Polish Gemstones* (Gem Guides Book Company)

Web sites:

The Rio Grande company (suppliers of lapidary materials) allows you to access free how-to video clips on varied lapidary projects. Go to their web site, www.riogrande.com, and click on "Learn with Rio."

Your Own Local Experts:

In addition to books and videos, draw from the experience of your own adult club members in helping kids learn about the various lapidary arts they might try. Many clubs have an expert in cabbing, another in faceting, another in metal smithing, etc. In the Ventura (California) Gem and Mineral Society, member Wayne Ehlers would sponsor cab-making workshops for kids and adults alike, and he prepared a set of handouts. In basic, step-by-step fashion, these included instructions for making a cab, useful hints, and a glossary of lapidary terms (what's a cab? a blank? a preform?). Who are the most experienced lapidary artists in your club? Work with them to prepare a set of handouts with simplified instructions and guidelines to distribute to your junior members, with emphasis on one or two basic arts (e.g., cutting and shaping a cab, wirewrapping, soapstone carving, rock tumbling and making freeform jewelry) to get kids' feet wet.

Back-up page 4.3: *Workshop safety and maintenance.*

Note: ***This activity is required for kids to earn the Lapidary Arts badge.***

Before kids are allowed to flip on a single power switch in a workshop, they should be required to read and sign a sheet outlining workshop safety rules and learn about all equipment. Machinery can be dangerous. Help kids learn how to operate rock saws, grinding wheels, and other tools safely, and make sure experienced adults are present in helping them through their projects. Whether working with kids or adults: safety first!

There are all sorts of lapidary arts, each requiring different materials, tools, and procedures. Also, according to Murphy's Law, anything that can go wrong will go wrong. Thus, no listing of safety rules can ever be complete, and any listing that tried would end up filling several volumes. There are, however, some basic safety rules. Kids should be encouraged to create their own set to match the project they undertake. Here are a few examples:

- Always have at least two people in the shop when equipment is in operation.
- Keep your workspace neat and organized and your equipment clean and in good condition; clean up equipment immediately after each use.
- Learn about equipment before flipping the "on" switch; know your equipment: read manuals and take note of manufacturers' safety precautions and warnings.
- Stock a first-aid kit in your workshop, along with an emergency phone number.
- Keep a fire extinguisher in your workshop and be sure it is in good working order.
- Decide what you need for your project ahead of time, and then have all necessary materials and equipment close at hand.
- Don't walk away and leave running equipment unattended; turn off machines if not being used.
- Wear safety glasses or goggles when hammering, sawing, grinding, etc.
- Keep a workplace thoroughly ventilated to avoid breathing rock dust or fumes from adhesives and, if necessary, wear a facemask to protect your lungs.
- If dry sanding, check frequently to make sure your stone does not overheat, and wear a facemask and/or work with a suction ventilating device.
- Diamond saw blades should not be run dry because the heat generated will ruin them; always use a lubricating coolant with a diamond saw blade.
- Don't overload electrical circuits.
- Make sure any belts connecting grinding wheels or saws to motors are shielded.
- Don't wear loose sleeves when working with saws or grinding wheels and tie back long hair.
- Keep electric motors and switches dry and grounded to prevent electric shocks.
- Don't allow grinding wheels to soak up water while idle to avoid unbalanced wheels.
- When grinding small stones or grinding without a dop stick, you can protect your fingers by wrapping the tips in tape or bandages.
- Don't use too much pressure when sawing or grinding stones; let the blades and grinding stones to the work.

Back-up page 4.4: *Completing a lapidary project.*

Note: ***This activity is required for kids to earn the Lapidary Arts badge.***

Your club should prepare a good supply of agate and jasper slabs, chunks of soapstone, petrified wood, onyx, and other rough materials. These should be on hand along with spools of wire, bell caps, etc., to give kids a plentiful supply of material with which to experiment and practice in crafting lapidary projects. Wire, bellcaps, and other lapidary mountings, findings, and materials may be purchased from dealers at gem and mineral shows or at rock shops, bead shops, variety hobby stores such as Michael's or Ben Franklin, or via cataloguers such as Rio Grande, Kingsley North, Diamond Pacific, Fire Mountain Gems and Beads, and others.

Then, you should schedule and sponsor several supervised sessions with as many adults assisting to give kids as much one-on-one guidance as possible, with parental attendance required as well. Don't leave kids on their own to satisfy the requirements for this badge. As with any art, successfully completing a lapidary project requires training and planning, and then practice, practice, and more practice, under the watchful eye of an experienced mentor.

Cabbing Without a Workshop.

Relvan Zeleznik of Stamford, Connecticut, shared this activity for those juniors groups not allowed to work in the adults' workshop or for those whose societies lack workshop facilities altogether. If you're facing such a challenge, you can turn to other activities described in Activity 4.2 (rock tumbling, beading, wirewrapping, etc.). Still, there is a way, described by Relvan, for kids to learn the basic principles of cabbing and producing a nice, finished cabochon. For this, you'll need someone in your club who can slab and cut soft stones (opals, common opal, Petoskey stone, alabaster, travertine onyx, etc.) as small, thumbnail-sized preforms. If you don't have a club member who can prepare these, you might approach a dealer for a supply.

Dop the stones atop nail heads with dop wax and give one to each child, along with small square sheets of coarse, medium, and fine wet-or-dry emery. Start with the coarse emery. Placing the sheet in your palm, add a few drops of water and begin grinding the stone against it using a rocking, twisting, circular motion. Grind, adding drops of water as necessary, until the cab is domed and smooth. Then rinse the stone and wipe it clean and repeat with medium and then fine emery. For a final polish, give each child a small leather pad dabbed with a light frosting of aluminum oxide polish mixed with water on the rough side of the pad. (This can also be done on the back of one of the emery paper sheets.) To remove the stone from the nail, place it in a freezer for just a few minutes; it should pop right off with gentle pressure. While the results may not be as shiny and even as if done with an expensive Genie, this "poor man's Genie" ain't bad for a first-time cabbing experience.

Back-up page 4.5: Sharing your lapidary project.

Encourage kids to bring a finished lapidary project to a club meeting to share with friends and to explain the steps that went into its creation. Or you might have them write brief articles for the club newsletter to describe their projects and to outline the steps taken in making them. Finally, as a third possibility, you might help them create an exhibit for your local gem show. Such an exhibit could be devoted to a single lapidary art, showing all the steps that went into crafting the finished item (for instance, showing how a rough rock was slabbed, preformed, ground, polished, and then set in a finding), or it might be an exhibit showcasing a variety of finished works crafted by a number of the club's kids.

Note: *Kids who prepare an oral or written report can use this activity toward satisfying requirements for the Communication badge simultaneously (Activities 7.1 and 7.2). Those who display their lapidary work in a case at a gem show or some other public venue can use this activity toward satisfying requirements for the Showmanship badge (Activity 6.4).*

Back-up page 4.6: Gemstone minerals.

Activity 4.1 introduces kids to a full range of lapidary rocks with emphasis on the most readily available and affordable stones that are relatively easy to cut and work. These include materials like agate, jasper, marble, or soapstone. Activity 4.6 shifts to the true rarities of the lapidary world: the precious and semi-precious gemstones.

The term "gemstone" can be applied not only to minerals but also to certain rocks and organic materials. The common denominators are that they tend to be colorful and rare and can be polished and/or cut to be used for jewelry or other ornamental purposes. Once cut and polished, they are referred to as gems. Gemstone rocks include charoite, lapis lazuli, and jade. Organic gemstones include pearls, jet, ivory, coral, and amber (all produced by once-living organisms).

Although certain rocks and organic materials have been classified as gemstones, most commonly we associate minerals as gemstones, and mineral gemstones are divided into two groups: precious and semi-precious. Precious gemstones are the most rare, beautiful, and durable. They are hard on the Mohs scale (7.5-10). All experts categorize three minerals as precious gemstones: diamond, corundum (varieties sapphire and ruby), and beryl (variety emerald). Some also include pearl, jade, beryl (variety aquamarine), topaz, and opal. Value increases with size, color intensity, clarity, and perfection of a stone. Semi-precious gemstones, while still rare, are usually more abundant and include such minerals as garnet, zircon, peridot, quartz (varieties amethyst and citrine), and tourmaline. They tend to be softer than precious gemstones (around Mohs 5-7).

Precious and semi-precious gemstones vary from transparent to translucent or even opaque. If transparent, they are usually faceted. If translucent to opaque (like jade, jet, turquoise, star rubies, or star sapphires), they are usually cut as cabochons or carvings.

Whether precious or semi-precious, clear or opaque, if it's rare, beautiful, and highly desirable for jewelry, it's a gemstone! Enlist adult members of your society who have both natural and faceted or cabbed specimens to do a show-and-tell presentation on precious and semi-precious gemstones and gems for your society's kids. Then encourage each junior member to select a favorite and to write a brief article for your newsletter. Encourage them to illustrate the articles with drawings or photographs of the gemstones they've selected.

If you have access to the machinery and a skilled and willing mentor within the ranks of your adult members, consider giving faceting classes to your more advanced juniors who seem up to the task, or assist them in cabbing a star garnet, star ruby, or star sapphire.

Note: *Kids who write a report about gemstones for Activity 4.6 can simultaneously satisfy requirements toward earning their Communication badge (Activity 7.2).*