National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Exemplar for Internal Achievement Standard

Technology Level 2

This exemplar supports assessment against:

Achievement Standard 91344

Implement advanced procedures using resistant materials to make a specified product with special features

An annotated exemplar is an extract of student evidence, with a commentary, to explain key aspects of the standard. It assists teachers to make assessment judgements at the grade boundaries.

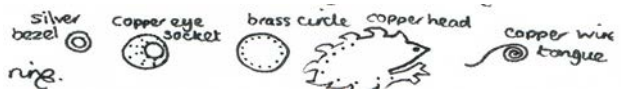
New Zealand Qualifications Authority

To support internal assessment

	Grade Boundary: Low Excellence
1.	For Excellence, students need to efficiently implement advanced procedures using resistant materials to make a specified product with special features. This involves students undertaking techniques and tests in a manner that economises time, effort and materials. This student's project was to create a cabochon ring. Sketches were used to show the ring that was to be made. These include detail of the special features that the ring would have, i.e. a handmade bezel, ring shank, soldering and textured components (2). Scheduling techniques and tests in a construction plan enabled the best use of time and effort to be achieved (3). Testing was carried out independently, and the results recorded (4) and evaluated (5). Visual checks ensured materials were accurately marked out and cut, joins soldered correctly, the stone placed symmetrically, and specifications met. The student worked efficiently by keeping components safe, planning ahead, following guidelines, and economising materials (6). Accurate recording of evidence and teacher verification shows how the consistent application of accepted conventions and techniques were carried out with precision (7). A cabochon ring with clearly identifiable structural and aesthetic special features was presented (1). For a more secure Excellence, the student could show more evidence of economising time. Teacher annotations state that, while waiting for help with some highly complex techniques, the student could have continued on with another aspect of the project.

Concept

Before I had developed the design for this ring I had bought three different sized and shaped cabochon stones. The round labradorite stone I chose for the ring inspired the final design. The opalescent qualities of the stone appeared to me like an eye. This led me to look at images of reptiles at the library and the chameleon idea developed from there. The texture of a chameleon's skin and the form of its eye lent itself to be re-created in the workshop from metal. As the nature of a chameleon is to change colour to adapt to its surroundings, I thought it would be fun to incorporate all the types of metal available to me in the workshop. I made sketches to plan the order in which the layers of the ring would be constructed and soldered. This plan made efficient use of time.



Structural Specification

The ring was made and assembled to the plans made in my sketchbook in consultation with tutors and with reference to the resource materials provided by tutors.

- 0.8mm silver plate for shank was chosen as a suitable weight for a chunky reptilian design
- 0.8mm copper plate for chameleon's head
- 0.5mm copper plate for chameleon's eye socket
- 0.5mm brass plate for chameleon's head detail
- Copper wire
- 0.5mm silver plate for bezel
- 7mm x 7mm round labradorite cabochon stone
- Hard solder

1

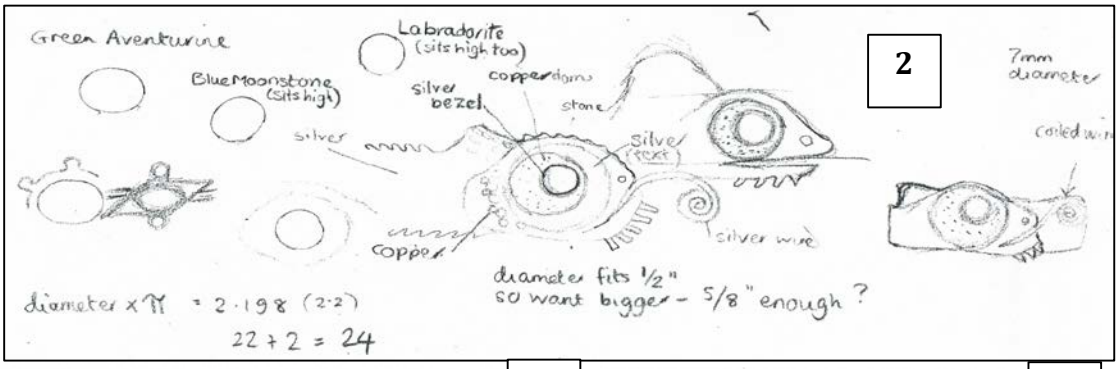
Aesthetic Specifications

- **To create a ring with a number of different textures, material and finishes**

Textures – sanding with 600, 800 and 1200 sanding sticks, steel wool, V-shaped punch and various sized pointed punches

Materials – silver, copper, brass, copper wire, labradorite stone

Finishes – matt finish on the shank, oxidized finish on other parts to emphasize their textures, burnisher to bring out highlights



Construction Plan

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1) I formed a wire loop around my middle finger, which when cut open measures 60.5mm
2) Drew a pencil sketch for the shank of the ring and stuck it to a piece of double-sided tape.
3) With the pierce saw cut a length of 0.8mm silver to measure 63mm in length and 7mm in height, in accordance to the dimensions of the drawn design.
4) Attach the paper pattern to the silver piece and cut out the design.
5) Annealed the silver in order to soften it prior to texturing, quenched it and put it in the pickle for 5 minutes.
6) Sanded the silver with 600 sand-paper to create a matt finish prior to texturing with a punch.
7) Attached with double-sided tape the paper pattern for the chameleon's head to a piece of 0.8mm copper plate and cut out with the pierce saw.
8) Holding the copper head piece to mask the silver shank, I could determine where the silver needed to be textured.
9) Used a small V-shaped punch to create a scale-like pattern on the silver shank (refer test 3).
10) Used a small flat file to create a beveled edge along the top and bottom edges of the shank. Beveling makes the silver catch the light and makes the ring smooth and comfortable to wear (test 3)
11) With the disc cutter cut a ⅝in disc from a piece of 0.5mm brass scrap for the chameleon's head and a ½in disc from 0.5mm copper scrap for the chameleon's eye socket.
12) With the doming punch shaped the copper disc
13) Textured the disc with a small pointed tip punch to make a radial pattern on the back of the disc. This would give the raised bumps on the surface of the eye socket. After making one dome I realized that the centre point of the radial pattern should be off-centre to match with the placing of the stone. Therefore I cut another disc, domed it and punched the radial pattern again.
14) Cut a piece of 0.5mm silver plate to make the bezel, in accordance to the measurements stated earlier (24mm long and 5mm high).
15) Filed the edges of the bezel piece with a flat file and then a 1200 sanding stick ensuring all edges were straight and even.
16) Annealed the bezel silver piece with the gas torch until it was a strong red colour, then quenched it in water.
17) Using the bezel mandrel, nylon hammer and the swage block, I formed the piece into the round so that the edges were tightly touching and no gaps were visible when held up to the light.
18) Using the pierce saw, cut through the joining ends to make the join more accurate before soldering. Edges left should allow no light through when held up to the light.
19) Applied flux to the join and placed 3 pallions of hard solder along it (refer tests 1 and 2). Introduced the heat from the gas torch slowly to let the flux settle down. Heated the whole bezel until the metal was a strong red colour and the solder flowed along the join, making a shiny line. Quenched the bezel in water and placed it in the pickle for 5 minutes.

Check List of Tests carried out during construction process

4

1) Ring shank soldered using hard solder?	☑
2) Solder joins are accurate with sufficient solder to withstand expected use?	☑
3) Shank filed, sanded and shaped correctly?	☑
4) Ring shank checked for size against specifications using appropriate tool and corrected if necessary?	☑
5) Bezel fits stone with sufficient ease, and height of bezel is correct for stone, and tested visually?	☑
6) Bezel fits shank accurately, check symmetry, distance from edges	☑
7) Stone supported correctly in bezel setting (wobble test) ?	☑
8) Metal finish completed to specification before stone is set?	☑
9) Stone set correctly, check visually for gaps at edges of bezel	☑
10) Ring evaluated against original specifications and drawings	☑

Critique

5

Initially I failed to properly carry out test 5 and made the bezel too small, perhaps by not making accurate measurements. This was corrected by enlarging the bezel using the mandrel, hammer and swage block.
In my haste to see the stone in place, it became lodged in the bezel at an angle. I was able to prise it free, but if the test procedures had been followed more closely this would not have happened.

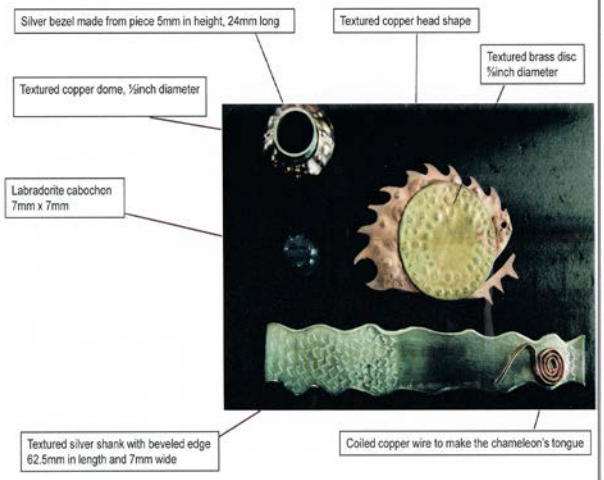
I had not considered the extent to which the filing of the domed piece in order to match the curvature of the shank would distort the appearance of the domed eye socket". It needed to be filed a good deal more than I had imagined, but still works as part of the design. A solution may be to solder a ring of copper around the base of the dome (like when you make a sphere with two domes and a joining strip), keeping more of the domed shape after filing.

Work Efficiency

6

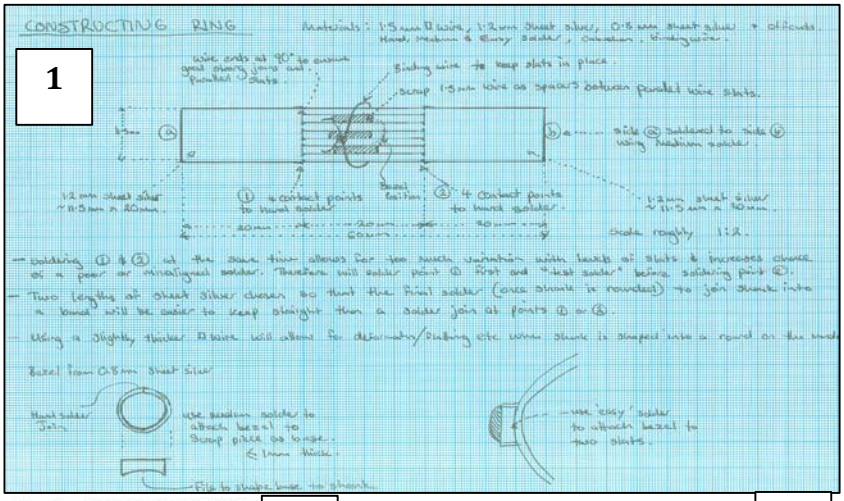
1) Kept all the components for the ring in one place, secured together in a sealed bag, so they were always easy to find.
2) By planning the assembly of the piece in my sketchbook, the best use of time was achieved by having a method to refer to and everything prepared.
3) Economical use of materials: made us of scrap metal in the workshop.
4) Referred to the resource materials provided by tutors (appendix I)

Make Cabochon Ring

Record of Evidence	7	
Ring design Includes reason for design process Alternative designs shown Specifications include at least two special features Structural (1+) Aesthetic (1+) Materials used and costings Working drawings of each component to scale in mm, annotated Size of cab and size of ring shown Equipment and tools to make design features identified Construction plan for sequence of making ring Schedule of testing shows how and when testing carried out, to meet specifications		Photograph of ring being assembled 
Record of progress provided with photographic evidence of making ring Schedule of tests and recorded outcomes Show special feature development Show ring meets specifications Explanations of modifications to plans and/or problems encountered, photographic evidence		observed making. ✓ ✓ ✓ ✓
Safety observed and recorded (schedule) Photographs - student using safety equipment and safe working practices X		observed. checklist provided.
MERIT Independence Student interaction with other students in workshop Level of teacher input required Accuracy: execution of techniques and tests Finished ring meets written specifications and testing schedule Size of ring Finished surface		✓ some interaction - ring of computer design  ✓ ✓
EXELLENCE Economy of time: Observations of student self organisation Economy of effort: Journal entries, Efficiency checklist Classroom observation Economy of resources: Evidence of minimised use of resources Photograph of layout of materials		✓ ✓ – ✓ provided 
Finished ring Observed Discussed Photographs (minimum of 2)		**Conclusion** I enjoyed the organic process of designing this ring, creating the different textures and building its layers. I learned in the making of this ring how important it is to have a plan of assembly. I like the fact that it is not immediately apparent at first glance what the design resembles. This is due to the fact the design was perceived in the flat two-dimensions, and not "in the round", which is something to be considered for future design concepts.

	Grade Boundary: High Merit
2.	For Merit, students need to skilfully implement advanced procedures using resistant materials to make a specified product with special features. This involves students showing independence and accuracy in the execution of techniques and tests. This student's project was to create a cabochon ring. They explained their proposed design and special features (1). Teacher-given specifications were developed further by the student and confirmed with the teacher. The relevant advanced craft skills and testing required to make the ring is accurately documented on a construction plan (3). Photographs (2) and annotations (4) indicate that problems were resolved independently. Test results also support that procedures were implemented skilfully (5). The teacher verifies that the student worked independently and accurately when implementing procedures (6), and complied with health and safety regulations (7). To reach Excellence, procedures need to be implemented with more efficiency. Practice in attaching the bezel to the shank would allow the most suitable technique to be selected (economising time and effort). In this case, sweat soldering may have enabled a more quality finish. Efficiently implementing procedures would also ensure that a replacement cabochon was not needed (8).

1



2


Bezel on scrap.


Soldering / inverted.


Ring Shank.


Ring clamp for shaping


Assembly finished.

3

4

5

Cabochon Ring Development Plan

Design of Ring		***Annotations***
1. Choose the cabochon to be used for the ring's bezel.		Cabochon was selected from a mixed packet of Rhodonite cabs. A 7mm diameter round, blackish coloured cab was chosen. Looks a bit rough, maybe quartz?
2. Develop a design for the Cabochon ring including aesthetic and structural components. Take into account efficiency, difficulty etc.		See appendix 1. A slotted band ring shank was chosen.
Construction Plan: Bezel	***Tests***	***Annotations***
1. Measure diameter [Ø] of cabochon. Use [$(\pi \times Ø) + approximate\ thickness$] to determine the length of 0.8mm thick sterling silver to make the bezel collar. Then cut a suitable strip of silver from 0.8mm thick sheet.	Measure once cut.	3.14x7=21.98 +1mm = ~23mm long. Cab ~3.5mm high so a 5mm wide strip was cut with saw to allow for variation. Ok cut when checked.
2. Form a basic roundish bezel shape using round nose pliers ensuring the two ends of the strip are flush. If required, file or cut the join so that no light can be seen through the join line.	No light seen through join.	A few tool marks made with pliers, can address at a later stage. Join Good.
3. Use borax on the clean cut sides of the join. Then place bezel on a fire brick with a small piece of plate solder [hard] under the join. Heat the silver with a medium flame until the solder becomes fluid and you can see it draw up the join line. Cool then Pickle.	Tidy seam with no holes or gaps	Good solder.
4. Use a mandrel or equivalent to form bezel into a round band, by gently tapping with a plastic mallet. File and sand off any tool marks or lumps of solder so that the cab sits snug within the bezel. Ensure that the base of the bezel is flat and level using the same tools.	Eyeball for level base. Check size against cab.	Mandrel was substituted for a punch to get the correct diameter. Cabochon fits well, base looks level.
5. To make bezel base, find an appropriate offcut [1mm or thicker so as to allow for later shaping] to fit the bezel band. Clean with sandpaper the bezel and the offcut. Place the bezel on the base; apply borax to the join and approx. 3 small pieces of plate solder [medium] to the inside of the bezel around the join. Heat the silver with a medium flame until you see the solder flow around the join. Cool then pickle.	Tidy seam inside and out, no gaps or holes.	An offcut or scrap silver is a good way to utilise metal that may have no other use. Found a 1.2mm piece from scrap. Solder flowed well – no gaps.
6. Saw off the excess silver from the base and file so that it is flush with the sides of the bezel, then give a light sand ~1200grit.	Cabochon fits.	Sawed a bit too close for comfort at one stage but ok. Cab became tight after second solder. Used dremel to remove some solder until fit was ok.
Construction Plan: Ring Shank	***Test s***	***Annotations***
1. Measure size of shank using binding wire to fit finger [I prefer this method over a finger sizer]. Tie wire on finger until it is a satisfactory size then cut the wire band using wire cutters. Flatten to gauge shank length.	Wire snug on finger but can still slide off.	Finger circumference as measured from wire is ~58mm plus ~2mm for thickness of band = 60mm [handy size]
2. Calculate how long a third of the shank is. One third will be slats, two thirds will be solid.		20mm for each segment.
3. Cut the four sections for slats from square 1.5mm wire. Each piece of wire should be one third of the shank long. Wire was chosen over piercing as there was a higher probability that the slatted sections would be uniform using this method. Also with wire there appeared to be less wastage of metal.	Measure with ruler after cutting.	Measured and cut 4x20.5mm lengths [added 0.5 to allow for filing each end straight]. Ok.
4. Straighten wire using flat pliers. File ends straight at a 90 degree angle to the wire. This is a critical step – must be done well to ensure a strong solder join and parallel slats.	Use a square to check 90 degrees.	Tricky as wires move easily. All checked and square.
5. Lay wires out and use 1.5mm wire offcuts [from scrap silver] as spacers between the lengths. Once satisfied they are straight, measure the width. This will give the width to cut the remaining two thirds of the shank. Bind to prevent movement.		Approximately 11.5mm [must have filed and sanded a bit off?], will add an additional 0.5mm to allow for sawing error etc.
6. Cut two lengths of 1.2mm thick silver sheet. Each the length of 1/3 of the shank, and the equivalent width of the slatted section previously measured. File the edges to be soldered square	Check with 90 degree square edge.	Two 20mmx12mm sections were cut from 1.2mm thick silver. Filed all edges straight particularly the edges to be soldered first.
7. Position the bound slatted section of the shank over a hollow on a soldering brick [to allow binding wire to sit in the hollow]. The section should sit flat and butt one section of sheet silver hard against the joint edge. Apply borax and a small piece of solder on each of the 4 joins. Heat with a medium flame until solder flows.	Seams are filled, no gaps. Join is straight.	See appendix 2, position (1). Solder attached well, all wire flush at the seam.
2. Lightly sand the top of the shank. Check for good positioning of the bezel, use helping hand to hold ring. Apply borax to the two surfaces and a couple of small pieces of solder [easy] to each side of the bezel. Heat with a medium flame until the solder flows. Be careful not to overheat and open up existing joins. Pickle to clean.	Seams are filled, no gaps. Join is straight.	Much trickier due to the slats. Only two square wires contact the bezel. Had to balance shank upside down on top of bezel to solder. Solder seams are fair, one section could have contacted better but strength is achieved.
3. Finish the surfaces of the metal to a high shine [the desired texture of the ring]. File and sand [using progressively finer grades of paper] to remove solder, fire scale and tool marks. Polish the ring with Tripoli if required and rouge.	No visible fire scale. High shine finish.	Most time consuming. Have trouble getting a tool to fit on the underside of the bezel to remove solder lumps [needle files are too large and may damage the edge of the bezel or slats and the dremel could gouge out large portion of the slats under the bezel]. As it does not affect the feel of the inside of the shank some solder will be left rather than risking damaging the shank and bezel.
4. Once ring is "finished" file the top edge of the bezel at a 45degree angle ready to accept the cabochon. Usually bezel height would be 2/3 the height of the stone; however a wider, squarer edge around the stone is wanted. Therefore keep the edge nearly the same height as the cab.	Check height against cab.	Height seems good for desired look. Top edge tidy and at 45 degree angle, no ratty edges.
5. Secure the ring on a mandrel with blue tack and fasten in clamp or vice to set stone. Using stone setting punch gently hammer in edges of bezel over the cab. Work on one side then the opposite to ensure stone is set level. E.g. halves, quarters, eighths etc. once bezel is folded over stone entirely, start the process again only pushing bezel downwards to achieve a more chunky edge. Once bezel is uniformly closed over the cabochon it should be secure.	Stone does not rattle or move, does not look wonky when viewed from side on.	After about the 5th reposition of the punch a large chip came off the stone. Started to use the punch less confidently and the top of bezel and stone became a real mess. Consult led to decision to try and replace damaged stone and cut away top of bezel. A trip to Hettie's was frustrating with the only suitable stone being very ugly. Begrudgingly filing away the top of the bezel and the stone that was to be removed, revealed an inlay look that I love. The black quartzite like

Make Cabochon Ring

6

Record of Evidence	Sign	Notes
Ring design Includes reasons for design process		✓
Alternative designs shown		✓
Specifications include at least two special features Structural (1+) Aesthetic (1+)		✓ ✓
Materials used and costings		✓
Working drawings of each component to scale in mm, annotated Size of cab and size of ring shown		✓ ✓
Equipment and tools to make design features identified		✓
Construction plan for sequence of making ring		✓
Schedule of testing shows how and when testing carried out, to meet specifications		✓
Record of progress provided with photographic evidence of making ring		✓
Schedule of tests and recorded outcomes Show special feature development Show ring meets specifications		✓
Explanations of modifications to plans and/or problems encountered, photographic evidence		✓
Safety observed and recorded (schedule) Photographs - student using safety equipment and safe working practices		observed
MERIT Independence Student interaction with other students in workshop		worked alone.
Level of teacher input required		minimal
Accuracy: execution of techniques and tests		✓
Finished ring meets written specifications and testing schedule Size of ring Finished surface		✓ ✓

7

Safety Checklist Achievement Standard 91344 Cabochon Ring	Checked
Workshop rules observed for correct and safe use of tools and equipment	✓
Appropriate clothing and footwear worn in the workshop	✓
Personal safety carried out using protection including safety goggles and gloves where required when using machinery	✓
Correct use of soldering and pickle pot	✓
Worked safely around and consideration shown for other students in the workshop	✓
Workplace kept tidy and cleaned after use	✓

8

Evaluation

If I was to make a ring following the same design, there are several steps that I would change/adapt in order to reduce the likelihood of a future disaster. They are as follows:

1. I would look up the true hardness of a stone prior to choosing it. Although the cab was in a mix of Rhodonite, it was not actually Rhodonite!
2. Where possible I would have a spare cabochon with matching dimensions as backup. There may not be a similar dimension stone available in a store.
3. When attaching a bezel to a pierced or textured shank, I will opt to sweat solder. I had not thought through how difficult it would be to tidy up the underside of the floating bezel.

	Grade Boundary: Low Merit
3.	For Merit, students need to skilfully implement advanced procedures using resistant materials to make a specified product with special features. This involves students showing independence and accuracy in the execution of techniques and tests. This student's project was to create a cabochon ring. They outlined specifications for the ring that they would make (1). A construction schedule details the techniques and tests executed (2). A record of evidence shows the manner in which advanced procedures were implemented (5), and how all health and safety regulations were adhered to (6). Accuracy was achieved by measuring, shaping and fitting the shank correctly using appropriate tools, and checking that the bezel is the correct weight, height and size for the stone (3). Appropriate testing ensured that the final product accurately met specifications. For example, visual checks were made to ensure that the bezel fit the shank correctly, and that the ring was the right size (4). For a more secure Merit, independence would need to be shown further in the execution of techniques. For example, the student had problems getting the desired flush finish when fitting the bezel to the shank. Although this step was detailed in the construction schedule (2), the student had to be reminded to sand both the shank and bezel to enable a good finish.

SPECIFICATIONS:

My design aim for this task - to make a decorative multi-layered cabochon ring. Ring Size Q.

The shank is to have two layers soldered onto it – the layer directly on top of the shank is to match the shape of the shank at the top and bottom so that it becomes part of the shank at those points.

The very top layer is to be thinner silver and echoes the shape of the layer below but is cut smaller to allow a 1.5mm margin between the layers (see diagrams below). The top layer will be pierced at the top and sides and punched in a circular shape around the bezel.

The handmade bezel will be oval: 2mm high at its minimum height and increasing to 3mm at its maximum to follow the curve of the shank.

Stone: Lapis 10mm x 8mm oval.

Diagram 1:

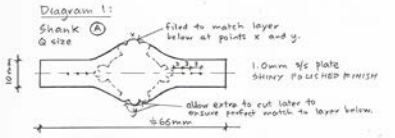


Diagram 2:

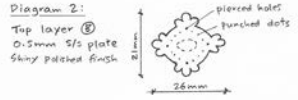


Diagram 3:

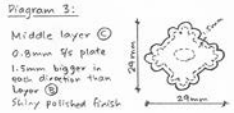
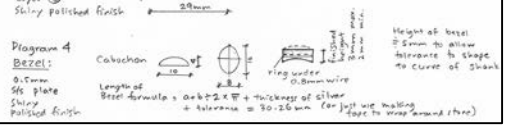


Diagram 4



1

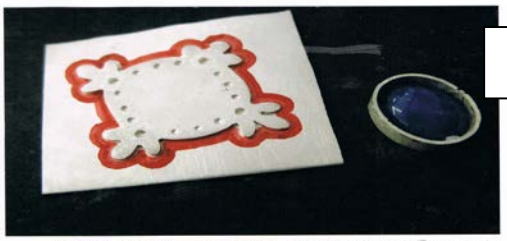
CONSTRUCTION SCHEDULE:

1. Cut out shank (A) from 1.0mm sterling silver plate according to specification allowing generous tolerance to ensure a correct fit at top and bottom points. Punch holes on the sides of the shank at 3mm intervals with pointed punch and small metal hammer.
2. Cut out top layer (B) from 0.5mm sterling silver plate using small saw. File and sand all sides. Lightly sand top surface and mark dots evenly in a circle 1.0mm from outside edge to allow enough space for the central bezel.
3. Drill four holes on the top and sides of top layer (0.8mm drill bit). Punch the rest of the holes to complete the circle.
4. Sweat solder (hard) Layer B onto a square piece of 0.8mm sterling silver plate. Clean in pickle and rinse. Draw around Layer B with a permanent marker and cut outside of drawn line to form Layer C. File the sides of Layer C except for very top and bottom points. These will be filed and tidied up later.
5. Sweat solder (hard) Layer C (now double-layered B+C) onto the shank centrally. Clean in pickle. Cut the shank at points x and y (see Diagram 1) so that the shank shape matches the top layer at these points. File and sand at these points.
6. Put the now multi-layered shank in the round, ensuring that it is Size Q using hard solder. The seam must be completely flush to ensure that the ring is strong. Make sure that the ring is round by hammering it against the mandrel turning it so top and bottom are shaped evenly. Check that it is Size Q at the end of this process.
7. Make the bezel to the right size to fit the stone, wrapping masking tape around the stone to get the length of silver for the bezel. This will confirm that the formula measurement is correct. Work out necessary height of the bezel by eye, allowing generous tolerance. (see Diagram 4)
8. Check that the stone fits correctly into the bezel – snug fit but stone able to come out of the bezel without too much difficulty. Adjust if necessary.
9. File the bezel at top and bottom until it sits flush with the round of the shank.
10. Solder bezel (medium) onto shank. Clean in pickle and rinse. Solder (easy) 0.8mm wire ring onto the shank on the inside of the bezel in order to lift the stone from the silver and let light shine through the stone. Clean in pickle and rinse.
11. File, sand, tidy and polish shank and bezel to finished shiny quality, including getting rid of all firescale. Smooth inside with sanding rod. Shiny polish finish with polishing machine.
12. Set stone into the bezel – put in vice and hammer gently with setting tool followed by burnisher. Light sand and polish the top edge of the bezel.

2

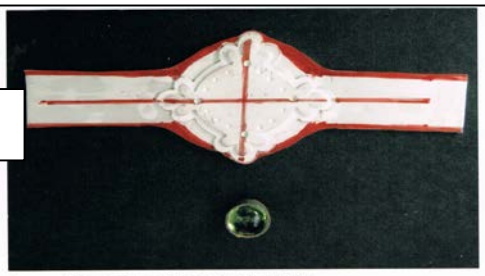
CONSTRUCTION PROCESS

Followed Steps 1-6 according to schedule although I decided to leave the punching of the holes in the shank until later to see if it needed it or not once the top layer was on.



Top layer (B) sweat soldered to 0.8mm plate. Layer (C) marked in pen. Oval bezel made for lapis.

3



Layers (B) and (C) sweat soldered to shank.
New bezel and peridot.
Decided punches in shank not necessary.
Red cross in middle identifies where bezel must sit centrally and symmetrically.

Testing Schedule Achievement Standard 91344 Cabochon Ring	Test	Notes
Ring shank soldered using hard solder	Yes	
Solder joins are accurate with sufficient solder to withstand expected use	Yes	
Shank filed, sanded and shaped correctly	Needed to do this to ensure that bezel fitted on correctly.	
Ring shank checked for size against specifications using appropriate tool and corrected if necessary	Yes using mandrel with ring sizes marked on it	
Bezel fits stone with sufficient ease, and height of bezel is correct for stone, (tested visually)	Yes	
Bezel fits shank accurately, check visually no light seen through join	Yes	
Bezel soldered onto shank accurately, check symmetry, distance from edges	Yes	This was an important part of the design.
Stone supported correctly in bezel setting (wobble test)	Yes	
Metal finish completed to specification before stone is set	Yes	
Stone set correctly, check visually for gaps at edges of bezel	Having made the bezel for the 7mm diameter peridot, I struggled to get the bezel to fit onto the shank properly until I was advised that I had to fully sand down the shank if I was to get a good flush finish. Having done that to the shank, I found it much easier to get a good fit between the shank and the bezel and it soldered onto the shank without a hitch.	

4

The completed shank in the round, ready to sand with a sanding stick to prepare it for the bezel. Prior to finishing the ring was checked on the mandrel to ensure it was still Size Q. Sanding sticks = 180, 600, 1000 grade

Make Cabochon Ring

5

Record of Evidence	Sign	Notes
Ring design Includes reason for design process		✓ challenging design.
Alternative designs shown		✓
Specifications include at least two special features Structural (1+) Aesthetic (1+)		✓ ✓
Materials used ~~and castings~~		
Working drawings of each component to scale in mm, annotated		✓
Size of cab and size of ring shown		✓✓
Equipment and tools to make design features identified		✓
Construction plan for sequence of making ring		✓
Schedule of testing shows how and when testing carried out, to meet specifications		.not ticked off.
Record of progress provided with photographic evidence of making ring		✓ V. good photos.
Schedule of tests and recorded outcomes Show special feature development Show ring meets specifications		
Explanations of modifications to plans and/or problems encountered, photographic evidence		✓
Safety observed and recorded (schedule)		✓
Photographs - student using safety equipment and safe working practices		
MERIT Independence Student interaction with other students in workshop		✓
Level of teacher input required		minimal -
Accuracy: execution of techniques and tests		
Finished ring meets written specifications and testing schedule Size of ring Finished surface		✓ ✓

6

Safety Checklist Achievement Standard 91344 Cabochon Ring	Checked
Workshop rules observed for correct and safe use of tools and equipment	√
Appropriate clothing and footwear worn in the workshop	√
Personal safety carried out using protection including safety goggles and gloves where required when using machinery	√
Correct use of soldering and pickle pot	√
Worked safely around and consideration shown for other students in the workshop	√
Workplace kept tidy and cleaned after use	√

Evaluation

At this point also, I made some changes to the cabochon I had planned on using. I went through a variety of options before settling on my final decision. I decided that the oval lapis might cheapen the look of the ring so I looked into using an oval garnet instead but realized that the one I had planned to use had an imperfect surface. Then I thought of using a 5mm peridot but decided that that was too small and finally went with a 7mm diameter peridot. I am really happy with my final choice as the size works really well with the size of the top layer and the stone is beautiful against sterling silver. I did end up making the oval bezel for the lapis – will use at a later date!

	Grade Boundary: High Achieved
4.	For Achieved, students need to implement advanced procedures using resistant materials to make a specified product with special features. This involves: • selecting techniques to achieve special features • undertaking testing to monitor special feature construction and demonstrate that the product meets specifications • applying techniques to comply with relevant health and safety regulations. This student's project was to create a cabochon ring. Specifications for the ring, including special features, were established by testing initial ideas with paper and copper. This enabled the student to check for fit and comfort, and to determine if the special features (an oval shaped bezel and a twisted detail) were achievable (1). Appropriate techniques were selected and detailed on working drawings (3) and a construction schedule (4). The record of evidence (5) validates that techniques were carried out in compliance with health and safety regulations. The manner in which some testing (2) was carried out diminished the quality of the finished look of the ring. To reach Merit, the student would need to show a higher degree of independence and accuracy. Some techniques were challenging for the student, and this required steps to be repeated numerous times. Teacher reassurance was needed before moving onto the next step. For example, shaping and joining techniques should have been carried out with minimal teacher help. Checking of tolerances and the fit and flush of solder joins could have been more consistent, allowing the finish of the cabochon ring to be carried out to a higher standard.

1. Develop a design for your ring

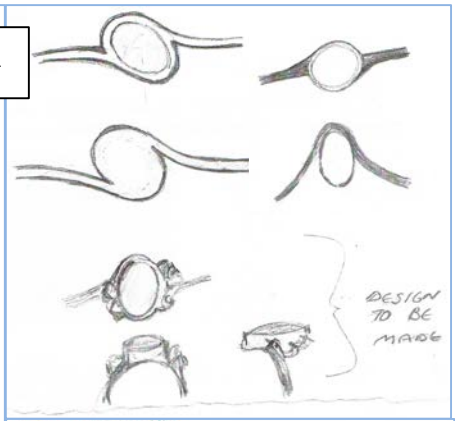
1

CABOCHON RING

The sketches show how different designs may work for this Cabachon. An Oval Onyx.

*This design I thought would work but once I made a pattern of it out of paper then copper I realised that it wouldn't sit properly for the wearer.

I then developed the design with more curves inspired by a building I saw in Barcelona designed by Gaudi "Casa Mila". The twisted metal on its facade.



Special features of this ring will be

Structural – shaped bezel

Aesthetic – Twisted details on side of bezel.

4. Make a testing checklist

2

- Make sure ring shank soldered using hard solder. YES
- Solder joins are accurate with sufficient solder to withstand use. YES
- Shank filed, sanded and shaped correctly. ✓ took a while because of shape
- Ring shank checked for size against specifications using appropriate tool and corrected if necessary. ✓
- Bezel fits stone with sufficient base and height of bezel is correct for stone – test visual. YES
- Bezel fits shank accurately – check visually – no light through join. ✓
- Bezel solder onto shank accurately – check symmetry – distance from edges. ALL GOOD
- Stone supported correctly in bezel setting – wobble test. ✓
- Check that twisted silver detail fits well – solder with medium. YES
- Metal finish completed to specification before stone is set. ✓
- Stone set, check visually for gaps at edges of bezel. ✓ ALL GOOD.
- Ring evaluated against specifications and drawings. ✓

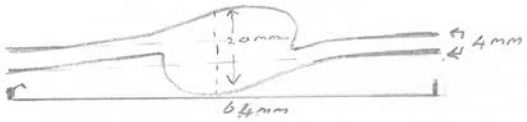
2. Prepare Working Drawings

3

SIZE OF STONE – 15mm x 11mm height of stone 5mm

BASE OF RING -

-



.8 mL STG SILVER

RING SIZE 62mm + 2mm

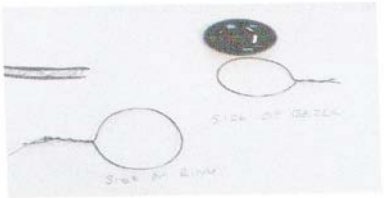
BEZEL -

5 mL STG SILVER

-Measurements for ring and bezel size were made by twisting wire around finger and stone, then cutting and measuring. This can be checked especially for the bezel by calculating

Oval $d + d \div 2x\pi =$

Round $d \times 3.14 =$



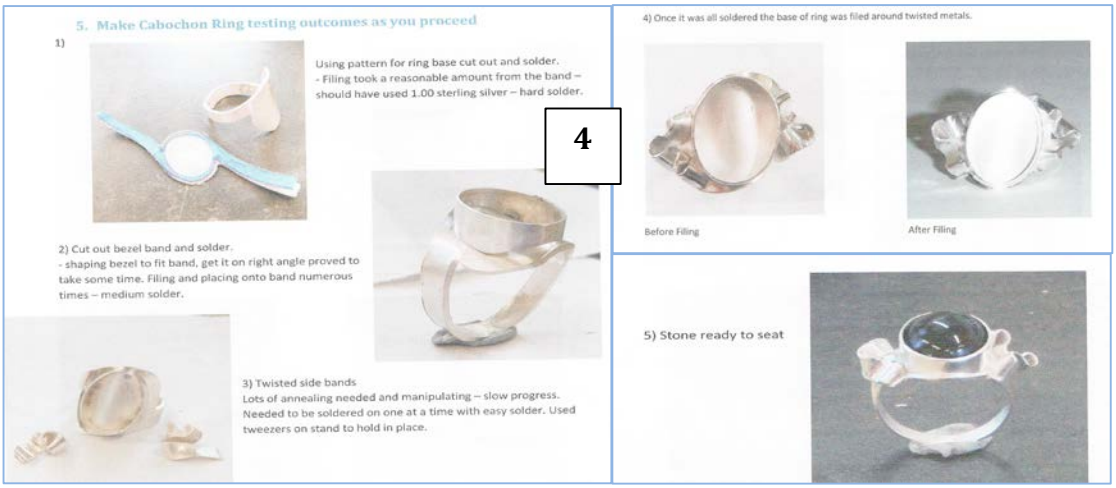
TWISTED DETAIL -

4 mm · 5mL STG SILVER

-Twisted detail is to be done freehand – difficult to design exactly so this will need to be worked step by step until aesthetically desired.

-To be dipped in lime sulphur then polished – giving depth to detailing.

FINISH –To be dipped in Lime Sulpher , then polished to give depth to the detailing



Record of Evidence	Sign	Notes
Ring design Includes reason for design process 5 Alternative designs shown Specifications include at least two special features Structural (1+) Aesthetic (1+) Materials used and costings Working drawings of each component to scale in mm, annotated Size of cab and size of ring shown Equipment and tools to make design features identified Construction plan for sequence of making ring Schedule of testing shows how and when testing carried out, to meet specifications		✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ 
Record of progress provided with photographic evidence of making ring Schedule of tests and recorded outcomes Show special feature development Show ring meets specifications Explanations of modifications to plans and/or problems encountered, photographic evidence		observed making. ✓ ✓ ✓ ✓
Safety observed and recorded (schedule) Photographs - student using safety equipment and safe working practices X		observed. checklist provided.

	Grade Boundary: Low Achieved
5.	For Achieved, students need to implement advanced procedures using resistant materials to make a specified product with special features. This involves: • selecting techniques to achieve special features • undertaking testing to monitor special feature construction and demonstrate that the product meets specifications • applying techniques to comply with relevant health and safety regulations. This student's project was to create a cabochon ring. A ring with special features was designed to meet specifications (1), and a working drawing (2) was completed. Teacher annotations state that later modifications were made to ensure that the ring would be finished on time, and at an appropriate skill level. Structural and aesthetic components are detailed (3). A construction plan (4) and testing sheet (6) show the techniques selected. These were carried out in a manner that complied with relevant health and safety regulations, as observed by the teacher (5). The testing checklist (6) gives some indication of how the outcome from testing was used to show that the ring met specifications. For a more secure Achieved, this student would need to undertake techniques more carefully to construct the cabochon ring to specifications. For example, because the student was unfamiliar with techniques, the quality of the join (bezel to the shank) was only just satisfactory (7). The teacher annotations also state that prompting was needed to ensure that the required tests were completed. While some prompting is acceptable, students should be able to carry out these procedures without too much teacher guidance.

My intention was to make a ring with two cabochons.
a) Cabochon was a stone polished
b) Cabochon was a glass cabochon made in class that I feel went quiet well together.
I wanted them to overlap, initially drawing a). But wasn't happy with this. So tried with arranging the two cabochons intersting together on the opposite plan. drawing b).
then to make it tighter to off centre them alittle. to sit on finger easier.
Drawing c) is my working design.

I made a template of the ring sized P½.

used in final design

first one for (b) Sterling silver 1mm th

is I used for ring.

2nd one for (c) Sterling silver 1m Thick

used (b) for the ring.

3rd one for Bezels. .5ml-thick for Both.

(a) (b)

1

a. Overlapping.

not really working.

b Meeting together.

c

WORKING DRAWINGS.

Actual shank used for Ring.

by 1mm thick. Stg

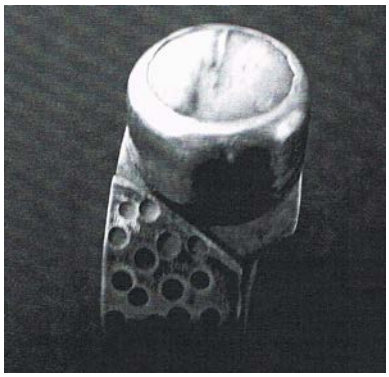
This is to fit P½ size ring.

2

Bezel for Ring.

by .5mm thick. stg

This includes 2mm for tolerance



The photos show a somewhat non smooth bezel setting. not to pleased about. This could be improved with the enamel.
I am pleased with the ring, like wearing it. The design I feel suits the cabochon. That is just a simple stone off the beach.

Development of construction plan to make a Cabochon Ring

1. gather required materials.
2. Cabochon. Silver shank Silver bezel.
3. make bezel to required size to fit cabochon.
4. make shank to required size of ring size.
5. Solder + fit the bezel to shank.
6. fit cabochon + set.
7. Sand + polish ring.

4

Structural

- handmade bezel to fit shape and size of selected stone
- ring shank made to correct size and soldered with correct grade of solder

Aesthetic

- e.g. texture using etching, hammer, rolling mill, stamps, or punches.
- shank design / shape

3

Safety observed and recorded (schedule) Photographs - student using safety equipment and safe working practices		✓

5

Testing Checklist.

These I did while making my ring.

1. Ring Shank soldered using hard solder.

To Solder the Shanks together. my design needed to be Sweat soldered + wired. (melting hard solder with flux to surface of silver.) and wired to hold in place so no room for movement) heating up to allow Solder to gain to edges together. This worked well.

2 Solder joins are accurate with sufficient solder to withstand needed use.

I also decided at this stage I would use some texture as not using two cabochons. needed something to accent the angles. I had created This required Straightening Silver again. by gently pully out with plyers. to indent surface used hammer + punch.
Repeated the mandrel and swag again.

3 Shank ~~Solder~~ filed, sanded and shaped correctly.

Third step.
Bezel shaped to fit the shape of the shank.
no light spaces needs to fit well to form a good strong solder So bezel wont be knocked off. ~~filling~~ filing till it fits.

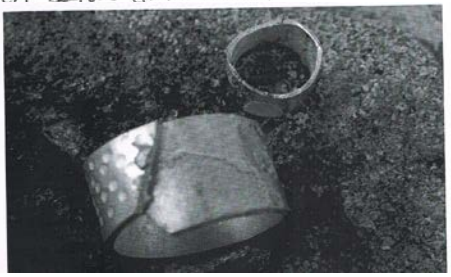
4 Bezel stone fits with sufficient ease and height of bezel is correct for the stone (I needed to include a small rim inside so the the stone could be set at the height I wanted).

5. Bezel fits shank accurately no light seen through join.

6 Bezel ~~Shot~~ soldered onto shank accurately, check symmetry and distance from edges.

7 Stone supported correctly in bezel setting (wobble test)

8 metal finish completed to specification before stone is set.



	Grade Boundary: High Not Achieved
6.	For Achieved, students need to implement advanced procedures using resistant materials to make a specified product with special features. This involves: • selecting techniques to achieve special features • undertaking testing to monitor special feature construction and demonstrate that the product meets specifications • applying techniques to comply with relevant health and safety regulations. This student's project was to create a cabochon ring. The student evidence gives some indication of techniques being selected (2) and testing occurring (3) (4). The student produced a ring that was fit for purpose. To reach Achieved, the student would need to show that they could consistently follow techniques, undertake appropriate testing, and comply with health and safety regulations during construction, to ensure that a cabochon ring that met specifications is completed. Teacher annotations confirmed that not all procedures were carried out correctly, and in a way that complied with relevant health and safety regulations. For example, a check of measurements (as detailed in journal) before cutting would have ensured the shank was accurately sized (5). By not undertaking this test, the shank needed to be stretched to the correct size (6). The result is a shank that is outside the accepted tolerances of symmetry as indicated in the working drawings (7). Although this student produced a ring that was fit for purpose (1), too much teacher assistance was required in order to complete it within the expected timeframe.

Specifications

1

- Manufactured and assembled to the tolerances indicated in the drawings
- Thickness of silver needs to suit chosen design and ensure robust construction for regular and sustained wear
- Drawings of the ring shank allow for chosen thickness of metal and required size of finished ring
- Size, shape and variety of cabochon stone identified
- Length and height of bezel calculated using given formula allowing stone to fit securely when set
- Required surface finish is achieved on shank and bezel, eg matte, satin, shiny

Development of construction plan. to make a Cabochon Ring

2

1. gather required materials.
2. Cabochon. silver shank
   silver bezel.
3. make bezel to required size to fit cabochon.
4. make shank to required size of ring size.
5. Solder + fit the bezel to shank.
6. fit cabochon + set.
7. Sand + polish ring.

3

Testing

- Ring shank soldered using hard solder
- Solder joins are accurate with sufficient solder to withstand expected use

After a pickle using medium solder. with flux. on inside of Bezel -6 small pieces evenly spaced. heating with gas the shank and t to allow Solder to flow.

This needs to be checked that it is continuous solder with no gaps is strong.

Sanding at this stage is needed to finish off the ring

4

Journal

Monday 20 February Also look at artclaynz.com. Grant from Fruitful Endeavours will come end of April/May.

Had been to Hettie's with the boys at the weekend, and bought 3 cabochons: a labradorite (7x7mm), a blue moonstone (9x7mm) and a green aventurine (8x10mm).

Thursday 23 Feb.

Started to make the bezel for the stone. Formula for bezel

~~Long~~ width PLUS breadth of stone ÷ 2
7 * 7 mm (14)
= 7mm x π (approx 3.14...)
= 21.98 then add 2mm as for ring
= 23.98 ≈ 24mm

5

Height 5mm

When I cut mine I don't think I could have added the extra 2mm, because it was too small and had to stretched by hammering

6

Thursday 1 March

WORKING DRAWINGS

Actual shank used for Ring

by 1mm thick. Stg

This is to fit P½ size ring.

Monday 5 March

Stone got wedged at one point - be careful - file inside bezel.

Bezel for Ring.

by .5mm thick. Stg

This includes 2mm for tolerance

7

Evaluation

Finishing as I used a non pressions stone and to give it a worn look I used the lime sulphur to darken the texturing.

The photos show a somewhat non smooth bezel setting. not to pleased about. This could be improved with the dremel.
I am pleased with the ring. like wearing it. The design I feel suits the cabochon. which is just a simple stone off the beach.

I have written down my process + how I made the ring. hopefully I will be able to include the other requirements separately.