# Unit 105: Exploring Specialist Metal and Jewellery Techniques

**Unit code:** D/502/5376

**QCF Level 3:** BTEC National

**Credit value:** 10

**Guided learning hours:** 60

## Aim and purpose

The aim of this unit is for learners to gain a thorough knowledge of the properties and characteristics, together with specialist making techniques, for metalwork and jewellery. Learners will do this through exploration and investigation rather than the production of finished artefacts.

## Unit introduction

Jewellery has long existed as a form of adornment and as a perceived enhancement of beauty and, as such, has roots in all cultures. Contemporary jewellery designers have reconsidered the role of ornament and its relationship to the human body to create a design aesthetic that results from innovative manipulation of shape and form and continuous exploration of the potential of materials.

For any practitioner working within the field of metal and jewellery design an understanding of the specialist techniques and processes for working with the relevant materials is essential. The ability to skilfully manipulate and explore these materials and techniques to exploit their full potential within both expected and unexpected contexts is the backbone of any designer's work. An important aspect of this exploration is the continuous analysis and evaluation of results and use of the knowledge and understanding gained to inform further work.

This unit guides learners to explore the properties and characteristics of materials for metalwork and jewellery making and a range of specialist working techniques which may include shaping, forming, deforming, joining, bending, hollow forming, laminating, forging, casting, etching, patinating, enamelling and, stone setting depending on the resources and facilities available. The focus of this unit is on exploration and investigation rather than on the production of finished artefacts and learners will be encouraged to develop a creative yet methodical approach whilst exploring the interplay between design and technique. Although technical and creative processes form an essential part of this exploration, the key aim is to gain a thorough understanding of the properties and characteristics of materials for metalworking and jewellery making and how they can be treated, prepared and worked to satisfy design intentions. Learners will learn how to analyse the suitability of specialist techniques in terms of aesthetic qualities and fitness for purpose at appropriate stages of the creative process and will begin to develop a personal visual language.

Use of materials, tools and equipment has health and safety implications. Learners will become familiar with COSHH guidance and risk assessments relevant to specialist metal and jewellery techniques and materials.

## Learning outcomes

**On completion of this unit a learner should:**

1 Know about the properties and characteristics of materials in metalwork and jewellery making

2 Be able to select and prepare materials for metalwork and jewellery making to meet specified requirements

3 Be able to experiment with specialist techniques in metalwork and jewellery making

4 Be able to present explorations in metalwork and jewellery.

# Unit content

## 1 Know about the properties and characteristics of materials in metalwork and jewellery making

*Properties*: eg strength, flexibility, ductility, malleability, density, weight and durability; surface treatment, construction and structural potential

*Characteristics*: eg aesthetic qualities, ease of working, fineness, colour, pattern, texture; suitability for specified purposes, eg performance according to strengths and weaknesses, impact, durability, quality of finishes which may be applied

*Materials*: a range of metals, eg ferrous (iron and steel), non-ferrous (base metals, precious metals, copper, silver), refractory metals (titanium), alloys (brass, bronze, gilding metal); forms, eg sheet, wire coils, tube; associated materials, eg resin, fabric, beads, gemstones, solder, rubber for moulds, wax for lost wax casting, found and recycled materials; components, eg fastenings, fixings

## 2 Be able to select and prepare materials for metalwork and jewellery making to meet specified requirements

*Selecting suitable materials*: consider technical and aesthetic properties and characteristics of metal and jewellery materials and their appropriateness for creative design intentions

*Preparing specialist materials*: eg stretching, measuring, marking, cutting, piercing, sawing, annealing, forming, joining, soldering, riveting

*Health and safety in workshop practice*: the Health and Safety Act 1974, elimination of risk to self and others; thinking and working safely within a studio or workshop environment; following relevant COSHH guidance on materials and workshop practice for specialist techniques for working with metals and associated materials

## 3 Be able to experiment with specialist techniques in metalwork and jewellery making

*Specialist working techniques*: eg cutting, shaping, forming, laminating, forging, lost wax casting, stone setting; surface decoration (hammering, engraving, acid etching, patination, reticulation, sand blasting, enamelling); construction and assembling techniques, eg soldering, welding, riveting

*Specialist equipment*: use a range of hand and machine tools, eg hammers, saws, pliers, callipers, doming block and punches, rolling mill, soldering torches, enamelling kiln, polishing unit

*Investigating*: the materials and techniques used by professional metalworkers and jewellery makers, eg historical, contemporary

*Experimenting*: eg testing materials, finishes, structures and processes; sketchbook work; sample pieces

*Recording*: in appropriate format, eg notes, technical data, reports, drawings, samples, photographs

## 4 Be able to present explorations in metalwork and jewellery making

*Present explorations:* for future reference; to others, eg peers, tutors, clients, customers; format, eg annotation in sketchbooks, notebooks, samples, on-screen

*Explain choices*: techniques; processes; suitability, eg through written evaluation, oral presentation, discussion

*Suitability*: aesthetic qualities; technical qualities; fitness for purpose

# Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

| Assessment and grading criteria | | |
|---|---|---|
| **To achieve a pass grade the evidence must show that the learner is able to:** | **To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:** | **To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:** |
| **P1** describe the properties and characteristics of relevant materials [IE] | **M1** generate individual work, through purposeful exploration of specialist metalwork and jewellery techniques, consistently meeting specified requirements | **D1** independently produce an innovative body of work that explores specialist metalwork and jewellery techniques comprehensively, showing perceptive evaluation of techniques and processes. |
| **P2** select and prepare materials for metalwork and jewellery making, in response to specified requirements [CT, SM] | **M2** coherently present exploratory work, showing analysis of techniques and processes. | |
| **P3** experiment safely with specialist techniques in metalwork and jewellery making [CT] | | |
| **P4** present exploratory work [RL, SM] | | |
| **P5** review own work. [RL] | | |

**PLTS**: This summary references where applicable, in the square brackets, the elements of the personal, learning and thinking skills applicable in the pass criteria. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

| **Key** | IE – independent enquirers | RL – reflective learners | SM – self-managers |
|---|---|---|---|
| | CT – creative thinkers | TW – team workers | EP – effective participators |

# Essential guidance for tutors

## Delivery

For this unit learners should have access to workbenches with appropriate tools and equipment in a studio/ workshop environment. Depending on the range of specialist techniques to be offered, this may include metalwork tools, standard jeweller's equipment, hand tools and appropriate machinery with extraction mechanisms where necessary. In all cases appropriate personal protective equipment should be available.

This unit has been designed to give learners an opportunity to undertake focused investigation and experiment in the specialist area of metalwork and jewellery. Tutors need to provide specific vocational, technical and theoretical support to enable learners to do this.

This unit is likely to be delivered mainly in the workshop or studio but may be supplemented with outside visits to exhibitions, museums, galleries, jewellery studios, metal and jewellery suppliers.

It is one of two units designed to introduce learners to the specialist techniques for metals and jewellery and will also extend the understanding gained *in Materials, Techniques and Processes in Art and Design.*

Learning outcome 1 requires an introduction to the properties and characteristics of materials for metalwork and jewellery making and a range of specialist working techniques. Metals may include base metals (copper, nickel, tin, zinc, lead), alloys (brass, bronze, gilding metal), precious metals (silver, gold, platinum), refractory metals such as titanium and ferrous metals such as iron and steel. Metals are often used in conjunction with other materials and these might include gemstones, both precious and semi-precious, acrylics, resin, glass, shells, feathers, and found objects and recycled materials. The possibilities for combination are endless. Specialist working techniques may include cutting, piercing, drilling, filing, shaping, forming, deforming, bending, doming, hollow forming, laminating, forging, casting, stone setting, mokume gane, enamelling, depending on resources and facilities available.

Specialist surface decoration techniques should also be explored and are likely to include a range of cold techniques such as hammering, polishing, engraving, acid etching, patination, roller printing, sand-blasting and a range of hot techniques such as granulation, fusing, reticulation and, enamelling. Additionally, a range of construction and assembling techniques such as soldering, welding, riveting, linking, hinging, fixing should be explored. The materials and processes explored will depend on the resources and facilities available but should include the use of a range of hand and machine tools.

For learning outcome 2, learners need to select and prepare materials for metalwork and jewellery making to meet specified requirements. Learners need to explore and investigate the properties, characteristics and potential of specialist metal and jewellery techniques and materials. To do this, need to instruct them in how to carry out an investigative enquiry from planning research, directions for exploration and experimentation and analysis and evaluation of results. Research into the materials and techniques used by professional designers, both historical and contemporary, will provide useful reference materials and should be recorded appropriately in photographs, found images, notes, drawings and samples. Manual dexterity, good hand-eye coordination and attention to detail are all essential skills for jewellery makers and metalworkers and tutors could devise a series of simple practical exercises to develop these skills.

For learning outcome 3, learners need to be more independent in their experimental work, exploring the potential of specialist techniques and processes to consolidate their learning. Learners should expect to produce a range of mainly practical work that demonstrates their breadth of understanding when using specialist metalwork and jewellery making techniques and processes. This could be in the form of tests, samples and/or prototypes and will provide evidence of manipulation of the materials and techniques. For reasons of economy initial experiments are likely to include the use of base and alloys. Investigation and exploration may arise from the needs of a given situation but may also be stimulated by curiosity, extending personal vocabulary or style.

Since the emphasis in this unit is on exploration rather than on the production of finished work, learners should be encouraged to use many different means of discovering, exploiting and investigating the potential of specialist metalwork and jewellery making techniques and generating ideas. Work can range from purely experimental, aimed at discovering the unexpected outcome as well as confirming established information, to systematic, scientific and sequential investigation of the materials.

It is particularly important for learners to develop the habit of making accurate and comprehensive records of their exploration. These may be in the form of samples, drawings, photographs, notes and reports and should be organised appropriately in a sketchbook or notebook. These records, alongside practical work and tutor observation, will provide the evidence required for assessment purposes.

For learning outcome 4, learners should discuss and comment on the success and/or failure of techniques used with regard to the 'fitness for purpose' of work produced. Discussion, group work, presentation to peers may form part of the delivery.

This unit is linked to *Extending Specialist Metal and Jewellery Techniques* and in most cases the two should be taught either in sequence or through an integrated programme. For assessment purposes the units are written in order to separate exploration and preparation from design development and production processes. As this is an artificial separation an integrated approach to delivery is likely to be more suitable. It is essential that there are appropriate means of referencing the unit specifications within integrated projects and programmes.

Tutors need to advise learners of, all aspects of current legislation associated with health and safety practices in the studio or workplace and ensure they adhere to it. Learners should observe appropriate COSHH guidance material and will need to be inducted in the safe working practices as they are applied to the working characteristics of specialist metalwork and jewellery techniques. Tutors should explain the importance of using personal protective equipment, such as clothing, eye shields and masks and behaving with regard to the health and safety of themselves and of others. Where sharp materials and hot processes are concerned, it is clearly important to continuously reinforce the principles of safe working practice to avoid injuries.

## Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan demonstrates one way in planning the delivery and assessment of this unit.

| Topic and suggested assignments/activities and/assessment |
|---|
| Introduction to unit and structure of the programme – whole class. |
| Introduction to relevant health and safety in the workshop including COSHH, use of personal protective equipment etc – whole class. |
| **Assignment 1:** Investigating the Materials – Research and Enquiry<br>Introduction to assignment and tasks – whole class.<br>Introduction to carrying out an investigative enquiry – whole class.<br>Learners:<br>• explore historical and contemporary precedents – visit Crafts Council gallery, V&A jewellery gallery – make drawings, notes, photographs etc – whole group/tutor<br>• investigate the creative potential and limitations of the specialist materials and their applications – exhibitions, sketchbook work, internet research, etc – individual work.<br>• collate findings from all research – annotated sketchbook work. |
| Learner-initiated study. |

| Topic and suggested assignments/activities and/assessment |
| --- |
| **Assignment 2:** Investigating the Materials – Experiment and Exploration<br><br>Introduction to assignment and tasks – whole class.<br><br>Introduction to exploring the properties and characteristics of metalwork and jewellery materials – tutor whole class then individually.<br><br>Learners:<br><br>• carry out a series of tasks for developing manual dexterity, hand/eye coordination – individual practical studio work<br>• carry out a series of experiments with different types of metalwork and jewellery materials to explore their properties, characteristics and limitations – practical studio work<br>• keep records of results and analyse findings against expectations – technical notes, annotated sketches<br>• explain choices – discuss in tutorials<br>• carry out a series of experiments combining a range of metalwork and associated jewellery materials – practical studio work – observed by tutor<br>• analyse results and write up<br>• evaluate effectiveness of techniques and processes used – verbally and written<br>• present results to tutor and group – explain choices and present a collection of annotated sample pieces. |
| Learner initiated study. |
| **Assignment 3:** Investigating the Materials – Surfaces and Structures<br><br>Introduction to assignment and tasks – whole class.<br><br>Introduction to a range of specialist working techniques – tutor demonstration, Q&A then individual experiment with surface decoration, construction, joining and assembly. Learners:<br><br>• explore a range of techniques to manipulate shape and form – through maquettes, drawings, test pieces<br>• carry out a series of experiments to explore a range of decorative surface techniques – test pieces, individual practical work in studio<br>• assess results for aesthetic qualities and fitness for purpose, collate and use problem solving to address the unexpected – technical notes, annotated drawings<br>• carry out a series of experiments using a range of assembly/joining techniques and processes – practical work in studio<br>• evaluate effectiveness of techniques and processes used – verbally and written<br>• plan presentation<br>• present results of explorations as a series of maquettes, drawings, sample pieces, annotations. |
| Learner-initiated study. |
| Review of unit and assessment. |

## Assessment

For the pass criteria, learners must investigate and experiment with the relevant specialist metal and jewellery techniques safely and be able to discuss their ideas in simple terms. It is anticipated that some learners may need tutor support to achieve the pass criteria. Evidence can be assessed by observation, discussion, and feedback from group presentations.

Evidence for P1, P2 and P3 will overlap to a certain extent and should include recordings of research and investigations for a range of specialist metal and jewellery techniques and processes. These should be organised in a sketchbook or notebook. These records, alongside actual work and tutor observation, will provide the evidence required for assessment purposes.

Evidence for P3 should include a range of experimental work, which is likely to be in the form of sample pieces with records of making processes. Work generated in this context will be influenced by the technical opportunities and constraints of the specialism and the available resources.

For P4, learners need to present their experiments and findings in a suitable way. This should include actual samples, photographs and notations of processes and techniques and is intended to be of use to learners in future work using specialist glass and jewellery making techniques. Evidence for P4 will be strongly linked to P5.

For P5, learners need to review their work using appropriate terminology and this may be part of an oral presentation or discussion or may take the form of a written evaluation or questionnaire. Evidence for oral presentation/discussion could be recorded or in the form of tutor written observations.

For M1, learners must work with some independence and show clear understanding of the characteristics and uses of a range of specialist metal and jewellery techniques and processes. They should demonstrate the ability to use metal and jewellery techniques and processes in different contexts and to apply results of experiments to their own continued creative work. The tasks are likely to be the same as those set for the pass criteria but learners should carry out investigations and experimentation with increased independence and greater understanding.

For M2, learners need to demonstrate a greater awareness of skills and knowledge gained in any discussion of their work. Work must show attention to detail and finish even in samples and experiments. Again, assessment evidence should take a similar format to that for P4.

For D1, learners must work independently to produce an innovative body of work that recognises the potential and limitations of specialist metal and jewellery techniques and processes and shows a high level of practical skill and intellectual rigour. Additionally, learners should reflect on the effectiveness of their decision making and use knowledge and skills gained to advance the creative work. Assessment evidence should take a similar format to M1 and M2 but should show a deeper level of analysis and understanding.

### Programme of suggested assignments

The table below shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the assessment and grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

| Criteria covered | Assignment title | Scenario | Assessment method |
|---|---|---|---|
| P1, P2<br>M1<br>D1 | **Assignment 1:** Investigating the Materials – Research and Enquiry | A jeweller carries out an investigative enquiry into historical and contemporary use of materials for jewellery making and presents results. | • Annotated sketchbook.<br>• Photographs, images.<br>• Collated research. |
| P1, P2, P3, P4, P5<br>M1, M2<br>D1 | **Assignment 2:** Investigating the Materials – Experiment and Exploration | A metal worker explores the properties and characteristics of materials for metalwork, making through a series of experiments, analysis and problem solving and assess the results. | • Samples/test pieces.<br>• Technical notes.<br>• Annotated sketches.<br>• Verbal and written evaluation. |
| P1, P2, P3, P4, P5<br>M1, M2<br>D1 | **Assignment 3:** Investigating the Materials – Surfaces and Structures | Members of a jewellery cooperative explore a range of specialist working techniques for metalwork and jewellery making to include surface decoration, construction and joining techniques with the aim of producing collaborative work. | • Annotated sketchbook work.<br>• Technical notes.<br>• Sample pieces.<br>• Maquettes/models.<br>• Verbal and written evaluation of effectiveness of techniques and processes used. |

## Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC Art and Design sector suite. This unit has particular links with the following unit titles in the BTEC Art and Design suite:

| Level 1 | Level 2 | Level 3 |
|---|---|---|
| Introduction to 3D Design Crafts | Working in Product Design | Extending Specialist Metal and Jewellery Techniques |
| Explore Surface Decoration | Explore Surface Decoration | Exploring Resistant Materials |
| Creative Use of Materials, Techniques and Processes | Working in 3D Design Crafts | Extending Resistant Materials |

## Essential resources

Learners need access to workshop facilities equipped to the appropriate standards for this level of specialised work. For metalwork, learners need workbenches, metalwork tools and machinery with extraction mechanisms where necessary. For jewellery, learners need standard jeweller's equipment, jewellery workbenches, pendant drills, soldering torches and polishing unit and a, pickle tank with extraction mechanisms. A rolling mill, sand blaster, and enamelling kiln are desirable according to the techniques offered. Learners also need a full range of hand tools including hammers, saws, pliers, anvils, leather bags, doming blocks and punches, pitch bowl, stakes, mandrils and tribletts. Suitable space for 'hot' work such as soldering, welding, forging, pouring and casting and a space for the use of small hand tools and experimental work are required according to the techniques offered. There should also be a safe area for handling hazardous substances such as acids, mordants and pickle. There should be adequate storage space for materials, work in progress and finished work including secure and appropriate facilities for the safe storage of valuable materials. Learners also need a clean area for drawing and recording work. For research learners need access to technical resources, a library, the internet, journals and IT facilities.

## Employer engagement and vocational contexts

Centres should develop links with practising artists, craftspeople and designers to deliver assignments to learners or to provide work experience.

Links with employers are essential to the delivery of the programme for work experience and future employment.

Vocational learning support resources:

- Learning and Skills Network – www.vocationallearning.org.uk

Business and finance advice:

- local and regional Business Link – www.businesslink.gov.uk

Assignments should be vocationally relevant; centres should consider the delivery of 'live projects', for example, to support the vocational content of the unit and programme.

Creative and Cultural Skills (www.ccskills.org.uk), the Sector Skills Council for Arts, Crafts and Design, has launched the web portal Creative Choices (www.creative-choices.co.uk). This portal has a range of information about careers in the arts, crafts and design sector, including job descriptions.

Creative making skills are identified as a long term need for the sector and this unit aims to equip learners with a broad base of practical design and making skills relating to specialist jewellery and metalwork materials and techniques, supported by sound technical knowledge to underpin the processes. With the lack of craft education in schools, the programme which includes this unit contributes to the continuing training of jewellers and metalworkers.

## Indicative reading for learners

### Textbooks

McCreight T – *Practical Casting* (Davis Publications, 1994) ISBN 978-0961598457

McCreight T – *The Complete Metalsmith* (Davis Publications, 1991) ISBN 978-0871922403

McGrath J – *The Jeweller's Directory of Decorative Finishes* (A&C Black, 2005) ISBN 978-0713670936

Olver E – *The Jeweller's Directory of Shape and Form* (A&C Black, 2001) ISBN 978-0713654875

Untracht O – *Jewellery Concepts and Technology* (Robert Hale, 1985) ISBN 978-0709196167

### Journal

*Crafts* – magazine published by the Crafts' Council every two months covering full range of crafts including metalwork and jewellery.

### Websites

| | |
|---|---|
| www.craftscouncil.org.uk | Crafts Council: photo library of work by contemporary jewellers |
| www.jaitc.org.uk | Jewellery and Allied Industries Training Council |
| www.vam.ac.uk/collections/jewellery | Victoria & Albert Museum |

## Delivery of personal, learning and thinking skills

The table below identifies the opportunities for personal, learning and thinking skills (PLTS) that have been included within the pass assessment criteria of this unit.

| Skill | When learners are ... |
|---|---|
| **Independent enquirers** | planning and carrying out an investigative enquiry into the properties and characteristics of specialist materials.<br>recording findings of experiments and analysing to inform further work |
| **Creative thinkers** | generating experimental work using specialist techniques for metalwork and jewellery making |
| **Reflective learners** | reviewing and evaluating the results of their own work |
| **Self-managers** | using tools and materials safely. |

Although PLTS are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

| Skill | When learners are ... |
|---|---|
| **Independent enquirers** | selecting and preparing materials for metalwork and jewellery making in response to specified requirements |
| **Creative thinkers** | developing and adapting ideas based on results<br>problem solving to address unexpected outcomes of experiments<br>presenting experimental work and justifying decisions made |
| **Reflective learners** | keeping a reflective log on their own progress and development<br>considering own strengths and areas for improvement and suggesting ways forward |
| **Team workers** | working in a group to share research and taking responsibility for their own contribution<br>managing discussions to reach agreement and achieve results |
| **Self-managers** | managing and prioritising their workload within specified time frames<br>managing resources<br>communicating to audience of peers and tutors |
| **Effective participators** | contributing to group discussions, group brainstorming sessions. |

## Functional Skills – Level 2

| Skill | When learners are ... |
|---|---|
| **ICT – Use ICT systems** | |
| Select, interact with and use ICT systems independently for a complex task to meet a variety of needs | researching into work of other artists, designers and makers |
| Use ICT to effectively plan work and evaluate the effectiveness of the ICT system they have used | planning research and presentations<br>presenting their own creative work to peer group and tutors |
| **ICT – Find and select information** | |
| Select and use a variety of sources of information independently for a complex task | researching into work of other artists, designers and makers and presenting findings |
| Access, search for, select and use ICT-based information and evaluate its fitness for purpose | using internet for research<br>selecting appropriate material for presentation |
| **ICT – Develop, present and communicate information** | |
| Enter, develop and format information independently to suit its meaning and purpose including:<br>• text and tables<br>• images<br>• numbers<br>• records | collating research with words and images<br>evaluating work<br>presenting research findings, possibly as a PowerPoint presentation |
| Bring together information to suit content and purpose | researching and presenting findings<br>planning presentation |
| Present information in ways that are fit for purpose and audience | presenting findings of research<br>discussing their own, their peers' and others' views on the work of other artists, designers and makers |
| **Mathematics** | |
| Understand routine and non-routine problems in a wide range of familiar and unfamiliar contexts and situations | planning project work and accessing information from suppliers etc<br>calculating sizes/weights of materials<br>calculating ring sizes using appropriate formula for circumference of a circle ($\pi$d)<br>using ring size calculations to inform work |
| Identify the situation or problem and the mathematical methods needed to tackle it | |
| Select and apply a range of skills to find solutions | |
| Use appropriate checking procedures and evaluate their effectiveness at each stage | |

| Skill | When learners are ... |
|---|---|
| **English** | |
| Speaking and listening – make a range of contributions to discussions and make effective presentations in a wide range of contexts | discussing their own, their peers' and others' views on their own work and on the work of others<br>presenting own creative work to peer group and tutors |
| Reading – compare, select, read and understand texts and use them to gather information, ideas, arguments and opinions | reading for research |
| Writing – write documents, including extended writing pieces, communicating information, ideas and opinions, effectively and persuasively | writing up research<br>writing up technical notes on processes and materials<br>writing an evaluation of their own work. |