



## Higher National Unit specification

### General information for centres

**Unit title:** Jewellery: Practical Gemmology

**Unit code:** F3XJ 34

**Unit purpose:** This Unit will enable candidates to develop the underpinning knowledge and practical skills required to analyse and identify a range of gemstones.

On completion of the Unit the candidate should be able to:

- 1 Describe the physical and optical theories in gemmological study.
- 2 Explain the use and function of gemmological instruments.
- 3 Produce an identification system for gem materials.
- 4 Use gemmological equipment to analyse gem materials.

**Credit points and level:** 2 HN credits at SCQF level 7: (16 SCQF credit points at SCQF level 7\*)

*\*SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

**Recommended prior knowledge and skills:** While entry to this Unit is at the discretion of the centre, candidates would benefit from having previously achieved the NQ Unit, D16H 12 *Retail Jewellery: Gemstones*.

**Core Skills:** There are opportunities to develop the Core Skills of *Problem Solving* at SCQF level 6 and the component Using Number of the Core Skill of *Numeracy* at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

**Context for delivery:** If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

**Assessment:** Outcome 1 could be in the form of closed-book assessments on physical and chemical theories relating to gemmology. Outcomes 2 and 3 could be in the form of reports. Outcome 4 will be in the form of a closed-book practical assessment with a range of gemstones and optical testing equipment.

## **Higher National Unit specification: statement of standards**

**Unit title:** Jewellery: Practical Gemmology

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The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

### **Outcome 1**

Describe the physical and optical theories in gemmological study

#### **Knowledge and/or Skills**

- ◆ Chemical compositions
- ◆ Crystallography
- ◆ Electromagnetic Spectrum
- ◆ Optics

#### **Evidence Requirements**

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ describe gemmological chemical compositions in relation to the following terms: atom, element, compound, mineral
- ◆ describe crystallography in relation to the following terms: crystalline, cryptocrystalline, amorphous, habit, massive, twin
- ◆ describe electromagnetic wave theory and give a gemmological use for each of the following members of the electromagnetic spectrum: infra-red, visible, ultra violet, x-radiation, gamma radiation
- ◆ describe the following optical terms: refraction, reflection, absorption, polarisation, dispersion

#### **Assessment Guidelines**

This Outcome could be assessed by closed-book, short answer or restricted response questions.

## Higher National Unit specification: statement of standards (cont)

**Unit title:** Jewellery: Practical Gemmology

### Outcome 2

Explain the use and function of gemmological instruments

#### Knowledge and/or Skills

- ◆ Gemmological instrument
- ◆ Practical application
- ◆ Limitations of use

#### Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ explain the function and use of the following instruments: polariscope, refractometer, microscope, spectroscope, dichroscope, Chelsea filter. Candidates must:
  - include a description of the main components of each item of equipment and an explanation of the way in which each instrument operates.
  - make reference to the optical property on which each of the following instruments is based: polariscope, refractometer, spectroscope, dichroscope, Chelsea filter.
- ◆ explain the limitations in use of the following instruments: polariscope, refractometer, microscope, spectroscope, dichroscope, Chelsea filter. Candidates must relate their explanation to the suitability or non-suitability of particular stones.

This Outcome is integrated with Outcome 1, in that candidates will use their knowledge of optical properties to meet the first Evidence Requirement.

#### Assessment Guidelines

This Outcome could be assessed using an open-book assessment in the form a report.

## Higher National Unit specification: statement of standards (cont)

**Unit title:** Jewellery: Practical Gemmology

### Outcome 3

Produce an identification system for gem materials

#### Knowledge and/or Skills

- ◆ Species and variety
- ◆ Colours
- ◆ Crystal Systems
- ◆ Constants

#### Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ produce an identification system for the following gemstones: diamond, corundum, beryl, quartz, garnet, opal, tourmaline, topaz, peridot, spinel, feldspar, jade, chrysoberyl, turquoise, malachite, zircon

The identification system must include species and variety, colour, crystal system and the following constants: hardness, refractive index, birefringence, specific gravity. The name or number must be correct against each gemstone and must have the potential to be used as a practical guide.

This Outcome is integrated with Outcome 4 in that candidates will use the identification system as a basis for their practical assessment in Outcome 4.

#### Assessment Guidelines

This could be assessed by an open-book assessment where candidates are required to produce a table providing the key identification details provided in the Evidence Requirements.

## **Higher National Unit specification: statement of standards (cont)**

**Unit title:** Jewellery: Practical Gemmology

### **Outcome 4**

Use gemmological equipment to analyse gem materials

#### **Knowledge and/or Skills**

- ◆ Use of equipment
- ◆ Test data
- ◆ Analysis

#### **Evidence Requirements**

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ analyse 12 gem materials through the selection and use of the appropriate gemmological equipment from the following: polariscope, refractometer, microscope, spectroscope, dichroscope, Chelsea filter. Candidates must record their test data, which will form the basis of their conclusion with regard to the identity of the gem material.

This assessment will be conducted under supervised conditions. Candidates will be given 12 gem materials, which they will have to analyse. Candidates must correctly identify 10 out of 12 materials under test. Candidates will be permitted to use the identification system they developed in Outcome 3.

This Outcome is integrated with Outcome 3 in that candidates will use the identification system from Outcome 3 as a basis for the practical assessment in this Outcome.

#### **Assessment Guidelines**

It is recommended that a three hour period be allocated to test a maximum of 12 gemstones.

## Administrative Information

**Unit code:** F3XJ 34  
**Unit title:** Jewellery: Practical Gemmology  
**Superclass category:** JH  
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### History of changes:

Version	Description of change	Date

**Source:** SQA

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## Higher National Unit specification: support notes

### Unit title: Jewellery: Practical Gemmology

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 80 hours.

### Guidance on the content and context for this Unit

This Unit has been designed to allow candidates to study the underpinning chemistry and physics required to understand the physical and optical properties of gemstone materials. This information can then be applied to the process of gemstone testing in a practical manner with the use of specialist gemmological equipment.

The equipment used should be limited to the standard items of testing equipment. These are: Polariscopes, Refractometers, Microscopes, Spectroscopes, Dichroscopes, Chelsea Filters.

Gem materials under discussion should be limited to the following species:

- ◆ inorganic: Beryl, Chrysoberyl, Corundum, Diamond, Garnet Group, Jadeite, Feldspar, Nephrite, Opal, Peridot, Quartz (including Chalcedony), Spinel, Topaz, Tourmaline, Turquoise, Zircon
- ◆ organic: Natural and Cultured Pearls, Amber, Coral, Jet
- ◆ synthetics: Corundum, Spinel, emerald, CZ
- ◆ simulants: Composite, Paste, Plastic

### Guidance on the delivery and assessment of this Unit

It is anticipated that the lecturer will provide a range of short lectures during the early stages in the delivery of this Unit but as time progresses and the candidates gain more knowledge and expertise, the subject will become increasingly practical.

This will allow the candidate to build up a range of competences in the gem testing process and allow them to apply this knowledge in a practical environment.

#### *Opportunities for developing Core Skills*

There are opportunities to develop the Core Skills of *Problem Solving* at SCQF level 6 and the component Using Number of the Core Skill of *Numeracy* at SCQF level 5 in this Unit.

*Problem Solving* at SCQF level 6 may be developed as candidates will be required to ascertain various measurements from a range of gemstones and using only this information, and with limited reference material, come up with a single identification of a given gemstone. Practical limitations in natural materials and the equipment may provide a variety of problems, which candidates will have to overcome.

The component Using Number of the Core Skill of *Numeracy* at SCQF level 5 may be developed as candidates will be required to weigh and accurately measure gemstones in order to calculate constants such as Specific Gravity and Birefringence.

## **Higher National Unit specification: support notes (cont)**

**Unit title:** Jewellery: Practical Gemmology

### **Open learning**

This Unit could be delivered by distance learning. However, it would require planning by the centre to ensure the sufficiency and authenticity of candidate evidence.

### **Candidates with disabilities and/or additional support needs**

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* ([www.sqa.org.uk](http://www.sqa.org.uk)).



## General Information for Candidates

### Unit title: Jewellery: Practical Gemmology

This Unit will develop the underpinning knowledge and practical skills required to analyse and identify a range of gemstones. It will allow you to optically test and confirm the identity of a range of popular gemstones found in the jewellery industry.

On completion of the Unit you should be able to:

- 1 Describe the physical and optical theories in gemmological study.
- 2 Explain the use and function of gemmological instruments
- 3 Produce an identification system for gem materials.
- 4 Use gemmological equipment to analyse gem materials.

In Outcome 1 you will study the underpinning physical and optical properties of gemstones and how they may be used in the identification of minerals and gemstones. The assessment for this Outcome will be theoretical and will test the underpinning knowledge, which will be required to complete the rest of the Unit.

In Outcome 2 you will research the specific range of gemmological testing equipment that is available to perform the testing process. You will describe both the equipment and the optical properties on which it relies.

In Outcome 3 you will produce an identification chart that matches relevant testing data with individual gemstones to provide a useful aid to correct diagnosis.

In Outcome 4, with the use of your own identification chart and specific items of gem testing equipment at your disposal, you will be required to identify correctly a range of gemstones.

You may have the opportunity to develop the Core Skill of *Problem Solving* at SCQF level 6 and the Core Skill component *Using Number* at SCQF level 5.