

## Centre Handbook

Science

OCR Level 2 Nationals in Science

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# 1 Introduction

This Centre Handbook provides information for centre staff involved in the planning, delivery, assessment or moderation of the following qualifications which have been accredited onto the National Qualifications Framework (NQF) at Level 2 and are part of the OCR Nationals suite of qualifications:

## **OCR Level 2 National Award in Science**

05644

## **OCR Level 2 National Certificate in Science**

05645

It is important that centre staff involved in the delivery, assessment or moderation of the above qualifications understand the requirements laid down in this handbook. Centres should therefore ensure that staff have access to this publication.

An electronic copy of this handbook is provided on CD Rom free to all centres on centre approval. It is also available to download from our website [www.ocr.org.uk](http://www.ocr.org.uk).

## 1.1 Documentation updates

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The information provided in this Centre Handbook was correct at the time of production. Occasionally OCR may update this information. Please refer to the updates section of the relevant qualification on our website [www.ocr.org.uk](http://www.ocr.org.uk) for details regarding amendments made to this handbook. For your convenience, the latest amended version of this handbook is available electronically for downloading from our website: [www.ocr.org.uk](http://www.ocr.org.uk).

## 1.2 OCR Nationals suite of qualifications

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The OCR Nationals suite of qualifications provides candidates with high quality, industry-relevant qualifications geared to the specific requirements of key sectors. They are vocationally-related qualifications that provide valuable opportunities for individuals to develop skills and gain underpinning knowledge and understanding which will support entry into work or progression to further studies through Further Education or Higher Education. The OCR Nationals are attractive, practically-based qualifications intended to stimulate and interest candidates. They support achievement of Key Skills and relate to national occupational standards thereby providing an ideal progression to National Vocational Qualifications (NVQs) once individuals are in suitable employment.

## 1.3 Administration arrangements for these qualifications

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A separate publication, the *Administrative Guide to OCR Nationals* (code A028), provides full details of the administration arrangements for these qualifications. The administrative guide is issued free on centre approval and is available from our website: [www.ocr.org.uk](http://www.ocr.org.uk).

## 1.4 If centre staff have queries

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This Centre Handbook and the *Administrative Guide to OCR Nationals* (code A028) contain all the information needed to deliver, assess, moderate and administer these qualifications. If centre staff have any queries about these qualifications that are not answered in these publications, they should refer to the section **Further support and information** for details of who to contact for further support.

## 2 General Information

### 2.1 Qualification profile

<b>Title</b>	OCR Level 2 National Award in Science			
<b>OCR code</b>	05644			
<b>Level</b>	This qualification has been accredited onto the National Qualifications Framework (NQF) at Level 2.			
<b>QAN</b>	100/5991/X (Qualification Accreditation Number)			
<b>Age group approved</b>	Pre-16	16-18	18+	19+
	✓	✓	✓	✓
<b>This qualification is suitable for</b>	Those studying in preparation for employment in the science sector particularly in job roles where they will be expected to use laboratory equipment, test samples, follow standard operating procedures, undertake investigations, and where they are expected to understand and adhere to health and safety requirements. This qualification is also suitable for those wishing to gain a Level 2 qualification to support further study in FE and it meets the requirements of the Key Stage 4 Science Programme of Study. This qualification also provides a route for progression to the OCR Level 2 National Certificate in Science.			
<b>Entry requirements</b>	There are no formal entry requirements for this qualification.			
<b>Qualification structure</b>	To achieve this qualification, candidates must complete a total of <b>three</b> units consisting of two mandatory units and one optional unit. These units are drawn from the same bank of units as the OCR Level 2 National Certificate in Science. <b>Please note that it is a statutory requirement that candidates below the age of 16 undertake units 1, 2 and 11, in order to meet the Key Stage 4 Programme of Study.</b>			
<b>Assessment and grading</b>	All units are centre-assessed and externally moderated by OCR. There are no timetabled exams for this qualification; candidates may complete units at a time that suits the centre. The full award and units from this qualification are graded as Pass, Merit or Distinction.			
<b>Funding</b>	<p>This qualification has been accredited onto the NQF and, as such, is eligible for public funding. When seeking public funding, centres will need to provide the Qualification Accreditation Number (QAN) shown above.</p> <p>For information on qualifications approved by the Secretary of State see the DfES websites:  <a href="http://www.dfes.gov.uk/section 96">http://www.dfes.gov.uk/section 96</a>  <a href="http://www.dfes.gov.uk/section 97">http://www.dfes.gov.uk/section 97</a></p>			
<b>Performance figures</b>	For information on this qualification's contribution to performance measurement please see QCA's OpenQUALS database: <a href="http://www.openquals.org.uk">http://www.openquals.org.uk</a>			
<b>National occupational standards</b>	This qualification relates to national occupational standards in the Science, Construction, Chemicals and Food Manufacturing sectors at Level 2. Mapping to the relevant standards is provided within this handbook.			

<b>Key Skills</b>	Signposting to Key Skills is provided within this handbook	
<b>Last entry date*</b>	31 August 2010	<b>Revised date:</b>
<b>Last certification date*</b>	31 August 2012	<b>Revised date:</b>

\*OCR will inform centres of changes to these dates. All centre records must be updated accordingly.

## 2.1 Qualification profile (continued)

<b>Title</b>	OCR Level 2 National Certificate in Science			
<b>OCR code</b>	05645			
<b>Level</b>	This qualification has been accredited onto the National Qualifications Framework (NQF) at Level 2.			
<b>QAN</b>	100/5992/1 (Qualification Accreditation Number)			
<b>Age group approved</b>	Pre-16	16-18	18+	19+
	✓	✓	✓	✓
<b>This qualification is suitable for</b>	Those studying in preparation for employment in the science sector particularly in job roles where they will be expected to use laboratory equipment, test samples, follow standard operating procedures, undertake investigations, and where they are expected to understand and adhere to health and safety requirements. This qualification is also suitable for those wishing to gain a Level 2 qualification to support further study in FE and it meets the requirements of the Key Stage 4 Science Programme of Study.			
<b>Entry requirements</b>	There are no formal entry requirements for this qualification.			
<b>Qualification structure</b>	To achieve this qualification, candidates must complete a total of <b>six</b> units consisting of four mandatory units and two optional units. <b>Please note that it is a statutory requirement that candidates below the age of 16 undertake units 1, 2 and 11, in order to meet the Key Stage 4 Programme of Study.</b>			
<b>Assessment and grading</b>	All units are centre-assessed and externally moderated by OCR. There are no timetabled exams for this qualification; candidates may complete units at a time that suits the centre. The full award and units from this qualification are graded as Pass, Merit or Distinction.			
<b>Funding</b>	<p>This qualification has been accredited onto the NQF and, as such, is eligible for public funding. When seeking public funding, centres will need to provide the Qualification Accreditation Number (QAN) shown above.</p> <p>For information on qualifications approved by the Secretary of State see the DfES websites:  <a href="http://www.dfes.gov.uk/section 96">http://www.dfes.gov.uk/section 96</a>  <a href="http://www.dfes.gov.uk/section 97">http://www.dfes.gov.uk/section 97</a></p>			
<b>Performance figures</b>	For information on this qualification's contribution to performance measurement please see QCA's OpenQUALS database: <a href="http://www.openquals.org.uk">http://www.openquals.org.uk</a>			
<b>National occupational standards</b>	This qualification relates to national occupational standards in the Science, Construction, Chemicals and Food Manufacturing sectors. Mapping to the relevant standards is provided within this handbook.			

<b>Key Skills</b>	Signposting to Key Skills is provided within the Centre Handbook	
<b>Last entry date*</b>	31 August 2010	<b>Revised date:</b>
<b>Last certification date*</b>	31 August 2012	<b>Revised date:</b>

\*OCR will inform centres of changes to these dates. All centre records must be updated accordingly.

## 2.2 Target

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These qualifications are typically (although not exclusively) aimed at young people aged 14-19 in full-time further education who are seeking a career in the science sector or wishing to further their studies at Level 2 of the National Qualifications Framework (NQF).

More mature learners wishing to make a fresh start on a course that prepares them for further learning or work involving science-related activities are equally served by these qualifications.

Individual units within these qualifications can be entered and certificated separately allowing flexibility to offer individual units alongside other programmes of learning. Candidates have the option of achieving as many or as few units as are appropriate for their own learning needs or employment situation.

These qualifications will be particularly suitable for those who wish to study in preparation for (or alongside) employment in job roles where they will be expected to use laboratory equipment, test samples, follow standard operating procedures, undertake investigations and where they are expected to understand and adhere to health and safety requirements.

## 2.3 Qualification aims

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The OCR Level 2 Nationals in Science have been developed to recognise candidates' skills, knowledge and understanding of science, scientific procedures and the commercial applications of science. They have been designed to accredit candidates' achievements in a modern and practical way that is relevant to the workplace. They do not certificate competence on the job but are work-related qualifications which will support progression to an NVQ once a candidate is in the workplace.

These qualifications specifically aim to:

- 1 develop candidates' knowledge and understanding of the science sector
- 2 develop candidates' skills, knowledge and understanding in contexts that are directly relevant to employment situations, thereby enhancing their employability within the science sector
- 3 develop candidates' ability to work autonomously and effectively in a science context
- 4 enable candidates to develop knowledge and understanding in specialist areas of science, and demonstrate the skills needed to participate in the operation and development of real science organisations
- 5 encourage progression by assisting in the development of skills, knowledge and understanding that candidates will need to access further or higher education programmes or occupational training on a full-time or part-time basis
- 6 encourage progression by assisting in the development of skills, knowledge and understanding that candidates will need to enter employment or enhance their current employment status
- 7 promote interaction between employers, centres and candidates by relating teaching and assessment to real organisations.

## 2.4 Entry requirements

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These qualifications are available to anyone who is capable of reaching the required standards. They have been developed free from any barriers that restrict access or progression thereby promoting equal opportunities.

All centre staff involved in the assessment or delivery of these qualifications should understand their requirements and match them to the needs and capabilities of individual learners before entering them as candidates for one of these qualifications. There is no requirement for candidates to achieve a Level 1 qualification before progressing onto these qualifications although, as a general guide, candidates with qualification profiles comparable to Level 1 of the National Qualifications Framework (NQF) will normally be at a level suitable for entry onto a programme leading to one of these qualifications. Individuals should be considered equally for entry whether they hold certificates easily recognisable against the NQF or present more varied profiles for consideration.

## 2.5 Entry restrictions

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There are no restrictions on candidate entry for a full qualification. However, these qualifications contain a career planning unit and a work experience unit as choices within the optional list of units. For the purpose of the full OCR Level 2 National Certificate, only one of these units will count towards a full qualification. If candidates choose to complete both of these units, one will count towards achievement of the full Certificate, the other will be recognised on a unit certificate but will not count towards the full qualification.

## 2.6 Progression opportunities

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### Progression into employment

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These qualifications are designed to enable candidates to enter employment at operative or trainee level within a wide range of scientific environments. Such candidates would normally enter employment through a work-related training programme.

For example, a candidate achieving an OCR Level 2 National in Science may:

- enter employment at an operative or supervisory level
- enter employment AND undertake a related NVQ at a level appropriate to their job role.

### Progression to further qualifications

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These qualifications have been designed to develop the skills, knowledge and understanding required to enable progression to qualifications along the vertical and horizontal planes in the National Qualifications Framework.

For example, a candidate achieving an OCR Level 2 National in Science may:

- undertake additional units to achieve an OCR Level 2 National Certificate in Science (where candidates were previously registered for the OCR Level 2 National Award in Science)
- undertake higher level qualifications part-time or full-time in further education, eg OCR Level 3 GCE Double Award Applied Science.

## 2.7 Work experience

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We have not made work experience a mandatory requirement of these qualifications (although it is strongly recommended) because we accept the difficulties some candidates and centres have in gaining local access to a workplace. Optional Unit 13 caters for those who wish to have their work experience recognised within these qualifications.

## 2.8 Supporting candidates

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Centres should ensure that candidates are informed of the title of the qualification they have been entered for and that OCR is the awarding body for their chosen qualification. To assist centres in their support of candidates, copies of candidate handouts are provided in the section **Guidance for Candidates**. This guidance is optional for issue and may be photocopied or adapted to suit the needs of candidates and centres.

Assessors (or other centre staff) should provide guidance on what needs to be included as evidence and should help candidates plan their evidence collection. Assessors can explain what they will be looking for when they are assessing the work and it is expected that candidates will receive feedback on work-in-progress but this feedback must not extend to assisting in the completion of tasks, writing of text or detailed instructions on how to do the work.

## 2.9 Wider issues

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These qualifications provide potential for centres to develop candidates' understanding of spiritual, moral, ethical, legislative, economic, social and cultural issues and heighten candidates' awareness of sustainable development, health and safety considerations and European developments consistent with international agreements.

### Spiritual, moral, ethical, legislative, economic, social and cultural issues

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Teachers and tutors delivering a course in science that supports these specifications would have opportunities to address ethical, social and moral values throughout all units in the exploration of issues such as individual responsibility, group/team responsibility, the science sector's social and environmental responsibilities, individual responsibilities towards the consumer, courtesy and protocols in dealing with colleagues, health and safety in the laboratory and security and confidentiality of information.

Unit 1 Best practice in science explores the health, safety and legislative considerations in laboratory work.

Unit 2 Materials science explores the ethical and environmental issues related to the production of materials.

Unit 6 Science of construction explores the effects of construction activities on the environment.

Unit 8 Science in sport explores the importance of maintaining a healthy lifestyle.

Unit 9 Investigating energy sources explores the impact of energy production on the environment and the issues relating the use of renewable energy sources.

Unit 11 The science of the universe and humanity explores the impact of cultural and environmental and social differences on human development.

## Environmental issues, health and safety considerations and European developments

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Teachers and tutors delivering a course in science that supports these specifications would have opportunities to address health and safety issues through Unit 1. The issue of safe working practice should be explored through the contexts of teamwork, maintaining one's own work environment and working with procedures.

Environmental issues could be explored in Units 6, 7 and 9.  
European developments could be explored in Units 12 and 13.  
Sustainable development could be explored in Units 9 and 11.

### 2.10 Guided learning hours

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The time it will take a candidate to complete one of these qualifications will depend on a number of things, for instance, mode of study (ie whether full-time or part-time) and level of knowledge or experience on entry onto the programme of study. As a general guide, each of the units in these qualifications is likely to require approximately 60 guided learning hours (glh). Guided learning hours refer to contact time and guided, but unsupervised, private study.

If candidates complete the OCR Level 2 National Award in Science consisting of three units, 180 glh are likely to be required.

If candidates complete the OCR Level 2 National Certificate in Science consisting of six units, 360 glh are likely to be required.

### 2.11 Mode of delivery

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OCR does not specify the mode of study or specify a time limit for the achievement of these qualifications other than the expiry dates for entry and certification laid down by the regulatory authorities and detailed in the qualification profiles.

Centres are free to deliver these qualifications using any mode of delivery that meets the needs of their candidates. Whatever mode of delivery is used, centres must ensure that learners have appropriate access to the resources identified below.

Centres should consider the candidates' complete learning experience when designing learning programmes. This is particularly important in relation to candidates studying part time alongside real work commitments where candidates may bring with them a wealth of experience that should be utilised to maximum effect by tutors and assessors.

### 2.12 Resources

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These qualifications are designed to prepare candidates for employment or further study in the science sector. The physical resources needed to support delivery and assessment should normally be of industry standard. As a minimum, the following resources are required for the delivery and assessment of these qualifications.

OCR strongly advises that teaching and development of subject content and associated skills be referenced to real vocational situations, through the utilisation of appropriate industrial contact, vocationally experienced delivery personnel, and real life case studies.

It is assumed that candidates will have access to computer facilities including internet access as well as library-based resources. In addition, candidates will have access to CLEAPSS and Hazard cards, goggles, and the centre's fire procedure, first aid procedure and safety regulations.

In some units there are specific resources to which candidates must have access in order to achieve the assessment objectives. These are listed below. If a unit is not listed, it has no specific resource requirements.

Units	Resources required
1 Best practice in science	Range of laboratory chemicals with hazard symbols clearly identifiable Summary table of SI units Range of instruments for calibration pH meter Colorimeter Electronic balance Small screwdriver to adjust pH meter Cuvette Burette Burette clamp Graduated pipette Pipette filler White tile Bunsen burner and heatproof mat Cobalt blue glass Spatula Nichrome wire loops Clamp and stand 100 cm <sup>3</sup> beaker 250 cm <sup>3</sup> conical flask 250 cm <sup>3</sup> beaker Test tubes Watch glass Delivery tube for hydrogen carbonate ions test Measuring cylinder Wash bottle Boiling tube Dropping pipettes Small filter funnel Filter paper Buffer solutions, pH 4, 7 and 10 Distilled water A variety of liquids to test pH, eg vinegar, antacid, detergents Reagents clearly labelled with name and safety: 1 mol dm <sup>-3</sup> dilute sodium hydroxide 1 mol dm <sup>-3</sup> dilute hydrochloric acid 0.1 mol dm <sup>-3</sup> barium chloride solution acidified with a few drops of bench HCl 0.1 mol dm <sup>-3</sup> silver nitrate solution acidified with a few drops of bench HNO <sub>3</sub> Concentrated hydrochloric acid Limewater

2	<p>Materials science</p> <p>Scales/electronic balance  100 g mass hanger and masses  Temperature probe  Thermometer  Stopwatch  200cm<sup>3</sup> measuring cylinder  100cm<sup>3</sup> measuring cylinder  10cm<sup>3</sup> measuring cylinder  Meter ruler  Protractor  Vernier callipers to measure diameter  Micrometer or travelling microscope  Bench clamp  Tripod  Stand and clamp  Ray box  Collimator lens  Large single slit  Light meter, luxmeter or photocell  1 to 12 volt variable d.c. power supply  Ammeter  Voltmeter  Variable resistor or rheostat  Electrical circuit switch  4mm lead  Crocodile clip for 4mm leads  Bunsen burner  Heat proof mat  Tongs  Test tube  Boil tube  250cm<sup>3</sup> beaker  100cm<sup>3</sup> beaker  Filter paper and funnel  Spatula  Glass stirring rod  25 cm<sup>3</sup> graduated pipette  Pipette filler  Burette  Range of materials for testing</p>
3	<p>Forensic science</p> <p>250 cm<sup>3</sup> beaker  100 cm<sup>3</sup> beaker  Measuring cylinder  Test tube  Boiling tube  Flame testing loops  Squirrel-hair brush  Spatula  Universal indicator colour charts</p>

<p>3 Forensic science cont.</p>	<p>Ink pad Chromatography tank with lid TLC plates Ray boxes Glass and Perspex blocks Light source Single slit comb Protractors Micropipettes Microscope Bunsen burner Heat proof mat Stand and clamp Tweezers Dental stone or plaster of Paris Hair spray Carbon powder Ninhydrin (0.2% in ethanol) in spray Iodine Benedict's solution (alternatively use Clinistix) Butanol Propanone (acetone) Acidified Potassium Dichromate solution Ethanol 1 mol dm<sup>-3</sup> dilute sodium hydroxide 1 mol dm<sup>-3</sup> dilute hydrochloric acid 0.1 mol dm<sup>-3</sup> barium chloride solution acidified with a few drops of bench HCl 0.1 mol dm<sup>-3</sup> silver nitrate solution acidified with a few drops of bench HNO<sub>3</sub> Concentrated hydrochloric acid Limewater</p>
<p>4 Food science</p>	<p>1000 cm<sup>3</sup> beaker 250 cm<sup>3</sup> beaker 100 cm<sup>3</sup> beaker Measuring cylinder Test tube Boiling tube Siphoning tube McCarthy bottle Petri dish Micropipettes Microscope Bunsen burner Heat proof mat Stand and clamp Forceps Microscope Haemocytometer and cover slips Callipers</p>

<p>4 Food science cont.</p>	<p>pH probe and data logger Incubator Light bank Scales Weighing boat Stop watch Thermometer Water bath Fridge Wooden spoon Spatula White tile Scalpel Large knife Dissection board Ethanol Growth medium</p>
<p>5 Science of health and bodycare products</p>	<p>Distillation equipment 100 cm<sup>3</sup> beaker 250 cm<sup>3</sup> conical flask 250 cm<sup>3</sup> beaker Test tubes Watch glass Measuring cylinder Wash bottle Boiling tube Dropping pipette Small filter funnel Scalpel Spatula Tripod Bunsen burner Heat proof mat Gauze Scalpel Spatula Test tubes 250 cm<sup>3</sup> beaker Dropping pipette Tweezers Mortar and Pestle Thermometer pH meter Emulsifier Preservative pH stabilizers Perfumes Smelling salts Plant oils Nut oils</p>

<p>5 Science of health and bodycare products cont.</p>	<p>Plant extracts Soaps Butanoic acid Butanol Ethanoic acid Ethanol Sodium chloride salt Sodium hydroxide solution, 40%</p>
<p>6 Science of construction</p>	<p>Scales/electronic balance 100 g mass hanger and masses Temperature probe Thermometer Newtonmeter Forcemeter Pressure sensor Tape measure Stopwatch Level 200cm<sup>3</sup> measuring cylinder 100cm<sup>3</sup> measuring cylinder 10cm<sup>3</sup> measuring cylinder Meter ruler Protractor Vernier callipers to measure diameter Micrometer or travelling microscope Bench clamp Tripod Stand and clamp Ray box Collimator lens Large single slit Light meter, Luxmeter or photocell 1 to 12 volt variable d.c. power supply Ammeter Voltmeter Variable resistor or rheostat Electrical circuit switch 4mm lead Crocodile clip for 4mm leads Bunsen burner Heat proof mat Tongs Test tube Boil tube 250cm<sup>3</sup> beaker 100cm<sup>3</sup> beaker Filter paper and funnel</p>
<p>7 Science and the environment</p>	<p>pH meter Colorimeter</p>

<p>7 Science and the environment cont.</p>	<p>Light sensor  Dissolved oxygen sensor  Sound sensor  Thermometer  Electronic balance  Cuvette  Microscope  Burette  Burette clamp  Graduated pipette  Pipette filler  White tile  Bunsen burner and heatproof mat  Cobalt blue glass  Spatula  Nichrome wire loops  Clamp and stand  100 cm<sup>3</sup> beaker  250 cm<sup>3</sup> conical flask  250 cm<sup>3</sup> beaker  Test tubes  Watch glass  Delivery tube for hydrogen carbonate ions test  Measuring cylinder  Wash bottle  Boiling tube  Dropping pipettes  Small filter funnel  Petri dish  Buffer solutions, pH 4, 7 and 10  1 mol dm<sup>-3</sup> dilute sodium hydroxide  1 mol dm<sup>-3</sup> dilute hydrochloric acid  0.1 mol dm<sup>-3</sup> barium chloride solution acidified with a few drops of bench HCl  0.1 mol dm<sup>-3</sup> silver nitrate solution acidified with a few drops of bench HNO<sub>3</sub>  Concentrated hydrochloric acid  Limewater</p>
<p>8 Science in sport</p>	<p>Scales/electronic balance  100 g mass hanger and masses  Temperature probe  Thermometer  Stopwatch  Tape measure  200cm<sup>3</sup> measuring cylinder  100cm<sup>3</sup> measuring cylinder  10cm<sup>3</sup> measuring cylinder  Meter ruler  Protractor  Vernier callipers to measure diameter</p>

<p>8 Science in sport cont.</p>	<p>Micrometer or travelling microscope Bench clamp Tripod Stand and clamp 1 to 12 volt variable d.c. power supply Ammeter Voltmeter Variable resistor or rheostat Electrical circuit switch 4mm lead Crocodile clip for 4mm leads Bunsen burner Heat proof mat Tongs Test tube Boil tube 250cm<sup>3</sup> beaker 100cm<sup>3</sup> beaker Filter paper and funnel Spatula Glass stirring rod 25 cm<sup>3</sup> graduated pipette Pipette filler Burette Stopwatch</p>
<p>9 Investigating energy sources</p>	<p>Solar cell Solar collector Fuel cell Wind turbine Water turbine Scales/electronic balance 100 g mass hanger and masses Pulley Bench clamp Thermometer Stopwatch 200cm<sup>3</sup> measuring cylinder 100cm<sup>3</sup> measuring cylinder 10cm<sup>3</sup> measuring cylinder Meter ruler Protractor Tripod Stand and clamp 1 to 12 volt variable d.c. power supply Ammeter Voltmeter Galvanometer Oscilloscope Variable resistor or rheostat Electrical circuit switch</p>

<p>9 Investigating energy sources cont.</p>	<p>4mm lead Crocodile clip for 4mm leads a.c. generator d.c. generator Transformer Magnet Compass Electrical wire coil Electric motor Stopwatch Bunsen burner Heat proof mat Tongs Test tube</p>
<p>10 Industrial science</p>	<p>Scales/electronic balance Thermometer Stopwatch 200cm<sup>3</sup> measuring cylinder 100cm<sup>3</sup> measuring cylinder 10cm<sup>3</sup> measuring cylinder Gas syringe 100 cm<sup>3</sup> round-bottom quick fit flask Condenser Thermometer and holder Still head Separating funnel Test tube Boil tube 250cm<sup>3</sup> beaker 100cm<sup>3</sup> beaker 250 cm<sup>3</sup> conical flask Delivery tubing Gas jar Large bowl Graduated pipette Burette Pipette filler Evaporating basin Spatula Glass stirring rod Tripod Stand and clamp Burette clamp and stand Bunsen burner Clay pipe triangle Heat proof mat Tongs White tile Isomantle Filter paper and funnel</p>

10 Industrial science cont.	Water/wash bottle Universal indicator solution Universal indicator colour scale
11 The science of the universe and humanity	Solar cell Solar collector Fuel cell Wind turbine Water turbine Steam generator Electric generator Scales/electronic balance 100 g mass hanger and masses Pulley Bench clamp Thermometer Stopwatch Fridge pH meter Colorimeter Cuvette Burette Burette clamp Graduated pipette Pipette filler White tile Infra red irradiance sensormeter Dissolved oxygen meter Carbon dioxide sensor 200cm <sup>3</sup> measuring cylinder 100cm <sup>3</sup> measuring cylinder 10cm <sup>3</sup> measuring cylinder Glass jar Meter ruler Protractor Tripod Stand and clamp 1 to 12 volt variable d.c. power supply Ammeter Voltmeter Oscilloscope Variable resistor or rheostat Electrical circuit switch 4mm lead Crocodile clip for 4mm leads Electric motor Bunsen burner Heat proof mat Tongs Test tube Boil tube

11 The science of the universe and humanity cont.	250cm <sup>3</sup> beaker 100cm <sup>3</sup> beaker Spatula Glass stirring rod Microscope Petri dish
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In addition, each unit will contain guidance on the resources required. Staff conducting the assessment of these qualifications must understand fully the requirements of these awards.

Centres will need to meet the above resource requirements when they seek centre approval from OCR.

## 2.13 Delivery in Wales and Northern Ireland

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The specification for these qualifications has been approved by DELLS for use by centres in Wales and by CCEA for use by centres in Northern Ireland.

Candidates in Wales or Northern Ireland should not be disadvantaged by terms, legislation or aspects of government that are different from those in England. Where such situations might occur the terms used have been selected as neutral, so that candidates may apply whatever is appropriate to their own situation.

We will provide specifications, assessments and supporting documentation in English. Assessment for these qualifications is in English.

Further information concerning the provision of assessment materials in Welsh and Irish may be obtained from the Customer Contact Centre at OCR (telephone 024 76 851509).

## 2.14 Arrangements for candidates with access-related needs

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We aim to make sure that all candidates are given equal opportunity to demonstrate their attainment. Full details of the arrangements available for candidates with special assessment needs are contained in our booklet *Access to Vocational Assessment: NVQs, Vocationally-Related Qualifications (VRQs) and Other Vocational Qualifications. Regulations and Guidance relating to Candidates with Particular Requirements* (code L016).

## 2.15 Funding

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These qualifications are accredited at Level 2 of the National Qualifications Framework and are eligible for funding under Section 96 and/or 97 arrangements. Should you require any more information on funding please contact The Learning and Skills Council.

## 2.16 Results enquiries and appeals

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Please refer to the *Administrative Guide to OCR Nationals* (code A028).

## 2.17 Centre malpractice guidance

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It is the responsibility of the Head of Centre\* to report (in writing) all cases of suspected malpractice involving centre staff or candidates, to the OCR Quality and Standards division.

When asked to do so by OCR, Heads of Centres are required to investigate instances of malpractice promptly, and report the outcomes to the OCR Quality and Standards division.

Further information is contained in the publication *Malpractice in examinations and assessment* (code R322) which is available from OCR Customer Contact Centre: 024 76 851509.

## 2.18 Work-related experience

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Centres will decide if work experience or work placement is to be an integral part of their OCR Level 2 Nationals programme. It is not a compulsory part of these qualifications. However, it is strongly recommended that some work-related experience be undertaken.

Work experience will enable candidates to have the opportunity to access science settings and to meet science professionals. It is recommended that, where possible, opportunities are provided for candidates to access scientific work settings.

Work placements are often difficult to find as so many places are being sought by candidates following other courses, for example, NVQs and other vocational programmes. Centres need to make decisions about when in the programme work experience/work placement may be appropriate.

## 2.19 How work-related experience may be organised

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### Timetabling lessons

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Some of the lessons may be organised in 'double periods' that back on to a lunch hour or break time. This enables visits to be arranged to businesses or industries within the lesson and gives time for the candidates to get back without missing other lessons.

### Organising visits

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Visits might have to be arranged in one of the lessons allocated for the subject. Choose businesses or industries that are near to the centre, for example, a local retail park or manufacturer. Make sure all statutory rules relating to visits are covered as well as meeting the centre's own regulations.

### Work experience

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Liaise with the work experience co-ordinator to establish if candidates could be placed in appropriate science settings. Some candidates may have part-time employment that can be utilised, while others may have parents who work in businesses or industries who can help to provide opportunities for work experience.

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\* The Head of Centre is defined as the most senior officer in the organisation, directly responsible for the delivery of OCR qualifications, eg the Principal of a College, the Head Teacher of a school, the Managing Director of a private Training Provider or the Group Training Manager of a major company.

## Activities week

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An activities week or similar could be used to place candidates in work experience placements. This means that staff would be available to visit the candidates in the workplace.

## Post-16 candidates

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Sometimes post-16 candidates have two-hour blocks for study time. These could be used for work experience/work placement. This will probably mean planning individual time with the candidate and the placement.

# 3 Assessment

## 3.1 Assessment

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Each unit within these specifications is designed around the principle that candidates will build a portfolio of evidence relating to progression towards meeting the unit assessment objectives.

The unit assessment objectives reflect the demands of the learning outcomes for each unit.

In order for candidates to be able to progress effectively towards meeting the requirements of each assessment objective, tutors must make sure that the supporting knowledge, understanding and skills requirements for each objective are fully addressed. The identified knowledge, understanding and skills are not exhaustive and may be expanded upon or tailored to particular contexts to which the unit is being taught and the assessment objective applied.

We recommend that teaching and development of subject content and associated skills be referenced to real vocational situations, through the utilisation of appropriate industrial contact, vocationally experienced delivery personnel, and real life case studies.

Centres should consider carefully the implications of candidates contacting business organisations or industries freely, and should examine management of such contact, in order that candidates receive the best possible information, and that certain important vocational contacts are not repeatedly asked for the same information from different candidates.

Assessment of these qualifications will be conducted in accordance with the appropriate codes of practice approved and published by the regulatory authorities.

Key features of the assessment of these qualifications are:

- Assessment of all units can take place at a time to suit candidates and centres. There are no timetabled exams required.
- Tutors and assessors can draw on real work-based opportunities for candidates to generate evidence. This approach has been found to motivate candidates and increase the likelihood of them staying on the programme. Even where work-based activities are limited; this qualification is designed to enable candidates to generate assessment evidence in a vocationally-relevant context.
- Performance at unit level is graded holistically, as Pass, Merit or Distinction, recognising that candidates may perform better in meeting the requirements of some objectives more than others.
- All units are centre-assessed and externally moderated by an OCR Visiting Moderator.

Centres should consider the following in relation to the assessment and moderation of candidates' work:

- Allocation of resources including assessors and internal moderators
- Generation and collection of evidence
- Assessment and grading of evidence
- Internal moderation and sampling strategies
- External moderation
- Retention of centre records

## 3.2 Allocation of resources

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Centres should ensure that appropriate physical resources are available in line with guidance provided in this handbook. In addition, the centre must ensure that appropriately qualified assessors are appointed to assess candidates against the requirements of these qualifications.

An assessor may be the candidate's tutor/teacher or another person accountable to the centre for the assessment of evidence presented by the candidate. An assessor will be deemed to be appropriately qualified if they have sufficient skills and knowledge within the area they are assessing to enable them to make valid and objective assessment decisions about the candidate's achievements.

Centres must also ensure that sufficient resources are allocated to the internal moderation of assessment decisions relating to these qualifications. In many cases centres will already have systems in place to quality assure internal activities. Further guidance on internal moderation is provided in section 3.9.

## 3.3 Generation and collection of evidence

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Evidence generated by each candidate for a specified unit should be in an appropriate format to demonstrate the skills competency, or application of knowledge and understanding, as specified in each assessment objective within the unit in question.

Evidence can come from a number of sources. A list of the main sources of evidence is provided below:

**Outcomes of activities** – the outcome or product of a candidate's work (either through simulated activities, assignments, projects or real work). Further guidance on centre-devised and simulation assignments and projects is provided in section 3.4 and 3.7.

**Observation** – recorded observations of candidate performance by the assessor whilst the candidate is undertaking activities. An example of an Observation/Witness Statement is included in the section **Supporting documentation** for use by assessors.

**Statements from witnesses** – written or oral accounts of a candidate's performance. An example of an Observation/Witness Statement is included in the section **Supporting documentation**. Centres must remember that witnesses must only describe what they observed the candidate doing. It is the candidate's assessor who will assess the evidence presented against the requirements of these awards. Often it will be necessary for assessors to make contact with witnesses to ensure that (a) the witness statement is authentic and (b) the assessor's interpretation of the witness statement is accurate. Witness statements do not have to be written by the witness, they may be recorded by the assessor after discussion with the witness and confirmed as accurate by the witness.

**A personal statement by candidate** – a written or verbal account by the candidate of specific incidents or situations. All personal statements made by candidates must be authenticated.

Candidates should take responsibility for the development of their own portfolios, with appropriate support from tutors, employers and peers, and should be aware of the necessity of clear presentation and ordering as an aid to assessment and grading once the work is submitted.

Where evidence contributes to or fulfils more than one assessment objective on more than one unit, the candidate should cross-reference this evidence within their unit portfolio so that evidence can be considered by the centre assessor and by the OCR Visiting Moderator if required.

We have designed an Evidence Record Sheet for candidates to record their evidence and cross-reference it to assessment objectives within a particular unit. An Evidence Record Sheet (or other suitable cross-referencing tool) must be adopted to allow the OCR Visiting Moderator to see what assessment objectives each piece of evidence refers to. A master Evidence Record Sheet is included in the section **Supporting documentation**.

### 3.4 Centre-devised assignments and projects

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Each assessment objective is a discrete area of assessment, however, some assessment objectives may relate to others in various ways. Several assessment objectives may be combined, or one assessment objective may extend the use of information sourced as part of another. Centres may therefore find it useful to produce their own assignments for candidates, which provide a context in which candidates can operate, or which set out tasks which can be undertaken to meet the requirements of the assessment objectives, and their associated skills, knowledge and understanding.

Activities should enable candidates to produce evidence that directly relates to the assessment objectives and allows all candidates to demonstrate their achievements across the full range of grades, ie Pass, Merit and Distinction. Centres are encouraged to provide candidates with assessment objectives and their associated grade descriptors to maximise their understanding of what is expected of them and the evidence they produce.

### 3.5 Sufficiency of evidence and collaboration

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Assessors should discuss with candidates the most suitable sources of evidence and ensure candidates are aware of the importance of quality rather than quantity when presenting evidence for assessment. Assessors must be convinced, from the evidence presented, that candidates working on their own can work independently to the required standard.

### 3.6 Authentication

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Assessors must be confident that the work they assess is the candidate's own. This does not mean that a candidate must be supervised throughout the completion of all work but the assessor must exercise sufficient supervision, or introduce sufficient checks, to be in a position to judge the authenticity of the candidate's work.

Wherever possible, assessors should discuss work-in-progress with candidates. This will not only ensure that work is underway in a planned and timely manner but will also provide opportunities for assessors to check authenticity of the work and provide general feedback.

Candidates must not plagiarise. Plagiarism is the submission of another's work as one's own and/or failure to acknowledge the source correctly. Plagiarism is considered to be malpractice and could lead to the candidate being disqualified. Plagiarism sometimes occurs innocently when candidates are unaware of the need to reference or acknowledge their sources. It is therefore important that centres ensure that candidates understand that the work they submit must be their own and that they understand the meaning of plagiarism and what penalties may be applied. Candidates may refer to research, quotations or evidence but they must list their sources. The candidate section of this handbook provides some guidance on referencing and reminds candidates that the work they submit must be their own and that they may be asked to sign a

declaration to this effect. Centres should reinforce this message to ensure candidates understand what is expected of them.

**Please note:**

Centres must confirm to OCR that the evidence produced by candidates is authentic. The Centre Authentication Form provided in this handbook (see **Supporting Documentation** section) includes a declaration for assessors to sign. It is a requirement of the QCA Common Criteria for all Qualifications that proof of authentication is received.

## 3.7 Simulation

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Wherever possible centres should generate evidence from the real work environment. Where it is not possible to produce evidence in this way, assessment objectives may be assessed through simulation of a real work environment.

If work experience is not possible practical activities can be simulated. If this is a method used, assessors must ensure that the conditions and environment realistically reflect those that would be found in scientific organisations and industries.

OCR Visiting Moderators will need to be provided with detailed evidence to show how the following criteria for realistic working environments have been met.

A realistic working environment is an environment within which candidates are producing evidence subject to the following criteria:

- real time pressures
- real work problems or situations
- real tools to do the job
- realistic behaviour patterns from third parties (eg during role-play).

OCR requires centres to internally standardise activities that take place under simulated and real conditions. Evidence that the Internal Moderator has sampled all evidence produced from simulated environments and real work conditions must be provided to OCR Visiting Moderators. Centre staff should participate in standardisation meetings to ensure that live and simulated environments, and the assessment decisions made within each environment, are comparable.

## 3.8 Assessment and grading of evidence

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It is the assessor's responsibility to assess the evidence presented by the candidate, provide feedback to the candidate, and award an initial grade which will be confirmed through internal and external moderation. Assessors will judge candidates' evidence against the assessment objectives and grade descriptors specified in the unit.

### Grading

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Within each unit OCR has produced grade descriptors which exemplify the typical performance of a candidate operating at the grade level described for the unit portfolio as a whole.

When awarding a grade, centre assessors must utilise the following elements when formulating their grading decision:

- 1 The degree to which the candidate has met the requirements of each assessment objective. When grading across a whole unit portfolio of evidence, candidates may perform better in meeting the requirement of some objectives than others. This performance will be dependent on the level of the command language in the objective (eg describe, explain, suggest, justify), the context of the assessment, and the mode of assessment (written, oral etc).
- 2 The unit grade descriptors, which provide indications of the required level and breadth of evidence to be assessed against particular grade outcomes.

A Pass grade will be awarded if the evidence presented meets at least the minimum requirements of the assessment objectives as specified by the Pass grade descriptor.

A Merit grade will be awarded if the evidence presented provides a closer match to the Merit grade descriptor than to the Pass grade descriptor.

A Distinction grade will be awarded if the evidence presented provides a closer match to the Distinction grade descriptor than to the Merit grade descriptor.

## Methods of assessment

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It is the assessor's responsibility to choose the best method of assessing a candidate in relation to their individual circumstances. The methods chosen must be:

- valid
- reliable
- safe and manageable and
- suitable to the needs of the candidate.

### Valid

A valid assessment method is one which is capable of measuring the knowledge or skills in question. For example, a written test cannot measure a candidate's practical skills or their ability to work well with others.

Validity can also be compromised if a candidate does not understand what is required of them. For example, one valid method of assessing a candidate's knowledge and understanding is to question them. If the questions posed are difficult for the candidate to understand (not in terms of the content but the way they are phrased, for example) the validity of the assessment method is questionable.

As well as assessment methods being valid, the evidence presented must also be valid. For example, it would not be appropriate to present an organisation's equal opportunities policy as evidence towards a candidate's understanding of the how the equal opportunities policy operates within the organisation. It would be more appropriate for the candidate to incorporate the policy within a report describing different approaches to equal opportunities.

### Reliable

A reliable method of assessment will produce consistent results for different assessors on each assessment occasion. Internal moderators must make sure that all assessors' decisions are consistent.

### Safe and manageable

Assessors and internal moderators must make sure that the assessment methods are safe and manageable and do not put unnecessary demands on the candidate and/or the organisation if real work features in the assessment.

## Suitable to the needs of the candidate

OCR is committed to ensuring that achievement of these awards is free from unnecessary barriers. Centres must follow this commitment through when designing assignments and/or considering assessment.

If centre staff think that any aspect of these qualifications unfairly restricts access and progression, they should talk to their OCR Visiting Moderator about this.

The following assessment methods are considered suitable for assessors to adopt for these awards:

- **observation** of a candidate doing something
- **examination of evidence**
- **questioning** of the candidate or witness.

### Observation

The assessor and candidate should plan observations together but it is the assessor's responsibility to record the observation properly.

After the observation has taken place, the assessor needs to record an assessment decision and the justification for the decision.

### Examining the evidence

Evidence can reflect how the candidate carried out the process or it can be the product of a candidate's work or a product relating to the candidate's competence.

For example:

The process that the candidate carries out could be recorded in a case history, personal statement or witness testimony.

The product of a candidate's work could be documents produced as a result of an assignment.

After the assessor has examined the evidence, the assessor must record an assessment decision and the justification for the decision.

### Questioning

Questioning the candidate is normally an ongoing part of the assessment process, and may in some circumstances provide evidence to support achievement of assessment objectives.

Questioning is often used to:

- test a candidate's knowledge of facts and procedures
- check if a candidate understands principles and theories and
- collect information on the type and purpose of the processes a candidate has gone through.

Assessors should ask open questions, that is questions where the candidate has to give an answer other than 'yes' or 'no'. Centres should be careful to avoid complicated questions that may confuse the candidate.

If questioning is to be used as evidence towards achievement of specific assessment objectives, it is important that assessors record enough information about what they asked and how the candidate replied to allow the assessment decision to be moderated.

Questioning witnesses is normally an ongoing part of validating written witness statements. However, questioning witnesses can be used for other purposes. Assessors should be able to speak to witnesses and record, in whatever way is suitable, the verbal statements of these witnesses. A record of a verbal statement is a form of witness statement and could provide valuable evidence.

## 3.9 Internal moderation and sampling strategies

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Centres must have in place processes to review assessors' decisions and ensure that they are correctly interpreting and applying the standards described in the specifications. The system used to do this is a matter for individual centres and OCR fully supports the use of centres' own quality assurance systems where this ensures robust internal standardisation. Centres must keep records of internal assessment and have these available for inspection by the OCR Visiting Moderator.

Internal moderators should sample assessments systematically in order to ensure the quality and consistency of assessment decisions made by assessors.

## 3.10 Sampling guidance

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Internal moderators should aim to draw their samples from across all candidates, all grades awarded and all assessors. Sample sizes will, of course, reflect the number of candidates entered.

## 3.11 External moderation

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External moderation ensures centres' internal assessment meets the national requirements of these qualifications.

OCR Visiting Moderators are appointed by OCR to carry out two distinct roles. They provide advice and guidance to centre staff and moderate centre assessment decisions.

External moderation of a centre's assessment decisions is achieved through systematic sampling. The assessment decisions of each assessor submitting work will be sampled at every moderation visit and all units for a full qualification will be sampled over the duration of the course. The outcomes of moderation will apply to all work submitted in each batch for moderation. No substitution of candidates' work will be allowed unless prior agreement of the OCR Visiting Moderator has been obtained. Each centre can have up to two visits per year (subject to centre activity). Additional chargeable visits can be arranged by contacting the Allocation Team within OCR Operations, Coventry.

On the basis of the sample taken, the OCR Visiting Moderator will either **agree** in the main with the centre's assessment decisions or **disagree** with the centre's assessment decisions in relation to particular units.

If the decision is **agree**, the centre's assessment decisions for all candidates' work entered for moderation on that occasion (ie in the single batch of work submitted for moderation) will be confirmed by the OCR Visiting Moderator at the end of the moderation visit. Some small degree of disagreement is allowed through the sampling process. In these cases, the OCR Visiting

Moderator will provide clear written advice to the centre to help future assessment and, where appropriate, agree action points with the centre.

If the decision is **disagree**, the OCR Visiting Moderator will provide feedback to the centre and agree appropriate action. Disagreement is usually due to one of the following:

- Work does not meet the required standard.
- Assessment in the sample is inconsistent.
- Some evidence is missing or has not been cross-referenced to the assessment objectives, so cannot be located by the OCR Visiting Moderator.
- There is no evidence of assessment having taken place.

At the end of each moderation visit the OCR Visiting Moderator will prepare a written report which will include comments on the accuracy of assessment and record the action agreed.

It is the OCR Visiting Moderator's responsibility to authorise Certification Record Forms (CRFs) and return these to OCR for processing.

During some moderation visits, the OCR Visiting Moderator may be accompanied by another OCR Officer(s) for quality assurance purposes. Wherever possible, centres will be informed of this prior to the visit taking place.

## 3.12 Retention of centre records

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A centre must make sure that assessment and moderation records are available for external moderation purposes. The Centre Handbook contains examples of assessment records. The use of these forms is optional and centres may devise their own documentation if they wish. Assessment records must be securely retained by the centre for a minimum of three years following candidate achievement of the qualification (ie from the date of certification).

# 4 Certification

Candidates who provide evidence that meets the assessment objectives for all units that make up a full qualification will receive:

- a certificate listing the units (with grades allocated) and
- a certificate giving the full qualification title (with grade allocated)

## OCR Level 2 National Award in Science

**Grade: Merit**

## OCR Level 2 National Certificate in Science

**Grade: Merit**

Candidates achieving one or more units, but who do not meet the requirements for a full qualification, will receive a certificate listing the units they have achieved.

## 4.1 Grading

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After assessment each unit is graded Fail, Pass, Merit or Distinction. For successful candidates the grade awarded will be displayed on the unit certificate.

In addition, each full award will have an overall grade of Pass, Merit or Distinction allocated depending on candidates' achievements at unit level. To arrive at the grade for the full award, we allocate points to each unit as follows:

- One point for a unit graded at Pass
- Two points for a unit graded at Merit
- Three points for a unit graded at Distinction
- Nil points for a unit graded at Fail.

## OCR Level 2 National Award in Science

In order to achieve **the OCR Level 2 National Award in Science**, candidates must achieve a minimum **Pass** grade for:

- two mandatory units
- one optional unit.

To achieve a **Pass** grade for the full Award, candidates must achieve a minimum of three points in total.

To achieve a **Merit** grade for the full Award, candidates must achieve a minimum of five points in total.

To achieve a **Distinction** grade for the full Award, candidates must achieve a minimum of seven points in total.

## OCR Level 2 National Certificate in Science

In order to achieve **the OCR Level 2 National Certificate in Science**, candidates must achieve a minimum **Pass** grade for:

- four mandatory units
- two optional units (only **one** unit from Units 12 and 13 may be chosen).

To achieve a **Pass** grade for the full Certificate, candidates must achieve a minimum of six points in total.

To achieve a **Merit** grade for the full Certificate, candidates must achieve a minimum of ten points in total.

To achieve a **Distinction** grade for the full Certificate, candidates must achieve a minimum of 14 points in total.

## 4.2 Claiming certificates

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For all units a Certification Record Form (CRF) must be completed when a candidate has finished as much of the award as they want at that time. Centres should only submit for moderation completed and assessed units that they consider meet the required minimum Pass standard. Further guidance is given in the *Administrative Guide to OCR Nationals* (code A028).

## 4.3 Replacement certificates

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If a replacement certificate is required a request must be made to the OCR Operations Division on 024 76 470033, or in writing to the Coventry office, and an application form with further instructions will be sent. A charge will be made for a replacement certificate.

## 4.4 Changes to candidate registration

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Further guidance about the following sections is provided in the *Administrative Guide to OCR Nationals* (code A028).

## 4.5 Moving up

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OCR Level 2 Nationals qualifications have been structured so that there is a natural progression route within the suite from Award to Certificate. Topping up allows candidates access to **only** the **three** additional units required to complete the next qualification. Therefore, candidates must fully complete and claim three units before topping up.

## 4.6 Transfers

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Centres can transfer candidate registrations provided transfer is requested before any units are claimed.

## 4.7 Special claims

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Where a candidate is registered for the OCR Level 2 National Certificate and has claimed some units towards this qualification, but is unable to complete all six units required for the full Certificate, OCR will allow a centre to make a special claim for the candidate to receive the OCR Level 2 National Award, provided the candidate has achieved the three units required.

# 5 Qualification Structure

## 5.1 Qualification structure

### OCR Level 2 National Award in Science

From the central bank of 13 units, candidates must achieve three units to gain the full qualification. Of the three units required, two units are mandatory (ie are prescribed by OCR and must be achieved by all candidates taking this qualification). The remaining one unit can be chosen from a list of optional units. Units achieved in the Award will count towards the achievement of the Certificate.

**Please note that it is a statutory requirement that candidates below the age of 16 undertake units 1, 2 and 11, in order to meet the Key Stage 4 Programme of Study.**

### OCR Level 2 National Certificate in Science

From the central bank of 13 units, candidates must complete 6 units to gain the full qualification.

Of the 6 units required, four units are mandatory (ie are prescribed by OCR and must be achieved by all candidates taking this qualification). The remaining two units can be chosen from a list of optional units.

**Please note that it is a statutory requirement that candidates below the age of 16 undertake units 1, 2 and 11, in order to meet the Key Stage 4 Programme of Study.**

Only one restriction is imposed on the selection of optional units and that relates to Units 12 and 13 (listed below). Only one of these units will count towards a full Certificate. Apart from this restriction, centre staff and candidates can choose the two optional units that best suit their circumstances, areas of expertise or interest.

In summary, to achieve the OCR Level 2 National Award in Science, candidates must achieve three units consisting of two mandatory units and one optional unit.

In summary, to achieve the OCR Level 2 National Certificate in Science, candidates must complete six units consisting of four mandatory units and two optional units.

A full list of the mandatory and optional units is provided below:

<b>Mandatory units (OCR Level 2 National Award in Science)</b>		
Unit 1	Best practice in science#	H/103/6659
Unit 2	Materials science#	Y/103/6660
<b>Mandatory units (OCR Level 2 National Certificate in Science)</b>		
Unit 1	Best practice in science#	H/103/6659
Unit 2	Materials science#	Y/103/6660
Unit 3	Forensic science	D/103/6661
Unit 4	Food science	H/103/6662

Optional units		
Unit 3	Forensic science~	D/103/6661
Unit 4	Food science~	H/103/6662
Unit 5	Science of health and bodycare products	D/103/6658
Unit 6	Science of construction	K/103/6663
Unit 7	Science and the environment	M/103/6664
Unit 8	Science in sport	T/103/6665
Unit 9	Investigating energy sources	A/103/6666
Unit 10	Industrial science	F/103/6667
Unit 11	The science of the universe and humanity#	J/103/6668
Unit 12	Career planning for science*	L/103/6669
Unit 13	Work experience in science*	F/103/6670

#Units 1, 2 and 11, when taken together, would meet the requirements of the Programme of Study for Key Stage 4 Science.

~Units 3 and 4 are optional units for the Award only.

\*Only one will count towards the full Award or Certificate.

## 5.2 Unit format

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To complete each unit a candidate must:

- gain the knowledge, understanding and skills specified in the unit – they will do this through a programme of learning devised by their centre
- produce evidence to prove that they have met each of the assessment objectives listed in the unit – they will collect evidence whilst completing centre-devised assignments or projects.

The information contained in each unit is structured in the same way. This will help centre staff and candidates to understand fully the requirements of these qualifications. Each unit contains nine distinct sections. Some cover mandatory requirements, others provide advice and guidance. The nine sections are described below:

### Learning outcomes

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This section describes the learning outcomes that a candidate will achieve when meeting the assessment objectives associated with the unit.

### Assessment objectives

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This section describes the objectives that candidates will be assessed against. It is a mandatory requirement of these qualifications that candidates provide evidence of their skills, knowledge and understanding in relation to each assessment objective.

### Knowledge, understanding and skills

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This section sets out the underpinning knowledge, understanding and skills which candidates will need in order to be able to undertake the assessment for the unit and to meet the requirements of

the assessment objectives. Tutors should cover all of the knowledge, understanding and skills requirements fully prior to entering candidates for assessment.

## Assessment

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This section specifies the mandatory requirements in relation to assessment of the unit. It details the way in which the assessment objectives must be assessed.

## Guidance on assessment and evidence requirements

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This section provides additional guidance for tutors on the depth and breadth of the evidence that will be required and on the range of assessment conditions that will be acceptable.

## Signposting to Key Skills

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Evidence generated for these qualifications may also provide opportunities to evidence Key Skills. Each unit provides signposting to Key Skills and the section **Key Skills signposting** contains a table incorporating the Key Skills signposting across all units.

## Mapping to National Occupational Standards

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This section provides general mapping to national occupational standards where this is relevant. The section **Mapping** contains a table incorporating the national occupational standards mapping across all units.

## Resources

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This section provides suggestions of suitable resources. The list is neither prescriptive nor exhaustive, and candidates should be encouraged to gather information from a variety of sources. Some suggested resources are intended for Tutor use. The resources in this section were current at the time of production.

## Grading

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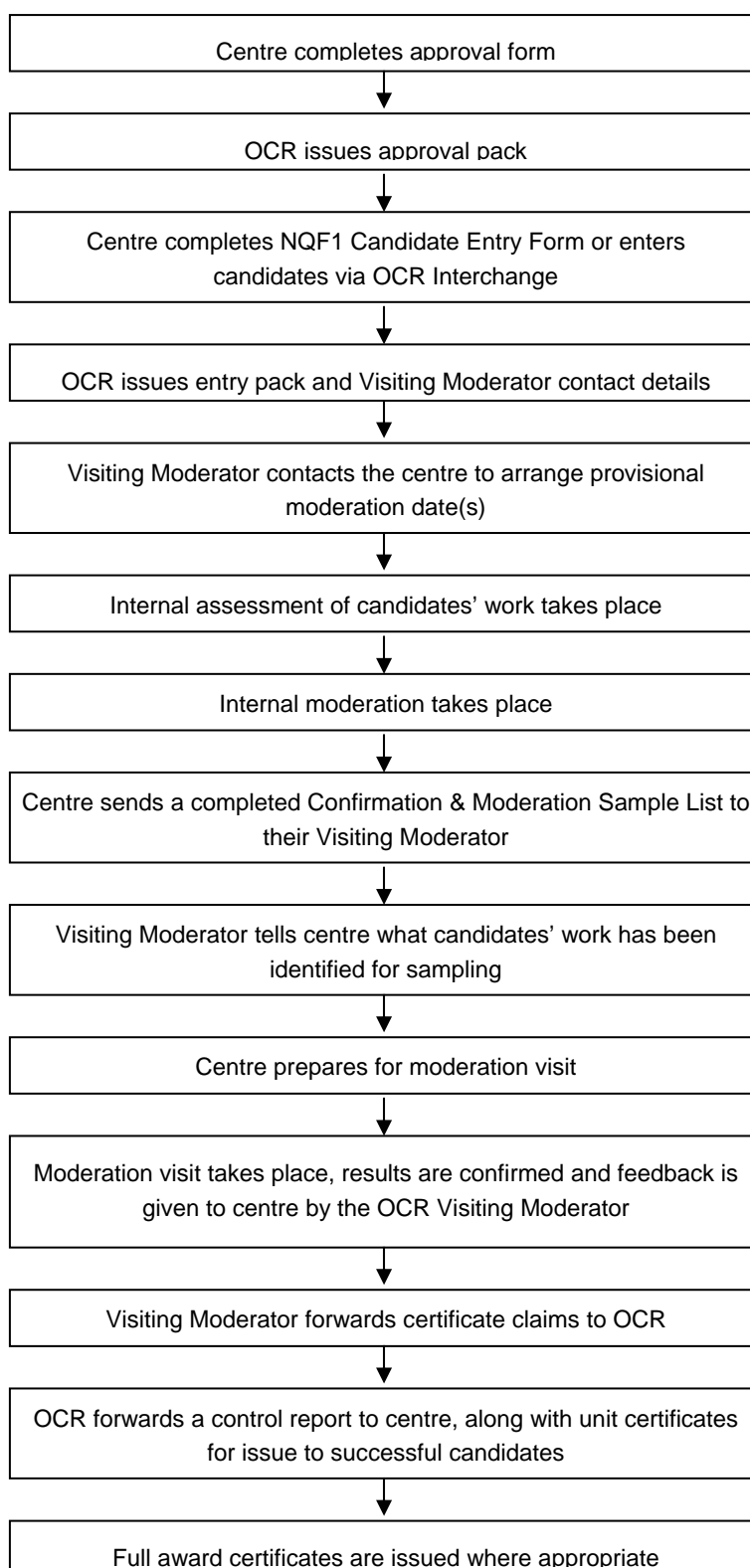
This section describes the typical performance at Pass, Merit and Distinction. These grade descriptors, together with the assessment objectives for the unit, are the measures for assessing candidates' achievements.

**The units for these qualifications can be found in the Units folder on this CD Rom**

# 6 Administration Arrangements

This section provides a brief overview of the administration arrangements operating for these qualifications. Please refer to the *Administrative Guide to OCR Nationals* (code A028) for full guidance.

## 6.1 Overview of full process



## 6.2 How to gain centre approval

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Complete the Centre Approval Form for these qualifications and return it to OCR Operations. A blank copy of this form is provided on this CD Rom. Alternatively copies are available on the our website: [www.ocr.org.uk](http://www.ocr.org.uk), or by calling the OCR Customer Contact Centre on 024 76 851509.

Further guidance on completion of the Centre Approval Form is provided in the *Administrative Guide to OCR Nationals* (code A028) together with the OCR Operations address.

## 6.3 How to enter candidates

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Enter candidates by completing an NQF1 Vocational Qualifications Candidate Entry Form (Named Route). NQF1 forms will be issued to you after you have been approved to offer these qualifications. You can also enter candidates electronically through OCR Interchange. If you are interested in becoming an OCR Interchange user, please contact the OCR Customer Contact Centre for more information.

## 6.4 How to request a visit from an OCR Visiting Moderator

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When you enter candidates for these qualifications you will receive a letter telling you the name and address of your Visiting Moderator. Shortly after receiving this letter, your OCR Visiting Moderator will contact you to arrange provisional dates for your visits (you are eligible for two free visits per academic year subject to centre activity each year).

We would advise you to enter candidates as soon as possible to take full advantage of the guidance and support available through your OCR Visiting Moderator. You may also find it useful to arrange the first visit of the year as early as possible, particularly when first approved for these qualifications. This will enable you to move forward with confidence towards final assessment and moderation of your candidates. An early visit is particularly important where you are delivering these qualifications through a one-year programme.

Please remember: before candidates' work can be externally moderated by OCR, you must ensure that the work of each candidate is complete and has been assessed and awarded a grade in line with the requirements of these qualifications.

In addition, you must ensure that all work submitted for moderation has been through your internal moderation processes to ensure consistent and valid assessment. When you are confident that candidates' work is ready for moderation you must complete the OCR Nationals Confirmation & Moderation Sample List and post two copies to your OCR Visiting Moderator. Please do not include any candidates' work with this form, it is simply a mechanism for your moderator to choose their initial sample for moderation during their visit. An example of a completed Confirmation & Moderation Sample List, and full guidance, is provided in the *Administrative Guide to OCR Nationals* (code A028).

## 6.5 How to prepare for a moderation visit

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Please refer to the *Administrative Guide to OCR Nationals* (code A028) for full guidance. You are also advised to read the section of the catalogue which explains your centre responsibilities in relation to internal assessment and moderation.

## 6.6 How to make an enquiry about results or appeal against a result

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Full details of the results enquiries and appeals procedures are contained in the *Administrative Guide to OCR Nationals* (code A028).

## 6.7 Administrative documentation

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Copies of example documentation may be found in the *Administrative Guide to OCR Nationals* (code A028).

Copies of supporting documentation for tutors may also be found in the section **Supporting documentation** in this publication.

# 7 Supporting Documentation

## 7.1 OCR model assignments (Units 1, 2, 3, 4 and 11)

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OCR model assignments are currently available for Units 1, 2, 3, 4 and 11. Centres may choose to:

- use these assignments for formal summative assessment of candidates
- tailor these assignments for formal summative assessment of candidates
- use these assignments as a benchmark for devising their own assignments.

OCR model assignments are available to download from our website: [www.ocr.org.uk](http://www.ocr.org.uk) and can also be found in the **Model Assignments folder on this CD Rom**.

## 7.2 Tracking and recording documentation

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Where we have produced tracking and recording documentation such as internal standardisation sheets, witness statements and observation records for use by tutors and candidates, it is recommended that they be distributed and used with appropriate guidance. The use of these forms is optional. Alternatively, centres may devise their own tracking and recording documentation.

The following documents are included in this handbook:

- **Centre Authentication Form**
- **Unit Evidence Record Sheet**  
For use by candidates to cross-reference evidence to assessment objectives at unit level.
- **Integrated Evidence Record Sheet**  
For use by candidates to cross-reference evidence across a number of different units.
- **Internal Moderation Record Form**  
For use by centre staff to record the internal standardisation of assessors by the Internal Moderator.
- **OCR Nationals Assessment Plan (Holistic Method)**  
Two versions of this plan are provided for use by centre staff to plan assessment opportunities for individual candidates.
  - 1.1 Designed for candidates undertaking the 3-unit Award.
  - 1.2 Designed for candidates undertaking the 6-unit Certificate.
- **OCR Nationals Assessment Plan**  
For use by centre staff to plan assessment opportunities at unit level for individual candidates.
- **OCR Nationals Progress Review**  
For use by centre staff to review individual candidate's progress through their chosen units. Would provide a useful candidate feedback/action sheet.

- **OCR Nationals Candidate Assessment Record**  
Centres must keep records of candidates' assessment as specified in the *Administrative Guide to OCR Nationals* (code A028). This example of a candidate assessment record is fairly comprehensive. If preferred, centres may wish to record assessment outcomes through the Group Assessment Record, (see below), or something similar.
- **OCR Nationals Group Assessment Record**  
For use by centre staff to record the assessment outcomes of groups of candidates. This form provides a record of all assessment decisions made (ie assessor initials and grade awarded) together with a record of the candidates, assessor judgements and units that were internally moderated and the results of that moderation.
- **Record of Achievement**  
For use by candidates to record progress through their chosen units.
- **Observation/Witness Statement**  
Dual purpose sheet for capturing statements from witnesses or recording an assessor's observation of a candidate's performance. This sheet, when completed, will form part of a candidate's evidence.



RECOGNISING ACHIEVEMENT

## Centre Authentication Form

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One copy of this form must be completed before each external moderation visit. The form must be signed by the appropriate person(s). The completed form must be made available to the Visiting Moderator.

Centre Name

Centre No

Date

\* I/We the undersigned confirm the candidates' evidence to be authentic, sufficient, valid and current. I/We confirm that the candidates' work was conducted under the required conditions as laid down in the specification.

Qualification:

Unit(s):

Signature: \_\_\_\_\_

Print name: \_\_\_\_\_

Signature: \_\_\_\_\_

Print name: \_\_\_\_\_

Signature: \_\_\_\_\_

Print name: \_\_\_\_\_

Signature: \_\_\_\_\_

Print name: \_\_\_\_\_

Qualification:

Unit(s):

Signature: \_\_\_\_\_

Print name: \_\_\_\_\_

Signature: \_\_\_\_\_

Print name: \_\_\_\_\_

Signature: \_\_\_\_\_

Print name: \_\_\_\_\_

Signature: \_\_\_\_\_

Print name: \_\_\_\_\_

\* Signature(s) of internal assessor(s) ie person(s) responsible for carrying out internal assessment of all work submitted to the Visiting Moderator.

# OCR Level 2 National Award in Science

## Unit Evidence Record Sheet

Unit Number \_\_\_\_\_

I confirm that the evidence provided is a result of my own work.

Unit Title \_\_\_\_\_

Name of candidate: \_\_\_\_\_

Signature of candidate: \_\_\_\_\_ Date: \_\_\_\_\_

Evidence reference or location	Evidence	Assessment objectives												
		1	2	3	4	5	6	7	8	9	10	11	12	

*(Please photocopy this sheet for recording further evidence)*

I confirm that the candidate has demonstrated competence by satisfying all of the assessment objectives for this unit.

Signature of assessor: \_\_\_\_\_ Date: \_\_\_\_\_

(Page of )

Signature of Internal Moderator: \_\_\_\_\_ Date: \_\_\_\_\_









## OCR Nationals Assessment Plan (Holistic Method) 1.1

Centre name:		Centre number:			
Candidate's name:		Assessor's name:			
Qualification:					
Proposed Activity	Assignment Ref	Target Date	Units to be covered		
			Unit/ AO	Unit/ AO	Unit/ AO
Assessor's signature:				Date:	
Candidate's signature:				Date:	

## OCR Nationals Assessment Plan (Holistic Method) 1.2

Centre name:			Centre number:					
Candidate's name:			Assessor's name:					
Qualification:								
Proposed Activity	Assignment Ref	Target Date	Units to be covered					
			Unit/ AO	Unit/ AO	Unit/ AO	Unit/ AO	Unit/ AO	Unit/ AO
Assessor's signature:							Date:	
Candidate's signature:							Date:	



## OCR Nationals Progress Review

---

Centre name:		Centre number:	
Candidate's name:		Assessor's name:	
Workplace details (if applicable):			
Qualification:			
Unit	Assessment Objective	Review notes/action to be taken/evidence to be produced	Target Date
Assessor's signature:			Date:
Candidate's signature:			Date:

# OCR Nationals Candidate Assessment Record

---

Centre name:		Centre number:		
Candidate's name:		Assessor's name:		
Workplace details (if applicable):				
Qualification:				
Units/Assessment objectives	Grade	Description of evidence	Date	Assessor Initials
<b>Location of assessment</b>			<b>Date</b>	

*Continued*

<b>Underpinning knowledge understanding and skills record</b>	<b>Date</b>
<b>Feedback notes</b>	
<b>I confirm that the evidence provided is a result of my own work:</b>	
Candidate's signature:	Date:
<b>I judge the above evidence to be authentic, sufficient, valid and current. It has been assessed in accordance with, and covers the requirements of the qualification specifications:</b>	
Assessor's signature:	Date:
Internal moderator's signature: <i>(where applicable)</i>	Date:

# OCR Nationals Group Assessment Record

Centre name:								Centre number:								
Qualification title:								OCR code:								
Assessor(s):																
Internal moderator(s):								Page of								
Candidate number		Candidate name			Unit no/title:				Unit no/title:							
					Ass	Grade	Date	IM	Agree	Date	Ass	Grade	Date	IM	Agree	Date
<b>Notes:</b>																

## OCR LEVEL 2 NATIONAL AWARD IN SCIENCE

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### Record of Achievement

Candidate name:

UNIT TITLES		Date passed to Assessor	Assessor agreed completed
Mandatory Units			
Unit 1	Best practice in science		
Unit 2	Materials science		
Optional Units			
Unit 3	Forensic science		
Unit 4	Food science		
Unit 5	Science of health and bodycare products		
Unit 6	Science of construction		
Unit 7	Science and the environment		
Unit 8	Science in sport		
Unit 9	Investigating energy sources		
Unit 10	Industrial science		
Unit 11	The science of the universe and humanity		
Unit 12	Career planning for science		
Unit 13	Work experience in science		

## OCR LEVEL 2 NATIONAL CERTIFICATE IN SCIENCE

---

### Record of Achievement

Candidate name:

UNIT TITLES		Date passed to Assessor	Assessor agreed completed
Mandatory Units			
Unit 1	Best practice in science		
Unit 2	Materials science		
Unit 3	Forensic science		
Unit 4	Food science		
Optional Units			
Unit 5	Science of health and bodycare products		
Unit 6	Science of construction		
Unit 7	Science and the environment		
Unit 8	Science in sport		
Unit 9	Investigating energy sources		
Unit 10	Industrial science		
Unit 11	The science of the universe and humanity		
Unit 12	Career planning for science		
Unit 13	Work experience in science		

## OBSERVATION/WITNESS STATEMENT

---

Candidate name: .....

Assessor name: .....

### *Witness details (where applicable)*

Name: ..... Job Title: .....

Name and address of place of work: .....

.....

Telephone number: ..... Email: .....

Fax number: ..... Relationship to candidate: .....

What activity(ies) did the candidate carry out, over what period of time and in what context?	For assessor use only: Unit/AO reference
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;">Have you continued on a separate sheet Y/N?</div>	

How much supervision or help was the candidate given?

I confirm that this statement is a true description of the above candidate's performance in relation to the activities outlined.

Signature: ..... (Witness/Assessor\*) Date: .....

For Assessor use only:

<b>Authentication notes</b>	<b>Date</b>	<b>Assessment notes</b>	<b>Grade</b>	<b>Date</b>

\*delete as appropriate

# 8 Model Assignments

OCR Model Assignments for Units 1, 2, 3, 4 and 11 can be downloaded from our website:  
[www.ocr.org.uk](http://www.ocr.org.uk).

# 9 Guidance For Candidates

## 9.1 What are the OCR Level 2 Nationals in Science?

---

These qualifications aim to:

- 1 develop your knowledge and understanding of the science sector
- 2 develop your skills, knowledge and understanding in contexts that are directly relevant to employment situations, thereby enhancing your employability within the science sector
- 3 develop your ability to work autonomously and effectively in a scientific context
- 4 enable you to develop knowledge and understanding in specialist areas of science, and demonstrate the skills needed to participate in the operation and development of real scientific organisations
- 5 encourage progression by assisting in the development of skills, knowledge and understanding that you will need to access further education programmes or occupational training on a full-time or part-time basis
- 6 encourage progression by assisting in the development of skills, knowledge and understanding that you will need to enter employment or enhance your current employment status
- 7 promote interaction between employers, centres and you by relating teaching and assessment to real organisations.

## 9.2 What do I have to do to achieve these qualifications?

---

To achieve these qualifications you must complete the required number of units from the bank of 13 units below and provide evidence that you have met the assessment objectives described in each unit.

### **OCR Level 2 National Award in Science**

To achieve the Award you must complete three units, consisting of the two mandatory units listed below and one unit chosen from the optional units.

### **OCR Level 2 National Certificate in Science**

To achieve the Certificate you must complete six units, consisting of the four mandatory units listed below and a further two units chosen from the optional units. Only one of Units 12 or 13 may count towards a full award.

**Please note that if you are below the age of 16, it is a statutory requirement that you must undertake units 1, 2 and 11, in order to meet the Key Stage 4 Programme of Study for Science.**

## OCR Level 2 National Award in Science

<b>Mandatory units</b>	
1	Best practice in science
2	Materials science
<b>Optional units</b>	
3	Forensic science
4	Food science
5	Science of health and bodycare products
6	Science of construction
7	Science and the environment
8	Science in sport
9	Investigating energy sources
10	Industrial science
11	The science of the universe and humanity
12	Career planning for science
13	Work experience in science

## OCR Level 2 National Certificate in Science

<b>Mandatory units</b>	
1	Best practice in science
2	Materials science
3	Forensic science
4	Food science
<b>Optional units</b>	
5	Science of health and bodycare products
6	Science of construction
7	Science and the environment
8	Science in sport
9	Investigating energy sources
10	Industrial science
11	The science of the universe and humanity
12	Career planning for science
13	Work experience in science

### 9.3 What if I cannot complete enough units needed for a full qualification?

---

These qualifications are very flexible and allow you to achieve recognition for what you have already achieved even if you do not finish the full qualification. OCR has systems in place which allow you to be awarded a certificate listing the unit (or units) you have achieved even if you are unable to complete the full qualification.

### 9.4 How do I know that these qualifications are right for me?

---

These qualifications will be suitable for you if you wish to gain an appreciation of science operations, activities and functions.

These qualifications will also form progression routes to qualifications at Level 3 of the National Qualifications Framework.

### 9.5 What is evidence?

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Evidence is your proof that you meet the requirements of these qualifications.

Evidence could be:

- completed assignments or projects
- products of real work that you have completed during work experience
- statements from witnesses
- records of your assessor observing you carrying out your work.

Evidence can be anything that proves:

- what you can do
- how well you do it
- the level of knowledge you have in relation to what you do and
- the level of understanding you have about what you do, how you do it, and why you do it.

For each unit of these qualifications you need evidence to prove that you have met all the assessment objectives specified in each unit. This will sometimes mean that you must prove you can do something, eg complete records accurately. Sometimes, your evidence must prove that you know or understand something, eg theories about the origins of the universe.

### 9.6 How much evidence do I need?

---

Your assessor will help you decide how much evidence you need to produce. Remember that it is quality not quantity that counts when putting work forward for assessment.

## 9.7 What happens to my evidence?

---

The evidence you provide will be assessed (checked by your assessor or assessors against the assessment objectives and grade descriptors listed in each unit). Your assessor will want you to continue providing evidence until they are satisfied that there is sufficient proof that you have met each assessment objective in a particular unit. Your evidence must be your own work.

## 9.8 Where do I keep my evidence?

---

You may decide to keep some of your evidence in a file (a portfolio of evidence) or you may want to record what the evidence is and where it can be found. For example, if you keep records of genetic variation on a spreadsheet you may want to print a section from this record as evidence to be stored in your portfolio. However, you may decide to make a note of what records you entered and where they can be found. This is called signposting evidence. The important thing to remember about evidence is that it must be available for your assessor to assess and for other people (called internal and external moderators) to have access to in the future.

## 9.9 How much help can I get?

---

All evidence that you submit for this qualification must be the result of your own work. You must not submit someone else's work or idea as your own and you must not copy from someone else or allow another candidate to copy from you.

Sometimes you may want to refer to research, quotations or other text in the evidence you submit for assessment. This is allowed but any text that is not entirely your own must be identified. The easiest way to identify text that is not your own is to mark the text and provide details of where it came from (ie its source). This is called referencing. Sources could be anything eg books, internet sites, television programmes, news articles. If you use the same wording as a published source, you must place quotation marks around the passage and state where it came from. A reference should show, as a minimum, the name of the author, the year of publication and the page number. For example: (Johnson, 2003, pg 100). This reference could appear as a footnote/endnote or immediately after the reference text in the body of your document.

For material taken from the internet, your reference must show the precise web page, not the search engine used to locate it. This can be copied from the address line. For example:  
[www.newscientist.com](http://www.newscientist.com)

You should also include a bibliography at the end of your work, which lists the full details of publications you have used to research your project. For example: Johnson, M (2003) "Past and Present Technology", London: Weston Press.

If you copy the words or ideas of others and do not show your sources in references and a bibliography, you will be committing plagiarism, and that is cheating.

If you receive help and guidance from someone other than your assessor, tell your assessor and they will advise you further.

If you worked as part of a group on a project, you must each write up your own account of the project. Even if the data you have is the same, the description of how that data was obtained and the conclusions you draw from it should be in your own words.

Your assessor is there to guide and assist you – showing them your work as it progresses will allow you and your assessor time to sort out any problems.

Take care of your work and keep it safe. If it is stored in the computer network, keep your password secure. Collect all copies from the printer and destroy those you don't need.

**Remember:** all work that you submit for assessment must be your own and you may be asked to sign a declaration to say that the work is your own.

---

## 9.10 Who are Internal and Visiting Moderators?

An internal moderator will be employed by your centre to look after these qualifications. Internal moderators make sure that all assessors judge evidence in the same way and to the same standard (this is called internal moderation).

The Visiting Moderator is employed by OCR to monitor the quality of the assessment and internal moderation decisions at a centre.

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## 9.11 How do I keep track of my achievements?

We have designed a **Record of Achievement** form for you to use to keep track of your achievements. This form is optional (you do not have to use it if you do not want to).

---

## 9.12 Can my evidence for these qualifications count towards Key Skills?

The evidence you produce for these qualifications may prove you have the skills required for the Key Skills units. Your assessor will help you decide if your evidence can be considered for assessment against any of the Key Skills units.

---

## 9.13 Finally

To gain a full OCR Level 2 National in Science you must collect enough evidence to prove you have met the assessment objectives listed in the required units. If you cannot finish all of the units for the full qualification, you may claim a 'unit certificate' which lists the unit or units which have been signed off by your assessor.

**OCR wishes you every success in your achievement of these qualifications.**

**CONFIRMATION OF ENTRY**

This is to confirm that you have been entered for the following OCR qualification which is accredited onto the National Qualifications Framework (NQF) at Level 2:

**OCR Level 2 National Award in Science**

Candidate Name:	
Candidate Registration Number:	
Centre Name:	
Centre Number:	

Awarding Body: OCR (Oxford Cambridge and RSA Examinations)

**CONFIRMATION OF ENTRY**

This is to confirm that you have been entered for the following OCR qualification which is accredited onto the National Qualifications Framework (NQF) at Level 2:

**OCR Level 2 National Certificate in Science**

Candidate Name:	
Candidate Registration Number:	
Centre Name:	
Centre Number:	

Awarding Body: OCR (Oxford Cambridge and RSA Examinations)

# 10 Key Skills Signposting

To assist centres in cross-mapping evidence for these qualifications and Key Skills, the table on the following page signposts where evidence from these awards may provide opportunities to evidence the Part B specification requirements of the following Key Skills:

- Communication
- Application of Number
- ICT

This signposting provides an indication of where evidence might be available for assessment against the Key Skills requirements. It does not claim to guarantee that evidence will meet the Key Skills requirements and all evidence put forward for Key Skills must be assessed against the Key Skills specification. This signposting is also available within the units themselves.

<b>Key Skills Units</b>	<b>OCR Level 2 Nationals in Science</b>													
<b>Key Skill</b>	<b>Evidence Ref</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>
Communication	C2.1				✓	✓		✓	✓			✓	✓	✓
	C2.2a	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	C2.2b	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	C2.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Information and Communication Technology	ICT2.1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ICT2.2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	ICT2.3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Application of Number	N2.1	✓	✓	✓	✓		✓		✓	✓	✓	✓		
	N2.2a	✓	✓	✓	✓		✓	✓		✓	✓	✓		
	N2.2b	✓	✓	✓	✓		✓	✓		✓	✓	✓		
	N2.2c	✓	✓	✓	✓		✓	✓		✓	✓	✓		
	N2.2d													
	N2.3	✓	✓	✓	✓		✓		✓	✓	✓	✓		

# 11 Mapping

## 11.1 National occupational standards mapping

---

These qualifications provide a key progression route between education and employment (or further study/training leading to employment). They are directly relevant to the needs of employers and relate to national occupational standards in Science at Level 2.

The following table indicates where units within these qualifications contain knowledge and understanding that map against the above national occupational standards.

This mapping provides an indication of where evidence might be available for assessment against some of the knowledge and understanding contained in the national occupational standards. It does not claim to guarantee that evidence will meet the NVQ requirements. This information is also available within the units themselves.

OCR Level 2 Nationals in Science		National Occupational Standards		
Unit	Title	National Occupational Standards	NOS Unit number	Title
1	Best practice in science	LATA LATA LATA LATA LATA LATA LATA LATA	1.01 1.04 1.05 2.03 2.04 2.05 2.06 2.13	Complying with Statutory regulations and Safety requirements Take laboratory measurements Perform basic laboratory activities Carry out simple testing operations Carry out simple sampling operations Prepare laboratory materials, equipment and resources Calibrate equipment (Cogent 1.8) Work in aseptic or clean room conditions
2	Materials science	LATA LATA LATA LATA LATA LATA LATA	1.01 1.04 1.05 2.03 2.04 2.05 2.06	Complying with Statutory regulations and Safety requirements Take laboratory measurements Perform basic laboratory activities Carry out simple testing operations Carry out simple sampling operations Prepare laboratory materials, equipment and resources Calibrate equipment
3	Forensic science	LATA LATA LATA LATA LATA LATA LATA LATA Forensic Science Forensic Science Forensic Science Forensic Science Forensic Science	1.01 1.04 1.05 2.03 2.04 2.05 2.06 2.13 1 2 3 4 5	Complying with Statutory regulations and Safety requirements Take laboratory measurements Perform basic laboratory activities Carry out simple testing operations Carry out simple sampling operations Prepare laboratory materials, equipment and resources Calibrate equipment (Cogent 1.8) Work in aseptic or clean room conditions Prepare to carry out examinations Examine items and samples Undertake specialist scene examinations Interpret findings Report findings

Unit	Title	National Occupational Standards	NOS Unit number	Title
4	Food science	LATA LATA LATA LATA LATA LATA LATA LATA	1.01 1.04 1.05 2.03 2.04 2.05 2.06 2.13	Complying with Statutory regulations and Safety requirements Take laboratory measurements Perform basic laboratory activities Carry out simple testing operations Carry out simple sampling operations Prepare laboratory materials, equipment and resources Calibrate equipment (Cogent 1.8) Work in aseptic or clean room conditions
5	Science of health and bodycare products	LATA LATA LATA LATA LATA	1.01 1.05 2.03 2.05 2.13	Complying with Statutory regulations and Safety requirements Perform basic laboratory activities Carry out simple testing operations Prepare laboratory materials, equipment and resources (Cogent 1.8) Work in aseptic or clean room conditions
6	Science of construction	LATA LATA LATA CIC LANTRA LANTRA Skillset CIC CITB	1.01 1.05 2.05 52 LBO 14 FE5 PD3 CICB51 CCESVR362	Complying with Statutory regulations and Safety requirements Perform basic laboratory activities Prepare laboratory materials, equipment and resources Assemble structural steelwork Assist with constructing structures and surfaces Cast reinforced concrete Determine design requirements which align with the production brief Develop and test project design solutions Lay construction related materials

Unit	Title	National Occupational Standards	NOS Unit number	Title
7	Science and the environment	LATA LATA LATA LATA LATA LATA LATA LATA	1.01 1.04 1.05 2.03 2.04 2.05 2.06 2.13	Complying with Statutory regulations and Safety requirements Take laboratory measurements Perform basic laboratory activities Carry out simple testing operations Carry out simple sampling operations Prepare laboratory materials, equipment and resources Calibrate equipment (Cogent 1.8) Work in aseptic or clean room conditions
8	Science in sport	LATA LATA LATA LATA LATA LATA Sport Recreation and Allied Occupations Skills for Health	1.01 1.04 1.05 2.03 2.05 2.06 B12 B13 D417 A EA3  EB1	Complying with Statutory regulations and Safety requirements Take laboratory measurements Perform basic laboratory activities Carry out simple testing operations Prepare laboratory materials, equipment and resources Calibrate equipment Promote the adoption and maintenance of regular physical exercise Promote active living and healthy eating Support participants in developing and maintaining fitness Coronary Heart Disease Develop and disseminate information and advice about CHD and how to reduce the risk of CHD Enable people to understand the lifestyle factors associated with CHD and take decisions to reduce the risk of CHD
9	Investigating energy sources	LATA LATA LATA ECS	1.01 1.04 1.05 7.04	Complying with Statutory regulations and Safety requirements Take laboratory measurements Perform basic laboratory activities Identify hazards in the workplace
10	Industrial science	LATA LATA LATA	1.01 1.04 1.05	Complying with Statutory regulations and Safety requirements Take laboratory measurements Perform basic laboratory activities

Unit	Title	National Occupational Standards	NOS Unit number	Title
11	The science of the universe and humanity	LATA LATA LATA LATA LATA	1.01 1.04 1.05 2.03 2.04	Complying with Statutory regulations and Safety requirements Take laboratory measurements Perform basic laboratory activities Carry out simple testing operations Carry out simple sampling operations
12	Career planning for science			
13	Work experience in science			

## 11.2 Mapping to other OCR qualifications

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The table on the following page documents the content crossover with the following OCR Level 2 qualifications in Science:

GNVQ Intermediate in Science

GCSE Double Award Applied Science

OCR Level 2 Nationals in Science		Content crossover with other OCR qualifications	
Unit	Title	OCR GNVQ Intermediate in Science	OCR GCSE Applied Science Double Award
1	Best practice in science	Units 1, 2, 3 and 4	Units 1, 3
2	Materials science	Unit 4	
3	Forensic science		Units 1, 2
4	Food science		Units 1, 2
5	Science of health and bodycare products	Unit 2	Units 1, 2
6	Science of construction	Units 2 and 5	
7	Environmental science	Unit 8	Units 1, 2, 3
8	Science in sport	Units 2, 3 and 5	Unit 2
9	Investigating energy sources	Unit 7	Unit 2
10	Industrial science	Unit 7	
11	The science of the universe and humanity	Units 2, 6, 7 and 9	Units 1, 2, 3
12	Career planning for science		Unit 3
13	Work experience in science		Unit 3

## 11.3 Links with other units

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The table below indicates where there are more significant content links between units in the OCR Level 2 Nationals in Science. Centres may find this information of use if devising integrated assignments for candidates.

<b>Unit number</b>	<b>Unit title</b>	<b>Links to other units</b>
1	Best practice in science	All other units
2	Materials science	1, 3, 6, 8
3	Forensic science	All other units
4	Food science	1, 3, 7
5	Science of health and bodycare products	1, 3, 10
6	Science of construction	1, 3, 8
7	Science and the environment	1, 3, 4
8	Science in sport	1, 3
9	Investigating energy sources	1,3, 11
10	Industrial science	5
11	The science of the universe and humanity	1,2, 3, 4, 5, 7, 8 and 9
12	Career planning for science	
13	Work experience in science	

## 11.4 Key Stage 4 Programme of Study mappings

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The following tables indicate where the OCR Level 2 Nationals in Science meet the Key Stage 4 Programme of Study for Science. The first table indicates where these qualifications meet the Key Stage 4 *How science works* criteria and the second table indicates where these qualifications meet the *Breadth of study* criteria.

		How science works	Unit Number										
			1	2	3	4	5	6	7	8	9	10	11
			Assessment Objective										
<b>3.6(i)</b>	<b>a</b>	the collection and analysis of scientific data	2	2	2	1,7	2,4,6	1		1	4,5	1	1,8
	<b>b</b>	the interpretation of data, using creative thought, to provide evidence for testing ideas and developing theories	3	4	5	2			4	2,3	4,5	2	1,2
	<b>c</b>	many phenomena can be explained by developing and using scientific theories, models and ideas	6	2									1,2
	<b>d</b>	there are some questions that science cannot currently answer, and some that science cannot address	6	2,6									1
<b>(ii)</b>	<b>a</b>	planning to test a scientific idea, answer a scientific question, or solve a scientific problem	2,3	5	1	3		6	2	6	1	2,4,5	3,6,7
	<b>b</b>	collecting data from primary or secondary sources, including the use of ICT sources and tools	2	2	2	7	2	2,5	2	5	4,5	2,4	1,6,8
	<b>c</b>	working accurately and safely, individually and with others, when collecting first-hand data	2,3	3	2	4	7,8 9,10	3	3,6	6	2,3	6	6
	<b>d</b>	evaluating methods of data collection, and considering their validity and reliability as evidence	2	3	4	5			5	6		7	5
<b>(iii)</b>	<b>a</b>	recalling, analysing, interpreting, applying and questioning scientific information or ideas	3	3	5		3	5		6	4,5	8	1,4
	<b>b</b>	using both qualitative and quantitative approaches	4	4	5	5		3		6	4,5	8	2,7
	<b>c</b>	presenting information, developing an argument and drawing a scientific, technical and mathematical language, conventions and symbols and ICT tools	4	6	6	5	4			7	6		3

		How science works	Unit Number										
			1	2	3	4	5	6	7	8	9	10	11
			Assessment Objective										
<b>(iv)</b>	<b>a</b>	the use of contemporary scientific and technological developments and their benefits, drawbacks and risks		6	4	6	5	5		8	6		2,5
	<b>b</b>	how and why decisions about science and technology are made, including those that raise ethical issues, and about the social, economic and environmental effects of such decisions		6		6	5	7		8	6		5,7
	<b>c</b>	how uncertainties in scientific knowledge and scientific ideas change over time and the role of the scientific community in validating these changes.	6	6									1

Breadth of Study	Unit number										
	1	2	3	4	5	6	7	8	9	10	11
	Assessment Objectives										
5a organisms are interdependent and adapted to their environments				3							5
5b variation within species can lead to evolutionary changes and similarities and differences between species can be measured and classified				5,7							5,6
5c the ways in which organisms function are related to the genes in their cells				6							5,6
5d chemical and electrical signals enable body systems to respond to internal and external changes, in order to maintain the body in an optimal state					1, 2, 3,4			4, 5, 8			4,7
5e human health is affected by a range of environmental and inherited factors, by the use and misuse of drugs and by medical treatments				2	4			2,8			3,5
6a chemical change takes place by the rearrangement of atoms in substances		1			7, 8, 9, 10					1	
6b there are patterns in the chemical reactions between substances		3			7, 8, 9, 10					4-6	
6c the properties of a material determine its uses.		2,5			11	2, 3, 4, 5,6		7			

Breadth of Study	Units number										
	1	2	3	4	5	6	7	8	9	10	11
	Assessment Objectives										
<b>7a</b> energy transfers can be measured and their efficiency calculated, which is important in considering the economic costs and environmental effects of energy use									4		8
<b>7b</b> electrical power is readily transferred and controlled, and can be used in a range of different situations									1,3 4		8
<b>7c</b> radiations, including ionising radiations, can transfer energy									5		1, 2
<b>7d</b> radiations in the form of waves can be used for communication											2
<b>8a</b> the effects of human activity on the environment can be assessed using living and non-living indicators	2,3	6	3	7		7,8	3, 4, 5,6		6		9
<b>8b</b> the surface and the atmosphere of the Earth have changed since the Earth's origin and are changing at present							3, 4, 5,6		6		1, 3
<b>8c</b> the solar system is part of the universe, which has changed since its origin and continues to show long-term changes.											1, 2

# 12 Further Support And Information

## 12.1 General enquiries

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For general enquiries relating to any of OCR's vocational qualifications, please contact the OCR Customer Contact Centre on:

Telephone: 024 76 851509  
Fax: 024 76 851633  
Email: [vocational.qualifications@ocr.org.uk](mailto:vocational.qualifications@ocr.org.uk)

Alternatively, you could visit our website: [www.ocr.org.uk](http://www.ocr.org.uk) for further information on OCR qualifications.

## 12.2 Entry forms and entry enquiries

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All entry forms should be returned to:

Operations  
OCR  
Progress House  
Westwood Way  
Coventry  
CV4 8JQ

If you have any queries about candidate entry, please contact Operations on 024 76 470033.

## 12.3 Results enquiries

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Forms and current fees can be obtained from:

Results Enquiries (VABSS)  
OCR  
Progress House  
Westwood Way  
Coventry  
CV4 8JQ

## 12.4 Customer feedback

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We welcome feedback from customers on all aspects of our provision. Comments relating to this documentation should be sent to:

The Professional Officer  
OCR Level 2 Nationals in Science  
OCR Nationals and WRL Team  
OCR  
Coventry Office  
Westwood Way  
Coventry  
CV4 8JQ

## 12.5 OCR Training Events

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Information on OCR's training events for centres can be found on our website: [www.ocr.org.uk](http://www.ocr.org.uk) or by contacting:

OCR Training  
Mill Wharf  
Mill Street  
Birmingham  
B6 4BU

Telephone: 0121 628 2950  
Fax: 0121 628 2940  
Email: [training@ocr.org.uk](mailto:training@ocr.org.uk)

## 12.6 OCR Publications

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OCR's Publications Catalogue (A410) lists all the qualifications that OCR offers, and contains more detail on how to order publications. It is available to download from our website: [www.ocr.org.uk](http://www.ocr.org.uk), or to order from the OCR Customer Contact Centre by telephoning 024 76 851509.

If you would like to order any OCR publications, please contact:

OCR Publications  
PO Box 5050  
Annesley  
Nottingham  
NG15 0DL

Telephone: 0870 770 6622  
Fax: 0870 770 6621  
Email: [publications@ocr.org.uk](mailto:publications@ocr.org.uk)

OCR Support Materials prepare extra resources to help you deliver our qualifications. These support materials can be ordered from OCR Publications and more information about the materials can be obtained from [support.materials@ocr.org.uk](mailto:support.materials@ocr.org.uk)

## 12.7 Publications (related to these qualifications)

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*Administrative Guide to OCR Nationals* (code A028)

*Access to Assessment: NVQs, Vocationally-Related Qualifications (VRQs) and Other Vocational Qualifications. Regulations and Guidance Relating to Candidates with Particular Requirements* (code L016)

# 13 Glossary

<b>Analyse</b>	to examine in detail in order to discover meaning, essential features, etc
<b>Apply</b>	to devote oneself with diligence to bring into operation or use to put to practical use; utilise; employ
<b>Assess</b>	to judge the worth, importance etc of; evaluate
<b>Calculate</b>	to solve (one or more problems) by a mathematical procedure; compute
<b>Carry out</b>	to perform or cause to be implemented
<b>Chart</b>	to plot or outline the course of to make a detailed plan of to make a chart of
<b>Classify</b>	to arrange or order by classes; categorise
<b>Collect</b>	to gather together or be gathered together
<b>Communicate</b>	to impart (knowledge) or exchange (thoughts, feelings, or ideas) by speech, writing, gestures, etc
<b>Compare</b>	to regard or represent as analogous or similar; liken
<b>Compile</b>	to make or compose from other materials or sources
<b>Complete</b>	to make whole or perfect to end; finish
<b>Conduct</b>	to do or carry out
<b>Contrast</b>	to distinguish by comparison of unlike or opposite qualities
<b>Contribute</b>	to give (support, money, etc) for a common purpose or fund to supply (ideas, opinions, etc) as part of a debate or discussion
<b>Cook</b>	to prepare (food) by the action of heat, as by boiling, baking, etc or (of food) to become ready for eating through such a process
<b>Define</b>	to state precisely the meaning of (words, terms, etc)
<b>Deliver</b>	to carry (goods, etc) to a destination, esp. to carry and distribute (goods, mail, etc) to several places to hand over, transfer, or surrender to produce or perform something promised or expected
<b>Demonstrate</b>	to show, manifest, or prove, esp. by reasoning, evidence, etc
<b>Describe</b>	to give an account or representation of in words
<b>Design</b>	to work out the structure or form of (something)
<b>Detail</b>	to list or relate fully to include all or most particulars
<b>Develop</b>	to come or bring to a later or more advanced or expanded stage; grow or cause to grow gradually
<b>Devise</b>	to work out, contrive, or plan (something) in one's mind
<b>Discuss</b>	to have a conversation about; consider by talking over; debate to treat (a subject) in speech or writing
<b>Estimate</b>	to form an approximate idea of (distance, size, cost, etc); calculate roughly; gauge

<b>Evaluate</b>	to ascertain or set the amount or value of to judge or assess the worth of; appraise
<b>Examine</b>	to look at, inspect, or scrutinise carefully, or in detail; investigate
<b>Explain</b>	to make (something) comprehensible, esp. by giving a clear and detailed account of the relevant structure, operation, surrounding circumstances, etc
<b>Explore</b>	to examine or investigate, esp. systematically
<b>Generate</b>	to produce or bring into being; create
<b>Give</b>	to present or deliver voluntarily (something that is one's own) to the permanent possession of another or others to impart or communicate
<b>Identify</b>	to prove or recognise as being a certain person or thing; determine the identity of
<b>Illustrate</b>	to clarify or explain by use of examples, analogy, etc
<b>Implement</b>	to carry out; put into action; perform
<b>Interact</b>	to act on or in close relation with each other
<b>Interpret</b>	to clarify or explain the meaning of; elucidate
<b>Investigate</b>	to inquire into (a situation or problem) thoroughly; examine systematically, especially in order to discover the truth
<b>Justify</b>	to prove or see to be just or valid; vindicate to show to be reasonable; warrant or substantiate
<b>Keep</b>	to have or retain possession of
<b>Lead</b>	to show the way to (an individual or a group) by going with or ahead to guide or be guided by holding, pulling, etc to phrase a question to (a witness) that tends to suggest the desired answer
<b>Measure</b>	to determine the size, amount, etc of by measurement
<b>Monitor</b>	to observe or record (the activity or performance) of (an engine or other device)
<b>Organise</b>	to form (parts or elements of something) into a structured whole; co ordinate
<b>Outline</b>	to give the main features or general idea of
<b>Participate</b>	to take part, be or become actively involved, or share (in)
<b>Perform</b>	to carry out or do (an action)
<b>Plan</b>	to have in mind as a purpose to make a plan of (a building)
<b>Prepare</b>	to make ready or suitable in advance for a particular purpose or for some use, event etc to put together using parts or ingredients; compose or construct to equip or outfit
<b>Present</b>	to show, exhibit to put forward; submit to bring or suggest to the mind
<b>Produce</b>	to bring (something) into existence; yield to bring forth (a product) by physical or mental effort; make
<b>Profile</b>	to draw, write or make a profile of

<b>Promote</b>	to further or encourage the progress or existence of to raise to a higher rank, status degree etc to urge the adoption of; work for to encourage the sale of (a product) by advertising or securing financial support
<b>Propose</b>	to put forward (a plan, motion, etc) for consideration or action
<b>Provide</b>	to put at the disposal of; furnish or supply
<b>Recognise</b>	to perceive (a person, creature, or thing) to be the same as or belong to the same class as something previously seen or known, know again
<b>Recommend</b>	to advise as the best course or choice; counsel
<b>Research</b>	to carry out investigations into (a subject, problem) etc
<b>Review</b>	to look at or examine again to look back upon
<b>Select</b>	to choose (someone or something) in preference to another or others
<b>Serve</b>	to render or be of service to (a person, cause, etc); help to distribute or provide
<b>Show</b>	to make, be, or become visible or noticeable to indicate or explain; prove
<b>Suggest</b>	to put forward (a plan, idea, etc) for consideration
<b>Summarise</b>	to make or be a summary of; express concisely
<b>Understand</b>	to know and comprehend the nature or meaning of
<b>Undertake</b>	to contract to or commit oneself to (something) or to do (something)
<b>Use</b>	to put into service or action; employ for a given purpose