



Short Course
CSI: Exploring
Forensic Science
Level 2

Specification for Junior Cycle Short Course



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Short courses and Level 2 Learning Programmes

In the new junior cycle, students taking this short course should be following a personalised Level 2 Learning Programme (L2LP) alongside other curriculum components (from Level 2 and possibly one or two from Level 3). The L2LPs are planned around a number of Priority Learning Units (PLUs) which focus on developing the personal, social and practical skills of students. In addition to the Priority Learning Units, students can study short courses with learning outcomes broadly aligned with the level indicators for Level 2 of the National Framework of Qualifications (Appendix 1). CSI: exploring forensic science is the first of these short courses that the NCCA has developed. The target group of students for whom L2LPs and Level 2 short courses have been developed are typically students presenting with significant learning needs. Some of them will have had a formal assessment by an educational psychologist which will have placed them in the low-mild to high-moderate categories of learning disability and they will have had a personalised learning plan while in primary school. In this context, the L2LPs and short courses are designed for students who would benefit from opportunities to improve learning and skills in areas such as elementary literacy and numeracy, language and communication, mobility and leisure skills, motor co-ordination, and social and personal development. The L2LPs also offer the chance for students to improve the length of time they can concentrate on activities, along with their capacity to generalise and transfer knowledge and skills across situations, and to process information from more than one sensory channel.

Introduction to junior cycle

Junior cycle education places students at the centre of the educational experience, enabling them to actively participate in their communities and in society, and to be resourceful and confident learners in all aspects and stages of their lives. Junior cycle is inclusive of all students and contributes to equality of opportunity, participation and outcome for all.

Junior cycle allows students to make a strong connection with learning by focusing on the quality of learning that takes place and by offering experiences that are engaging and enjoyable for them, and relevant to their lives. These experiences are of a high quality, contribute to the physical, mental and social wellbeing of learners, and where possible, provide opportunities for them to develop their abilities and talents in the areas of creativity and enterprise. The student's junior cycle programme builds on their learning in primary school. It supports their further progress in learning. It helps students to develop the learning skills that can assist them in meeting the challenges of life beyond school.

Rationale

This short course is designed to develop the student's science process skills at an elementary level: observing, recalling, retelling, naming, labelling, sequencing, classifying and measuring, in addition to skills needed for following procedures and problem-solving. These skills are developed through a number of interactive, fun, role-play activities and inquiry-based science experiments in the context of solving a mystery crime. The student learns to work as part of a team, to take direction from others and to take on a role with responsibilities appropriate to their ability. Some students will have heard the term 'CSI' and may have some familiarity with the world of forensic science from what they have learned through the TV programme or movies. This can act as a reference point to start from. Others will have participated in related experiments through the Discover Primary Science project during their primary school years and will bring this experience to the course.

Activities such as learning about crime investigation methods and gadgets, and collecting and studying evidence at a crime scene, will help improve the student's ability to apply logical thinking in different situations and find solutions to problems. Learning to think critically and work collaboratively are important life skills. Other skills for future life are developed through links with the community, creative projects, numeracy, communication and literacy.

Aim

This short course aims to facilitate the development of basic science process skills and other key skills for life and learning such as working collaboratively, planning sequentially and thinking logically. The skills gained through a focus on basic science are ones that can be used by the student in many areas of his/her future life.

Overview: Links

Tables 1 and 2 on the following pages show how CSI: exploring forensic science may be linked to central features of learning and teaching in junior cycle.

CSI: exploring forensic science and statements of learning

Table 1: Links between CSI: exploring forensic science and the statements of learning

Statements of learning (SOL)	
Statement	Examples of related learning in the course
SOL 1: The student communicates effectively using a variety of means in a range of contexts in L1 or ISL ¹ .	In each strand, the student is asked to complete simple forms and follow verbal and/or nonverbal as well as written and/or pictorial instructions to carry out tasks. Items are identified and described, and gathered as evidence. Receiving information and summarising, as well as using deduction skills, are important to strand 3. Throughout the course, communicating as a member of a group is encouraged. In strand 4, there is an opportunity to present in a role-play situation such as a trial or a TV/radio news programme.
SOL 18: The student observes and evaluates empirical events and processes and draws valid deductions and conclusions.	Individually and/or collaboratively, the student is engaged in the collection and presentation of scientific evidence, measuring and weighing, as well as quantifying and sequencing across all strands. Evidence is also gathered in order to reach valid conclusions.
SOL 24: The student uses technology and digital media tools to learn, work and think collaboratively and creatively in a responsible and ethical manner.	The student uses digital technology at the appropriate level to: look for information; record evidence (photographic evidence in strands 1 and 2); produce a storyboard (strand 3) and possibly design or contribute to the design of a digital presentation (strand 4).

¹ Irish sign language.

CSI: exploring forensic science and key skills and Priority Learning Units

In addition to their specific content and knowledge, the subjects and short courses of junior cycle provide students with opportunities to develop a range of key skills. The junior cycle curriculum focuses on eight key skills.

Figure 1: Key skills of junior cycle



There is an overlap between the learning in the PLUs with the key skills of junior cycle developed for all students.

Table 2 below lists the PLUs, some elements of those PLUs and the sorts of associated learning activities that will support students in achieving the learning outcomes and elements of the PLUs. Teachers can also build many of the other elements of the key skills of junior cycle into their classroom planning.

Table 2: Links between the Priority Learning Units (PLUs), elements of the PLUs and student learning activity

PLU	PLU element	Student learning activity
Communicating and literacy	Communicating appropriately for a variety of purposes and demonstrating attentiveness as a listener	In strand 3, the student might role-play as a CSI detective, interviewing other students as suspects or witnesses to obtain evidence. Throughout the course the student reads and/or listens to obtain information. The student may also present findings to an audience in strand 4 in a variety of forms.
Numeracy	Developing an awareness of weight and capacity	In strand 2, a number of experiments require the student to use a balance, measuring jugs and graduated cylinders, thus gaining an understanding of mass/weight and volume.
Personal care	Knowing how to stay safe	In strand 2, the student identifies safety hazards that may occur in a lab and the precautions to take to avoid such hazards.
Living in a community	Developing good relationships	Taking on roles within teams is important in science. In all strands, the student learns to communicate appropriately with different people, whether peers, teachers, members of the community or visiting speakers, and to participate co-operatively in group situations.
Preparing for work	Being able to set goals for learning	The student has various targets to work towards, e.g. completion of an experiment and identification of a substance in strand 1. Throughout the course, the student learns the importance of sequencing tasks in order to reach a goal and of revisiting tasks and working on them over a period of time.

Overview: Course

The specification for this junior cycle short course in CSI: exploring forensic science focuses on developing cognitive, social and practical skills through four inter-connected strands. The four strands presented here are: **The work of a forensic scientist; Scene of the crime: evidence collection; Scientific laboratory testing: solving the crime** and **Concluding the inquiry**.

Strand 1: The work of a forensic scientist.

This first strand introduces students to the world of forensic science. They learn the terminology associated with and the processes of forensic science. They also learn how to work accurately and safely with science equipment.

Strand 2: Scene of the crime: evidence collection.

This strand deepens students' understanding of the importance of process in gathering and recording scientific evidence.

Strand 3: Scientific laboratory testing: solving the crime.

In this strand, students carry out investigations and further tests, developing theories about the mock crime they are investigating.

Strand 4: Concluding the inquiry.

This strand provides opportunities for team work as students make connections between findings from earlier strands, develop conclusions and draw their investigations to a close. Students also undertake a reflective process, identifying the knowledge, skills and attitudes they have developed through undertaking the course.

Although the strands are interconnected to some degree, they have been developed to be undertaken sequentially to reflect the actual process involved in solving a crime.

Teamwork is encouraged throughout all four strands. Students collaborate, peer-explain, seek feedback, provide feedback and reflect on their work. Practical, hands-on and problem-solving learning activities should be in evidence across all strands of the course.

The Classroom-Based Assessment outlined below reflects the learning students undertake in this NCCA short course. Schools have the flexibility to adapt any NCCA-developed short course to suit their particular needs and school context, with the exception of the Classroom-Based Assessment, which all students taking this short course will complete. Schools may also develop their own short course(s) and related Classroom-Based Assessment. Guidelines for schools who wish to develop their own short courses are available at http://www.curriculumonline.ie/Junior-cycle/Junior-Cycle_Short-Courses.

The learning outcomes in this short course are broadly aligned with the level indicators for Level 2 of the National Framework of Qualifications (Appendix 1).

The course has been designed for approximately 100 hours of student engagement.

Expectations for students

Expectations for students is an umbrella term that links learning outcomes with annotated examples of student work. For NCCA-developed short courses, in some cases examples of work associated with a specific learning outcome or with a group of learning outcomes will be available. Schools who design their own short courses may wish to create a bank of examples of student work for discussion and for future reference.

Learning outcomes

Learning outcomes are statements that describe what knowledge, understanding, skills and values students should be able to demonstrate having completed this junior cycle short course in CSI: exploring forensic science. The learning outcomes set out in the following tables apply to all students and represent outcomes for students at the end of their period of study (approximately 100 hours).

The outcomes are numbered within each strand. The numbering is intended to support teacher planning in the first instance and does not imply any hierarchy of importance across the outcomes themselves.

Strand 1: The work of a forensic scientist

Learning outcomes

Students learn about	Students should be able to
The terminology and processes of forensic science	1.1 use the terms crime scene, evidence, suspect, scientist, detective, contamination and other relevant terms 1.2 make observations and inferences about a crime scene photograph (what's missing, broken, out of place) 1.3 identify the people involved in processing a crime scene 1.4 sequence the steps involved in processing a crime scene
The various types of physical evidence that can be found at a crime scene	1.5 identify from a list, potential sources of physical evidence: fingerprints, hair and fibres, impression evidence such as tyre tracks, footprints and teeth marks 1.6 communicate how evidence is left behind at a scene, e.g. contact, impression, force 1.7 demonstrate an understanding of the various evidence collection techniques, e.g. use fingerprinting techniques on peers, identify patterns of fingerprints, observe their fingerprints and classify their prints as arch, loop, or whorl
Forensic experiments ² : Learn to use the tools and methods of a crime scene investigator	1.8 list materials required for the experiments 1.9 organise materials for a task 1.10 follow verbal, written or pictorial instructions with a small number of steps 1.12 work collaboratively with others 1.12 identify substances through basic experiments, using a key provided 1.13 use a microscope, where available, to conduct basic comparisons between samples 1.14 record findings by talking/signing/writing/using ICT and sketching in a journal
Working safely and precisely with science equipment	1.15 identify safety hazards that may occur in a lab and the precautions to take to avoid such hazards 1.16 list ways in which a crime scene may be contaminated 1.17 use a measuring jug and a graduated cylinder to measure a specific volume of liquid 1.18 use weighing scales/balance to get a specific mass of a dry powder

² Experiments might include white powder analysis; hair analysis; paper chromatography.

Strand 2: Scene of the crime: evidence collection

Learning outcomes

Students learn about	Students should be able to
Finding evidence	<ul style="list-style-type: none">2.1 identify sources of evidence at crime scenes2.2 sequence steps for recording evidence at crime scenes (first, next, then...)2.3 make observations at a mock crime scene and deduce what might yield evidence2.4 identify, from a written or pictorial list, what laboratory tests can be performed on the physical evidence at the scene
Processing and collecting evidence properly	<ul style="list-style-type: none">2.5 follow a series of spoken/signed or pictorial instructions under supervision2.6 with assistance, collect evidence such as fabric fibres and fingerprints/footprints without contamination2.7 estimate and measure related objects2.8 record findings (writing/drawing/using ICT/differentiated worksheets)2.9 use basic functions on a digital camera, which may include uploading photos to a computer

Strand 3: Scientific laboratory testing: solving the crime

Learning outcomes

Students learn about	Students should be able to
Gathering evidence from suspects	3.1 listen to obtain information 3.2 demonstrate good practice when collecting evidence, selecting and using appropriate measurement tools 3.3 with prompts, make decisions about which information from a witness interview is useful 3.4 identify the key questions to answer in helping to solve the crime, e.g. Who was here last? Who wrote this note?
Applying their previous course laboratory activities to solve a crime	3.5 repeat/carry out further laboratory tests to those in strand 3 for comparisons 3.6 demonstrate an understanding of cause and effect
Developing a theory/motive/story related to the crime scene being investigated	3.7 identify simple patterns and classifications suggested by an exploration of evidence gathered 3.8 explain the basis for groupings using differences in materials 3.9 make rudimentary predictions about a possible suspect based on observations, information gathering and clues, or evidence they can measure using simple equipment 3.10 create an uncomplicated storyboard/timeline which demonstrates their theory of what happened

Strand 4: Concluding the inquiry

Learning outcomes

Students learn about	Students should be able to
Preparing to present evidence	4.1 identify the steps required to complete a task 4.2 put steps into a logical sequence or order 4.3 create a timeline tracing the procedures carried out 4.4 create a visual representation of the crime scene 4.5 contribute to the planning of a conclusion to the crime scene investigation which will reveal the solution to the crime
Presenting the evidence as part of the forensic team	4.6 make an individual (or contribute to a team) presentation of the evidence in the concluding activity, e.g. a written report/oral presentation/digital presentation to peers or an invited audience 4.7 express personal opinions, facts and feelings appropriately, e.g. expressing an opinion on the evidence to peers, participating in a formal interview with 'suspects'
Evaluating	4.8 communicate what worked best in terms of experiments conducted and investigative procedures followed 4.9 identify knowledge and skills developed and those they wish to improve 4.10 link learning to other areas of the curriculum and their lives

Assessment and reporting

Essentially, the purpose of assessment and reporting at this stage of education is to support learning. This short course supports a wide variety of approaches to assessment. Some learning outcomes lend themselves to once-off assessment, others to assessment on an ongoing basis as students engage in different learning activities such as discussing, explaining, presenting, planning, taking action and, at an appropriate level, finding out information. In these contexts, students with their teachers and peers reflect upon and make judgements about their own and others' learning by looking at the quality of particular pieces of work (according to their ability). They plan the next steps in their learning, based on feedback they give and receive. Ongoing assessment can support the student in their learning journey and in preparing for the Classroom-Based Assessment related to this short course.

It is envisaged that students will provide evidence of their learning in a variety of ways including digital media, audio recordings and written pieces.

Assessment is most effective when it moves beyond marks and grades and reporting focuses not just on how the student has done in the past but on the next steps for further learning. Student progress and achievement in short courses, both in ongoing assessments and in the specific Classroom-Based Assessment relating to this short course will be communicated to parents in interim reporting and in the Junior Cycle Profile of Achievement (JCPA). To support teachers and schools, an Assessment Toolkit is available online. The Assessment Toolkit will include learning, teaching, assessment and reporting support material.

Classroom-Based Assessment

Classroom-Based Assessments are the occasions when the teacher assesses the students in the specific assessment(s) that are set out in the subject or short course specification. Level 2 junior cycle short courses will have one Classroom-Based Assessment.

Classroom-Based Assessment: Solving a mock crime

Preparation for the Classroom-Based Assessment

This Classroom-Based Assessment can be undertaken following completion of strand 4. In the time leading up to it, the student is presented with an unfamiliar mock crime scene (physically/ orally/ using sign language/visually/in written format). While the mock crime is new it can share some features in common with one the student has investigated during the short course. The student listens/reads/observes closely and identifies one or more pieces of physical evidence which could be tested to help solve the crime in this new case.

The student is required to select the most appropriate measurement tools and/or technology to

record and preserve evidence from the crime scene. A list of 'suspects' may be drawn up based on the evidence in the mock crime scene and/or on information provided to the student by the teacher. Those 'suspects' may be interviewed.

The Classroom-Based Assessment

The Classroom-Based Assessment asks the student to recall – in a format of their choice (storyboard, using pictures to sequence, in interview with the teacher, as a newsreader, oral storytelling, writing...) what has happened so far in this new investigation. The student is asked to identify appropriate scientific or investigative practices which could be used to examine one source of evidence that has been identified as the most significant and the one which will solve the crime. The student discusses or produces a basic plan, or uses pictures to represent the steps that need to be taken, to examine this source of evidence. They are then asked to carry out that experiment/ investigative action to solve the crime.

Features of quality

The features of quality support student and teacher judgement of the Classroom-Based Assessment and are the criteria that will be used by teachers to assess students' Classroom-Based Assessments.

More detailed material on assessment and reporting in this junior cycle short course, including features of quality and details of the practical arrangements related to assessment of the Classroom-Based Assessment, will be available in separate assessment guidelines for CSI: exploring forensic science. The guidelines will include suggestions for what might be included in the students' portfolios as evidence of learning across the four strands.

Inclusive assessment

Inclusive assessment practices, whether as part of ongoing assessment or the Classroom-Based Assessment, are a key feature of teaching and learning in schools. Accommodations, e.g. the support provided by a special needs assistant or the support of assistive technologies, should be in line with the arrangements the school has put in place to support the student's learning throughout the year.

Where a school judges that a student has a specific physical or learning difficulty, reasonable accommodations may be put in place to remove, as far as possible, the impact of the disability on the student's performance in the Classroom-Based Assessment.

Accommodations which enable all students to access curriculum and assessment are based on specific needs. For example, a student who cannot physically type may use free dictation software to complete ongoing assessments and the Classroom-Based Assessment. Equally, a student who cannot speak may sign/draw/write/type/create visuals and subtitles to present and communicate ideas. A student with a specific learning difficulty may benefit from having learning tasks and activities presented in a different way. Comprehensive guidelines on inclusion in post-primary schools are available here and guidelines for teachers of students with general learning disabilities are available here.

Appendix 1:

Level indicators for Level 2 of the National Framework of Qualifications

This short course has been developed in alignment with the level indicators for Level 2 of the National Framework of Qualifications. Usually, Level 2 certification and awards involve basic learning with well-supported direction. The range of knowledge is usually narrow. Learning is developmental but may include knowledge, skills and competence related to particular fields of learning, e.g. aspects of literacy and numeracy and learning within familiar contexts.

NFQ Level	2
Knowledge <i>Breadth</i>	Knowledge that is narrow in range
Knowledge <i>Kind</i>	Concrete in reference and basic in comprehension
Know-how and skill <i>Range</i>	Demonstrate limited range of basic, practical skills, including the use of relevant tools
Know-how and skill <i>Selectivity</i>	Perform a sequence of tasks given clear direction
Competence <i>Context</i>	Act in a limited range of predictable and structured contexts
Competence <i>Role</i>	Act in a range of roles, under direction
Competence <i>Learning to learn</i>	Learn to learn in a disciplined manner in a well-structured and supervised environment
Competence <i>Insight</i>	Demonstrate awareness of independent role for self



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