



An Roinn Oideachais
agus Scileanna

Junior Cycle Wood Technology



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Introduction to junior cycle

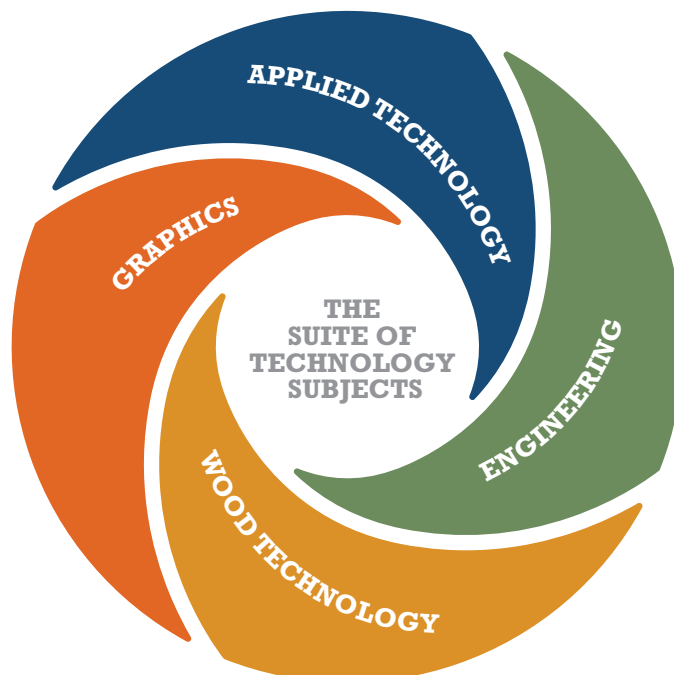
Junior cycle education places students at the centre of the educational experience, enabling them to actively participate in their communities and in society and to be resourceful and confident learners in all aspects and stages of their lives. Junior cycle is inclusive of all students and contributes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

The junior cycle allows students to make a greater 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 directly 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, innovation and enterprise. The learner's junior cycle programme builds on their learning to date and actively supports their progress in learning and in addition, supports them in developing the learning skills that will assist them in meeting the challenges of life beyond school.

Preamble

Under the current *Framework for Junior Cycle*, students have access to a suite of technology subjects: Engineering, Wood Technology, Graphics and Applied Technology.

FIGURE 1: THE SUITE OF TECHNOLOGY SUBJECTS



Rationale

Each subject of the technology suite offers the student different experiences which contribute towards their education in technology education. As a result, preparing students for learning in the technology subjects is not just about teaching towards the technology but towards the skills that are fundamental to the technology subjects and are transferable into other areas of their learning. Skills that encourage the student to problem-solve through creation, innovation, communication, collaboration and exploration, all of which are developed in an active learning environment where students can advance their ideas from conception to realisation.

Wood Technology is a subject that will allow students to explore and learn about a key natural resource that nature has provided. Trees and wooden material have a unique relationship with nature and humankind. The sustainable use and management of this natural resource is important as the world faces the challenges of the 21st century. From habitats to construction or recreation to oxygen creation this resource can play a significant role in wellbeing of our planet. To this end it is important that citizens be given the opportunity to become knowledgeable about this resource, exploring its heritage and potential as a material for the future.

In Wood Technology, students will explore the natural and made world through the medium of design, seeking out opportunities to creatively and innovatively apply the material/resource in making and shaping their environment. Wood as a material resource has seen much innovation and change. Technological advances have created significant opportunities to expand the use of wood as a resource for a broad range of applications. However, the uniqueness of this material and craft is that many of the traditional applications and processes are still of value, transcending the test of time.

Learning in this subject will be active and student centred, with learners collaborating in the pursuit of knowledge and in the safe management of the technology classroom environment. Through the challenges posed by the design-based philosophy of the subject, students will develop the relevant knowledge, skills and values to bring ideas from conception to reality in a way that will allow them to be expressive, creative and innovative.

Aim

The study of Wood Technology at junior cycle aims to:

- enable students to develop the necessary conceptual understanding, disciplinary skills and subject knowledge to design and create artefacts of value
- empower students through designing and making, whilst developing an awareness of sustainability and the use of natural resources
- develop a range of core design skills and relevant manipulation skills through modelling and processing wood and other materials
- develop the confidence and resilience of students through engagement with the uncertainty of design challenges
- encourage students' innovation and creativity through recognition and appreciation of their capacity to design and create.

Overview: Links

Wood Technology supports a broad range of learning objectives at junior cycle. Tables 1 and 2 on the following pages show how junior cycle Wood Technology is linked to central features of learning and teaching in junior cycle.

TABLE 1: LINKS BETWEEN JUNIOR CYCLE WOOD TECHNOLOGY AND THE STATEMENTS OF LEARNING

The statement	Examples of relevant learning
SOL 15: The student recognises the potential uses of mathematical knowledge, skills and understanding in all areas of learning.	Students will apply numerical reasoning to establish appropriate functions, proportions and dimensions.
SOL 19: The student values the role and contribution of science and technology to society, and their personal, social and global importance.	Students will evaluate the impact of Wood Technology on their lives, society and the environment.
SOL 20: The student uses appropriate technologies in meeting a design challenge.	Students will select suitable equipment to realise a design task.
SOL 21: The student applies practical skills as she/he develops models and products using a variety of materials and technologies.	Students will create solutions through modelling and tasks that encourage the development of their practical skills, while working with a range of materials and equipment.
SOL 23: The student brings an idea from conception to realisation.	Students will develop, individually, a concept to address a problem and create their solution using appropriate materials and the skills they have developed.
SOL 24: The student uses technology and digital media tools to learn, work and think collaboratively and creatively in a responsible and ethical manner.	Students will select appropriate digital media tools to explore, research and represent design ideas.

Key skills

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. Figure 2 below illustrates the key skills of junior cycle. There are opportunities to support all key skills in this course but some are particularly significant.

FIGURE 2: JUNIOR CYCLE KEY SKILLS



TABLE 2: LINKS BETWEEN JUNIOR CYCLE WOOD TECHNOLOGY AND KEY SKILLS

Key skill	Key skill element	Examples of student learning activities
Being creative	Exploring options and alternatives	Students will research design solutions to a given design brief.
Being literate	Expressing ideas clearly and accurately	Students will select the most appropriate media to communicate their ideas/solutions.
Being numerate	Expressing ideas mathematically	Students will use correct scientific and mathematical notation when calculating moisture content.
Communicating	Using language	Students will demonstrate correct technical language when explaining a process.
Managing information and thinking	Thinking creatively and critically	Students will engage in innovative thinking to create a solution and critique their solution based on the needs of the problem.
Managing myself	Setting and achieving personal goals	Students will establish a plan of work and apply it to the creation of an artefact.
Staying well	Being responsible, safe and ethical in using digital technology	Students will work ethically and safely online and when using the internet as a learning resource.
Working with others	Co-operating	Students will collaborate to research and develop solutions to a given problem.

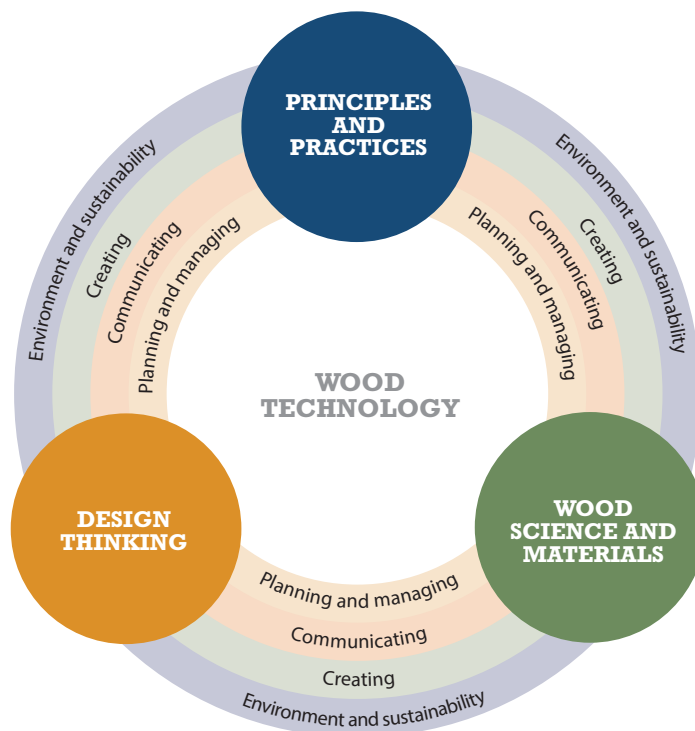
Overview: Course

The specification for junior cycle Wood Technology focuses on developing students' understanding of, and skills in, the applications and impact of using wood as a resource in the world around them. This will be achieved through three interconnected contextual strands: **Principles and practices**, **Design thinking** and **Wood science and materials**. Throughout each of the strands, the use of four elements: **Planning and managing**, **Communicating**, **Creating**, and **Environment and sustainability** creates a framework for learning that ensures a coherent learning experience for the students.

Wood Technology uses an interdisciplinary approach which encourages the integration of the three strands in the teaching and learning of the subject. It has been designed for a minimum of 200 hours of timetabled student engagement across the three years of junior cycle.

This specification aims to strike a balance between exploring the breadth of possibilities the study of the subject presents and providing opportunities for in-depth experiences of particular areas as appropriate. To this end, the specification allows for a certain amount of flexibility and freedom for teachers to facilitate learning in a way that reflects students' own choices, their curiosity and their creativity. The achievement of learning outcomes should be planned in a way that is active and stimulating.

FIGURE 3: THE STRANDS AND ELEMENTS OF JUNIOR CYCLE WOOD TECHNOLOGY



Strands

STRAND 1: PRINCIPLES AND PRACTICES

In this strand, students learn about and employ the fundamental principles and practices associated with the study of Wood Technology. They learn to work safely and efficiently with equipment and materials, and apply principles of craft excellence through design and manufacture. They will investigate the environmental benefits and impacts of using wood as a natural and renewable resource and learn about sustainable practice.

STRAND 2: DESIGN THINKING

In this strand, students explore design briefs and their solutions. They use key principles of design and produce sketches, drawings, models/prototypes and artefacts that illustrate their design thinking. Students consider factors such as materials, cost, time resources and skills to produce purposeful, functional, appealing artefacts. They also consider the environmental and social impacts of design decisions and investigate how to minimise material use and manage waste.

STRAND 3: WOOD SCIENCE AND MATERIALS

In this strand, students explore the natural and physical properties and characteristics of wood. They learn how to use the natural aesthetics and properties of wood to enhance the appearance and function of artefacts. They explore the role of forestation and wood in terms of local/global ecology and sustainability and recognise the importance of considering the impact on the natural environment when sourcing materials.

Elements

ELEMENT 1: PLANNING AND MANAGING

The learning outcomes in this element encourage students to develop a range of project management skills while evolving their designs to the creation stage. Students develop the necessary knowledge and skills that will enable them to effectively solve contextual problems.

ELEMENT 2: COMMUNICATING

The learning outcomes in this element encourage students to select and use appropriate media to communicate design ideas and technical information. Students will use technical language associated with wood science and technology. They learn about the important role that communication plays in addressing global and local environmental issues.

Students will plan and narrate their design evolution highlighting critical features of their solutions to design problems.

ELEMENT 3: CREATING

The learning outcomes in this element encourage students to be creative and to explore ways in which they can apply their knowledge and skills and appreciate the practices needed to produce purposeful, functional, appealing artefacts. Students develop their creativity across the three strands and use the natural aesthetics and properties of wood to enhance the appearance and function of their artefacts.

ELEMENT 4: ENVIRONMENT AND SUSTAINABILITY

The learning outcomes in this element encourage students to appreciate the environmental benefits and impacts of using wood as a natural and renewable resource, and to use sustainable practice throughout their learning. Students explore the role of forestation and wood in terms of global and local ecology and sustainability.

Progression from primary to senior cycle

PRIMARY CURRICULUM

While Wood Technology is not a stand-alone subject or area within the Primary School Curriculum, through its strands, elements and outcomes, junior cycle Wood Technology can progress related learning that has taken place at primary level.

A number of areas in the primary curriculum make reference to the development of problem-solving skills which are important for all aspects of Wood Technology. Throughout their years at primary school, learners engage in 'design and make' activities that develop their creativity and their fine motor skills. Both domains are further developed in students of junior cycle Wood Technology. In Social, Environmental and Scientific Education, students learn about the importance of maintaining sustainable forests and the importance of wood as a renewable energy source. This understanding is developed as learners progress through Wood Technology at junior cycle.

SENIOR CYCLE

The study of Wood Technology at junior cycle develops the foundations for a student to continue their studies in the suite of technology subjects in both the Leaving Certificate and Leaving Certificate Applied programmes.

More specifically, the subjects Construction Studies and Graphics and Construction Studies are available in the Leaving Certificate and Leaving Certificate Applied programmes respectively. The learning outcomes in junior cycle Wood Technology establish strong foundations for both these subjects.

The activities students engage in during junior cycle Wood Technology aim to develop a technologically-competent student who should be able to adapt to any discipline related to the technology subjects at senior cycle.

Expectations for students

Expectations for students is an umbrella term that links learning outcomes with annotated examples of student work in the subject specification. When teachers, students or parents looking at the online specification scroll through the learning outcomes, a link will sometimes be available to examples of work associated with a specific learning outcome or with a group of learning outcomes. The examples of student work will have been selected to illustrate expectations and will have been annotated by teachers. The examples will include work that is:

- exceptional
- above expectations
- in line with expectations

The purpose of the examples of student work is to show the extent to which the learning outcomes are being realised in actual cases.

Learning outcomes

Learning outcomes are statements that describe what knowledge, understanding, skills and values students should be able to demonstrate having studied Wood Technology in junior cycle. The learning outcomes set out in the following tables apply to all students. As set out here they represent outcomes for students at the end of their three years of study. **The specification stresses that the learning outcomes are for three years and therefore the learning outcomes focused on at a point in time will not have been 'completed' but will continue to support the students' learning in Wood Technology up to the end of junior cycle.**

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. Junior Cycle Wood Technology is offered at a common level.

Strand 1: Principles and practices

BRIEF OVERVIEW OF STRAND

In this strand, students learn about and employ the fundamental principles and practices associated with the study of Wood Technology. They learn to work safely and efficiently with equipment and materials, and to apply principles of craft excellence in design and manufacture. They investigate the environmental benefits and impacts of using wood as a natural and renewable resource and learn about sustainable practice.

Elements	Learning outcomes
	<i>Students should be able to:</i>
Planning and managing	1.1 explore key elements required for the completion of tasks ¹ 1.2 justify the selection of plans, processes and materials for the completion of tasks 1.3 collaborate effectively in a workshop learning environment 1.4 manage themselves and their resources
Communicating	1.5 represent key information graphically 1.6 create sketches and working drawings to recognised standards using a variety of media 1.7 explain the function and application of a range of tools, equipment, fixtures and fittings
Creating	1.8 apply knowledge of and skills in a range of appropriate existing and emerging principles, processes and techniques 1.9 demonstrate principles of craft excellence through the design and realisation of tasks and artefacts ² 1.10 apply recognised health and safety practices in the use of tools, equipment and materials
Environment and sustainability	1.11 investigate the environmental impacts of using wood as a natural and renewable resource 1.12 appreciate sustainable practice throughout their learning

¹ A task in this specification refers to any piece of work undertaken by students.

² An artefact in this specification refers to a realised piece of work with a specific purpose or function.

Strand 2: Design thinking

BRIEF OVERVIEW OF STRAND

In this strand, students explore design briefs and their solutions. They use key principles of design and produce sketches, drawings, models/prototypes and artefacts that illustrate their design thinking. Students consider factors such as materials, cost, time resources and skills to produce purposeful, functional, appealing artefacts. They also consider the environmental and social impacts of design decisions and investigate how to minimise material use and manage waste.

Elements	Learning outcomes
	<i>Students should be able to:</i>
Planning and managing	2.1 explore design problems
	2.2 manage information and thinking to support an iterative design process
	2.3 evaluate their own progress to inform future learning
	2.4 understand key principles of design and ergonomics
Communicating	2.5 communicate relevant information
	2.6 produce sketches, drawings and models/prototypes to explore design ideas
	2.7 communicate a suitable approach to solving a problem
	2.8 compile a folio through appropriate media
Creating	2.9 evolve their solutions based on critical reflection
	2.10 devise templates and models using various media
	2.11 produce purposeful, functional, appealing artefacts
	2.12 create an artefact having considered factors such as materials, cost, time resources and skills
Environment and sustainability	2.13 recognise the environmental and social impacts of design decisions
	2.14 investigate how to minimise material use and manage waste

Strand 3: Wood science and materials

BRIEF OVERVIEW OF STRAND

In this strand, students explore the natural and physical properties and characteristics of wood. They learn how to use the natural aesthetics and properties of wood to enhance the appearance and function of artefacts. They explore the role of forestation and wood in terms of local/global ecology and sustainability and recognise the importance of considering the impact on the natural environment when sourcing materials.

Elements	Learning outcomes
	<i>Students should be able to:</i>
Planning and managing	3.1 identify common species of wood
	3.2 evaluate the characteristics and properties of common species of wood
	3.3 understand the properties associated with a range of materials applicable to Wood Technology
	3.4 evaluate the use of wood in comparison to alternative materials
Communicating	3.5 explain the properties associated with the classification of wood
	3.6 discuss the use of wood in comparison to alternative materials
	3.7 justify the use of materials based on characteristics and properties within a context
Creating	3.8 utilise the natural aesthetics and properties of wood to enhance the appearance and function of an artefact
	3.9 create an artefact that demonstrates an understanding of the properties associated with a range of materials applicable to Wood Technology
Environment and sustainability	3.10 appreciate the role of forestation and wood in terms of local/global ecology and sustainability
	3.11 investigate the use of wood from forest to end use
	3.12 consider the impact on the natural environment when sourcing materials

Assessment and reporting

Assessment in education involves gathering, interpreting and using information about the processes and outcomes of learning. It takes different forms and can be used in a variety of ways, such as to record and report achievement, to determine appropriate routes for learners to take through a differentiated curriculum, or to identify specific areas of difficulty or strength for a given learner. While different techniques may be employed for formative, diagnostic and summative purposes, the focus of assessment and reporting is on the improvement of student learning. To do this it must fully reflect the aim of the curriculum.

The junior cycle places a strong emphasis on assessment as part of the learning process. This requires a more varied approach to assessment, ensuring that the assessment method or methods chosen are fit for purpose, timely and relevant to the students. Assessment in junior cycle Wood Technology will optimise the opportunity for students to become reflective and active participants in their learning and for teachers to support this. This can be achieved through the provision of opportunities for students to negotiate success criteria against which the quality of their work can be judged by peer, self, and teacher assessment; and through the quality of the focused feedback they get in support of their learning.

Providing focused feedback to students on their learning is a critical component of high-quality assessment and a key factor in building students' capacity to manage their own learning and their motivation to stick with a complex task or problem. 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. This approach will ensure that assessment takes place as close as possible to the point of learning. Final assessment still has an important role to play but is only one element of a broader approach to assessment.

Essentially, the purpose of assessment and reporting at this stage of education is to support learning. Parents/guardians should be given a comprehensive picture of student learning. Linking classroom assessment and other assessment with a new system of reporting that culminates in the awarding of the Junior Cycle Profile of Achievement (JCPA) will offer parents/guardians a clear and broad picture of their child's learning journey over the three years of junior cycle. To support this, teachers and schools have access to online assessment support material. Along with the guide to the Subject Learning and Assessment Review (SLAR) process, this focuses on learning, teaching and assessment support material, including:

- formative assessment
- planning for and designing assessment
- ongoing assessments for classroom use
- judging student work – looking at expectations for students and features of quality
- reporting to parents and students
- thinking about assessment: ideas, research and reflections
- a glossary.

The contents of the online support material include the range of assessment supports, advice and guidelines that enable schools and teachers to engage with the new assessment system and reporting arrangements in an informed way, with confidence and clarity.

Assessment for the JCPA

The assessment of Wood Technology for the purposes of the Junior Cycle Profile of Achievement (JCPA) will comprise:

- two Classroom-Based Assessments: Wood science in our environment, and Self-analysis and evaluation
- a project
- a written examination.

Assessment

CBA 1: Wood science in our environment	The teacher's judgement is recorded for the purpose of subject learning and assessment review, and for the school's reporting to parents and students. The CBA will be completed within a three-week period during term one of second year.
CBA 2: Self-analysis and evaluation	The teacher's judgement is recorded for the purpose of subject learning and assessment review, and for the school's reporting to parents and students. The CBA will be completed within a three-week period during term one of third year and will inform the student's work on the project.

Final assessment	Weighting for examinations externally assessed	Assessment method
Project	70%	Will be specified and marked by the State Examinations Commission annually.
Written examination	30%	Set and marked by the State Examinations Commission.

Rationale for the Classroom-Based Assessments in Wood Technology

Classroom-Based Assessments are the occasions when the teacher assesses students in the specific assessments that are set out in the specification. Classroom-Based Assessments are similar to the formative assessment that occurs every day in every class. However, in the case of the Classroom-Based Assessments, the teacher's judgement is recorded for the purpose of subject learning and assessment review, and for the school's reporting to parents and students.

Over the three years of junior cycle students will be provided with opportunities to stimulate their curiosity and interest in Wood Technology. The Classroom-Based Assessments link to the priorities for learning and teaching in Wood Technology. It is envisaged that through the Classroom-Based Assessments students will actively engage in practical and authentic learning experiences.

The Classroom-Based Assessments will provide an opportunity for students to:

- research information using a range of methods
- analyse data and evidence to make informed valued judgements and decisions
- organise information and plan logically
- communicate clearly and effectively
- collaborate with others on tasks
- reflect on their contributions to the work and their own learning.

Through these Classroom-Based Assessments they will develop their knowledge, understanding, skills, and values, thereby achieving the learning outcomes across the strands.

Classroom-Based Assessment 1: Wood science in our environment

This Classroom-Based Assessment is designed to encourage the practice of research for students. It affords students the opportunity to individually or collaboratively develop their skills in researching and communicating their findings. The Classroom-Based Assessment is primarily focused on the Wood science and materials strand but can incorporate learning from the other strands. Students will explore a wood science-related issue within a local/global context. They will analyse the information/data collected, evaluate and present the findings of their research of the issue they have investigated, with support/guidance from the teacher. It is important to instil in students a curious disposition where they are free to experiment and encouraged to explore new and challenging opportunities and to reflect on the process.

The student can communicate their findings through any appropriate media.

Classroom-Based Assessment 2: Student Self-analysis and evaluation

For this Classroom-Based Assessment, the student, individually, will conduct an analysis of their coursework and skills to date in Wood Technology. Students will focus their analysis and evaluation on a range of completed tasks or on a specific task. Students are expected to critically review their progress and identify areas of strength and areas for improvement, with a view to informing their planning and decisions for the project. The formative assessment related to this process will be reported upon to the student and parent/guardian by the school as with all other Classroom-Based Assessments.

This Classroom-Based Assessment is designed to encourage the practice of self-evaluation throughout, rather than only on completion of a task. Once the student conducts the self-analysis, they must interpret their analysis and evaluate their findings to offer constructive direction for the upcoming project.

The student can communicate the self-analysis and evaluation process through any appropriate media.

Features of quality

The features of quality support student and teacher judgement of the Classroom-Based Assessments and are the criteria that will be used by teachers to assess the pieces of student work. Features of quality for the Classroom-Based Assessments will be provided in the Assessment Guidelines document.

Assessing the Classroom-Based Assessments

More detailed information related to assessment of the Classroom-Based Assessments will be available in separate Assessment Guidelines. This will include, for example, the suggested length and formats for student pieces of work, the features of quality to be applied to the assessment, and support in using 'on balance' judgement in relation to the features of quality.

The assessment section of www.ncca.ie will also include substantial resource material for use and reference in ongoing classroom assessment of junior cycle Wood Technology, as well as examples of student work and guidance for the Subject Learning and Assessment Review process.

Project

On completion of the Classroom-Based Assessments, students undertake a project as part of their final assessment. The project is completed after the second Classroom-Based Assessment in third year. The brief for the project is set and the project is marked by the State Examinations Commission.

Written examination

Students will undertake a written examination of 90 minutes duration:

- The examination will take place at the end of third year and will be offered at a common level.
- The examination will be set and marked by the State Examinations Commission.

Inclusive assessment practices

This specification allows for inclusive assessment practices whether as part of ongoing assessment or Classroom-Based Assessments. 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 Classroom-Based Assessments. The 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.

Appendix A: Glossary of Wood Technology terms

This glossary is designed to clarify the terminology used in the junior cycle Wood Technology specification, enabling both teachers and students to understand how the terms are interpreted and applied.

Term	Interpretation
Artefact	A realised piece of work with a specific purpose or function.
Craft excellence	This is an umbrella term that relates to accuracy of work, quality of finishing, correct application of tools and equipment.
Task	Refers to any piece of work undertaken by students.

Appendix B: Glossary of action verbs

This glossary is designed to clarify the learning outcomes. Each action verb is described in terms of what the learner should be able to do once they have achieved the learning outcome. This glossary will be aligned with the command words used in the assessment.

Verb	Description
Analyse	study or examine something in detail, break down in order to bring out the essential elements or structure; identify parts and relationships, and to interpret information to reach conclusions
Apply	select and use information and/or knowledge and understanding to explain a given situation or real circumstances
Appreciate	recognise the meaning of, have a practical understanding of
Calculate	obtain a numerical answer showing the relevant stages in the working
Collaborate	work jointly with others or together on an activity or project
Communicate	use visual gestural, verbal or other signs to share meaning or exchange information; interaction between sender and recipient; both work together to understand
Compare	give an account of the similarities between two (or more) items or situations, referring to both (all) of them throughout
Compile	to build up gradually
Consider	think carefully about something, typically before making a decision
Construct	develop information in a diagrammatic or logical form; not by factual recall but by analogy or by using and putting together information
Contrast	detect correspondences between two ideas
Convert	change to another form
Create	process and give form to the topic of what is to be created using selected methods and material and/or to give the material used a new form
Critique	give a detailed analysis and assessment of something
Deduce	reach a conclusion from the information given
Define	give the precise meaning of a word, phrase, concept or physical quantity
Demonstrate	prove or make clear by reasoning or evidence, illustrating with examples or practical application
Describe	develop a detailed picture or image of, for example a structure or a process, using words or diagrams where appropriate; produce a plan, simulation or model
Determine	obtain the only possible answer by calculation, substituting measured or known values of other quantities into a standard formula
Develop	advance a piece of work or an idea from an initial state to a more advanced state

Verb	Description
Devise	to plan or invent with careful thought
Discuss	offer a considered, balanced review that includes a range of arguments, factors or hypotheses; opinions or conclusions are supported by appropriate evidence
Distinguish	make the differences between two or more concepts or items clear
Draft	develop an idea or concept for planned work
Engage	enter into or become occupied by an activity or interest; to attract or hold interest and attention
Engineer	develop/build an item for a specific purpose that includes critical-to-function components
Estimate	give a reasoned order of magnitude statement or calculation of a quantity
Evaluate (data)	collect and examine data to make judgements and appraisals; describe how evidence supports or does not support a conclusion in an inquiry or investigation; identify the limitations of data in conclusions; make judgements about the ideas, solutions or methods
Evaluate (ethical judgement)	collect and examine evidence to make judgements and appraisals; describe how evidence supports or does not support a judgement; identify the limitations of evidence in conclusions; make judgements about the ideas, solutions or methods
Evolve	to develop through experience
Explain	give a detailed account including reasons or causes
Examine	consider an argument or concept in a way that uncovers the assumptions and interrelationships of the issue
Experience	to perceive an object on the basis of aesthetic considerations and to establish a direct personal relationship
Experiment	a procedure undertaken to make a discovery, test a hypothesis, or demonstrate a known fact
Evidence	provide information indicating if something is true, or valid or to establish facts in investigation
Explore	to think or talk about something in order to find out more about it
Identify	recognise patterns, facts, or details; provide an answer from a number of possibilities; recognise and state briefly a distinguishing fact or feature
Illustrate	use examples to describe something
Illustrate (graphically)	use drawings or examples to describe something
Investigate	observe, study, or make a detailed and systematic examination, to establish facts and reach new conclusions
Interpret	use knowledge and understanding to recognise trends and draw conclusions from given information

Verb	Description
Interpret (aesthetic)	assign meaning to objects on the basis of observations and contextual knowledge; translate the effect of an image into words by reasoning and explaining on the basis of reflection and understanding why the image is how it is and is not different
Justify	give valid reasons or evidence to support an answer or conclusion
List	provide a number of points, with no elaboration
Manage	to work upon or try to alter for a purpose
Measure	quantify changes in systems by reading a measuring tool
Model	generate a mathematical representation (e.g., number, graph, equation, geometric figure) for real-world or mathematical objects, properties, actions, or relationships
Order	describe items/systems based on complexity and/or order
Outline	give the main points; restrict to essentials
Present	make objects perceivable for others
Produce	make or manufacture from components or raw materials
Prove	use a sequence of logical steps to obtain the required result in a formal way
Realise	implement, execute or put into practice an idea or a product or a draft
Recognise	identify facts, characteristics or concepts that are critical (relevant/appropriate) to the understanding of a situation, event, process or phenomenon
Respond	react to a stimulus which may be: critical emotional aesthetic or contextual based, or a combination of these
Represent	bringing clearly and distinctly to mind by use of description or imagination
Research	the study of materials and sources in order to establish facts and reach new conclusions; revision of accepted theories or laws in the light of new facts
Review	looking over or through material in order to correct, improve or revise
Sketch	represent by means of a diagram or graph (labelled as appropriate); the sketch should give a general idea of the required shape or relationship, and should include relevant features
Solve	find an answer through reasoning
Test	establish the quality, performance, or reliability of something
Understand	have and apply a well-organised body of knowledge
Use	apply knowledge or rules to put theory into practice; employ something in a targeted way
Utilise	make practical and effective use of
Verify	give evidence to support the truth of a statement
Visualise	make visible to the mind or imagination something that is abstract or not visible or present to the eye

