An Roinn Oideachais
agus Scileanna

Junior Cycle Graphics

Contents

Introduction to junior cycle

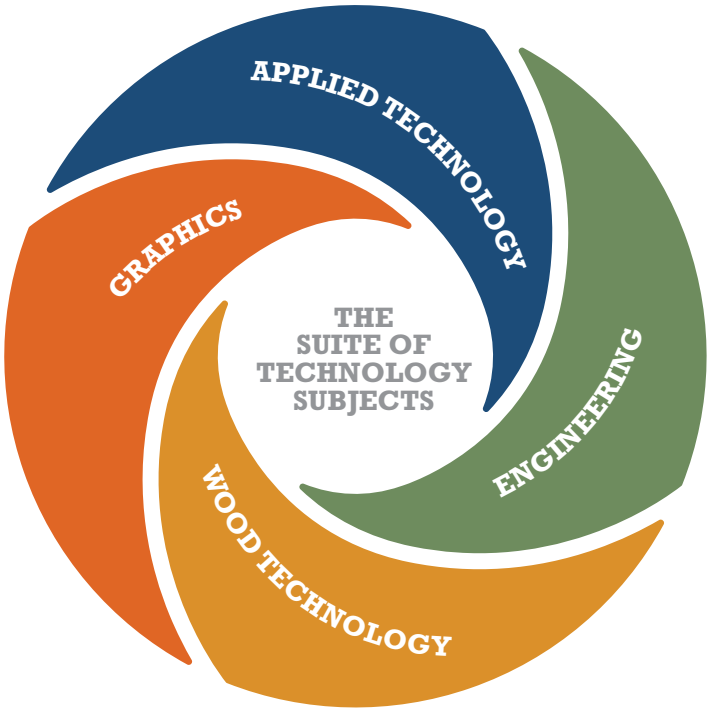
Junior cycle education places students at the centre of the educational experience, enabling them to actively participate in their communities and in society and to be resourceful and confident learners in all aspects and stages of their lives. Junior cycle is inclusive of all students and contributes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

In the junior cycle curriculum there is a suite of technology subjects; Applied Technology, Engineering, Wood Technology and Graphics. Each subject offers the student different experiences which contribute towards their education in the technologies.

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 solve problems 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.

Graphics is recognised as the underpinning language of the technology disciplines and is transferable across a wide range of subjects such as mathematics, science and art. Students will use a variety of media to communicate their ideas and designs through this unique language. Throughout the course, students will explore the geometric world to gain an appreciation of the importance of graphics in the world around them. They will develop cognitive and practical skills such as graphical communication, spatial visualisation, creative problem-solving, design capabilities and modelling, both physically and through the use of computer-aided design.

Students will develop their creativity as they investigate and solve design challenges. During the problem-solving process, they will work with their peers to refine their ideas from an abstract concept to a final, detailed, drafted design. Abstraction, and spatial reasoning are fundamental to this process; graphics provides multiple and varied opportunities for students to develop these high level cognitive and creative skills in engaging contexts.

Accurate technical drawings are essential in the design and manufacture of components and artefacts. The need for precise communication in the preparation of a functional document distinguishes technical drawing from the expressive drawing of the visual arts. Producing accurate drawings requires significant attention to detail and a patient and resilient mind-set. Students will continually review and reflect on their working drawings developing strategies for improvement as they progress.

Aim

The study of Graphics at junior cycle aims to:

- develop the student's creativity, spatial ability, and capacity to reason and communicate ideas through engagement with abstract and applied geometric problem-solving activities
- encourage the development of the cognitive and practical dexterity skills associated with graphical communication
- instil an appreciation of the role of graphics in the world around them
- equip all students to make judgements on the best mode through which to represent their ideas and solutions
- encourage the production of drawings that promotes the skills of communicating through graphics
- develop students cognitive and practical skills associated with modelling and graphical communication.

Overview Links

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

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

Statements of Learning

The statement	Examples of relevant learning
SOL 15 Recognises the potential uses of mathematical knowledge, skills and understanding in all areas of learning	Students will be able to support their solutions to geometry problems by referencing appropriate geometry concepts and principles.
SOL 19 Values the role and contribution of science and technology to society, and their personal, social and global importance	Students will evaluate the impact of technologies on their lives, society and the environment.
SOL 20 Uses appropriate technologies in meeting a design challenge	Students will determine the most suitable technologies available to them and apply them to fulfil the criteria of a given design challenge.
SOL 21 Applies practical skills as she/he develops models and products using a variety of materials and technologies	Students will develop 3D representations of solutions to problems through modelling using appropriate media.
SOL 23 Brings an idea from conception to realisation	Students will individually explore ideas to satisfy a problem and develop their solutions using appropriate modelling skills they have developed.
SOL 24 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 research, explore and present 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 GRAPHICS AND KEY SKILLS

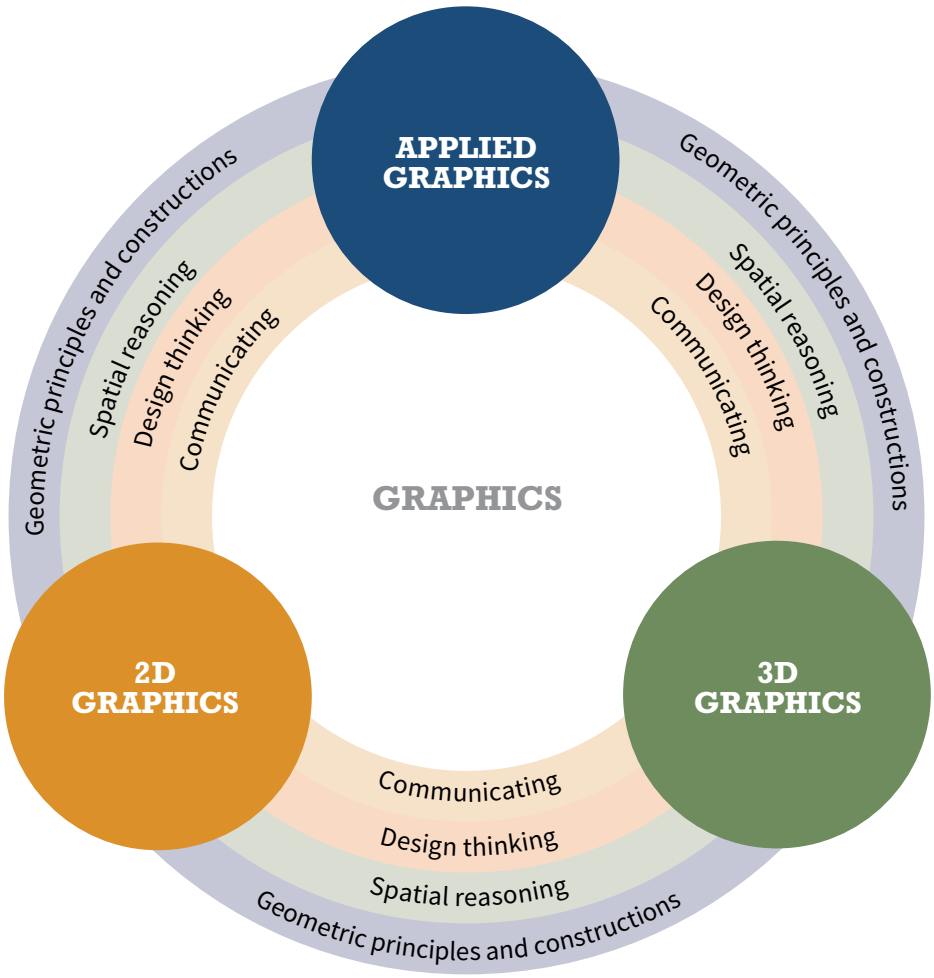
Key skill	Key skill element	Examples of student learning activities
Being creative	Exploring options and alternatives	Students will explore alternative design solutions to a problem/brief.
Being literate	Expressing ideas clearly and accurately	Students will select the most appropriate graphical means to communicate their ideas/solutions.
Being numerate	Expressing ideas mathematically	Students will use appropriate mathematical notation when communicating dimensions.
Communicating	Using language	Students will demonstrate appropriate technical language when explaining a process.
Managing information and thinking	Thinking creatively and critically	Students will engage in innovative thinking to design 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 when researching design solutions.
Staying well	Being responsible, safe and ethical in using digital technology	Students will work ethically and safely online and take responsibilty for ensuring security and privacy of themselves and others while researching ideas.
Working with others	Co-operating	Students will collaborate to research and develop solutions to a given problem.

Overview: Course

The specification for Junior Cycle Graphics focuses on developing students' understanding of and skills in the applications and impact of technologies in the world around them. These will be achieved through three inter-connected contextual strands: **2D graphics**, **3D graphics** and **Applied graphics**.

Graphics 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 embodies 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.



STRAND 1: 2D GRAPHICS

In this strand, students will engage with, understand and apply the fundamental concepts and principles of 2D constructions, 2D shapes and projection systems. Throughout their studies, students will gain an appreciation of the application of 2D graphics to problem solving and develop an understanding of the role of 2D graphics in the creation of 3D objects and representations. Students should, as a result, be able to create clear representations of objects in space and accurately represent these in two- dimensions.

STRAND 2: 3D GRAPHICS

In this strand, students will engage with, understand and use the fundamental concepts and principles underpinning 3D objects, modelling systems and graphical conventions. This strand is of specific importance in developing each student's ability in visual imagery and representation. Students should as a result be able to accurately represent objects in three dimensions and apply these skills to problem solving.

STRAND 3: APPLIED GRAPHICS

In this strand, students will draw on the knowledge, principles and techniques developed through the 2D Graphics and 3D Graphics strands to create and communicate solutions and information graphically. Students should be encouraged to investigate their physical environment and to apply the principles of 2D Graphics and 3D Graphics to the solution of a variety of problems. Students should be able to select the most appropriate methods to communicate their solutions to solve these problems, both in terms of their selection of graphical media and the mechanism for their utilisation.

While the learning outcomes are set out under strand headings, this should not be taken to imply that the strands are to be studied in isolation. The students' engagement and learning are optimised by a fully integrated experience across the three strands. To give further emphasis to the integrated nature of learning, the learning outcomes for each strand are grouped by reference to four elements – **Spatial reasoning**, **Design thinking**, **Communicating** and **Geometric principles and constructions**.

ELEMENT 1: SPATIAL REASONING

The learning outcomes from the different strands that are associated with this element encourage students to investigate a range of shapes, graphical information, objects and artefacts to assist students in developing their spatial ability. The learning outcomes aid the student in developing their abilities from initially recognising spatial properties to visualising their manipulation.

ELEMENT 2: DESIGN THINKING

The learning outcomes from the different strands that are associated with this element encourage students to use their understanding of Graphics to develop ideas and solutions to everyday problems. Students develop the creative and innovative skills needed to develop and communicate their design solutions, influenced by their learning under the three strands.

ELEMENT 3: COMMUNICATING

The learning outcomes from the different strands that are associated with this element encourage students to communicate through appropriate media to relay technical information, and to design ideas and solutions to problems. Emphasis should be placed on developing the students' abilities to communicate through a range of graphical media and make decisions on the appropriateness of specific media relative to specific stages of a design process.

ELEMENT 4: GEOMETRIC PRINCIPLES AND CONSTRUCTIONS

The learning outcomes from the different strands that are associated with this element encourage students to execute their understanding of geometric shapes and objects in the construction of two- dimensional and three-dimensional representations and in the solving of geometric problems. Students will adapt their knowledge from classroom activities to explore the role of geometric principles and constructions in the natural world around them.

Progression from Primary to Senior Cycle

PRIMARY CURRICULUM

While Graphics is not a stand-alone subject within the Primary School Curriculum, in its strands, elements and outcomes, Junior Cycle Graphics can progress related learning that has taken place at primary level.

A number of subjects in the primary curriculum such as Science, Mathematics and Visual Arts refer to the development of problem solving skills, which are key skills for a student of Graphics. Throughout their years at primary school, students engage in various activities that develop their creativity, which lends itself directly to the study of Graphics.

SENIOR CYCLE

The study of Graphics at junior cycle develops the underlying language of the technology subjects and enhances the learning for a student who wishes to continue their studies in the suite of technology subjects in both the Leaving Certificate and Leaving Certificate Applied programmes.

More specifically, the subject Graphics has a strong relationship with the Leaving Certificate subject, Design and Communication Graphics. The learning outcomes to be achieved in the Graphics specification provide a strong foundation of the knowledge required for the study of Design and Communication Graphics.

Under the Leaving Certificate Applied programme, a discipline similar to that of Junior Cycle Graphics is not found as a standalone subject. However, as part of the study of Graphics and Construction Studies, students have the option to study graphic communication and computer aided design which would offer good progression from the learning outcomes of Junior Cycle Graphics.

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 Graphics 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 of Graphics 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. Graphics at junior cycle is offered at a common level. The examples of student work linked to learning outcomes will offer commentary and insights that support differentiation and inclusive classroom practices.

Strand 1: 2D Graphics

Brief overview of strand

In this strand, students will engage with, understand and apply the fundamental concepts and principles of 2D constructions, 2D shapes and projection systems. Throughout their studies, students will gain an appreciation of the application of 2D graphics to problem solving and develop an understanding of the role of 2D graphics in the creation of 3D objects and representations. Students should, as a result, be able to create clear representations of objects in space and accurately represent these in two-dimensions.

Elements	Learning Outcomes Students should be able to:	
Spatial Reasoning	1.1	visualise the manipulation of 2D shapes
	1.2	analyse graphical information for the planning of a 2D solution
	1.3	derive 2D solutions using appropriate media
Design Thinking	1.4	appreciate the role of 2D graphics in the creation of solutions
	1.5	illustrate ideas using free-hand sketches to accurately communicate their thought process
	1.6	apply their understanding of geometric principles to solve problems
	1.7	interpret and create graphical representations of data/information
Communicating	1.8	communicate the progression of ideas and thinking during the course of an activity using a variety of media
	1.9	represent 3D information using 2D conventions
Geometric Principles and Constructions	1.10	understand the properties of geometric shapes
	1.11	appreciate the application of geometric constructions in the study of other areas
	1.12	construct 2D solutions accurately in accordance with graphical conventions.

Strand 2: 3D Graphics

Brief overview of strand

In this strand, students will engage with, understand and use the fundamental concepts and principles underpinning 3D objects, modelling systems and graphical conventions. This strand is of specific importance in developing each student's ability in visual imagery and representation. Students should as a result be able to accurately represent objects in three dimensions and apply these skills to problem solving.

Elements	Learning Outcomes Students should be able to:	
Spatial Reasoning	2.1	visualise the manipulation of 3D objects
	2.2	analyse graphical information for the planning of a 3D solution
	2.3	derive 3D solutions using appropriate media
Design Thinking	2.4	appreciate the role of 3D graphics in the creation of solutions
	2.5	develop ideas using free-hand sketches and other media to accurately communicate the thought process
	2.6	apply their understanding of 3D principles to solve problems
	2.7	construct solutions to presented and/or defined problems
Communicating	2.8	construct a 3D representation of an artefact or abstract idea using a variety of media and methods.
	2.9	communicate the progression of ideas/thinking during the course of an activity using a variety of media
Geometric Principles and Constructions	2.10	understand the properties of geometric objects and surfaces
	2.11	appreciate the application of geometric principles in the study of other areas
	2.12	generate and develop design ideas using appropriate geometric principles and constructions
	2.13	apply geometric principles to construct accurate 3D solutions in accordance with graphical conventions.

Strand 3: Applied Graphics

Brief overview of strand

In this strand, students will draw on the knowledge, principles and techniques developed through the 2D Graphics and 3D Graphics strands to create and communicate solutions and information graphically. Students should be encouraged to investigate their physical environment and to apply the principles of 2D Graphics and 3D Graphics to the solution of a variety of problems. Students should be able to select the most appropriate methods to communicate their solutions and solve these problems, both in terms of their selection of graphical media and the mechanism for their utilisation.

Elements	Learning Outcomes Students should be able to:	
Spatial Reasoning	3.1	recognise 2D and 3D features in everyday objects and artefacts
	3.2	appreciate the hidden features of an object or an artefact necessary for its representation
	3.3	demonstrate their spatial understanding by modelling and/or simulation
Design Thinking	3.4	solve real-context and abstract problems using graphical techniques
	3.5	analyse and evaluate both their own work, and the work of others
Communicating	3.6	develop design ideas/solutions through modelling and prototyping using a variety of media
	3.7	use computer-aided graphics to communicate design solutions effectively
	3.8	represent graphically their approach to a design task
	3.9	apply a variety of rendering and presentation techniques to enhance the communication of solutions
Geometric Principles and Constructions	3.10	investigate and apply the principles of plane and descriptive geometries to create solutions
	3.11	investigate how geometric principles and constructions found in the natural world have provided inspiration for human applications
	3.12	develop an appropriate graphical representation of a solution to a contextual problem of their choice

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 Graphics at junior cycle 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 Graphics for the purposes of the Junior Cycle Profile of Achievement (JCPA) will comprise of:

- two Classroom-Based Assessments; Communicating through sketching and Graphical presentation skills
- a project
- a final examination.

Classroom-Based Assessments:

CBA 1: **Communicating through sketching**	The teacher's judgement is recorded for the purpose of subject learning and assessment review, and for the school's reporting to parents/guardians and students. This CBA is to be completed within 3 weeks.
CBA 2: **Graphical presentation skills**	The teacher's judgement is recorded for the purpose of subject learning and assessment review, and for the school's reporting to parents/guardians and students. This CBA is to be completed within 3 weeks.

Final Assessment:

Project 30%	Will be specified and marked by the State Examinations Commission. This project will be completed within a four-week window in term two of third year.
Final examination 70%	Two-hour examination set and marked by the State Examinations Commission.

RATIONALE FOR THE CLASSROOM-BASED ASSESSMENTS IN GRAPHICS

Classroom-Based Assessments are the occasions when the teacher assesses the 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 Graphics. The Classroom-Based Assessments link to the key priorities for learning and teaching in Graphics. 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 value 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.

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 Graphics at junior cycle, as well as examples of student work and guidance for the Subject Learning and Assessment Review process.

Classroom-Based Assessment 1: Communicating through sketching

This Classroom-Based Assessment will provide students with the opportunity to develop their skills to become competent in communicating through sketching. Students will be asked to graphically communicate their ideas using two-dimensional and three-dimensional sketching techniques in response to a chosen stimulus theme.

Through this Classroom-Based Assessment, students will develop their skills in using effective sketching methods and media to accurately communicate their vision, design and solution. This Classroom-Based Assessment is an opportunity to instil in students a curious disposition where they are free to experiment, allowed to take risks, encouraged to explore new and challenging opportunities and to reflect on the process.

Students can communicate their work through any appropriate media.

Classroom-Based Assessment 2: Graphical presentation skills

This Classroom-Based Assessment will focus on how effectively students present their research graphically. It will inform the project assessment element (see below). Through this CBA, students research and investigate the domain in which the project is situated and present their findings graphically through any appropriate graphical media. This enables them to develop the concepts for their final project in a real-life context prior to starting their work on the project. This Classroom-Based Assessment is an opportunity to instil in students a curious disposition, where they are free to experiment, encouraged to explore new and challenging opportunities and to reflect on the process.

Students can communicate their work 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.

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 marked by the State Examinations Commission. Students will be required to complete three outputs:

Output 1: Responding to a theme informed by the work of Classroom-Based Assessment 2

Output 2: Dimensioned drawings

Output 3: Three-dimensional computer-aided design modelling

Final examination

Students will sit a two-hour examination at the end of third year and this will be offered at a common level.

The examination will be prepared 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 line with the arrangements the school has put in place to support the student's learning throughout the year.

Appendix A: Glossary of Graphics terms

This glossary is designed to clarify the terminology used in the Junior Cycle Graphics specification to enable teachers and students to understand how the terms are interpreted and applied.

Term	Interpretation
2D conventions	first angle orthographic, oblique, isometric drawing, axonometric
3D representation	A view which displays a physical object or an abstract concept in a form which reflects length, depth and height.
3D solution	A solution to a specific or abstract problem derived and/or presented using 3D technique/s.
Contextual problem	A problem which draws on a real world experience, situation or application.
Geometric constructions	The accurate drawing of points, lines, circles, angles, bisectors, divisions and other shapes using standard drawing instruments.
Geometric principles	The fundamental precepts which define and describe the nature of points, lines and planes together with the two dimensional and three dimensional shapes, solids, projection systems and constructions derived from them.
Graphical conventions	current standards, conventions and practices associated with drawing and illustration.
Plane & Descriptive geometries	The graphical representation, description and analysis of relationships between points, lines and planes in space. The graphical representation of three dimensional objects in two dimensions.

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
Comment	give an opinion based on a given statement or result of a calculation
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
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
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
Derive	to be formulate or prepare from concepts

Verb	Description
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
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 judgments 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 judgments about the ideas, solutions or methods
Evaluate (ethical judgement)	collect and examine evidence to make judgments and appraisals; describe how evidence supports or does not support a judgement; identify the limitations of evidence in conclusions; make judgments about the ideas, solutions or methods
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.
Experiment (artistic)	approach creating either playfully or systematically but always with an unknown outcome
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
Generate	To produce or create
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

Verb	Description
Interpret	use knowledge and understanding to recognise trends and draw conclusions from given information;
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
Measure	quantify changes in systems by reading a measuring tool
Order	describe items/ systems based on complexity and/or order
Present	make objects perceivable for others
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-organized body of knowledge
Use	apply knowledge or rules to put theory into practice. Employ something in a targeted way.
Verify	give evidence to support the truth of a statement
Visualise	make something visible to the mind or imagination something that is abstract or not visible or present to the eye

NCCA
An Chomhairle Náisiúnta Curaclaim agus Measúnachta
National Council for Curriculum and Assessment

AN ROINN OIDEACHAIS AGUS SCILEANNA
DEPARTMENT OF EDUCATION AND SKILLS