

Empowering Mathematics Literacy Leaders

Transition Year Module



NCCA

An Chomhairle Náisiúnta
Curraclaim agus Measúnachta
National Council for
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Transition Year

Transition Year (TY) is a one-year optional programme available to all post-primary schools and is offered as part of the senior cycle experience. During senior cycle students develop a stronger sense of their identity, learning with and from their peers, teachers, other adults, and various media. Senior cycle educates the whole person. Students' experiences in senior cycle should contribute to their intellectual, social and personal development and their overall wellbeing. During TY, students can develop more mature relationships with teachers and other adults and become active agents in designing their own educational experiences and their own contribution to society.

TY programmes offer a unique opportunity in senior cycle where schools and communities can collaborate to encourage young people to thrive now and into the future. TY offers time, space, and autonomy to create enjoyable and meaningful educational experiences that support students in senior cycle while facilitating their engagement with a broader range of pathways and possibilities. It equips young people with the supports and experiences to develop a greater capacity to respond to uncertainty, manage complexity, and become agents of positive, ethical change in society.

Key competencies of senior cycle

Key competencies is an umbrella term which refers to the knowledge, skills, values and dispositions students develop during senior cycle, which helps them to become more engaged, enriched and competent learners.

[Further information on key competencies of senior cycle can be found on *ncca.ie*.](https://www.ncca.ie/)

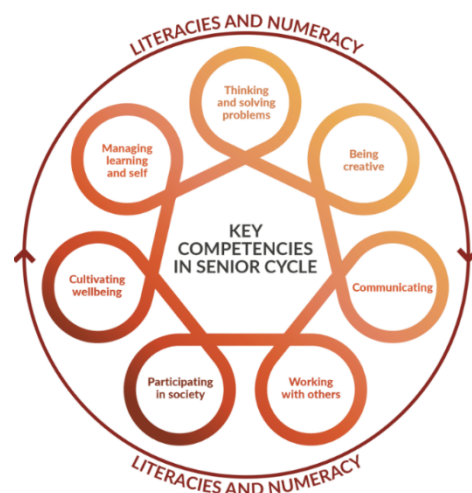


Figure 1: Key Competencies in Senior Cycle, supported by literacies and numeracy

Student Dimensions of Transition year

The Student Dimensions describe how students can develop in TY and the experiences that can support this development. The four Student Dimensions are:

- Personal Growth
- Being a Learner
- Civic and Community Engagement
- Career Exploration.

Each Student Dimensions contains a set of developmental indicators and related student experiences. The four Student

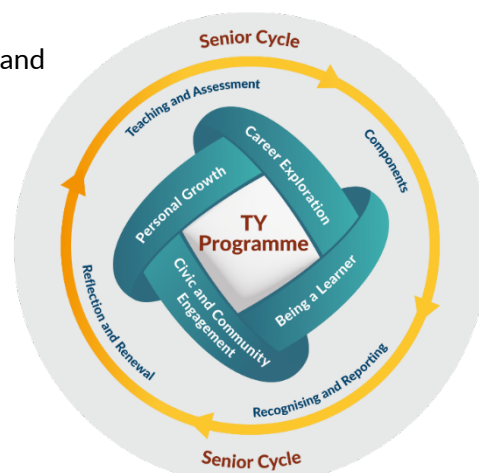


Figure 2: Overview of the Transition Year Programme Statement

Dimensions are designed to interlock in such a way that together they intersect with all seven key competencies of senior cycle.

[Further details can be found in the Transition Year Programme Statement.](#)

The four Student Dimensions are the foundations upon which TY programmes are designed. They describe how students can develop during TY. Table 1 lists the developmental indicators that are most likely to be supported by student participation and engagement with this module.

Table 1 Student Dimensions supported by the module.

Student Dimension	Developmental Indicators most relevant to the module
Personal Growth	<ul style="list-style-type: none">- Coming to see challenges as further opportunities for growth- Increasingly taking ownership of their own behaviours and decisions- Showing more initiative and leadership in school, at home and in the community
Being a Learner	<ul style="list-style-type: none">- Seeing the importance of feedback and placing more value on it- Increasing capacity for independent and self-regulated learning- Broadening their communication and presentation skills- Expressing their own ideas more clearly while engaging with other people's ideas
Civic and Community Engagement	<ul style="list-style-type: none">- Sustaining more caring and respectful relationships with people place and nature- Taking actions to live more sustainably- Wanting to contribute to a more just world- Understanding better the interconnections of local, national and global communities

Rationale

In today's data rich world, quantitative literacy is a necessary literacy for full participation and citizenship. However, for many young people mathematics acts as a barrier to full participation in our 21st century technology-based economy. Fuelled by a belief that they can't do maths, many disengage with mathematics early in their school career. This module aims to empower young people to re-engage with mathematics and demand this tool which, it's assumed they do not want, but which is so essential for meaningful citizenship, by creating an environment where students can practise and celebrate learning mathematics. Through an ongoing cycle of learning, practising, teaching and reflecting students learn foundational mathematics concepts well enough to teach them to others and at the same time develop the social and professional competencies to facilitate the learning experience for younger peers-and to work collaboratively while doing so.

Aims

This module will empower students to:

- build confidence by helping them make sense of foundational mathematical ideas that they will build on in senior cycle
- use mathematical literacy as a tool to develop leadership skills
- take an active role in their school and local community by helping younger students to learn mathematics with a unique game-based approach

Time allocation

This module has been designed for 20 hours of teaching and learning and 10 hours of outreach. Professional judgement can be used to decide on the nature of the 10 hours of outreach which can take place within the school, a local primary school or the local community.

Learning Outcomes

The learning outcomes below are designed to promote teaching and learning that develop students' knowledge, skills, values and dispositions incrementally, enabling them to apply their key competencies to different situations as they progress. The right-hand column contains learning outcomes which describe the knowledge, skills, values and dispositions students should be able to demonstrate after a period of learning. The left-hand column outlines specific areas that students learn about. Taken together, these provide clarity and coherence with the other sections of the specification.

The learning outcomes are numbered to support teacher planning. It does not imply any hierarchy of importance across the outcomes themselves.

Table 2 Student Dimensions supported by the module.

Students learn about	Students should be able to
<u>Foundational mathematics concepts</u>	1.1 define and Identify <ul style="list-style-type: none">• even and odd numbers• prime and composite numbers
- factorisation of numbers <ul style="list-style-type: none">○ unique prime decomposition○ highest common factor○ lowest common denominator	1.2 find the prime factors of a given positive integer
- additive and multiplicative reasoning	1.3 explore how numbers are structurally equivalent
- the Mobius function	1.4 define and explore mutually exclusive groups
	1.5 explore categorising numbers and objects on a mutually exclusive Venn diagram
	1.6 categorise the numbers 2 to infinity into three mutually exclusive groups

<u>Mathematical reasoning</u> <ul style="list-style-type: none"> - representation - conjecture - experimentation - generalisation 	2.1 make and test conjectures 2.2 represent numbers in multiple ways 2.3 flexibly translate between different representations of number 2.4 generalise observations and patterns
<u>Playing mathematical games</u> <ul style="list-style-type: none"> - Even/Odd Relay Race - Prime Hunt - PFC Match Up - Algebra Form Layout - Venn Diagram Puzzles - Capture the Flag/Endpoint - Flagway™ Game 	3.1 make strategic mathematical decisions whilst playing interactive mathematical games 3.2 facilitate others to learn and strategically play interactive mathematical games
<u>Near-peer teaching</u> <ul style="list-style-type: none"> - leadership skills <ul style="list-style-type: none"> o taking ownership of their work o building a team that supports the learning and development of others o designing, planning, implementing, discussing, and debriefing workshops 	4.1 envision themselves as a leader 4.2 support peers to make meaningful mathematical connections 4.3 lead/facilitate well-structured workshops
<u>Community activism</u> <ul style="list-style-type: none"> - Maths showcase - Community circles - Local Flagway™ games 	5.1 organise community events

Teaching for student learning

Teaching for student learning in TY requires a dynamic approach that prioritises student engagement, exploration, and development. The Curriculum Dimension for Teaching and Assessment identifies collective professional practice and classroom practice that can support student learning and development.

This module capitalises on young students' propensity for running, the galvanising energy of team competition, and the intrinsic sense of achievement when a team succeeds by introducing them to a knowledge-based sport that uses mathematically rich games to create the environment for students to practice and celebrate learning mathematics.

The sport in question is Flagway™ a competitive game involving mathematical and physical skill and speed. Based on the Mobius¹ function Flagway™ constructs a meaningful elaboration² on basic number facts by incorporating those facts into a game where students guess, conjecture, reflect on the options in the game, and tie these mental operations into the kinesthetics of running the patterned network of the game.

Learning the game

This module begins in the classroom where, for approximately 20 hours students learn about the knowledge-based sport Flagway™ through engagement with a series of mathematically rich constituent games. Similar to other sports a Flagway™ game can be broken down into a number of required game skills and students develop these through engagement with a series of mathematically rich interactive games. Research shows that identity, engagement, and motivation are key elements of students' success so in this module students initially learn about the game as participants in a classroom setting.

Participating in Flagway™ in this way builds on students' strengths, bolsters their skills and allows them to see themselves as mathematicians. As students become proficient with the game skills, they begin to play the game and learn the coaching skills necessary to teach it to others.

Facilitating the game

The module incorporates 10 hours of outreach providing an opportunity for students to share their skills with their peers and community members. During this time, they are supported to facilitate school/community-based workshops and events. Engaging in such a cycle of learning supports their personal development while involving them in a wealth of experiences that broadens their perspective on how they can impact their community. With continued support beyond participation in this module these young Mathematics Literacy Leaders have the potential to participate in a cycle which builds a critical mass of young people and parents/adults in their communities who take responsibility for their education and ensure that younger community members have the drive, skills and work habits that will allow them to develop to their full potential.

Pedagogies

Through the TY Teacher Professional Network (TYTPN) teachers can receive the professional support required to enact this module in their classroom.

During the 20-hour professional training teachers will develop the capacity to facilitate a module where students are given the space and responsibility for owning it themselves and creating their own curriculum from an idea. Participation will involve students creating/leading/ revising/reflecting on their own work so that they can lead younger versions of themselves.

¹ A mathematical function which assigns to each positive whole number one of three possible outputs.

² Cognitive science recognises two basic mechanisms of memory acquisition: repetition and elaboration. Repetition, the most frequently used method for acquiring multiplication facts in young children, as an empirical matter, has not succeeded with a significant majority of students. Elaboration, a more effective mode of memory acquisition, is why we remember stories for years but a phone number for only minutes after we first hear

Positioning youth at the forefront of education within their communities allows them to feel inspired to learn and subsequently pass that commitment, excitement, and positive attitude toward education onto their direct and near peers.

Assessment

Assessment in senior cycle involves gathering, interpreting, using and reporting information about the processes and outcomes of learning. It takes different forms and is used for a variety of purposes. Assessment supports and improves learning by helping students and teachers to identify next steps in the teaching and learning process.

The assessment method for this module is a digital badging system that documents the student's achievements in 4 domains (see features of quality criteria 1-4 below) and in doing so builds their awareness of the skills they are developing in the process.

Territorium's comprehensive learner record (CLR) will be used as an assessment platform to track progress. By the end of the module, students may earn up to 4 of the 8 digital badges required for official Mathematics Literacy Leader certification, which qualifies them as apprentices. Continued engagement with outreach and access to the platform beyond TY will allow them to earn the remaining 4 digital badges required for full Mathematics Literacy Leader certification.

Features of quality

Features of quality are the statements that support teachers and/or students in making judgements about the quality of student work for the purpose of awarding achievement. The feature of quality below are the criteria that will be used to assess the student learning and achievement. To assess progress towards indicated competencies, students will upload evidence that they are mastering the mathematics and are learning the core facilitation competencies into a CLR powered by Territorium.

Table 3 Features of quality

	High (Apply) Level 3 (Proficient)	Medium (Understand) Level 2 (Developing)	Low (Know) Level 1 (Beginning)
Criteria 1: Learner Evidence of learning as determined by student understanding of <i>Foundational Mathematics Concepts & Mathematical Reasoning</i>	Shows strong applications of using skills related to foundational mathematics concepts and mathematical reasoning	Shows some understanding of learning skills related to foundational mathematics concepts and mathematical reasoning	Shows minimal knowledge of learning skills related to foundational mathematics concepts and mathematical reasoning
Criteria 2: Fun Evidence of fun as determined by students <i>Playing Mathematical Games</i>	Shows strong applications of having fun through playing mathematical games	Shows some understanding of what it means to have fun by playing mathematical games	Shows minimal knowledge of what it means to have fun by playing mathematical games

Criteria 3: Discourse Evidence of discourse as determined by students planning and leading workshops supporting <i>Near-peer Teaching</i>	Shows strong applications of leading discourse that models near-peer teaching	Shows some understanding of how to lead discourse that models near-peer teaching	Shows minimal knowledge of how to lead discourse that models near-peer teaching
Criteria 4: Relationships Evidence of relationships as determined by Community Activism	Shows strong applications of building relationships through events organised for community activism	Shows some understanding of relationship building through events organised for community activism	Shows minimal knowledge of relationship building through events organised for community activism

Reporting

The Transition Year Programme Statement describes the three elements to reporting in TY programmes:

- The TY portfolio
- Student reflection
- School reporting.

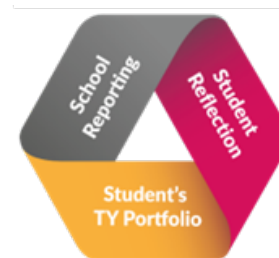


Figure 3: The three elements of reporting in TY.

The TY portfolio can be used as the portfolio for this module, or a module-specific portfolio could be drawn upon to create an entry into their TY portfolio, as outlined in previous sections. Students can reflect on the evidence they have submitted to summarise the impact of this module on their own learning and development.

On completion of the module students become apprentice Mathematics Literacy Leaders, a foundation for continuing beyond TY to receive internationally recognised certification as Mathematics Literacy Leaders. The activities support student academic and social development, empowering not only themselves, but also their peers to succeed in mathematics.

Evaluating

Reflection and Renewal is a Curriculum Dimension that speaks to the importance of ongoing evaluation of the TY programme and of the components that comprise the programme. The purpose of evaluating the module is to find out, from both the students' and teacher's perspective, the success or otherwise of the module and how it can be improved for the future.

The evaluation of this module may be achieved through a mix of verbal feedback, online evaluation, evaluation based on teacher feedback as part of TY programme evaluation, or other methods that may be suited to the school.

Resources

Training for those hoping to enact this module in schools is provided and supported through the TY Teacher Professional Network (TYTPN) . All the resources required for enactment will be provided during the training.



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