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

Background paper and brief for the development of Leaving Certificate Climate Action and Sustainable Development

June 2022

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1. Introduction

The Senior Cycle Review: Advisory Report (NCCA, 2022) was published in March 2022 following the response from the Minister for Education, Norma Foley, TD. The report records and responds to the views of teachers, students, parents and stakeholders gathered during the four-year review about how Senior Cycle could evolve to meet the needs of all our young people. It provides strong foundations for the phased redevelopment of Senior Cycle in the coming years.

Actions outlined in the Advisory Report include a review of existing curriculum components – both subjects and modules – and scoping the need for new curriculum components. The Advisory Report informed the Minister's plan for the redevelopment of senior cycle, which includes the introduction of a new Leaving Certificate subject of *Climate Action and Sustainable Development* in September 2024. This paper provides a background for the development of the subject and forms the basis for a consultation, which will seek to elicit the views of a range of interested parties, including teachers, school leaders and students, to contribute to the development of a specification for this new subject.

This paper begins with an exploration of the historical context and current position of Education for Sustainable Development (ESD) as a concept and area of learning directly related to this new subject, including the area of climate action. An overview of where climate action and sustainable development are currently integrated into the Irish curriculum is presented. The paper looks at some international jurisdictions to explore how these areas of learning are taught and assessed. The implications of various policy imperatives and national initiatives are considered in light of some of the opportunities and challenges facing the development of a new subject like Climate Action and Sustainable Development, before finally setting out a proposed brief for the development of the specification.

2. Background

This section sets the scene for the policy initiatives, both nationally and internationally, which are most relevant to the development of Leaving Certificate Climate Action and Sustainable Development.

International Policy Context

> "Our most pressing challenge is keeping our planet healthy. This is the greatest responsibility of our times. I want Europe to become the first climate-neutral continent in the world by 2050. To make this happen, we must take bold steps together."
>
> (Ursula von der Leyen, 2019).

The words of the EU President in her inaugural speech demonstrate the high priority placed internationally on the climate crisis. Human influenced climate change is adversely transforming our planet, with greenhouse gases at their highest levels ever recorded in history. As the wide-ranging impacts of climate change intensify, crises such as food shortages and environmental degradation increase. This, coupled with instability brought about by conflicts such as the war in Ukraine, heightens and magnifies vulnerabilities around displacement of peoples, dependencies on fossil fuels, and shapes international relations. The climate crisis is an interconnected issue of complexity that shapes and is shaped in many areas of the economy, society, culture, and politics. Action on climate change cannot be considered in isolation from actions towards a more sustainable world.

At the 2015 Paris Climate Conference (COP21), 195 countries agreed a worldwide commitment to keep global warming below 2 degrees Celsius. It is recognised that steps are needed to mitigate against climate change and achieve this goal in the short, medium, and long term. The Intergovernmental Panel on Climate Change (IPCC, 2022) identifies education, along with health care and social safety, as instrumental to mitigate and cope with environmental challenges. For over 30 years, education policy and practice has been evolving in this area, and there is still work to be done.

Climate Action and Sustainable Development - connecting the dots

Climate action is a core component of sustainable development. Sustainable development, broadly understood as development that meets today's needs without jeopardising the ability of future generations to meet theirs, was initially outlined in 1987 by the World Commission on Environment and Development in *Our Common Future* (more commonly known as the Brundtland Report). In 2002 the concept of Education for Sustainable Development (ESD) was proposed by the United Nations (UN) at the World Summit on Sustainable Development, to be followed by the Decade of Education for Sustainable Development 2005-2014 launched by UNESCO, the lead UN agency for ESD. This recognised ESD as a key element of quality education and aimed to integrate the principles, values, and practices of sustainable development into all aspects of education and learning. It sees ESD as an educational process of achieving human development in three areas – economic, social, and environmental.

Moreover, ESD:

- empowers learners with knowledge, skills, values and attitudes to make informed decisions and take responsible actions for environmental integrity, economic viability and a just society empowering people of all genders, for present and future generations, while respecting cultural diversity
- is a lifelong learning process and an integral part of quality education that enhances cognitive, social and emotional and behavioural dimensions of learning
- is holistic and transformational and encompasses learning content and outcomes, pedagogy and the learning environment itself
- is recognized as a key enabler of all Sustainable Development Goals and achieves its purpose by transforming society.

(UNESCO, 2020, p. 8)

In a recent review of national curriculum frameworks in over 100 countries, UNESCO (2021a, p.12) offered some findings and recommendations on climate change education, including:

- Climate change education should be a core curriculum component in every country – only 53% of national curriculum frameworks included any mention of climate change, with a further 40% including minimal content.
- Climate change education should be integrated across all levels and disciplines of learning.
- Climate change education needs to incorporate action-focused learning with equal importance placed on 'head', 'heart' and 'hands' through holistic curricula and pedagogies.

Through its ESD programme, UNESCO works to make education a more central and visible part of the international response to climate change. Climate action is one of the key thematic priorities of UNESCO's ESD agenda. In May 2021 at the UNESCO World Conference on ESD, over 70 ministers and 2,800 education and environment stakeholders adopted the Berlin Declaration on ESD, which has climate change at its core. It commits, by 2025, to ensuring

'...that ESD is a foundational element of education systems at all levels, with environmental and climate action as a core curriculum component, while maintaining a holistic perspective on ESD that recognises the interrelatedness of all dimensions of sustainable development.'

(UNESCO 2021, p.2)

The Sustainable Development Goals

Building on the broad understanding of sustainable development in the Brundtland Report, ESD is understood to serve as a well-established framework to prepare learners of all ages for the 'battle of our lives' (UN Secretary – General, in UNESCO 2020, p.iii) as children and young people take individual and collective action on local, national and global urgencies.

Education for Sustainable Development: A roadmap (UNESCO, 2020) sets out a global framework for the implementation of the UNESCO ESD 2020-2030 agenda, emphasising the contributions of education to achieving the Sustainable Development Goals (SDGs). Published in 2016, the SDGs have now become ubiquitous in educational circles and beyond and are central to the UN 2030 Agenda for Sustainable Development. While education is recognised as an enabler for the

achievement of all 17 Global Goals, it is also a goal in its own right as SDG 4 – Quality Education. It has a number of targets with Target 4.7 focused on ESD. It is acknowledged that the achievement of the SDGs cannot happen without educating people on sustainable development.

Fig. 1 – The Sustainable Development Goals (UNESCO, 2020, p.12)

Climate Action, SDG 13, is a specific goal which sits within the broader goals. Education once again is specifically mentioned in the context of climate action –Target 13.3 seeks to 'Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning'. To this end, a positive indicator of moving towards both goals (SDG 4 and SDG 13) is the extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (a) national education policies; (b) curricula; (c) teacher education; and (d) student assessment. This further underscores the interconnected nature of climate action and sustainable development and the value of embedding both in curricula.

National Policy Context

Ireland's first National Strategy on Education for Sustainable Development (2014-2020) aimed to ensure that our education system contributes to sustainable development by:

> "...equipping learners with the relevant knowledge (the 'what'), the key dispositions and skills (the 'how') and the values (the 'why') that will motivate and empower them throughout their lives to become informed active citizens who take action for a more sustainable future" (DES, 2014, p. 13).

The first National Strategy, published towards the end of the UN Decade of Education for Sustainable Development (2005-2014), predates the UN ESD 2030 agenda and the Sustainable Development Goals (SDGs). This strategy led to significant progress in embedding ESD in Irish education, including the integration of ESD into the curriculum across all levels and the publication of a 2018 audit by NCCA of ESD opportunities and linkages in the curriculum. This was followed by the publication of a 2021 international curriculum audit by NCCA, providing further opportunities to consider ESD in curriculum and assessment from early childhood to senior cycle. The reports from both of these audits are published on ncca.ie.

The 2019 and 2021 Climate Action Plans identify actions in relation to curriculum developments for climate education. The 2019 plan asks for the school curriculum to be reviewed against climate change on an ongoing basis. The 2021 plan sets out an action to build climate literacy through the primary and secondary curriculum. Climate literacy involves the empowerment of young people to understand complex information about the planet (Government of Ireland, 2021, p.60). A climate literate person understands the climate's influence on society and their influence on the climate. Moreover, a climate literate person (NOAA, in Milár & Sládek, 2011, p. 152)

- understands the essential principles of all aspects of the Earth system governing climate patterns.
- knows how to gather information about climate and weather, and how to distinguish credible from noncredible scientific sources on the subject.
- communicates about climate and climate change in a meaningful way.
- makes scientifically informed and responsible decisions regarding climate.

The Climate Action Plan recognises the importance of education to improve climate literacy in order to 'enhance our capacity to make small changes in our daily lives, to engage with climate action at a local level, and to participate at national level in the co-design of policy' (Government of Ireland, 2021, p. 60). In April 2021, Minister Norma Foley, TD and Minister Simon Harris, TD jointly launched a public consultation on the development of the second National Strategy on Education for Sustainable Development to 2030. The second National Strategy, *ESD to 2030*, aligns with the expectations of the UNSECO ESD for 2030 roadmap and outlines a firm commitment to SDG 4, target 4.7, which expects to

> By 2030, ensure that all learners acquire the knowledge and skills to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development.

Section Summary

Education for sustainable development, and climate action as a core component of this area of learning, has made significant strides in Irish and international education circles. The rise of the SDGs and the work of UNESCO in charting a course towards ESD 2030 have been suffused with national endeavours at integrating ESD, including:

- A national strategy on ESD introduced in 2014
- A second national strategy consulted upon and set for introduction in 2022
- A curriculum audit of ESD by NCCA in 2018, identifying opportunities for building on existing practice and potential linkages between the themes in *Aistear: the Early Childhood Curriculum Framework* and between the different subjects in primary and post primary schools
- An international curriculum audit of ESD by NCCA in 2021, providing further opportunities to consider ESD in curriculum and assessment from early childhood to senior cycle.

A policy timeline, capturing these national and international developments, is presented in Fig. 2 below.

Future policy directions for climate action and sustainable development include

- the continued situating of climate action as a core component of ESD
- action-focused climate change education through holistic curricula and pedagogies
- the enhancement of climate literacy in schools and society
- the embedding of climate action and ESD in curricula.

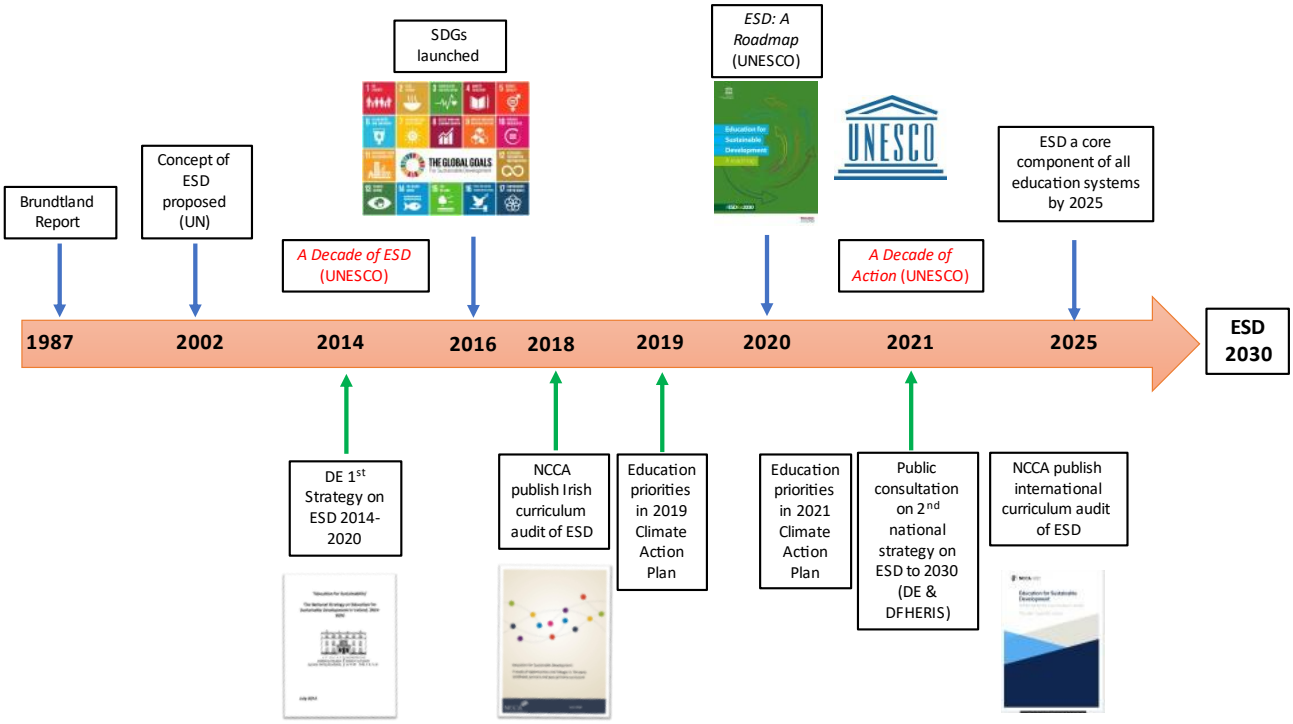

Fig. 2 – Policy timeline for national and international ESD developments

3. Climate action and sustainable development in the curriculum

Similar to other international curricula, climate action and sustainable development are integrated through a cross-curricular and cross-sectoral approach in Ireland. This section provides an overview of this integration and identifies developments which are most relevant to the development of this specification.

Aistear

In *Aistear: the Early Childhood Curriculum Framework*, learning through play is underpinned by 12 interconnecting principles, one of which is 'Children as Citizens'. This principle acknowledge the rights and responsibilities of children, including to care for each other and the environment (NCCA, 2009,p. 8). NCCA is currently updating *Aistear* and the consultation invites stakeholders to take into consideration the changes to children's lived experiences of school and Irish society and to reflect on the degree to which the framework supports the promotion of children's learning and development in the context of increasing diversity. The updated framework is due to be published in late 2023.

Primary Curriculum

The existing Primary Curriculum, revised in 1999, aims to 'enable the child to develop as a social being through living and cooperating with others and so contribute to the good of society' (DES, 1999, p. 6). In the primary curriculum, climate action and sustainable development can be engaged with through curriculum areas such as Social, Environmental and Science Education (SESE), which involves fostering a sense of environmental awareness and care through the study of history, geography and science.

The *Draft Primary Curriculum Framework* identifies the need to be responsive to a changing world, with climate change, sustainability, human migration and geopolitical shifts specifically mentioned (NCCA, 2020, pp. 1-3). Further relevance can be found in the key competencies of the draft framework. The key competency 'being an active citizen' explicitly aims to

> "foster within children the knowledge, skills, concepts, attitudes, values and dispositions that motivate and empower them as citizens to take positive actions to live justly, sustainably and with regard for the rights of others. It helps children question, critique and understand what is happening in the world within a framework of human rights, equality and social justice. It places democratic practices at the centre of the learning process. This competency develops children's capacity and motivation for active and meaningful participation in society at local, national and global levels, and fosters their ability to contribute positively and compassionately towards the creation of a more sustainable and just world."
>
> (ibid, p. 7).

The redeveloped curriculum will be presented in five broad curriculum areas. Across these areas, the draft framework (NCCA, 2020) references the types of knowledge, competencies and dispositions related to climate action and sustainable development. For example, the curriculum area of Wellbeing speaks of the importance of children developing a strong sense of connectedness to their school, community and wider society and valuing what it means to be an active citizen, with rights and responsibilities in local and wider contexts. The area of Social and Environmental Education describes how children develop an understanding of the human and natural environments and the relationship between them (ibid).

Junior Cycle

The Framework for Junior Cycle (2015) sets out the vision and structure of junior cycle education, underpinned by eight guiding principles, 24 statements of learning and eight key skills. Sustainability is embedded in the statements of learning, specifically in

- SoL 10: has the awareness, knowledge, skills, values and motivation to live sustainably
- SoL 7: values what it means to be an active citizen, with rights and responsibilities in local and wider contexts.

Junior cycle adopts a cross-curricular approach to integrating sustainability. This allows teachers and students to plan for teaching, learning and assessment related to sustainability both within and across individual specifications, whilst also recognising sustainability links between subjects. Specific learning outcomes related to climate change and sustainable development are outlined in a number of subjects (e.g., in science, geography, business studies, home economics and wood technology).

The CSPE short course, with its focus on active citizenry, has a direct alignment with the knowledge, skills and dispositions of sustainability. Its learning outcomes are organised into three strands: Rights and responsibilities, Global citizenship, and Exploring democracy. Following a recent curriculum review, revisions were made to place greater emphasis on climate change and climate action.

A number of organisations and schools across the country have also developed short courses in areas related to sustainable development and climate action, following the NCCA guidelines to schools on the development of short courses.

Senior Cycle

There have been six senior cycle specifications designed to a common template and approved by Council in the period from 2016 to 2019. The six specifications are for the subjects Politics and Society (introduced in 2016), Physical Education (introduced in 2017), Agricultural Science, Economics, Computer Science (all introduced in 2018), and Applied Mathematics (introduced in 2019).

Building on NCCA's cross-curricular approach, some of these recently developed senior cycle specifications have included learning relevant to sustainability. Leaving Certificate Economics contains an element in its unifying strand on economic, social and environmental sustainability that provides a context in which economics functions today (NCCA, 2018a). In Computer Science, many of the contexts used to explore the knowledge and understanding of computer science provide opportunities to discuss the practical and ethical aspects of computing, and to consider the use of computers and related technology from a societal perspective (NCCA, 2018b).

Leaving Certificate Agricultural Science and Leaving Certificate Politics and Society both contain curricular structures with strong links to ESD. Politics and Society supports ESD through the knowledge and skills developed through all four strands: Power and decision-making; Active citizenship; Human rights and responsibilities, and Globalisation and localisation are all integral to education for sustainable development. In addition, topic 8, Sustainable development, provides excellent opportunities for students to engage with this area of learning (NCCA, 2019, p. 12). In Agricultural Science, 'sustainability' is a crosscutting theme. By linking and integrating the learning across the four strands, the interdependence of the scientific, economic and social dimensions of agricultural science is reinforced. By considering the impact of human activity and the importance of responsible management in relation to soils (Section 2.3), crops (Section 3.3.) and animals (Section 4.3.), students develop awareness of the need for sustainable development and use of natural resources at local, national and global levels (NCCA, 2018c, p. 10). There are also specific references to promoting the agri-food industry whilst insulating it from the challenge of climate change, and the role of soils in regulating the climate.

Section Summary

- Learning related to climate action and sustainable development can be found in the curriculum at early childhood, primary and post-primary.
- The cross-curricular approach used to achieve learning in sustainability endeavours to ensure vertical and horizontal curricular alignment from early childhood to senior cycle.
- An analysis of existing curricula identifies, in a variety of ways, evidence of climate action and sustainable development in existing Irish curricula and its integration through various structures and approaches including
    - Underpinning principles
    - Statements of learning
    - Key skills and competencies
    - Crosscutting elements/themes
    - Content specified in learning goals/outcomes.

4. International perspectives from upper secondary curricula

Learning in climate action and sustainable development has been realised internationally in different ways. To describe what learning and assessment in Leaving Certificate Climate Action and Sustainable Development might look like, an overview is provided of what is included in curriculum documentation at upper secondary for three jurisdictions, with a particular focus on approaches to climate action as a core component of sustainable development. Whilst this is not a standalone subject in these jurisdictions, lessons can be learned from how the broader area of sustainability, which is a bedrock of climate action and sustainable development, is addressed as a cross-curricular priority.

New Zealand

Compulsory education in New Zealand begins at age 6, although most children start school when they are 5. It is preceded by early childhood education. Secondary education is compulsory until Year 11, age 16. The New Zealand Curriculum covers Years 1-13 (ages 5-18). At senior secondary level (ages 15-18), the curriculum is also influenced by the student's choice of subjects for the National Certificate of Educational Achievement (NCEA).

How is knowledge organised?

Education for Sustainability (EfS) in The New Zealand Curriculum includes three key aspects:

- Economic aspect: environmental law, sustainable land use, sustainable industrial development, sustainable enterprise education, resource management, energy consumption and conservation, sustainable tourism, green consumerism, fair distribution of resources, fair trade.
- Socio-cultural-political aspect: equity and fairness, cultural perspectives, total wellbeing, peace education, personal and social responsibility for action, fights of indigenous cultures.
- Environmental aspect: environmental literacy, climate change, ecological life support systems, research and investigation, knowledge and understanding of biodiversity, interdependence, knowledge about the environment, introduced species.

The rationale in the Teaching and Learning Guide for EfS in senior secondary education (ages 15-18) says that it is important to study EfS as 'we depend on the environment for everything'.

> One way or another, the opportunities that we have – or will ever have – come back to the environment. So how we treat our environment is of great importance. EfS challenges students to develop the kinds of thinking and behaviours that will secure the future
> (New Zealand Ministry of Education, 2010).

The rationale highlights the importance of students learning to investigate practices that put the environment and its inhabitants at risk, and that have created sustainability issues, so that they can make informed decisions about how to live their own lives and advocate for change. This applies from the earliest years of education onwards.

People can have very different views on sustainability. For this reason, in Education for Sustainability (EfS), children and young people explore and evaluate different perspectives, rethink long-standing ideas, and consider alternative practices and directions. With the support of their teacher, they can take ownership of their learning and create new knowledge.
In addition, the key concepts/big ideas incorporated in the EfS curriculum throughout the phases are:

- Sustainability: the ability of individuals, groups, communities and societies to adopt ways of thinking and behaving that allow them to meet their needs and aspirations without compromising the ability of future generations of all living things to meet theirs.
- Equity/fairness: includes respect for all life, social justice, intergenerational equity, and the fair management of finite resources.
- Interdependence: the interconnectedness of people and environments which can be understood through considering ecosystems/biodiversity, community, cultural diversity, democracy, globalisation and fair trade.
- Responsibility for action: the personal and social actions required to live sustainably which include guardianship (*kaitiakitanga*), taking action, informed decision-making, citizenship, thoughtful consumerism, enterprise and entrepreneurship, resilience, and regeneration.

Education for Sustainability (EfS) in The New Zealand Curriculum is integrated in cross-curricular learning with the aim of enabling children and young people to make sense of complex issues. The New Zealand Curriculum contains learning objectives to indicate the progression in EfS learning that teachers might expect to see across curriculum Levels 7 and 8 (ages 15-18). These objectives are structured in three inter-related strands:

- knowledge and understanding
- attitudes and values
- actions.

Students are expected to see and make sense of the connections within and across these strands and those in other subjects such as geography, health, and biology. There is flexibility to EfS learning programme design, so long as they align to the learning objectives. Possible models suggested include a themed approach addressing key issues such as global climate change, environmental refugees, loss of biodiversity and threatened environments.

As they move from Level 7 to 8, students are expected to develop their action competence and their critical thinking, and to move from describing how people affect the environment, to planning and participating in positive action, through to evaluating action and its impacts, both short- and long-term. At the same time, the focus moves from guided action to informed, independent action.

Each learning objective includes a set of indicators (examples of the behaviours and capabilities that a teacher might expect to observe in a student who is achieving at the appropriate level), with examples of possible concept links, guidance about possible context elaborations (contexts for learning, with a suggestion of how they might be used with the learning objective).

For example, learning objective 7.4 states that 'students will gain knowledge, skills, and experience to plan, implement, and evaluate personal action for a sustainable future'. Concept links related to this span across social (e.g., Resilience, action orientation), environmental (e.g., Ecosystems), cultural and economic (e.g., Entrepreneurship) sustainability. Examples of

context elaborations are provided, which include supports on energy saving initiatives, carrying out a beach clean-up and hosting a sustainability conference.

The key concept indicators are further elaborated in specific subject guides. In Economics, for example, students compare and contrast economic growth against the environmental damage caused when producers use unsustainable production methods. In Legal Studies, students explore sustainability and the environment as a major issue. They learn about legal systems and processes and the function of specialist courts such as the Environment Court.

What skills are prioritised?

EfS promotes development of the key competencies through learning activities that engage, encourage, challenge and motivate student and teacher actions that foster inquiry, discussion, understanding, active participation and reflection. These competencies are:

- Thinking
- Using language, symbols and texts
- Managing self
- Relating to others
- Participating and contributing.

EfS in senior secondary education is also intended to empower students to develop valuable, transferable skills to:

- think critically and creatively about issues and solutions
- view the world from different perspectives, particularly those that are directly relevant to New Zealand
- negotiate complexity and deal with change and uncertainty
- be confident, connected, lifelong learners with a sense of responsibility for the wellbeing of their country and the planet
- connect thinking and actions in ways that will lead to a sustainable future – environmental, social, cultural, and economic.

What does assessment look like?

There are a range of National Certificate of Educational Achievement (NCEA) achievement standards for EfS which schools can use to engage their senior secondary students (Years 11-13, ages 15-18) in qualifications linked to sustainability. The achievement standards relate to internal and external assessments, which can be used in a variety of ways depending on student needs, and how a school plans its EfS programmes. They may be used within dedicated year-long sustainability courses, which encourage learning in a range of disciplines, or incorporated into other senior subjects such as geography, the sciences, economics, and horticulture, or within learning areas such as technology and the arts.

Aspects of assessment for the Level 2 and 3 EfS standards (summarised in the 'Education for Sustainability Matrix' on this webpage) can include:

- personal actions that contribute towards a sustainable future
- understanding the biophysical environment

- understanding how different personal values or worldviews can impact on a sustainable future/ sustainability
- understanding how initiatives and policies can impact on a sustainable future
- the development of collaborative responses or organisational strategies for a sustainable future
- an understanding of sustainability in different contexts.

Scotland

Compulsory education in Scotland begins at age 5 and is preceded by early learning and childcare (ELC). Secondary education is compulsory until Secondary 4 (S4), age 16. Curriculum for Excellence (CfE) covers ages 3-18 and is divided into five levels. During senior secondary education, the curriculum followed depends on the student's choice of National Qualifications, which are available in a wide range of subjects.

The aims and priorities for Learning for Sustainability (LfS) in Scotland are determined by the five strategic recommendations of the original (2012) Vision 2030+ Learning for Sustainability Action Plan (available as a Word document here), one of which is that all learners should have an entitlement to LfS.

How is knowledge organised?

The Building the Curriculum series of guidance documents make a number of references to the role and place of Learning for Sustainability (LfS) within the curriculum, but do not prescribe specific curriculum content. Curriculum for Excellence is intended as a broad, flexible framework to help schools plan their curriculum. It is defined in terms of Experiences and Outcomes, which are statements about children's learning and progression in each curriculum area from ages 3 to 15 and are used to help plan learning and assess progress. The Experiences and Outcomes are supported by Benchmarks, which provide clarity on the national standards expected within each curriculum area at each CfE Level.

The Climate Change in Scottish Education Briefing – August 2019 explains that the curriculum areas of sciences, technologies, social studies, health and wellbeing, and religious and moral education offer opportunities to learn about climate change, renewable energy and sustainable development, including moral principles which link to human responsibility for the environment (p.2). The Briefing also gives examples of how these issues are included in the Experiences and Outcomes of Curriculum for Excellence.

What skills are prioritised?

Building the Curriculum 3: a Framework for Learning and Teaching (Scottish Government, 2008) provides the framework for planning the curriculum. It highlights sustainable development as one of a number of important curricular themes (enterprise, citizenship, sustainable development, international education, and creativity) which need to be developed in a range of contexts (p. 23). To help achieve this, learning relating to these themes is built into the Experiences and Outcomes.

Building the Curriculum 4: Skills for Learning, Skills for Life and Skills for Work (Scottish Government, 2009) describes skills for learning, skills for life and skills for work. It provides guidance on developing these skills through a range of practical activities and wider opportunities within the curriculum. Its list of examples includes sustainable development activities, such as environmental and community activity and participation in the Eco-Schools Programme (p. 22).

What does assessment look like?

During senior secondary education (ages 15-18) students take a number of National Courses leading to approved external National Qualifications, developed to support Curriculum for Excellence. National Qualifications are single-subject qualifications available in a wide range of subjects, some of which incorporate specific requirements for Learning for Sustainability (LfS), for example environmental science and design and technology.

As explained in the Climate Change in Scottish Education Briefing (2019), climate change and renewable energy feature extensively in the National Qualifications developed to support Curriculum for Excellence. These qualifications provide learners with opportunities to study the causes and effects of climate change in greater detail and develop their understanding of the scientific, geographical, technological and political aspects of the issue.

The content covered depends on the individual qualifications, as set out in course specifications developed by the Scottish Qualifications Authority (SQA), the body responsible for accrediting and awarding qualifications. There are also a number of qualifications in different subjects providing opportunities to learn about LfS. For example, in the course specification for the National 5 qualification in Environmental Science, it says that

> Environmental science is an inter-disciplinary subject which draws from the sciences and social sciences. Environmental scientists are involved in tackling issues such as global climate change, pollution, use of land and water resources, and changes in wildlife habitats. The course involves an understanding of scientific principles, economic influences, and political action (p. 29).

The coursework assessment, which is school-based with a completed report sent to SQA for marking, contains an assignment worth 20 marks, in which students 'apply skills, knowledge and understanding by carrying out an experiment or fieldwork procedure and investigating a topic relevant to environmental science' (p. 21). The other assessment is an examination worth 100 marks. Other qualifications which provide opportunities to learn about climate change and its impacts include modern studies, geography, religious, moral and philosophical studies, and engineering science.

Australia

Children in Australia begin primary education at around age 5 in the Foundation Year. They move to secondary education in Year 7 or 8, aged 12 or 13. There is an Early Years Learning Framework for 0- to 5-year-olds and a Foundation to Year 10 Australian Curriculum (F-10 Australian Curriculum), for ages 5-16. Developed by the Australian Curriculum, Assessment and Reporting Authority (ACARA), the F-10 Curriculum is for use in all Australian states and territories.

In Years 11 and 12, the Council of Federal, State and Territory Education Ministers has endorsed 15 senior secondary subjects as the common base for the development of state and territory courses. The senior secondary curriculum is also influenced by the individual state or territory leaving certificates, such as the Queensland Certificate of Education, the Victorian Certificate of Education and the Higher School Certificate, and a student's choice of subjects to contribute towards those qualifications.

How is knowledge organised?

Fig. 3 – Australian curriculum foundation to year 10 (F-10 Curriculum)

The Australian Curriculum for Foundation to Year 10 (F-10 Curriculum) (ages 5-16), summarised in Figure 3 above, includes Sustainability as a cross-curriculum priority, addressed through each of the individual learning areas of the curriculum. It is organised around four key concepts of systems, worldview, design, and futures, which are further elaborated through a set of organising ideas.

All Australian Curriculum learning areas (English; mathematics; science; humanities and social sciences; the arts; technologies; health and physical education; languages) and the 15 senior secondary subjects (distributed across the four areas of English, mathematics, science, humanities and social science) contribute differently to the Sustainability cross-curriculum priority, and to the key concepts and organising ideas. For example:

- some have content that enables students to work with ecological and human systems and to appreciate their interdependence
- others contribute to the development of world views necessary for students to act to create a more socially and ecologically just world
- others provide content that challenges students to consider sustainable futures and to design and take action that recognises projected future economic, social and environmental impacts.

Climate action and sustainable development are integrated within the content descriptions of the 15 senior secondary subjects. The technologies, for example, enable consideration of preferred futures. When students identify and critique a problem, need or opportunity; generate ideas and concepts; and create solutions, they give prime consideration to sustainability by anticipating and balancing economic, environmental and social impacts. The curriculum focuses on the knowledge, understanding and skills necessary to design for effective sustainability action, taking into account issues such as resource depletion and climate change.

Through studying languages, students develop knowledge and understanding about sustainability within particular cultural contexts, which is crucial in the context of national and international concerns about, for example, climate change, food shortages and alternative ways of caring for land and agriculture.

What skills are prioritised?

Through the key concepts and organising ideas for Sustainability as a cross-curriculum priority in the F-10 curriculum, students develop the knowledge, skills, values and worldviews to:

- understand ecological and human systems, and the ways social, economic and environmental systems interact to support and maintain human life, and appreciate their interdependence
- develop the worldviews to act to create a more socially and ecologically just world
- appreciate and respect the diversity of views and values that influence sustainable development
- understand the role of innovation and creativity in designing solutions which preserve or restore environmental, social and economic systems
- think and act in ways that will lead to an equitable, sustainable, inclusive and socially and ecologically just future, and participate critically and act creatively in determining more sustainable ways of living
- make balanced judgements based on present and future impacts.

In the upper secondary curriculum, students have further opportunities to develop skills and competencies that allow them to engage with climate action and sustainable development as appropriate to the discipline they are studying. In Earth and Environmental Science, for example, students learn about the cause and impact of Earth hazards and global climate change as they develop skills in describing, explaining, applying understanding, analysing and interpreting evidence, investigating phenomena, evaluating processes, claims and conclusions and communicating understandings, findings, arguments and conclusions. In Geography, students formulate and plan geographical inquiries, collect geographical information, record observations,

identify patterns and trends to understand the interrelationships between land cover change and global climate change or biodiversity loss.

What does assessment look like?

Climate action and sustainable development may be incorporated within the qualification syllabuses/specifications for the individual subjects which students choose to study in senior secondary education, and which contribute towards individual state or territory leaving certificates. In Queensland, for example, global climate change is a key component of the senior syllabus for Earth and Environmental Science, which students can study to contribute towards the Queensland Certificate of Education. This component is assessed through a 20% internal (school-based) assessment which takes the form of a research investigation. This is combined with a further 30% school-based assessment in the area of renewable and non-renewable resources, giving a total of 50% school-based assessment. The other 50% external assessment takes the form of an examination. Teachers are provided with instrument-specific marking guides to support their judgments of evidence submitted for internal assessment.

Section Summary

Whilst it is difficult to find a jurisdiction where climate action and sustainable development is a standalone subject, the selected countries provide some international perspectives on how knowledge is organised, skills are prioritised and what assessment looks like.

- In the international jurisdictions examined, learning about climate action and sustainable development is a cross-curricular priority, integrated using organising concepts, learning outcomes, key ideas and themes.
- Specific content areas highlight the interconnectedness of social, economic, environmental, political and cultural pillars. A variety of disciplines including science and technology, business, the arts, humanities and social studies, health and wellbeing, and religious and moral education all present opportunities for learning about climate action and sustainable development.
- As students progress to upper secondary education there is an increased emphasis on informed, independent action as they engage with complex issues.
- There is an emphasis on skills development to enable students to effectively engage with climate action and sustainable development issues. These skills relate to students' ability to gather, process and analyse information, make informed decisions, communicate, work with and influence others, think critically, think in systems, see the world from varying perspectives, negotiate complexity and uncertainty, and design sustainable futures.
- Assessment is undertaken within subject areas. There are a range of approaches to assessing climate action and sustainable development which relate to encouraging student action, including course work and project work.

5. Issues for consideration

Significant strides have been made here in Ireland to promote and progress climate action and sustainable development. This has been achieved through broad ranging efforts from policy to practice, in schools and classrooms, across various agencies and in local communities. As we begin a UNESCO 'decade of action', the national strategy *ESD to 2030* aims to contribute to SDG 4 on quality and inclusive education to provide relevant education that puts responsibility for the future at the centre. In this regard, Leaving Certificate Climate Action and Sustainable Development can make a unique and positive contribution to responding to the biodiversity and climate crises and a rapidly changing world filled with complex and interrelated global issues.

This following brings into focus some considerations that emerge from discussions in the preceding sections, and some further considerations relevant to the development of Leaving Certificate Climate Action and Sustainable Development.

Scope and structure of the specification

Section 4 showed evidence of climate action and sustainable development across a variety of curriculum areas spanning science, the arts, humanities and social studies, religious and moral education. Leaving Certificate Climate Action and Sustainable Development, as a new subject, finds itself in both an opportunistic and a challenging position when it comes to specifying knowledge. One evident challenge is the need for clarity and boundaries around what is and is not included. The potential for pluralism and 'fuzziness' between learning areas emerges when the concepts of ESD, climate action and sustainable development, given their interdisciplinary nature, yield multiple interpretations (Kopnina & Merjers, 2014, p. 194).

The opportunity exists to define a new subject that stands distinct from but also relates, connects to and complements other subjects and areas of learning in the curriculum. The challenge, however, is to ensure this subject does not lead to inappropriate duplication of objectives and learning from other subjects and perceptions of unnecessary overcrowding in the curriculum.

Any misalignment of key aspects of the curriculum with the aims and objectives can lead to a widening of the gap between the intended and enacted curriculum. Research (Sullanmaa *et al.*, 2019; Manyukhina & Wyse, 2019) suggests the development of a shared vision and purpose within the curriculum is vital in clarifying its scope and structure.

Learning within and outside the classroom

Leaving Certificate Climate Action and Sustainable Development has an opportunity to capitalise on the wealth of resources and initiatives provided by other agencies and organisations that have heretofore been pivotal in supporting learning in this area.

The influence of agencies and initiatives in the promotion of climate action and sustainable development in Irish education over the last decade has been expansive and significant. Green Schools, Get Up and Goals, ECO-UNESCO, Trócaire, Worldwise Global Schools, the coordinated work on the 'Take 1' programme in ETBI schools, to name but a few, have supported the realisation of SDG targets and a deeper understanding of climate action and ESD in schools. Coupled with this, a vast array of competitions and fairs (e.g., the SEAI *One Good Idea* project,

Junk Kouture and other fast fashion initiatives) provide opportunities for students to engage with climate and sustainability matters. There are repeated calls for continued influence of such programmes and agencies, along with a recognition of their benefit in promoting whole-school and holistic approaches that both enhance and complement formal curricula. More recently the Irish Schools Sustainability Network, founded in March 2021, provides a forum for teachers and students to work in partnership to accelerate climate action, address the loss of nature, and prioritise sustainability in the Irish education system.

The experience in Ireland is mirrored internationally, where a variety of networks and initiatives have moved the ESD agenda forward (NCCA, 2021b, pp. 53-55). These include Regional Centres of Expertise which offer tailored CPD for teachers and stakeholders in their respective countries (e.g., LfS Scotland). The UNESCO Associated Projects Network (ASPNet) is recognised as a driver for innovation in realising SDG 4. It is a network of around 11,500 schools and educational institutions in 180+ countries working in support of international understanding, peace, intercultural dialogue, sustainable development and quality education in practice. The Eco-Schools International Programme - the largest global sustainable schools programme – starts in the classroom and expands to the community by engaging the next generation in action-based learning. The programme supports schools to take action on climate change and environmental issues to attain the 'Green Flag' award. This programme is pervasive around the world and across Ireland.

Outside formal school settings there are a range of existing initiatives and structures that could link schools with their communities (DE, 2022b, pp. 19-21). Maximising school links with local authorities, Tidy Towns and local libraries, for example, could support broader engagement and opportunities for community-school links on sustainability projects. Meaningful and transformative local actions can take place where stakeholders are supported to examine the needs and desires of their immediate environment and community. Example initiatives in the Irish context include the UNESCO Learning City Initiative, 'green' measures at local level and reskilling through business initiatives related to ESD. Irish Aid, for example, plans to launch a revitalised Community Initiative, building on the learning to date from the Saolta and Youth 2030 programmes.

The development and provision of Leaving Certificate Climate Action and Sustainable Development will further support the cross-curricular and whole-school approach to ESD in schools. Conversely, this subject can capitalise on the wealth of resources and initiatives currently available. Community collaboration, community linking and engagement with external agencies and initiatives locally, nationally and internationally can serve and complement the learning set out in the curriculum specification for this subject.

Student voice and action

> "It is today's youth and following generations who will be left to face the consequences of unsustainable development. It is their present and future that are at stake. In return, it is young people who are becoming increasingly vocal and active, demanding urgent and decisive change and holding world leaders accountable, in particular to address the climate crisis. They have, and continue to envision, the most creative and ingenious solutions to sustainability challenges."
>
> (UNESCO, 2020, p. 32)

Young people are seen as key contributors to climate action and sustainable development. Recent examples of young people using their voices for influence in this area include the Climate Ambassador programme, the National Youth Assembly on Climate Action, and the inclusion of the Irish Second Level Students' Union (ISSU) on the DE ESD Advisory Group. The recent appointment of the ISSU as a nominee to the NCCA Council by the Minister for Education is further evidence of the growing role of the voice of students and young people in curriculum matters.

Elsewhere, young people continue to make their voices known on climate action nationally and internationally. In 2019, students all over Ireland held school walk outs in an international day of action as part of the Global Climate Strike by student-led groups, Fridays for Future Ireland and the Schools Climate Action Network (Irish Times, 2019). Consideration will need to be given to identifying how the curriculum specification can provide opportunities to further enable student voice and action on local and global issues through the teaching and learning of Leaving Certificate Climate Action and Sustainable Development.

Pedagogies to support learning

In section 4, international perspectives shed light on how learning in climate action and sustainable development involves progression of knowledge and skills across a continuum through engaging with relevant and increasingly complex issues. A range of supporting pedagogies have been recommended and adopted internationally to support this type of learning, some of which are presented in Fig. 4 below. For a subject which has action as a foundation and aims to encourage action towards a sustainable future, Climate Action and Sustainable Development could benefit from a focus on approaches to teaching and learning that enable student voice, critical thinking, creativity, individual and collective action.

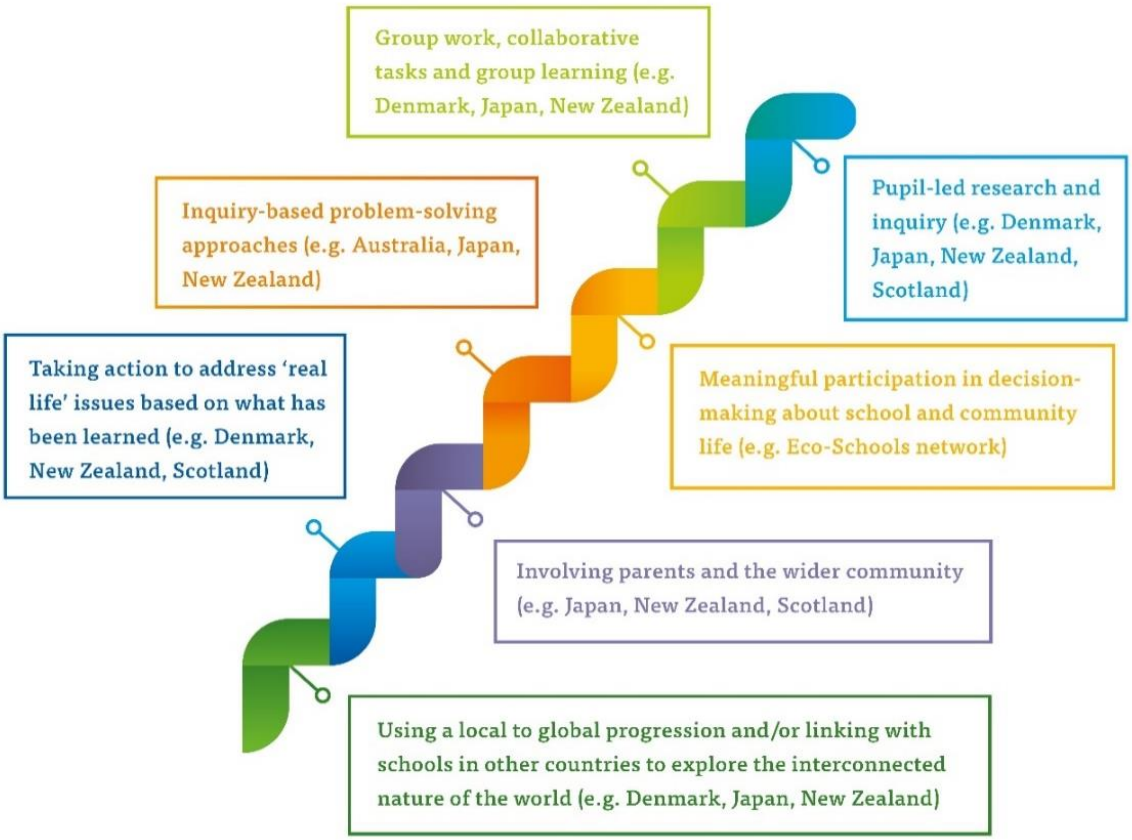

Fig. 4 - Pedagogies to support ESD learning (NCCA, 2021b, p. 56)

During the consultation on the second national strategy, ESD to 2030, stakeholders identified a number of 'signature pedagogies' that are important for the achievement of learning in ESD (DE, 2022b, pp. 9-10), including those that are:

- Problem-based
- Design-based
- Challenge-based
- Technology-enabled learning
- Participatory
- Value the voice and agency of the learner
- Value criticality and reflection
- Leave space for creativity and imagination
- Inquiry-based learning
- Place-based and project-based learning.

Stakeholders also felt that such pedagogies should pay attention to the emotional dimension in their aims to change student behaviours so they may engage meaningfully with global justice issues. Specific to climate change, Hicks (2019, in Dolan, 2022, pp. 23-24) suggests four dimensions of learning needed to explore the concept effectively – knowing, feeling, choosing, and acting. These represent a holistic understanding of climate change and recognise that climate

change knowledge is insufficient unless it is accompanied by a shift in attitude, wisdom in choices and student agency.

Caution is exercised in relation to teaching students about climate change, which in some instances heretofore has relied on scare tactics focusing on natural disasters and changing weather patterns to incite panic. This approach can lead to apocalypse fatigue– through rhetorical strategies aimed at motivating students by focusing only on the facts of environmental losses, they become overwhelmed and feel powerless in the face of a future they feel they cannot change (ibid, p. 285). Conversely, acting with tokenistic optimism that classroom activities can solve the complexities of climate change is illusory and has the potential to increase eco-anxiety rather than decrease it. A pedagogy of meaningful hope acknowledges the uncertainty of the future, but that in this uncertainty there is space to act. It is not the blind belief that 'everything will be fine', but instead focuses attention on desired futures (e.g., carbon-free) and the types of actions that can be taken to strive towards this. Such pedagogical approaches provide a forum for hope 'informed by narratives of resiliency, well-being, health and sustainability' (ibid, p. 286). As the development of this subject progresses, it would be beneficial to consider how the specification may provide sufficient space and time to integrate and embed appropriate pedagogies.

Capacity

Teaching climate change education can be conceptually challenging (Shepardson *et al*, 2012), requiring a significant level of conceptual knowledge in addition to pedagogical content knowledge. A recent survey by UNESCO and Education International (UNESCO, 2021b) shows that while many teachers are motivated to teach in this area, a quarter still do not feel ready to teach ESD related themes. Moreover, fewer than 40% of teachers feel confident in teaching about climate change, citing insufficient coverage of this area in curricula and in teacher education. Encouragingly, a high proportion of teachers (95%) see this as an area of great importance for classroom learning and over 80% are willing to engage in further training in the areas of ESD and Global Citizenship Education (GCE). As the development of Leaving Certificate Climate Action and Sustainable Development progresses, it would be beneficial to take cognisance of the evident enthusiasm of teachers to engage with this area of learning along with the potential capacity challenges.

Section Summary

- The development and provision of Leaving Certificate Climate Action and Sustainable Development will further support and enhance the cross-curricular and whole-school approaches to ESD in schools.
- This subject can capitalise on the wealth of resources and initiatives currently available in the area of climate action and sustainable development.
- The empowerment and mobilisation of youth is seen as central to climate and sustainability matters. Through the teaching and learning of Leaving Certificate Climate Action and Sustainable Development, there are opportunities to further enable student voice and action on local, national, and global issues.
- Leaving Certificate Climate Action and Sustainable Development should be distinct from but also complement other subjects, avoiding duplication and unnecessary overcrowding of the curriculum. In this regard, developing a shared vision and purpose is critical in clarifying the scope and structure of the subject.
- A range of pedagogies have been adopted to enable meaningful learning in climate action and sustainable development. In the design of this subject, sufficient space and time needs to be created to appropriately embed these approaches to teaching and learning.
- Despite the evident enthusiasm for engaging with climate change education, teaching in this area can present conceptual difficulties for teachers.

6. Brief for the development of Leaving Certificate Climate Action and Sustainable Development

NCCA will establish a development group to undertake the task of developing a curriculum specification for the new subject, Leaving Certificate Climate Action and Sustainable Development. The work of the Development Group is, in general terms, agreed by the NCCA Board for Senior Cycle and by the Council in the form of the brief set out below.

Leaving Certificate Climate Action and Sustainable Development will be developed to support the realisation of the purpose and vision for a redeveloped senior cycle as set out in the Senior Cycle Review: Advisory Report (NCCA, 2022). The guiding principles, as described in the Advisory Report, provide a touchstone for the Development Group as they undertake the task of preparing a curriculum specification for Leaving Certificate Climate Action and Sustainable Development.

The specification will be student-centred and outcomes-based and in general terms, the specification should be broadly aligned with levels 4 and 5 of the National Framework of Qualifications. It will be available at both Higher and Ordinary level, and it will be designed to be taught and assessed in a minimum of 180 hours.

The specification will align to the template, agreed by Council, for curriculum specifications which will be published by NCCA in Q4, 2022 following further research on the nature and design of curriculum specifications for the senior cycle stage of education. Furthermore, the design of the specification will be informed by research conducted by NCCA in collaboration with the SEC, on the weighting, timing, and assessment of components additional to the written examinations.

The specification will be completed for Autumn 2023.

More specifically, the development of the new specifications will address:

- how the specification aligns with the guiding principles of senior cycle
- how the specification can support continuity and progression, including how to connect with and build on related learning at junior cycle and in other senior cycle subjects and modules as well as future learning in life, study, apprenticeships, traineeships, further and higher education and the world of work
- the rationale for studying Leaving Certificate Climate Action and Sustainable Development, making it transparent and evident to students, teachers, and parents within the specification
- how to widen the appeal of the subject and promote gender balance in its uptake
- how the specification, in its presentation and language register, can be strongly student-centred and have a clear focus on how students develop and demonstrate their knowledge, skills, values and dispositions
- how to embrace and embed technology in teaching, learning and assessment
- how to encourage student voice and agency and an associated capacity for lifelong learning

- How to provide multiple, diverse, and appropriate opportunities for students to achieve and demonstrate their learning
- how the specification can support students in understanding the relevance of climate action and sustainable development to their daily lives and the relevance and importance of the skills developed through the subject for the 21st century
- the interconnectedness of social, economic, environmental, political, and cultural aspects of climate and sustainability issues
- how the specification can support the development of students' climate literacy and capacity for action as they engage with complex issues and design sustainable futures
- how students will draw on interdisciplinary and transdisciplinary knowledge, skills and dispositions in developing ideas and solutions to a variety of sustainability challenges, including the climate crisis, and the types of pedagogies to nurture this
- opportunities for students to engage with issues, people, relationships, contexts, audiences, and environments in exploring real and relevant climate and sustainability problems that call for explanations, solutions or innovations
- how to differentiate on conceptual depth to meet the needs of a diverse range of students; for example, those who wish to progress to careers through third level or apprenticeships, or those who will pursue other pathways but still need to be sustainability and climate literate citizens.

The work of the Development Group will be based, in the first instance, on this brief. In the course of the work and deliberations of the Development Group, elaborations of some of these points and additional points may be added to the brief.

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