



Oide

Tacú leis an bhFoghlaim
Ghairmiúil i measc Ceannairí
Scoile agus Múinteoirí

Supporting the Professional
Learning of School Leaders
and Teachers

Focus on the Unifying Strand in Senior Cycle Biology, Chemistry and Physics

Professional Learning Experience – Day 1



Purpose of the Day

Subject department collaboration towards the provision of a student-centred approach to scientific inquiry through the lens of the Unifying Strand in Leaving Certificate Biology, Chemistry and Physics.



Key Messages

Through engagement with the learning outcomes set out in the Leaving Certificate science specifications, students will develop **key competencies** that they can apply to various tasks, contexts, situations and events.

With their **student-centred design** and emphasis on scientific investigations, the Leaving Certificate science specifications accommodate a variety of learning, teaching and assessment methods, to meet the needs of all learners.

When planning for learning, teaching and assessment, teachers provide opportunities for students to engage with the **scientific practices set out in the unifying strand.**



Schedule

Session 1 9:15 – 11:00	Overview of the specifications Looking at the evidence
11:00 – 11:20	Tea/Coffee
Session 2 11:20 – 13:00	Inquiry in the senior cycle science classroom
13:00 – 14:00	Lunch
Session 3 14:00 – 15:45	Department Planning: A collaborative approach to the unifying strand



Curiosity in the Science Classroom

Discuss the picture on your table and write down:

- What scientific connections relevant to your subject(s) can you make from this picture?
- What are you curious about?



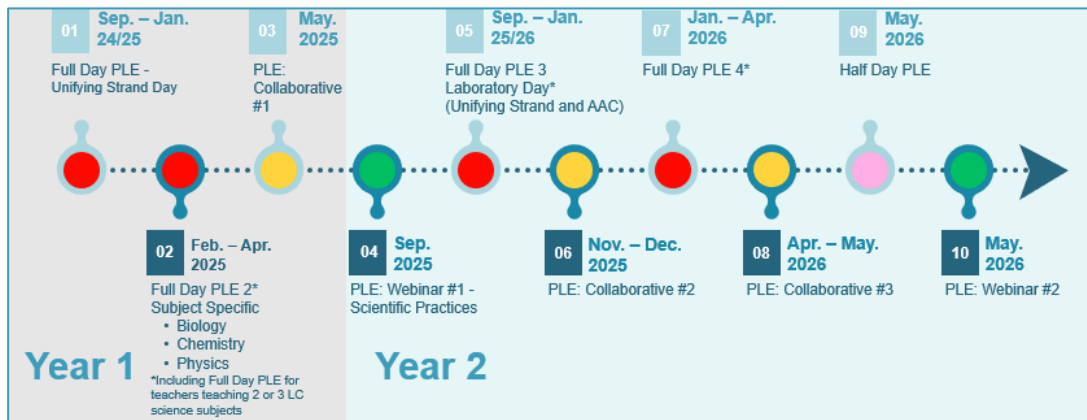


Check-In

Question(s) you have about the professional learning relating to the new Senior Cycle science specifications?



[Classroomscreen.com](https://www.classroomscreen.com)





Types of Support Oide Provides

Collaboratives

Webinars

Oide.ie /
Oidetechnologyin
education.ie

Half Day
Professional
Learning
Experiences

Scoilnet.ie

Full Day
Professional
Learning
Experiences

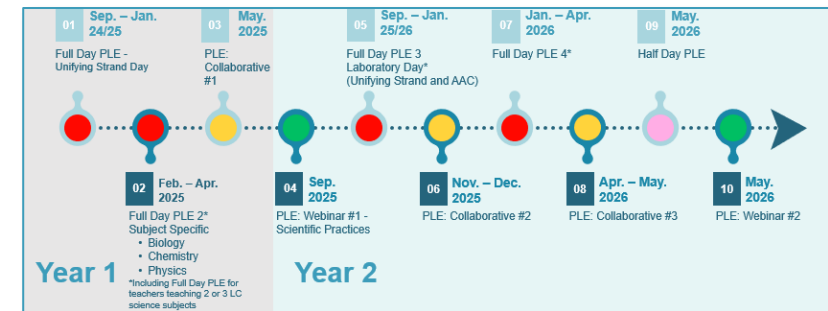
School Support
Visits





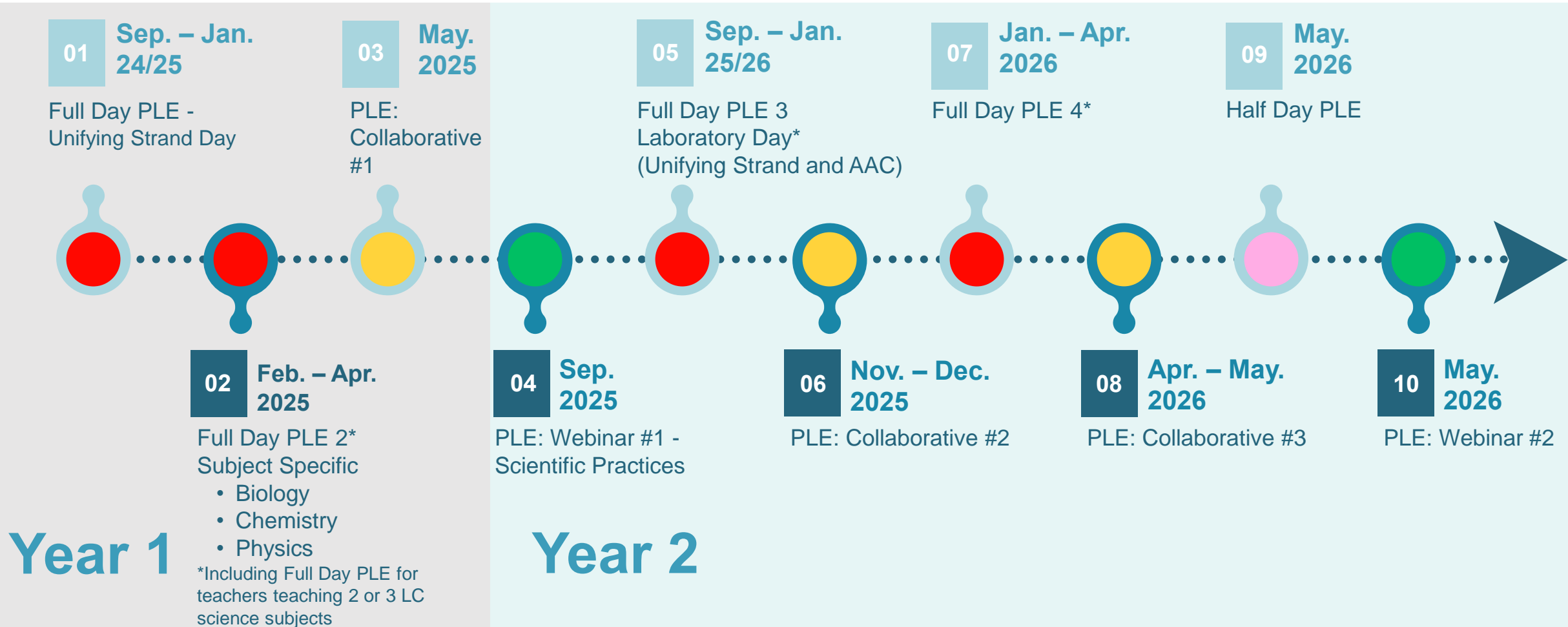
4 Year Schedule of Support 2024-2028

- 7 Full days of PLEs
- 6 Webinars
- 7 Collaboratives
- ½ day PLE





Leaving Certificate Science Subjects PLE Timeline



Full Day PLE



Collaborative



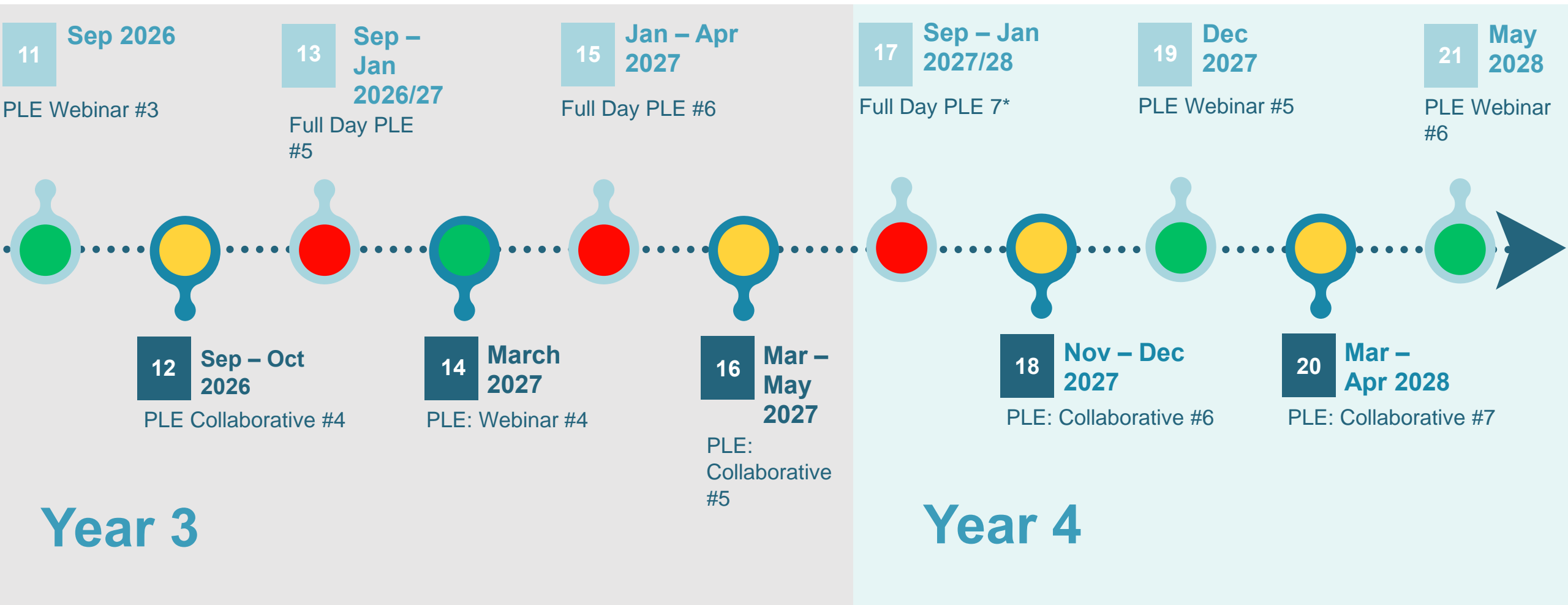
Webinar



Half Day PLE



Leaving Certificate Science Subjects PLE Timeline



Year 3

Year 4





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Session 1

Overview of the Biology, Chemistry and
Physics Specifications



Participant Learning Intentions for Session 1

By the end of this session participants will have:

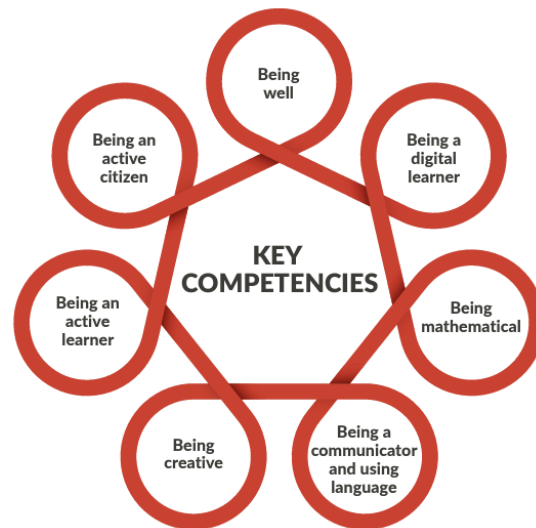
- Explored the rationale behind the curriculum redevelopment
- Engaged with some of the key aspects of the new Leaving Certificate Science specifications:
 - Teaching, learning and assessment
 - Key competencies
 - The unifying strand



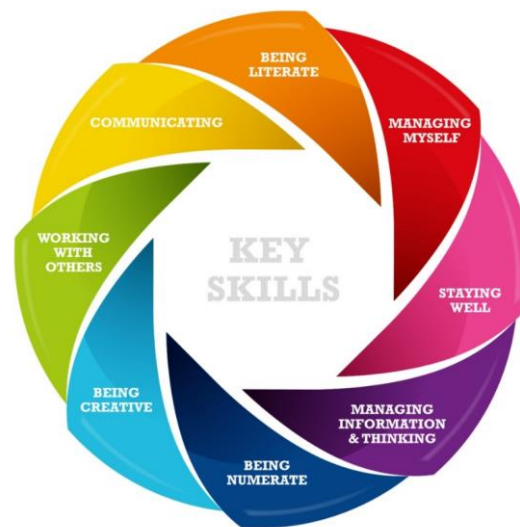
The Continuum of Learning



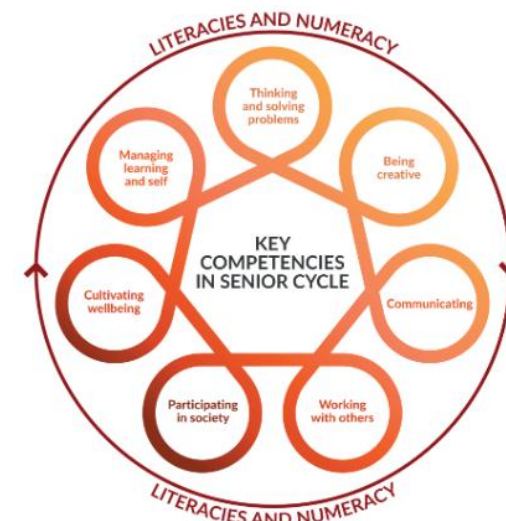
Aistear



Primary Curriculum



Junior Cycle



Senior Cycle



Key Supporting Policy Documents





Senior Cycle Guiding Principles

‘Senior cycle education cultivates learning and contributes to human flourishing. It recognises the whole person, contributing to students’ growth and maturity, to their continuing intellectual, social and personal development and their overall health and wellbeing.’

(Senior Cycle Review Advisory Report, NCCA, 2022, pp. 21-24)



Senior Cycle Guiding Principles

Senior Cycle Guiding Principles

Wellbeing and relationships

Inclusive education and diversity

Challenge, engagement and creativity

Learning to learn, learning for life

Choice and flexibility

Continuity and transitions

Participation and citizenship

Learning environments and partnerships

(Senior Cycle Biology, Chemistry and Physics specifications, p. 2)



Some Specifics about the Specifications

180 hours

Additional Assessment Component (AAC):

Submitted digitally

Based on a common brief set and examined by the SEC

Assessment component	Weighting	Level
Biology in Practice Investigation	40%	Common brief
Written examination	60%	Higher and Ordinary level



Additional Assessment Component

Process not product

Integrated

Evolution not revolution

Develops

Positive

Aligned to LOs

Consolidate

Complement



Elaine Sheridan,
State Examinations Commission

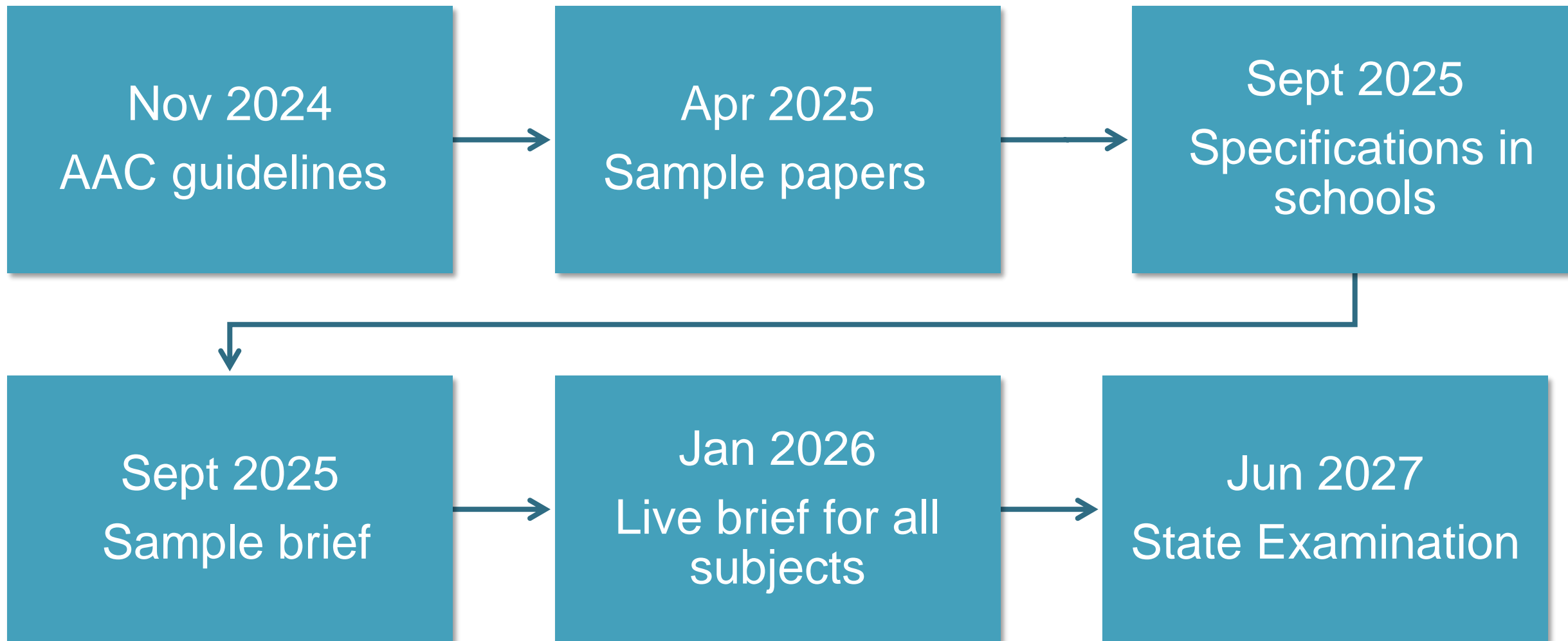
Not siloed

Front-wash



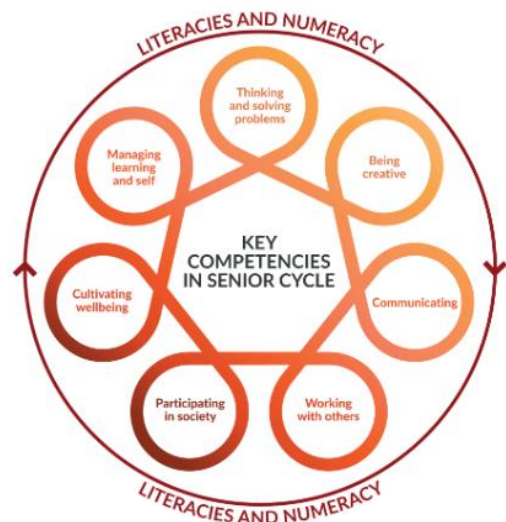


Key Dates





Supporting Teaching, Learning and Assessment



Unifying Strand Learning Outcomes

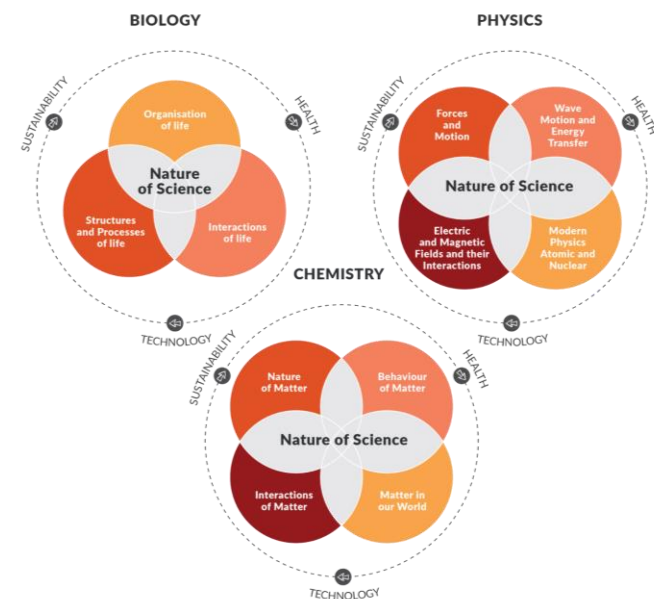
Students learn about

U1 Scientific knowledge

- the nature of scientific knowledge
- science as a global enterprise that relies on clear communication, international conventions, peer review and reproducibility
- recognising bias

Students should be able to

- appreciate how scientists work and how scientific ideas are modified over time
- conduct research relevant to a scientific issue, evaluate different sources of information including secondary data, understanding that a source may lack detail or show bias



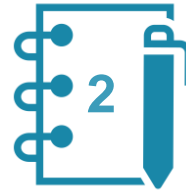
Assessment component	Weighting	Level
Biology in Practice Investigation	40%	Common brief
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Looking at the Evidence

[Classroomscreen.com](https://www.classroomscreen.com)



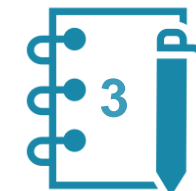
Jigsaw Activity:

What are the key messages in your extract from the specifications?





Reflection



How can we incorporate these key messages into our senior cycle classrooms?





Participant Learning Intentions for Session 1

Participants now have:

- Explored the rationale behind the curriculum redevelopment
- Engaged with some of the key aspects of the new Leaving Certificate Science specifications:
 - Teaching, learning and assessment
 - Key competencies
 - The unifying strand



Tea/Coffee





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Session 2

Developing Scientific Practices and Competencies



Participant Learning Intentions for Session 2

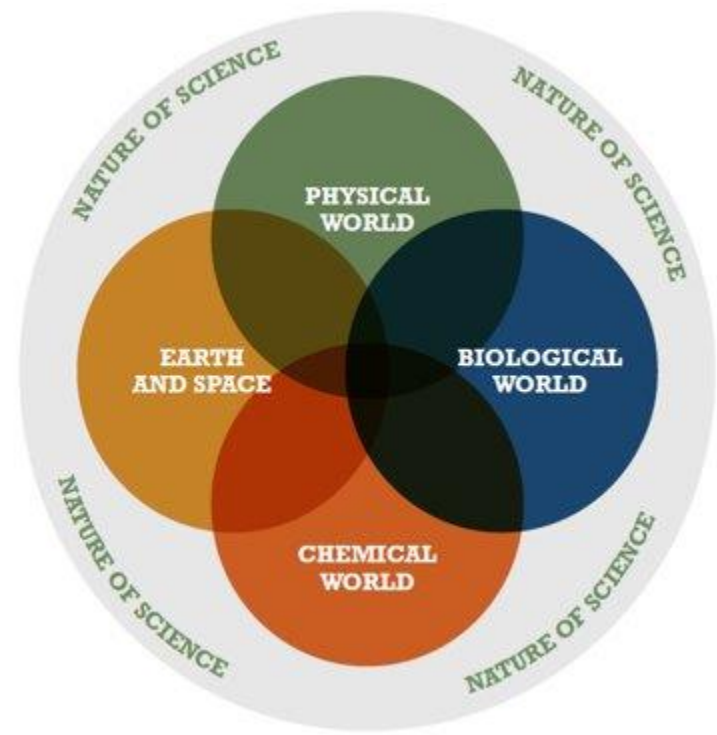
By the end of this session participants will have:

Engaged with one inquiry approach to a scientific investigation and recognise the importance of developing a range of inquiry skills along the continuum of inquiry

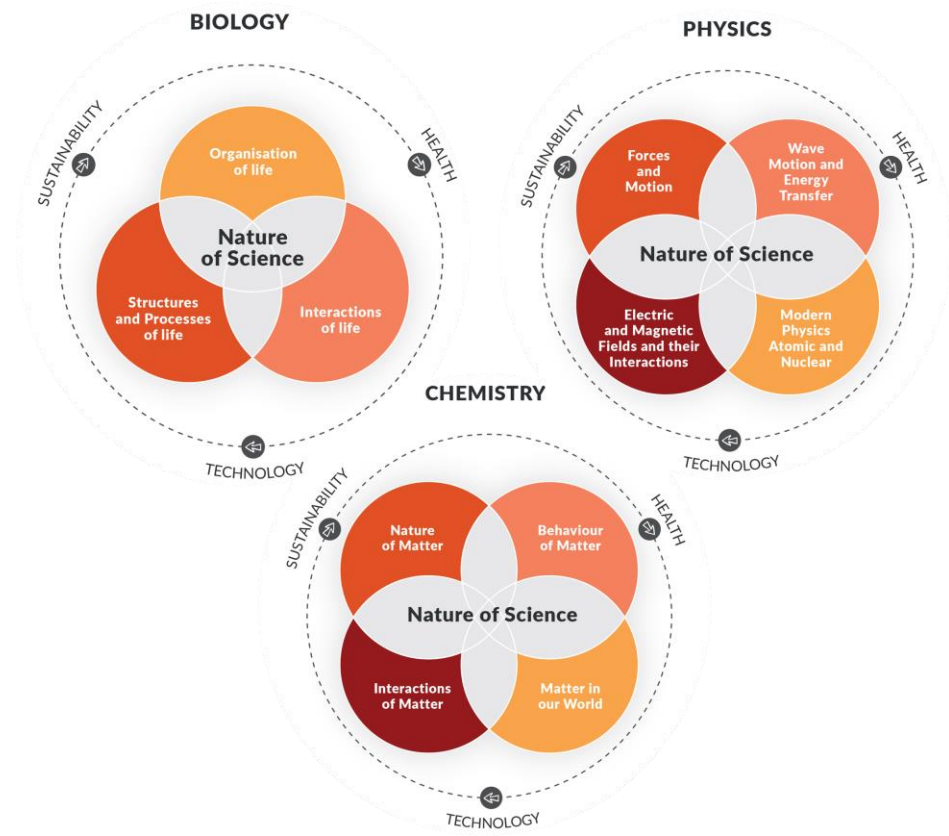
In preparation for teaching, learning and assessment, reflected on the potential of such activities to help develop students' scientific practices and key competencies



Unifying Strand – Nature of Science



Junior Cycle Science Specification, 2015, p.10



Biology, Chemistry and Physics Specifications, 2024



Unifying Strand – Nature of Science

“In senior cycle it is expected that students will be able to meet these learning outcomes with a greater degree of independence”

(Physics Specification, 2024, p.12)

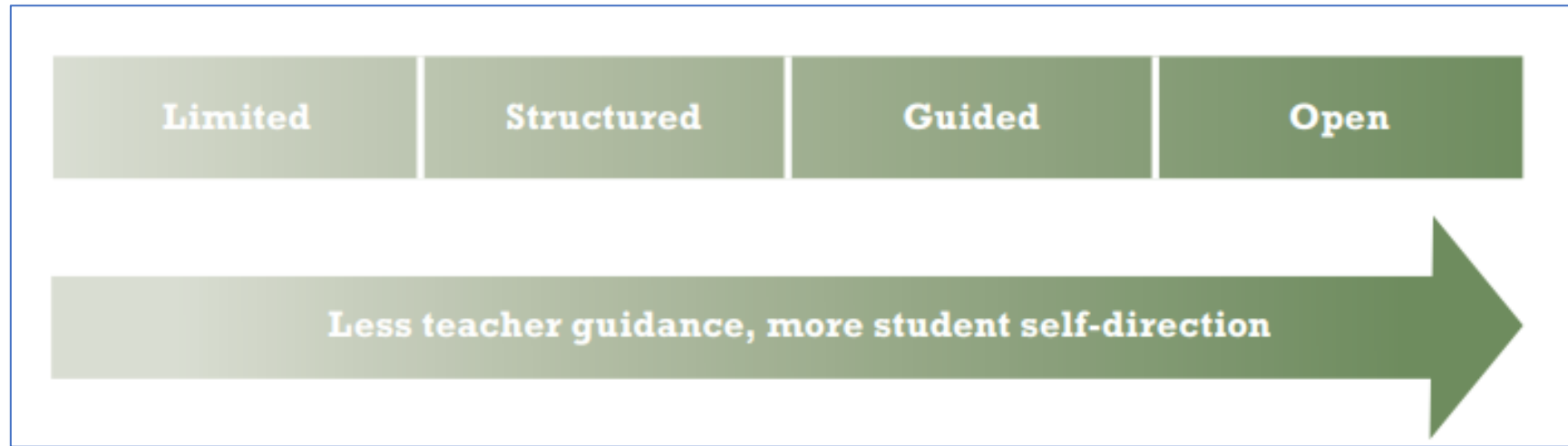


Curiosity in the Science Classroom





Continuum of Inquiry



Junior Cycle Science Specification, 2015, p. 14

“Providing opportunities for students to develop a range of inquiry skills will be necessary to progress along the continuum of inquiry”

(Biology specification, 2024, p 40)

“Teachers are best positioned to make professional judgements on how to develop these skills with their students through an appropriate balance of explicit instruction and inquiry-based approaches”

(Specifications, 2024)



Inquiry in the Specifications

Leaving Certificate Biology, Chemistry, Physics aims to empower students to:

‘Demonstrate inquiry and practical skills consistent with the principles and practices of Biology, Chemistry and Physics’



(Specifications, 2024, Biology p.5, Chemistry p.5 and Physics p.4, 2024)



Investigating in the Senior Cycle Science Classroom



“As they learn to work like scientists, they develop a habit of mind that sees them rely on a set of established procedures and practices associated with scientific inquiry to gather evidence, generate models and test their ideas on how the natural world works”

(Specifications, 2024, Biology p.13, Chemistry p.14, Physics p.12)



Guided Inquiry With Effective Questioning





Investigating in Science

What does investigating look like in your Science classroom?





Making Connections Between the Unifying Strand and Contextual Strands

“The content and activities of the contextual strands are intended to be experienced through the lens of the unifying strand. As students progress, they build on their knowledge, skills, values and dispositions incrementally, while constantly deepening their understanding of the nature of science.”

(Chemistry Specification, 2024, p. 12)



Investigating in the Senior Cycle Science Classroom

“As they learn to work like scientists, they develop a habit of mind that sees them rely on a set of established procedures and practices associated with scientific inquiry to gather evidence, generate models and test their ideas on how the natural world works”

(Specifications, 2024, Biology p.13, Chemistry p.14, Physics p.12)

Investigating in the Senior Cycle Science Classroom



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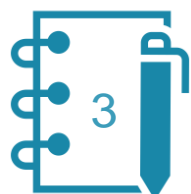


Investigating in the Senior Cycle Science Classroom

Activity:

A family is going on a sun holiday. They would like to ensure all the family is protected from the harmful UV rays of the sun.

Outline the factors that could protect them from the sun.



Outline: give the main points, restrict to essentials

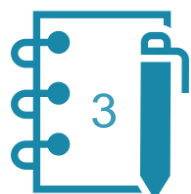


Investigating in the Senior Cycle Science Classroom

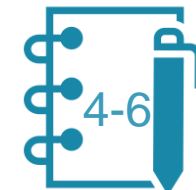
Activity:

A family is going on a sun holiday. They would like to ensure all the family is protected from the harmful UV rays of the sun.

Investigate the factors that could protect them from the sun and develop a research question and testable hypothesis.



Investigate: observe, study, or make a detailed and systematic examination, in order to establish facts and reach new conclusions



Investigating in the Senior Cycle Science Classroom

The screenshot shows a digital workspace with a blue background. On the left, there is a 'UV Index' chart with levels 1-2 (Low), 3-5 (Moderate), 6-7 (High), 8-10 (Very High), and 11+ (Extreme). Next to it are images of a Raspberry Pi, a sensor module, and a handheld device. Below these are images of colorful beads and a black cylindrical object. In the center, there are several educational cards: 'SUNSCREEN CHEMICALS AND HOW THEY PROTECT YOUR SKIN', 'MELANOMA OF SKIN' with a bar chart showing incidence and mortality, 'Protective Clothing' with a table, and 'WHY DO WE HAVE TO WEAR SUNSCREEN?' with a diagram of a normal eye vs. an eye with a cataract. On the right, there is a large digital timer showing '40:00' and a play button. Below the timer is a photo of a man with a red sunburn on his shoulder. At the bottom right, there is an analog clock showing '12:45 PM'. In the bottom left, there is a circular icon with three people and the text 'work together'. In the bottom center, there is a white box with two numbered instructions.

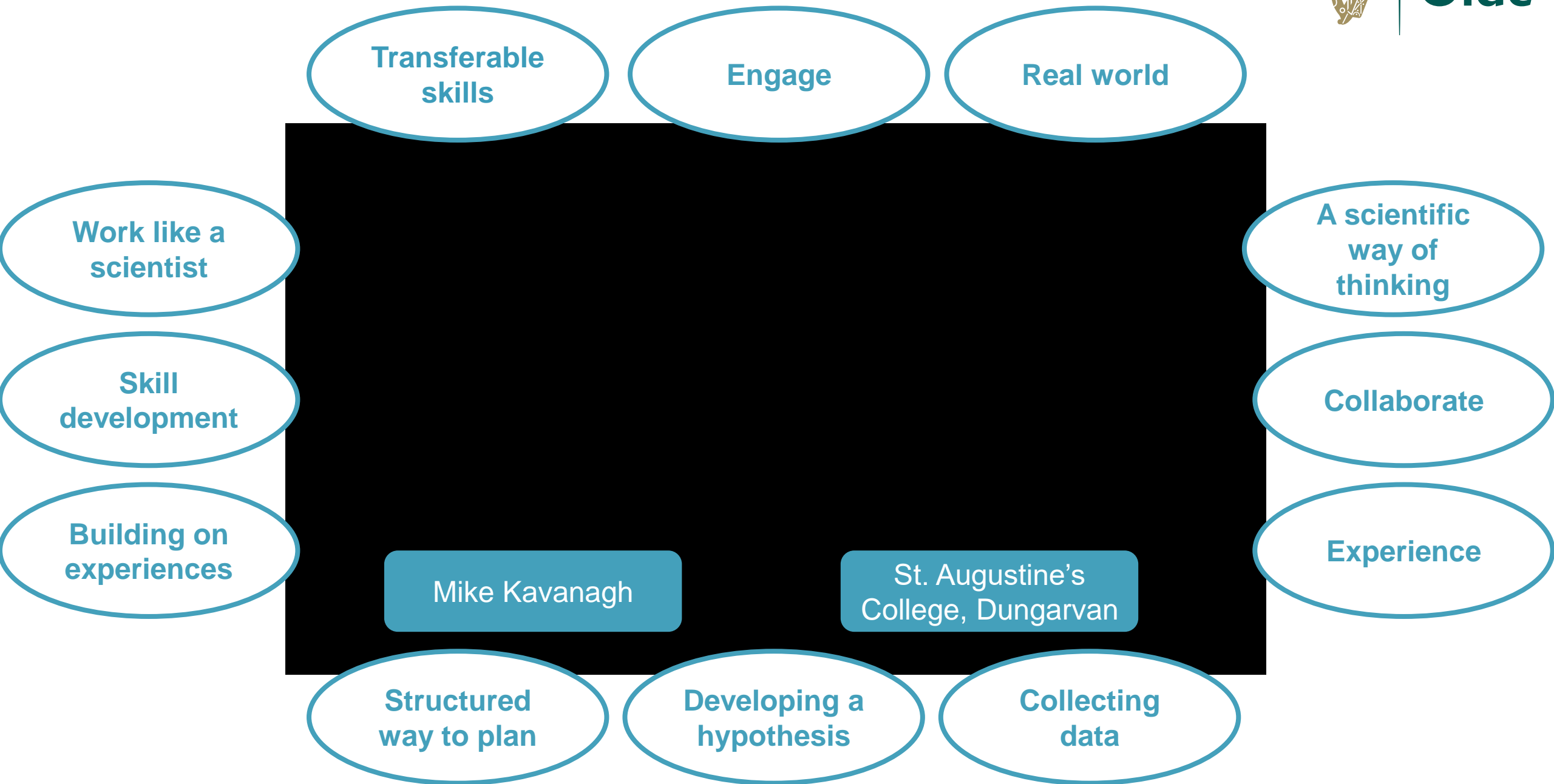
1. Investigate the factors that could protect them from the sun
2. Consider what would make this a good investigation



Developing Scientific Practices Through Inquiry

“Building on their learning to date, students will learn more about the nature of investigation through research and experimentation. Students should be empowered in realising that research and experimentation is more about engaging with and learning from the process, rather than seeking a perfect answer.”

(Biology Specification, 2024, p.43)



Reinforcing the Learning Outcomes of the Unifying Strand



Unifying Strand Learning Outcomes

Students learn about

U1 Scientific Knowledge

- the nature of scientific knowledge
- science as a global enterprise that relies on clear communication, international conventions, peer review and reproducibility
- recognising bias

Students should be able to

1. appreciate how scientists work and how scientific ideas are modified over time
2. conduct research relevant to a scientific issue, evaluate different sources of information including secondary data, understanding that a source may lack detail or show bias

Students learn about

U2 Investigating in Science

- questioning and predicting
- objectivity
 - Identifying potential sources of random and systematic error
 - Evaluating data in terms of repeatability and reproducibility
- communicating results to a range of audiences

Students should be able to

1. recognise questions that are appropriate for scientific investigation
2. conduct research relevant to a scientific issue, evaluate different sources of information including secondary data, understanding that a source may lack detail or show bias
3. design, plan and conduct investigations; explain how reliability, accuracy, precision, error, fairness, safety, integrity, and the selection of suitable equipment have been considered
4. produce and select data (qualitatively/quantitatively), critically analyse data to identify patterns and relationships, identify anomalous observations, draw and justify conclusions
5. review and reflect on the skills and thinking used in carrying out investigations, and apply their learning and skills to solving problems in unfamiliar contexts



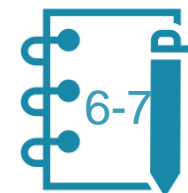
Revisiting the Evidence



Reinforcing the Learning Outcomes of the Unifying Strand



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In this activity

- which aspects of the unifying strand could you engage with?
- which contextual strands would you make links to?





Participant Learning Intentions for Session 2

By the end of this session participants will have:

Engaged with one inquiry approach to a scientific investigation and recognise the importance of developing a range of inquiry skills along the continuum of inquiry

In preparation for teaching, learning and assessment, reflected on the potential of such activities to help develop students' scientific practices and key competencies



Lunch





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Supporting the Professional
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Session 3

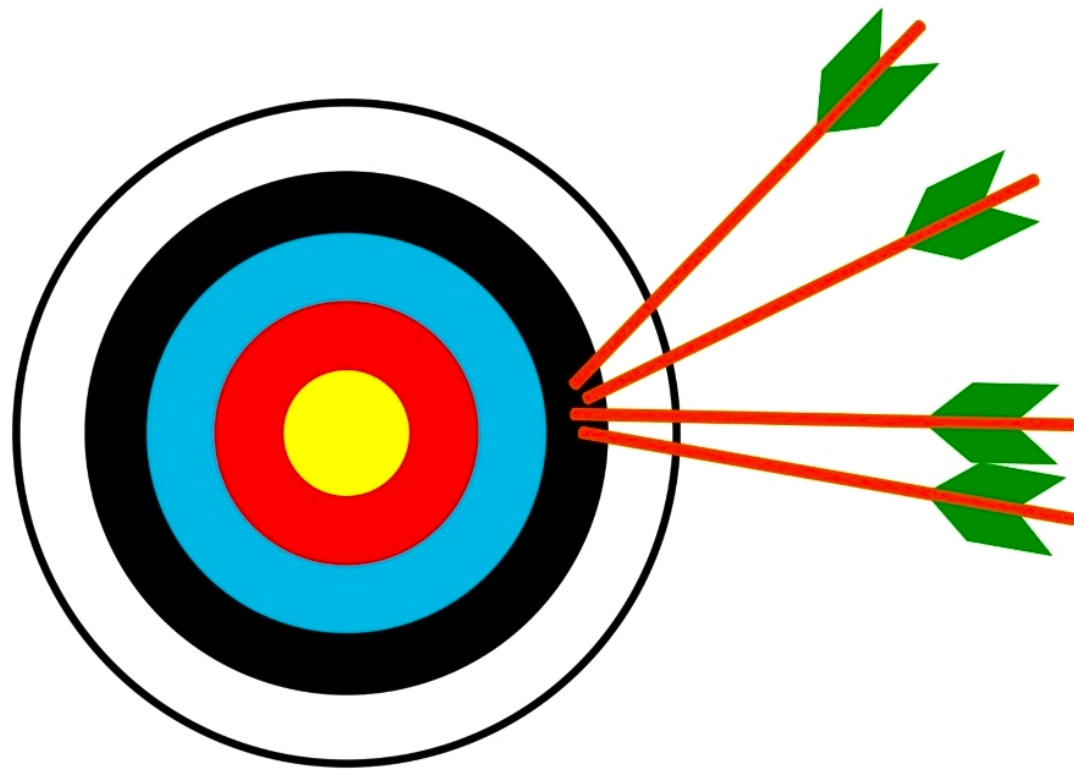
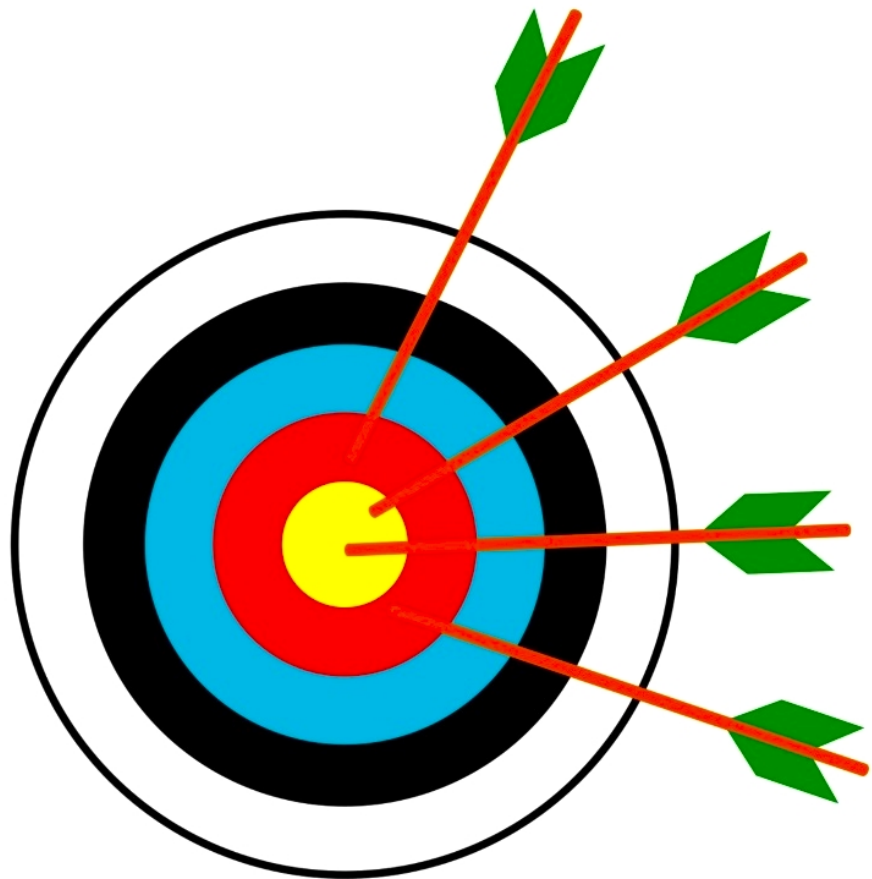
Planning for the Unifying Strand

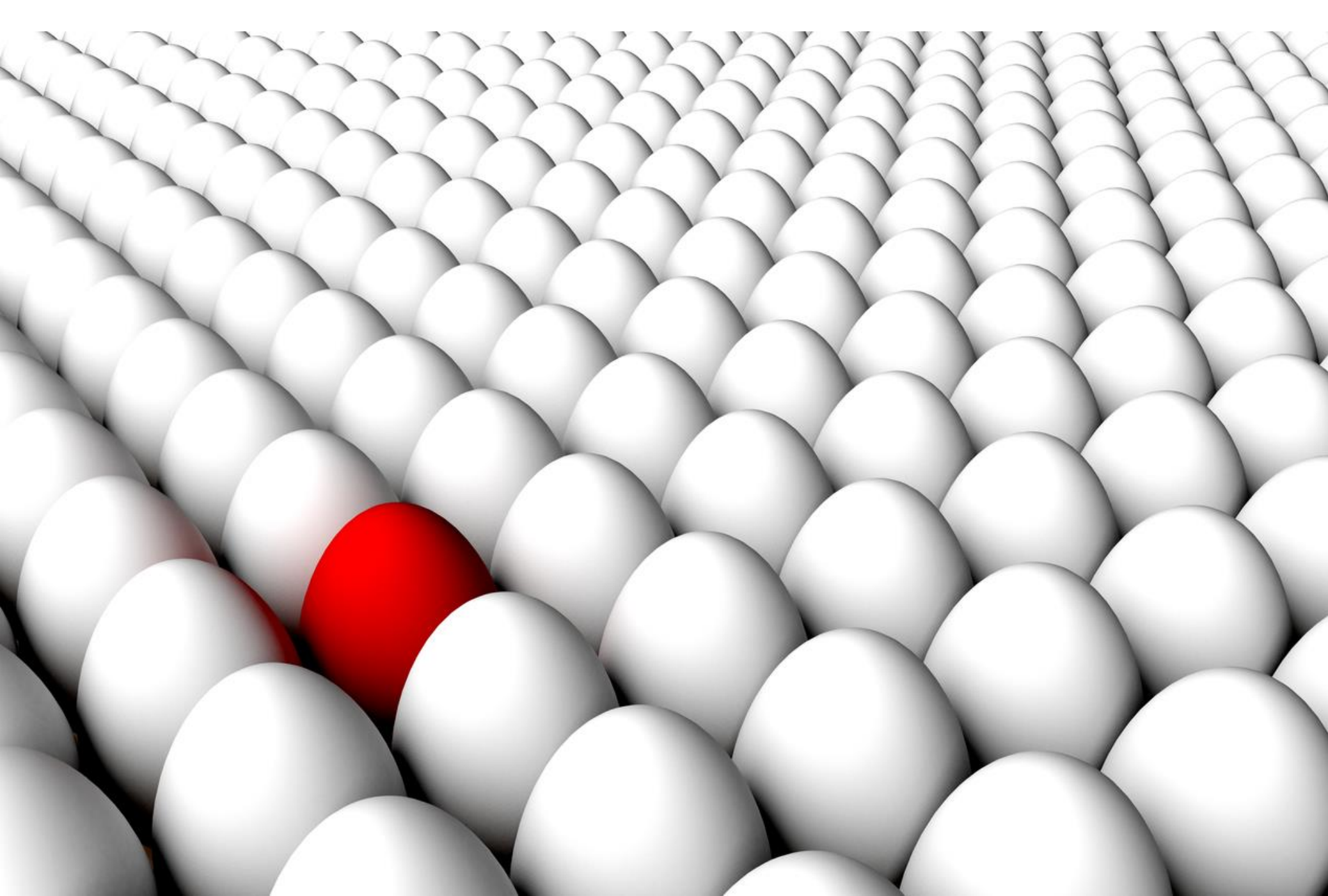


Participant Learning Intentions for Session 3

By the end of this session participants will have:

- Recognised the importance of a consistent approach to scientific practices and language as outlined in the unifying strand for Leaving Certificate sciences
- Collaborated to plan a common approach to developing scientific practices and key competencies across the school's science department





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Purpose of the Day

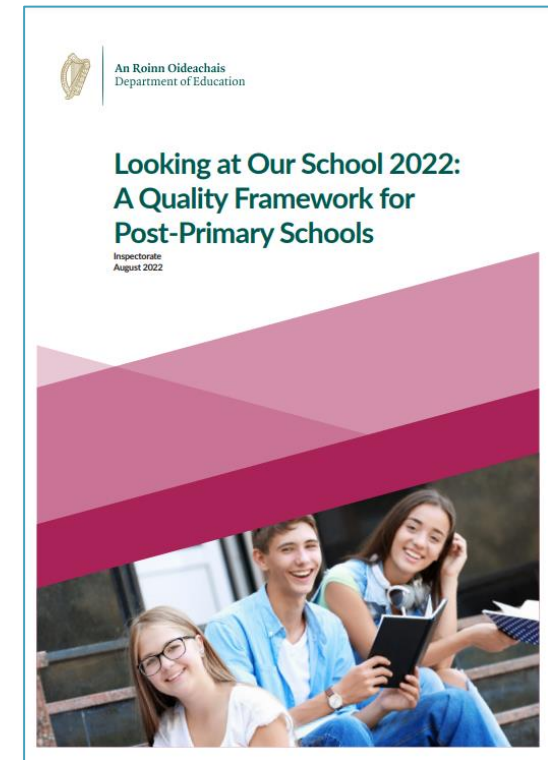
Subject department collaboration towards the provision of a student-centred approach to scientific inquiry through the lens of the Unifying Strand in Leaving Certificate Biology, Chemistry and Physics.



Teacher Collaborative Practice

“Teachers respond positively to change and are proactive in building collective expertise in the skills and approaches necessary, including those relating to digital competence, to facilitate current and future student learning.”

(Looking at Our School, 2022, p.34)

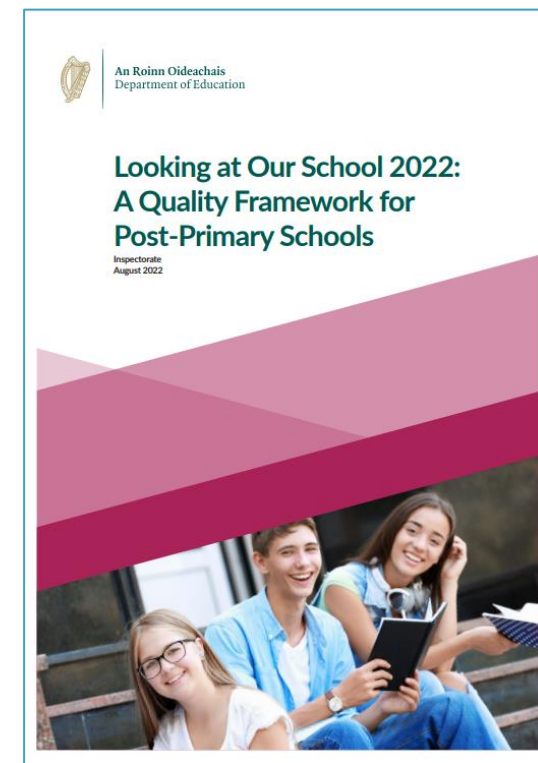




Teacher Collaborative Practice

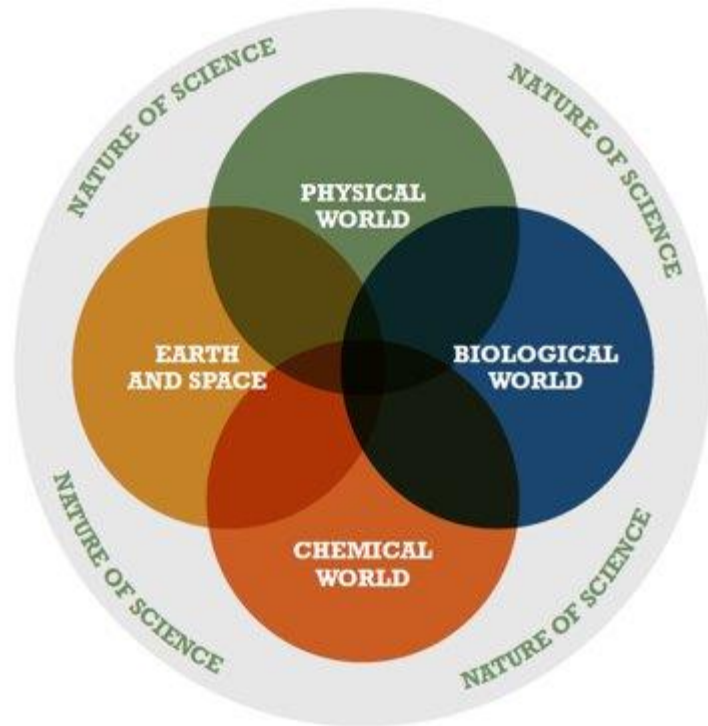
“Teachers view collaboration as a means to improve student learning and also to enhance their own professional learning. They engage in constructive collaborative practice, and in collaborative review of their practice.”

(Looking at Our School, 2022, p.33)

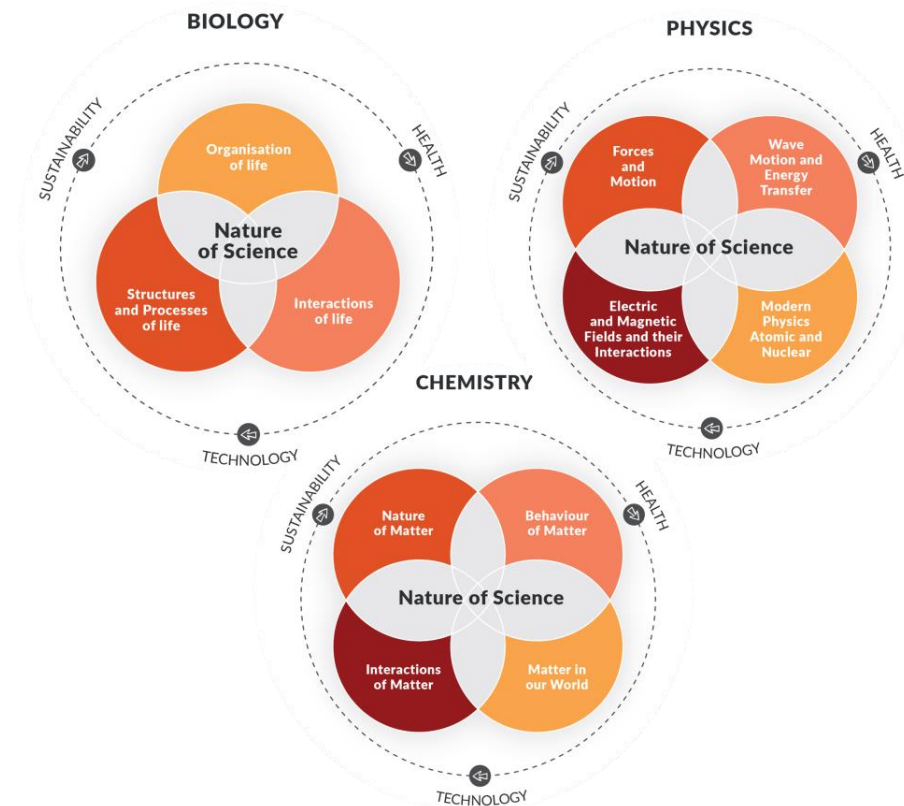




Unifying Strand – Nature of Science



Junior Cycle Science:
Nature of Science = “Unifying Strand”



Senior Cycle Biology/Physics/Chemistry
Nature of Science = “Unifying Strand”



Enhancing Understanding Through the Unifying Strand

“The content and activities of the contextual strands are intended to be experienced through the lens of the unifying strand. As students progress, they build on their knowledge, skills, values and dispositions incrementally, while constantly deepening their understanding of the nature of science.”

(Chemistry Specification, 2024, p. 12)

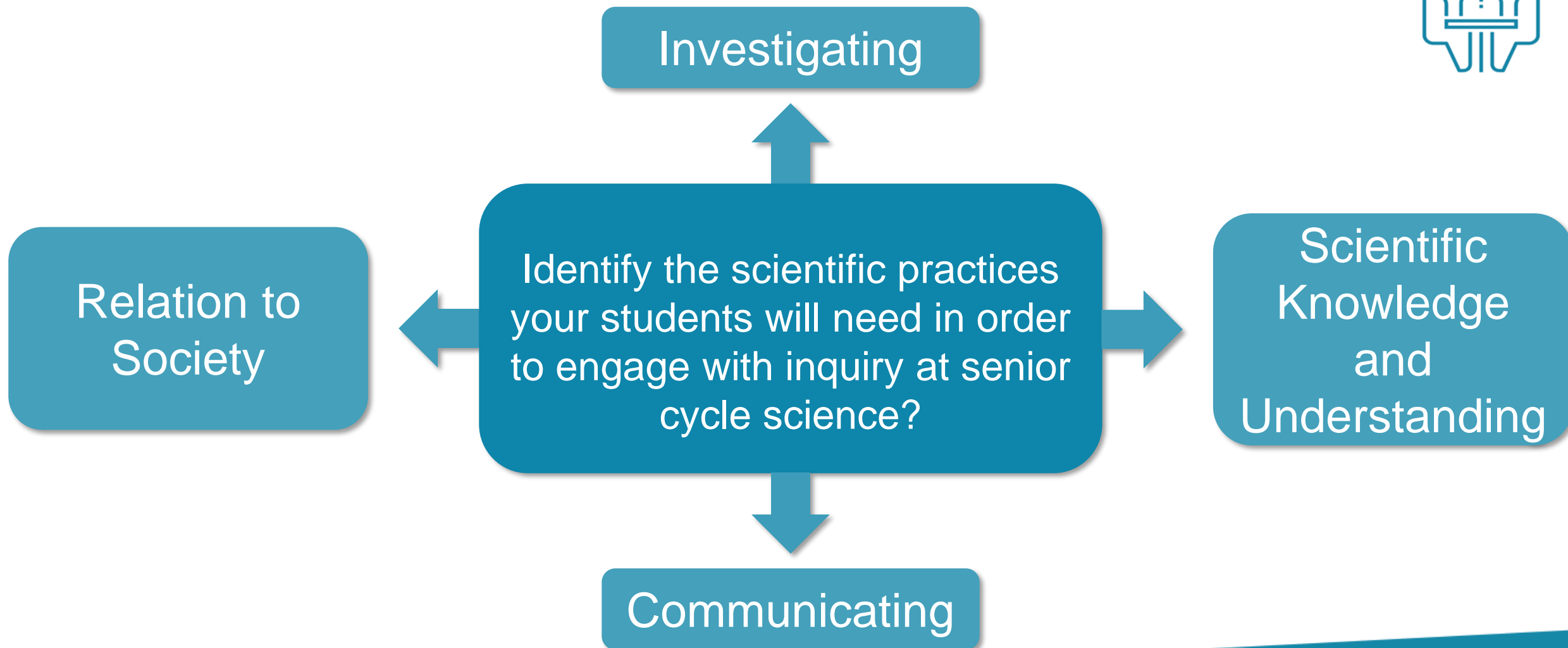


Enhancing Understanding Through the Unifying Strand





Identifying Scientific Practices





Developing of Scientific Practices

In your departments consider the following:

A consistent and collaborative approach to teaching elements of the unifying strand to support students who may be engaging in more than one leaving certificate science subject

Opportunities to foster the development of scientific practices as students progress from Junior Cycle to Senior Cycle

The incremental development of scientific practices over time.



Developing Scientific Practices

In your departments:

Step 1 – Department Reflection

Consistent Approaches – Reflect to move forward



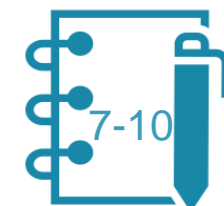
Step 2 - Consistency of Scientific Language

Consistency of Scientific Language



Step 3 - Department Planning

Actions to move forward





Participant Learning Intentions for Session 3

Participants now have:

- Recognised the importance of a consistent approach to scientific practices and language as outlined in the Unifying Strand for Leaving Certificate Sciences
- Collaborated to plan a common approach to developing scientific practices and key competencies across the school's science department



Key Messages

Through engagement with the learning outcomes set out in the Leaving Certificate science specifications, students will develop **key competencies** that they can apply to various tasks, contexts, situations and events.

With their **student-centred design** and emphasis on scientific investigations, the Leaving Certificate science specifications accommodate a variety of learning, teaching and assessment methods, to meet the needs of all learners.

When planning for learning, teaching and assessment, teachers provide opportunities for students to engage with the **scientific practices set out in the unifying strand**.



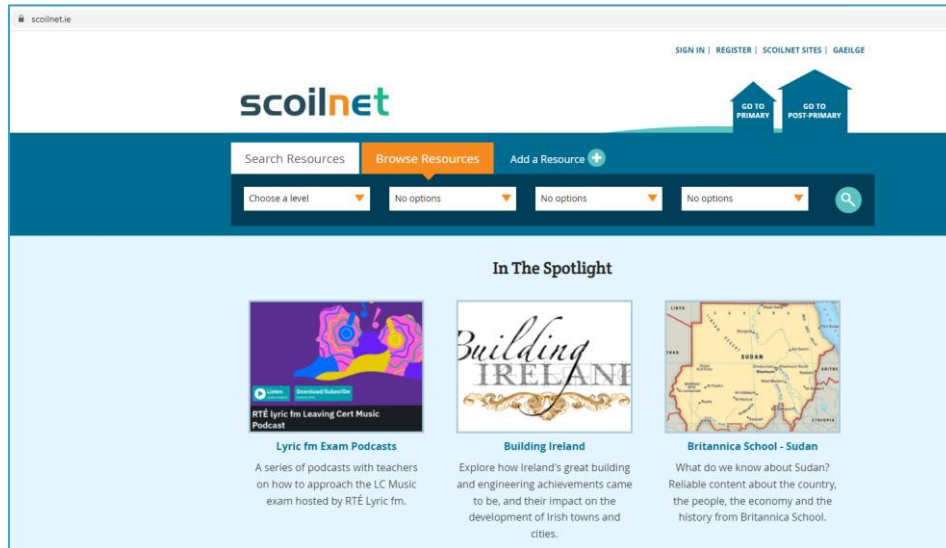
Next Steps





Contact Us

www.scoilnet.ie



Link to the day's resources
<https://bit.ly/sunscreenPLE1>



info@oide.ie

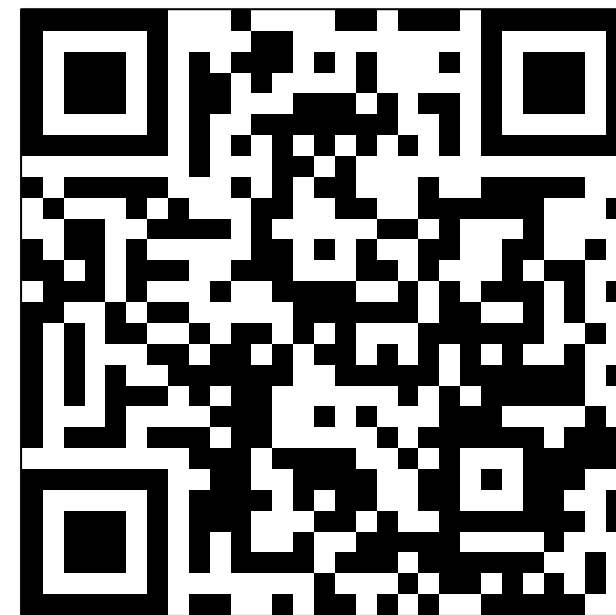
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