PDST
Professiona Deve opment Service for Teachers | An tSeirbhís um Fhorbairt Ghairmiúi do Mhúinteoirí

An Roinn Oideachais
Department of Education

Agricultural Science

Phase 2
National Workshop 2

PDST
Professional Development Service for Teachers | An tSeirbhís um Fhorbairt Ghairmiúil do Mhúinteoirí

LEAVING CERTIFICATE
AGRICULTURAL SCIENCE

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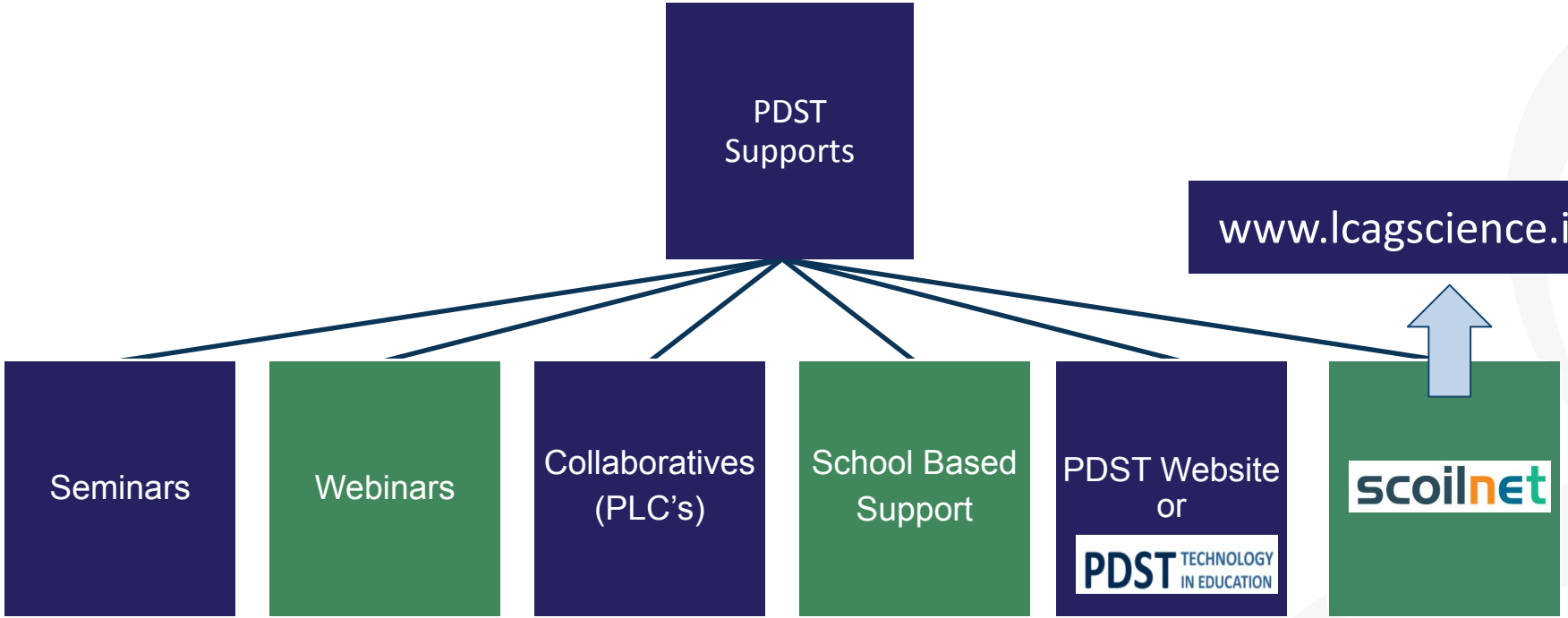
PDST Supports



CPD Timeline 2021/22

PDST
Professional Development Service for Teachers | An tSeirbhís um Fhorbairt Ghairmiúil do Mhúinteoirí

Oct '21
PLC 6

Dec '21
Webinar 5

April '22
Collaborative
(PLC 7)

May '22
Webinar 6

Sept '21

May '22

Sept '21
Phase 2
National
Workshop 1

Jan '22
Phase 2
National
Workshop 2

Feb / Mar '22
Phase 1
National
Workshop 6

Purpose for Today

To reinforce the report structure of the IIS and discuss the features of quality for each section of the report

To support teachers in developing the literacy skills of senior cycle Agricultural Science students

Working collaboratively with professional colleagues, engaging with the documentation to help plan and support the design and completion of the IIS

Timetable

Session 1 9:30 - 11:00	• Looking at the evidence • IIS Engagement Activity: Structure of the Report
Tea/Coffee Break 11:00 - 11:20	
Session 2 11:20 - 1:00	• IIS Level of achievement criteria • Writing scientific reports - Features of Quality
Lunch 1:00 - 2:00	
Session 3 2:00 - 3:30	• Supporting literacy in the agricultural science classroom • Developing a research question

Key Messages

Working collaboratively with professional colleagues, engaging with the documentation to help plan and support the design and completion of the IIS

To support teachers in developing the literacy skills of senior cycle Agricultural Science students.

Using the scientific method to write scientific reports.

Session 1

By the end of this session participants will have:

- Engaged with the key documentation that supports the Individual Investigative Study (IIS)
- Examined the structure of the Individual Investigative Study (IIS)
- Discussed the features of quality for each section of the Individual Investigative Study (IIS)

Coursework The IIS

Students prepare and present a report describing the research question, methodology, results, analysis and conclusion

They collect, analysis and evaluate primary data developing logical arguments to support findings

The coursework is examined by the SEC while the skills developed will be assessed in the written

Follows the structure of the scientific method

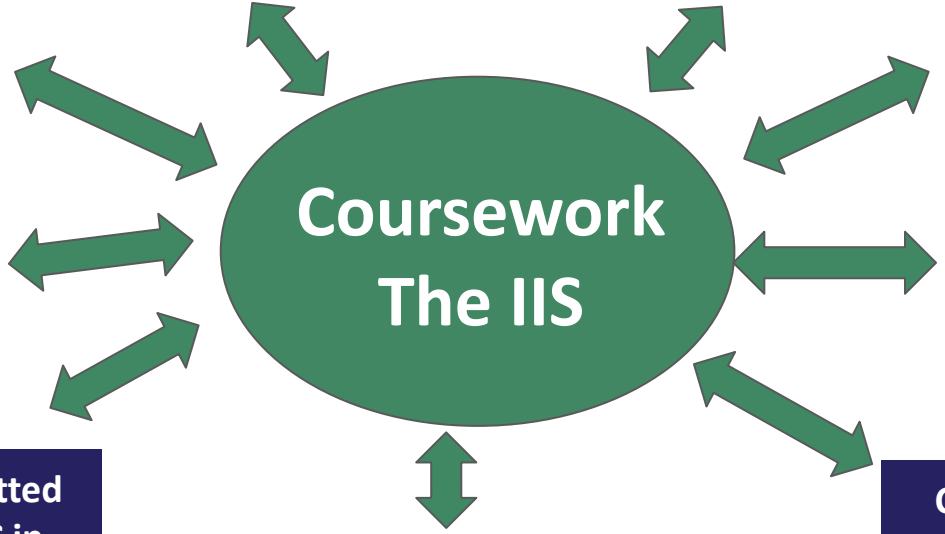
Coursework is issued at a common level but marked at either (H) or (O). Assessment is not of the complexity of the study but of the quality of the written report itself

It is intended that the coursework is carried out concomitantly with delivery of the course

The coursework is submitted electronically to the SEC in word doc format with a maximum word count of 2500 words

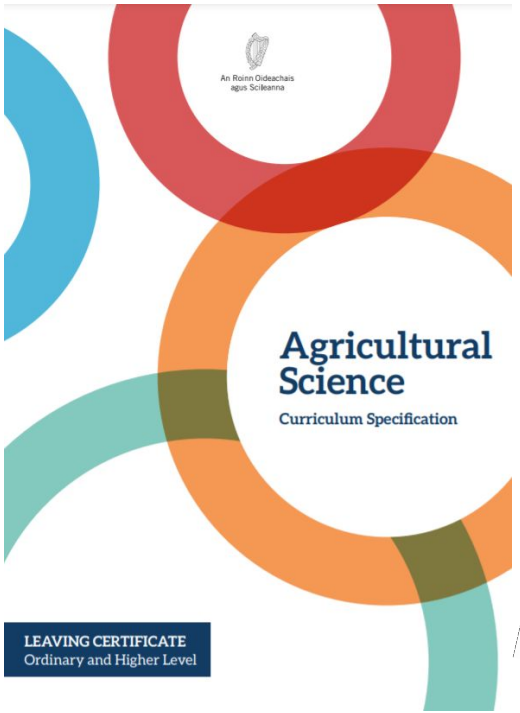
Use references and short in-line citations

Use secondary data to affirm arguments and decisions



NCCA Guidelines & SEC Information Note 2021

Information sources for IIS



IIS - Engagement Activity on the Structure of the Report

The theme for the 2021 brief is "**Improving Sustainability in Irish Agriculture**".

Use the theme, **"Improving Sustainability in Irish Agriculture",** as a "lens" to look through while undertaking the learning contained in the specification's strands and crosscutting themes.

In your Individual Investigative Study, you should do the following;

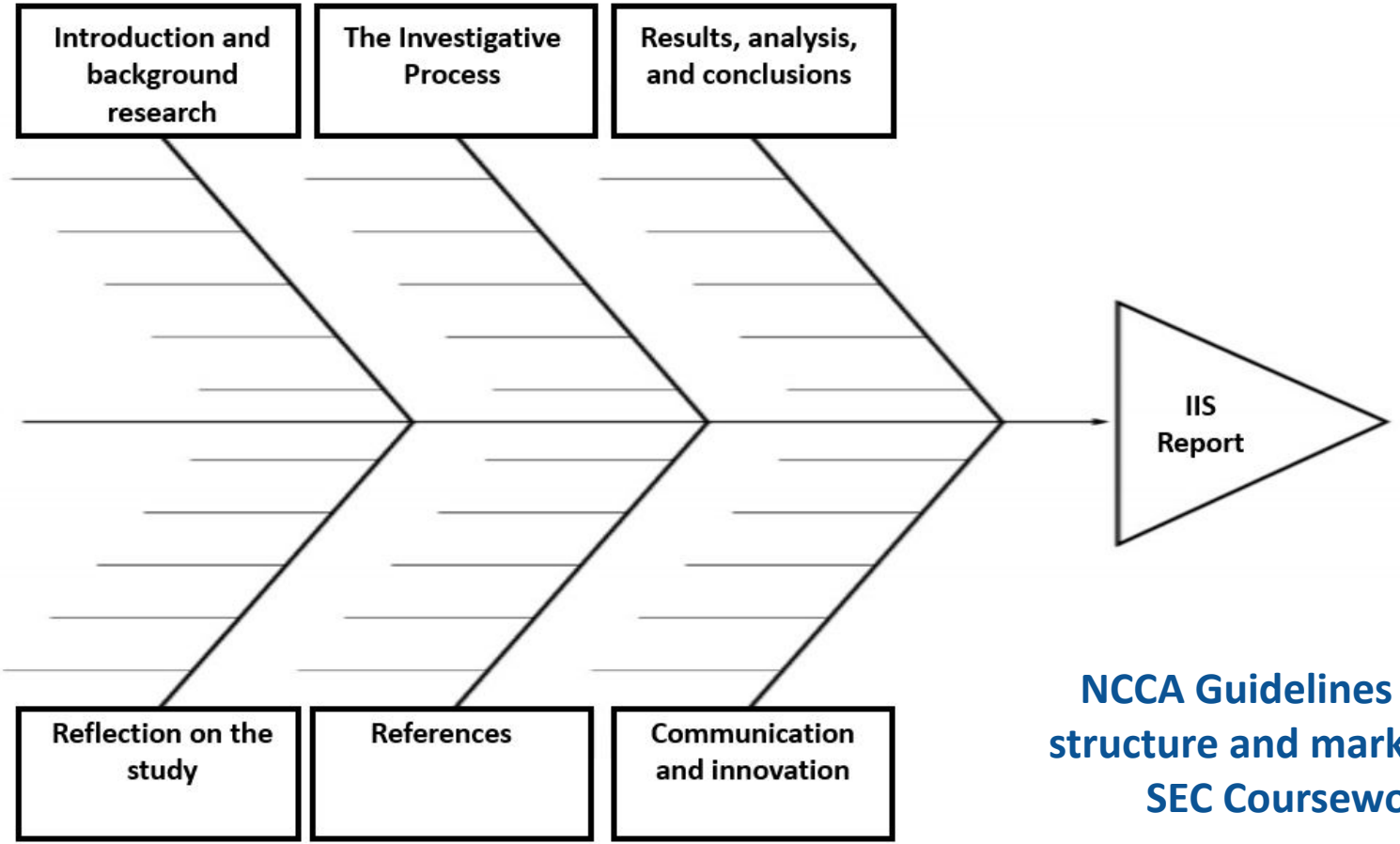
- Choose a specific agricultural enterprise[1] and a topic relevant to that enterprise and to the theme.
- Develop a research question that is related to the theme and which you would like to investigate in the context of the chosen enterprise.
- Carry out initial research on the topic as it relates to the theme.
- In the context of your chosen enterprise, investigate the topic by carrying out one or more experiments, supplemented, if appropriate, by other investigative activities. Carry out specific scientific investigation(s) of the topic. This will involve developing and testing specific hypothesis and drawing conclusions based on evidence gathered.
- At least one of the experiments you carry out must involve gathering and processing data.
- Document and present your work in the digital coursework booklet provided by the State Examinations Commission for marking.

Submit the final report to your teacher on or before **16 April 2021**. You are not allowed to make any changes to it after that date.

Report structure and mark allocations

Section	Indicative content to be included	Marks
Introduction and background research Suggested range between 300 and 500 words	▪ Give a title to your Individual Investigative Study. ▪ Identify the agricultural enterprise chosen as the context for the study and state the topic selected for investigation. ▪ State the research question, and make clear how it relates to the theme of the brief and the chosen enterprise. ▪ Outline what the initial research you carried out tells you about the topic and the research question. Include references. (Use short in-line citations here, with full references at the end of the report.)	20
The investigative process Suggested range between 500 and 800 words	▪ Describe the specific experiments and other relevant investigative activities undertaken, stating clearly the purpose of each and describing how it was carried out. ▪ Make clear what specific hypotheses were developed and tested. ▪ Describe in detail how you gathered the data.	25
Results, analysis, and conclusions Suggested range between 600 and 1000 words	▪ Present the data and results from your investigation. Use tables, graphs, and photographs as appropriate. ▪ Analyse and interpret the data, results, and other information. ▪ Make judgements and draw conclusions from your analysis. ▪ Take due account of any relevant limitations of your study. ▪ Link the conclusions clearly to the research question.	35
Reflection on the study Suggested range between 150 and 200 words	▪ Reflect on the insights gained from engagement with the study and comment on: o The degree to which the research question was answered o Possible changes or alternative approaches that might have made the investigation better o Future directions and possible areas of further investigation o Significance of the outcomes of the study for the agri-food sector and/or the study of agricultural science.	10
References	▪ Full references for all sources used during the study and/or referred to in the report. This section will not attract a separate mark. Any deficiencies in referencing will be taken account of when marking the relevant section of the report.	-
Communication and innovation	**This is not a distinct section of the report.** Marks will be awarded for evidence of taking an individual approach, for coherence and for innovative thinking.	10

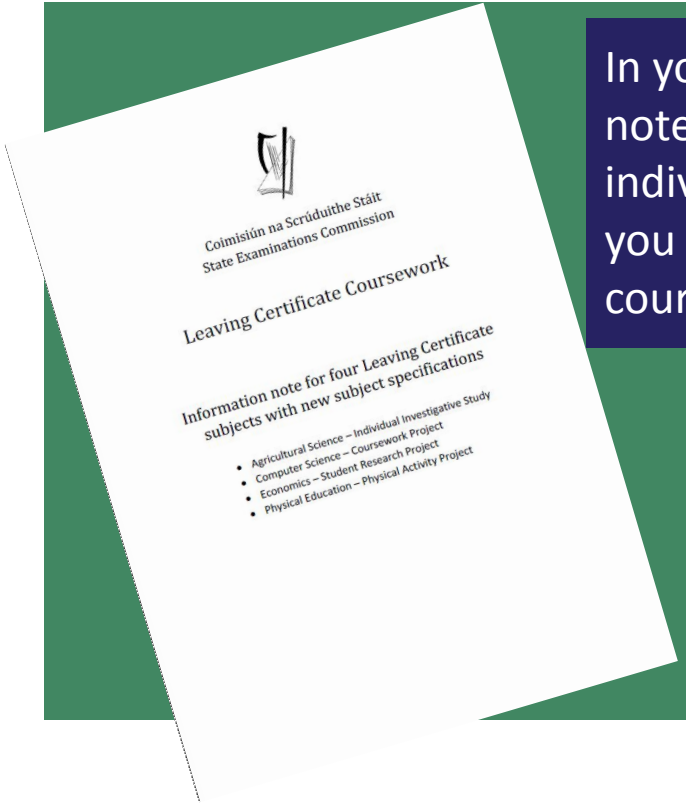
Pg 5 and 6, SEC Coursework Brief



NCCA Guidelines and Report structure and mark allocations - SEC Coursework Brief

Information note for new specification 2021

Pg 7

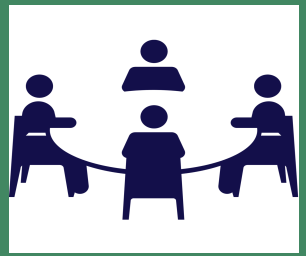

Coimisiún na Scrúduithe Stáit
State Examinations Commission

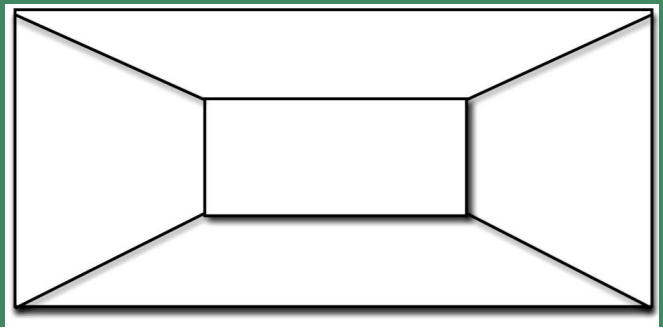
Leaving Certificate Coursework

Information note for four Leaving Certificate subjects with new subject specifications

- Agricultural Science – Individual Investigative Study
- Computer Science – Coursework Project
- Economics – Student Research Project
- Physical Education – Physical Activity Project

In your groups read pages 3-6 of the information note. Then using the placemat activity, record individual and group responses and ideas which you think are important / significant to the coursework.





(Information Note, SEC, 2021)

Session 1: Plenary

Participants have:

- Examined the relevant supporting documents
- Familiarised themselves with the sections of the coursework and had a detailed discussion around the features of quality for each section

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Tea/Coffee Break

Enjoy!

Session 2

By the end of this session participants will have:

- Explored scientific reports, discussed and analysed their features of quality
- Understood and use the assessment criteria to guide students through the IIS

Scientific Literacy in the Agricultural Science Classroom

What does it mean to be scientifically literate?

Science education provides a means by which students can interact with the world around them and understand how scientific concepts can be used to interpret the natural and physical world

Scientific knowledge is constructed by the sharing of ideas and by developing, refining and rejecting or accepting these ideas

Scientific principles are applied to testing stated hypotheses, which in turn leads to the solving of identified problems arising from the learner's own observations and perceptions of agricultural situations
(Specification page 6-7)

pg 20

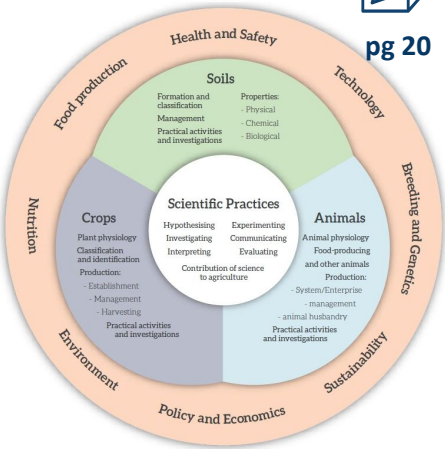
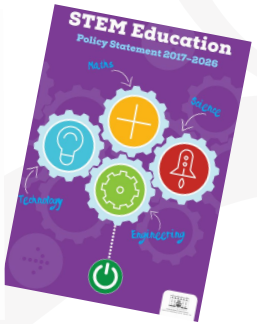


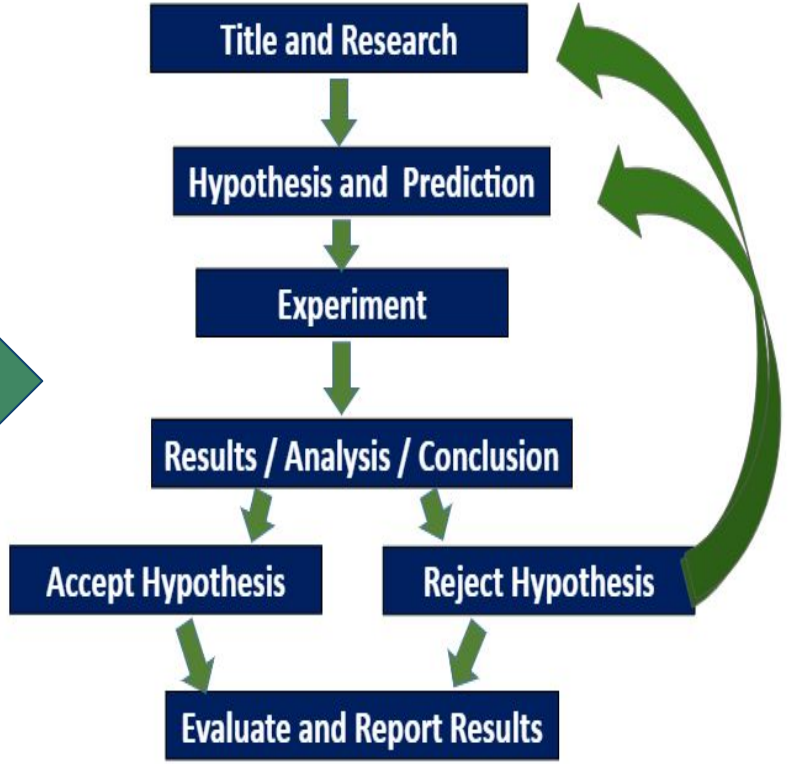
Figure 5: Key skills of senior cycle



Scientific Reports for the Agricultural Science Specification

"Practical laboratory and field investigative and experimental activities provide opportunities for the promotion of the scientific methodology"

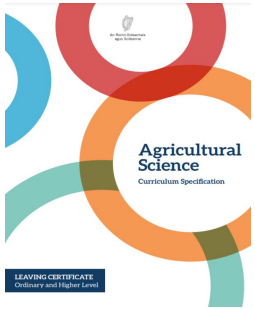
Pg 15 Specification



Scientific method should be used for SPAs

Level of Achievement Criteria

- What would quality look like for the IIS?
- In groups, complete the table on pg 15 of your workbook on what is required at each level by the students.



Pg 28

Pg 16

Pg 8

	High Level of Achievement	Moderate Level of Achievement	Low Level of Achievement
Level of substantive and procedural understanding			
Generate a valid, testable hypothesis			
Make predictions and generalisations that are supported by the available evidence			
Use of arguments to put theory into practice			
Apply knowledge and understanding of science to develop arguments and draw conclusions based on collected evidence			

Writing Scientific Reports - Features of Quality

What is a Scientific Report?

Structure

Title
Hypotheses
Prediction
Variables
Materials / Labelled diagram
Procedure
Results – Quantitative/Qualitative
Graph (if appropriate)
Analysis
Conclusion
Evaluation / Discussion

Language features

Past tense
Technical vocabulary
Impersonal language
Definitions or explanations
Visual elements – diagrams, tables, charts
Reflective

Pg 9

By examining and debating reports about contemporary issues in science, students develop an appreciation of the social context of science

By critically evaluating scientific texts and debating public statements about science, students engage with contemporary issues in agricultural science that affect their everyday lives

Practical laboratory and field investigations and experimental activities provide opportunities for the promotion of the scientific methodology

(Specification page 14)

Session 2 - Plenary

Participants will have:

- Explored scientific reports, discussed and analysed their features of quality
- Understood the assessment criteria to guide students through the IIS

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Lunch Break

Enjoy!

Session 3

By the end of this session participants will have:

- Considered and discussed literacy skills in the agricultural Science classroom
- Examined digital tools to support literacy and allow for differentiation
- Reflected on their next steps for working with the IIS with their students

Literacy in the Agricultural Science Classroom

Pg 21

Where do students need literacy support in the agricultural science classroom?

"Students develop their reading, comprehension and writing skills when they research, examine,record, compare, and critique different agricultural practices, contexts and information" Specification p12

- **Oral Language**
  - speaking
  - conversations
  - debates
  - presentations
  - listening and responding
- **Reading**
  - information texts
  - comprehension
  - vocabulary
  - fluency
- **Writing**
  - answering questions
  - recording findings
  - writing genres
  - scientific literacy?

Digital literacy
e.g.Research and presentations

Using Digital Technology to Enhance Student Literacy and Differentiation

Grammarly

Readable

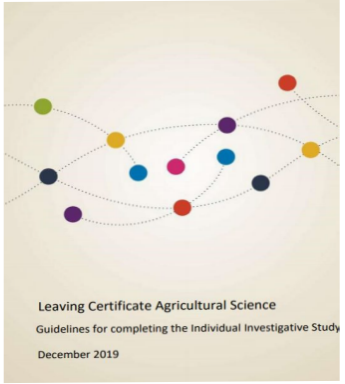
Rewordify

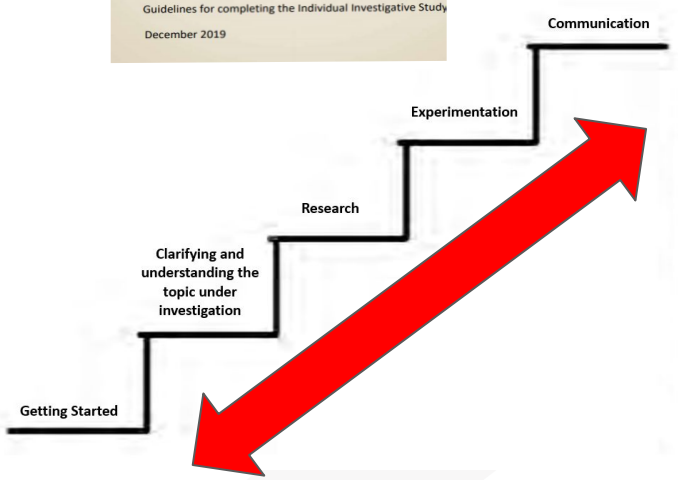
Immersive Reader

PDST TECHNOLOGY IN EDUCATION

Conducting the study - 5 phases of Research

1. Getting started
2. Clarifying and understanding the topic under investigation
3. Research
4. Experimentation
5. Communication





NCCA Guidelines P. 6-12

Appendix 1 and 3 - NCCA Guidelines

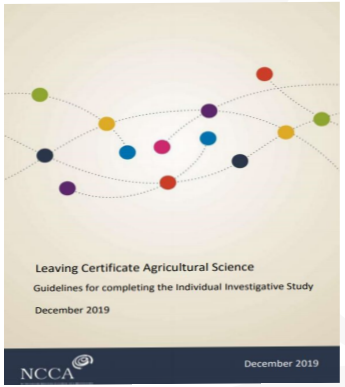
pg24,25

Appendix 1: Suggested student plan for the study

Student name:	Date: Class:
The topic I wish to investigate:	
How it connects to the brief:	
My plan for conducting the study	
Areas of the study	Timeline
Research	
Experimentation	
Communication	
Approved by:	Date:
Feedback:	

Appendix 3: Suggested experimental plan

Student name:	Date: Class:
Experiment:	
How it connects to the brief:	
Equipment and materials request:	
Safety:	
Proposed method:	
Approved by:	Date:
Feedback:	



Pg 18 and 20

Suitability of topic in response to Brief

- Is the topic relevant to the brief?
- Are there a number of viewpoints that can be researched?
- Can the research question be investigated through controlled experimentation?
- Can primary scientific data be collected safely in laboratory and / or field settings which support the formation of conclusion?
- Can the research question be pursued over an appropriate period of time (e.g. a season of production) in laboratory and /or field settings?

Appendix 2, pg 19 NCCA Guidelines

Research Questions

- Research is about informing, not instructing
- Research aims to improve understanding and suggest possibilities (rather than ready made solutions)

Relevant and Original

- Is the topic relevant to the brief?
- Does it link to an agricultural enterprise?
- Is it an area that you are interested in?
- Does it focus on a gap in existing knowledge?

Complex and Arguable

- Cannot simply be answered with Yes / No leaving little scope for investigation / discussion
- Cannot be answered with readily available facts / figures
- Provides scope for discussion and interpretation of results

Safety

Can primary data be collected safely in the laboratory and / or field settings which support the formation of a conclusion?

Focused

- Focuses on a single topic / problem
- Is answerable using primary data (quantitative / qualitative)

Feasible and Specific

- Can the research question be carried out over an appropriate period of time (e.g. a season of production) in laboratory and / or field setting?
- Have you enough resources?

Researchable

Have you conducted background research which allows for a number of viewpoints to be explored?

Can the research question be investigated by conducting a controlled experiment while you follow the scientific method?

Next Steps

Pg 14

Reflect on the following questions:

What are your next steps to support your students with their IIS?

- 5th Year Students?
- 6th Year Students?

What resources do you need to engage with to provide this support your students?

Collaboratives 2022

- Shared values and vision
- Collective responsibility
- Trust
- Collaboration
- Reflection

(Adapted from the work of Hargreaves and O'Connor, 2018).

Session 3

Participants will now have:

- Considered and discussed literacy skills in the agricultural Science classroom
- Examined digital tools to support literacy and allow for differentiation
- Reflected on their next steps for working with the IIS with their students

National Workshop 2 Phase 2 Evaluation

Please complete the evaluation form:
https://tinyurl.com/2y9pccfs