2024 ASSESSMENT REPORT

TDS315123 TRANSDISCIPLINARY SCIENCE

General Comments

The 2024 Transdisciplinary Science (TDS) Folio and Oral presentation showed that students struggled to plan and improve their projects across three modules. Students must complete the “Module 1 – Learner Inquiry Project Plan Checklist”, have it signed by a teacher, and include it in their final assessment (see Appendices 3 and 7).

Each module involves specific tasks:

- Module 1: Research, trial and plan the project
- Module 2: Conduct the experiment, monitor results, and make improvements
- Module 3: Review findings, present results, and make recommendations.

Teachers should help students meet course requirements and ensure all modules are included in the final folio. Students should evaluate their data and information from other sources, using tools like annotated bibliographies or a literature review in Module 1 to show their understanding.

Experiments should have different treatments and repeated trials for better data analysis and clearer conclusions. Students should use the right tools for accurate observations and document their research in their logbooks.

Schools need to provide the equipment students require or help them choose projects that fit available resources. If a project raises ethical concerns, students should adjust their approach to ensure it is appropriate.

Oral Component

Criterion 3: analyse concepts, processes and interrelationships between scientific models and theories

Students must show evidence of thorough reading, note-taking, and analysis of concepts related to their topic to identify and explain the connection between the variables in their system. Their introduction should highlight these interrelationships. While discussing the findings, students must show the evidence of analysis of theories and models, and evaluation of their results using these frameworks. Hypotheses should be justified with scientific ideas and reliable sources. Module 2 and Module 3 should include hypotheses for each module's specific questions. Referencing should be appropriately done in the poster. Evidence of mathematical modelling is essential to identify data patterns and reliability.

Criterion 4: analyse and communicate scientific data and information

The data presented should provide clear evidence through proper scientific conventions. Graphs should include a clear title, labelled axes, a key, a scale, and appropriate units. Students should evaluate the reliability of their evidence by considering the number of replications, data spread, gaps, unexpected results, and outliers. Throughout the investigation, students should develop subject-specific vocabulary and properly acknowledge all secondary evidence in their speech. Images, graphs, and other poster content should be discussed as part of their evidence during the presentation. Students must present their evidence clearly, by ensuring that poster text is large enough for the audience to read.

Criterion 8: analyse, synthesise and represent scientific inquiry to make valid conclusions

All data and findings from the experiments must be explained and justified with reliable scientific evidence and secondary sources. Conclusions should summarise the main findings, linking them to the hypotheses tested in each module. Recommendations should address stakeholders, society, and future scientists, offering insights into the issue, experimental design improvements, and perspectives to enhance a transdisciplinary approach. This serves as a comprehensive summary of findings from all three modules. Students should be able to discuss all phases of their inquiry, explaining how it evolved across the modules and provide evidence to support their conclusions and recommendations.

Folio Component

Criterion 3: analyse concepts, processes and interrelationships between scientific models and theories

Students must be able to identify interrelationships between system components by exploring variables and researching how each is influenced. They should be able to evaluate sources of evidence for their introduction and discussion. Students should also consider insights from different disciplines, including First Nations Peoples' knowledge. Exploring how various stakeholders locally, nationally, and globally investigate and understand the issue will improve the inquiry's relevance. Finally, students must discuss the precision, and usefulness of their mathematical analysis. They should evaluate whether the evidence supports their findings and hypotheses and consider changes to improve the reliability of their data analysis for future investigations.

Criterion 4: analyse and communicate scientific data and information

Students should provide evidence of exploring multiple ways to present their data and select the format that best highlights patterns revealed by their experiments. Tables and graphs must follow scientific formats, with science journals serving as a useful guide for professional presentation. Students must evaluate their experiment's validity by determining whether it accurately tested their hypothesis and produced reliable evidence. All work must adhere to TASC academic integrity

guidelines, with clear differentiation between their work and others. Referencing should be used accurately, with in-text citations for evidence from research and a complete reference list for all components of the folio.

Criterion 5: analyse the interrelationships between local, national, and global contexts with an inquiry

Students should consider the Tasmanian, Australian, and global contexts of their transdisciplinary inquiry. Comparing the situation locally to national and global contexts can help refine their research question and ensure its relevance at all levels. Students must include the history of the technology used in their investigation instead of merely identifying the technologies used. Students should be able to evaluate the contribution of technological advancement to the research such as how the invention of the microscope advanced cell theory. Students should also evaluate the significance of their research question in addressing societal or environmental needs. This reflects the purpose of transdisciplinary inquiry and the study's broader implications and the evidence of its potential impact on society/environment.

Criterion 7: apply, analyse and adapt experimental design with an inquiry

This criterion applies to the end of Module 2, where students assess their inquiry, and the evidence gathered to refine it for Module 3. They must evaluate the relevance of the information used so far and conduct additional research from secondary sources to strengthen their final investigation. Using a combination of collected data, scientific theories and models, students should make valid connections to guide the experimental design in Module 3. To evaluate their experimental design, students must consider the evidence of precision, errors, and gaps in their inquiry, identifying areas to further refine their investigation.

Criterion 8: analyse, synthesise and represent scientific inquiry to make valid conclusions.

This criterion is assessed at the end of Module 3 and focuses on synthesising the investigation's main findings. Students must evaluate the results, integrating evidence from all modules and relevant theories to make valid arguments. Validity can be assessed by considering the intended variables. The next element evaluates the overall conclusions drawn from the inquiry. Students must make conclusions, supported by scientific reasoning and proper references, directly addressing the tested hypotheses. Teachers can help by teaching hypothesis writing at the start of the course. The final element is recommendations, which should be evidence-based and connected to broader contexts, including local, national, and global perspectives, as well as social, ethical, legal, and environmental considerations. This section requires detailed referencing and explores the investigation's potential applications, benefits, limitations, further questions, and how it could be refined or improved. Stakeholders involved in the inquiry's context should also be considered.