# Pre-approved Learning and Assessment Plan

LAP 02 – Dam to drain

Stage 2 Scientific Studies

Pre-approved learning and assessment plans are for *school use only*.

* Teachers may make changes to the plan, retaining alignment with the subject outline.
* The principal or delegate endorses the use of the plan, and any changes made to it, including use of an addendum.
* The plan does not need to be submitted to the SACE Board for approval.

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| School |  | Teacher(s) |  |

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| SACE school code | | |  | Year |  | Enrolment code | | | | |  | Program variant code (A–W) |
| Stage | Subject code | | | No. of credits (10 or 20) |
|  |  |  | 2024 | **2** | **S** | **T** | **U** | **20** |  |

Addendum – changes made to the pre-approved learning and assessment plan

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| Describe any changes made to the pre-approved learning and assessment plan to support students to be successful in meeting the requirements of the subject. In your description, please explain:  what changes have been made to the plan   * the rationale for making the changes * whether these changes have been made for all students, or for individuals within the student group. |

Endorsement

The use of the learning and assessment plan is approved for use in the school. Any changes made to the plan support student achievement of the performance standards and retain alignment with the subject outline.

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| Signature of principal or delegate |  | Date |  |

# Assessment overview

Stage 2 Scientific Studies – 20 credits

The table below provides details of the planned tasks and shows where students have the opportunity to provide evidence for each of the specific features of all of the assessment design criteria.

Assessment Type 1: Inquiry Folio – weighting 50%

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| Assessment details | Assessment design criteria | | Assessment conditions  (e.g. task type, word length, time allocated, supervision) |
| IAE | KA |
| **Proposal for Individual Inquiry (prior to Assessment Type 3) – Water for the people**  In preparation for their external assessment, students individually prepare a proposal for a scientific investigation for which the outcome is uncertain. The design proposal includes: a question/hypothesis, problem/need, a deconstruction of the problem that includes an identification of variables and discussion of how these variables might impact the problem or influence the design, an outline of an approach or method **or** engineering design of a model designed to obtain primary data, and a justification of the plan of action, including for conducting research. The external assessment is related to the purification of water which may contain biological contaminants, chemical contaminants, or both. The project should have a particular focus – examples include (but are not limited to) treatment of hard water, treatment of water in third world countries, sewerage treatment, desalination plants, treatment of chemical or industrial wastewater etc. | 1 | 1, 4 | Individual proposal.  Maximum 4 x A4 pages if written or equivalent in multimodal form.  Minimum font size 10, no page reduction. |
| **SIS: Data collection and representation task - testing water quality**  Using the key stages of the scientific method and the engineering design process student’s research then use water testing methods (including commercially available test kits) to determine the water quality at predetermined locations – this can include biological samples, tap samples, pool samples or any other source of water. Students will report back on the quality of the water they have tested and ramifications they may have for anyone who uses the water. The main focus of the task is to collect and display data in an appropriate manner and for an appropriate audience. Students also consider the accuracy of the equipment. If the facilities exist students can branch out into testing for other contaminants such as PFAS or heavy metal contamination. | 2, 3, 4 | 2 | Individual report to a maximum of 4 x A4 pages.  or  Poster presentation – maximum 1 x A2.  or  Equivalent multimodal form. |
| **SIS: Investigate the myths – alkaline water/chlorination/fluoridation/recycling**  Students work in small groups to undertake research (using scientific methods) a number of common beliefs in relation to the benefits of alkalising water for health, chlorinating water for sanitation, fluoridation of water for dental health or recycling of water in water stressed areas. The students present their report as a multimodal presentation with a maximum of 3 minutes per student. Emphasis should be placed on the investigation of scientific claims, investigation of scientific myths and analysing the accuracy of published data. | 4, 5 | 1, 2, 4 | Maximum 3 minutes oral presentation backed by PowerPoint or alternative additional supporting media.  Editor’s note: This is equivalent to 2 pages or less in the total allowed maximum of 12 pages for the set of three science inquiry skills tasks. |
| **SIS Individual Design Task – Water treatment – filtration and flocculation**  Students design and conduct a practical investigation to treat dirty water through the process of filtration and flocculation. Students undertake this task individually and write a report to analyse their data and evaluate the method. As a part of this investigation students will need to deconstruct the problem, research methods for flocculation and filtration then carry out their method. | 1, 2, 3, 4 | 4 | Individual report.  Maximum 6 x A4 pages – approx. 2 pages for design; 2 pages for evaluation.  Investigation is conducted individually. |
| **SHE Task – chemistry in the toilet**  Students investigate sewerage treatment and the role of new technologies, communication, the influence of other areas of science, and the beneficial or unexpected consequences. They explore and understand the connection between science and society through this topic. |  | 1, 3, 4 | Individual. Maximum 1500 words or 10 minutes if oral, or equivalent in multimodal form. |

Assessment Type 2: Collaborative Inquiry – weighting 20%

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| Assessment details | Assessment design criteria | | Assessment conditions  (e.g. task type, word length, time allocated, supervision) |
| IAE | KA |
| **Collaborative Inquiry – aquaculture/permaculture**  Water and the water cycle is a central part of what’s needed for humans to survive including on other planets like Mars. Manipulating the water cycle can also have ramifications for people living in areas where there is little to no natural water available.  **Design**  Students formulate a question or investigate a specific problem regarding the water cycle and manipulate it to support human or ecosystem survival. Students deconstruct the problem and determine the most appropriate method for investigation, formulating investigable questions, hypotheses, or proposed solutions, selecting, trialing, and using appropriate equipment, apparatus, and techniques, identifying variables.  Students work in groups to facilitate the completion of a productive practical setup which can include (but is not limited to) aquaculture and/or permaculture. Students individually record in a personal journal:   * their initial thinking, ideas and individual deconstruction of the problem * their own contribution to the project and progress along with evidence and supporting documentation of the group’s application of collaborative skills to reflect their learning and development of the method. * A record of the primary data collected, their analysis and interpretation and, evaluate the procedures and the method, formulating a conclusion with justification and consideration of possible limitations.   **Evaluation (recorded presentation)**  After completing the investigation, students individually complete a recorded presentation that evaluates the effectiveness of the collaboration within the group across all parts of the investigation. Opportunities exist to explore the cycles involved in the project extend past the water cycle and can include the carbon cycle, the phosphorus cycle and the nitrogen cycle. | 1, 2, 3, 4, 5 | 2 | **Collaborative Inquiry Design**  **Personal journal** – one-sided A4 pages, min 10 font size, no page reduction.  **Collaborative Inquiry Evaluation (recorded presentation)**  Recorded presentation (either recorded or multimedia) – maximum 5 minutes. |

Assessment Type 3: Individual Inquiry – weighting 30%

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| Assessment details | Assessment design criteria | | Assessment conditions  (e.g. task type, word length, time allocated, supervision) |
| IAE | KA |
| Students undertake one individual inquiry using the proposal developed and assessed in Assessment Type 1: Inquiry Folio and incorporating any feedback.  Students use the design proposal to conduct an investigation for which the outcome is uncertain. They select either a scientific method or the engineering design process to conduct an investigation based on a question, problem, or a need for a solution identified by each student.  Students present an individual report that includes: an introduction, summary of design including hypothesis/proposed solution, modifications, results of the practical, analysis of results, identification of trends and linking results to relevant discipline knowledge, evaluation of method/model used, identification of sources of uncertainty, conclusion with justification of the limitations of the investigation, citations and referencing. | 2, 3, 4 | 1, 4 | Individual report,  maximum of 1500 words or equivalent in multimodal form.  Only the following sections are included in the word count:   * introduction * analysis of results * evaluation of procedures * conclusion with justification |

*Seven assessments.**Please refer to the Stage 2 Scientific Studies subject outline.*