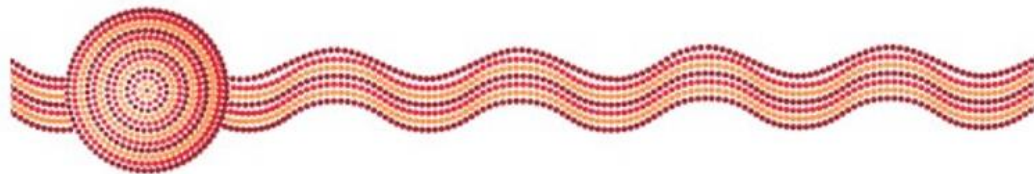# VCE Algorithmics (HESS) School-assessed Task

Video 1
Background to the SAT

Acknowledgement of Country

The VCAA respectfully acknowledges the Traditional Owners of Country throughout Victoria and pays respect to the ongoing living cultures of First Peoples.

VCE Algorithmics (HESS) School-assessed Task

Video 1
Background to the SAT

Phil Feain

Digital Technologies Curriculum Manager

VCAA

Outline of presentation

- Resources and documents
- VASS dates
- Nature and scope of the task
- Assessment criteria
- Authentication
- Assessment sheet
- Marking

Essential resources

- Algorithmics (HESS) study page
- Algorithmics (HESS) Study Design (2023–2026)
- Administrative information for School-based Assessment
- Support material
- Examination specifications and past examinations
- General advice on School-based Assessment audits
- VCAA Bulletin and Notices to Schools
- On-demand videos on the Algorithmics (HESS) study page.

Study Design for 2023 – 2026
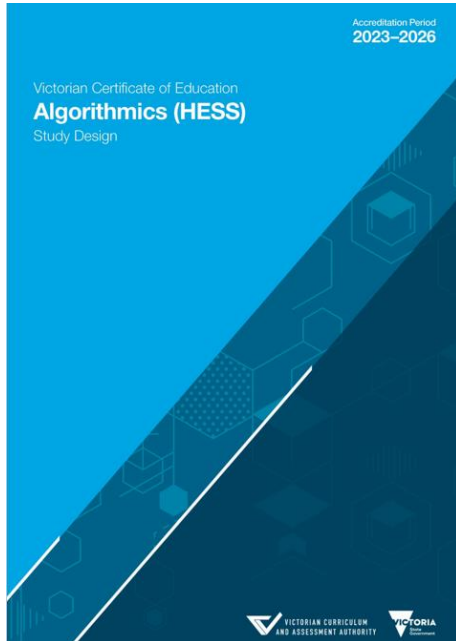
Study design is for 2023–2026

Includes details on:

- Accreditation period
- Introduction
- Assessment and reporting
- Units 3 and 4 Algorithmics
- Areas of study
- Outcomes
- Key knowledge
- Key skills

- School-based assessment:
  - Satisfactory completion
  - Assessment of levels of achievement
  - Contribution to final assessment
  - School-assessed Coursework
  - School-assessed Task
- External assessment:
  - End-of-year examination

Algorithmics (HESS) study page
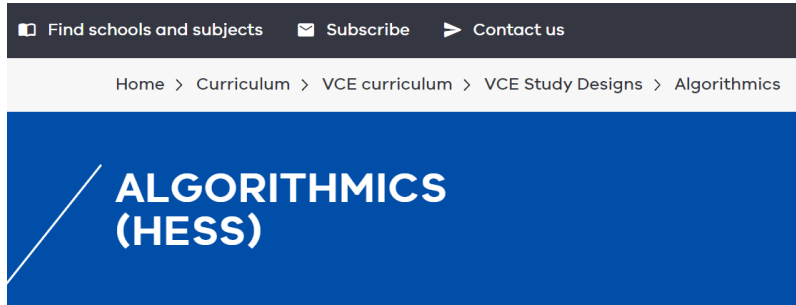
The Algorithmics (HESS) study page includes content on:

- Study design
- Administrative information (SAT criteria)
- General advice on School-based Assessment audits
- Examination reports
- Examination specifications
- Past examinations
- Support material
    - Planning
    - Teaching and learning
    - Assessment
    - Professional learning videos (on-demand videos).

Support material

Content includes:

- Planning
    - Developing a program
    - Overviews of the Areas of Study
    - Sample weekly planners for each unit
- Teaching and learning activities
    - For each area of study
- Assessment
    - Advice for each component of the SAT
    - Sample approaches to developing an assessment task (SAC).

Administrative information for School-based Assessment

Contains SAT criteria (performance descriptors) and authentication information, including record forms and the assessment sheet.

Content included for U3 O3, U4 O1 and U4 O2:

- Details regarding the SAT
  - Nature of the task
  - Scope of the task
- Assessment criteria (1–10) rubrics
- Authentication of the SAT
- Authentication record form
- Assessment sheet.

You should only be referring to the current year's Administrative information only

VCE Algorithmics (HESS)
Administrative information for
School-based Assessment in 2023

School-assessed Task

The School-assessed Task (SAT) contributes 20 per cent to the study score.

Teachers will provide to the Victorian Curriculum and Assessment Authority (VCAA) a score against each criterion that represents an assessment of the student's level of performance for Unit 3 Outcome 3 and Unit 4 Outcomes 1 and 2. The recorded scores must be based on the teacher's assessment of the student's performance according to the criteria on pages 8–17. This assessment is subject to the VCAA's statistical moderation process.

The 2023 VCE Algorithmics (HESS) assessment sheet on page 21 is to be used by teachers to record the Unit 3 and Unit 4 SAT scores. The completed assessment sheet for each student's SAT must be available on request by the VCAA.

The mandated assessment criteria are published annually on the Algorithmics (HESS) study page of the VCAA website and notification of their publication is given in the February *VCAA Bulletin*.

Details of authentication requirements and administrative arrangements for School Assessed Tasks are published annually in the *VCE and VCAL Administrative Handbook 2023*.

The Authentication record form on pages 19–20 is to be used to record information for each student and must be made available on request by the VCAA.

The SAT relates to:

- Unit 3 Outcome 3
- Unit 4 Outcome 1
- Unit 4 Outcome 2

Teachers should be aware of the dates for submission of scores into VASS in July and November. These dates are published in the 2023 Important Administrative Dates and Assessment Schedule, published annually on the VCAA website. vcaa.vic.edu.au/pages/schooladmin/admindates/index.aspx

© VCAA

VCAA Bulletin

The *VCAA Bulletin* is an official VCAA publication for Early Years, Foundation–10, VCE, VCAL and VET, published in ten editions each year.

It is available by email subscription or can be downloaded as a PDF from the *VCAA Bulletin* index page**.**

If you aren't already a subscriber, please visit the VCAA Bulletin subscription webpage**.**

Notices to Schools

2022 NOTICES TO SCHOOLS

October

- Flood-affected schools and impact on VCE examinations [Notice 168, October 2022]
- Monitoring the impact of weather conditions on the delivery of VCE examinations [Notice 167, October 2022]
- Updated COVIDSafe measures for VCE examinations [Notice 166, October 2022]
- VASS new-users professional development [Notice 165, October 2022]
- VCE written examinations observation visits [Notice 164, October 2022]
- Running VCE and VCAL eligibility reports on VASS [Notice 163, October 2022]
- October and November examination centre messages [Notice 162 was emailed directly to schools/providers]
- VCE VET programs in Top Designs 2023 [Notice 161, October 2022]
- 2023 senior secondary enrolments in VASS [Notice 160, October 2022]
- Join a next generation Victorian Curriculum F–10 reference panel [Notice 159, October 2022]
- Support materials for VCE Algorithmics (HESS) 2023–2026 study design [Notice 158, October 2022]
- VCE Vocational Major and Victorian Pathways Certificate professional learning [Notice 157, October 2022]
- Accessing applied learning programs before senior secondary years [Notice 156, October 2022]
- Nominations open for the VCAL Achievement Awards, class of 2022 [Notice 155, October 2022]
- 2023 VCE Literature Text List: Desdemona [Notice 154, October 2022]
- 2022 VCE written examination materials and COVIDSafe measures [Notice 153, October 2022]
- COVIDSafe measures and arrangements for VCE performance/Languages oral examinations and Extended Investigation oral presentations [Notice 152, October 2022]

A Notice to Schools is an official communication to Victorian schools or Registered Training Organisations issued by the VCAA.

Teachers can register for Notices through the school's VASS administrator.

The VCAA then processes these requests and updates the distribution lists used to send Notices to Schools.

Other important resources

Assessment Schedule

This document should be used in conjunction with the annual **Important Administrative Dates** on the VCAA website.

VCE and VCAL Administrative Handbook

This publication is a comprehensive guide for principals, teachers and administrators, outlining the rules, regulations and policies governing the delivery of the VCE and VCAL.

VASS dates

VASS dates

- **Unit 3 School-assessed Task – July**
    - Algorithmics (HESS): Criteria 1–4

- **Unit 4 School-assessed Task – November**
    - Algorithmics (HESS): Criteria 5–7
    - Algorithmics (HESS): Criteria 8–10.

Teachers should be aware of the dates for submission of scores into VASS in July and November. These dates are published in the annual Important Administrative Dates and Assessment Schedule, published annually on the VCAA website. vcaa.vic.edu.au/pages/schooladmin/admindates/index.aspx.

Nature and scope of the task

Nature of the task – Unit 3 Outcome 3

Nature of task

The design of a data model and algorithm combination to solve a real-world/applied problem, including:

- a specification of the problem

- a consideration of multiple solution options

- the selection of a suitable, coherent, clear and fit-for-purpose solution

Scope of the task – Unit 3 Outcome 3

Specification of the problem

Criterion 1 assesses students' skills in specifying a problem and modelling its key features. Teachers are to provide students with a real-world/applied problem context. The problem should be stated in terms that are sufficiently general to allow for individual students to approach it in different ways. The problem context should lend to the data modelling and algorithm design approaches studied in Unit 3, but also have the potential to benefit from the advanced algorithm design methods studied in Unit 4.

Students are to precisely specify the algorithmic problem, formulated from the real-world/applied problem context. They are to identify salient features of the problem and model them using suitable ADTs. They should describe how features of the problem map to the data model and describe signatures for key operations of the data model. Their data model should be presented as an integrated whole, with clear justification for modelling decisions.

Teachers should approve each student's intended approach early in the process.

The evidence from this task is observed through Observation 1 and assessed through Criterion 1.

Scope of the task – Unit 3 Outcome 3

Consideration of multiple solutions options

Criterion 2 assesses students' skills in the design of an algorithm to solve a real-world/applied problem. Students should consider multiple algorithm design approaches to the problem. This may include exploring various Unit 3 algorithm design patterns and/or combining or modifying Unit 3 course algorithms. Students should discuss the rationale underpinning their algorithm design decisions and explain their solution.

The word range for this task is approximately 600–800 words.

The evidence from this task is observed through Observation 2 and assessed through Criterion 2.

Criterion 3 assesses students' skills in the communication of an algorithmic solution to a real-world/applied problem. Students are to communicate their algorithmic solution in pseudocode.

The evidence from this task is observed through Observation 3 and assessed through Criterion 3.

Scope of the task – Unit 3 Outcome 3

Solution selection

Criterion 4 assesses students' skills in the justification of an algorithmic solution to a real-world/applied problem. The justification of a solution at the end of the Unit 3 component relates to:

- the suitability of the choice of model and algorithm

- the coherence of the integration of the data model and algorithm

- whether it is fit-for-purpose in terms of its meeting of the requirements of the real-world/applied problem context

The word range for this task is approximately 300–500 words.

The evidence from this task is observed through Observation 4 and assessed through Criterion 4.

Students should submit their completed Unit 3 Outcome 3 School-assessed Task work.

Further information to support teachers with the planning, teaching and assessing of the Unit 3 Outcome 3 School-assessed Task can be found in the Support materials on the Algorithmics (HESS) study page.

Nature of the task – Unit 4 Outcome 1 & 2

Nature of task

A formal time complexity analysis of the designed algorithm for the applied problem and an explanation of the consequences of these results on the algorithm's real-world application.

AND

A design of an improved data model and algorithm combination to solve the applied problem, including:

- the selection of an efficient, coherent and fit-for-purpose solution
- a time complexity analysis
- a comparison to the original solution.

Scope of the task – Unit 4 Outcome 1 & 2

Scope of tasks

Formal analysis

Criterion 5 assesses students' skills in determining the time complexity of algorithms. Students are to determine the time complexity of the initial algorithmic solution that they developed as part of Unit 3 Outcome 3.

The word range for this task is approximately 100–200 words.

Full working of time complexity calculations should also be included.

The evidence from this task is observed through Observation 5 and assessed through Criterion 5.

Criterion 6 assesses students' understanding of the consequences of an algorithm's time complexity on its real-world application. Students are to explain the consequences of their initial algorithmic solution's time complexity on its real-world application, including a thorough discussion of practical input sizes and its suitability to the problem's requirements.

The word range for this task is approximately 100–200 words.

The evidence from this task is observed through Observation 6 and assessed through Criterion 6.

Scope of the task – Unit 4 Outcome 1 & 2

Design of an improved solution

Criterion 8 assesses students' skills in the design of an improved data model and algorithm combination. Students are to apply the knowledge and skills from Unit 4 Outcome 2 to select and design an improved algorithmic solution. This may include combining or modifying Unit 4 course algorithms. Students should discuss the rationale underpinning their data model and algorithm design decisions and precisely describe their designs.

The word range for this task is approximately 200–400 words.

The evidence from this task is observed through Observation 7 and assessed through Criterion 8.

Criterion 9 assesses students' skills in advanced algorithmic problem-solving. Students are assessed on the quality of their improved designs based on the solution's coherence, efficiency and fitness for purpose.

The evidence from this task is observed through Observation 8 and assessed through Criterion 9.

Scope of the task – Unit 4 Outcome 1 & 2

Further formal analysis

Criterion 5 assesses students' skills in determining the time complexity of algorithms. Drawing on their Unit 4 Outcome 1 knowledge and skills, students are to determine the time complexity of the improved algorithm that they designed as part of Unit 4 Outcome 2.

The word range for this task is approximately 100–200 words.

Full working of time complexity calculations should also be included.

The evidence from this task is observed through Observation 9 and assessed through Criterion 5.

Scope of the task – Unit 4 Outcome 1 & 2

Comparison

Criterion 7 assesses students' skills in the comparison of the time complexities of algorithmic solutions to a real-world/applied problem. Criterion 10 assesses students' skills in the comparison of algorithmic solutions in terms of their coherence and fitness for purpose. Students draw on Unit 4 Outcomes 1 and 2 to compare the suitability of their developed solutions.

The word range for this task is approximately 400–600 words.

The evidence from this task is observed through Observation 10 and assessed through Criterion 7 and 10.

Students should submit their completed Unit 4 Outcomes 1 and 2 School-assessed Task work.

Assessment criteria

Criteria

VCE Algorithmics (HESS): School-assessed Task 2023							
Assessment Criteria	**Levels of Performance**						
	Indicators	**Not shown**	**1–2 (very low)**	**3–4 (low)**	**5–6 (medium)**	**7–8 (high)**	**9–10 (very high)**
Unit 3 Outcome 3 1. **Skills in specifying a problem and modelling its key features.**	• Specifies an algorithmic problem.	Insufficient evidence	Identifies some algorithmic aspects of the real-world/applied problem context.	Outlines some aspects of an algorithmic problem relevant to the real-world/applied problem context.	Formulates an algorithmic problem from the real-world/applied problem context.	Explains how the algorithmic problem is formulated from the real-world/applied problem context.	Provides clear and precise specification of the algorithmic problem, suitably formulated from the real-world/applied problem context.
	• Explains the salient features of the real-world/applied problem.		Lists arbitrarily-selected features of the real-world/applied problem.	Identifies some relevant features of the real-world/applied problem and outlines reasons for their selection.	Describes salient features of the real-world/applied problem and reasons for their selection.	Identifies features of the real-world/applied problem, and by considering their characteristics, chooses a suitable set of features to model.	Identifies a comprehensive range of features of the real-world/applied problem, and by considering their relevant characteristics, selects a suitable set of salient features to model.
	• Models the problem using ADTs		Makes a limited attempt to model the selected features of the problem using ADTs that may not be suitable.	Models some features of the problem using suitable ADTs.	Models the selected features of the problem using a combination of suitable ADTs. Outlines how some features of the problem map to the data model.	Models selected features of the problem using a coherent combination of suitable ADTs. Describes how some features of the problem map to the data model. Describes signatures for some operations of the data model.	Models selected features of the problem using a coherent and fit-for-purpose combination of suitable ADTs. Describes how features of the problem map to the data model. Describes signatures for key operations of the data model.
		0 ☐	1 ☐ 2 ☐	3 ☐ 4 ☐	5 ☐ 6 ☐	7 ☐ 8 ☐	9 ☐ 10 ☐

Authentication

Authentication

- Teachers are reminded of the need to comply with the authentication requirements specified in the Assessment: School-based Assessment section of the VCE and VCAL Administrative Handbook. This is important to ensure that 'undue assistance [is] not … provided to students while undertaking assessment tasks'.

- Teachers must be aware of the requirements for the authentication of the VCE Algorithmics (HESS) School-assessed Task.

Authentication record form

Authentication record form: VCE Algorithmics (HESS) 2023

Unit 3 School-assessed Task

This form must be completed by the class teacher. It provides a record of the monitoring of the student's work in progress for authentication purposes. This form is to be retained by the school and filed. It may be collected by the VCAA as part of the School-based Assessment Audit.

Student name ………………………………………………………..   Student No [ ][ ][ ][ ][ ][ ][ ][ ][ ]

School ……………………………………………………….   Teacher: …………………………..………………………………………….

Component of School-assessed Task	Date observed and submitted	Teacher comments	Teacher's initials	Student's initials
Observation 1: Specifying and modelling the problem **(Criterion 1) Unit 3 Outcome 3 SAT – Part 1** The student specifies the problem and models it using ADTs.	Observed	Observation of the problem specification and modelling process.		
Observation 2: Designing an algorithmic solution **(Criterion 2) Unit 3 Outcome 3 SAT – Part 1** The student considers a range of approaches and designs an algorithmic solution to the problem.	Observed	Observation of the design of an algorithmic solution.		
Observation 3: Communicating the algorithmic solution **(Criterion 3) Unit 3 Outcome 3 SAT – Part 1** The student communicates their solution in pseudocode.	Observed	Observation of pseudocode.		
Observation 4: Solution justification **(Criterion 4) Unit 3 Outcome 3 SAT – Part 1** The student justifies the suitability of their solution.	Observed	Observation of the justification of the solution.		
Submission of Unit 3 Outcome 3 School-assessed Task The student submits the Unit 3 Outcome 3 SAT – Part 1 for assessment.	Submitted	Submission of Unit 3 Outcome 3 SAT – Part 1.		

I declare that all resource materials and assistance used have been acknowledged and that all unacknowledged work is my own.

Student signature ……………………………………………. Date ………………………………….

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

VICTORIA State Government

Assessment Sheet

Assessment Sheet

2023

Victorian Certificate of Education
Algorithmics (HESS) Assessment Sheet
School-assessed Task

STUDENT NAME

This assessment sheet will assist teachers to determine their score for each student. Teachers need to make judgments on the student's performance for each criterion. Teachers will be required to choose one number from 0–10 to indicate how the student performed on each criterion with comments, as appropriate. Teachers then add the subtotals to determine the total score.

STUDENT NUMBER

ASSESSING SCHOOL NUMBER

Criteria for the award of grades The extent to which the student demonstrates:	Not Shown (0)	Very Low (1–2)	Low (3–4)	Med (5–6)	High (7–8)	Very High (9–10)	Performance on Criteria: Teacher's Comments You may wish to comment on aspects of the student's work that led to your assessment.
1. Skills in specifying a problem and modelling its key features	☐	☐	☐	☐	☐	☐	
2. Skills in the design of an algorithm to solve a real-world/applied problem.	☐	☐	☐	☐	☐	☐	
3. Skills in the communication of an algorithmic solution to a real-world/applied problem.	☐	☐	☐	☐	☐	☐	
4. Skills in the justification of an algorithmic solution to a real-word/applied problem.	☐	☐	☐	☐	☐	☐	
5. Skills in determining the time complexity of algorithms.	☐	☐	☐	☐	☐	☐	
6. Understanding of the consequences of an algorithm's time complexity on its real-world application.	☐	☐	☐	☐	☐	☐	
7. Skills in the comparison of the time complexities of algorithmic solutions to a real-world/applied problem.	☐	☐	☐	☐	☐	☐	
8. Skills in the design of an improved data model and algorithm combination.	☐	☐	☐	☐	☐	☐	
9. Skills in advanced algorithmic problem solving.	☐	☐	☐	☐	☐	☐	
10. Skills in the comparison of algorithmic solutions in terms of their coherence and fitness for purpose.							

| If a student does not submit the School-assessed Task at all, N/A should be entered in the total score box. | **SUBTOTALS** | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

☐ ☐ ☐ ☐ ☐ ☐

VICTORIAN CURRICULUM AND ASSESSMENT AUTHORITY

VICTORIA State Government

Marking

Marking

- Use the rubrics from the annual Administrative information for School-based Assessment – Algorithmics (HESS)

- Mark the rubrics holistically

- Consider how you mark and the effect on statistical moderation on those marks

- The awarding of a 0 instead of an NA can affect the statistical moderation of your class results

Marking

- Late submission – this is a school-based decision with some flexibility
- NA is to be awarded when a criterion or group of is not observed and not submitted – can award a mark if observed and not submitted
- 0 is to be awarded when the work is submitted but does not meet the descriptors – students still need to be able to achieve an S

Review of presentation

In this video we looked at:

- Resources and documents
- VASS dates
- Nature and scope of the task
- Assessment criteria
- Authentication
- Assessment sheet
- Marking.

Contact

- **Phil Feain – Digital Technologies Curriculum Manager (VCAA)**

- **Ph: (03) 9059 5146**

- **Philip.Feain@education.vic.gov.au**

Authorised and published by the
Victorian Curriculum and Assessment Authority