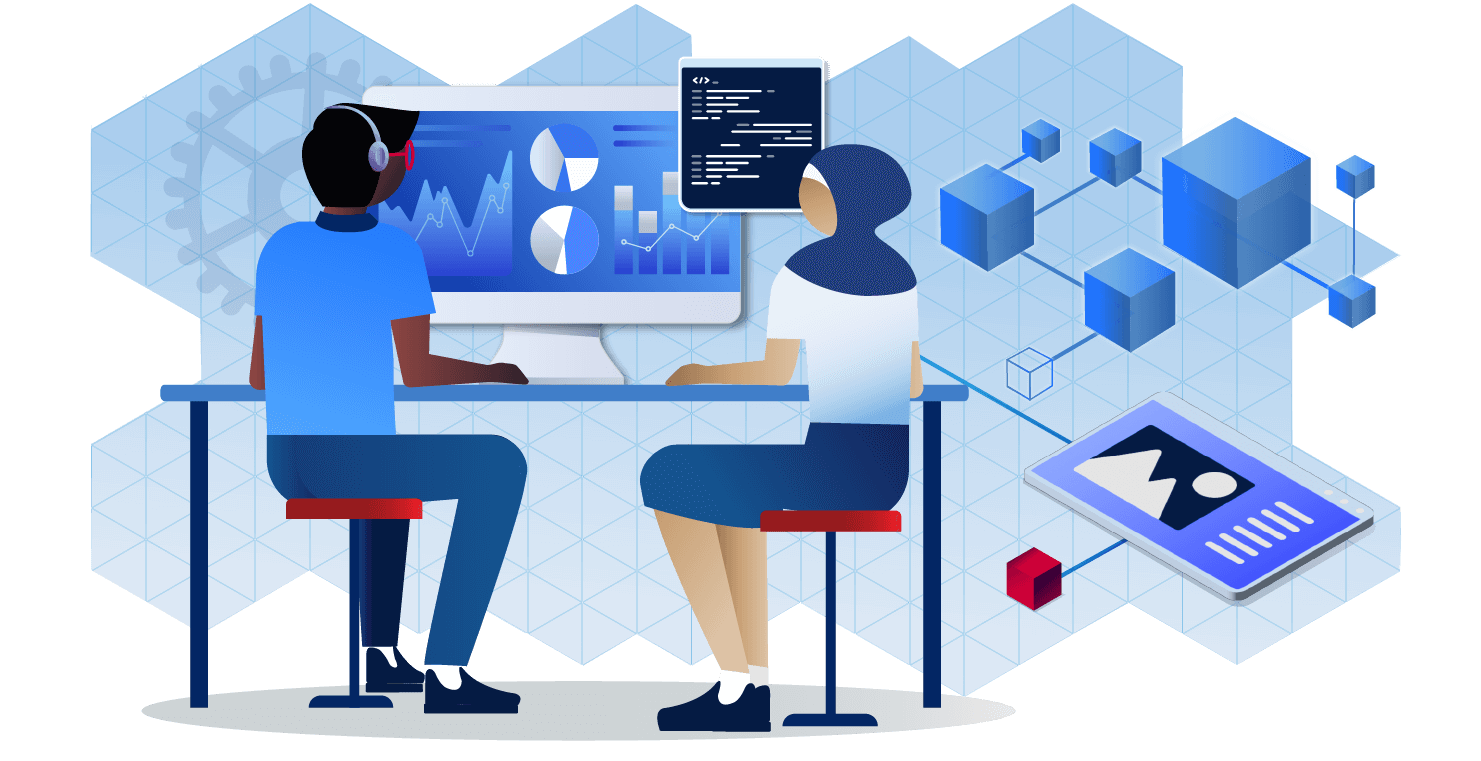
# Computing Technology Stage 5 (Year 9) – sample assessment task 2 notification



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## Task description

**Type of task: Research, create and record the development of a digital solution that requires the collection, analysis and visualisation of data to showcase a real-world problem or opportunity.**

**Outcomes being assessed:**

* applies iterative processes to define problems and plan, design, develop and evaluate computing solutions **CT5-DPM-01**
* explains how data is stored, transmitted and secured in digital systems and how information is communicated in a range of contexts **CT5-DAT-01**
* communicates ideas, processes and solutions using appropriate media **CT5-COM-01**
* applies computational, design and systems thinking to the development of computing solutions **CT5-THI-01**
* acquires, represents, analyses and visualises simple and structured data **CT5-DAT-02**

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**Suggested weighting: 35%**

Persuade the audience with data transformed into information for a real-world problem or opportunity.

The solution may take any digital form including:

* a social media awareness, education or advocacy campaign
* a prototype proposal for an app
* a webpage or wiki
* an interactive report.

The problem may be personal, school based, local, regional, national or global.

Each team collects and/or sources datasets to analyse and visualise into information used to drive decisions, answer questions and inform the proposed solution.

Datasets are analysed using software tools to create data visualisations.

**Teacher note:** ensure datasets are compatible with screen reading software for students who are blind or have low vision. Datasets may need to be presented in digital and print format.

## Submission details

Allow time in class for each student or group to present.

The presentation may take the form of a 3-minute pitch or video to the class to persuade the audience about the problem and the student or team’s solution may include using the data analysis and visualisation to inform a campaign of action.

The presentation should include the [Who? What? When? Where? Why and How](https://app.education.nsw.gov.au/digital-learning-selector/LearningActivity/Card/599#.YxA3APmsGg4.link)? of the digital solution.

Documentation including the associated spreadsheet and database files and final presentation may also be digitally submitted.

## Steps to success

Table – assessment preparation schedule

|  |  |
| --- | --- |
| Steps | What I need to do/when I need to do it |
| Introduction  Define a real-world problem (or question) that can be solved (or answered) using data analysis, visualisation and data driven decision making | * Select a topic for your presentation and confirm with your teacher its suitability for the task. * Break down the problem into manageable parts. * Describe the users of the solution. * Develop a digital solution using a range of software including a spreadsheet and a database to interpret, represent, analyse and visualise data to create information. |
| Document the project development of your digital solution | * Document the design and implementation of the solution in a project notebook, [learning portfolio](https://app.education.nsw.gov.au/digital-learning-selector/LearningActivity/Card/583#.Yw1jmzdRnLQ.link) or scaffold provided. * Recording project development can occur in multiple ways including capturing screenshots. * Demonstrate iterative design and evaluation that occurs throughout the project. |
| Create your digital solution understanding the importance of data | * Specify what data is collected, who owns it, and how it will be protected. * Use appropriate methods to collect, store, validate and verify qualitative and quantitative data, considering data integrity. * Generate alternative designs and evaluate them against the requirements to select a preferred design. |
| Create your digital solution using data analysis in a spreadsheet and database | * Represent and store data to facilitate computation. * Select appropriate data types, understanding data type limitations and structuring data systematically. * Summarise data using formulas, functions and features of a spreadsheet, including complex formulas, aggregate functions and lookup functions. * Filter, group and sort data using a spreadsheet, including using filters and sorting. * Using present data, make predictions and decisions using a spreadsheet, including creating a data dashboard or report in a spreadsheet, with decision formulas and optimisation. * Load, insert and update data in a database. * Model entities, events and their attributes using structured data. * Model the relationships between entities and events using relational data. |
| Create your digital solution using data visualisation | * Analyse data to make decisions and generate reports using a database. * Generate a data visualisation to identify trends and outliers using a range of tools. * Create interactive solutions for sharing information online with a visualisation library. |
| Evaluate the analysing data project | * Evaluate your own project and that of your peers using predetermined functional and non-functional requirements. * Evaluate sourced data processed using the 3Vs: volume, variety and velocity. * Evaluate whether solutions meet social, ethical and legal responsibilities and cybersecurity principles. * Evaluate tools and processes used in the analysis of data for validation. |

## What is the teacher looking for?

Students are to manage, document and explain individual work practices using their preferred communication method as they document the development of the solution. The record of development contains detailed and accurate lesson by lesson accounts of work completed, which includes discussions, evaluations, images and milestones.

This task will require students to choose a relevant real-world problem or issue they can investigate. Their real-world problem should be researched to ensure there are existing datasets they can utilise to persuade the class with information in the final presentation.

Understanding how they can use software such as spreadsheets and databases is developed in the learning sequence. This task focuses on students forging a journey of **collection, analysis and visualisation of data to showcase a real-world problem**.

Evaluation of students culminates in a presentation of their findings using their preferred communication method to the class.

## Marking guidelines

Table – assessment marking guidelines

|  |  |
| --- | --- |
| Grade | Marking guideline descriptors |
| A | * The student skilfully applies appropriate iterative processes to produce computing solutions. * The student develops highly effective computing solutions using computational, design and systems thinking skills. * The student selects and applies safe, secure and ethical practices in the use of data. * The student selects relevant data, media and processes to effectively communicate information in a range of contexts. |
| B | * The student applies appropriate iterative processes to produce computing solutions. * The student develops effective computing solutions using computational, design and systems thinking skills. * The student selects and applies safe, secure and ethical practices in the use of data. * The student selects relevant data, media and processes to communicate appropriate information in a range of contexts. |
| C | * The student applies iterative processes to produce computing solutions. * The student develops sound computing solutions using computational, design and systems thinking skills * The student applies safe, secure and ethical practices in the use of data. * The student selects appropriate data, media and processes to communicate information in a range of contexts. |
| D | * The student uses processes to produce computing solutions. * The student develops basic computing solutions using computational or design or systems thinking skills. * The student uses data safely and responsibly. * The student uses data to communicate basic information. |
| E | * The student identifies processes that may produce a computing solution. * The student works safely with data. * The student uses data to communicate information in a very limited way. |

## Student-facing rubric

Table – rubric for assessment

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Criteria | Limited | Basic | Sound | High | Outstanding |
| Criteria 1  Introduction | Student incorrectly identifies one (1) existing analysing data project that they will be replicating. | Student identifies one (1) analysing data project that they will be replicating and identifies the user of the system. | Student outlines one (1) analysing data project that they will be creating and breaks it down into manageable parts. The user of the system is identified. | Student accurately describes one (1) analysing data project that they will be creating and breaks it down into manageable parts. The user of the system is outlined. | Student accurately explains in detail one (1) analysing data project that they will be creating and correctly breaks it down into manageable parts. The user of the system is described. |
| Criteria 2  Functional Requirements | Student provides limited or no understanding of functional requirements. | Student provides a basic understanding of functional requirements. Including purpose, user cases, developing test cases of inputs and expected outputs. | Student provides sound knowledge and description of functional requirements. Including purpose, user cases, developing test cases of inputs and expected outputs. | Student provides a high level and thorough description of functional requirements. Including purpose, user cases, developing test cases of inputs and expected outputs. | Student provides an extensive and detailed explanation of functional requirements covering the purpose, user cases, developing test cases of inputs and expected outputs. |
| Criteria 3  Social impacts, ethical and legal responsibilities | Student provides a limited or incomplete identification of either a social or ethical issue. | Student identifies some of the following: social impacts, ethical responsibilities, legal responsibilities | Student provides an outline of social impacts and ethical and legal responsibilities in analysing data. | Student provides a high-level description of social impacts and ethical and legal responsibilities in analysing data. | Student provides an outstanding explanation of social impacts and ethical and legal responsibilities in analysing data. |
| Criteria 4  Spreadsheet | Student builds an incomplete spreadsheet. The spreadsheet does not contain the correct data or formulas for its purpose. | Student builds an incomplete spreadsheet. The model contains some working data using formulas, functions and features including using filters and sorting. | Student builds an appropriate spreadsheet. The spreadsheet contains working data using formulas, functions and features including using filters and sorting. | Student builds an effective and reliable spreadsheet that demonstrates problem solving, computational, design and systems thinking. The spreadsheet contains working data using formulas, functions and features including using filters and sorting. The spreadsheet can make predictions. | Student builds an outstanding spreadsheet that demonstrates excellent problem solving, computational, design and systems thinking. The spreadsheet contains working data using formulas, functions and features including using filters and sorting. The spreadsheet uses a dashboard to present multiple predictions. |
| Criteria 5  Database | Demonstrates an elementary understanding of database software. | Demonstrates a basic understanding of database software to develop a somewhat effective solution.  Database has structured data and reports. | Demonstrates a sound understanding of database software to develop a mostly effective and reliable solution.  Database is relational and has structured data, entities, events, and reports. | Demonstrates a thorough understanding of database software to develop an effective, reliable, and efficient solution.  Database is relational and has structured data, entities, events and can make decisions using reports. | Demonstrates an extensive understanding of database software to develop a highly effective, reliable, and efficient solution.  Database is relational and has accurate structured data, entities, events and can make accurate decisions using reports. |
| Criteria 6  Data visualisation | Data visualisation shows little connection to the analysing data project. | Student applies basic problem-solving skills to create data visualisation that identifies trends related to their data analysing project. | Student applies sound problem-solving skills to create data visualisation that identifies trends and outliers using tools related to their analysing data project. | Student applies highly developed problem-solving skills to create data visualisation that identifies trends and outliers using a range of tools.  Student creates interactive solutions for sharing information online with a visualisation library. | Student applies outstanding problem-solving skills to create data visualisation related to their analysing data project that identifies trends and outliers using a range of tools.  Student creates interactive solutions for their data analysing project sharing information online with a visualisation library. |
| Criteria 7  Presentation | Student compiles and presents a limited presentation. The presentation is unstructured. The student extensively uses notes and fails to document all aspects of the project. | Student compiles and presents a basic presentation on their analysing data project. The presentation has limited visual ques and communication is not sequenced or each aspect of the project has not been documented. | Student compiles and presents a sequenced presentation on their analysing data project. The presentation has a satisfactory sequence. The student communicates using the visual cues. Each aspect of the project is documented and outlined. | Student compiles and presents an organised and sequenced presentation on their analysing data project. The presentation reveals a clear outline, introduction, body and conclusion. The student uses communication to enhance the visual cues. Each aspect of the project is documented and discussed including providing appropriate data visualisation. | Student compiles and presents a well organised and sequenced presentation on their analysing data project. The presentation reveals a very clear outline, introduction, body and conclusion. The student communicates succinctly and their presentation enhances the use of visual cues. Each aspect of the project is well documented and explained including providing accurate and appropriate data visualisation. |
| Criteria 8  Record of project development | Students incorrectly record the journey of completing data analysis. The record is limited and incomplete and is presented inappropriately. | Students provide a basic record of project development that inaccurately illustrates the journey of completing the data analysis. The record contains incomplete lesson by lesson accounts of work completed and is word processed. | Students provide a record of project development that correctly illustrates the journey of completing the data analysis. The record contains lesson by lesson accounts of work completed which includes, discussions, evaluations, images and milestones precisely timestamped and is presented appropriately. | Students provide an accurate record of project development that correctly illustrates the journey of completing the data analysis. The record contains detailed lesson by lesson accounts of work completed which includes, discussions, evaluations, images and milestones precisely timestamped and is presented in a professional manner. | Students provide an extensive record of project development that accurately illustrates the journey of completing the data analysis. The record contains detailed and accurate lesson by lesson accounts of work completed which includes, discussions, evaluations, images and milestones precisely timestamped and is presented in a professional manner. |
| Criteria 9  Evaluation | Evaluation is incomplete and/or lists some areas of success or for improvement. | Evaluation identifies some areas of success and/or areas for improvement.  Evaluation identifies how data is processed, the ethical and social requirements and the process for validation. | Evaluation outlines areas of success and areas for improvement based on predetermined functional and non-functional requirements.  Evaluation outlines how data is processed, the ethical and social requirements and the process for validation. | Evaluation describes areas of success and areas for improvement based on predetermined functional and non-functional requirements.  Evaluation describes how data is processed, the ethical and social requirements and the process for validation. | Student evaluation is detailed and objective and explains areas of success and improvement, based on predetermined functional and non-functional requirements.  Extensive evaluation occurs around how data is processed, the ethical and social requirements and the process for validation. |

## Student support material

### Examples of a real-world issue or problem

**Note:** The teacher resource and program step students through techniques of examining data and showcase a range of datasets that could be used for their project. Students may need guidance to find an effective idea for this task.

**Real world problems** include scenarios surveyed in this unit as well as the following examples:

* Residents advocate to Council to develop infrastructure in your community. Analyse and visualise data to show the need for improved car parking, a new playground, dog off-leash parks, or development of a skate park.
* The protection of the environment and sustainable living. Analyse and visualise data to show how flora or fauna are adversely affected during natural disasters and extreme weather events.
* How to improve student health and wellbeing. Analyse and visualise data on student’s capacity to perform at school highlighting what type of activities are distracting or hindering students from learning.
* Use data to improve individual or sports team performance.
* Tell a story with data to inform, educate, influence, convince or advocate.

**Teacher note:** Provide options for students to deliver the presentation using a pre-recorded video as a presentation. Some students with disabilities such as autism and mental health/anxiety may not be able to stand in front of a class and deliver a presentation. They may however show they have excellent understanding of the content and task if allowed to make a pre-recoded video. This may be more inclusive of all students.

## Additional information

This resource has been developed to assist teachers in NSW Department of Education schools to create learning that is contextualised to their classroom. It can be used as a basis for the teacher’s own program, assessment, or scope and sequence, or be used as an example of how the new curriculum could be implemented. The resource should be used with timeframes that are created by the teacher to meet the overall schedules of assessment.

For additional support or advice, contact the TAS curriculum team by emailing TAS@det.nsw.edu.au.

### Assessment advice

Assessment is a powerful tool to measure student learning and plan for the next stages in the learning process. Some considerations in using parts of this assessment notification are:

* Consider the skills, knowledge, and understanding students need to complete the task, and see where there are opportunities for them to refine these through ongoing feedback in the learning sequences associated with the assessment task.
* Ensure the language and readability of the task presents an appropriate challenge for the students the task is being used with. Direct, plain English will allow the greatest number of students to access the task independently.
* Marking guidelines should directly reflect the success criteria and outcomes of the task and align with appropriate levels of achievement for the relevant stage.
* When constructing or adjusting the marking guidelines and/or rubric, try to keep active verbs like ‘do’, ‘say’, ‘make’, or ‘write’ in mind to measure student performance at each level. This will help to avoid subjective language.

### Assessment as a learning opportunity

Assessment can provide ways for students to use formal and informal feedback and self-assessment to help them understand where they are in their learning, where they are going, and how they are going to get there. It is essential that students receive feedback on their performance in the task and have opportunity to clarify and plan the next steps in learning.

* Clear and explicit marking rubrics can support effective self-assessment in relation to the learning intentions and success criteria assisting students to become owners of their own learning. Students can then build their capacity for individual goal setting, which includes students asking questions such as, ‘What do I need to improve?’ and ‘What is my next step?’ ([CESE Growth goals setting – what works best in practice](https://education.nsw.gov.au/about-us/educational-data/cese/publications/practical-guides-for-educators/growth-goal-setting)).
* Greater learning gains may be made when teachers provide explicit descriptive feedback to students in a timely manner. This feedback supports students in forming their learning goals as well as helping the teacher to plan for the next iteration of the teaching and learning cycle.

#### Differentiation advice

Differentiated learning can be enabled by differentiating the assessment approach to content, process, and product. Reasonable adjustments of assessment for students with disability is a legal requirement under the [Disability Standards for Education 2005 (Cth)](https://www.education.gov.au/disability-standards-education-2005). For students with a disability, adjustment in assessment tasks should be made through the [Collaborative curriculum planning](https://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/diversity-in-learning/special-education/collaborative-curriculum-planning) process. For more information on differentiation, go to [Differentiating learning](https://education.nsw.gov.au/teaching-and-learning/professional-learning/teacher-quality-and-accreditation/strong-start-great-teachers/refining-practice/differentiating-learning) and [Differentiation](https://education.nsw.gov.au/campaigns/inclusive-practice-hub/primary-school/teaching-strategies/differentiation). When using this resource, teachers can use a range of [adjustments](https://education.nsw.gov.au/teaching-and-learning/disability-learning-and-support/personalised-support-for-learning/adjustments-to-teaching-and-learning) to ensure a personalised approach to student learning.

* Some common adjustments are available through the [Inclusive Practice hub assessment and reporting](https://education.nsw.gov.au/campaigns/inclusive-practice-hub/all-resources/secondary-resources/other-pdf-resources/nesa-assessment-and-reporting) site.
* The [HPGE Differentiation Adjustment Tool](https://education.nsw.gov.au/teaching-and-learning/high-potential-and-gifted-education/supporting-educators/implement/differentiation-adjustment-strategies) and [Differentiation Package](https://schoolsnsw.sharepoint.com/sites/HPGEHub/SitePages/Home.aspx#first-time-access-to-hpge-resources) can assist teachers to decide how to provide extension and additional challenge for High Potential and Gifted (HPG) students.

The steps below may be useful to consider when creating access opportunities for all students:

* remove unnecessary words or images
* simplify any tricky words or make a glossary of subject specific words
* reduce the lexical density of the steps and use student friendly language
* chunk large passages of reading or offer alternate ways of representing the information, such as a visual
* make the task description a checklist with numbered steps
* limit options and/or reduce the number of choices students need to make independently.

### Support and alignment

**Resource evaluation and support**: all curriculum resources are prepared through a rigorous process. Resources are periodically reviewed as part of our ongoing evaluation plan to ensure currency, relevance and effectiveness. For additional support or advice, contact the TAS curriculum team by emailing [TAS@det.nsw.edu.au](mailto:TAS@det.nsw.edu.au).

**Alignment to system priorities and/or needs:** [School Excellence Policy](https://education.nsw.gov.au/policy-library/policies/pd-2016-0468), [School Success Model.](https://education.nsw.gov.au/public-schools/school-success-model/school-success-model-explained)

**Alignment to the School Excellence Framework**: this resource supports the [School Excellence Framework](https://education.nsw.gov.au/teaching-and-learning/school-excellence-and-accountability/sef-evidence-guide/resources/about-sef) element of assessment (formative assessment, summative assessment, student engagement).

**Alignment to Australian Professional Teaching Standards**: this resource supports teachers to address [Australian Professional Teaching Standards](https://educationstandards.nsw.edu.au/wps/portal/nesa/teacher-accreditation/meeting-requirements/the-standards/proficient-teacher) 5.1.2, 5.4.2.

**Consulted with**: Curriculum and Reform, Inclusive Education, Multicultural Education, Aboriginal Outcomes and Partnerships and subject matter experts

**NSW Syllabus**: Computing Technology 7–10

**Syllabus outcomes**: CT5-DPM-01, CT5-DAT-01, CT5-COM-01, CT5-THI-01, CT5-DAT-02

**Author**: TAS, Curriculum Secondary Learners, Curriculum Reform

**Publisher**: State of NSW, Department of Education

**Resource**: Assessment task notification

**Related resources**: further resources to support Computing Technology Stage 5 can be found on the [TAS curriculum page](https://education.nsw.gov.au/teaching-and-learning/curriculum/tas).

**Professional learning**: relevant professional learning is available through the TAS statewide staffroom.

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## Evidence base

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