

**Internal Assessment Resource**

**Digital Technologies & Hangarau Matihiko Level 3**

This resource supports assessment against Achievement Standard 919021

**Standard title:** Use complex techniques to develop a database

**Credits:** 4

**Resource title:** Keep Organised

**Resource reference:** Digital Technologies & Hangarau Matihiko 3.3B

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| This resource:   * Clarifies the requirements of the achievement standard * Supports good assessment practice * Should be subjected to the school’s usual assessment quality assurance process * Should be modified to make the context relevant to students in their school/kura environment and ensure that submitted evidence is authentic |

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| Date version published by Ministry of Education | December 2018 Version 1  To support internal assessment from 2019 |
| Authenticity of evidence | Teachers/kaiako must manage authenticity for any assessment from a public source, because students may have access to the assessment schedule or student exemplar material.  Using this assessment resource without modification may mean that students’ work is not authentic. The teacher may need to change figures, measurements or data sources or set a different context or topic to be investigated or a different text to read or perform. |

**Internal Assessment Resource**

**Achievement Standard:** 91902

**Standard title:**  Use complex techniques to develop a database

**Credits:** 4

**Resource title:** Keep Organised

**Resource reference:** Digital Technologies & Hangarau Matihiko 3.3B

**Teacher/Kaiako guidelines**

The following guidelines are supplied to enable teachers/kaiako to carry out valid and consistent assessment using this internal assessment resource.

Teachers/kaiako need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing students/ākonga against it.

**Context/Te Horopaki**

This assessment task requires students to use complex techniques to develop a refined database to maintain a list of items, events, tasks for a specific purpose and end-user. This includes logically designing the structure of the data, as well as organising and querying the data logically. They must also present the data effectively for the purpose and end-users of the database.

Throughout the development they should use ongoing testing procedures to refine the outcome and improve its quality. To gain excellence, students will need to demonstrate use of efficient tools and techniques.

**Conditions/Ngā Tikanga**

Conditions of Assessment related to this achievement standard can be found at <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>

**Resource requirements/Ngā Rauemi**

This assessment has been intended to be developed within a MySQL/PHP environment. Students will need:

* Read/Write access to folders sitting on an IIS or Apache2 type server
* HTTP access to a server which includes PHP modules
* A database admin tool such as phpmyadmin or MySQL Workbench

**Internal Assessment Resource**

**Achievement standard:** 91902

**Standard title:**  Use complex techniques to develop a database

**Credits:** 4

**Resource title:** Keep Organised

**Resource reference:** Digital Technologies & Hangarau Matihiko 3.3B

**Student/Akonga instructions**

**Introduction/Kupu Arataki**

This assessment task requires you to use complex techniques to develop a database to maintain a list of items, events, tasks for a specific purpose and end-user. For example, you could create a database for the school notices, canteen orders, sports events for each term, a cataloguing (booking) system for the school tablets/laptops. This includes logically designing the structure of the database, as well as organising and querying the data logically. You must also present the data effectively for the purpose and end-users of the database.

The database outcome will enable users to maintain a list of items, events, tasks for a specific purpose and end user/s.

The database outcome needs to include:

* User Authorisation/Registration
* Create, Read, Update, Delete (CRUD) operations on a list of items, events or tasks

You may work with others to help generate ideas and develop those ideas. However, you will be expected to show your own thinking and evidence of how you discussed and combined ideas together to write and submit your own work.

You are going to be assessed on how successfully you:

* apply complex techniques to logically structure, organise and query the data
* use efficient tools and techniques while producing your database
* demonstrate iterative improvement throughout the design, development and testing process, to refine and improve the quality of your database outcome
* present data effectively for the purpose and end users through the web interface
* address relevant implications (e.g. functionality, usability, security).

Teacher note: Insert due dates and timeframes

**Task/Hei Mahi**

Select the context you are developing the database for (a database for the school notices, canteen orders, sports events for each term, a cataloguing (booking) system for the school tablets/laptops).

Once you have selected your context, design your database structure:

1. Design the structure of the data and create a database which allows students and teachers to log ‘lost and found’ items.
2. The database must include the following functionality:

* Any user should be able to add an item to the database and edit their own entries.
* Only those with admin access should be able to delete or edit any entry other than their own database entries.
* The database needs to be easy to search based on key fields (see below).
* Once an item has been completed, it is marked as such. Administrators can later on inspect the database to find out what sort of events were included, how often they happened, etc.

Ensure you meet the specifications below:

Database specifications

* MySQL database with two related tables
* CRUD operations on tables
* Authentication of users

**The web interface must:**

* Allow users to create a user identity and add items to the database.
* Ensure that users can’t add obviously incorrect data (perform some data validation).
* Allow users to search the database for:
  + specific items (by name/part of a name)
  + date that the item was added (this could be a date range)
  + category (where results are sorted alphabetically)
* Allow users to update their own entries
* Allow admins to:
  + edit and delete items from the database
  + search for items that occurred within certain timeframes
* Present the data appropriately for the task and the end users.

Ensure you meet the specifications below:

Website specifications

* Forms for registration and authentication
* HTML pages that enable CRUD operations on database tables
* HTML pages that display items, events or tasks.

1. You also need to provide documentation showing:

* **Purpose and End-Users.** Describe the purpose of your database, who your end users are and how that will affect your design decisions regarding both the structure and interface.
* **Web interface** **design**. This would generally include wire frames showing the layout for
  + - the form(s) used to input data and delete items
    - the forms used to search for objects
    - the required admin forms
    - the page showing the results of a successful search.
* **Designing the structure of the data**. Include:
  + An analysis of the data requirements of your chosen context, to help you decide upon appropriate fields, tables and data types.
    - A description of the table/s and datatypes used.
    - A diagram showing how the tables are linked together (i.e. a UML diagram or similar), and a second diagram showing how the pages of the site/database are related.
    - A list of queries/features to be implemented with test data for each query (i.e. how will you ensure that the query/feature works correctly?).
* **Relevant Implications**. There are a range of implications that are relevant to your outcome. You need to provide evidence of how you have identified and addressed these in the process of developing the database and web interface. For example:
  + - Is your web interface accessible; via multiple devices or screen sizes.
    - Does your database address functionality;
      * items are displayed correctly, relevant categories can be queried
      * items added and deleted easily.
    - Is your interface readable and usable;
      * proofing of spelling
      * grammar
      * appropriate font sizes and colour contrast
      * buttons, menus are intuitive.
* **Database Refinement**. During the development of the database and interface, you will be expected to apply ongoing trialling and testing procedures to iteratively improve the quality and functionality of the database, throughout the design, development and testing of the database and web interface. Ensure that the data is logically structured, organised and queried.

You should be testing to ensure you have addressed the implications that you identified above and for the required functionality:

* + - the data input/delete form(s) works successfully and updates the database
    - error messages appear when users attempt to enter invalid data
    - the various queries work as expected and display the correct data for the end users
    - permissions work as intended.

You should include ‘before’ and ‘after’ screenshots with an explanation what you did and why, and how this improved the quality and functionality of the database.

* Testing of the final outcome may include screenshots with a table of what has been tested or a screencast with an explanation showing that the database and interface have been tested and works as expected. You should provide annotations to explain what is being shown in the screenshots or screencast.

**Assessment schedule/Mahere Aromatawai: Digital Technologies & Hangarau Matihiko 91902 – Keep Organised**

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| **Evidence/Judgements for Achievement/Paetae** | **Evidence/Judgements for Achievement with Merit/Kaiaka** | **Evidence/Judgements for Achievement with Excellence/Kairangi** |
| Use complex techniques to develop a database.  The student has:   * designed the structure of the database * used appropriate tools and techniques to organise, query and present data for a purpose and end users   **For example (partial evidence)**  They have:   * a database plan which includes at least two linked tables*,* shows the structure of the tables, shows the designs for the interfaces and a plan for linking the tables * used appropriate data types and data formatting * created a form and queries (php/MySQL) which allows user registration and authentication * created a form and queries (php/MySQL) which allow CRUD operations on a list, event or task database table.   The student has:   * applied appropriate data integrity and testing procedures   **For example (partial evidence)**  Data is validated before it is added to the database   * field names are logical and intuitive and error free * all fields pass validation rules before inserting into database * registration scripts 1st look to see if identical user exists before inserting new user   Evidence of testing has been supplied showing that adding material to the database works correctly and that the various queries return the expected results  The student has:   * explained relevant implications   **For example (partial evidence)**  The student has explained why:   * copyright/IP needs to be honoured * the database/website needs to be easy to use * the information needs to be accessible (e.g. images have alt tags and student has checked that site is readable for colour blind users) * passwords need to be hidden or encrypted * the database needs to be secure – unauthorised users cannot access, authenticated users can only see their own data.   *The examples above are indicative samples only* | Use complex techniques to develop an informed database.  The student has:   * used information from testing procedures to improve the quality of the database * structured, organised and queried the data logically   **For example (partial evidence):**  The student has attempted to remove redundant data from the database.  The form has been tested to ensure only designated users can access and edit the data.  The student tested and trialled the web interface with multiple users to ensure the database outcome/ web interface is easy to use.  The student has made improvements/changes based on the testing and user feedback.  The database output is displayed in a logical order that is easy to read and understand.  The form has been edited so that the input types restrict the input to what is allowable to improve accuracy of the data and efficiency for the user.  *The examples above are indicative samples only* | Use complex techniques to develop a refined database.  The student has:   * shown evidence of iterative improvement throughout the design, development and testing process * used efficient tools and techniques in the outcome’s production   **For example (partial evidence):**  The student used information gained from trialling of parts of the database and usability tests with both the end user and other users to make iterative improvements.  They further improved the database structure design and used feedback on trial designs.  They used results from trialling to improve the functionality and reliability of the database.  These tests and trials were made key points during the creation of the database outcome/web interface to ensure that it was fit for purpose and easy to use. For instance, they checked (and iteratively improved where appropriate):   * that the input forms had been modified to make it easier to enter data and tested that the error messages/validation rules were visible and easy to understand * improved the query results from trialling and testing so they were easier to understand * after testing showed some problems, they made it easier for users and admins to easily find and use the search bar * they modified the structure of the tables to make the most common queries run more efficiently * the database has minimal redundant data * the student has used “includes” to make efficient use of PHP scripts * the student created relationship diagrams before implementing the table structure * the student created queries that use input parameters so that scripts do not have to be duplicated.   The student has:   * presented data effectively for the purpose and end-user   **For example (partial evidence):**  Web interface is easy to use. This may include   * clear registration and authentication methods * clear and well laid out list, event or task CRUD operations * forms have correct tab order/structure and are aesthetically pleasing * error messages provide useful feedback * data is aligned well and use of CSS enhances readability, even when the web page is scaled * data is formatted correctly (e.g. numeric or text styling) for the presentation.   *The examples above are indicative samples only* |

Final grades will be decided using professional judgement based on a holistic examination of the evidence provided against the criteria in the achievement standard