

Designed for Australian Secondary Schools



Digital Technologies

ACARA Version 9.0 Band 7 - 8



Vic Farrell

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Year 8 Unit One Rubric

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Glossary

Term	Description
Agile	A flexible project management method used in software development that focuses on collaboration, customer feedback, and small, rapid releases.
Algorithms	Step-by-step sets of instructions designed to perform a task or solve a problem.
Analyse	To examine data or processes in detail to understand patterns, relationships, or outcomes.
Attributes	Characteristics or properties that describe an object or entity in computing, such as color, size, or name.
Authentication	The process of verifying the identity of a user or device, usually through passwords, biometrics, or security tokens.
Binary	A number system using only 0s and 1s, which is the fundamental language of computers.
Control Structures	Programming constructs that manage the flow of a program (e.g. if statements, loops).
Conventions	Agreed-upon standards or rules for writing code, file naming, or formatting to improve readability and consistency.
Cyber Security	The practice of protecting computers, networks, and data from unauthorized access, attacks, or damage.
Cyber Threats	Potential dangers that can harm digital systems, such as viruses, phishing attacks, or hacking.
Database	An organized collection of data that can be accessed, managed, and updated electronically.
Debug	The process of finding and fixing errors or bugs in a program or system.
Design Criteria	Specific goals, needs, and conditions that a solution must meet to be considered successful.
Digital Footprint	The trail of data left by a user's online activity, including social media, websites visited, and messages sent.
Digital Systems	Systems that process data using digital technology, including hardware, software, and networks.
Flowcharts	Diagrams that use symbols to represent steps in a process or algorithm.
Hardware	The physical parts of a computer or digital system, like the monitor, keyboard, or CPU.
Internet	A global network of interconnected computers that share information and services.
Networks	Systems that connect computers and devices to share data and resources.
Objects	In programming, self-contained components that contain data (attributes) and procedures (methods).
Pseudocode	An informal, human-readable way to plan algorithms using structured logic without specific programming syntax.
Spreadsheet	A digital tool (like Microsoft Excel or Google Sheets) used to organize, calculate, and analyze data in tables.
Structured Data	Data that is organized in a predefined format, such as rows and columns in a database or spreadsheet.
Trace	To follow the path of a program's execution to understand how it processes data or to find bugs.
User Experience (UX)	The overall experience and satisfaction a user has when interacting with a digital system or product.
User Stories	Short, simple descriptions of a feature from the perspective of an end user to guide software development.
Validate	To check data or processes to ensure accuracy, reliability, or compliance with rules.
Visualise	To represent data or information in a visual format (e.g. charts, graphs) to aid understanding.
Workloads	The amount of processing or tasks a digital system or user must handle, often used in performance measurement.

ACARA V 9.0

Below are the 18 Content Descriptions for Digital Technologies to be taught across Years 7 and 8.

Code	Content Description
AC9TDI8K01	explain how hardware specifications affect performance and select appropriate hardware for particular tasks and workloads
AC9TDI8K02	investigate how data is transmitted and secured in wired and wireless networks including the internet
AC9TDI8K03	investigate how digital systems represent text, image and audio data using integers
AC9TDI8K04	explain how and why digital systems represent integers in binary
AC9TDI8P01	acquire, store and validate data from a range of sources using software, including spreadsheets and databases
AC9TDI8P02	analyse and visualise data using a range of software, including spreadsheets and databases, to draw conclusions and make predictions by identifying trends
AC9TDI8P03	model and query the attributes of objects and events using structured data
AC9TDI8P04	define and decompose real-world problems with design criteria and by creating user stories
AC9TDI8P05	design algorithms involving nested control structures and represent them using flowcharts and pseudocode
AC9TDI8P06	trace algorithms to predict output for a given input and to identify errors
AC9TDI8P07	design the user experience of a digital system
AC9TDI8P08	generate, modify, communicate and evaluate alternative designs
AC9TDI8P09	implement, modify and debug programs involving control structures and functions in a general-purpose programming language
AC9TDI8P10	evaluate existing and student solutions against the design criteria, user stories and possible future impact
AC9TDI8P11	select and use a range of digital tools efficiently, including unfamiliar features, to create, locate and communicate content, consistently applying common conventions
AC9TDI8P12	select and use a range of digital tools efficiently and responsibly to share content online, and plan and manage individual and collaborative agile projects.
AC9TDI8P13	explain how multi-factor authentication protects an account when the password is compromised and identify phishing and other cyber security threats.
AC9TDI8P14	investigate and manage the digital footprint existing systems and student solutions collect, and assess if the data is essential to their purpose.

Unit One: Year 7

Topic One: What is a Digital System?

In this topic students investigate the nature of hardware and how computers process data and move data through networks. They will learn about the Binary number system and how it shapes the way computers work. This will lead into an investigation into data types and file types and how stored data takes up storage space. Students will investigate image, sound and video types and how they are stored. Students can learn how to animate in PowerPoint and use these skills to visualise their understanding of Digital Systems.



AC9TDI8K01



AC9TDI8K03



AC9TDI8P07



AC9TDI8K02



AC9TDI8K04



AC9TDI8P11

Topic Two: Network Privacy and Security

In this topic students further investigate the nature of networks and their vulnerabilities. Students will learn how to create a web page with HTML and investigate the importance of file management. Security measures such as multi-factor authentication, passwords and PINs are investigated in how they combat cyber threats. Students will work collaboratively to create a website that informs an audience on why these security measures are so important. Students will learn how to design a user experience in their web page, generate alternative designs, modify and debug their code and evaluate their solutions.



AC9TDI8K01



AC9TDI8K02



AC9TDI8P08



AC9TDI8P07



AC9TDI8P11



AC9TDI8P12



AC9TDI8P13



AC9TDI8P14

Unit Two: Year 8

Topic One: The Power of Data!

In this topic students investigate the nature of data how it is collected, stored and analysed. Students learn to create and edit spreadsheets with formula. The Australian Bureau of Statistics website is used to access their extensive databases applying filters and queries. Students will research through databases and use analysing techniques to create a visualisation. Students will learn about how data is structures in tables, rows and fields so that they can use techniques to find information. Students will ideate a user story and create a poster from their data research using design conventions.



AC9TDI8P01



AC9TDI8P02



AC9TDI8P03



AC9TDI8P04



AC9TDI8P08



AC9TDI8P10



AC9TDI8P11

Topic Two: Programming

This topic explores programming in Python using Microbits. Students learn about control structures: sequence, decision and loops and how they can be nested to solve a problem. Students will learn how to trace and write algorithms, design a user experience for a Microbit solution and create alternative solutions. Students will code in Python to implement and debug their project. Students will evaluate their completed solutions against design criteria.



AC9TDI8K01



AC9TDI8P05



AC9TDI8P06



AC9TDI8P07



AC9TDI8P08



AC9TDI8P09



AC9TDI8P10

How to use this book.

This book contains content and suggested activities that will support the teaching of Digital Technologies in Australian Schools. Some of the content in this book and the Digital Technologies Band 9 - 10 has been previously published in Digital Technology Years 7 - 10 (2021), but it has been re-organised and enhanced with more up to date information. It is now more clearly aligned with ACARA 9.0 Digital Technologies.

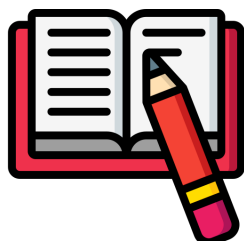
Chapter Organisation

Reading Content



Each Chapter is made up of Topics where reading is required. Students can read the Topic text themselves or you can access the resources on [teachers-pd.com](https://www.teachers-pd.com) to find a supporting video.

Research Questions



Each Topic has an activity which revises the content in the form of comprehension questions, research questions or idea generation.

Practical Tasks on a digital device



At the end of each Topic there will be at least one practical task that involves investigating the content and developing a digital literacy skill.

Other Ideas



Each Chapter will provide for other ideas not fully explored in the book and online resources that will assist.

Unit One: Year 7

Topic One: What is a Digital System?

Sections Include:

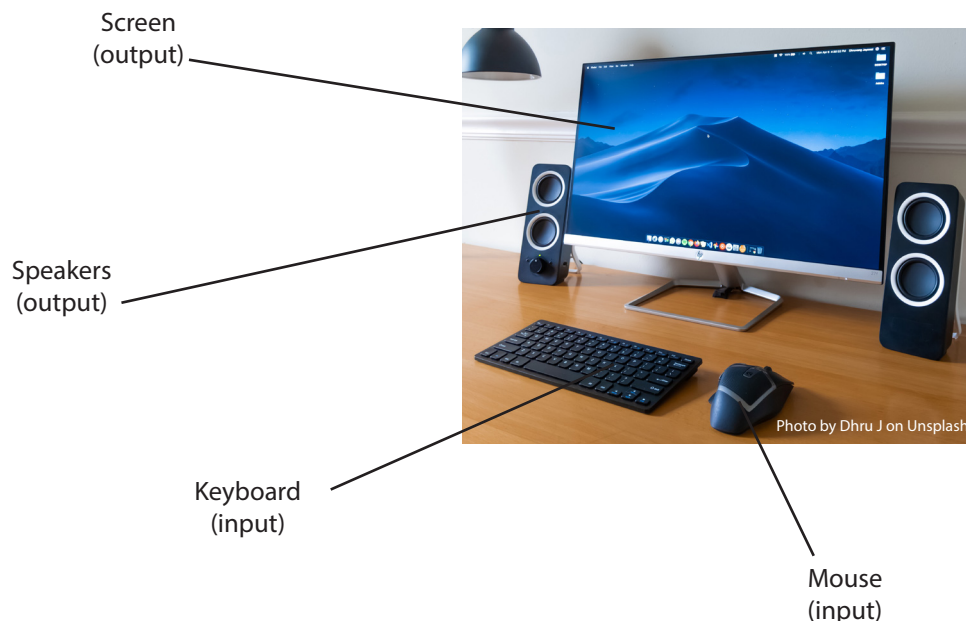
- Hardware
- Networks
- Binary
- Data Types & File Types

AC9TDI8K01: explain how hardware specifications affect performance and select appropriate hardware for particular tasks and workloads



Hardware

Hardware is the part of the computer that is physical. As users of computers, we only really interact with the input and output hardware components. Below, you can see a typical set up of a desktop computer. We type data into the keyboard and use the mouse to input instructions. We hear the information out of the speakers and see it displayed out of the screen.



What you don't see is how the input becomes output. Inside the computer are processors that do lots of calculations per second. When you buy a computer with 2.7 GHz processor, for example, is 2.7 billion instructions per second. It hard to imaging this little black square, known as a CPU (Central Processing Unit) can work so hard. When we store data so we can retrieve it later we use storage hardware such as the hard disc. Storage devices store the data in memory.

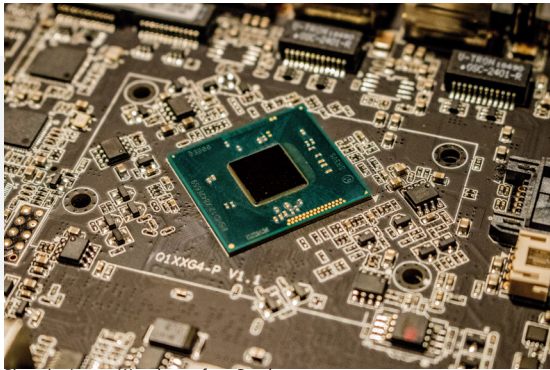
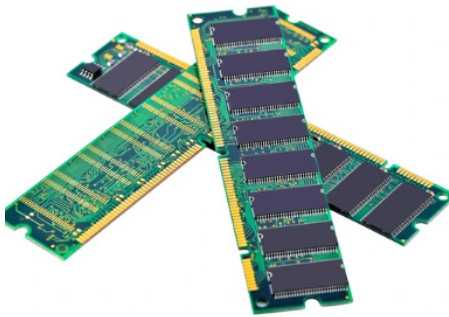


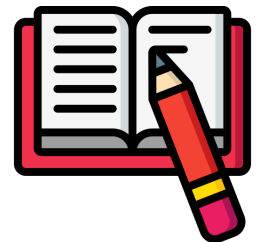
Photo by Jeremy Waterhouse from Pexels



Above is a CPU which is the brain of the computer and uses millions of circuits to process data. The three square boxes show the evolution of storage drives from hard discs to solid state. You can see they decreased in size making our laptops smaller and lighter. These drives allow for data to be permanently stored, so you can retrieve your files after you have turned off the computer.



This image on the left shows R.A.M. Cards. These are temporary memory spaces that only store data while the computer is running. This is where all the work you do is stored until you save it. Once you turn off the computer the R.A.M. Is wiped. R.A.M. Stands for Random Access Memory and it is so named due to the way it is used by the processor. The processor randomly accesses sections of memory on the cards without it being organised. Since the data there is only going to be temporary, it can be stored randomly.



Hardware Research Activity

Use your online research skills to complete the table below:

Computer Hardware Components	Image	Description
Monitor /Screen		A computer monitor is an output device that displays information as images or text.
Mouse		
Trackpad		
Keyboard		
Speakers		
CPU		
RAM		
Motherboard		
Hard-drive		



AC9TDI8P11: select and use a range of digital tools efficiently, including unfamiliar features, to create, locate and communicate content, consistently applying common conventions

Hardware Practical Activity

This activity is going to demonstrate how RAM and Hard-drives work. Students will need to use either Microsoft Word or PowerPoint to create a diagram of the hardware of a computer. Do not use online versions of these applications where they autosave.

In both Word and PowerPoint they have an INSERT menu where you can select "Shapes". Here you can select shapes to create diagrams.

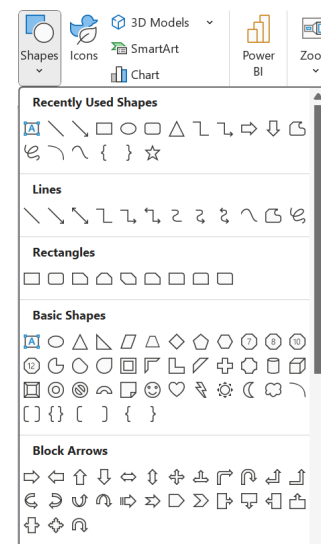
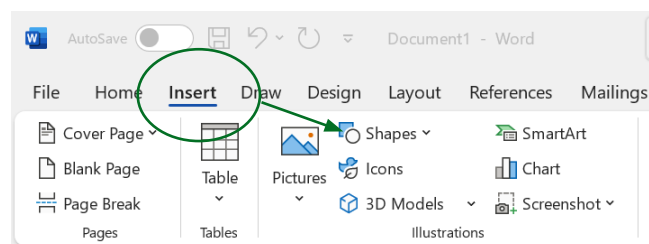
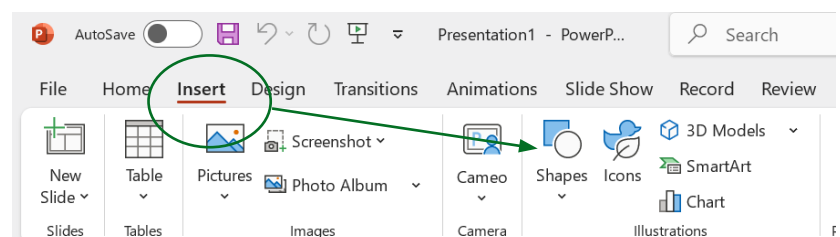
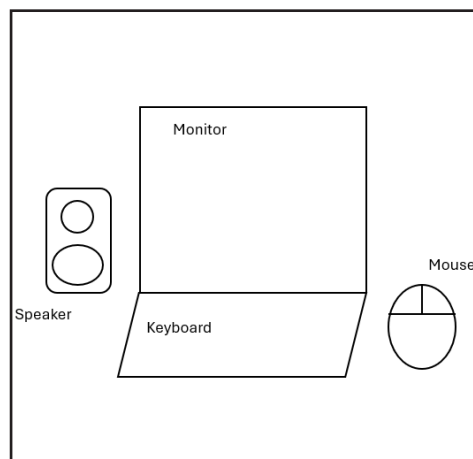
INSTRUCTIONS

1. Open the chosen software
2. Go to FILE -> SaveAs
3. Find location on the local drive (C:)
4. Name the file "Hardware Diagram"
5. Create a diagram like the one below using the shapes (see the sample on the right)
6. When you are finished you can SAVE your work by doing one of the following:

File -> Save

S +

S +



7. Now you can close PowerPoint and re-open the file. You can re-open the file TWO ways. a). Go to the file location and double click on it, or b) Open the application and select File -> Open.
8. Once your file is open again. You are going to create a new box and label it "RAM". Do not save the file!
9. Close the application and do not save changes.
10. Open your file and you will see that the box called RAM is no longer there, because you did not save it to the hard-drive. When you added the box to your illustration it was only saved in the RAM until you closed the file.

Hardware Activity Ideas



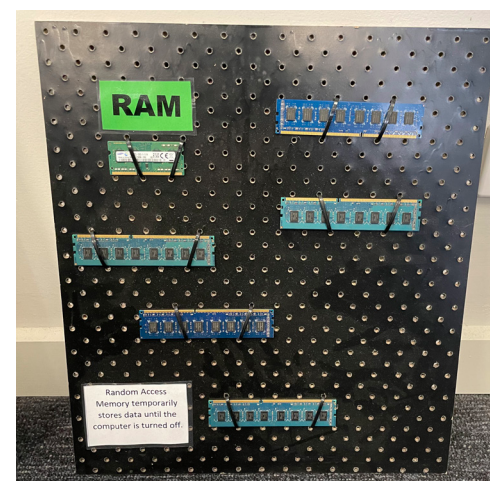
Year 7 love to get their hands on some hardware and pull it apart.

EQUIPMENT

- Pegboards (I painted mine black (below) to make them look cool.
- Bright labels of different hardware components
- Old computers that have been donated
- Hot glue gun
- Zip ties
- Various screwdrivers, pliers and snipping tools.

INSTRUCTIONS

1. Allow the students to pull apart the computers with the tools
2. Identify each of the items.
3. The CPU will be under a heat sink. You can show them how it moves heat from the CPU.
4. Use the zip ties to attach the components onto the pegboard
5. Laminate the labels and the descriptions
6. Hot glue these labels to the board.
7. Hang the boards in your computer lab!



Year 8 Digital Technologies

Topic Two: Programming

Student Name _____

Teacher Name _____

Class _____

This topic explores programming in Python using Microbits. Students learn about control structures: sequence, decision and loops and how they can be nested to solve a problem. Students will learn how to trace and write algorithms, design a user experience for a Microbit solution and create alternative solutions. Students will code in Python to implement and debug their project. Students will evaluate their completed solutions against design criteria.

Curriculum Code	Descriptor	Excellent (A)	High (B)	Sound (C)	Basic (D)	Limited (E)
AC9TDI8K01	Explain how hardware specifications affect performance and select appropriate hardware for tasks	Provides in-depth analysis of hardware specifications and justifies optimal selections for complex tasks	Explains most hardware components clearly and selects suitable options for specific tasks	Identifies basic hardware types and makes appropriate selections for common tasks	Identifies some hardware, with limited links to task needs	Shows little understanding of hardware or task relevance
AC9TDI8P05	Design algorithms involving nested control structures and represent them using flowcharts and pseudocode	Designs efficient and well-structured algorithms with multiple nested control structures, and represents them clearly using both detailed flowcharts and accurate pseudocode.	Creates logical algorithms with appropriate nested control structures, represented clearly through mostly accurate flowcharts and pseudocode	Designs basic algorithms using some nested control structures and represents them with simple flowcharts and pseudocode that generally reflect the logic.	Attempts algorithms with limited or incorrect use of nesting; flowcharts and pseudocode are present but lack clarity or completeness.	Struggles to design algorithms or use nested control structures; representations are missing or incorrect.
AC9TDI8P06	Trace algorithms to predict output for a given input and to identify errors	Accurately traces complex algorithms, consistently predicts correct output for varied inputs, and clearly identifies logical and runtime errors with detailed justification.	Effectively traces most algorithms, usually predicts correct outputs, and identifies common errors with sound reasoning.	Correctly traces simple algorithms with familiar structures, predicts basic outputs, and identifies obvious errors.	Attempts to trace algorithms but may miss key steps or make incorrect predictions; identifies some errors with assistance.	Struggles to trace algorithm steps or predict output; rarely identifies errors or provides inaccurate conclusions.
AC9TDI8P07	Design the user experience of a digital system	Designs a highly effective and intuitive user experience with accessibility and feedback considered	Designs a functional and user-friendly interface with some consideration of user needs	Creates a basic interface design that meets user needs	Interface is minimal or lacks clear user focus	Design lacks usability and relevance
AC9TDI8P08	Generate, modify, communicate and evaluate alternative designs	Generates multiple creative design options, evaluates with insight, and clearly communicates decisions	Presents alternative designs, modifies based on feedback and communicates reasoning	Produces and communicates one or two variations with basic evaluation	Attempts alternative designs but with limited evaluation or explanation	Produces one design with little communication or reflection



AC9TDI8P09	Implement, modify and debug programs involving control structures and functions in a general-purpose programming language	Expertly implements, modifies, and debugs complex programs using control structures and functions confidently.	Correctly writes and adjusts programs with varied control structures and functions; debugs with few errors.	Successfully implements basic control structures and functions; debugs common errors with guidance.	Attempts simple control structures and functions; struggles to modify or debug without support.	Fails to implement working control structures or functions; heavily reliant on assistance for debugging.
AC9TDI8P10	Evaluate existing and student solutions against the design criteria, user stories and possible future impact.	Thoroughly evaluates solutions using all criteria, user stories, and future impacts with insight.	Effectively evaluates solutions against criteria and user needs with some future consideration.	Evaluates solutions using basic criteria and user stories with limited future impact consideration.	Partially evaluates solutions with minimal reference to criteria or future consequences.	Struggles to evaluate solutions or apply criteria and user feedback meaningfully.
AC9TDI8P11	Select and use a range of digital tools efficiently to communicate content	Uses multiple advanced tools and unfamiliar features effectively and appropriately	Selects suitable tools and uses most conventions correctly	Uses familiar tools with some conventions applied	Attempts to use tools with inconsistent or inefficient use	Rarely selects or uses tools appropriately

Activity 1

The Microbit

Identify the features of the Microbit as inputs and outputs.

Inputs	Outputs

Activity 2

Your First Program

Use the Python Editor page on the Microbit.org website: <https://python.microbit.org/v/3>

Based on the default code on the site, edit it so that it shows a HAPPY face for half a second (sleep 500) followed by your name. Paste your code below.



Activity 2

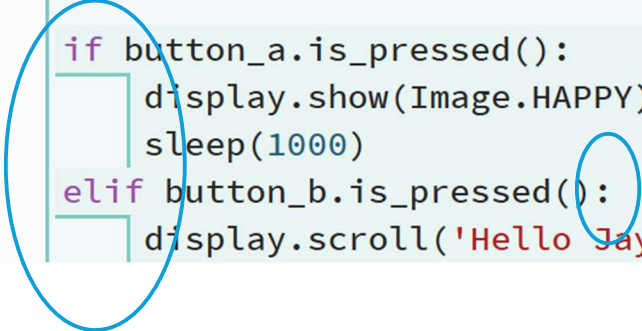
Indents & Errors

Check your indents are correctly identified with the green lines. Make sure you use your `:` to control the sections.

```

6  while True:
7
8      if button_a.is_pressed():
9          display.show(Image.HAPPY)
10         sleep(1000)
11     elif button_b.is_pressed():
12         display.scroll('Hello Jaydan')

```



Activity 3

Using Buttons

Let's use IF, ELIF, and ELSE! Create your own solution with different images or scrolled messages.

You can access all the images here: <https://microbit-micropython.readthedocs.io/en/latest/tutorials/images.html>

Paste your solution below.

```

6  while True:
7      if button_a.is_pressed():
8          display.show(Image.HAPPY)
9      elif button_b.is_pressed():
10         display.show(Image.DUCK)
11     else:
12         display.show(Image.SILLY)

```

Activity 4

Both Buttons to Clear

Let's add a new feature to our app. Keep all the features from Activity 3 and add a feature that allows the user to press the A and B buttons together to clear the screen. P

```

6  while True:
7      if button_a.is_pressed() and button_b.is_pressed():
8          display.clear()
9      elif button_a.is_pressed():
10         display.show(Image.HAPPY)
11     elif button_b.is_pressed():
12         display.show(Image.DUCK)
13     else:
14         display.show(Image.SILLY)

```



Activity 5**Counting with a loop**

Let's create a new app that counts from 0 to 5.

```

6  while True:
7      for i in range (5):
8          display.scroll(i)

```

Activity 6**The Accelerometer**

```

2  from microbit import *
3
4  while True:
5      if accelerometer.was_gesture('shake'):
6          display.show(Image.ANGRY)
7          sleep(500)
8

```

Activity 7**Step Counter**

```

2  from microbit import *
3
4  steps=0
5
6  while True:
7      if accelerometer.was_gesture('shake'):
8          steps += 1
9          display.show(steps)

```

Activity 8**Thermometer**

```

1  # Imports go at the top
2  from microbit import *
3
4  while True:
5      if button_a.was_pressed():
6          display.scroll(temperature())

```





✔ DigitalTechnology_Band_7_8_2025.pdf



✔ DigitalTechnology_Band_7_8_2025.zip



✔ FullRubric.docx



✔ Year 7 Topic 1 Student Workbook SOLUTIONS....



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✔ Year 7 Topic 2 Student Workbook SOLUTIONS....



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✔ Year 8 Topic 2 Student Workbook SOLUTIONS....