**Recognising AI**

**Years 5–6, 7–8**

Please refer to the online lesson plan on the DT Hub to access all website links and additional resources.

Use the tasks in this lesson to introduce concepts that underpin artificial intelligence (AI). The majority of the tasks are unplugged (do not require a digital device). Students will:

* use a card sort to group and classify information systems according to AI-related questions
* introduce the schema of input–process–output to explain how an AI works
* pose a series of questions organised into a flow chart and presented as a computer program to determine if an application uses AI
* (as an assessment task) use a graphic organiser to describe what they know about AI.

# Curriculum links

| Links with Australian Curriculum: Digital Technologies. |
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| Year | Content description |
| 5-6 | Examine how digital systems form networks to transmit data (AC9TDI6K02) Explain how digital systems represent all data using numbers (AC9TDI6K03) Define problems with given or co-developed design criteria and by creating user stories (AC9TDI6P01) Evaluate existing and student solutions against the design criteria and user stories and their broader community impact (AC9TDI6P06) |
| 7-8 | Investigate how data is transmitted and secured in wired and wireless networks including the internet (AC9TDI8K02) Explain how and why digital systems represent integers in binary (AC9TDI8K04) Define and decompose real-world problems with design criteria and by creating user stories (AC9TDI8P04) Evaluate existing and student solutions against the design criteria, user stories and possible future impact (AC9TDI8P10) |

| Links with Australian Curriculum: English |
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| Year | Content description |
| 5-6 | Literacy: Phonic and word knowledge* Use knowledge of known words, word origins including some Latin and Greek roots, base words, prefixes, suffixes, letter patterns and spelling generalisations to spell new words including technical words (AC9E6LY09 )
* Build and spell new words from knowledge of known words, base words, prefixes and suffixes, word origins, letter patterns and spelling generalisations (AC9E5LY09 )

Language: Language for expressing and developing ideasIdentify and explain how images, figures, tables, diagrams, maps and graphs contribute to meaning (AC9E6LA07 ) |
| 7 - 8 | Language: Language for expressing and developing ideas * Investigate the role of vocabulary in building specialist and technical knowledge, including terms that have both everyday and technical meanings (AC9E7LA08 )

Literacy: Word knowledge* Understand how to use spelling rules and word origins; for example, Greek and Latin roots, base words, suffixes, prefixes and spelling patterns to learn new words and how to spell them (AC9E7LY08 )
* Apply learnt knowledge to spell accurately and to learn new words (AC9E8LY08 )
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# Step 1 Explore examples and uses of information systems using AI.

Talk through some examples of information systems that use AI. Why is the AI-based system used? What are its benefits and what issues might arise? Introduce the concept that AI uses data (input), processes the data to make a prediction (process) and makes some sort of decision or action (output). Here are some relevant examples.

Biometric security: A smartphone can be unlocked by scanning the user’s face, the iris of their eye, or their fingerprint (input). The system uses image recognition and feature extraction (input). The system is looking for an image that is a close match (process). If the scan does not reveal a close match, access to the smartphone is denied (output). Users don’t need to remember a password – this form of security is designed to improve user experience. Might/can the system be fooled? How?

Video streaming services: Online content providers often use a user’s past viewing behaviours and profile (input) to suggest content they might like (output). The system bases its suggestions on the analysis of data from a vast number of users with similar profiles and behaviours (process). However, these systems need to protect the user’s personal information, which could otherwise be misused.

A virtual assistant: A user asks a virtual assistant a question, it senses their voice (input) and uses speech recognition software to identify key words, which it uses to work out what information the user needs (process). The assistant also keeps track of the context the user operates in, for example navigation or dining. It suggests relevant information (output). Is your personal information safe when using these devices?

**Create a word wall of AI-related terms, and reinforce an understanding of them.**

The word wall terms may include:
Machine learning (ML), Deep learning (DL), Supervised learning (SL), Classification, Biometrics, Facial recognition, Voice recognition, Speech recognition, Natural-language processing, Computer vision.

Link to English

Discuss with students how employing a knowledge of known words, word origins and spelling generalisations can help them to spell technical terms.

Reinforce the spelling and understanding of each term by encouraging students to develop a definition that is easy to understand.

# Step 2 **Students explore AI-systems firsthand.**

Some suggested applications include:

* MyComputerBrain Home Automation
* Quick, Draw!
* Smartphone assistants such as Siri or virtual assistants such as Google Home.

Ask your students these questions:

* What is the application doing that you might consider to be ‘smart’?
* What are the giveaways or evidence that the system uses AI?
* In the application being explored, what data is/was used as the input?

AI uses data to make some sort of decision and take some form of action (best guess). But the data it uses is often imprecise or incomplete. Human decision-making is similar. An AI system will always try to come up with a decision. If it is uncertain about anything, the system will inform the user of this, and try to get more information.

# Step 3 Sort and Classify

This revolves around the question ‘Does it use AI?’

Students sort cards of information systems, some of which use AI and others that don’t. In pairs or small group, students discuss which ones they think use AI and sort them accordingly. For the categorisation, ask students to think about what data is being used and how it might be used by the application. Does it use the data in a useful, sensible way (smart)?

Download and print the cards **Does it use AI?**  Cut the cards out and give them to your students. Students sort the cards into those that use AI, those that might use AI (unsure) and those that don’t. The ones that do use AI can be further grouped according to:

* type of AI (image recognition, speech recognition, text recognition)
* uses large amounts of data
* the way in which the AI helps the user (lifestyle/entertainment, travel, information, protection, purchasing).

See below for the wording on the cards and a system for grouping these cards.

Possible card groupings

Question mark (unsure), cross (no AI), tick (yes, AI). Note: some examples might be more challenging than others and may depend on certain circumstances.

* Use an online map to find your way to a selected location. *(The application might provide alternative routes based on fastest journey times. If so, then it uses AI.)*
* Use an online dictionary. *(The system may prompt words as you type, which would suggest it is using AI.)*
* View a blog.
* Watch free to air television.
* Play a quiz app on your smartphone.
* Play a video game not connected to the internetPlay a video game not connected to the internet
* Use suggested search terms while searching online.
* A photo is tagged in a social media app.
* Talk to a chatbot to get product information.
* Control home appliances using a virtual assistant.
* View a YouTube video recommended to you.
* Use the predictive text when creating a text message.
* Unlock a phone using thumbprint or iris scan.
* Test drive a driverless car.
* Use a voice assistant on a smartphone.
* Translate spoken words into another language.
* Spam is blocked from your inbox.

# Step 4 Input, process and output

This revolves around input, process and output in AI systems.

Discuss with students that an AI system requires an input – some form of data, which the AI processes in some way, makes a prediction based on that data, then provides an output.

Download and print the **Input, process and output cards (PDF**). Cut out the cards and give them to the students. Students sort and match these cards to the AI system cards used in the previous activity.

These cards could be provided to students in small groups to sort on a large table.

Alternatively, each student gets one card, either an input, process, output or an AI application card. Students mingle around the room looking for the three other students who have cards that are a match. A benefit of this is that fewer cards need to be printed; however, students don’t get to sort all cards.

Another alternative is to play a card game in small groups with a complete deck of cards (including the AI cards and the input, process and output cards). Shuffle the cards and deal out eight cards. The aim of the game is to get two complete sets of matched cards with no spares remaining.

A matched example:



When all the cards have been matched, students share their groupings as a class. A teacher answer sheet is also available (refer to online lesson plan)

Assessment

Ask students to play the Scratch game *AI four of a kind.* Students can reflect on the game and their correct and incorrect matches. They describe what they learned about input–process–output of an AI.

# Step 5 Is it an AI application?

This involves students engaging with a Scratch computer program, answering a series of questions to help them decide if the application is AI-based. The activity does not require any student programming.

Provide students with the link to the Scratch computer program Is it an AI application or machine? This Scratch computer program is based on the flow chart made by Karen Hao.

Ask students in groups to see the answer the series of questions about each of the applications shown at the top right area the Scratch screen. As they answer, they need to draw on their discussions and learnings developed through the previous card-sorting activities.

Note: The Scratch program does not provide answers or feedback to say that some assumptions are incorrect; it deals more with the thought process for students to engage in as they respond to the questions.

# Assessment

Find out what your students already know about AI.

Provide students with the handout *What I know about AI*, which contains a graphic organiser referred to as a thinkboard. View the article linked online for mor information about the Frayer model.

The sheet asks students to do these four things:

* Write a definition.
* List the characteristics or features of AI.
* List some examples that use AI.
* List examples that are not (or do not use) AI.