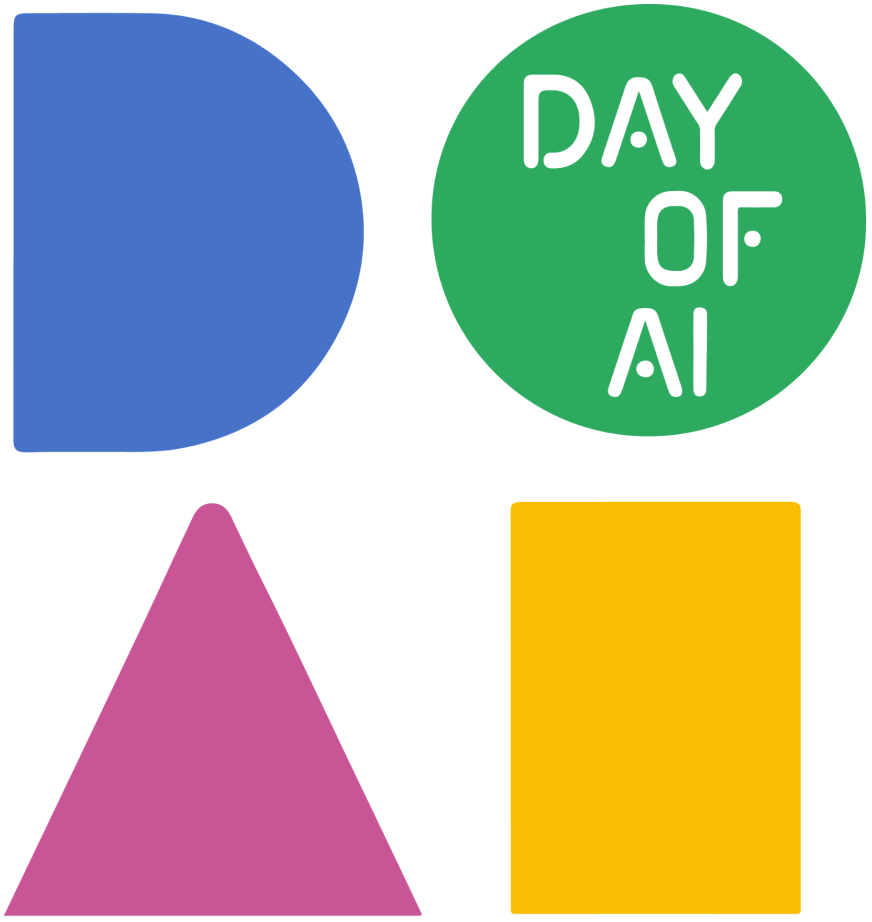

AUSTRALIA

Lesson 1:
What is Artificial Intelligence?

LESSON PLAN

DAYOFAIAUSTRALIA.COM

Lesson 1: What is Artificial Intelligence? | 45 mins

Lesson Summary

In this lesson, students explore Artificial Intelligence (AI) through interactive activities, discussions, and videos. They dissect the term "AI" and its components, engaging with the 5 Big Ideas of AI to understand its capabilities. Through a captivating game, "AI or Not?", they apply their knowledge to classify technology. Finally, students get hands on and have fun with 'Google Quick, Draw!' and learn about the core AI mechanics — datasets, algorithms, and predictions — laying the groundwork for deeper exploration.

Objectives

- Students will be introduced to the **5 Big Ideas of AI**
- Students will develop an understanding of what Artificial Intelligence (AI) is
- Students will compare examples of technology and classify them as AI or not AI
- Students will learn about data and the different forms it can take

Curriculum Alignment

This lesson is linked to the following Australian Curriculum (Version 9) content descriptors:

- **Years 5 and 6**
  - AC9TDI6K01: investigate the main internal components of common digital systems and their function.
  - AC9TDI6K03: explain how digital systems represent all data using numbers.
  - AC9TDI6P10: explain the creation and permanence of their digital footprint and consider privacy when collecting user data.
- **Years 7 and 8**
  - AC9TDI8K03: explain how digital systems represent all data using numbers.
  - AC9TDI8P02: analyse and visualise data using a range of software, including spreadsheets and databases, to draw conclusions and make predictions by identifying trends.
  - AC9TDI8P14: investigate and manage the digital footprint existing systems and student solutions collect and assess if the data is essential to their purpose.
- **Years 9 and 10**
  - AC9TDI10P02: analyse and visualise data interactively using a range of software, including spreadsheets and databases, to draw conclusions and make predictions by identifying trends and outliers.

Vocabulary

- **Artificial**, adj. made by humans, especially in imitation of something natural
- **Intelligence**, n. the ability to learn or understand
- **Artificial intelligence**, n. a program made by people that makes computers do things that seem intelligent (or smart) in the same way that humans are intelligent

- **Understand**, v. to grasp the meaning of
- **Perceive**, v. to become aware of, know, or identify through one the senses (sight, taste, smell, hear, touch)
- **Interact**, v. to communicate with or react
- **Data**, n. information that is represented digitally on a computer
- **Dataset**, n. a curated, organised collection of related data

Resources

- Presentation Slides for lesson (available on website once logged in)
- Toy pet video (embedded in the lesson slides)
- Self-driving car video (embedded in the lesson slides)
- Google Quick, Draw!
- Google Quick, Draw! The Data

Activity Steps

1. **2 mins.** Welcome students to the day, and mention that they are one of hundreds of classrooms across Australia taking part in Day of AI!
    a. Talk briefly about the use of AI and how it is all around us. Throughout the day, students will be exposed to unique case studies that capture how AI is being used in Australia; in our homes, local communities and in our natural environment.
2. **2 mins.** Ask students what they think of when they hear the words "artificial intelligence". Over the next few slides, we will define those two words separately and then come up with a definition for what AI is.
3. **2 mins.** To come up with a good definition for AI we should look at each word separately. The word **Artificial** is used to describe something which is not natural and is usually made by people. Have the class share examples of things that are "artificial". Use a whiteboard or chart paper to write down definitions or examples they come up with. (Artificial food, artificial body parts, etc.) If no one brings it up, make sure that **technology, machines, and robots** come up.
4. **2 mins.** Move on to **Intelligence.** Intelligence is something related to using your mind to do things like understand what is going on, apply knowledge, solve problems, and be creative (there are no simple definitions of intelligence!) Have the class share out actions they would describe as intelligent. Make sure you consider intelligence in areas that are not just "getting good grades". If no one explicitly says them, make sure you write the ability to **understand, learn, and plan.**
5. **1 min.** Connecting the two ideas, share the proposed definition of artificial intelligence with the class and check to see if everyone agrees with that definition.
6. **2 mins.** Introduce the **5 Big Ideas of AI**. This model of AI comes from the AI for K-12 initiative and offers 5 key characteristics and concepts relating to artificial intelligence. Namely; **perception, representation & reasoning, learning, natural interaction and societal impact.** We will refer back to these ideas throughout each of the lessons. For now, we use the model to establish 5 things AI can do:
    a. It can **understand** its environment.
    b. It can **plan** and make decisions.
    c. It can **learn** new knowledge and skills.
    d. It can **interact** with humans and the environment.

e. It has an **impact** on society.

7. **4 mins.** Show the toy pet and self-driving car videos (also available in the Lesson Slides). Take note of how both examples are clearly artificial, but also how they are both seemingly intelligent, based on our earlier definition of artificial intelligence.
8. **2 mins.** Ask the students if they thought that the pet and the car in the video were artificially intelligent. Discuss at least one example from the videos that touch on each of the **5 Big Ideas:**
    a. **Understand:** Toy pets and self-driving cars often have cameras and other sensors that can see objects around them.
    b. **Plan:** Toy pets decide how they should act based on what time of day it is, and self-driving cars plan their route based on traffic and street signs.
    c. **Learn:** Toy pets and self-driving cars are trained and can be re-trained to take in new information, to better predict how they should behave or move around on the road.
    d. **Interact:** Toy pets control their arms, legs, and tail to respond to their owner, and self-driving cars control all parts of a car to constantly respond to the environment.
    e. **Impact:** Toy pets can generate an emotional bond and response from humans, and self-driving cars enable people with disabilities to travel safely by car without a driver.
9. **4 mins.** Students will now play a game called **"AI or Not?"**, where they must identify if a piece of technology is an example of AI or not. Give students 1 minute for each object to determine if it meets the criteria outlined by the **5 Big Ideas of AI:**
    a. **Understand:** There is a difference between perceiving/understanding the environment and just sensing it. A camera senses light and colours, but does not know what objects they represent. It may also detect an object, but may not recognise what the object is.
    b. **Plan:** There is a difference between making a plan and following a plan. GPS apps make a plan by considering multiple different routes against variables like distance, speed limits, traffic conditions and more. A robot vacuum cleaner follows a set path, with limited ability to avoid obstacles but without ever improving.
    c. **Learn:** There is a difference between learning and using a knowledge bank. Computer programs that play simple games with no element of chance, like Tic Tac Toe or Checkers, can win every time. However, they are not learning how to beat their opponent, they are following precise mathematical and logical instructions for the game. Games like Chess require a computer to learn by studying many, many games of Chess and react to their opponent's strategy while playing.
    d. **Interact:** There is a difference between proactively interacting with an environment and reactively following a script. Automated voicemail systems can talk with you but you can generally only use predefined options to move through a conversation. Modern voice assistants, such as Siri and Alexa, can respond to almost any question, no matter how you phrase it.
    e. **Impact:** This Big Idea is not an essential component of AI per se, but it is important to consider how AI technologies may or may not impact society.

(Bonus Hint) Intelligence vs. Programming: Is the object making intelligent actions on its own or did all of the intelligence come from the humans who interact with it?

✎ **NOTE**

This is not one of the 5 Big Ideas of AI, however it is a useful way to think about artificial technology that is not necessarily AI, but that simply responds to user instruction. E.g. A remote-controlled robot is not AI, since it requires human input.

10. **1 min.** Show the correct answers to the game and check that everyone understands why these answers are correct.
11. **1 min.** Pose the question of how machines become intelligent.
    a. The next few slides step through a model of **data** feeding into an **algorithm** which results in a **prediction**. We will touch on each part of this model, focusing mainly on the **prediction** that is produced by AI.
12. **2 mins.** Explain to the class that **data** is information that is represented digitally. Data can include anything! We typically think of data as numbers, but it could also be text, video, images and more. Additionally, these forms of data represent **information** that means something, e.g. 25°C is a piece of data, and the information is the physical temperature that number and symbol represent.

     **EXTENSION QUESTIONS:** Do you own data about you? Do you think companies should be allowed to use your data, if their product or service is free?
13. **1 min**. Next, touch on **algorithms.** We do not dive deep into algorithms, suffice to say that they are the models that are trained using data to produce our predictions. Algorithms are a series of steps to achieve a goal, e.g. to learn what a cat looks like, and what a dog looks like, so that the AI can then tell them apart.
14. **3 mins.** Ask the students if they know what a **prediction** is. How does a person make a prediction? If no one says it, make sure you point out that predictions are often made based on prior knowledge. It is part of learning and therefore intelligence.
15. **3 mins.** Tell students that you are going to play a game, where you are going to start drawing an image on the board and they are going to try to predict what you are drawing in less than 20 seconds. Ask one student to be the timer and the rest of the students the guessers.

     Begin drawing some simple images (you can use any that you would like, but we would suggest a house, a bird, a clock, an apple or anything else you feel comfortable drawing and you think will be easily recognizable to your students.) Tell the students that they can shout out their predictions while you are drawing and the timer will record how long it takes you to correctly predict each one. You can draw as many images as you would like, but we would suggest at least 3 or 4.
16. **1 min.** Ask the students how they were able to predict the correct answers so often given that you had not told them what you were drawing, and they would not have seen any of those exact

drawings ever before. Make sure that it comes out that they used images or pictures of other houses, birds, clocks that they had seen before and "matched" them to the shapes you were drawing to make a prediction.

17. **2 mins.** Explain that the images and pictures they have seen before are part of a personal **"dataset"**: a collection of related pieces of data, that they may not think about, but use all the time. Talk about how that is often how we predict and make decisions about things without even thinking about it.
    a. A dataset could be a collection of any form of data, e.g. lots of temperature readings, lots of pictures of cats or lots of pieces of music in the same genre.
    b. For example, they could recognise you drawing a tree, because they have seen lots of trees and know what they look like. They also know how people usually draw trees, and so they know what a drawing of a tree looks like.
18. **2 mins.** Tell the students that we are now going to test a machine which is going to try to do the same thing they just did. Ask them to go to Google Quick, Draw in their student webpage. Each of them should follow the instructions and draw the items that they are asked to draw.

> ✎ **NOTE**
>
> **If you want to, you can project your screen and demonstrate yourself using 'Google Quick, Draw' first and then ask them to do it themselves.**

19. **5 mins.** Give students an opportunity to play on 'Google Quick, Draw'. After the students have had a chance to play with it, ask them how many of their drawings 'Google Quick, Draw' was able to guess correctly, and how fast it was. Ask them how they think 'Google Quick, Draw' did that.
20. **2 mins.** Show students the Google Quick, Draw dataset. Explain that the machine uses that dataset in a very similar way to how we used our own personal datasets to predict its answer. Ask the students if they think 'Google Quick, Draw' has intelligence. Why or why not?
21. **1 min.** Return to the idea of **dataset → algorithm → prediction.** We have looked at datasets and predictions, but how does a machine take data and make a prediction? That is our next lesson.

END OF LESSON PLAN