

# The Black Box: Decoding the System

(Year 9 - Ages 14-15)

## Lesson 3 of 9

### Lesson Summary

In Lesson 2, we debugged our own biases. In Lesson 3, we debug the System. This 60-minute lesson invites students to look inside the "Black Box" of organ allocation. How does the medical system decide who gets a life-saving heart when there are two people waiting? Is it random? Is it fair?

Students will act as "Ethical Hackers," analyzing the algorithms used to match donors and recipients. They will grapple with the tension between Utility (saving the most years of life) and Equity (giving everyone a fair chance). The lesson concludes with a "Future Forecast" on how Artificial Intelligence (AI) might remove—or worsen—bias in this high-stakes code.

### Learning Intentions

Students will .....

- Investigate the criteria used in the Australian organ allocation system (e.g., urgency, tissue match, waiting time).
- Analyze the ethical tension between Utilitarianism (Efficiency) and Egalitarianism (Fairness) in medical decision-making.
- Evaluate the role of technology (algorithms/AI) in making life-and-death decisions.
- Debate complex ethical scenarios ("The Lifeboat Problem") to understand the difficulty of the allocation process.

### Success Criteria

Students can .....

- List three key factors used to match organs (e.g., Blood Type, Size, Urgency).
- Explain why "Social Status" (money/fame) is excluded from the algorithm.
- Apply an ethical framework (Utility vs. Equity) to justify a decision in a hypothetical matching scenario.
- Discuss one potential risk and one benefit of using AI in future transplantation.

### Lesson Details

Time:	60 minutes
Year Level:	Year 9 (Ages 14-15)
Unit:	This is Lesson 3 of 9 in the series.
Educational Partner:	This lesson is adapted from resources provided by DonateLife

### General Capabilities

Ethical Understanding; Critical and Creative Thinking; ICT Capability (AI & Algorithms); Intercultural Understanding.



# Curriculum Mapping and Links

## Australian Curriculum (v9.0)

Subject	Strand	Content Descriptor
Science	Science as a Human Endeavour	<u>AC9S9H02</u> : Investigate how scientific knowledge is used to solve problems... and the ethical considerations involved. (Focus on allocation ethics)
Civics and Citizenship	Knowledge and Understanding	<u>AC9HS9K01</u> : The key features of Australia's system of government... and the values of justice. (Focus on fairness in public systems)
HPE / Philosophy	Ethical Inquiry	Reasoning about moral dilemmas and distributive justice.

## Queensland Curriculum (QCAA)

Subject	Syllabus	Content Description
Science	Year 9	Scientific knowledge is used to inform personal and community decisions (Ethics).
Civics and Citizenship	Year 9	How citizens participate in society and the principles of justice.
HPE / Philosophy	Year 9	Evaluate health information and services.



## Resources Required

- Whiteboard/Smartboard.
- Resource: "The Algorithm Cards" (Profile cards of 3 hypothetical patients waiting for the same heart).
- Student Worksheet: "The Ethical Hacker's Logbook."
- Video Hook: A clip on "The Trolley Problem" or "AI Bias" to introduce ethical dilemmas.
- Prop: A "Black Box" (cardboard box painted black) containing the "Rules" of allocation.

## Skills

- Ethical Reasoning (Weighing competing values).
- Algorithmic Thinking (Understanding rules-based systems).
- Debating (Justifying difficult choices).
- Empathy (Understanding the impact on patients).

## Teacher Preparation

- The Metaphor: "The Black Box." In computing, a black box is a system where you see the input and output, but not the workings. The donation system feels like a black box to patients. Today, we open it.
- Key Concepts:
  - Utility: Getting the most "bang for buck" (e.g., giving a heart to a 20-year-old vs. a 70-year-old).
  - Equity: Treating everyone the same (e.g., First come, first served).
  - The Australian System: It uses a mix. It prioritizes clinical urgency and matching over waiting time.
- Prepare the Cards: Create 3 profiles:
  - Patient A: 15 years old, genetic condition, high success chance.
  - Patient B: 45 years old, mother of 3, moderate success chance.
  - Patient C: 60 years old, famous scientist, lower success chance but high social value.

## Additional Information

This lesson appeals to the Logic/Math/Coding students. It strips away the emotion to look at the "Code" of fairness. It forces students to make impossible decisions, helping them appreciate why the system must be robust, transparent, and protected from corruption

