

The Black Box: Decoding the System

(Year 9 - Ages 14-15)

Lesson 3 of 9

Lesson Overview

Lesson Title:	The Black Box: Decoding the System
Year Level:	Year 9 (Ages 14-15)
Lesson Duration:	60 minutes
Key Focus Areas:	Ethics (Utility vs Equity), Algorithms, AI, Social Justice.
Curriculum Links:	<p>Australian Curriculum – Health and Physical Education (Foundation)</p> <ul style="list-style-type: none">• <u>AC9S9H02</u>: Investigate how scientific knowledge is used to solve problems... and the ethical considerations involved. (Focus on allocation ethics)• <u>AC9HS9K01</u>: The key features of Australia's system of government... and the values of justice. (Focus on fairness in public systems)• Reasoning about moral dilemmas and distributive justice.

Learning Intentions

- 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

- 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.



Teaching Sequence

Work through this lesson in the following sequence:

Duration	Part	Focus
10 minutes	Part A: The Black Box	Hook: The Trolley Problem / Introduction to Allocation.
15 minutes	Part B: The Criteria	Worksheet: Ranking the factors (Medical vs. Social).
20 minutes	Part C: The Lifeboat	Group Activity: Choosing between Patient A, B, and C.
15 minutes	Part D: The Future Code	Discussion: AI Bias and the "Blind" Principle.

Part A: The Black Box (10 minutes)

Step 1. The Hook

- Visual: Show "The Trolley Problem" image.
- Ask: "You have to pull the lever. Who do you save? 1 person or 5? A doctor or a child?"
- Link: "This isn't just a puzzle. Transplant doctors face this every day. Today, we look at the Algorithm that helps them decide."

Part B: The Criteria (15 minutes)

Step 1. The Rules

- Explain: "In Australia, we don't look at money or fame. We look at: Match, Urgency, and Benefit."
- Task: Students complete Part 1 of the Student Worksheet.
- Discussion: "Why is Age tricky? Is a young life worth more than an old life?"

Part C: The Lifeboat (20 minutes)

Step 1. The Simulation

- Activity: Small groups. Give them the profiles (Patient A, B, C).
- Constraint: "There is ONE heart. You have 5 minutes to decide. You must write down why."

Step 2. The Reveal

- Debrief: Ask groups to reveal their choice.
 - Likely outcome: Split decision. Some choose the Teen (Life years), some the Mum (Dependents), some the Surgeon (Social Utility).
- The Reality: "In the real system, Patient B or C would likely get it because they are Critical (Urgency). Patient A is Stable, so they wait."



Part D: The Future Code (15 minutes)

Step 1. The AI Risk

- Concept: Explain "Algorithmic Bias" (AI learning bad habits from data).
- Task: Students complete Part 3 (The AI Forecast).

Step 2. Conclusion

- Say: "The system isn't perfect, but it strives to be Blind. True justice means the rules apply to everyone equally, no matter who you are."

Differentiated Learning

- Extension:
 - Students research the concept of "Quality Adjusted Life Years" (QALYs)—a metric used by economists to measure health outcomes. Is it fair to use math to measure life?
- Learning Support:
 - Simplify the profiles. Remove "Social Status" distractors and focus only on "Sick" vs "Very Sick" to highlight Urgency.

Teacher Reflection

- Did the "Lifeboat" activity generate respectful debate?
- Were students surprised that "Social Status" is ignored in the real system?
- Did the lesson successfully link "Coding/Algorithms" to "Human Rights"?

Assessment

- Worksheet (Part 2): Assess ethical reasoning—did they justify their choice using logic (e.g., "We chose B because she has dependents") rather than just emotion?
- Class Discussion: Assess understanding of the difference between Utility and Equity.

Additional Notes:

This lesson is intellectually demanding. It forces students to confront the fact that resources are finite. Ensure you emphasize that the goal of the system is to be Fair, not just Efficient. The "Blindness" of the system is its greatest strength

