The Alchemist's Laboratory: Systems & Innovation

(Year 7 - Ages 12-13)

Lesson 3 of 9

Name: _____ Class: _____

Mission Briefing: An Alchemist needs more than just good intentions; they need a System. Today, we enter the "Laboratory" of donation. Your mission is to map the complex journey of the "Elixir of Life" (Organs and Tissues) and investigate the future technologies that are changing the rules of the game.

Part 1: The Systems Challenge (Sequencing)

Task: You have two different "Alchemical Recipes" (Pathways). One is a race against time; the other is a process of preservation. Use the terms in the box to complete the flowcharts.

Word Bank: Transport (Lights & Sirens), Tissue Bank (Storage), 4 Hours, 5 Years, Immediate Transplant, Processing & Cleaning.

Pathway A: The Organ Sprint (e.g., Heart)	**Pathway B: The Tissue Marathon (e.g., Bone)**
1. Retrieval: The organ is carefully removed.	1. Retrieval: The tissue is carefully removed.
2. Constraint: It has a time limit of approx _____.	2. Constraint: It can be preserved for up to _____.
3. Logistics: It requires _____ to get to the hospital.	3. Logistics: It is sent to a _____.
4. The End: It goes straight to _____.	4. The End: It undergoes _____ and waits for a patient.

Analysis: Why is the logistics system for a Heart so much more stressful than for a Bone Graft?

_____

Part 2: The "Crystal Ball" (Future Innovation)

Task: Science is always trying to solve problems. The biggest problem in donation is Time and Supply. Investigate one "Future Alchemy" technology discussed in class. Select One:

[ ] "Heart in a Box" (Perfusion) [ ] 3D Bioprinting [ ] Xenotransplantation (Animal to Human)

What is it? (Describe it in one sentence):

What problem does it solve? (e.g., Does it give us more time? Does it create more organs?):

The Alchemist's Opinion: Do you think this technology will be common by the time you are 30 years old? Why/Why not?

Part 3: The Human Element

Even with robots and helicopters, the system fails without the Human Element.

Scenario: A "Heart in a Box" machine is ready. A jet is waiting on the runway. A surgeon is scrubbed in. But the family of the donor says "No" because they didn't know what their loved one wanted.

Result: What happens to the system?

Conclusion: Why is the "Conversation" (Lesson 1) still the most important part of this high-tech system?

Extension Challenge: System Sketch

Below draw a Diagram of the "Organ Sprint." Include the Donor Hospital, the Transport (Heli/Jet), and the Recipient Hospital. Label the "Time Limit" on your drawing.