



LESSON

plan

grade: KS3 (11-12 yr old)

date:

subject: General Science (Biology)

lesson topic: Cells, Tissues, and Organs – Introducing Animal-Free Science

learning objective/s:

- Recall how cells, tissues, and organs are connected.
- Identify what cells need to survive and grow.
- Recognise how lab-grown cells and tissues are used in science instead of animals.
- Explain that human cells can be grown in laboratories.

materials needed:

- Computer + projector/screen
- Slide deck (contact us for slides)
- 3 visuals: human muscle cell, muscle tissue, heart (organ) (in slides or printed)
- Short video (1-2 min) showing cells growing in a lab (preload/test sound)
- Student worksheet
- Whiteboard + markers

hook/intro:

- Prompt: “Did you know scientists can take human cells and grow them outside the body?”
- Show a short video (1-2 mins) of cells growing in a petri dish / animation of stem cells becoming tissues.
- Discussion: If we can grow human cells in a lab, what do you think they need to survive?

lesson structure:

Starter/Recap (5mins)

- “Before we start, let’s remind ourselves of the basics. What’s the smallest building block of life?”
- Show images in sequence: human muscle cell → muscle tissue → heart (organ).
- Quick Q&A: How does a cell become tissue? How do tissues become an organ?

Part 1: Refer to Hook/Intro (10mins)

Part 2: Cells Need...(10mins)

- On the board (or worksheet), build a list with students:
 - Nutrients (like food)
 - Oxygen (for energy release)
 - Controlled temperature (~37°C)
 - Moisture / liquid environment
 - Protection from infection (sterile conditions)
- Teacher note: compare with how humans need food, oxygen, warmth, and safety.



Part 3. From Cells to Animal-Free Science (10mins)

·Introduce examples:

- 1. Lab-grown skin – for cosmetics/chemical testing instead of rabbits.
- 2. Mini-livers (organoids) – to check if medicines harm the liver.
- 3. Heart-on-a-chip – tiny device with heart cells to test drug safety.
- Teacher note: These are real science innovations removing the need for animal testing.

Activity (10mins)

- Worksheet task: Match the innovation (skin model / mini-liver / heart-on-a-chip) with its use.
- Extension question: Why might testing on human cells be better than testing on animals?

closure:

- Revisit sequence: Cell → Tissue → Organ → Organ system → Lab-grown versions.
- Exit ticket: “What do cells need to grow in the lab?”