

Cells and Systems: Cells to Body Systems

30 minutes, 3 stages

Every part of your body, from a single skin cell to your entire circulatory system, works because smaller units combine into bigger, organized structures. This homework connects the cell, the basic unit of life, to the tissues and organs that keep you alive ([Outcome](#), [Outcome](#)). Understanding this chain helps explain everyday things, like why your heart rate jumps during a soccer game or why plant cells and animal cells look different under a microscope.

Stage 1: Warm-up (8 min)

Answer these in full sentences in your notebook.

1. Define "cell" in your own words, and explain why scientists call it the basic unit of life ([Outcome](#)).
2. List three differences between a plant cell and an animal cell. Include at least one structure that plant cells have and animal cells do not ([Outcome](#)).
3. An amoeba is a single-celled organism. A grizzly bear is multicelled. Write two sentences comparing how each one might carry out a basic function, such as getting food or reacting to danger ([Outcome](#)).

Stage 2: Build the model (15 min)

Work through this task to connect cells, tissues, organs and systems.

Part A: Sort the levels (5 min)

Copy this list and put the items in order from smallest to largest: heart, cardiac muscle cell, circulatory system, heart muscle tissue.

Then write one sentence explaining how these four levels relate to each other ([Outcome](#), [Outcome](#)).

Part B: Match the system to the job (5 min)

Copy the table below and match each body system to its main role. Use each system once.

Systems: respiration, circulation, digestion, excretion, sensory

Jobs:

- a) removes waste products from the body
- b) breaks down food into nutrients the body can use
- c) carries oxygen and nutrients to tissues and organs
- d) detects changes in the environment, such as light or temperature
- e) exchanges oxygen and carbon dioxide with the air

Write your matches as pairs, for example: respiration, e ([Outcome](#)).

Part C: Diffusion in action (5 min)

Diffusion moves gases and liquids into and out of cells based on concentration differences ([Outcome](#)).

Answer this scenario:

Inside your lungs, oxygen concentration is higher in the air sacs than in your blood. Carbon dioxide concentration is higher in your blood than in the air sacs.

Explain, using the word "diffusion," what happens to the oxygen and to the carbon dioxide. Write two to three sentences.

Stage 3: Apply it (7 min)

Your body changes how it functions depending on what you are doing. Pick one of the two scenarios below and answer in a short paragraph (four to six sentences).

Scenario 1: You are running the final sprint of a cross-country race. Describe two changes your body makes (for example, heart rate, breathing rate, or metabolism) and explain why each change helps your body cope with the demand ([Outcome](#)).

Scenario 2: You step outside on a very cold winter day in Alberta without a jacket. Describe two changes your body makes in response and explain the purpose of each change ([Outcome](#)).

Name the body system involved in each change you describe.

Self-check

Answer these to confirm you understood today's work.

1. In one sentence, explain the difference between a tissue and an organ.
2. Give one example of a cell type mentioned in this homework (nerve, muscle, blood, skin, or bone) and describe its role in keeping the body healthy ([Outcome](#)).
3. True or false: diffusion always moves substances from an area of lower concentration to an area of higher concentration. Correct the statement if it is false.