

Cells Working Together: From Single Cells to Body Systems

30 minutes, 3 stages

Cells are the basic units of all living things ([Outcome](#)). In this homework, you will organize what you know about how cells group together into tissues and organs, and how those structures work as systems to keep an organism alive and responding to its environment ([Outcome](#)). Understanding these connections helps you see why damage to one part of a body system affects the whole organism.

Stage 1: Cell Types and Their Jobs (8 min)

You have two cells in front of you: a plant cell and an animal cell. Both have a cell membrane, cytoplasm, and a nucleus. The plant cell also has a cell wall and chloroplasts.

Task 1: Write one sentence explaining why a plant cell needs a cell wall but an animal cell does not ([Outcome](#)).

Task 2: Name one job that chloroplasts do in a plant cell. Then name one structure in an animal cell that does a similar job for the animal.

Task 3: A single-celled amoeba and a grizzly bear are both living things, but one is made of one cell and one is made of trillions. Write two ways they are similar and one way they are different ([Outcome](#)).

Stage 2: How Cells Move Materials In and Out (10 min)

Gases and liquids move into and out of cells all the time. When there is more of a substance on one side of the cell membrane than the other, that substance moves across the membrane to balance things out. This is called diffusion ([Outcome](#)).

Task 4: A cell is sitting in salty water. The water has more salt outside the cell than inside. In which direction will salt molecules move: into the cell or out of the cell? Explain your answer in one or two sentences.

Task 5: Your lungs need oxygen from the air you breathe. Oxygen moves from the air in your lungs into your blood cells through diffusion. Why does oxygen move in that direction? (Hint: Is there more oxygen in the air you breathe or in your blood cells?)

Task 6: Label a simple diagram or write a description showing how oxygen enters a lung cell, then travels through the bloodstream to a muscle cell in your leg during exercise ([Outcome](#)).

Stage 3: Tissues, Organs and Body Systems (12 min)

Cells group together to form tissues. Tissues group together to form organs. Organs work together to form body systems ([Outcome](#), [Outcome](#)).

Task 7: Choose one body system from this list: respiration, circulation, digestion, or excretion. Write the name of one organ in that system and describe in two sentences what that organ does ([Outcome](#)).

Task 8: Your heart is an organ made of muscle tissue. That muscle tissue is made of many muscle cells. Explain why the heart needs to be made of many cells rather than just one giant cell. (Hint: Think about what each cell can do and what happens when cells work together as a system.)

Task 9: When you exercise, your heart beats faster and you breathe faster. These are changes in body function in response to a changing condition. Name one other change your body makes during or after exercise, and explain why that change helps you ([Outcome](#)).

Self-check

1. How are plant and animal cells similar, and what is one structure that only plant cells have?
2. Why does diffusion happen: do substances move randomly, or do they move in a direction based on where there is more or less of that substance?
3. Explain the relationship between cells, tissues, organs and body systems using one example from the human body.