

Cells Build Living Systems

30 minutes, 3 stages

Cells are the basic unit of life, and they work together in tissues and organs to keep living things functioning ([Outcome](#)). Understanding how cells organize into systems helps you see why a single cell is different from a whole organism, and why your body depends on billions of cells working in coordination.

Stage 1: Single cells versus multicelled organisms (8 min)

Compare an amoeba (a single-celled organism) with a grizzly bear (a multicelled organism). Write three sentences that answer these questions:

1. What does an amoeba have to do all by itself that a grizzly bear can divide among different cells?
2. Why does a grizzly bear need many different types of cells when an amoeba manages with just one?
3. What is one advantage of being multicelled?

Use the example in [Outcome](#) to help you think through the comparison.

Stage 2: Plant and animal cells (12 min)

You are looking at two cells under a microscope. One is from a leaf. One is from your cheek. Label each structure on the diagrams below, then answer the questions.

Plant cell structures to label: cell wall, cell membrane, nucleus, chloroplast

Animal cell structures to label: cell membrane, nucleus, mitochondrion

Now answer:

1. Which structure do plant cells have that animal cells do not? What does it do?
2. Which structure do both cells have that controls what enters and leaves the cell?
3. Why do you think a plant cell needs a cell wall but an animal cell does not?

(Hint: Think about what plants need to do to stand up straight, and what animals do instead.)

Stage 3: How materials move in and out (10 min)

Cells need oxygen and nutrients to survive. These materials move into the cell, and waste moves out. This happens through diffusion and osmosis, which depend on concentration differences ([Outcome](#)).

Read this scenario: A cell is placed in salt water that has a higher salt concentration than the cell's interior.

1. In which direction will water molecules move, into the cell or out of the cell? Why?
2. What do you think will happen to the cell if too much water leaves it?
3. Name one gas that must move into your cells to keep you alive, and one waste product that must move out.

Self-check

Answer these three questions to confirm your understanding:

1. Describe the role of cells as the basic unit of life. What does this mean?

2. Name one way plant cells and animal cells are similar, and one way they are different.
3. Why do living things need both diffusion and osmosis to survive?