SCIENCE FOUNDATIONS

# Levels of biological organization

### Difficulty level: Intermediate

### Science Foundations

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## *Overview of the concept*

This is how you see your body as layers built on each other, from cells to tissues to organs to you as a whole person, and beyond you to your town and the living world. A muscle is not just a pile of cells, it is cells organised into tissue, and tissues organised into an organ that does a job. A doctor tracing a problem goes up and down the layers, from a cell going wrong to the organ it belongs to. Knowing these levels tells you how small changes at the bottom can show up as big effects at the top.



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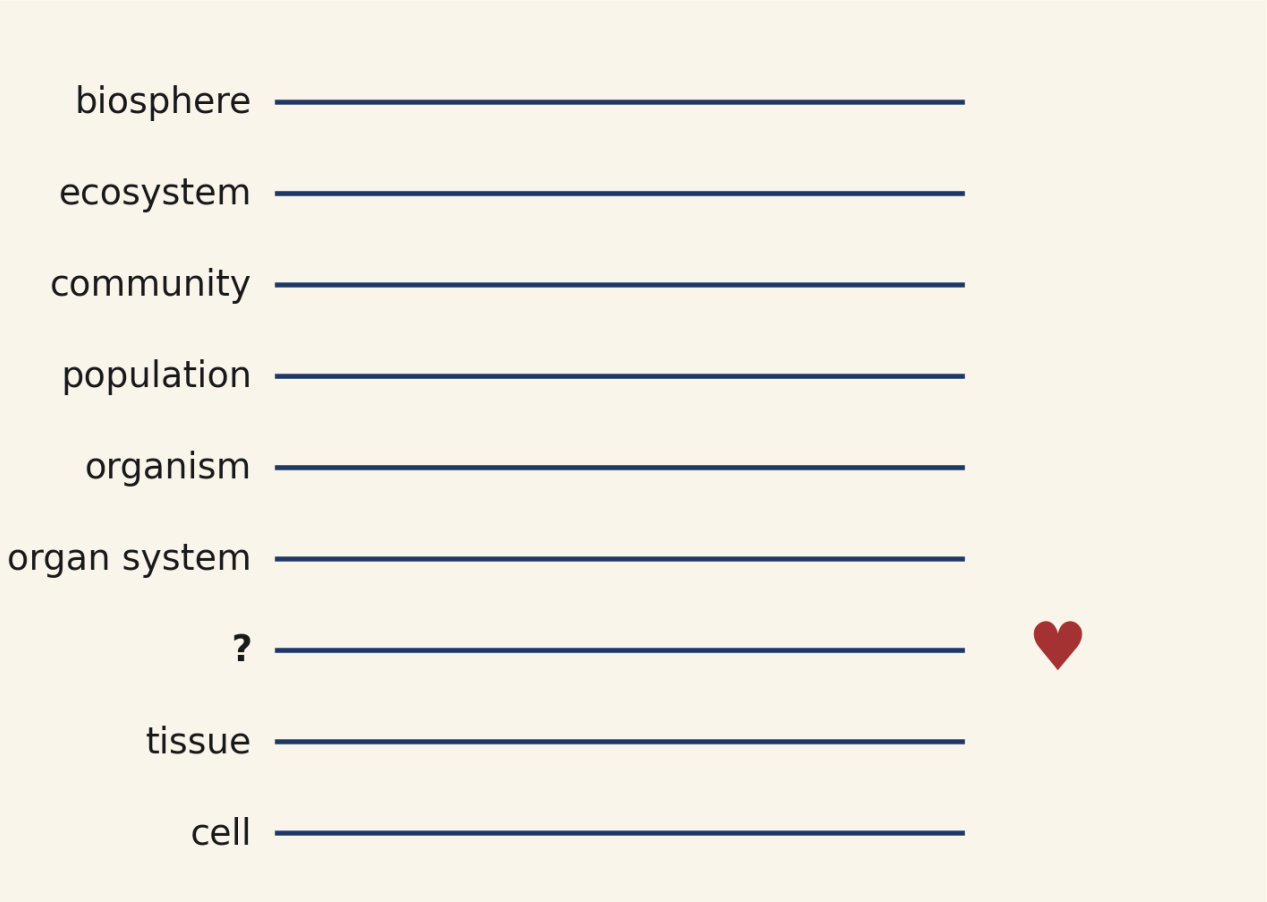
## Worked examples

EXAMPLE 1

**Q** Where does a heart belong in the levels of biological organization?




### SOLUTION

Ask what a heart is: a structure made of tissues doing one job.

That definition matches an organ.

Place it between tissue and organ system.

The result is heart is an organ.

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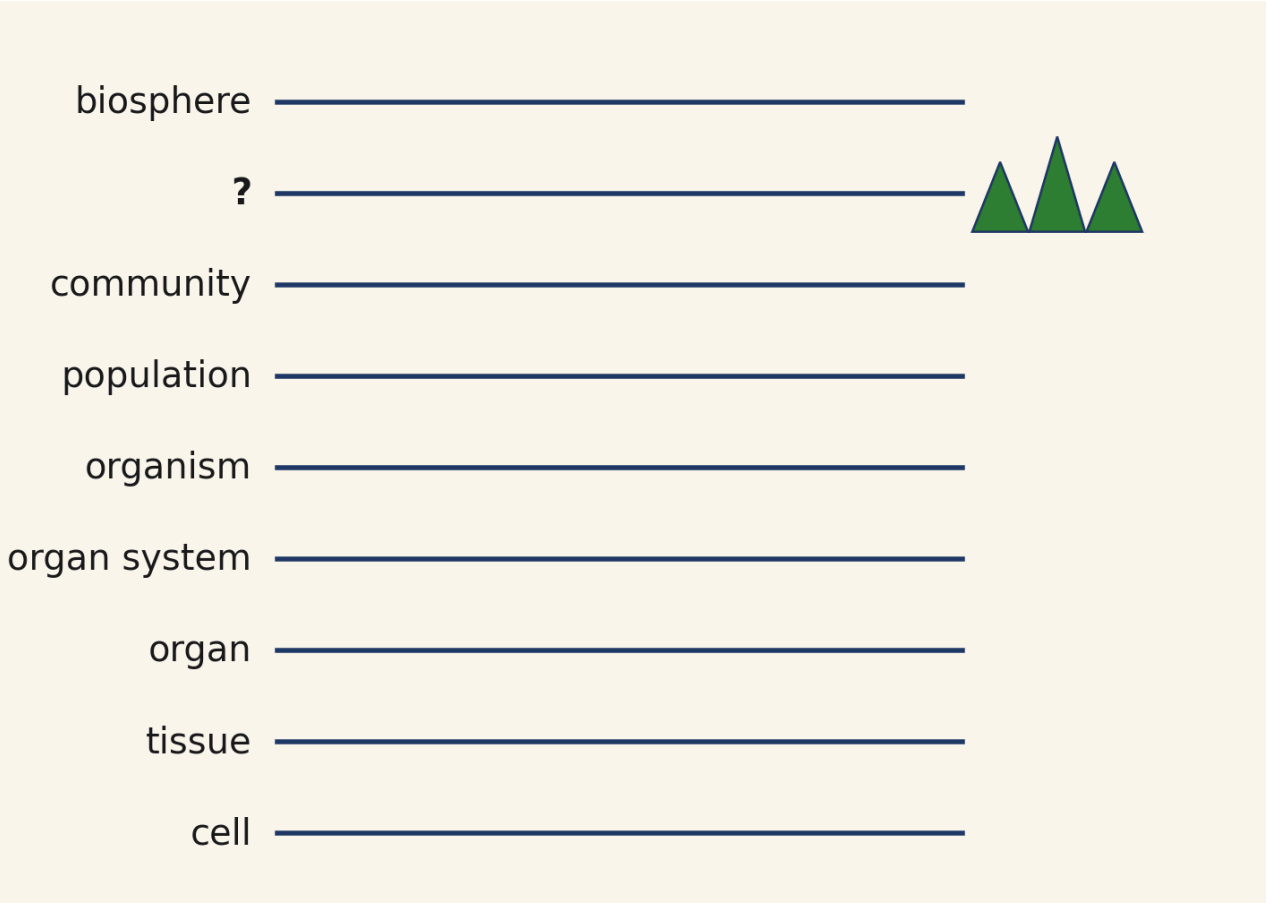
EXAMPLE 2

## Q Where does a forest belong in the levels of biological organization?




### SOLUTION

Ask what a forest is: many communities plus their non-living surroundings.

That definition matches an ecosystem.

Place it above community, below biosphere.

The result is forest is an ecosystem.

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## Practice questions

**1** A stomach is made of muscle tissue and churns food. Which level of organization is it, and which levels sit directly below and above it?

- **A** Organ, tissue below, organ system above
- **B** Tissue, cell below, organ above
- **C** Organ system, organ below, organism above
- **D** Organ, organ system below, organism above

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**2** **A kidney filters blood and is made of several tissues working together. Which level of organization is it? Explain.**

- **A** Organ, a structure made of tissues doing one job
- **B** Tissue, a group of similar cells
- **C** Organ system, a group of organs
- **D** Cell, the smallest unit of life

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**3** **A pond includes all the living communities in an area plus the water, mud, and air around them. Which level of organization is it, and which levels sit directly below and above it?**

- **A** Ecosystem, community below, biosphere above
- **B** Community, population below, ecosystem above
- **C** Biosphere, ecosystem below, nothing above
- **D** Ecosystem, biosphere below, community above

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**4** **A coral reef includes the corals, fish, algae, and the surrounding seawater. Which level of organization is it? Explain.**

- **A** Ecosystem, a community plus its non-living surroundings
- **B** Community, all the populations in one area
- **C** Biosphere, all ecosystems on Earth
- **D** Population, one species in one area

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**5** **Put these in order from smallest to largest: organ system, cell, organism, tissue, organ.**

- **A** Cell, tissue, organ, organ system, organism
- **B** Organism, organ system, organ, tissue, cell
- **C** Cell, organ, tissue, organ system, organism
- **D** Tissue, cell, organ, organism, organ system

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## A muscle cell is one cell that contracts. Which level of organization is it?

A Tissue

B Cell

C Organ

D Organ system

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## What is a community?

A All the populations of different species living in one area

B All the ecosystems on Earth

C One species living in one area

D All the non-living parts of an area

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## What is the biosphere?

A All ecosystems on Earth

B All the populations in one area

C One forest and its surroundings

D All the cells in one organism

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## A human is made of organ systems working together. Which level of organization is it?

A Organ

B Organ system

C Organism

D Tissue

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## What is a population?

A. All the members of one species living in one area

B. All the populations of different species living in one area

C. All the ecosystems on Earth

D. A group of tissues doing one job

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## ANSWER KEY

1. Organ, tissue below, organ system above
2. Organ, a structure made of tissues doing one job
3. Ecosystem, community below, biosphere above
4. Ecosystem, a community plus its non-living surroundings
5. Cell, tissue, organ, organ system, organism
6. Cell
7. All the populations of different species living in one area
8. All ecosystems on Earth
9. Organism
10. All the members of one species living in one area

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