The Missing Labels

Build and use a key from cell observations

ZOO.1.1 "Develop and use dichotomous keys to distinguish animals from protists, plants, and fungi."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each trait the scientists test. Number the tests in the order you would use them to identify a sample.

Four Samples, One Key

1. At a field station, four sealed samples arrive with their labels rubbed off. The samples came from a freshwater pool, a forest floor, and a greenhouse. A microscope reveals cells with nuclei in every sample, so the team considers four broad groups: animals, protists, land plants, and filamentous fungi. The team's protist sample is a single-celled organism, while the other samples are multicellular. This limited collection matters. Some protists have many cells, and some fungi, such as yeasts, have only one cell. A key built for these four samples may need new branches for a wider collection.

2. A dichotomous key presents two choices at each decision point. To build one for this collection, first inspect cell number. A single cell leads to the protist branch; many cells lead to the next decision. For a multicellular sample, check whether its cells have rigid walls. Cells without walls lead to the animal branch. Cells with walls lead to one final decision: look for chloroplasts, structures that capture light for photosynthesis. Chloroplasts lead to the land plant branch; their absence leads to the filamentous fungus branch. Each choice either names a group or sends the user to another pair of choices.

3. Test the key with observations, not a specimen's shape or its location. A filamentous fungus may spread across soil like a plant, but its cells have walls made mainly of chitin and lack chloroplasts. Land plant cell walls contain cellulose, and their green cells generally have chloroplasts. Animal cells lack walls, even when an animal seems stiff because it has a skeleton or shell. Some single-celled protists have chloroplasts, so checking for green color before checking cell number could mislead a user. Write each branch so two choices cannot both apply to the same specimen in the collection.

2 ANSWER WITH EVIDENCE

Use the passage

1. Sample A is one cell with a nucleus and chloroplasts. Follow the passage's key. Which group does it reach, and which test settles the choice?

2. Sample B has many cells, and none has a cell wall. Which group does the key identify? Give its path through the tests.

3. Sample C has many cells with walls but no chloroplasts. Which group does the key identify? Give its path through the tests.

4. Sample D has many cells with walls and chloroplasts. Which group does the key identify? Explain how the final test separates it from Sample C.

3 YOUR TURN

Your own words

Invent and name four new lab specimens, one from each group in the passage. Give each specimen at least two cell traits, then write a three-step dichotomous key with two choices and a destination at every step that identifies all four.

ANSWER KEY

The Missing Labels

PART 1 · READ AND MARK

Underline each trait the scientists test. Number the tests in the order you would use them to identify a sample. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Sample A is one cell with a nucleus and chloroplasts. Follow the passage's key. Which group does it reach, and which test settles the choice?	**Protist. The first test, cell number, sends this single-celled sample to the protist branch.**
2	Sample B has many cells, and none has a cell wall. Which group does the key identify? Give its path through the tests.	**Animal. It follows the multicellular choice, then the no-cell-wall choice.**
3	Sample C has many cells with walls but no chloroplasts. Which group does the key identify? Give its path through the tests.	**Filamentous fungus. It follows the multicellular, cell-wall, and no-chloroplast choices.**
4	Sample D has many cells with walls and chloroplasts. Which group does the key identify? Explain how the final test separates it from Sample C.	**Land plant. Sample D has chloroplasts, while Sample C does not.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Dot: one cell, no cell wall. Ribbon: many cells, no cell walls. Frond: many cells, cellulose walls, chloroplasts. Thread: many cells, chitin walls, no chloroplasts.
1a. One cell → Dot, protist.
1b. Many cells → 2.
2a. No cell walls → Ribbon, animal.
2b. Cell walls present → 3.
3a. Chloroplasts present → Frond, land plant.
3b. Chloroplasts absent → Thread, filamentous fungus.

For Part 3, accept different specimen names or a different order of tests if all three pairs have mutually exclusive choices and correctly identify the four invented specimens. Apply the key to the limited collection described in the passage, not to every possible protist or fungus.