Clues to Life

Use shared traits to classify organisms

L.6.4 "Students will demonstrate an understanding of classification tools and models such as dichotomous keys to classify representative organisms based on the characteristics of the kingdoms: Archaebacteria, Eubacteria, Protists, Fungi, Plants..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline traits that help sort organisms into groups. Circle each clue about how scientists decide which organisms belong together.

Who Lives Near the Pond?

1 At the edge of a pond, a drop of water can hold many kinds of life. Scientists sort organisms by shared traits, not just where they live. Plants have many cells and usually make food using sunlight. Animals have many cells and eat other organisms. Fungi, including bread mold, absorb nutrients from their surroundings. Protists have cells with nuclei, but their shapes and ways of getting food vary. Eubacteria and Archaebacteria are single-celled organisms without nuclei. Some archaebacteria live in extreme places, but many live in ordinary habitats.

2 A dichotomous key guides you through a choice between two traits at each step. One split might separate cells with nuclei from cells without nuclei. In a pond sample, euglena swims with a whip-like flagellum and can use sunlight to make food. Paramecium moves with tiny cilia and sweeps food into its cell. Amoeba stretches temporary extensions to move and surround food. These three are protists, even though they move and feed in different ways. Observing one trait alone may not reveal an organism's group.

3 Long ago, Aristotle grouped many animals by where they lived or how they moved. Linnaeus later used shared physical structures to place organisms in groups within groups and gave species two-part names. Today, scientists also compare DNA, which can reveal relationships that appearance misses. For example, two pond microbes may have similar shapes but very different genetic material. A strong classification claim uses several clues: cell structure, how an organism gets energy, movement, and genetic evidence when available. Each clue helps explain why organisms belong together or apart.

2 ANSWER WITH EVIDENCE

Use the passage

1. A single-celled organism from the pond has no nucleus. Which two kingdoms should you consider? Why can you rule out protists?

2. The three named protists move in different ways. What shared cell trait helps explain why they belong in the same kingdom?

3. A student puts every organism found in the pond into one group. Why could this group contain organisms from different kingdoms? Give two traits from the passage as evidence.

4. Two pond microbes look alike, but their DNA is very different. How could comparing DNA change a decision based only on appearance?

3 YOUR TURN

Your own words

Three mystery organisms all have many cells: A makes food using sunlight, B absorbs nutrients from dead leaves, and C eats other organisms. Write a numbered, two-choice key that sorts A, B, and C, then name each organism's kingdom.

Clues to Life

PART 1 · READ AND MARK

Underline traits that help sort organisms into groups. Circle each clue about how scientists decide which organisms belong together. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	A single-celled organism from the pond has no nucleus. Which two kingdoms should you consider? Why can you rule out protists?	**Consider Eubacteria and Archaebacteria. Protists have cells with nuclei.**
2	The three named protists move in different ways. What shared cell trait helps explain why they belong in the same kingdom?	**They all have cells with nuclei.**
3	A student puts every organism found in the pond into one group. Why could this group contain organisms from different kingdoms? Give two traits from the passage as evidence.	**Living in the same place does not mean organisms share a kingdom. Pond organisms may differ in whether their cells have nuclei and in how they get food.**
4	Two pond microbes look alike, but their DNA is very different. How could comparing DNA change a decision based only on appearance?	**Appearance might suggest they are closely related, but their different DNA could show that they are not closely related.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

1a. Makes food using sunlight: A, Plants.
1b. Does not make food using sunlight: go to 2.
2a. Absorbs nutrients from dead leaves: B, Fungi.
2b. Eats other organisms: C, Animals.

Accept any two-choice key that separates all three organisms using the given traits and assigns A to Plants, B to Fungi, and C to Animals. For question 3, accept other supported contrasts, such as movement or ways of getting energy.