Streamside Sorting

Build a key from visible traits of freshwater invertebrates

MAQ.6.3 "Develop a dichotomous classification key to be used in the identification of sample aquatic invertebrates."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each visible trait that could help you tell specimens apart. Number the traits in an order you could use to identify an unknown specimen.

Five Specimens in a Tray

1. At a streamside sampling station, a class collects five living freshwater invertebrates in a shallow tray. An invertebrate has no backbone, but that shared trait will not tell these specimens apart. To identify one unknown specimen, a dichotomous key offers two contrasting choices at each step. Choose the description that matches what you can observe, then follow its direction to another step or a name. A useful pair divides the specimens into different groups. Start with features you can check without harming an animal, and make sure each choice tells the reader where to go next.

2. One specimen, a freshwater snail, carries a single coiled shell and has no jointed legs. A freshwater mussel also lacks jointed legs, but its shell has two parts joined by a hinge. Both can pull their soft bodies inside their shells. Another specimen, a leech, has no shell and no jointed legs; its soft body stretches and contracts as it moves. These three animals could end up together if a key begins by asking about legs. Later choices would need to sort them into smaller groups until each specimen has its own name.

3. The remaining two specimens are insect nymphs, the young stages of insects. Both have six jointed legs and no shell. The mayfly nymph in this tray has three thin tail filaments at the end of its abdomen. The dragonfly nymph does not have three thin tail filaments, though it may have short structures at its rear. Counting legs can separate these nymphs from the leech, but it cannot separate one nymph from the other. When you build a key, make each pair of choices about one visible feature. Give each outcome a destination so a reader never has to guess where to go next.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why would “has a backbone” versus “has no backbone” fail as the first pair of choices for these specimens?

2. If the first pair of choices is “has six jointed legs” versus “does not have six jointed legs,” which specimens follow each choice?

3. Write two contrasting shell descriptions that would separate the snail from the mussel.

4. What visible feature would separate the two nymphs, and which outcome identifies each one?

3 YOUR TURN

Your own words

Write a dichotomous key that identifies all five specimens. Start with shell present versus shell absent; write four numbered pairs of a/b choices, and make every choice lead to a specimen name or another numbered pair.

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PART 1 · READ AND MARK

Underline each visible trait that could help you tell specimens apart. Number the traits in an order you could use to identify an unknown specimen. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why would "has a backbone" versus "has no backbone" fail as the first pair of choices for these specimens?	**All five specimens are invertebrates, so all five would follow the "has no backbone" choice.**
2	If the first pair of choices is "has six jointed legs" versus "does not have six jointed legs," which specimens follow each choice?	**The mayfly nymph and dragonfly nymph have six jointed legs. The snail, mussel, and leech do not.**
3	Write two contrasting shell descriptions that would separate the snail from the mussel.	**A single coiled shell identifies the snail; a shell with two hinged parts identifies the mussel.**
4	What visible feature would separate the two nymphs, and which outcome identifies each one?	**Three thin tail filaments identify the mayfly nymph. Not having three thin tail filaments identifies the dragonfly nymph.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

1a. Shell present: go to 2.
1b. Shell absent: go to 3.
2a. Single coiled shell: freshwater snail.
2b. Shell with two hinged parts: freshwater mussel.
3a. Six jointed legs: go to 4.
3b. No jointed legs: leech.
4a. Three thin tail filaments: mayfly nymph.
4b. Does not have three thin tail filaments: dragonfly nymph.

Accept different wording for observable traits if each paired choice is contrasting and every path identifies exactly one specimen. For question 4, "three tail filaments" is sufficient.