Mollusk Sorting Paths

Build a key from visible traits

ZOO.3.5 "Develop a dichotomous key to contrast characteristics of gastropods, bivalves, and cephalopods."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline descriptions of arms around the mouth, circle descriptions of shell arrangements, and number two traits you could use as yes-or-no splits in a dichotomous key.

Three Mollusks, One Key

1. At a rocky shoreline, a collector finds three kinds of mollusks and wants to sort them without guessing from color or size. A dichotomous key works like a series of forks: each question offers two choices based on a trait. Each choice sends the observer to another question or to one group. For these mollusks, useful clues include the position of fleshy appendages and the arrangement of shells. Habitat alone is a poor clue because members of all three groups can live in the sea. A useful question must make the two possible paths clear.

2. Cephalopods have a prominent head and arms arranged around the mouth. Squid also have two longer feeding tentacles. These appendages seize prey, unlike a snail's small sensory tentacles, which extend from its head but do not form a ring of arms around its mouth. Cephalopods move by pushing water through a funnel, though that movement may be hard to see in a still specimen. Most living cephalopods have no external shell, but a nautilus has one. Because shell appearance varies within the group, arms around the mouth are a more reliable clue than the presence of an external shell.

3. Bivalves have two shell halves joined by a hinge. Their bodies lack a distinct head, and many filter food particles from water. Gastropods, including snails and slugs, have a muscular foot and a distinct head, but they do not have arms arranged around the mouth. A snail usually carries one shell, while a slug has none. A shell can therefore help distinguish some mollusks, but its absence does not identify a group by itself. When developing a key, check that each choice leads toward just one of the three groups and that every group can be reached.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why would "Does it have an external shell?" be an unreliable first question for separating cephalopods from the other groups? Use one example from the passage.

2. After ruling out cephalopods, write a yes-or-no question that separates bivalves from gastropods. Name the group reached by each answer.

3. Use this fixed route: first ask whether arms surround the mouth; if not, ask whether two shell halves meet at a hinge. A specimen has no arms around its mouth and has two shell halves joined by a hinge. Give its two answers and its final group.

4. A specimen has no external shell, has a distinct head, and has no ring of arms around its mouth. Which group fits these traits? Why would sorting it by shell absence alone be a mistake?

3 YOUR TURN

Your own words

Write a two-step dichotomous key that asks about two hinged shell halves first, then uses arms around the mouth to separate the remaining groups. Invent a specimen with at least two visible traits, and show its path through your key.

ANSWER KEY

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PART 1 · READ AND MARK

Underline descriptions of arms around the mouth, circle descriptions of shell arrangements, and number two traits you could use as yes-or-no splits in a dichotomous key. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why would "Does it have an external shell?" be an unreliable first question for separating cephalopods from the other groups? Use one example from the passage.	**Cephalopods do not all give the same answer: most lack an external shell, but a nautilus has one.**
2	After ruling out cephalopods, write a yes-or-no question that separates bivalves from gastropods. Name the group reached by each answer.	**Does it have two shell halves joined by a hinge? Yes leads to bivalves; no leads to gastropods.**
3	Use this fixed route: first ask whether arms surround the mouth; if not, ask whether two shell halves meet at a hinge. A specimen has no arms around its mouth and has two shell halves joined by a hinge. Give its two answers and its final group.	**No, then yes. The specimen is a bivalve.**
4	A specimen has no external shell, has a distinct head, and has no ring of arms around its mouth. Which group fits these traits? Why would sorting it by shell absence alone be a mistake?	**Gastropods fit these traits because slugs lack shells. Shell absence alone would not distinguish a gastropod from a cephalopod.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

1. Does it have two shell halves joined by a hinge? Yes: bivalve. No: go to 2.
2. Does it have arms around its mouth? Yes: cephalopod. No: gastropod.

My specimen has one shell and no arms around its mouth. It answers no at step 1 and no at step 2, so it is a gastropod.

Accept equivalent yes-or-no wording if both branches are clear and all three groups are reached correctly. The invented specimen must have traits consistent with its stated path.