Hidden Body Plans

Compare marine animals by symmetry and body cavity.

MAQ.6.4 "Compare and contrast major body plans (e.g., asymmetry, radial, bilateral symmetry, acoelomate, pseudocoelomate, and eucoelomate)."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline clues about symmetry and circle clues about body cavities so you can compare each animal's outside and inside body plan.

Life on a Pier and Below It

1 At low tide, a sponge clings to a pier post while a sea anemone opens its tentacles nearby. Many sponges are asymmetrical: no plane through the body makes matching halves. A sea anemone has radial symmetry, with body parts arranged around a central axis. Several planes through that axis can divide it into roughly matching halves. This arrangement lets its tentacles meet food approaching from different directions. A marine flatworm has bilateral symmetry: one plane divides its body into left and right mirror halves. Its front end encounters the surroundings as it glides across a rock.

2 Symmetry describes the outside arrangement, but a second body-plan feature lies inside. In bilaterally symmetrical animals, a body cavity is a fluid-filled space between the digestive tract and the body wall. A marine flatworm is acoelomate: tissue fills the region between its gut and body wall, leaving no body cavity. A marine nematode, or roundworm, is pseudocoelomate. It has a cavity, but the tissue called mesoderm does not completely line that cavity. Both animals can live among grains of seafloor sand. Their similar symmetry does not mean they share the same internal plan.

3 A polychaete, a segmented marine worm, also has bilateral symmetry, like the flatworm and nematode. Unlike either one, it is eucoelomate: mesoderm completely lines its body cavity, including the surfaces facing the gut and body wall. Fluid in a worm's cavity can help support its body as muscles work. These cavity terms apply to animals with three embryonic tissue layers, such as the three worms in this passage. They do not classify the sponge or sea anemone in the same way. When comparing marine animals, check symmetry and cavity type separately. A shared outside pattern does not guarantee a shared inside structure.

2 ANSWER WITH EVIDENCE

Use the passage

1. How does the sponge's symmetry differ from the sea anemone's symmetry?

2. Compare the sea anemone's and flatworm's symmetry. How does each animal encounter its surroundings?

3. What symmetry do the flatworm and nematode share, and how do their body cavities differ?

4. How are the nematode and polychaete alike in symmetry but different in body cavity?

3 YOUR TURN

Your own words

A newly found animal A has several planes through its central axis that make matching halves. Animal B has one plane that makes left and right halves, plus a cavity that mesoderm does not completely line. In four sentences, identify and compare their known body-plan features, then explain what you cannot determine about A's body cavity.

ANSWER KEY

Hidden Body Plans

HIGH SCHOOL · MAQ.6.4

PART 1 · READ AND MARK

Underline clues about symmetry and circle clues about body cavities so you can compare each animal's outside and inside body plan. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How does the sponge's symmetry differ from the sea anemone's symmetry?	**Many sponges are asymmetrical, with no plane that makes matching halves. A sea anemone has radial symmetry, with several such planes through its central axis.**
2	Compare the sea anemone's and flatworm's symmetry. How does each animal encounter its surroundings?	**The anemone has radial symmetry and can meet food from different directions. The flatworm has bilateral symmetry and encounters its surroundings with its front end as it glides.**
3	What symmetry do the flatworm and nematode share, and how do their body cavities differ?	**Both have bilateral symmetry. The flatworm is acoelomate and has no body cavity; the nematode is pseudocoelomate and has a cavity not completely lined with mesoderm.**
4	How are the nematode and polychaete alike in symmetry but different in body cavity?	**Both have bilateral symmetry and a body cavity. The nematode's cavity is not completely lined with mesoderm, while the polychaete's cavity is completely lined with mesoderm.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Animal A has radial symmetry because several planes through its axis make matching halves. Animal B has bilateral symmetry because one plane makes left and right halves. B is pseudocoelomate because mesoderm does not completely line its cavity. The animals differ in symmetry, but the evidence does not reveal A's cavity type.

Accept equivalent descriptions of matching planes and mesoderm lining. For the open task, students should not assign a cavity type to animal A from symmetry alone.