Inside the Sponge

Trace water through a simple sponge model

ZOO.2.4 "Create a model, either physical or digital, illustrating the anatomy of a sponge, tracing the flow of water."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the structures a drop of water passes through. Number them from entry to exit to plan the path your model must show.

A Sponge's Moving Water

1. Imagine a sponge fixed to a pier piling while the tide slides past. It has no mouth, stomach, or heart, yet it collects food and exchanges gases as water moves through its body. For this model, picture a simple sponge shaped like a hollow vase. Its outer wall surrounds a central cavity called the spongocoel. Tiny openings in the wall are ostia, the entrances for incoming water. Each ostium leads into a short channel through a tube-shaped cell called a porocyte. At the top, a larger opening called the osculum connects the cavity to the water outside.

2. Trace a drop of water rather than the sponge's outline. The drop enters an ostium, crosses the porocyte channel, and reaches the spongocoel. Choanocytes line this cavity. Each choanocyte has a beating flagellum surrounded by a collar that catches tiny food particles from passing water. The combined beating of many flagella draws water inward through the small openings and sends it upward through the cavity. The water then exits through the osculum. Oxygen carried by the water can enter sponge cells, while carbon dioxide and other wastes can leave in the outgoing water. Food particles do not simply leave with every drop.

3. A useful model is a cutaway, so the inside remains visible even though a real sponge's wall wraps around its cavity. In a paper version, folded material could form the wall; in a digital version, a transparent surface could reveal it. Use narrow gaps for water entrances and a wider opening for the exit. Arrows represent moving water, not tubes inside the cavity. The model should also distinguish a choanocyte's collar, which catches food, from its flagellum, which beats. This matters because a water path alone cannot show how the sponge feeds or keeps water moving.

2 ANSWER WITH EVIDENCE

Use the passage

1. In a cutaway model, where should you place the spongocoel in relation to the outer wall and osculum?

2. List the four structures, in order, that an arrow should trace from a water entrance to the exit.

3. Your model uses moving paper strips to represent flagella. Where should you place them, and what water movement should they help show?

4. A model places its food-catching collars at the osculum. What should you change, and why?

3 YOUR TURN

Your own words

Draw a plan for a physical or digital model of a simple sponge with two separate water entry points and one exit. Label the outer wall, ostia, porocyte channels, spongocoel, osculum, and choanocytes; add arrows for both complete water routes and write one sentence explaining what drives the flow.

Inside the Sponge

PART 1 · READ AND MARK

Underline the structures a drop of water passes through. Number them from entry to exit to plan the path your model must show. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	In a cutaway model, where should you place the spongocoel in relation to the outer wall and osculum?	**Place the spongocoel inside the outer wall as the central cavity, with the osculum opening from its top.**
2	List the four structures, in order, that an arrow should trace from a water entrance to the exit.	**Ostium, porocyte channel, spongocoel, osculum.**
3	Your model uses moving paper strips to represent flagella. Where should you place them, and what water movement should they help show?	**Place them on choanocytes lining the spongocoel. They should show water being drawn in through the ostia and moving upward toward the osculum.**
4	A model places its food-catching collars at the osculum. What should you change, and why?	**Move the collars to choanocytes lining the spongocoel, where they catch food particles from passing water.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Sketch: A hollow outer wall has two labeled ostia, each leading through a labeled porocyte channel into the labeled spongocoel. Choanocytes line the cavity, and the labeled osculum opens at the top. Arrows: surrounding water → left ostium → left porocyte channel → spongocoel → osculum; surrounding water → right ostium → right porocyte channel → spongocoel → osculum. Sentence: Beating flagella on the choanocytes draw water in and move it upward to the osculum.

Accept equivalent cutaway designs if both arrows enter through separate ostia, cross porocyte channels, pass through the spongocoel, and exit at the osculum. Choanocytes should line the cavity, and the sentence should identify their beating flagella as the cause of water flow.