Inside a Sponge

Trace how specialized cells work together to feed an animal without true tissues.

ZOO.2.2 "Identify the anatomy and physiology of a sponge, including how specialized cells within sponges work cooperatively without forming tissues to capture and digest food."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the openings where water enters and exits, circle the two food-handling cell types, and number the actions that move food from capture to nutrient delivery.

A Meal in Moving Water

1. Beneath a dock, a sponge stays fixed to a piling while plankton drift past. Its body is full of small openings called ostia, or pores. Water enters through these openings and passes into a network of internal canals. The water eventually leaves through one or more larger openings called oscula. This route matters because a sponge cannot swim after it settles as an adult. Rather than chase food, it brings moving water through its body. The same flow supplies dissolved oxygen and carries away waste, so the openings connect feeding with other basic needs.

2. Inside the canals, choanocytes, also called collar cells, keep the water moving. Each choanocyte beats a thin flagellum, creating a current that pulls water past its collar. The collar traps tiny food particles from the passing water. The choanocyte takes in trapped particles and begins to digest them inside the cell. Other particles may pass through and leave with the water. In a sponge with many choanocytes, countless tiny currents combine to move water through the canals. Open passages provide a route, but living cells generate the flow and catch the food.

3. Food taken in by a choanocyte can be passed to an amoebocyte, a mobile cell within the sponge. Amoebocytes continue digestion inside their cells and carry nutrients to other parts of the body. The sponge has different cell types doing linked jobs: its pores admit water, choanocytes drive it past food-catching collars, and amoebocytes share the food. Yet these cells do not form true tissues or a digestive organ. Digestion happens inside cells rather than in a stomach. A sponge survives because its specialized cells coordinate feeding, even though it lacks the organized tissues found in many other animals.

2 ANSWER WITH EVIDENCE

Use the passage

1. Trace the route water takes through the sponge. Where along that route is food caught?

2. How do two parts of a choanocyte work together to capture food?

3. After a choanocyte takes in food, how can an amoebocyte help feed the sponge?

4. How can a sponge digest food even though it has no true tissues or digestive organ?

3 YOUR TURN

Your own words

Imagine a sponge whose choanocyte flagella slow down while its pores and oscula stay open. In four sentences, predict what happens to water flow, food capture, and nutrient delivery, and explain why open passages are not enough.

Inside a Sponge

PART 1 · READ AND MARK

Underline the openings where water enters and exits, circle the two food-handling cell types, and number the actions that move food from capture to nutrient delivery. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Trace the route water takes through the sponge. Where along that route is food caught?	**Water enters through ostia, passes through internal canals and exits through oscula. Choanocyte collars catch food as water passes them.**
2	How do two parts of a choanocyte work together to capture food?	**Its flagellum creates a current that moves water past its collar, which traps food particles.**
3	After a choanocyte takes in food, how can an amoebocyte help feed the sponge?	**An amoebocyte can receive the food, continue digesting it inside the cell and carry nutrients to other parts of the sponge.**
4	How can a sponge digest food even though it has no true tissues or digestive organ?	**Choanocytes and amoebocytes digest food inside their cells. These specialized cells work together without forming true tissues or a digestive organ.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

With slower flagella, less water would travel from the pores through the canals to the oscula. Fewer food particles would reach the choanocyte collars, so the cells would capture and digest less food. Amoebocytes would receive less food and deliver fewer nutrients to other cells. Open passages alone cannot feed the sponge because its specialized cells must create flow and work together without true tissues.

Accept equivalent terms such as pores for ostia and collar cells for choanocytes. In the open response, look for a linked prediction from reduced current to reduced food capture and nutrient delivery.