Dinner Through a Gap

Trace how a sea star digests prey outside its body.

ZOO.6.2 "Explain how the starfish inverts its stomach for external digestion of food."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline five steps, from pulling the shells apart to absorbing nutrients, and number them in order. Use your marks to explain how external digestion works.

A Meal Inside a Shell

1. At low tide, a sea star creeps over a mussel fastened to a rock. The mussel snaps its two shells together, leaving almost no room for a predator's mouth. The sea star presses its tube feet against both shells and pulls in opposite directions. It does not need to crack the shells or open them wide. Even a narrow gap can give the sea star access to the soft body inside. This slow contest may take time, but the gap lets the sea star feed while much of its prey remains enclosed.

2. The sea star's mouth is on the underside of its central disk. Just inside is a flexible cardiac stomach, which can turn inside out through the mouth. When the mussel's shells part slightly, the sea star pushes this stomach through the gap and against the mussel's tissues. Digestive enzymes released by the stomach break down those tissues outside the sea star's body. This process is called external digestion because the prey begins to be digested before it enters the sea star. The stomach does not have to envelop the entire mussel to do this work.

3. As the mussel's tissues soften into a liquid mixture, the sea star draws the partly digested food inward and pulls its cardiac stomach back through its mouth. The food then moves through the digestive system for further digestion. Branching digestive glands, called pyloric caeca, extend into the arms and absorb most of the nutrients. The stomach's trip outward gives enzymes access to prey that is still inside its shell, while the return trip brings food inside for processing. A sea star can therefore feed through a small shell opening without swallowing the whole mussel or breaking its shell.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why does the sea star need only a narrow gap between the mussel's shells?

2. How does the cardiac stomach get from inside the sea star to the mussel's tissues?

3. What do the stomach's enzymes do, and why is this called external digestion?

4. After the tissues soften, what happens to the food, and where are most nutrients absorbed?

3 YOUR TURN

Your own words

An aquarium visitor says a sea star must swallow an oyster whole to eat it. Write four or five sentences that correct the visitor and explain how the sea star can feed through a small opening, from gaining access to absorbing nutrients.

ANSWER KEY

Dinner Through a Gap

PART 1 · READ AND MARK

Underline five steps, from pulling the shells apart to absorbing nutrients, and number them in order. Use your marks to explain how external digestion works. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why does the sea star need only a narrow gap between the mussel's shells?	**Its flexible cardiac stomach can pass through the gap to reach the mussel's tissues.**
2	How does the cardiac stomach get from inside the sea star to the mussel's tissues?	**It turns inside out through the mouth on the sea star's underside and is pushed through the shell gap.**
3	What do the stomach's enzymes do, and why is this called external digestion?	**The enzymes break down the mussel's tissues while they are still outside the sea star's body.**
4	After the tissues soften, what happens to the food, and where are most nutrients absorbed?	**The sea star draws the partly digested food inward for further digestion. The pyloric caeca absorb most of its nutrients.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A sea star does not need to swallow an oyster whole. It pulls on the oyster's shells with its tube feet until a small gap opens. The sea star turns its cardiac stomach inside out through its mouth and pushes it into the gap. Enzymes from the stomach begin breaking down the oyster's tissues outside the sea star's body. The sea star draws the softened food inward for further digestion, and its pyloric caeca absorb most of the nutrients.

For the marking task, accept five ordered steps showing shell opening, stomach eversion, enzyme action, food moving inward, and nutrient absorption. In the open response, look for a clear distinction between digestion outside the body and nutrient absorption inside it.