Blood on the Move

Trace circulation through an earthworm

ZOO.4.1 "Define and describe the closed circulatory system of an annelid."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the sentence beginning "This arrangement" in paragraph 1 to mark the definition, then circle the terms "dorsal vessel" and "ventral vessel" wherever they appear in paragraph 2 to mark the main route.

Inside an Earthworm

1 After a rainstorm, an earthworm stretches across a sidewalk. Under its skin, blood moves through a network of vessels rather than washing freely around its organs. This arrangement is a closed circulatory system: blood stays inside vessels as it travels through the body. The earthworm is an annelid, a member of a group of segmented worms. Its moving blood carries oxygen and nutrients to living cells and takes away some wastes. A closed system does not mean the worm is sealed off from its surroundings. Materials still cross thin vessel walls, and oxygen enters the worm through its damp skin.

2 Follow one route through the worm. A dorsal vessel runs along the upper side of the gut and moves blood toward the head. Near the front, several muscular connecting vessels, called aortic arches, squeeze blood from the dorsal vessel into a ventral vessel. The ventral vessel runs beneath the gut and carries blood toward the tail. Smaller branches lead from it into narrow capillaries throughout the body, including the skin and gut. Blood in these capillaries exchanges materials with surrounding tissues. Other small vessels collect the blood and return it to the dorsal vessel, completing the circuit.

3 The skin must stay moist so oxygen can dissolve in the moisture and pass through the skin into tiny blood vessels. As blood moves through skin capillaries, oxygen enters it; carbon dioxide moves out toward the skin. Blood then delivers oxygen to cells elsewhere in the body. At gut capillaries, nutrients from digested food enter the blood. At body tissues, oxygen and nutrients leave the blood through capillary walls, while wastes can enter it. The blood does not spill into open spaces around the organs during these exchanges. Staying in vessels lets the moving blood carry materials between distant parts of the worm.

2 ANSWER WITH EVIDENCE

Use the passage

1. What makes an earthworm's circulatory system closed, even though materials enter and leave the blood?

2. Describe the direction blood moves in the dorsal vessel and the ventral vessel. How do the aortic arches connect their flow?

3. Trace the route blood takes after leaving the ventral vessel until it returns to the dorsal vessel.

4. How does oxygen get from outside the earthworm to its body cells while the blood remains inside vessels?

3 YOUR TURN

Your own words

A classmate claims, "An earthworm's blood must leave its vessels to bring oxygen to its cells." Write four or five sentences correcting the claim. Trace oxygen from the skin to body cells, explain how it crosses vessel walls, and name at least two vessels that move blood around the body.

ANSWER KEY

Blood on the Move

HIGH SCHOOL · ZOO.4.1

PART 1 · READ AND MARK

Underline the sentence beginning "This arrangement" in paragraph 1 to mark the definition, then circle the terms "dorsal vessel" and "ventral vessel" wherever they appear in paragraph 2 to mark the main route. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	What makes an earthworm's circulatory system closed, even though materials enter and leave the blood?	**Blood stays inside vessels as it travels; materials cross vessel walls without the blood leaving the vessels.**
2	Describe the direction blood moves in the dorsal vessel and the ventral vessel. How do the aortic arches connect their flow?	**The dorsal vessel moves blood toward the head. Near the front, aortic arches squeeze it into the ventral vessel, which carries it toward the tail.**
3	Trace the route blood takes after leaving the ventral vessel until it returns to the dorsal vessel.	**Blood travels through smaller branches into body capillaries, where it exchanges materials. Other small vessels collect it and return it to the dorsal vessel.**
4	How does oxygen get from outside the earthworm to its body cells while the blood remains inside vessels?	**Oxygen passes through the damp skin into skin capillaries. Blood carries it through vessels to body tissues, where it crosses capillary walls to reach cells.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

An earthworm's blood stays inside vessels, so it does not need to spill around cells. Oxygen passes through the damp skin into skin capillaries, and the blood returns to the dorsal vessel. The dorsal vessel carries blood toward the head, where aortic arches squeeze it into the ventral vessel. The ventral vessel carries blood toward the tail, and oxygen crosses body capillary walls to reach cells.

Accept routes that name smaller branches or collecting vessels without giving them a specific name. Responses should distinguish blood staying in vessels from materials crossing vessel walls.