Built in Segments

How a repeated body plan helped annelids thrive

ZOO.4.5 "Describe the evolutionary importance of the segmented body plans of annelids."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two features of annelid segments, circle the movement or survival benefit linked to each, and give each feature-benefit pair the same number.

A Body That Moves in Parts

1. After rain, an earthworm pushes into damp soil, leaving a narrow tunnel. Its body is not one continuous working unit. It is built from repeated segments, many separated internally by thin walls called septa. Fluid in these compartments presses outward against the body wall, forming a hydrostatic skeleton. When circular muscles contract in some segments, those segments lengthen; when lengthwise muscles contract, segments shorten and thicken. Tiny bristles grip the soil while neighboring segments change shape. Because different regions can move at different times, the worm can crawl and burrow through tight spaces without bending its entire body at once.

2. Repeated units can also limit the effect of some injuries. If a predator damages a few rear segments, internal walls can help keep pressure in other compartments, so undamaged segments may still move. This does not make an earthworm invincible: a deep injury or damage to vital organs can kill it. Segments also offer parts that evolution can modify for different jobs. In many bristle worms, paired fleshy extensions called parapodia grow from numerous segments. Their bristles help the worm crawl or swim, and in some species the extensions also help exchange gases with the water.

3. These differences matter over evolutionary time because inherited variations that improve survival or reproduction can become more common across generations. A burrowing lineage may benefit from segments that anchor and push in sequence, while a swimming lineage may benefit from segments bearing paddling extensions. The repeated layout gives natural selection multiple regions whose structures and movements can change somewhat independently. A change in one region need not change every other region in the same way. Segmentation did not guarantee success, and annelids are not the ancestors of every segmented animal. Still, their body plan helped annelids exploit different habitats, from muddy soil to coastal water.

2 ANSWER WITH EVIDENCE

Use the passage

1. How does moving different segments at different times help an earthworm burrow?

2. How might internal walls between segments help an earthworm after a predator damages a few rear segments? What is one limit to this benefit?

3. Why could parapodia on repeated segments be useful to a bristle worm living in water?

4. Why could a segmented body plan help annelid lineages succeed in both soil and coastal water?

3 YOUR TURN

Your own words

Imagine an annelid that lives in rock cracks where waves tug at its body. Propose a segment-level feature not named in the passage that could help it stay in a crack. In 3 to 4 sentences, explain how it would work and why it could become common over generations.

ANSWER KEY

Built in Segments

PART 1 · READ AND MARK

Underline two features of annelid segments, circle the movement or survival benefit linked to each, and give each feature-benefit pair the same number. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How does moving different segments at different times help an earthworm burrow?	**Some segments grip the soil while others lengthen or shorten, allowing the worm to push through a narrow space without bending its whole body at once.**
2	How might internal walls between segments help an earthworm after a predator damages a few rear segments? What is one limit to this benefit?	**The walls can help preserve pressure in undamaged compartments so those segments may still move. A deep injury or damage to vital organs can still kill the worm.**
3	Why could parapodia on repeated segments be useful to a bristle worm living in water?	**Parapodia can help it crawl or swim, and in some species they also help exchange gases with the water.**
4	Why could a segmented body plan help annelid lineages succeed in both soil and coastal water?	**Different segments can move or develop structures for different jobs. This allows burrowing lineages to anchor and push through soil, while swimming lineages can use paddling extensions in water.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Several middle segments could develop small sticky pads on their undersides. When a wave pulls, those segments could press the pads against the rock while other segments reach deeper into the crack. Worms with stronger pads might be washed away less often and leave more offspring. Over many generations, the inherited pad feature could become more common in the population.

Accept other plausible segment-level features if the response explains how they help the worm stay sheltered and connects inherited variation to greater reproductive success over generations. Do not require students to claim that an individual worm develops a new trait because it needs one.