Beyond the Water

How tetrapod evolution opened new ways of life

ZOO.8.8 "Explain the importance of tetrapod evolution."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline three inherited changes, circle a challenge or opportunity linked to each, and give each pair matching numbers to show why the change mattered.

A New Way to Move

1 About 370 million years ago, shallow waterways held fish with sturdy, fleshy fins. Over many generations, some lineages evolved limbs with digits, a defining feature of tetrapods. Fossils show that early tetrapods still spent much of their time in water. Their limbs could help them move through plant-filled shallows and push against the bottom. This transition did not turn a single fish into a land animal overnight. It was a branching change across populations, and many fish lineages continued to thrive. Why did the new body plan matter? It offered more ways to move through shallow habitats.

2 Moving onto land brought both opportunities and problems. Air provided access to oxygen, and land offered food such as insects and other small invertebrates. But a body supported by water must resist gravity on land. Stronger limb bones and joints helped later tetrapods bear weight, while a flexible neck helped them turn the head without turning the entire body. Air breathing also became important away from water, although some fish ancestors already had lungs. These changes let tetrapod descendants use shoreline habitats and eventually live farther inland. Early tetrapods, however, generally remained tied to water, especially for reproduction.

3 The importance of this evolution extends beyond one new habitat. As tetrapod descendants spread into different environments, natural selection favored different ways of moving, feeding, and surviving. Much later, some lineages evolved eggs that could develop away from open water. This change helped reptiles and their relatives expand into drier places. Birds and mammals also arose from tetrapod branches. Today, frogs, lizards, eagles, and people are all tetrapods, even though their limbs do different jobs. The shift toward limbs, followed by further changes, opened ecological roles on land while leaving water as a habitat for other lineages.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why were limbs with digits useful even though early tetrapods still spent much of their time in water?

2. Why did stronger limb bones and joints matter as later tetrapods moved onto land?

3. How did air breathing and available food make shoreline habitats an opportunity for tetrapod descendants?

4. Why did eggs that could develop away from open water help some tetrapod lineages expand?

3 YOUR TURN

Your own words

A museum label says, “When fish grew legs, they left water and became today’s land animals.” Rewrite it as a four-sentence label explaining why tetrapod evolution mattered. Correct the misleading timeline, connect a body change to a new opportunity, and explain how later changes contributed to the variety of tetrapods today.

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PART 1 · READ AND MARK

Underline three inherited changes, circle a challenge or opportunity linked to each, and give each pair matching numbers to show why the change mattered. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why were limbs with digits useful even though early tetrapods still spent much of their time in water?	**Limbs helped early tetrapods push against the bottom and move through plant-filled shallows.**
2	Why did stronger limb bones and joints matter as later tetrapods moved onto land?	**They helped bear body weight against gravity when water no longer supported the body.**
3	How did air breathing and available food make shoreline habitats an opportunity for tetrapod descendants?	**Air breathing helped them obtain oxygen away from water, while insects and other small invertebrates provided food on land.**
4	Why did eggs that could develop away from open water help some tetrapod lineages expand?	**Those lineages no longer needed open water for their eggs to develop, so they could reproduce in drier places.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Tetrapod evolution took place over many generations, and early tetrapods still spent much of their time in water. Limbs with digits helped them move through shallow habitats before their descendants lived farther inland. Stronger limbs later helped support bodies on land, opening new places to find food. Further changes, including eggs that could develop away from open water, helped tetrapod lineages spread and diversify into animals such as lizards, birds, and mammals.

Accept explanations that link an inherited change to the challenge it addressed or the opportunity it opened. For the museum label, look for a gradual transition, an aquatic stage, and a connection between later changes and diversification.