Life Between Tides

Compare living and nonliving factors in a rocky pool.

FB.6.1 "Compare and contrast biotic and abiotic factors."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline three biotic factors, circle three abiotic factors, and number two sentences that show a biotic factor interacting with an abiotic factor.

A Pool Left by the Tide

1 At low tide, a rocky pool becomes a tiny, crowded habitat. Green algae cling to its floor, mussels fasten to its sides, and small crabs hide in cracks. Sunlight warms the shallow water while the open sky allows some water to evaporate. As water leaves, salt remains, so the pool can become saltier before the next high tide. Scientists distinguish living parts of a habitat, called biotic factors, from nonliving physical and chemical parts, called abiotic factors. Both kinds can affect survival, even though only living things grow and reproduce.

2 On a sunny afternoon, algae use light to make sugars. They need enough light, but very warm water can stress them. Mussels also face changing conditions: they keep their shells closed when the pool is exposed, reducing water loss. A crab may eat a mussel small enough to pry open, while mussels crowd one another for attachment space. Compare those pressures. A crab and a mussel can interact through feeding, but a shift in water temperature can affect both without being alive. In the same pool, more than one factor can influence an organism at once.

3 When the tide returns, incoming seawater mixes into the pool and may dilute its unusually salty water. Waves can also dislodge algae from bare rock. If algae cover more of the pool, they may shade the surfaces beneath them, changing how much light reaches other organisms. This shade begins with living algae, while the light itself is nonliving. A crab tucked beneath algae can escape direct sun, yet it still needs food. To explain the pool, scientists ask not only which factors are living or nonliving, but also how those factors act together.

2 ANSWER WITH EVIDENCE

Use the passage

1. How can a crab and water temperature each affect a mussel? How do these factors differ?

2. How are algae and sunlight connected in the pool? Explain why one is biotic and the other is abiotic.

3. Mussel crowding and rising salt concentration can both change conditions in the pool. How does each arise, and which kind of factor causes it?

4. How can algae and the returning tide each change conditions for other organisms? How do they differ as factors?

3 YOUR TURN

Your own words

Imagine a school garden after a week of rain. In 3 to 4 sentences, compare one biotic factor and one abiotic factor that could affect a young plant, and explain how the two factors could interact.

Life Between Tides

PART 1 · READ AND MARK

Underline three biotic factors, circle three abiotic factors, and number two sentences that show a biotic factor interacting with an abiotic factor. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How can a crab and water temperature each affect a mussel? How do these factors differ?	**A crab may eat a mussel, while a change in water temperature can affect it. The crab is biotic because it is alive; water temperature is abiotic.**
2	How are algae and sunlight connected in the pool? Explain why one is biotic and the other is abiotic.	**Algae use sunlight to make sugars. Algae are living and biotic, while sunlight is nonliving and abiotic.**
3	Mussel crowding and rising salt concentration can both change conditions in the pool. How does each arise, and which kind of factor causes it?	**Living mussels crowd one another for space, so crowding comes from a biotic factor. Salt concentration rises when water evaporates, an abiotic process.**
4	How can algae and the returning tide each change conditions for other organisms? How do they differ as factors?	**Living algae can shade surfaces and reduce the light reaching other organisms. The returning tide brings in water that may dilute the pool's salt; this movement of water is abiotic.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

An earthworm is a biotic factor because it is alive, and its tunnels can help a young plant's roots get air. Rainwater is an abiotic factor because it is nonliving, and too much of it can fill soil spaces around roots. The earthworm's tunnels can let some rainwater drain away, so these two factors can affect the plant together.

Accept other accurate examples of living and nonliving factors. For Part 3, look for a plausible interaction between the two factors, not just two separate effects on the plant.